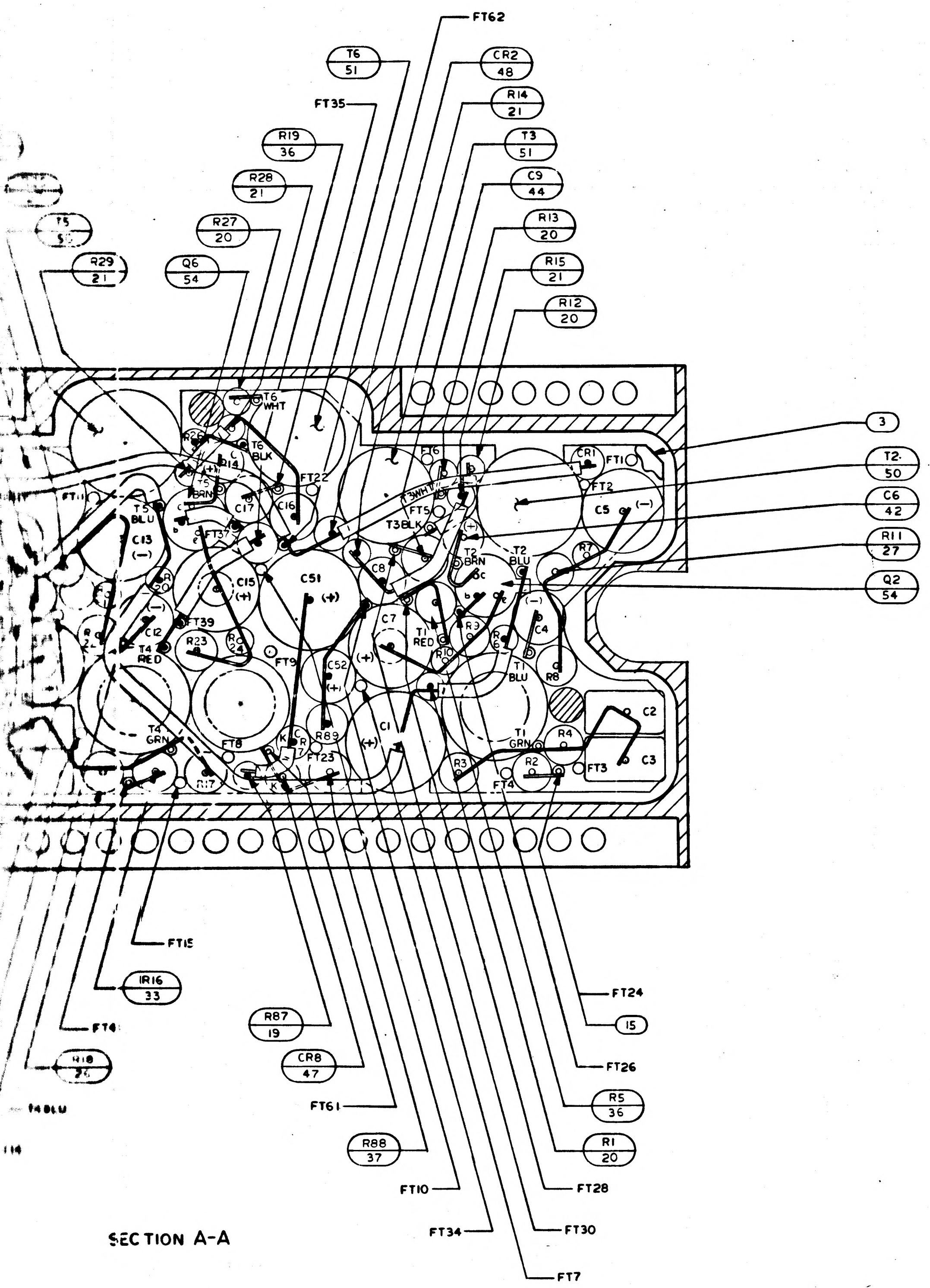
REVISIONS 27408						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28564	EM	LSB	5 MAY 66	



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T6 51
CR2 48
FT35
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R19 36
T3 51
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R13 20
T5
Q6 54
R15 21
R29 21
R12 20
3
T2 50
C6 42
R11 27
Q2 54
FT15
IR16 33
FT4
R87 19
R18
CR8 47
T4 BLU
FT61
FT24
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FT26
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R1 20
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FT10
FT28
FT34
FT30
FT7
T6 WHT
T6 BLK
FT22
C16
C17
FT37
C13
C15
C51
FT39
C12
T4 RED
R23
FT9
C52
C7
T1 RED
C8
T2 BRN
T2 BLU
C4
T1 BLU
R8
CR1
FT1
FT2
C5
R7
C2
C3
FT3
R4
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C1
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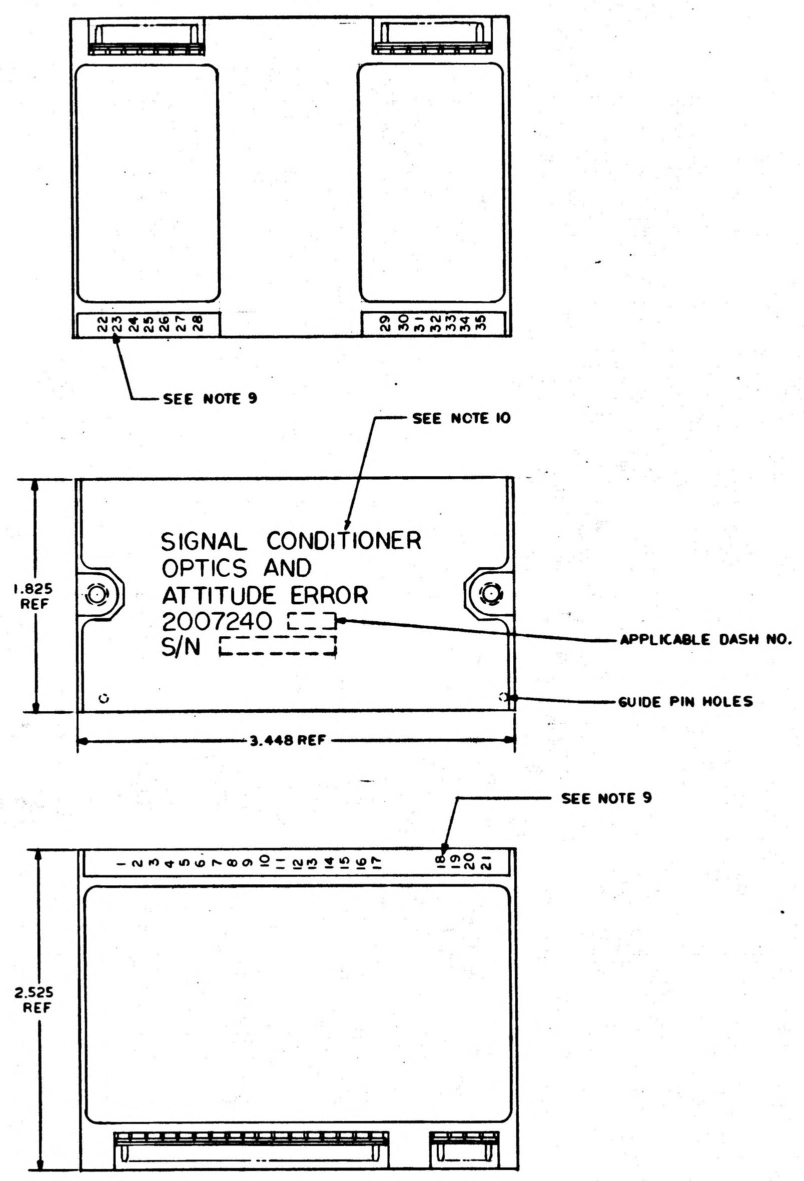
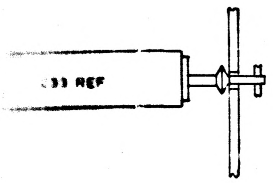
FT8
T4 GRN
R17
R3

SECTION A-A



22 23 24 25 26 27 28
29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
APPLICABLE DASH NO.
GUIDE PIN HOLES
1.825 REF
3.448 REF
SEE NOTE 9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
2.525 REF

MARKING VIEWS
SCALE 2/1



QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
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2	1010311-198		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
8	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-134		CAPACITOR	43
6	1006755-69		CAPACITOR	42
2	1006755-40		CAPACITOR	41
12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364 SEE NOTE 26		RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-318		RESISTOR	34
12	1010364-653		RESISTOR	33
1	1010364-403		RESISTOR	32
1	10103[illegible]-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010364-131		RESISTOR	28
2	1010311-306		RESISTOR	27
6	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
6	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008163-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006782-9		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR.WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD B	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1
-011	LIST OF MATERIALS			

2007240 A

NEXT ASSY	USED ON
2007235	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Scarcerigo 7 Mar 66
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

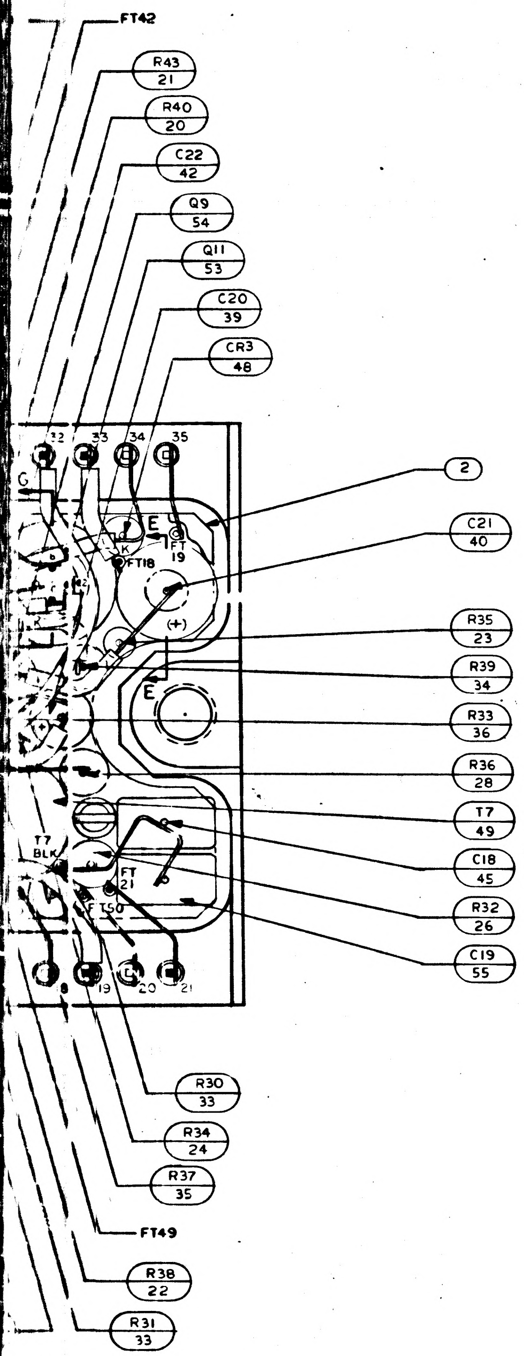
OPTICS AND ATTITUDE ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 1 OF 2

2007240 A

MASTER

F3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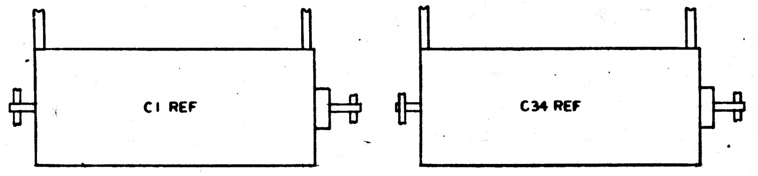
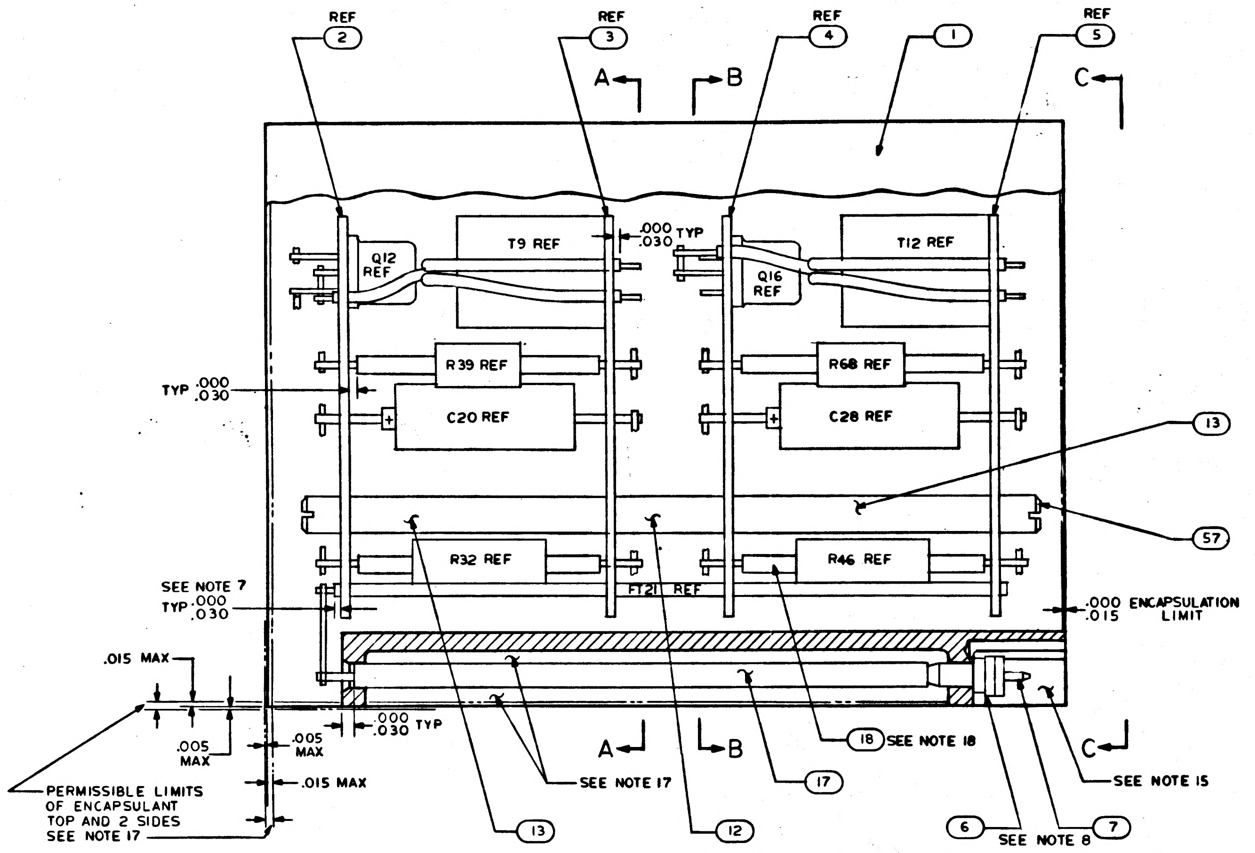
R40 20
C22 42
Q9 54
Q11 53
C20 39
CR3 48
32 33 34 35
2
C21 40
E
FT18
FT 19
(+)
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55
T7 BLK
FT 21
T50
19 20 21
R30 33
R34 24
R37 35
FT49
R38 22
R31 33


C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51&C53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REF 3
REF 4
1
REF 5
A
B
C
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T9 REF
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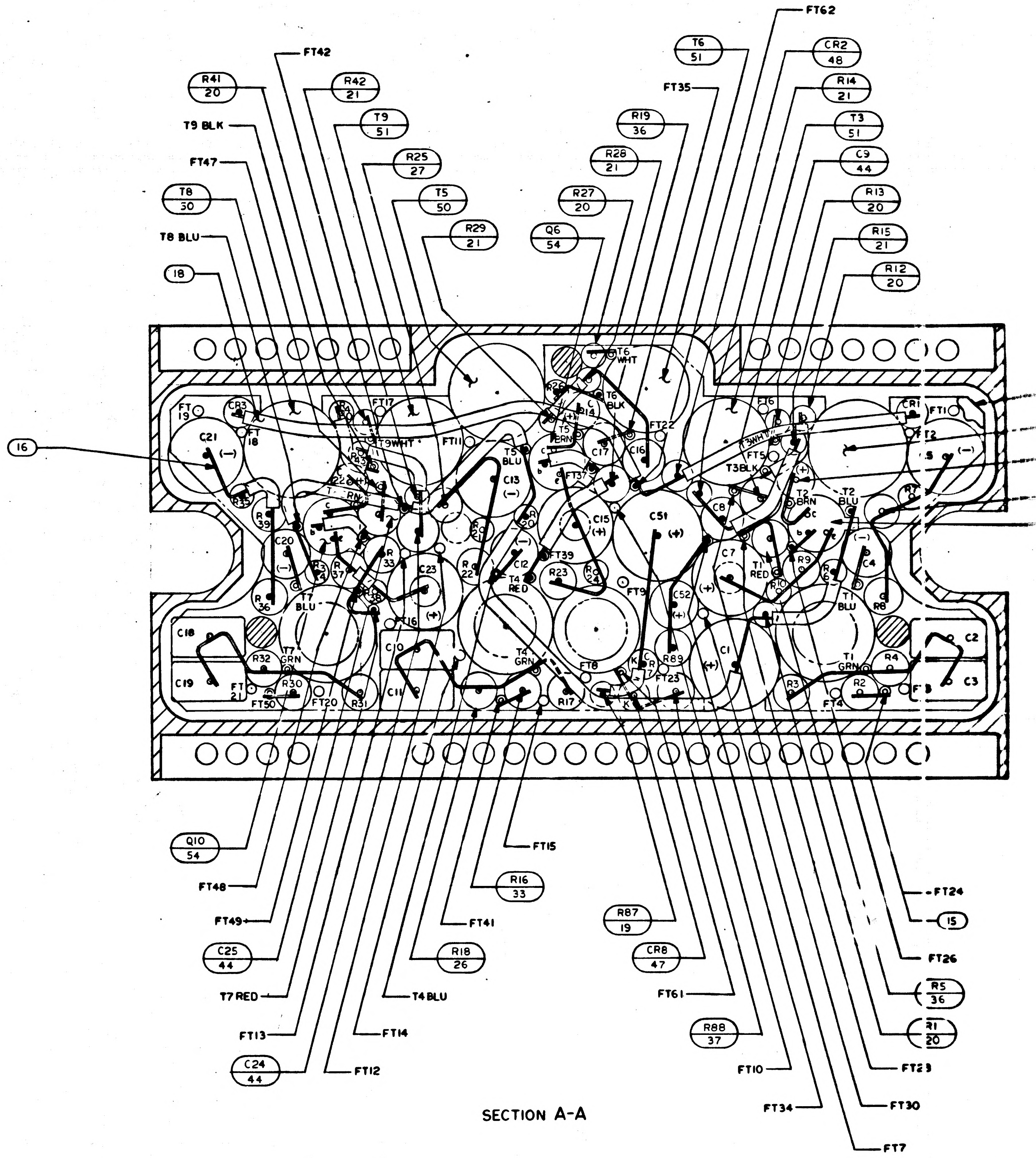
Q16 REF
T12 REF
TYP .000 .030
R39 REF
R68 REF
C20 REF
C28 REF
13
57
R32 REF
R46 REF
FT21 REF
SEE NOTE 7
TYP .000 .030
.000 ENCAPSULATION .015 LIMIT
.015 MAX
.005 MAX
.005 MAX
.000 .030 TYP
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
SEE NOTE 17
13
12
17
18 SEE NOTE 18
6
SEE NOTE 8
7
SEE NOTE 15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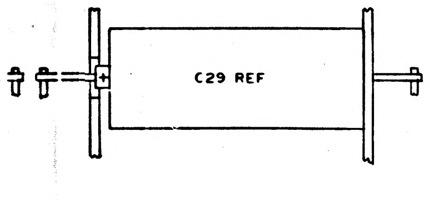
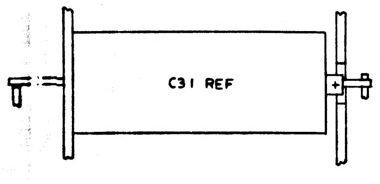
FT42
R41 20
R42 21
FT35
R14 21
T9 BLK
T9 51
R19 36
T3 51
FT47
R25 27
R28 21
C9 44
T8 30
T5 50
R27 20
R13 20
T8 BLU
R29 21
Q6 54
R15 21
18
R12 20
16
C21 (-)
FT 19
CR3
FT 18
C51 (+)
C52
C15 (+)
C13 (-)
T5 BLU
T6 WHT
T6 BLK
T3BLK
T2 BRN
T2 BLU
T1 RED
T1 BLU
T1 GRN
T4 RED
T4 GRN
T7 BLU
T7 GRN
C18
C19
C2
C3
C1
C4
C7
C8
CR1
FT1
FT2
FT9
FT11
FT17
FT22
FT39
FT16
FT8
FT20
FT50
Q10 54
FT48
FT15
FT49
R16 33
FT41
FT24
R87 19
15
C25 44
R18 26
CR8 47
FT26
T7 RED
T4 BLU
FT61
R5 36
FT13
FT14
R88 37
R1 20
C24 44
FT12
FT10
FT23
FT34
FT30
FT7

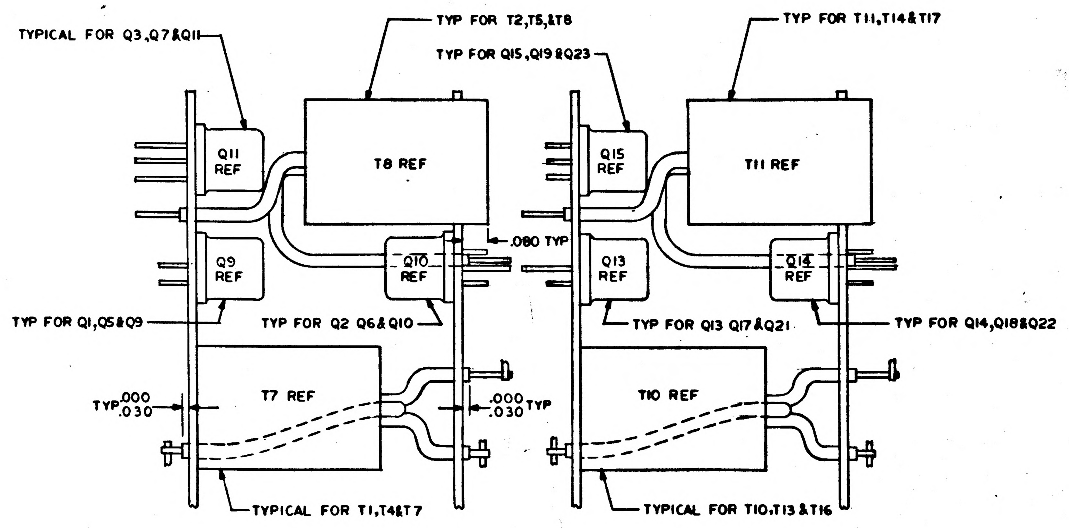
SECTION A-A



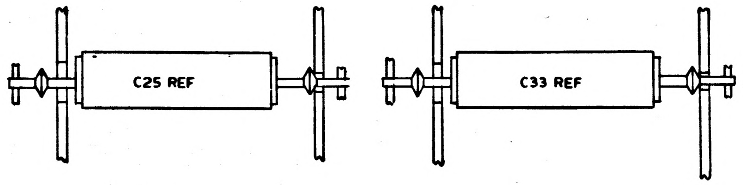
ECTION E-E
.C21,C 9,C38 AND C46



CTION F-F
.C23,C 1,C40 AND C48

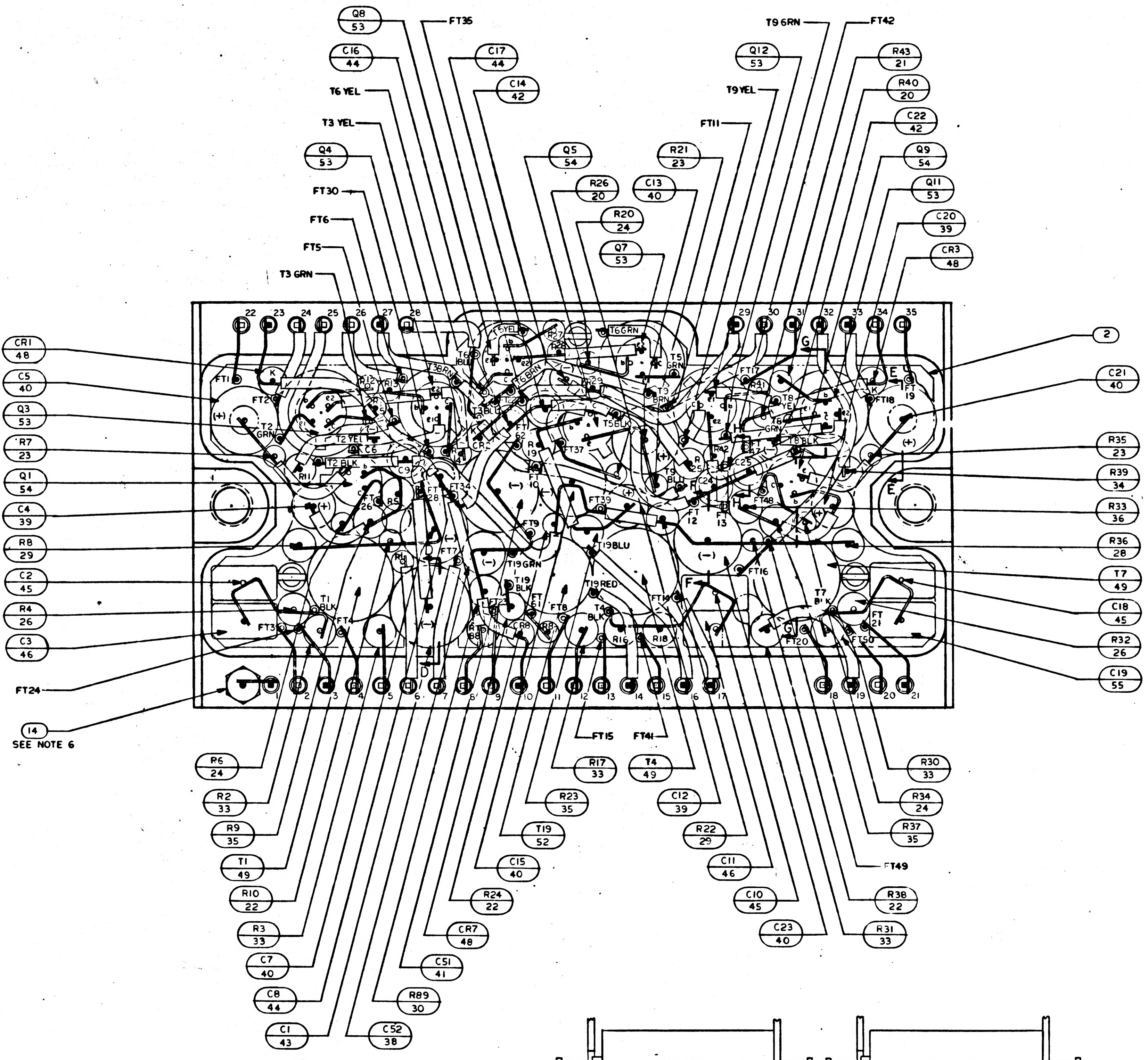

TYPICAL FOR Q3,Q7&Q11
TYP FOR T2,T5,&T8
TYP FOR Q15,Q19&Q23
TYP FOR T11,T14&T17
Q11 REF
T8 REF
Q15 REF
T11 REF
Q9 REF
Q10 REF
.080 TYP
Q13 REF
Q14 REF
TYP FOR Q1,Q5&Q9
TYP FOR Q2 Q6&Q10
TYP FOR Q13 Q17&Q21
TYP FOR Q14,Q18&Q22
T7 REF
T10 REF
TYP .000 .030
.000 .030 TYP
TYPICAL FOR T1,T4&T7
TYPICAL FOR T10,T13&T16

PARTIAL SECTION G-G


C25 REF
C33 REF

PARTIAL SECTION H-H
TYPICAL FOR C8 C9-C16 C17 C24 C25 C32
C33 C41 C42 C49 AND C50

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


Q8 53
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
FT30
FT6
FT5
T3 GRN
Q5 54
R26 20
R20 24
Q7 53
C13 40
R21 23
FT11
T9 YEL
T9 GRN
Q12 53
FT42
R43 21
R40 20
C22 42
Q9 54
Q11 53
C20 39
CR3 48
CR1 48
C5 40
Q3 53
R7 23
Q1 54
C4 39
R8 29
C2 45
R4 26
C3 46
FT24
14
SEE NOTE 6
2
C21 40
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55
R6 24
R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
C52 38
R89 30
C51 41
CR7 48
R24 22
C15 40
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R23 35
R17 33
FT15
FT41
T4 49
C12 39
R22 29
C11 46
C10 45
C23 40
R30 33
R34 24
R37 35
FT49
R38 22
R31 33

R88	
PART NO.	VALUE
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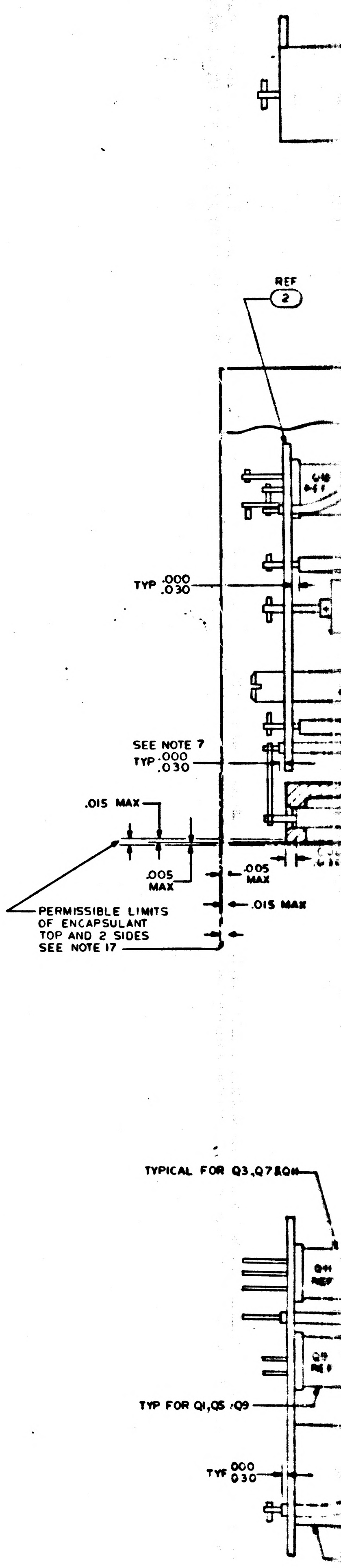
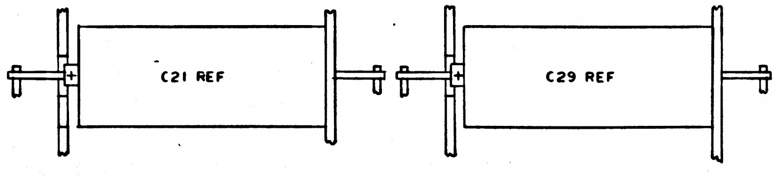
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

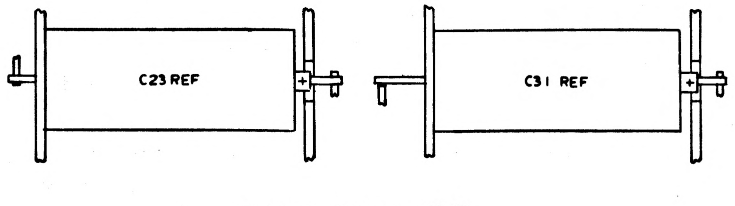

REF 2
TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
.005 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3,Q7&Q11
TYP FOR Q1,Q5,Q9
TYP .000 .030

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO. 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37,47,48 AND 56
19. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO. 2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. PIN BLADES AND INSULATORS TO BE FREE OF PAINT
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.

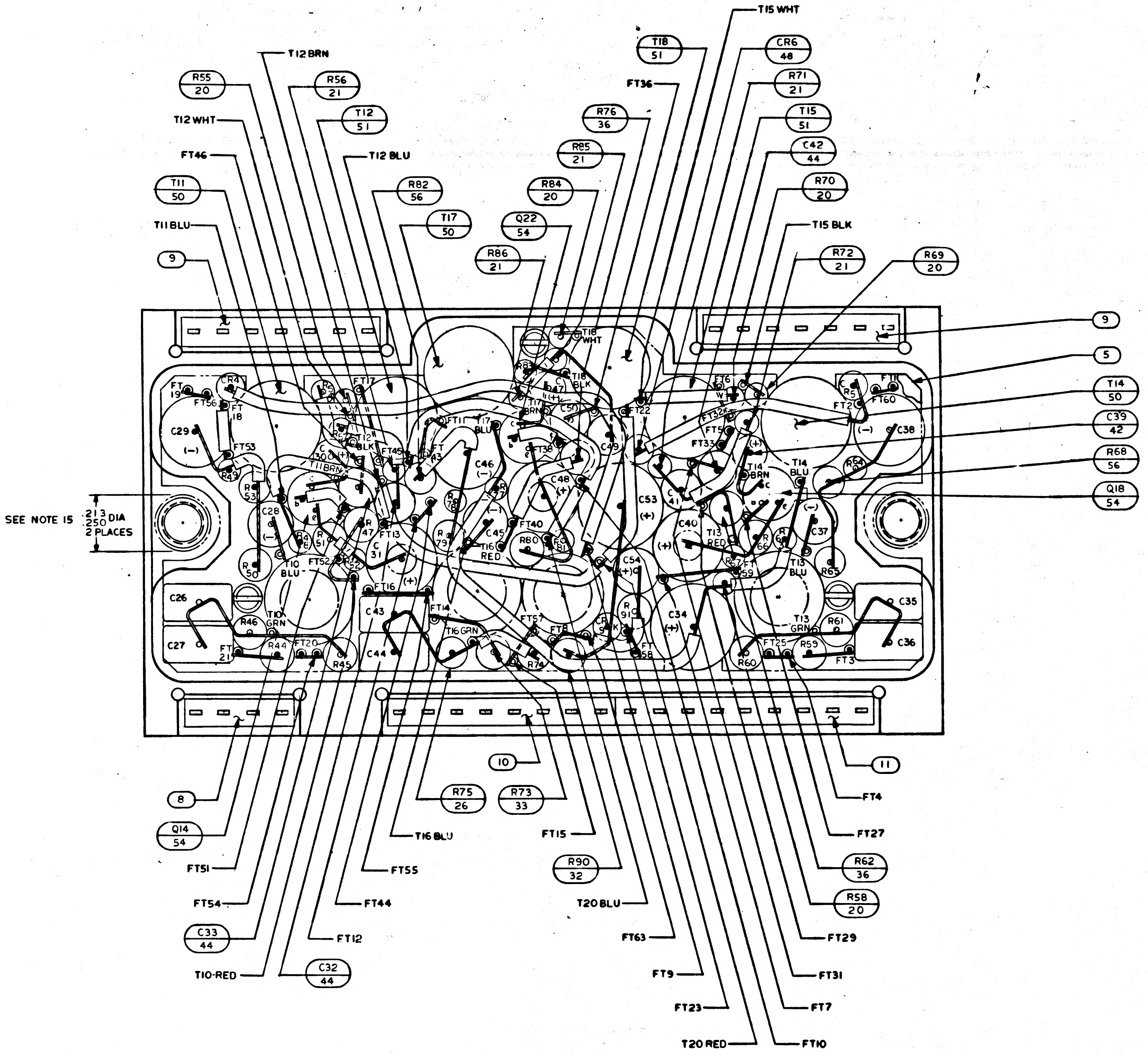

C21 REF
C29 REF

PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28564	5 MAY 66	EMS



T15 WHT
T18 51
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FT36
R71 21
T12 BRN
R55 20
R56 21
T15 51
R76 36
T12 51
T12 WHT
C42 44
R85 21
FT46
T12 BLU
R70 20
R84 20
R82 56
T11 50
T17 50
T15 BLK
Q22 54
T11 BLU
R86 21
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
10
8
R75 26
R73 33
11
FT4
Q14 54
T16 BLU
FT15
FT27
FT51
FT55
R90 32
R62 36
FT54
FT44
T20 BLU
R58 20
C33 44
FT12
FT63
FT29
T10-RED
C32 44
FT9
FT31
FT23
FT7
T20 RED
FT10

VIEW C-C

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Sonarrigo 9/7/66
CHECKED [illegible]
APPROVED [illegible] 17 Mar 66
APPROVED [illegible]
APPROVED MIT [illegible] A/C METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

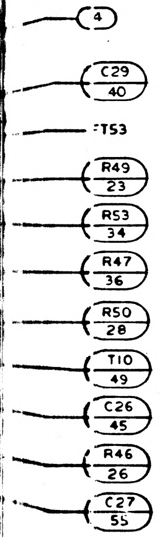
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 2 OF 2

MASTER

2007240 A

2007240 A

F3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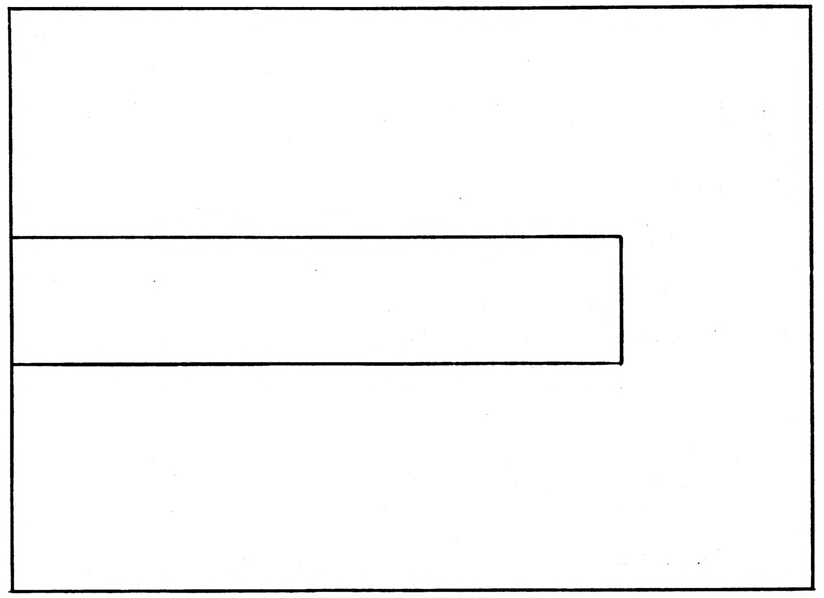
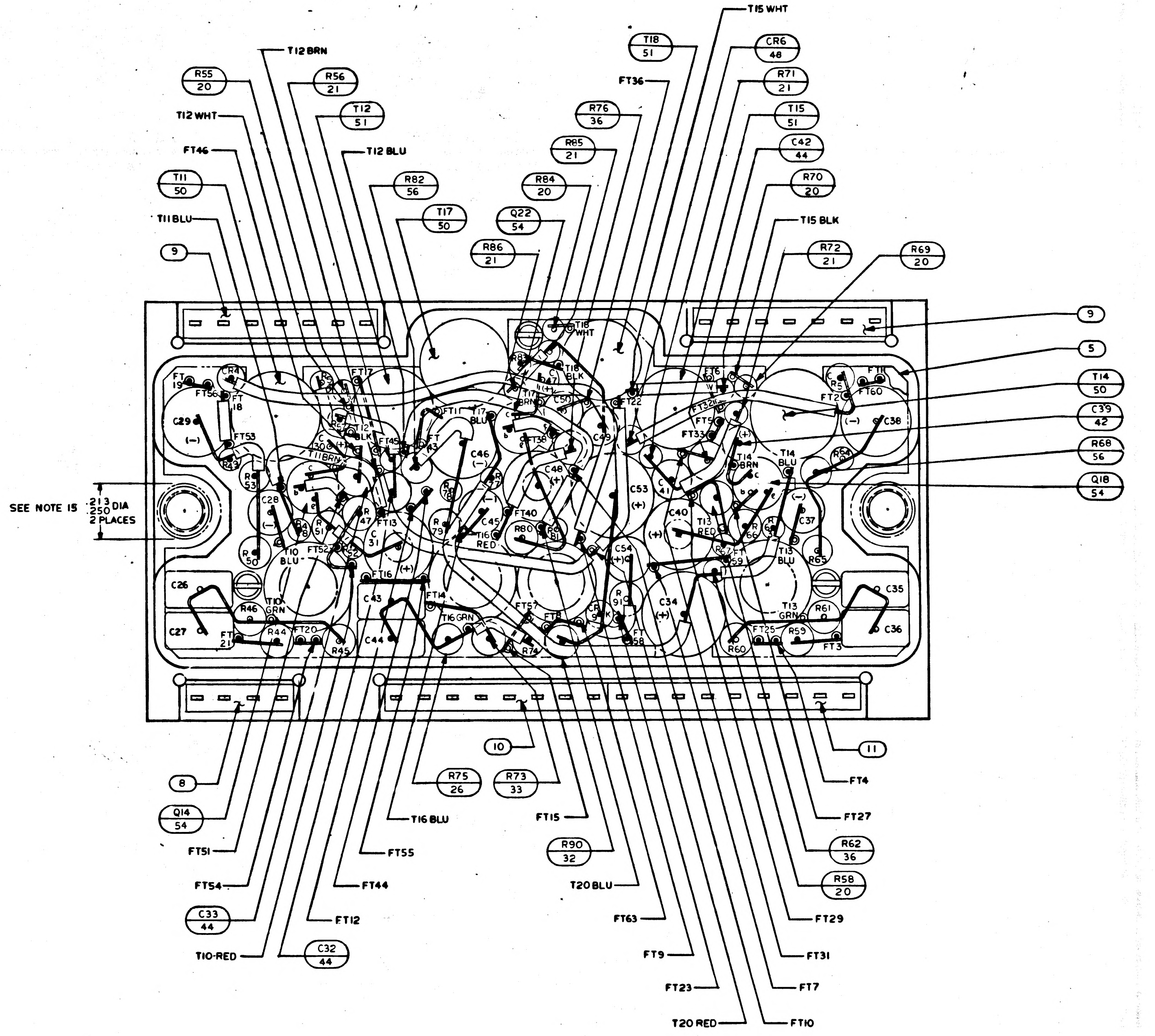
C26 45
R46 26
C27 55

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R76 36
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FT46
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C42 44
T11 50
R82 56
R84 20
R70 20
T11 BLU
T17 50
Q22 54
T15 BLK
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R86 21
R72 21
R69 20
9
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T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213
.250 DIA
2 PLACES
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11
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Q14 54
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R73 33
FT4
T16 BLU
FT15
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FT51
FT55
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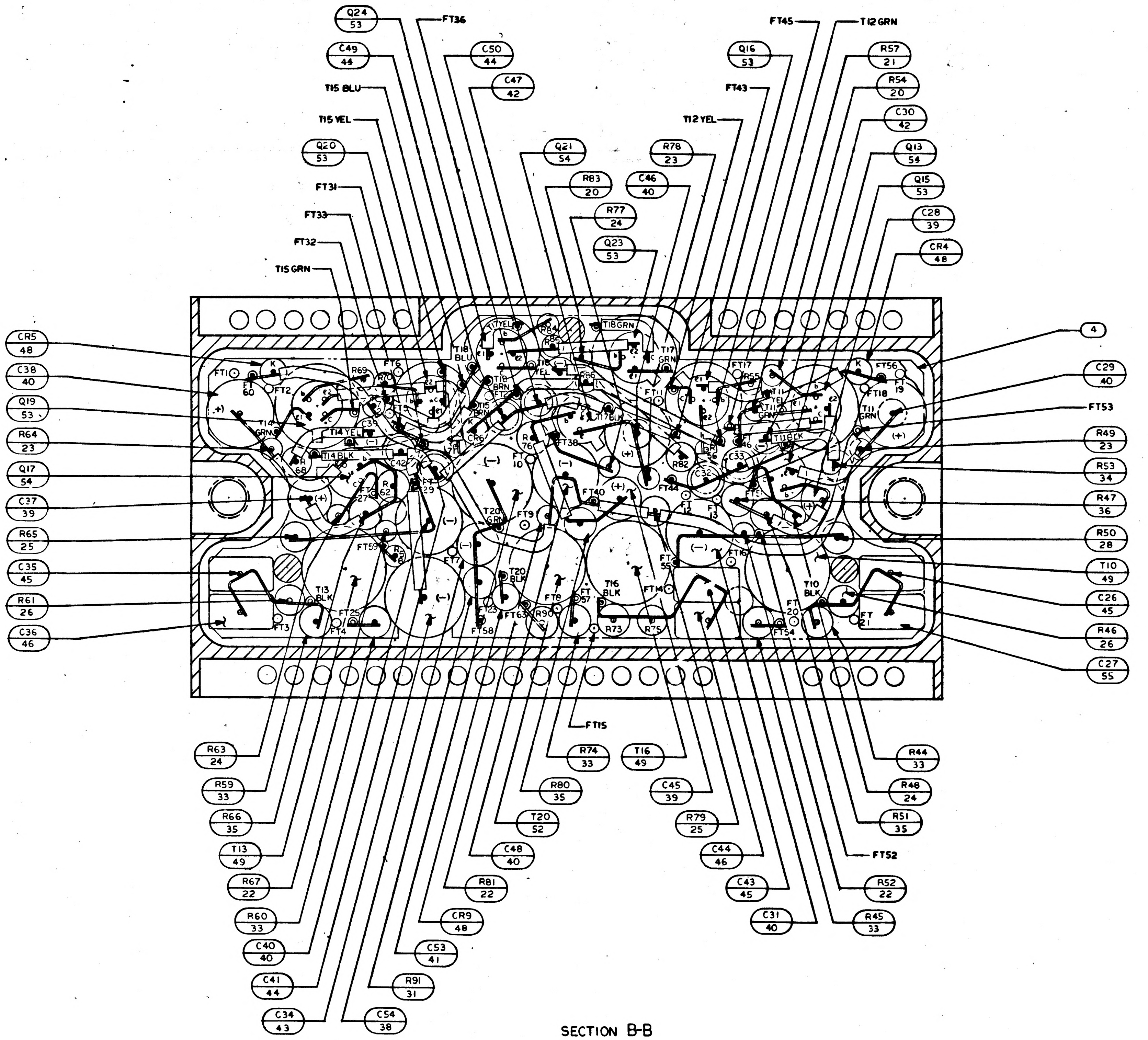
FT54
FT44
T20 BLU
R58 20
C33 44
FT12
FT63
FT29
C32 44
T10-RED
FT9
FT31
FT23
FT7
T20 RED
FT10

VIEW C-C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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FT36
C49 44
C50 44
C47 42
T15 BLU
T15 YEL
Q20 53
FT31
FT33
FT32
T15 GRN
Q21 54
R83 20
R77 24
Q23 53
R78 23
C46 40
FT45
T12 GRN
Q16 53
FT43
T12 YEL
R57 21
R54 20
C30 42
Q13 54
Q15 53
C28 39
CR4 48
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
C35 45
R61 26
C36 46
4
C29 40
FT53
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 26
C27 55
T17 YEL
T18 GRN
T18 BLU
T17 GRN
R84
R85
T14 YEL
T14 BLK
T13 BLK
T16 BLK
T10 BLK
T20 GRN
T20 BLK
T11 GRN
T16 YEL
T17 BLU
T11 BLK
(+)
(–)
FT15
R63 24
R59 33
R66 35
T13 49
R67 22
R60 33
C40 40
C41 44
C34 43
C54 38
R91 31
C53 41
CR9 48
R81 22
C48 40
T20 52
R80 35
R74 33
T16 49
C45 39
R79 25
C44 46
C43 45
C31 40
R44 33
R48 24
R51 35
FT52
R52 22
R45 33

SECTION B-B

2007240 A

APOLLO G&N Specification
PS2007240 REV A
Original Issue Date: 7 June 1966
Release Authority: TDRR 29461
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

SIGNAL CONDITIONER, OPTICS AND ATTITUDE ERROR ASSEMBLY

DRAWING NO. 2007240

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/22/66	A	31227	3-6, 9, 11, 12	MGM EA	--

This specification consists of page 1 to 12 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	R M Kowalski 20 May 66 MIT/IL	G H Krier ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 9.0±3.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 45 ma.

3.1.3 Offset Voltages. The offset voltages of assembly sections a, b, e, and f shall be ≤10 mvdc. The offset voltages of assembly sections c and d shall be ≤50 mvdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Sections a and b. The input voltages of assembly sections a and b shall be 5.00±0.50V rms with a phase angle of 0° ±2° when the respective output voltages are 2.500±0.005 vdc.

3.1.4.2 Assembly Sections c and d. The input voltages of assembly sections c and d shall be 0.50±0.05V rms with a phase angle of 0° ±2° when the assembly section outputs are +2.500±0.005 vdc.

3.1.4.3 Assembly Sections e and f. The input voltages of assembly sections e and f shall be 6.10±0.50V rms with a phase angle of 0° ±2° when the respective output voltage is 2.500±0.005 vdc.

3.1.4.4 Assembly Section g. The output voltage across pins 10 (Hi) and 8 (Lo) shall be -2.500±0.025 vdc when the 800 cps reference input voltage is 28.00±0.28V rms.

3.1.4.5 Assembly Section h. The output voltage of assembly section h shall be 4.50±0.20 vdc when the reference input voltage is 28.00±0.28V rms.

3.1.5 Gain Stability. The scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than ±1 percent when the +28 vdc supply is enhanced to +33 vdc or degraded to +23 vdc.

3.1.6 Scale Factor Linearity. The individual scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than 4 percent from the average of 6 scale factors for each assembly section.

3.1.7 Output Impedance. The output impedance of assembly sections a, b, c, d, e, f, and h shall be <5k ohms. The output impedance of assembly section g shall be <500 ohms.

4.3.2 Workmanship-Vibration. The assembly shall be vibrated with the input test voltage, and output loads and voltages connected and monitored as shown in Figure 1. The assembly shall be mounted in the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the axis shown in Figure 2. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibration shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. Previbration output levels shall be set within the range of 2.50±0.10 vdc for assembly sections a, b, c, d, e, f and g. A 4.5±0.2 vdc voltage shall be present at the output pins of assembly section h. During vibration the output voltages shall not deviate by more than ±10 percent of the previbration levels for a period exceeding 1 msec. Any deviation exceeding these requirements shall be cause for rejection of the assembly. After vibration, the assembly shall be examined as specified in 4.3.1.

4.3.3 Selection of Resistor R88. Verification by examination of parts selection data shall be performed to ensure that the requirement of 3.2.2 has been met.

4.3.4 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be $\geq$100 megohms.

4.3.5 Continuity and DC Resistance. The dc resistance between the pins listed in Table I shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.6 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.3.3 has been met.

4.3.7 DC Current Drain. With all of the input pins specified in Table II connected together and the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 9.0±3.0 ma.

4.3.8 Reference Input Current. With all input pins specified in Table II connected together and the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 45 ma.

4.3.9 Offset Voltages. With the input pins of assembly sections a, b, c, d, e, and f specified in Table II connected together and the operating voltages applied, the voltage at each pair of output pins for sections a, b, e, and f shall be $<$10 mv dc and for sections c and d shall be $\leq$50 mv dc.

4.3.10 Scale Factor

4.3.10.1 Assembly Sections a, and b. With an output of 2.500±0.005 vdc, plus the measured offset voltage, the input signal shall be between 4.50 and 5.50V rms with a phase angle of 0° ±2°.

4.3.13 Output Impedance. With the operating voltages applied and the input voltage to assembly sections a, b, c, d, e, and f adjusted for an output of 2.500±0.025 vdc for the respective assembly section, and then a 100k ohm ±1 percent resistor substituted for the 1-megohm load resistor, the respective assembly section output shall not decrease more than 120 mv. With the output of assembly section g set to -2.500±0.025 vdc across the 1 megohm load resistor of assembly section g, and then 50k ohm ±1 percent resistor substituted as the load, the output shall not decrease more than 25 mv. The output voltage of assembly section h shall not decrease more than 220 mv when a 100k ohm ±1 percent load is connected across its output pins.

4.3.14 Diode Function. With the outputs of assembly sections e and f adjusted to +2.50±0.10 vdc, momentarily connecting pin 24 to pin 30 shall not decrease the output voltage levels. With the output of assembly sections e and f adjusted to -2.50±0.10 vdc, momentarily connecting pin 24 to 30 shall reduce the respective output voltages below -1.0 vdc.

4.3.15 Output Ripple and Noise. With the output of assembly sections a, b, c, d, e, and f adjusted to +2.50±0.05 vdc, the ripple and noise voltage at the respective output pins shall be <10 mv pp. The ripple and noise voltage at the output of assembly sections g and h shall be less than 1.0 mv pp and 10 mv pp respectively.

4.3.16 Overvoltage Test. With 10.0±0.1V rms 0 and π phase applied to the input pins of assembly sections a and b, the respective output voltages shall not exceed the range of 0±4 vdc. With 1.0±0.1V rms 0 and π phase applied to the input pins of assembly sections c and d, the respective output voltages shall not exceed the range of 0±4 vdc.

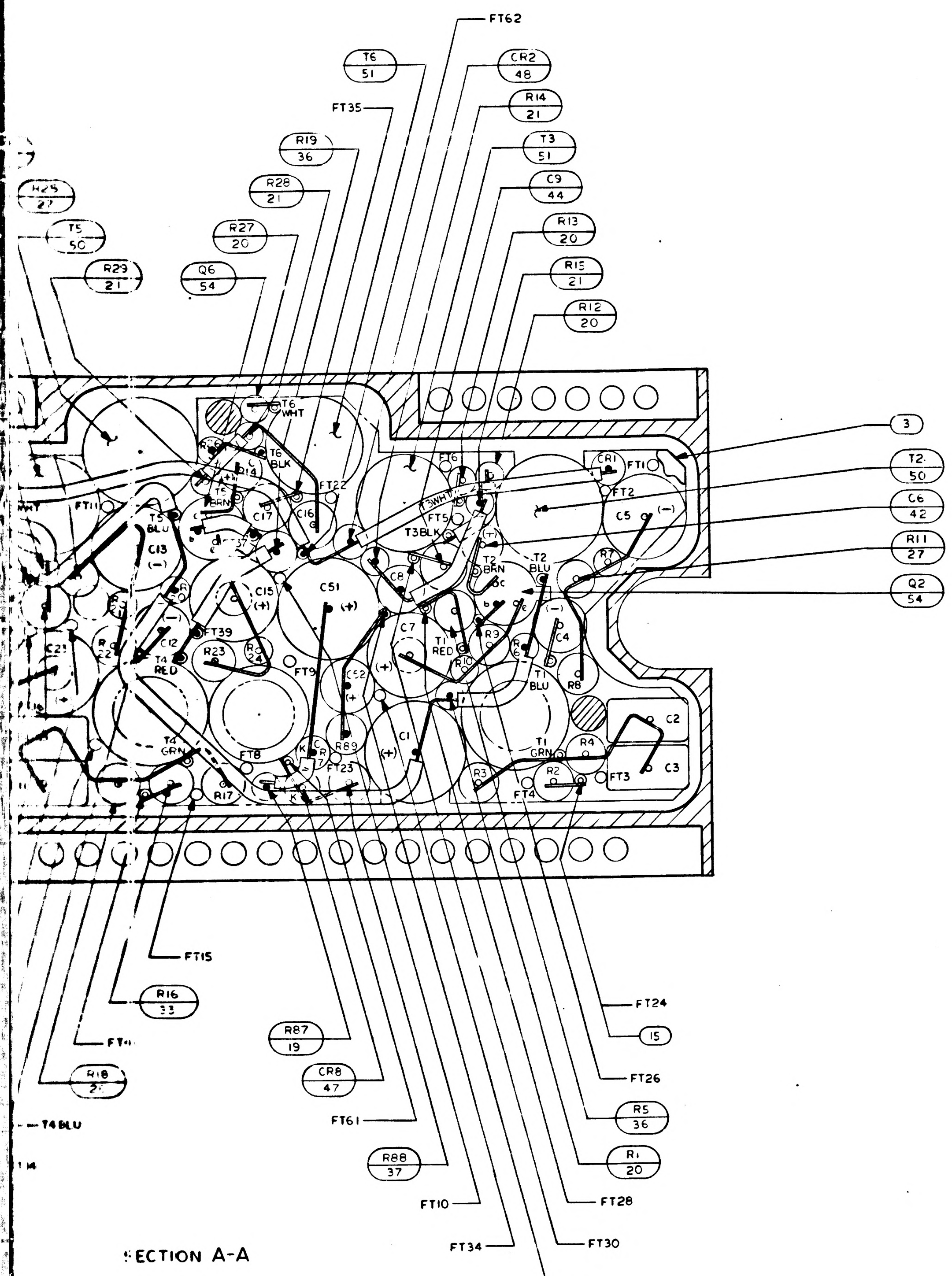
5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

GWK:lv

REVISIONS 2-408							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 28564	EM	LSB	5 MAY 66		
B		REVISED PER TDRR 29918	B.	JRC	13 JUL 66		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T6 51
CR2 48
R14 21
FT35
T3 51
R19 36
C9 44
R28 21
R13 20
R27 20
R15 21
T5 50
Q6 54
R29 21
R12 20
R25 27
3
T2 50
C6 42
R11 27
Q2 54
T6 WHT
T6 BLK
FT22
FT6
CR1
FT1
FT2
C5
C13
C17
C16
T5 BLU
T3 BLK
T2 BRN
T2 BLU
R7
C15
C51
C8
FT39
R23
T4 RED
C7
T1 RED
R3
C4
FT9
C52
T1 BLU
R6
T4 GRN
FT8
R89
C1
T1 GRN
R4
C2
C3
FT23
R2
R3
FT4
FT3
R17
FT15
R16 33
FT24
15
R87 19
FT26
R18 2
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T4 BLU
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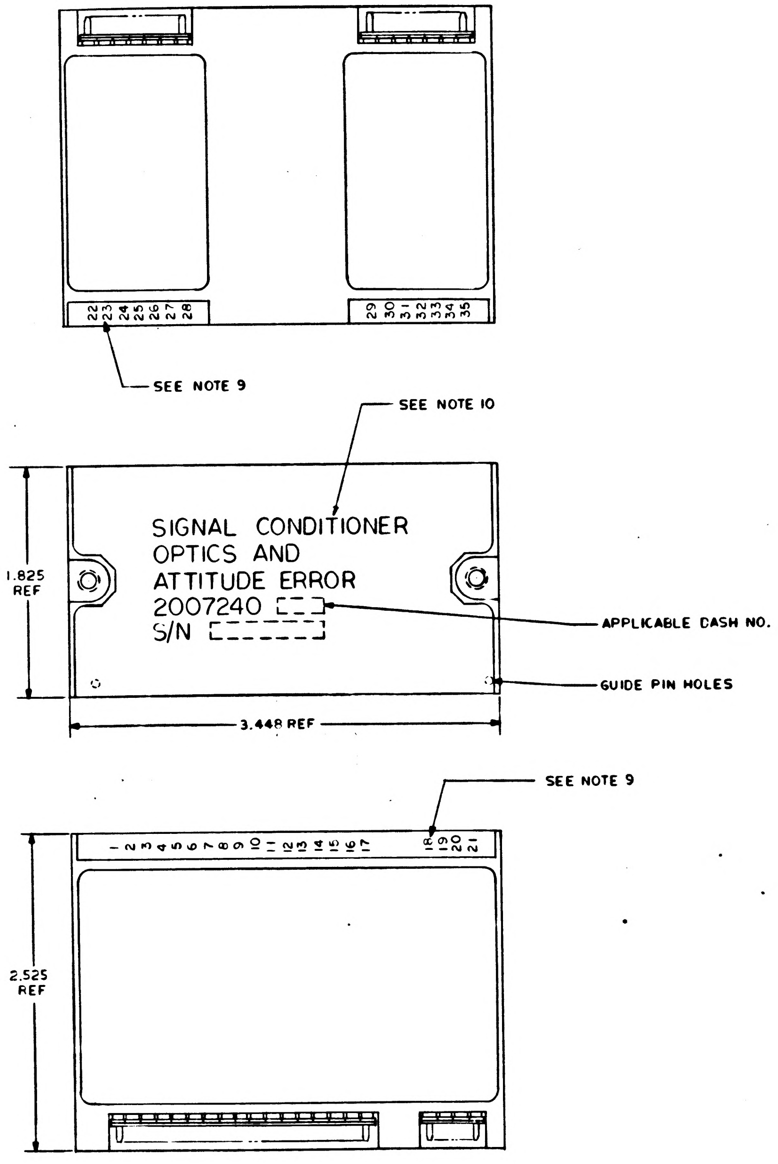
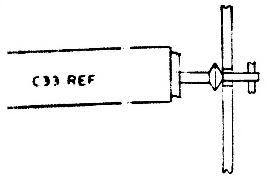
FT10
FT28
FT34
FT30
FT7
SECTION A-A


22 23 24 25 26 27 28
29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
1.825 REF
APPLICABLE DASH NO.
GUIDE PIN HOLES
3.448 REF
SEE NOTE 9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21
2.525 REF

MARKING VIEWS
SCALE 2/1



QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010123		SCHEMATIC	REF
12	1008161-1		SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-198		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
8	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-134		CAPACITOR	43
6	1006755-69		CAPACITOR	42
2	1006755-40		CAPACITOR	41
12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364 SEE NOTE 26		RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-318		RESISTOR	34
12	1010364-653		RESISTOR	33
1	1010364-403		RESISTOR	32
1	1010364-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010364-131		RESISTOR	28
2	1010311-306		RESISTOR	27
6	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
6	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008163-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006762-9		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR.WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD B	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1

-011 LIST OF MATERIALS

2007240 B

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

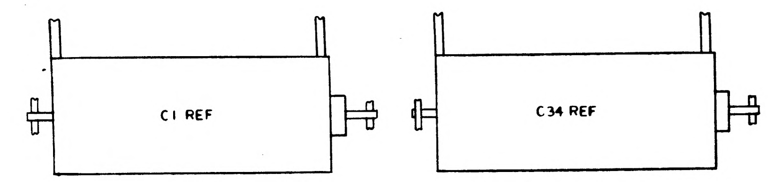
DRAWN Bocarrigo 7 Mar 66
CHECKED
APPROVED 18 MAR 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

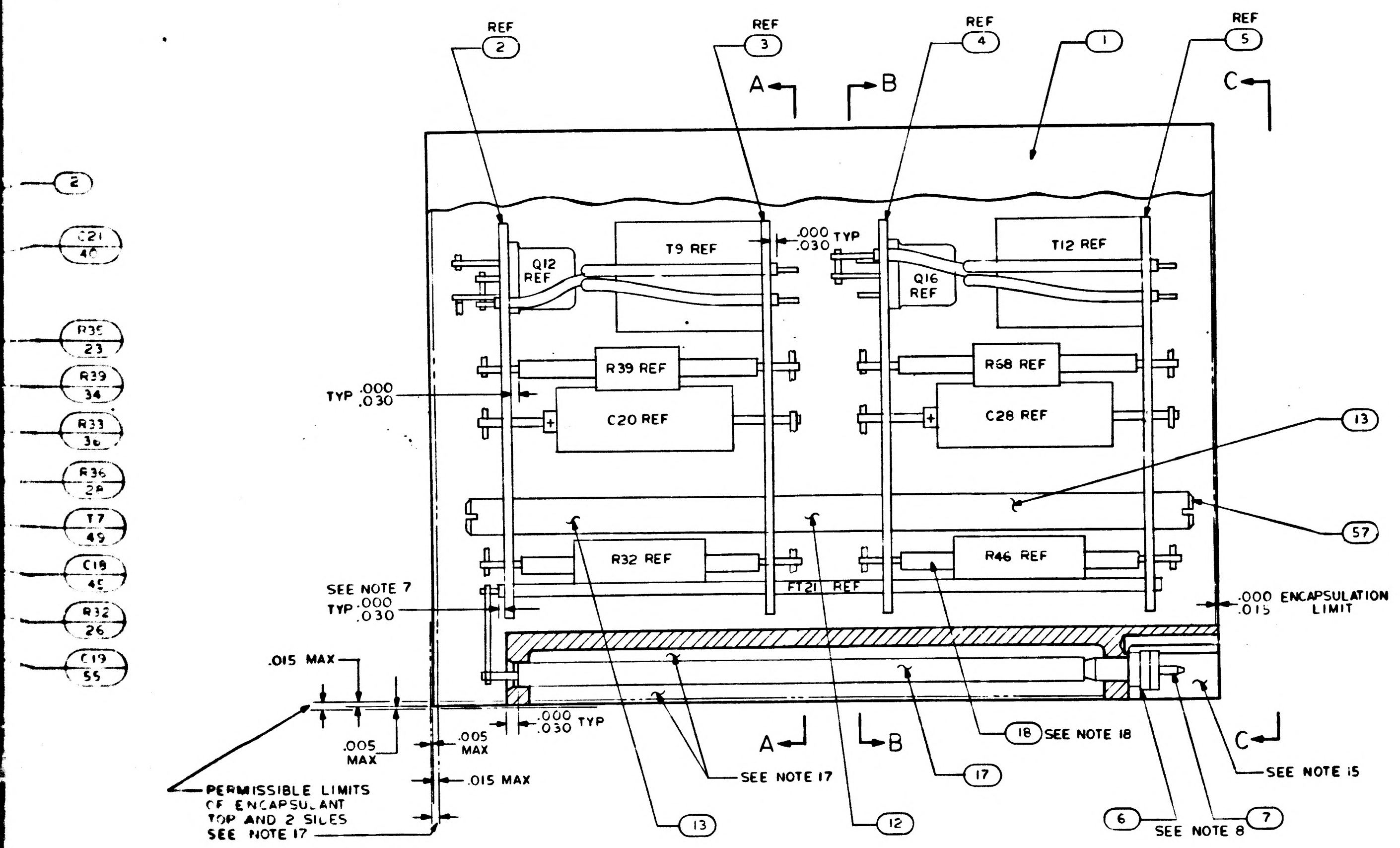
OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 1 OF 2

2007240


C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51 & C53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REF 5
1
A
B
C
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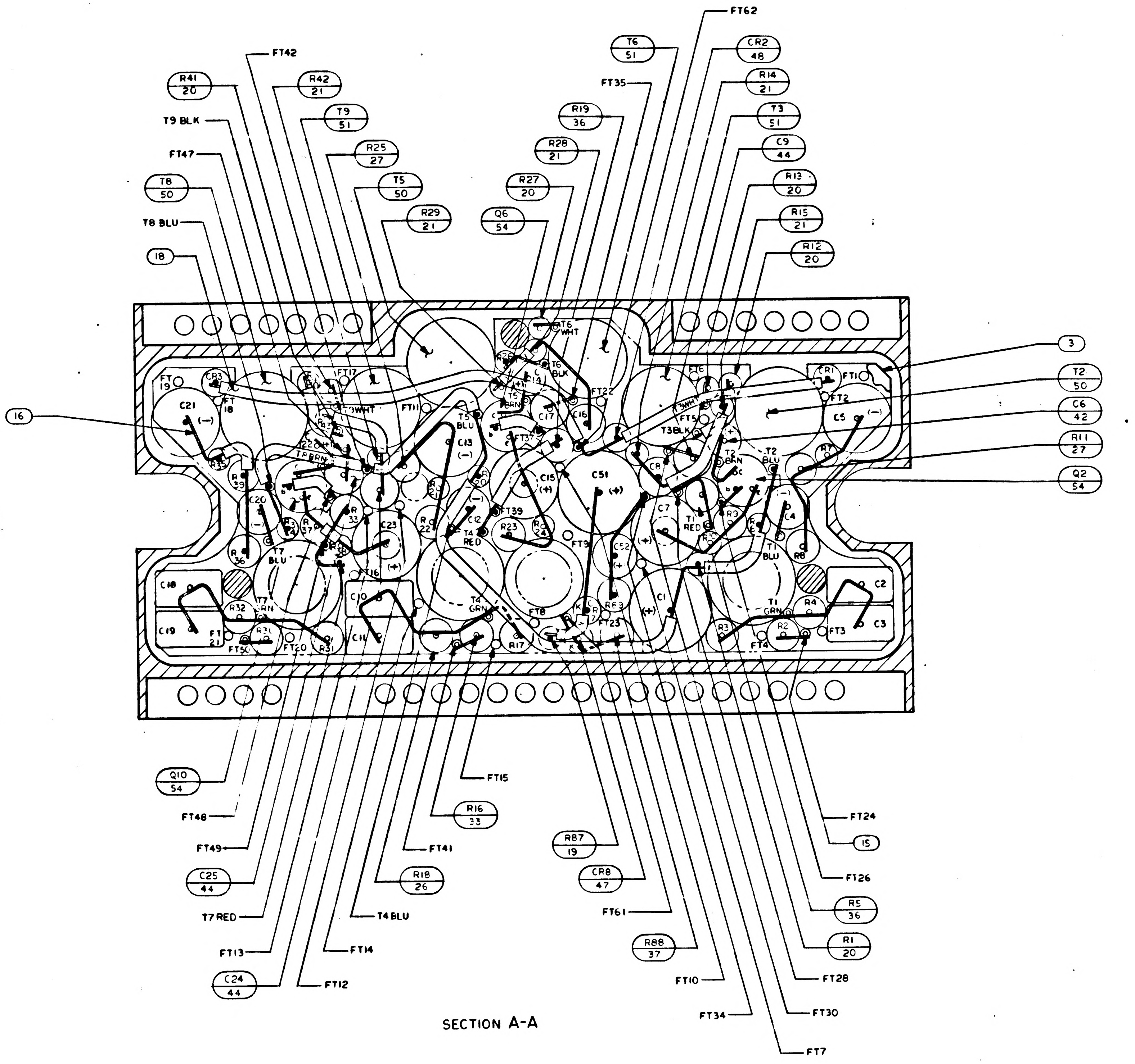
T9 REF
.000 .030 TYP
Q16 REF
T12 REF
R39 REF
R68 REF
TYP .000 .030
C20 REF
C28 REF
13
57
R32 REF
R46 REF
SEE NOTE 7
TYP .000 .030
FT21 REF
.000 ENCAPSULATION .015 LIMIT
.015 MAX
.005 MAX
.005 MAX
.015 MAX
.000 .030 TYP
SEE NOTE 17
18 SEE NOTE 18
17
SEE NOTE 15
6
SEE NOTE 8
7
13
12
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
2
C21 40
R35 23
R39 34
R33 36
R36 28
T7 45
C18 45
R32 26
C19 55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FT35
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R19 36
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R28 21
C9 44
FT47
R25 27
R27 20
R13 20
T8 50
T5 50
Q6 54
R15 21
T8 BLU
R29 21
R12 20
18
3
16
T2 50
C6 42
R11 27
Q2 54
C21
C13
C15
C51
C5
C18
C19
C10
C11
C20
C23
C12
C17
C16
C8
C7
C52
C1
C2
C3
CR1
T7 BLU
T4 RED
T4 GRN
T1 RED
T1 BLU
T1 GRN
T2 BRN
T2 BLU
T3 BLK
T5 BLU
T6 WHT
T6 BLK
(+)
(−)
Q10 54
FT15
R16 33
FT24
15
FT48
FT49
FT41
R87 19
C25 44
R18 26
CR8 47
FT126
R5 36
T7 RED
T4 BLU
FT61
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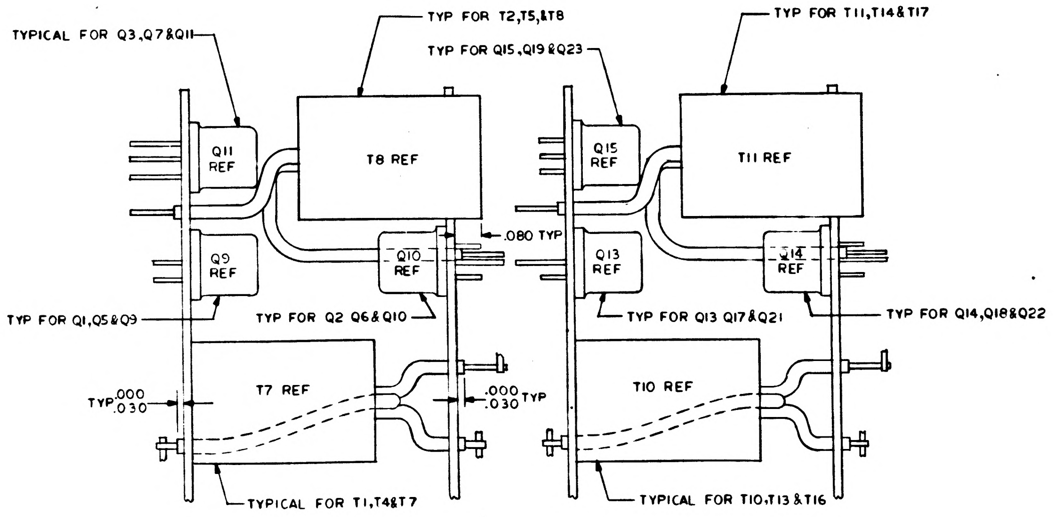
FT13
FT14
R88 37
FT28
C24 44
FT12
FT10
FT30
FT34
FT7

SECTION A-A


TYPICAL FOR Q3, Q7 & Q11
TYP FOR T2, T5, & T8
TYP FOR T11, T14 & T17
TYP FOR Q15, Q19 & Q23
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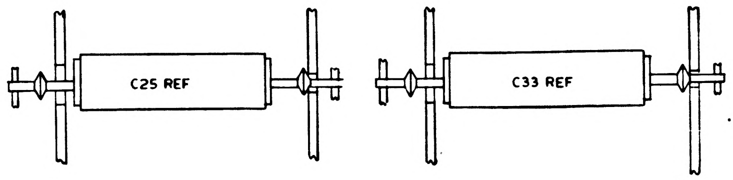
T8 REF
Q15 REF
T11 REF
.080 TYP
Q9 REF
Q10 REF
Q13 REF
Q14 REF
TYP FOR Q1, Q5 & Q9
TYP FOR Q2 Q6 & Q10
TYP FOR Q13 Q17 & Q21
TYP FOR Q14, Q18 & Q22
TYP .000 .030
T7 REF
.000 .030 TYP
T10 REF
TYPICAL FOR T1, T4 & T7
TYPICAL FOR T10, T13 & T16

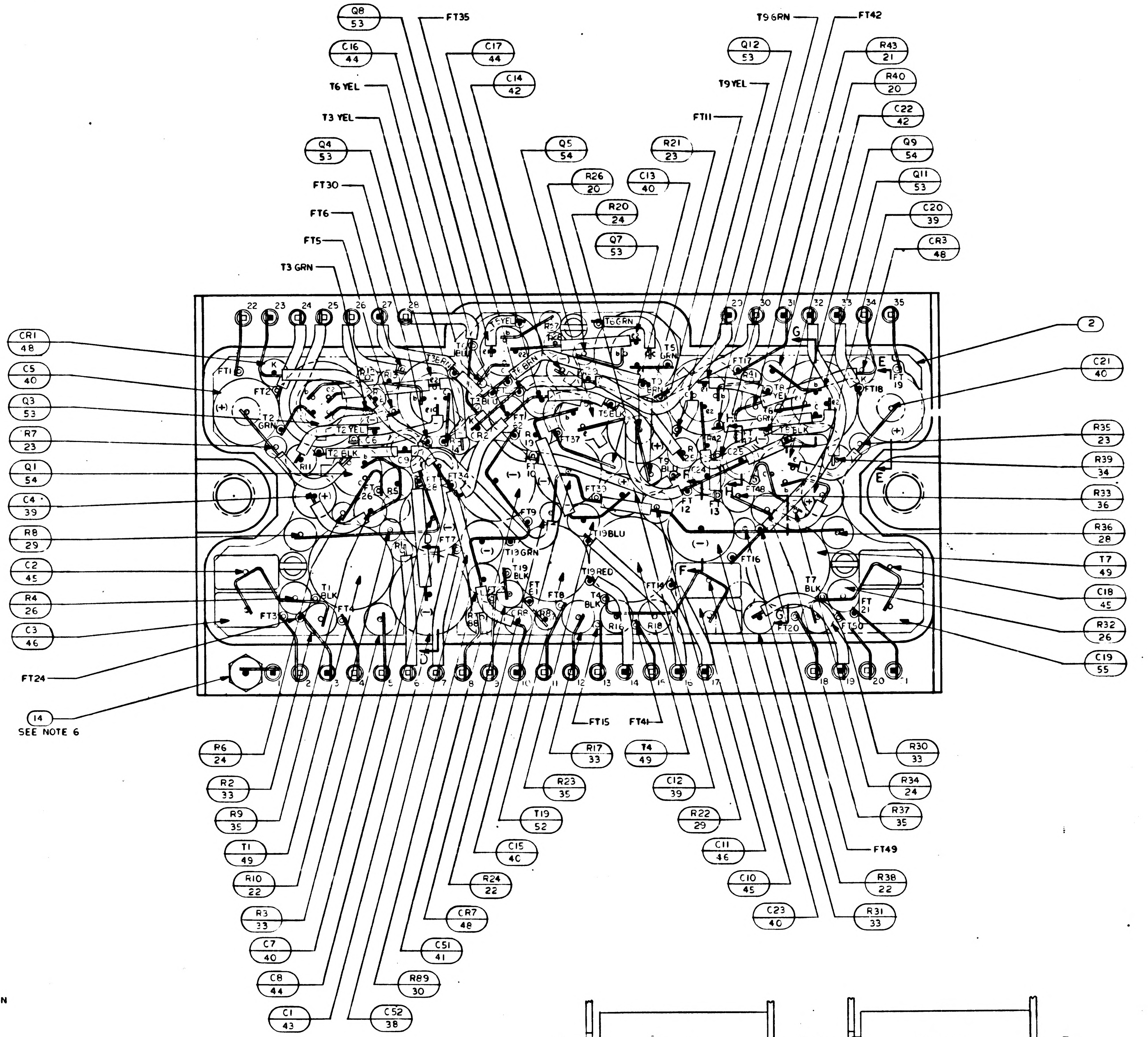
PARTIAL SECTION G-G


C25 REF
C33 REF

PARTIAL SECTION H-H
TYPICAL FOR C8 C9 C16 C17 C24 C25 C32 C33 C41 C42 C49 AND C50

2007240	REV LTR A	SH 1 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


Q8 53
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
FT30
FT6
FT5
T3 GRN
Q5 54
R26 20
R20 24
Q7 53
C13 40
R21 23
FT11
T9 YEL
T9 GRN
FT42
Q12 53
R43 21
R40 20
C22 42
Q9 54
Q11 53
C20 39
CR3 48
2
C21 40
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T7 49
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R32 26
C19 55
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C5 40
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R7 23
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C4 39
R8 29
C2 45
R4 26
C3 46
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R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
C52 38
R89 30
C51 41
CR7 48
R24 22
C15 40
T19 52
R23 35
R17 33
FT15
FT41
T4 49
C12 39
R22 29
C11 46
C10 45
C23 40
R31 33
R38 22
FT49
R37 35
R34 24
R30 33
22
23
24
25
26
27
28
29
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31
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34
35
1
2
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12
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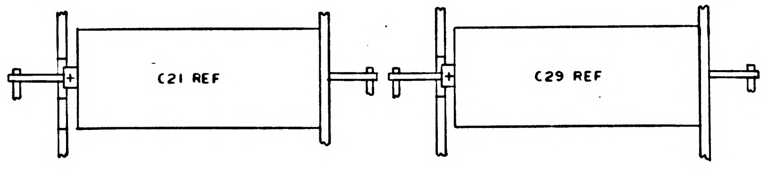
14
15
16
17
18
19
20
21
FT1
FT2
K
(+)
(−)
T2 GRN
T2 YEL
T2 BLK
FT3
FT4
T1 BLK
T5 YEL
T6 GRN
T5 GRN
T6 BLU
T19 GRN
T19 BLU
T19 BLK
T19 RED
T4 BLK
T7 BLK
FT18
FT19
FT48
FT16
FT20
G
E
F

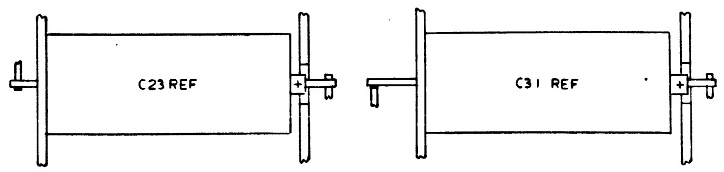
R88	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

NOTES:

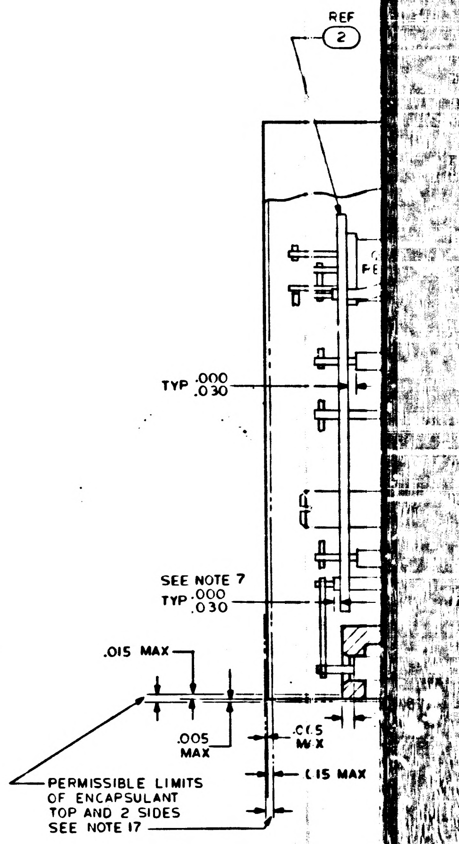
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37,47,48 AND 56
19. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO. 2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.


C21 REF
C29 REF

PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48


REF
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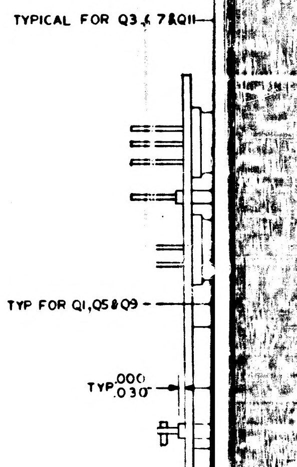
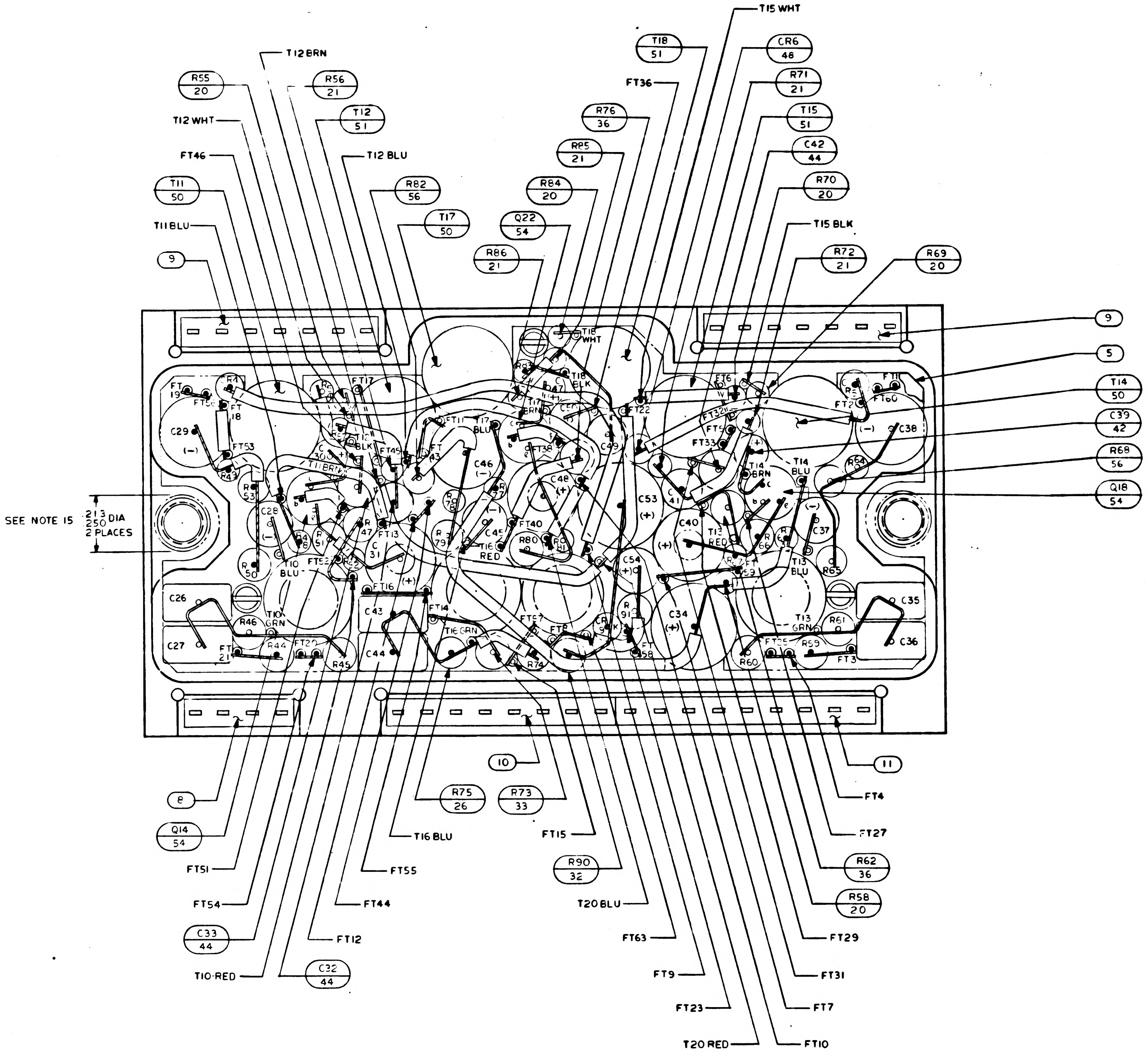
TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
.015 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17


TYPICAL FOR Q3,6,7&Q11
TYP FOR Q1,Q5&Q9
TYP .000 .030

2007240	REV LTR A	SH 1 OF 2

1/2007240

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28564	5 MAY 66	EM.S
B	REVISION STATUS CHANGED	13-JUL-66	B. JAC



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R56 21
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T12 WHT
FT46
T12 BLU
T11 50
R82 56
T11 BLU
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T18 51
FT36
R76 36
R85 21
R84 20
Q22 54
R86 21
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
C29
C28
C26
C27
R46
R44
R45
T10 BLU
C43
C44
C46
C48
C45
C53
C54
C34
C40
C37
C38
C35
C36
T16 RED
T16 GRN
T13 RED
T13 BLU
T13 GRN
T14 BRN
T14 BLU
R80
R74
R59
R60
R61
10
R75 26
R73 33
11
FT4
FT27
8
Q14 54
FT51
T16 BLU
FT55
FT15
R90 32
R62 36
R58 20
FT54
FT44
T20 BLU
C33 44
FT12
C32 44
FT63
FT29
T10 RED
FT9
FT31
FT23
FT7
T20 RED
FT10

VIEW C-C

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonanno 7/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

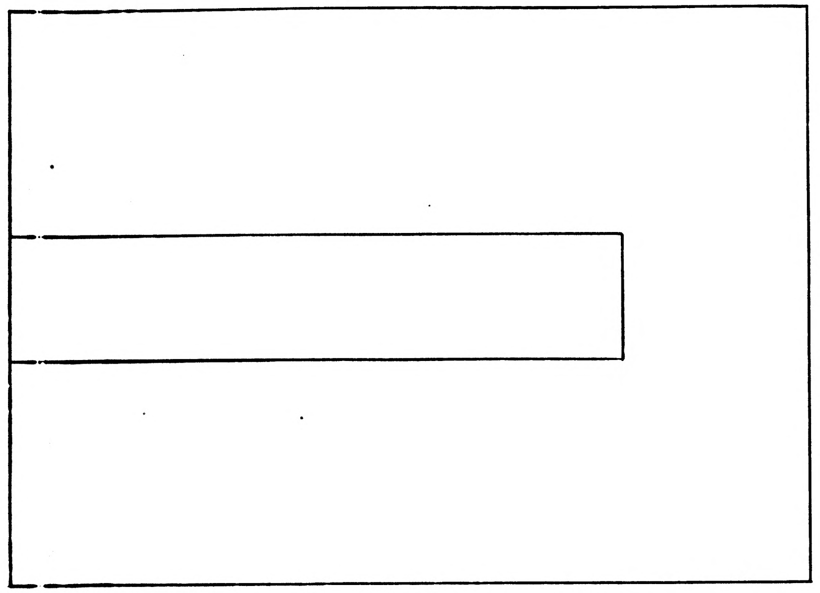
CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2007240

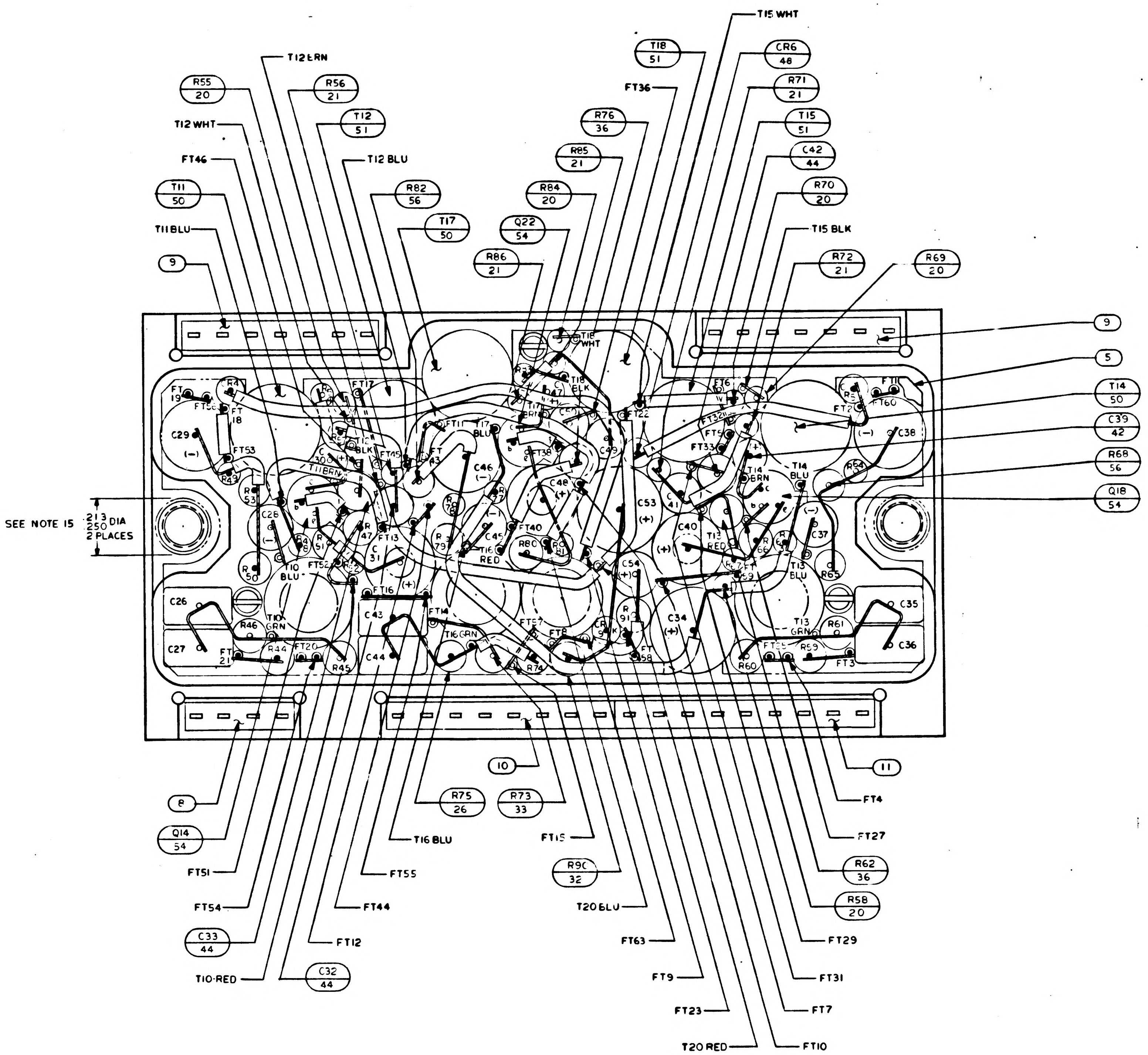
SCALE 5/1 | SHEET 2 OF 2

2007240 REV A

2007240 B

3/2007240




T12 BRN
R55 20
R56 21
T12 WHT
T12 51
FT46
T12 BLU
T11 50
R82 56
T11 BLU
T17 50
9
R86 21
Q22 54
R84 20
R85 21
R76 36
T18 51
FT36
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213
.250 DIA
2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10 RED
C32 44
FT12
FT44
FT55
T16 BLU
R75 26
R73 33
10
FT15
R90 32
T20 BLU
FT63
FT9
FT23
T20 RED
FT10
FT7
FT31
FT29
R58 20
R62 36
FT27
FT4
11

VIEW C-C

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY	USED ON
APPLICATION	

QTY REQ

2007240	REV LTR A	SH 2 OF 2

2/2007240

9 8 7 6

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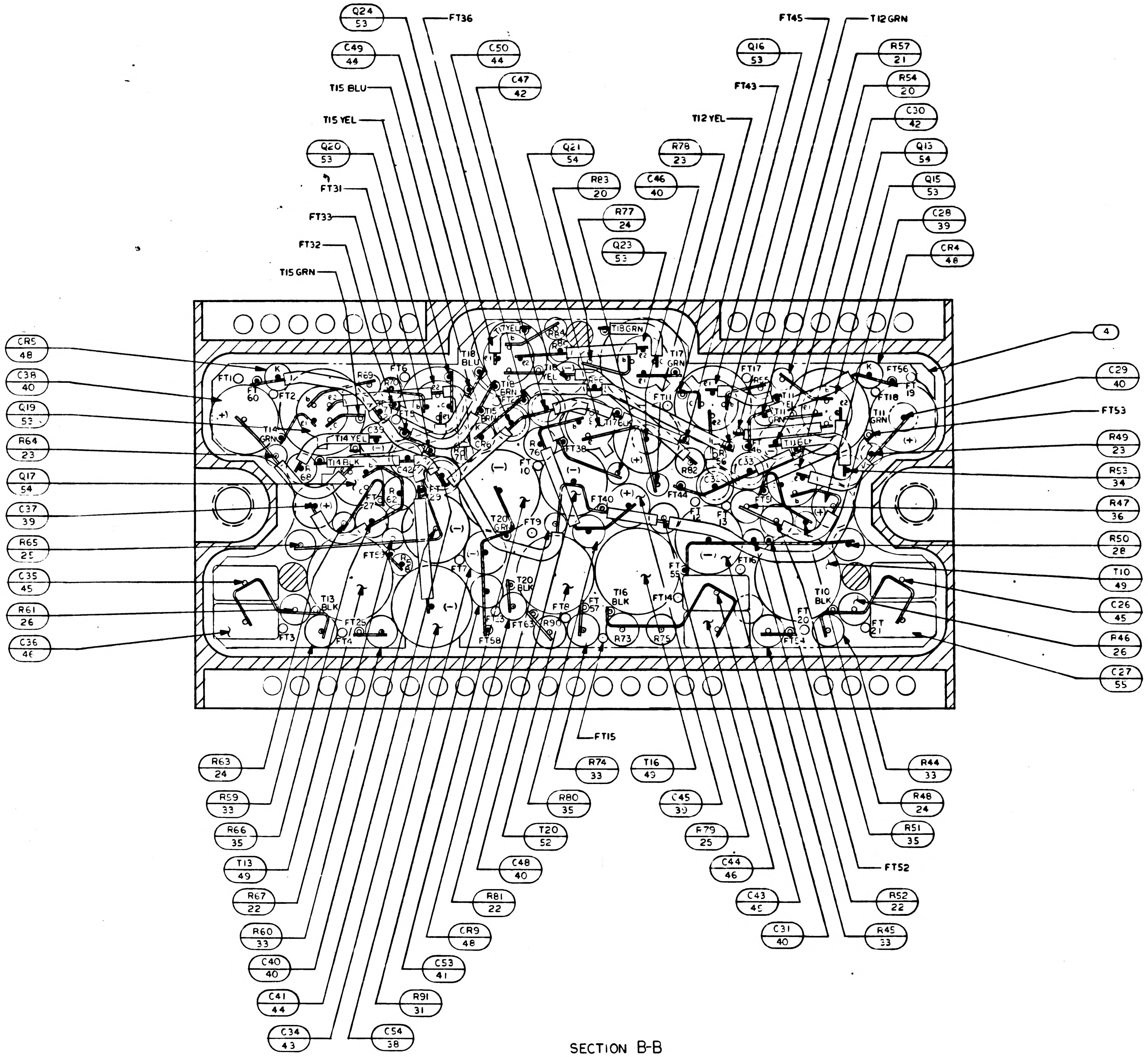
D

C

B

A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FT36
C49 44
C50 44
C47 42
T15 BLU
T15 YEL
Q20 53
FT31
FT33
FT32
T15 GRN
Q21 54
R83 20
R77 24
Q23 53
C46 40
R78 23
FT45
T12 GRN
Q16 53
R57 21
FT43
R54 20
T12 YEL
C30 42
Q13 54
Q15 53
C28 39
CR4 48
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
C35 45
R61 26
C36 46
4
C29 40
FT53
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 26
C27 55
FT15
R63 24
R59 33
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R67 22
R60 33
C40 40
C41 44
C34 43
C54 38
R91 31
C53 41
CR9 48
R81 22
C48 40
T20 52
R80 35
R74 33
T16 49
C45 39
R79 25
C44 46
C43 45
C31 40
R44 33
R48 24
R51 35
FT52
R52 22
R45 33
T17 YEL
T18 GRN
T18 BLU
T17 GRN
T16 BLK
T13 BLK
T10 BLK
T20 BLK
T20 GRN
T14 YEL
T14 BLK
T11 GRN
FT1
FT2
FT3
FT6
FT9
FT14
FT17
FT18
FT40
FT56
(+)
(−)

SECTION B-B

9 8 7 6

APOLLO G&N Specification
PS2007240 REV B
Original Issue Date: 7 June 1966
Release Authority: TDRR 29461
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

SIGNAL CONDITIONER, OPTICS AND ATTITUDE ERROR ASSEMBLY

DRAWING NO. 2007240

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/22/66	A	31227	3-6, 9, 11, 12	MGM EA	--
12/28/66	B	32377	3, 9	JP MGM	--

This specification consists of page 1 to 12 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	P M Kowalski 20 May 66 MIT/IL	G H Krier G.C. Hamren ACSP

APOLLO G&N Specification
PS2007240 REV B
Original Issue Date: 7 June 1966
Release Authority: TDRR 29461
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

SIGNAL CONDITIONER, OPTICS AND ATTITUDE ERROR ASSEMBLY

DRAWING NO. 2007240

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/22/66	A	31227	3-6, 9, 11, 12	MGM EA	--
12/28/66	B	32377	3, 9	JP MGM	--

This specification consists of page 1 to 12 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	P M Kowalski 20 May 66 MIT/IL	G H Krier ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 9.0±3.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 45 ma.

3.1.3 Offset Voltages. The offset voltages of assembly sections a, b, e, and f shall be ≤30 mvdc. The offset voltages of assembly sections c and d shall be ≤60 mvdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Sections a and b. The input voltages of assembly sections a and b shall be 5.00±0.50V rms with a phase angle of 0° ±2° when the respective output voltages are 2.500±0.005 vdc.

3.1.4.2 Assembly Sections c and d. The input voltages of assembly sections c and d shall be 0.50±0.05V rms with a phase angle of 0° ±2° when the assembly section outputs are +2.500±0.005 vdc.

3.1.4.3 Assembly Sections e and f. The input voltages of assembly sections e and f shall be 6.10±0.50V rms with a phase angle of 0° ±2° when the respective output voltage is 2.500±0.005 vdc.

3.1.4.4 Assembly Section g. The output voltage across pins 10 (Hi) and 8 (Lo) shall be -2.500±0.025 vdc when the 800 cps reference input voltage is 28.00±0.28V rms.

3.1.4.5 Assembly Section h. The output voltage of assembly section h shall be 4.50±0.20 vdc when the reference input voltage is 28.00±0.28V rms.

3.1.5 Gain Stability. The scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than ±1 percent when the +28 vdc supply is enhanced to +33 vdc or degraded to +23 vdc.

3.1.6 Scale Factor Linearity. The individual scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than 4 percent from the average of 6 scale factors for each assembly section.

3.1.7 Output Impedance. The output impedance of assembly sections a, b, c, d, e, f, and h shall be <5k ohms. The output impedance of assembly section g shall be <500 ohms.

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 9.0± 3.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 45 ma.

3.1.3 Offset Voltages. The offset voltages of assembly sections a, b, e, and f shall be ≤30 mvdc. The offset voltages of assembly sections c and d shall be ≤60 mvdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Sections a and b. The input voltages of assembly sections a and b shall be 5.00±0.50V rms with a phase angle of 0° ±2° when the respective output voltages are 2.500±0.005 vdc.

3.1.4.2 Assembly Sections c and d. The input voltages of assembly sections c and d shall be 0.50±0.05V rms with a phase angle of 0° ±2° when the assembly section outputs are +2.500±0.005 vdc.

3.1.4.3 Assembly Sections e and f. The input voltages of assembly sections e and f shall be 6.10±0.50V rms with a phase angle of 0° ±2° when the respective output voltage is 2.500±0.005 vdc.

3.1.4.4 Assembly Section g. The output voltage across pins 10 (Hi) and 8 (Lo) shall be -2.500±0.025 vdc when the 800 cps reference input voltage is 28.00±0.28V rms.

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3.1.6 Scale Factor Linearity. The individual scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than 4 percent from the average of 6 scale factors for each assembly section.

3.1.7 Output Impedance. The output impedance of assembly sections a, b, c, d, e, f, and h shall be <5k ohms. The output impedance of assembly section g shall be <500 ohms.

4.3.2 Workmanship-Vibration. The assembly shall be vibrated with the input test voltage, and output loads and voltages connected and monitored as shown in Figure 1. The assembly shall be mounted in the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the axis shown in Figure 2. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibration shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. Previbration output levels shall be set within the range of 2.50±0.10 vdc for assembly sections a, b, c, d, e, f and g. A 4.5±0.2 vdc voltage shall be present at the output pins of assembly section h. During vibration the output voltages shall not deviate by more than ±10 percent of the previbration levels for a period exceeding 1 msec. Any deviation exceeding these requirements shall be cause for rejection of the assembly. After vibration, the assembly shall be examined as specified in 4.3.1.

4.3.3 Selection of Resistor R88. Verification by examination of parts selection data shall be performed to ensure that the requirement of 3.2.2 has been met.

4.3.4 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be ≥100 megohms.

4.3.5 Continuity and DC Resistance. The dc resistance between the pins listed in Table I shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.6 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.3.3 has been met.

4.3.7 DC Current Drain. With all of the input pins specified in Table II connected together and the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 9.0±3.0 ma.

4.3.8 Reference Input Current. With all input pins specified in Table II connected together and the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 45 ma.

4.3.9 Offset Voltages. With the input pins of assembly sections a, b, c, d, e, and f specified in Table II connected together and the operating voltages applied, the voltage at each pair of output pins for sections a, b, e, and f shall be ≤30 mv dc and for sections c and d shall be ≤60 mv dc.

4.3.10 Scale Factor

4.3.10.1 Assembly Sections a, and b. With an output of 2.500±0.005 vdc, plus the measured offset voltage, the input signal shall be between 4.50 and 5.50V rms with a phase angle of 0° ±2°.

4.3.2 Workmanship-Vibration. The assembly shall be vibrated with the input test voltage, and output loads and voltages connected and monitored as shown in Figure 1. The assembly shall be mounted in the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the axis shown in Figure 2. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibration shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. Previbration output levels shall be set within the range of 2.50±0.10 vdc for assembly sections a, b, c, d, e, f and g. A 4.5±0.2 vdc voltage shall be present at the output pins of assembly section h. During vibration the output voltages shall not deviate by more than ±10 percent of the previbration levels for a period exceeding 1 msec. Any deviation exceeding these requirements shall be cause for rejection of the assembly. After vibration, the assembly shall be examined as specified in 4.3.1.

4.3.3 Selection of Resistor R88. Verification by examination of parts selection data shall be performed to ensure that the requirement of 3.2.2 has been met.

4.3.4 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be ≥100 megohms.

4.3.5 Continuity and DC Resistance. The dc resistance between the pins listed in Table I shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.6 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.3.3 has been met.

4.3.7 DC Current Drain. With all of the input pins specified in Table II connected together and the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 9.0±3.0 ma.

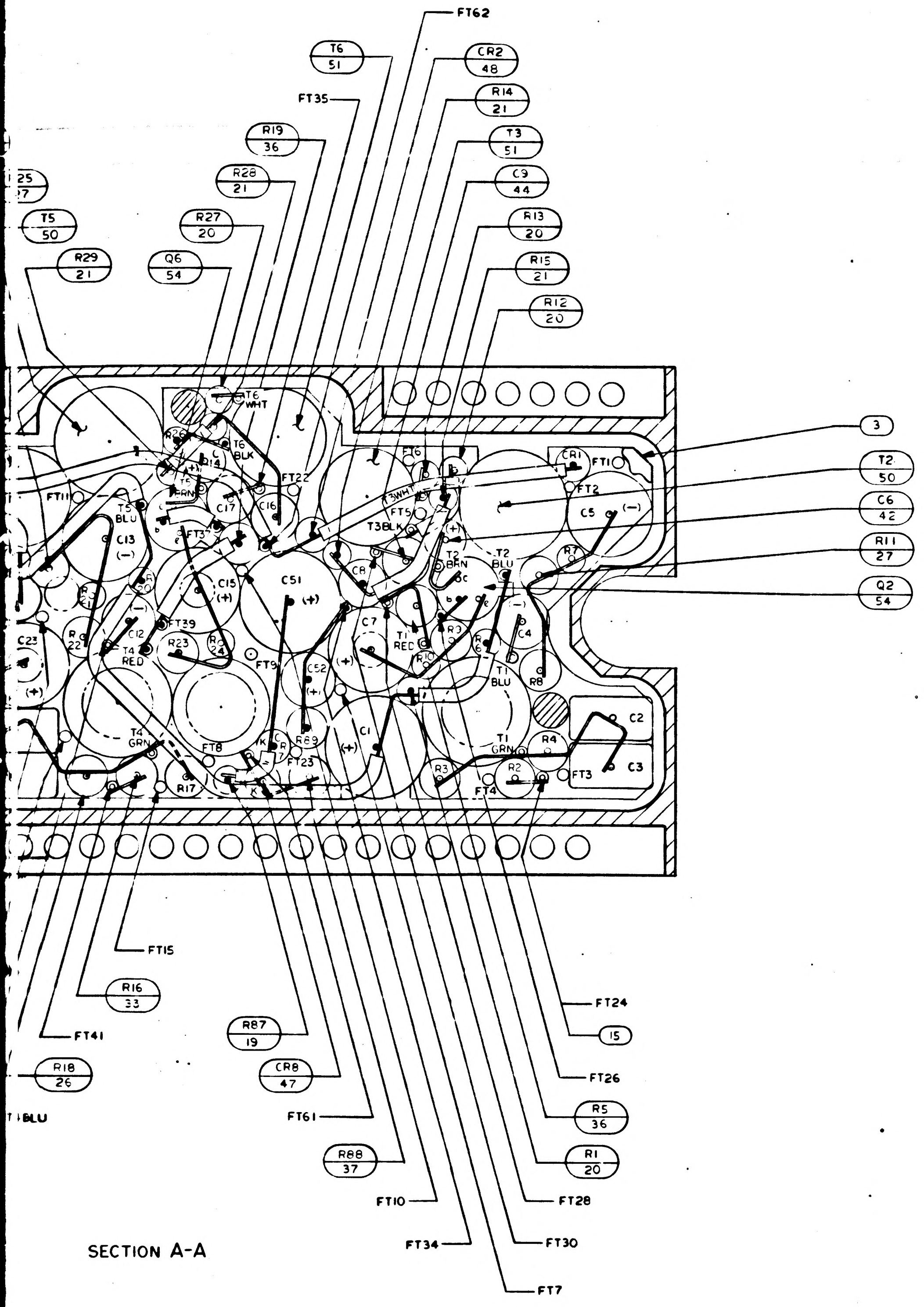
4.3.8 Reference Input Current. With all input pins specified in Table II connected together and the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 45 ma.

4.3.9 Offset Voltages. With the input pins of assembly sections a, b, c, d, e, and f specified in Table II connected together and the operating voltages applied, the voltage at each pair of output pins for sections a, b, e, and f shall be ≤30 mv dc and for sections c and d shall be ≤60 mv dc.

4.3.10 Scale Factor

4.3.10.1 Assembly Sections a, and b. With an output of 2.500±0.005 vdc, plus the measured offset voltage, the input signal shall be between 4.50 and 5.50V rms with a phase angle of 0° ±2°.

REVISIONS 27408							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 28564	EM		5 MAY 66		
B		REVISED PER TDRR 29918		JRC	13 JUL 66		
C		REVISED PER TDRR 30249	WAB	N.S.	29 JUL 66		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FT35
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R12 20
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T2 50
C6 42
R11 27
Q2 54
FT15
R16 33
FT41
R87 19
R18 26
CR8 47
FT61
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FT28
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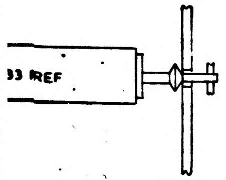
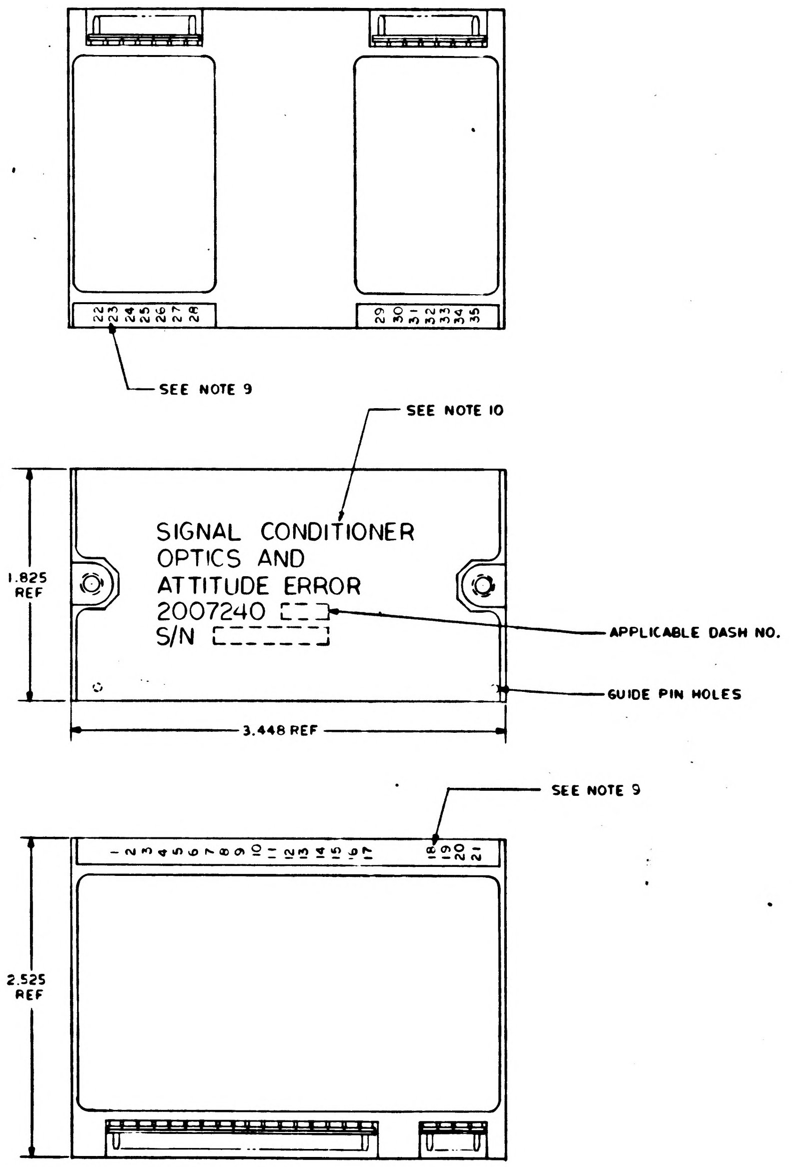
FT26
15
FT24
BLU

SECTION A-A




22 23 24 25 26 27 28
29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
1.825 REF
APPLICABLE DASH NO.
GUIDE PIN HOLES
3.448 REF
SEE NOTE 9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21
2.525 REF

MARKING VIEWS
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	2010123		SCHEMATIC	REF
12	1008161-1		SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-198		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
8	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-182		CAPACITOR	43
6	1006755-69		CAPACITOR	42
2	1006755-40		CAPACITOR	41
12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364	SEE NOTE 26	RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-318		RESISTOR	34
12	1010364-653		RESISTOR	33
1	1010364-403		RESISTOR	32
1	1010364-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010364-131		RESISTOR	28
2	1010311-306		RESISTOR	27
6	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
6	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008163-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006782-9		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR.WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD B	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1
-011			LIST OF MATERIALS	

2007240 C

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

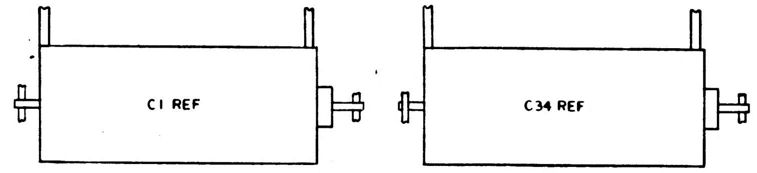
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

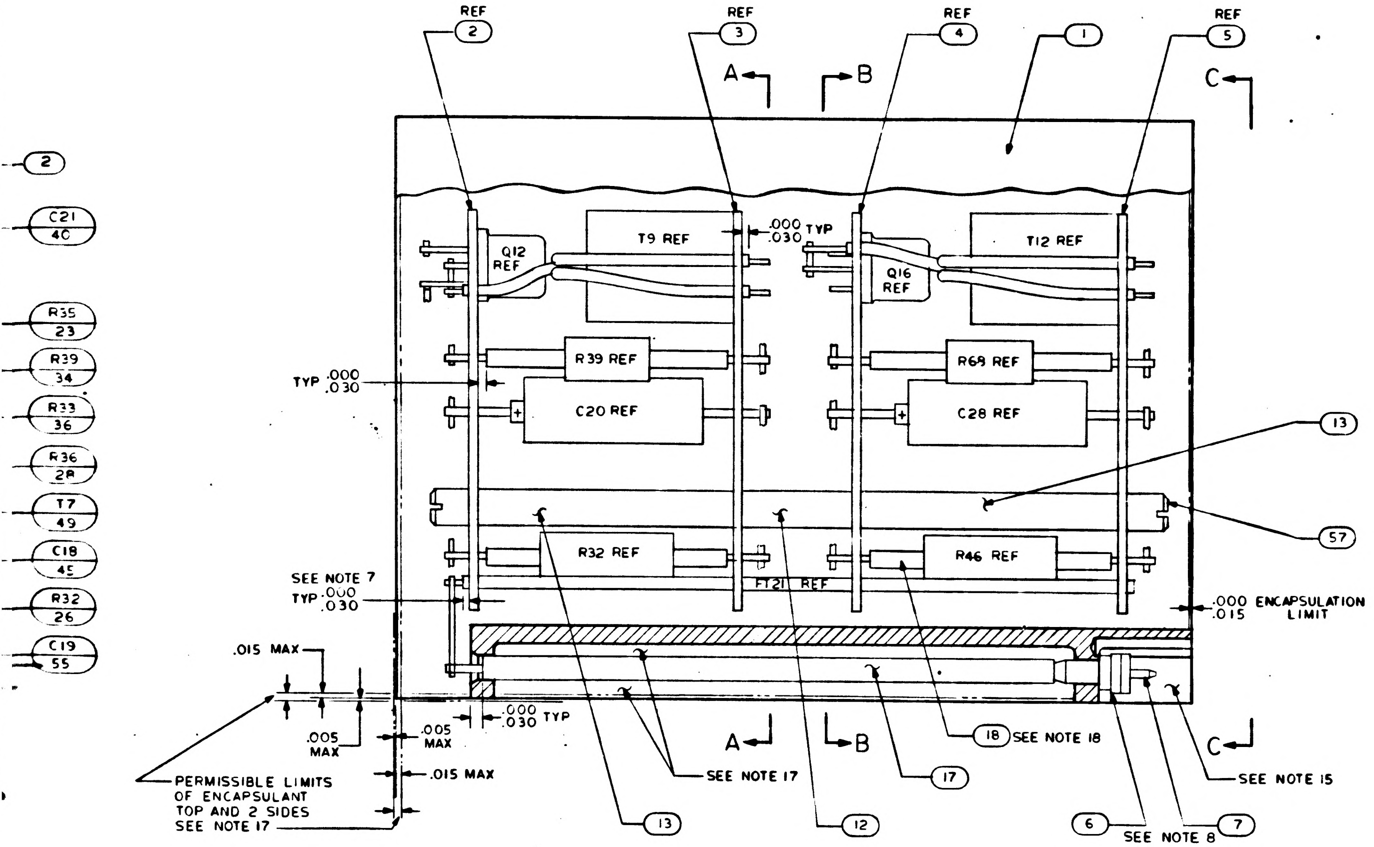
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET OF 2

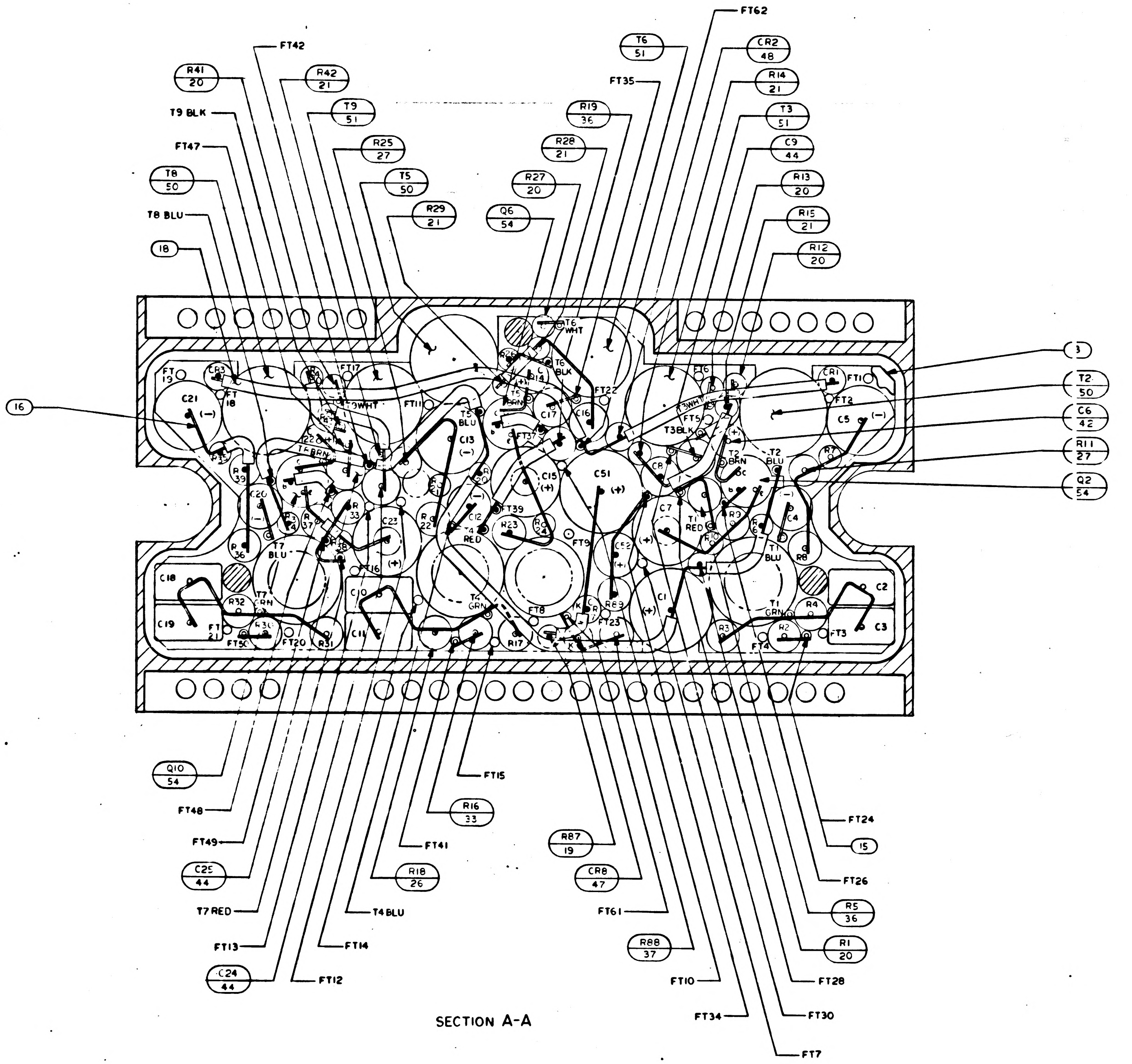
2007240 REV LTR C SH 2

3/2007240

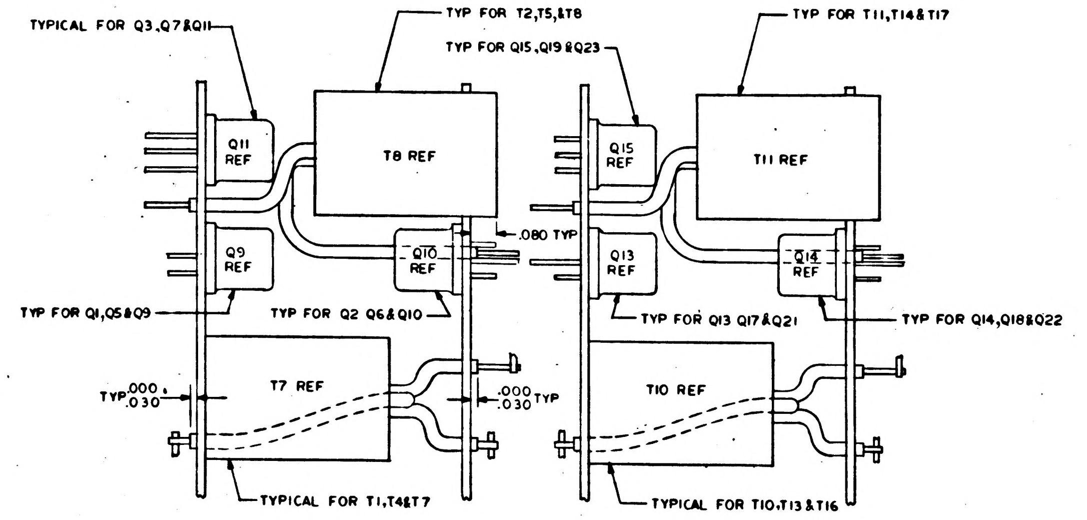

C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51 & C53

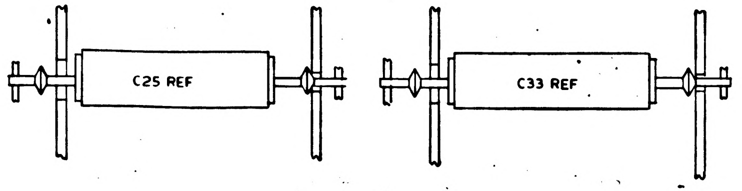

REF 2
REF 3
REF 4
REF 5
1
A
B
C
Q12 REF
T9 REF
.000 .030 TYP
Q16 REF
T12 REF
R39 REF
R69 REF
TYP .000 .030
C20 REF
C28 REF
13
57
R32 REF
R46 REF
FT21 REF
SEE NOTE 7
TYP .000 .030
.000 ENCAPSULATION .015 LIMIT
.015 MAX
.005 MAX
.005 MAX
.000 .030 TYP
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
SEE NOTE 17
18 SEE NOTE 18
17
SEE NOTE 15
13
12
6
SEE NOTE 8
7
2
C21 40
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55


FT62
FT42
T6 51
CR2 48
R41 20
R42 21
FT35
R14 21
T9 BLK
T9 51
R19 36
T3 51
FT47
R25 27
R28 21
C9 44
T8 50
T5 50
R27 20
R13 20
T8 BLU
R29 21
Q6 54
R15 21
18
R12 20
16
3
T2 50
C6 42
R11 27
Q2 54
C21
C5
C18
C19
C2
C3
C51
C15
C1
C7
Q10 54
FT48
FT49
C25 44
T7 RED
FT13
C24 44
FT15
R16 33
FT41
R18 26
T4 BLU
FT14
FT12
R87 19
CR8 47
FT61
R88 37
FT10
FT34
FT24
15
FT26
R5 36
R1 20
FT28
FT30
FT7

SECTION A-A


TYPICAL FOR Q3,Q7 & Q11
TYP FOR T2,T5,&T8
TYP FOR T11,T14 & T17
TYP FOR Q15,Q19 & Q23
Q11 REF
T8 REF
Q15 REF
T11 REF
.080 TYP
Q9 REF
Q10 REF
Q13 REF
Q14 REF
TYP FOR Q1,Q5 & Q9
TYP FOR Q2 Q6 & Q10
TYP FOR Q13 Q17 & Q21
TYP FOR Q14,Q18 & Q22
TYP .000 .030
T7 REF
.000 .030 TYP
T10 REF
TYPICAL FOR T1,T4 & T7
TYPICAL FOR T10,T13 & T16

PARTIAL SECTION G-G


C25 REF
C33 REF

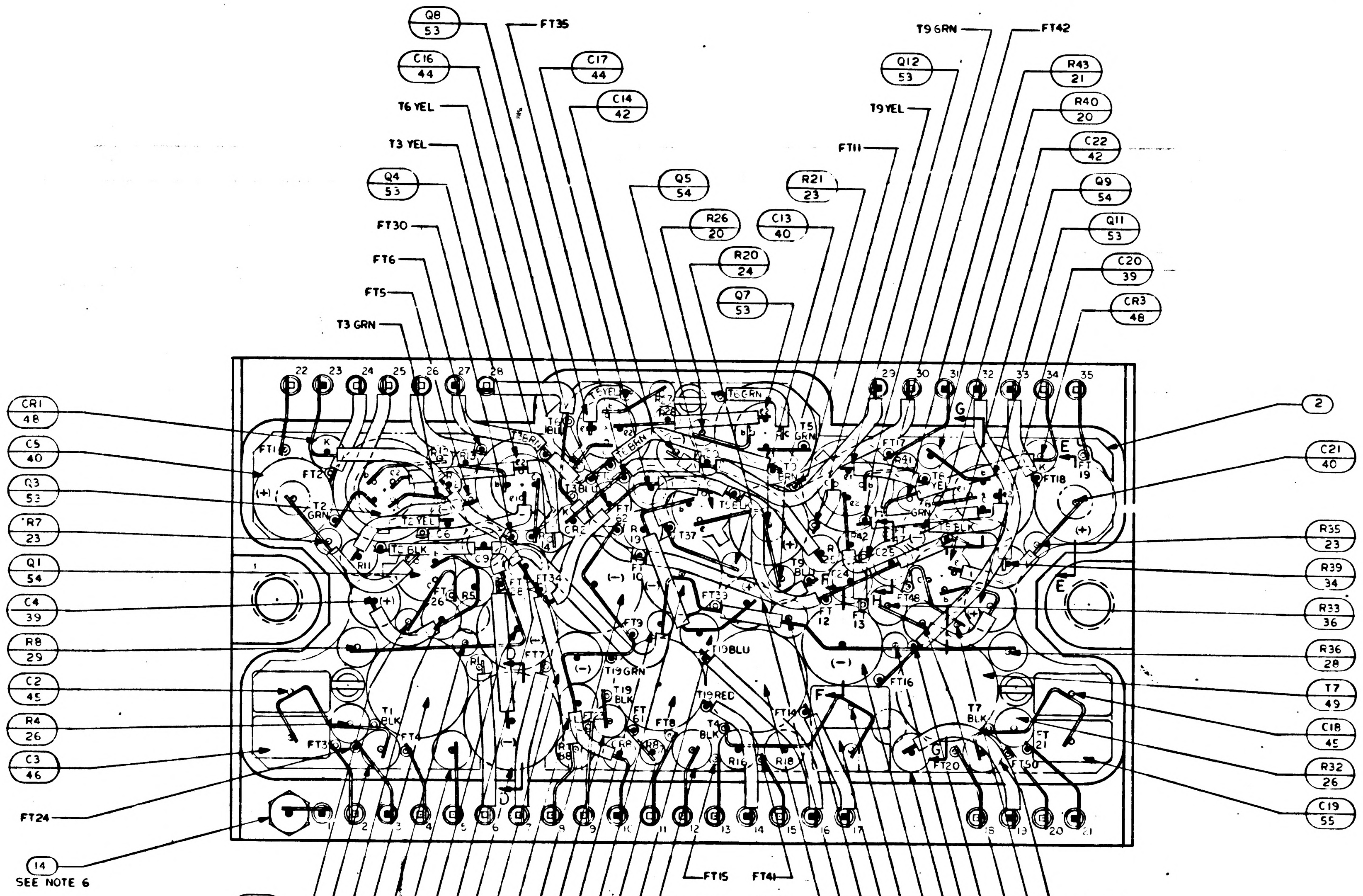
PARTIAL SECTION H-H
TYPICAL FOR C8 C9 C16 C17 C24 C25 C32
C33 C41 C42 C49 AND C50

2007240 REV LTR C SH 1 OF 3

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

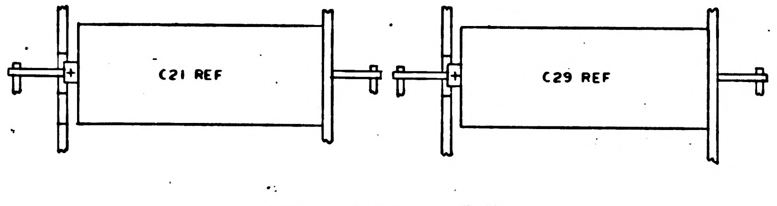
R88

PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

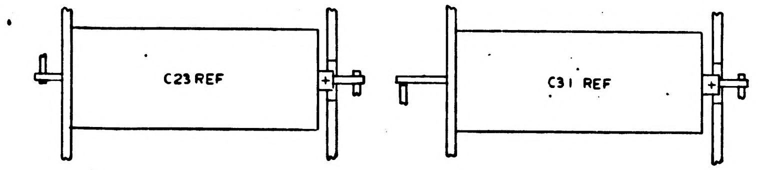

Q8 53
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
Q5 54
R21 23
R26 20
C13 40
FT30
R20 24
FT6
Q7 53
FT5
T3 GRN
T9 GRN
FT42
Q12 53
R43 21
T9 YEL
R40 20
FT11
C22 42
Q9 54
Q11 53
C20 39
CR3 48
CR1 48
C5 40
Q3 53
R7 23
Q1 54
C4 39
R8 29
C2 45
R4 26
C3 46
FT24
14 SEE NOTE 6
2
C21 40
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55
R6 24
R2 33
R5 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
FT15
FT41
R17 33
T4 49
R23 35
C12 39
T19 52
R22 29
C15 40
C11 46
R24 22
C10 45
CR7 48
C23 40
C51 41
R89 30
C52 38
R30 33
R34 24
R37 35
FT49
R38 22
R31 33
T19 BLU
T19 GRN
T19 BLK
T19 RED
T1 BLK
T4 BLK
T7 BLK
E
F
G

NOTES:

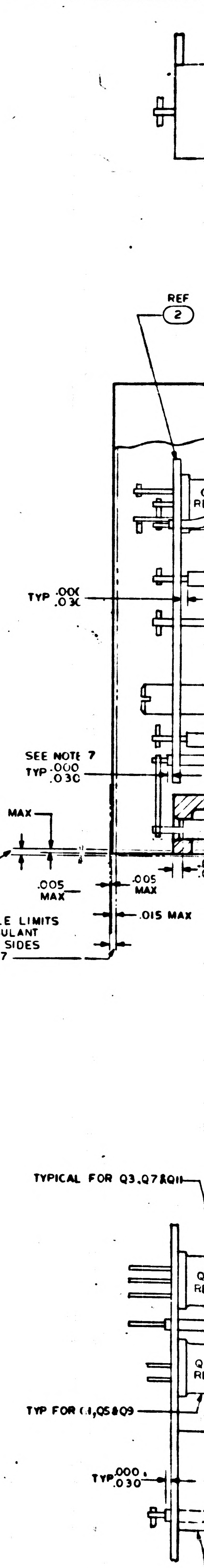
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37,47,48 AND 56
19. BOND FIND NO. 5 TO FIND NO 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO.2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.


C21 REF
C29 REF

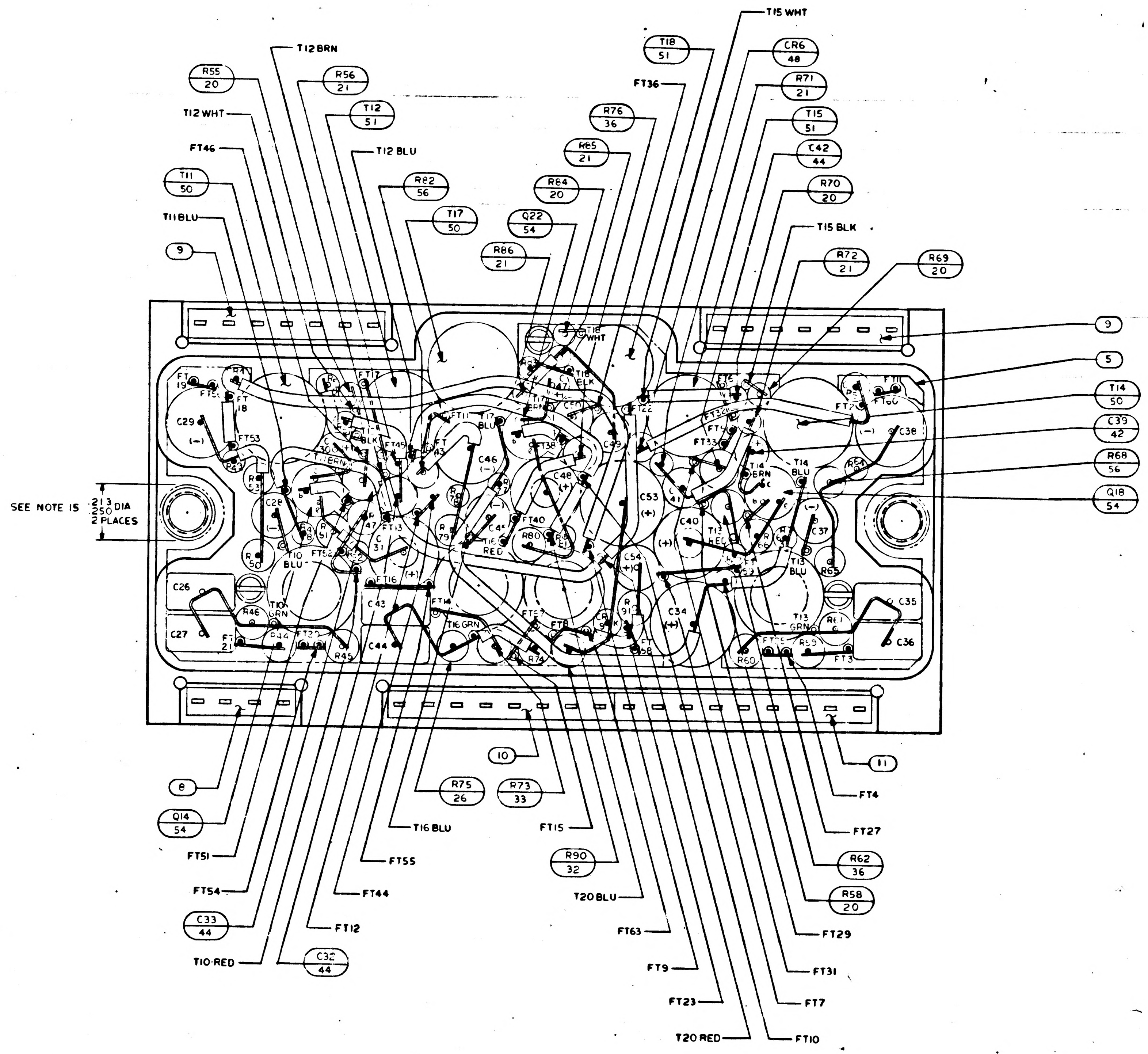
PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48


REF 2
TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
.005 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3,Q7&Q11
TYP FOR Q1,Q5&Q9
TYP .000 .030

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 27408			
A	REVISED PER TDRR 28564	MAY 66	
B	REVISION STATUS CHANGED	13 JUL 66	B. JRC
C	REVISION STATUS CHANGED	29 JUL 66	W.A.B. N.S.



T12 BRN
R55 20
R56 21
T12 WHT
T12 51
FT46
T12 BLU
T11 50
R82 56
T11 BLU
T17 50
9
Q22 54
R86 21
R84 20
R85 21
R76 36
FT36
T18 51
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213/.250 DIA 2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10 RED
C32 44
FT12
FT44
FT55
T16 BLU
10
R75 26
R73 33
FT15
R90 32
T20 BLU
FT63
FT9
FT23
T20 RED
FT10
FT7
FT31
FT29
R58 20
R62 36
FT27
FT4
11

VIEW C-C

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

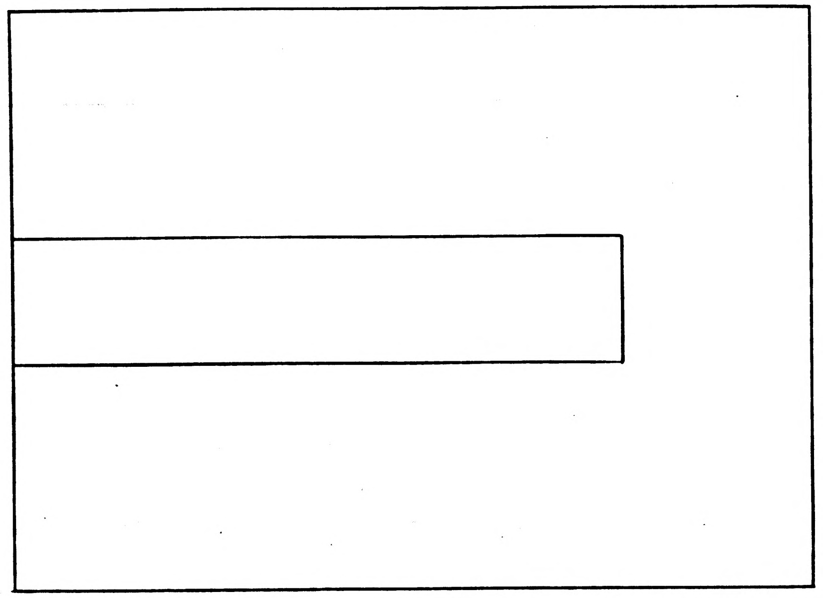
OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

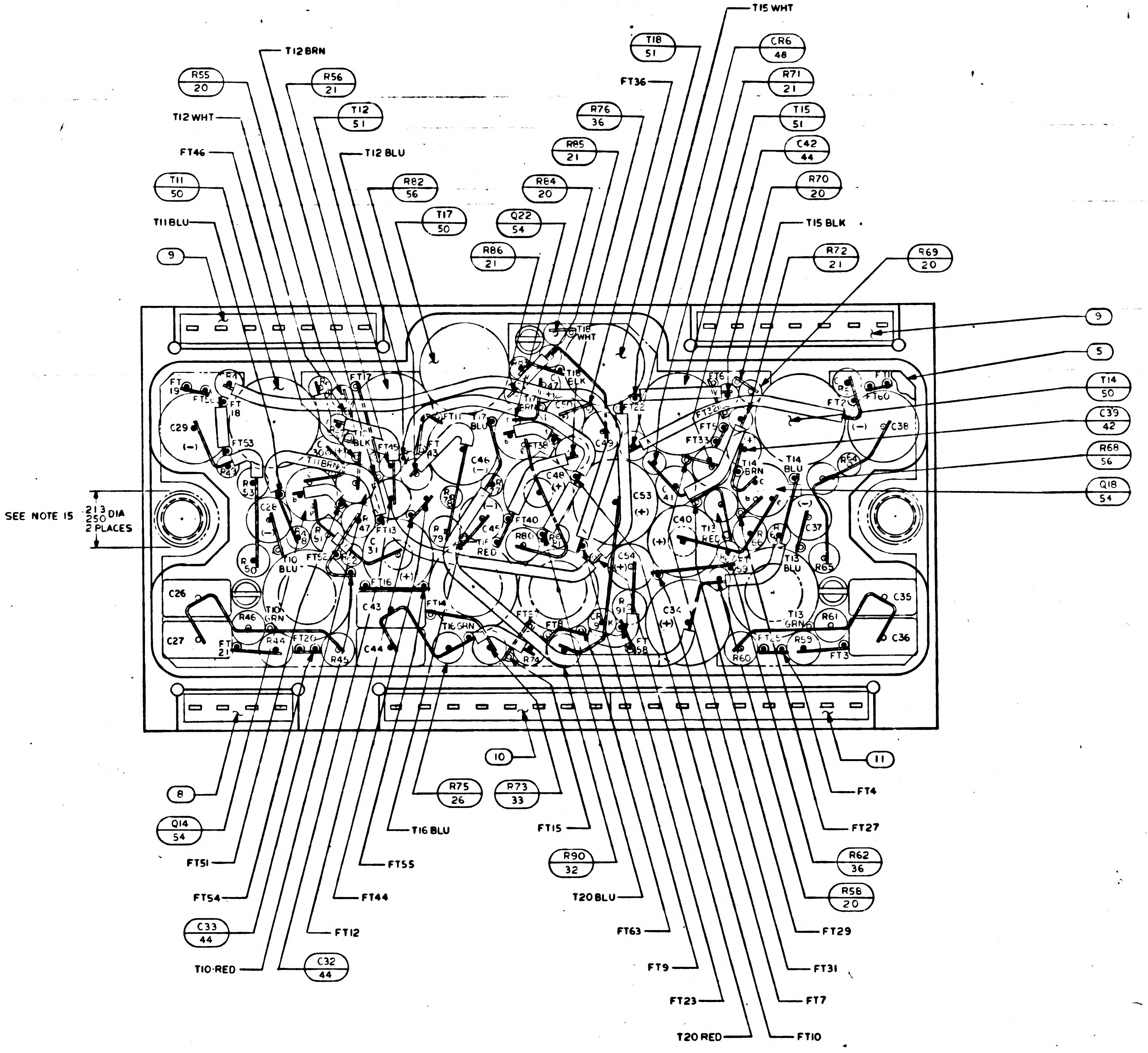
CODE IDENT NO. 80230
SIZE 3
DRAWING NO. 2007240
SCALE 5/1
SHEET 2 OF 2

2007240 C

2007240 REV LTR C SH 2 OF 2

3/2007240



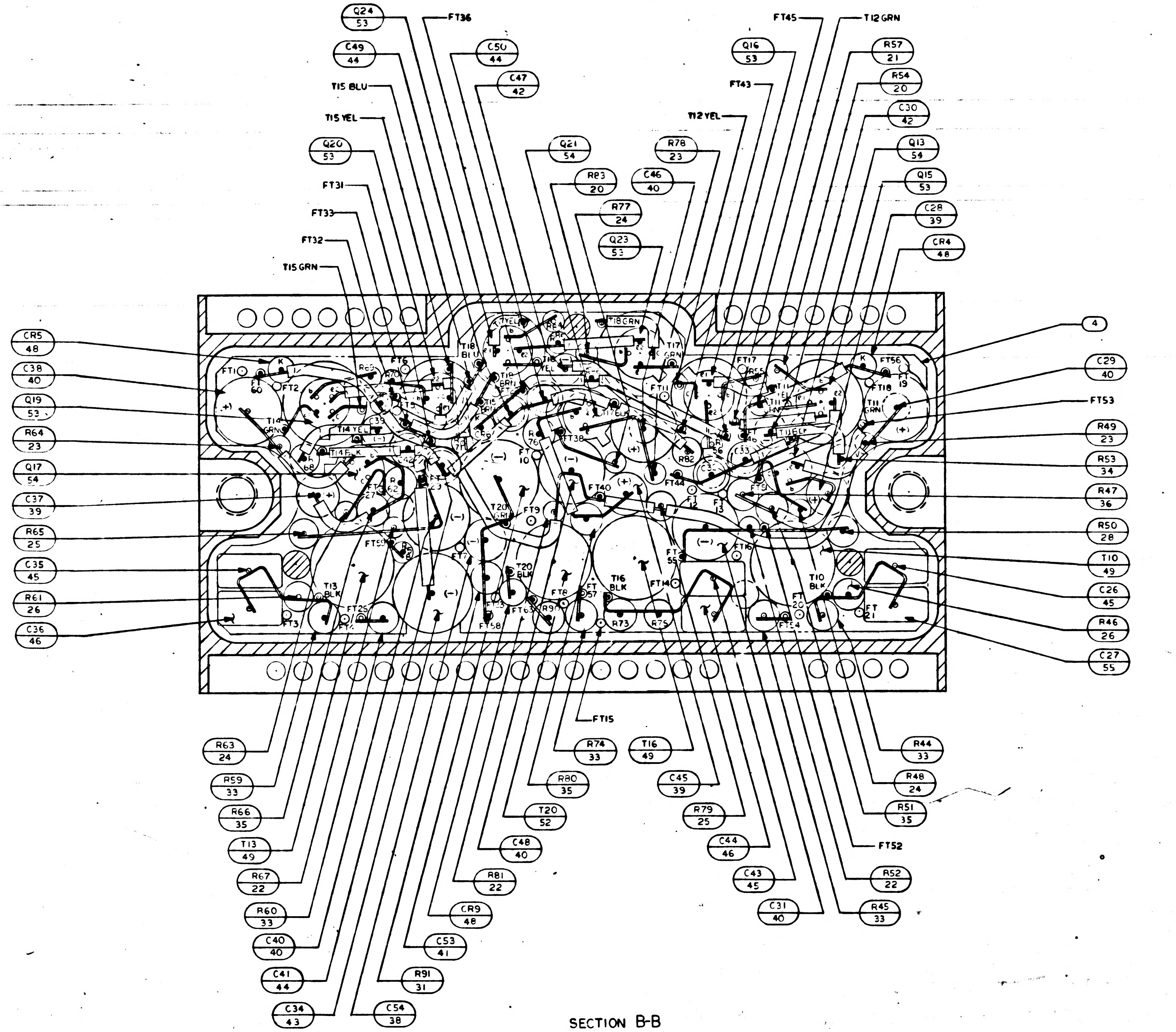

T12 BRN
R55 20
R56 21
T12 WHT
T12 51
FT46
T12 BLU
T11 50
R82 56
T17 50
T11 BLU
9
T18 51
FT36
R76 36
R85 21
R64 20
Q22 54
R86 21
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10 RED
C32 44
FT12
FT44
FT55
T16 BLU
R75 26
R73 33
10
FT15
R90 32
T20 BLU
FT63
FT9
FT23
T20 RED
FT10
FT7
FT31
FT29
R58 20
R62 36
FT27
FT4
11
C29
C26
C27
C28
C43
C44
C46
C48
C53
C54
C40
C37
C38
C35
C36
C34
T10 BLU
T10 GRN
T16 GRN
T13 BLU
T13 GRN
T14 BRN
T14 BLU
T18 WHT
R46
R44
R45
R50
R59
R60
R61
R63

VIEW C-C

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µ
RESISTOR VALUES ARE IN
TOLERANCES ON
FRACTIONS DECIMALS
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


Q24 53
FT36
C49 44
C50 44
C47 42
T15 BLU
T15 YEL
Q20 53
FT31
FT33
FT32
T15 GRN
Q21 54
R83 20
R78 23
C46 40
R77 24
Q23 53
FT45
T12 GRN
Q16 53
R57 21
FT43
R54 20
T12 YEL
C30 42
Q13 54
Q15 53
C28 39
CR4 48
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
C35 45
R61 26
C36 46
4
C29 40
FT53
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 26
C27 55
T14 YEL
T14 BLK
T13 BLK
T18 BLU
T18 GRN
T17 GRN
T16 BLK
T20 BLK
T10 BLK
T11 GRN
FT1
FT2
FT3
FT9
FT10
FT11
FT13
FT14
FT16
FT17
FT18
FT20
FT21
FT25
FT38
FT40
FT44
FT54
FT55
FT56
FT57
FT58
FT60
R73
R75
R82
R97
FT15
R63 24
R59 33
R66 35
T13 49
R67 22
R60 33
C40 40
C41 44
C34 43
C54 38
R91 31
C53 41
CR9 48
R81 22
C48 40
T20 52
R80 35
R74 33
T16 49
C45 39
R79 25
C44 46
C43 45
C31 40
R45 33
R52 22
FT52
R51 35
R48 24
R44 33

SECTION B-B

9
8
7
6
D
C
B
A

APOLLO G&N Specification
PS2007240 REV C
Original Issue Date: 7 June 1966
Release Authority: TDRR 29461
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

SIGNAL CONDITIONER, OPTICS AND ATTITUDE ERROR ASSEMBLY

DRAWING NO. 2007240

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals AC	Approvals NASA
9/22/66	A	31227	3-6, 9, 11, 12	MGM EA	--
12/28/66	B	32377	3, 9	JP MGM	--
2/9/67	C	32942	3, 9	MGM EA	--

This specification consists of page 1 to 12 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	PMKowalski 20 May 66 MIT/IL	ACSP

APOLLO G&N Specification
PS2007240 REV C
Original Issue Date: 7 June 1966
Release Authority: TDRR 29461
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

SIGNAL CONDITIONER, OPTICS AND ATTITUDE ERROR ASSEMBLY

DRAWING NO. 2007240

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
9/22/66	A	31227	3-6, 9, 11, 12	MGM EA	--
12/28/66	B	32377	3, 9	JP MGM	--
2/9/67	C	32942	3, 9	MGM EA	--

This specification consists of page 1 to 12 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	R M Kowalski 20 May 66 MIT/IL	G H Krier ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 9.0± 3.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 45 ma.

3.1.3 Offset Voltages. The offset voltage of assembly sections a, b, e, and f shall be ≤30 mvdc. The offset voltages of assembly sections c and d shall be ≤75 mvdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Sections a and b. The input voltages of assembly sections a and b shall be 5.00±0.50V rms with a phase angle of 0° ±2° when the respective output voltages are 2.500±0.005 vdc.

3.1.4.2 Assembly Sections c and d. The input voltages of assembly sections c and d shall be 0.50±0.05V rms with a phase angle of 0° ±2° when the assembly section outputs are +2.500±0.005 vdc.

3.1.4.3 Assembly Sections e and f. The input voltages of assembly sections e and f shall be 6.10±0.50V rms with a phase angle of 0° ±2° when the respective output voltage is 2.500±0.005 vdc.

3.1.4.4 Assembly Section g. The output voltage across pins 10 (Hi) and 8 (Lo) shall be -2.500±0.025 vdc when the 800 cps reference input voltage is 28.00±0.28V rms.

3.1.4.5 Assembly Section h. The output voltage of assembly section h shall be 4.50±0.20 vdc when the reference input voltage is 28.00±0.28V rms.

3.1.5 Gain Stability. The scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than ±1 percent when the +28 vdc supply is enhanced to +33 vdc or degraded to +23 vdc.

3.1.6 Scale Factor Linearity. The individual scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than 4 percent from the average of 6 scale factors for each assembly section.

3.1.7 Output Impedance. The output impedance of assembly sections a, b, c, d, e, f, and h shall be <5k ohms. The output impedance of assembly section g shall be <500 ohms.

4.3.2 Workmanship-Vibration. The assembly shall be vibrated with the input test voltage, and output loads and voltages connected and monitored as shown in Figure 1. The assembly shall be mounted in the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the axis shown in Figure 2. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibration shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. Previbration output levels shall be set within the range of 2.50±0.10 vdc for assembly sections a, b, c, d, e, f and g. A 4.5±0.2 vdc voltage shall be present at the output pins of assembly section h. During vibration the output voltages shall not deviate by more than ±10 percent of the previbration levels for a period exceeding 1 msec. Any deviation exceeding these requirements shall be cause for rejection of the assembly. After vibration, the assembly shall be examined as specified in 4.3.1.

4.3.3 Selection of Resistor R88. Verification by examination of parts selection data shall be performed to ensure that the requirement of 3.2.2 has been met.

4.3.4 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 150±25 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be ≥100 megohms.

4.3.5 Continuity and DC Resistance. The dc resistance between the pins listed in Table I shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.6 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.3.3 has been met.

4.3.7 DC Current Drain. With all of the input pins specified in Table II connected together and the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 9.0± 3.0 ma.

4.3.8 Reference Input Current. With all input pins specified in Table II connected together and the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 45 ma.

4.3.9 Offset Voltages. With the input pins of assembly sections a, b, c, d, e, and f specified in Table II connected together and the operating voltages applied, the voltage at each pair of output pins for sections a, b, e, and f shall be ≤30 mv dc and for sections c and d shall be ≤75 mv dc.

4.3.10 Scale Factor

4.3.10.1 Assembly Sections a, and b. With an output of 2.500±0.005 vdc, plus the measured offset voltage, the input signal shall be between 4.50 and 5.50V rms with a phase angle of 0° ±2°.

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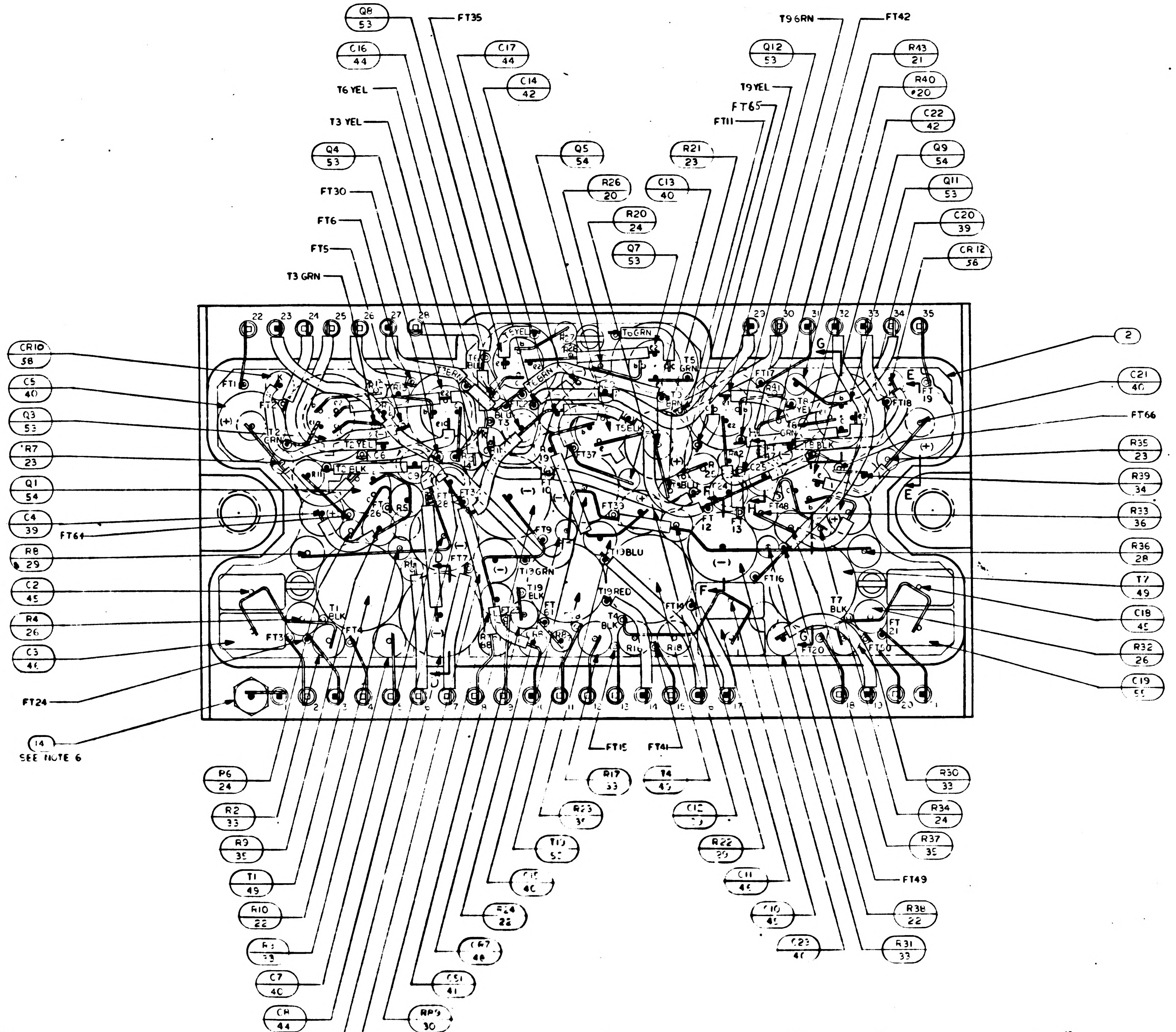
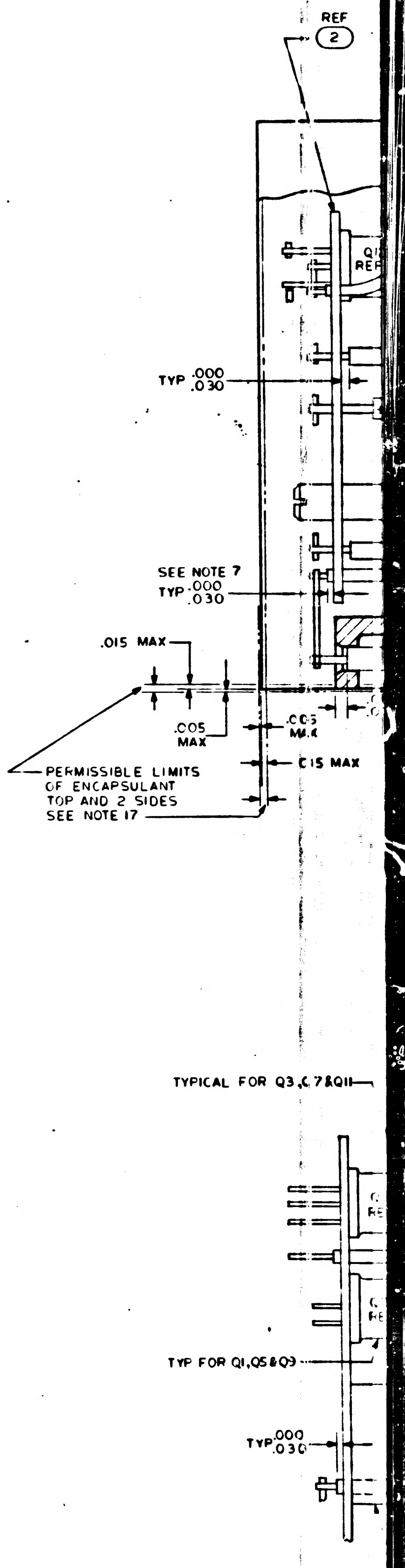
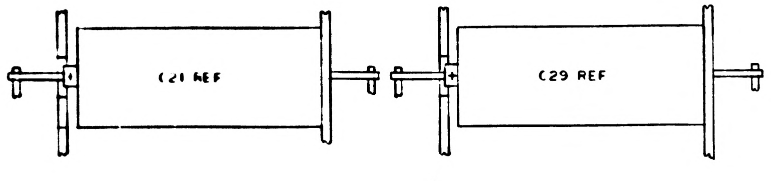
R88	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180


Q8 53
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
Q5 54
R21 23
R26 20
C13 40
R20 24
Q7 53
FT30
FT6
FT5
T3 GRN
T9 GRN
FT42
Q12 53
R43 21
T9 YEL
R40 20
FT65
FT11
C22 42
Q9 54
Q11 53
C20 39
CR12 56
22
23
24
25
26
27
28
29
30
31
32
33
34
35
T6 YEL
T6 GRN
T5 GRN
G
E
F
CR10 58
C5 40
Q3 53
R7 23
Q1 54
C4 39
FT64
R8 29
C2 45
R4 26
C3 46
FT24
14
SEE NOTE 6
2
C21 40
FT66
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55
FT1
FT19
FT18
FT17
FT37
FT33
FT9
FT13
FT12
FT48
FT16
FT14
FT20
FT50
FT3
FT4
FT2
T1 BLK
T4 BLK
T7 BLK
T19 RED
T19 GRN
T19 BLK
T10 BLU
T8 BLK
T5 BLK
(+)
(−)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
FT15
FT41
R17 33
T4 45
R30 33
R34 24
R37 35
FT49
R38 22
R31 33
P6 24
R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
C52 38
RP9 30
C51 41
C47 48
R24 22
C15 40
T10 55
R23 35
C12
R22 29
C11 45
C10 45
C23 40

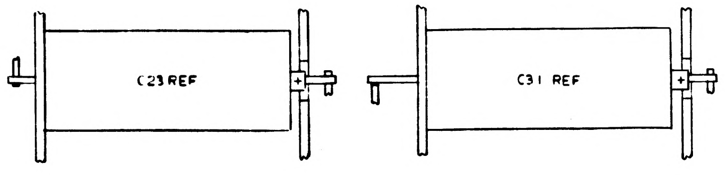

REF
2
Q1 REF
TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
.005 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3,Q7&Q11
TYP FOR Q1,Q5&Q9
TYP .000 .030

NOTES:

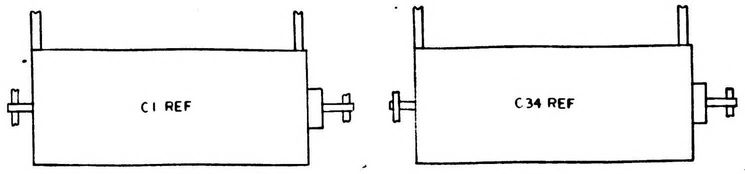
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO 19 THRU 37,47,48 AND 56
19. BOND FIND NO 5 TO FIND NO 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO.2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO.5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.


C21 REF
C29 REF

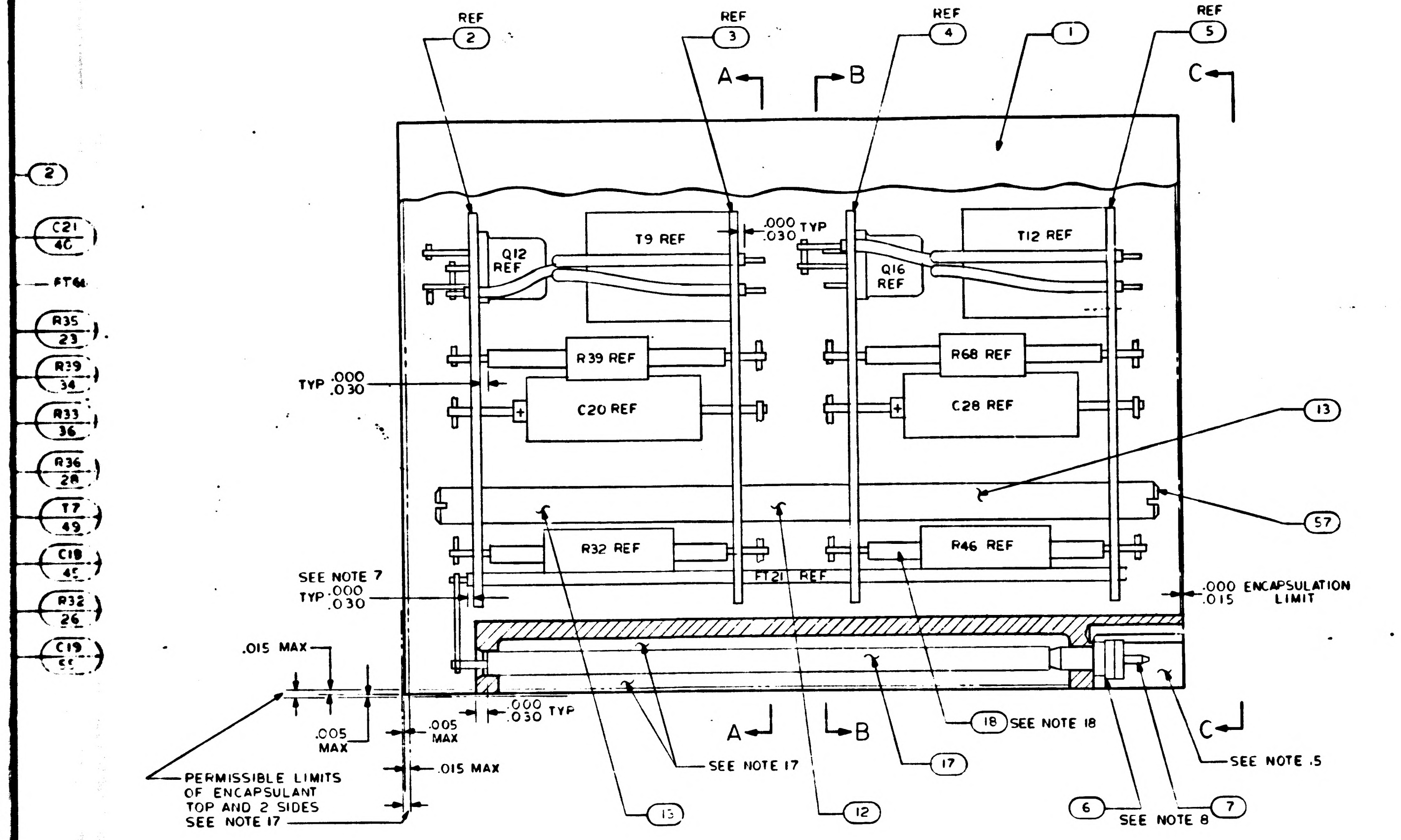
PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46

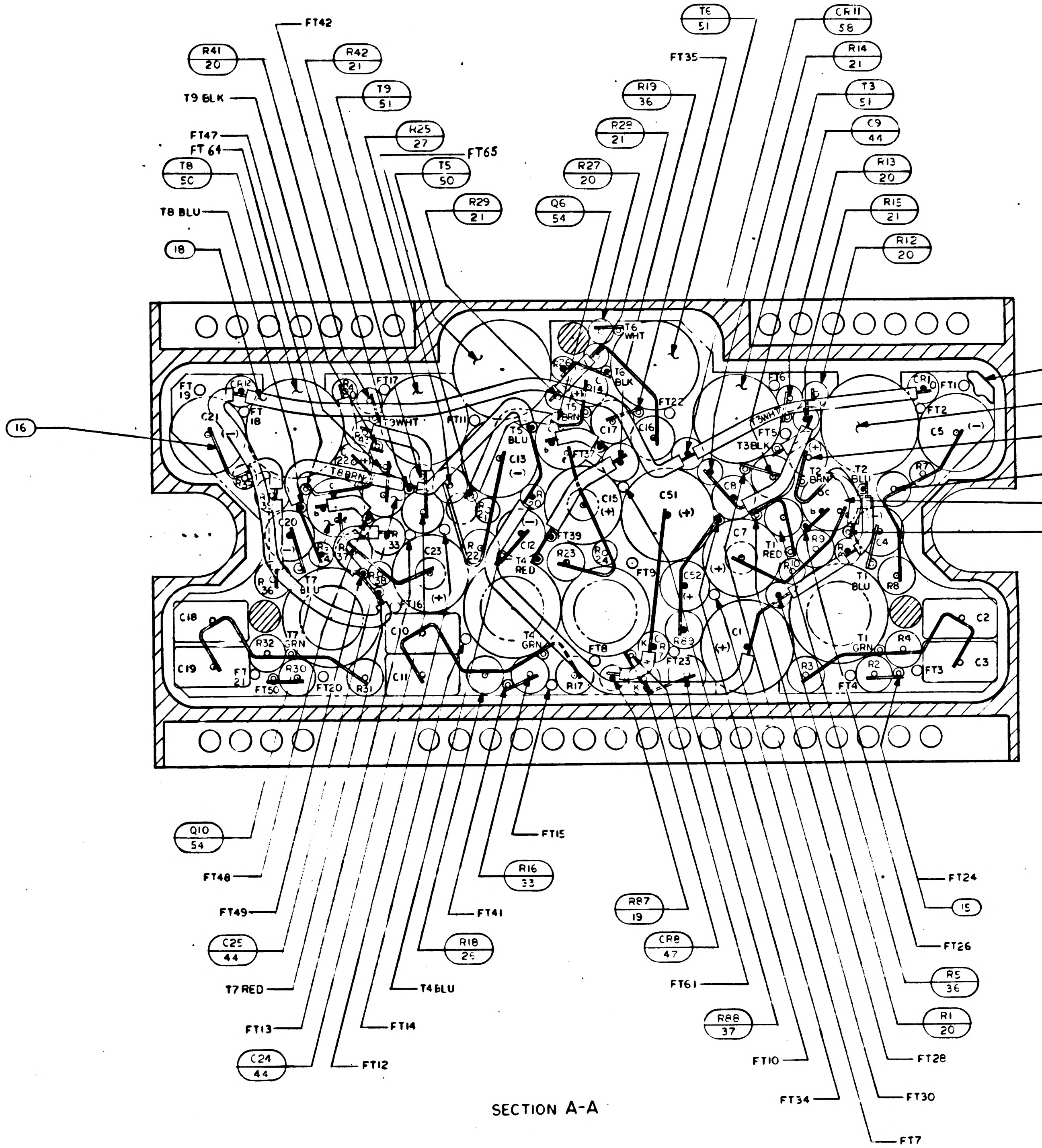

C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48

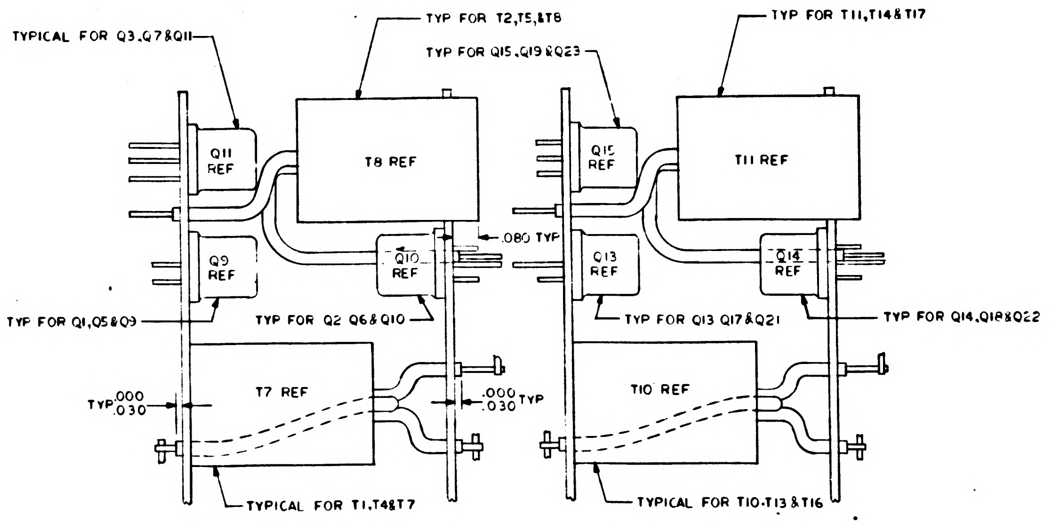

C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51 & C53

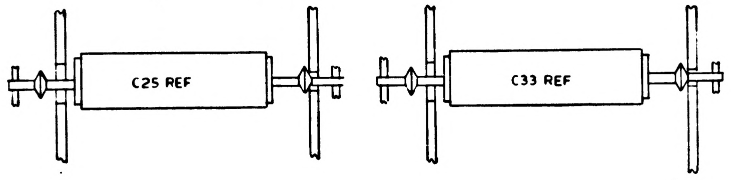

2
C21 46
FT64
R35 23
R39 38
R33 36
R36 28
T7 49
C18 45
R32 26
C19
REF 2
REF 3
REF 4
REF 5
1
A
B
C
Q12 REF
T9 REF
.000 .030 TYP
Q16 REF
T12 REF
TYP .000 .030
R39 REF
C20 REF
R68 REF
C28 REF
13
57
R32 REF
R46 REF
FT21 REF
SEE NOTE 7
TYP .000 .030
.000 ENCAPSULATION .015 LIMIT
.015 MAX
.005 MAX
.005 MAX
.000 .030 TYP
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
.015 MAX
SEE NOTE 17
13
12
17
18 SEE NOTE 18
6
SEE NOTE 8
7
SEE NOTE 5


FT42
R41 20
R42 21
T9 BLK
T9 51
R25 27
FT65
FT47
FT64
T8 50
T5 50
R29 21
T8 BLU
18
16
T6 51
FT35
R19 36
R28 21
R27 20
Q6 54
CR11 58
R14 21
T3 51
C9 44
R13 20
R15 21
R12 20
3
T2 50
C6 42
R11 27
Q2 54
FT66
C51
C5
C18
C19
C2
C3
R32
R30
R31
FT20
FT50
R17
FT8
FT9
FT25
R63
C52
C1
C7
R2
R3
R4
FT3
FT4
T1 BLU
T1 GRN
T1 RED
T2 BLU
T3 BLK
T4 GRN
T4 RED
T7 BLU
T7 GRN
T8 BRN
T6 WHT
T6 BLK
FT16
FT39
C10
C11
C12
C13
C15
C16
C17
C20
C23
R23
R8
Q10 54
FT48
FT49
C25 44
T7 RED
FT13
C24 44
FT15
R16 33
FT41
R18 25
T4 BLU
FT14
FT12
R87 19
CR8 47
FT61
R88 37
FT10
FT34
FT24
15
FT26
R5 36
R1 20
FT28
FT30
FT7

SECTION A-A


TYPICAL FOR Q3, Q7 & Q11
TYP FOR T2, T5, & T8
TYP FOR Q15, Q19 & Q23
TYP FOR T11, T14 & T17
Q11 REF
T8 REF
Q15 REF
T11 REF
Q9 REF
Q10 REF
.080 TYP
Q13 REF
Q14 REF
TYP FOR Q1, Q5 & Q9
TYP FOR Q2 Q6 & Q10
TYP FOR Q13 Q17 & Q21
TYP FOR Q14, Q18 & Q22
TYP .000 .030
T7 REF
.000 .030 TYP
T10 REF
TYPICAL FOR T1, T4 & T7
TYPICAL FOR T10-T13 & T16

PARTIAL SECTION G-G

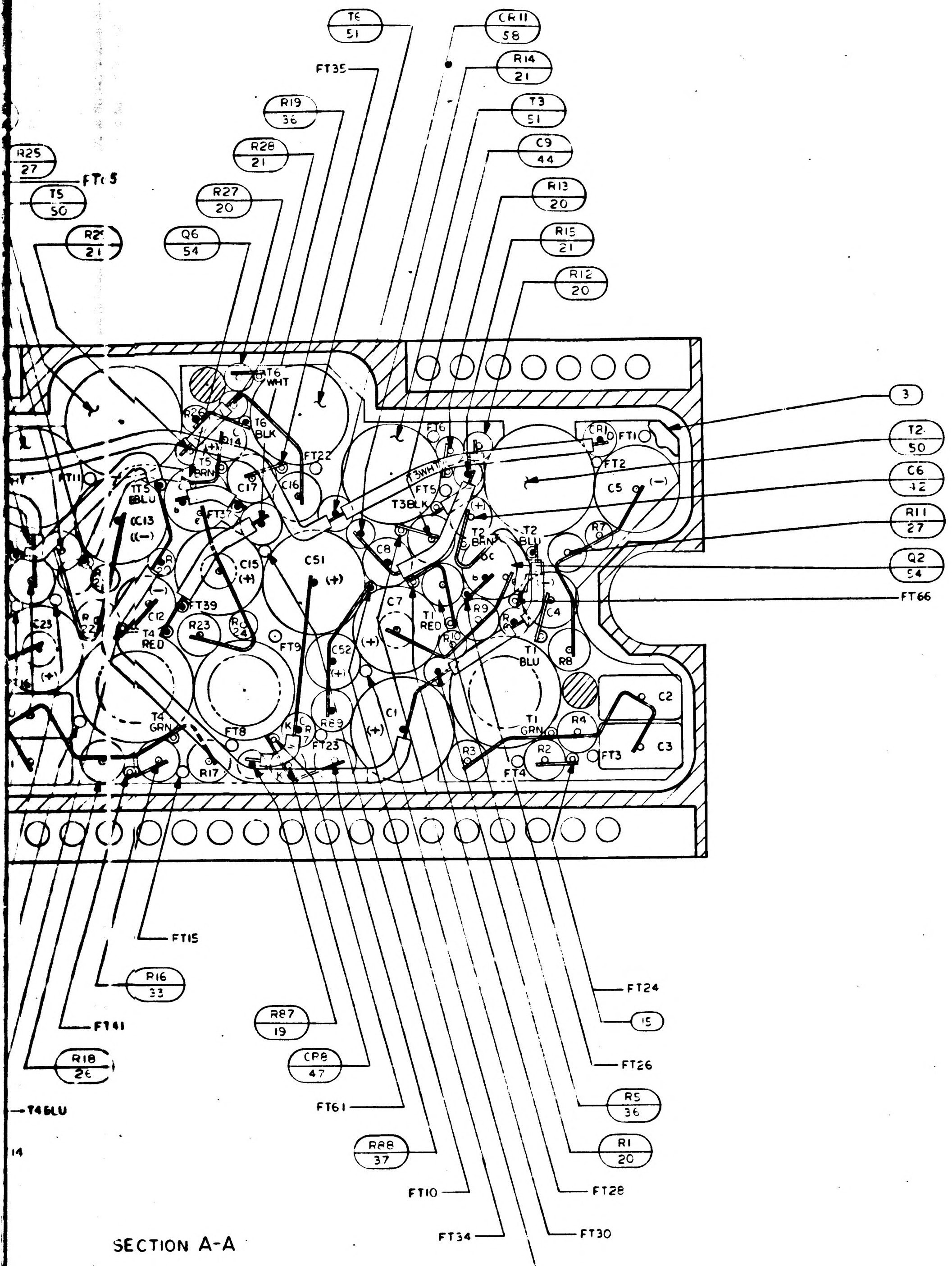

C25 REF
C33 REF

PARTIAL SECTION H-H
TYPICAL FOR C8 C9-C16 C17 C24 C25 C32
C33 C41 C42 C49 AND C50

2007240 REV D SH 1 OF

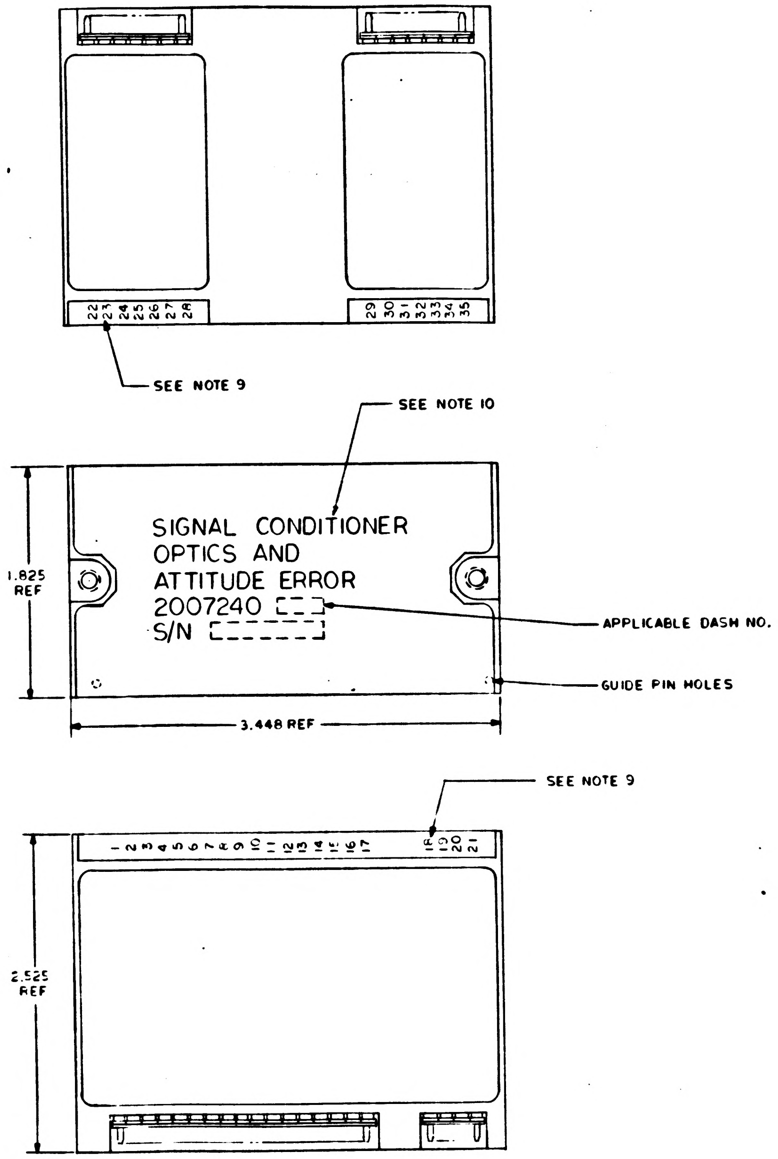
2/2007240

REVISIONS 27408							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 28564	EM	LSB	5 MAY 66		
B		REVISED PER TDRR 29918	B.	JAC	13 JUL 66		
C		REVISED PER TDRR 30249	WAB	N.S.	29 JUL 66		
D		REVISED PER TDRR 30282			24 AUG 66		



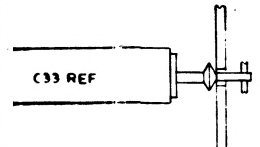
T6 51
CR11 58
R14 21
T3 51
C9 44
R13 20
R15 21
R12 20
R19 36
R28 21
R27 20
Q6 54
R25 27
T5 50
R2 21
FT35
FT65
3
T2 50
C6 42
R11 27
Q2 54
FT66
FT15
R16 33
FT41
R18 26
T4BLU
RB7 19
CP8 47
FT61
RB8 37
FT10
FT34
FT24
15
FT26
R5 36
R1 20
FT28
FT30
FT7
C51
C52
C13
C15
C17
C16
C8
C7
C1
C5
C4
C3
C2
C23
R23
R17
R3
R4
R2
R6
R7
R9
T4 RED
T4 GRN
T1 RED
T1 BLU
T1 GRN
T2 BLU
T2 BRN
T3 BLK
T6 WHT
T6 BLK
T5 BLU
FT1
FT2
FT3
FT4
FT5
FT8
FT9
FT22
FT23
FT39

SECTION A-A



22 23 24 25 26 27 28
29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
APPLICABLE DASH NO.
GUIDE PIN HOLES
1.825 REF
3.448 REF
SEE NOTE 9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21
2.525 REF

MARKING VIEWS
SCALE 2/1



QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010123		SCHEMATIC	REF
4	1008815-9		DIODE	58
12	1008161-1		SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-198		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
4	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-182		CAPACITOR	43
6	1006755-60		CAPACITOR	42
2	1006755-40		CAPACITOR	41
12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364 SEE NOTE 26		RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-318		RESISTOR	34
12	1010364-673		RESISTOR	33
1	1010364-403		RESISTOR	32
1	1010364-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010364-131		RESISTOR	28.
2	1010311-306		RESISTOR	27
6	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
[illegible]	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008163-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006782-9		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR, WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD E	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1

-011 LIST OF MATERIALS

2007240 D

NEXT ASSY	USED ON
2007235	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Scoggins 7 Mar 66
CHECKED
APPROVED 18 Mar 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 1 OF 2

3/2007240

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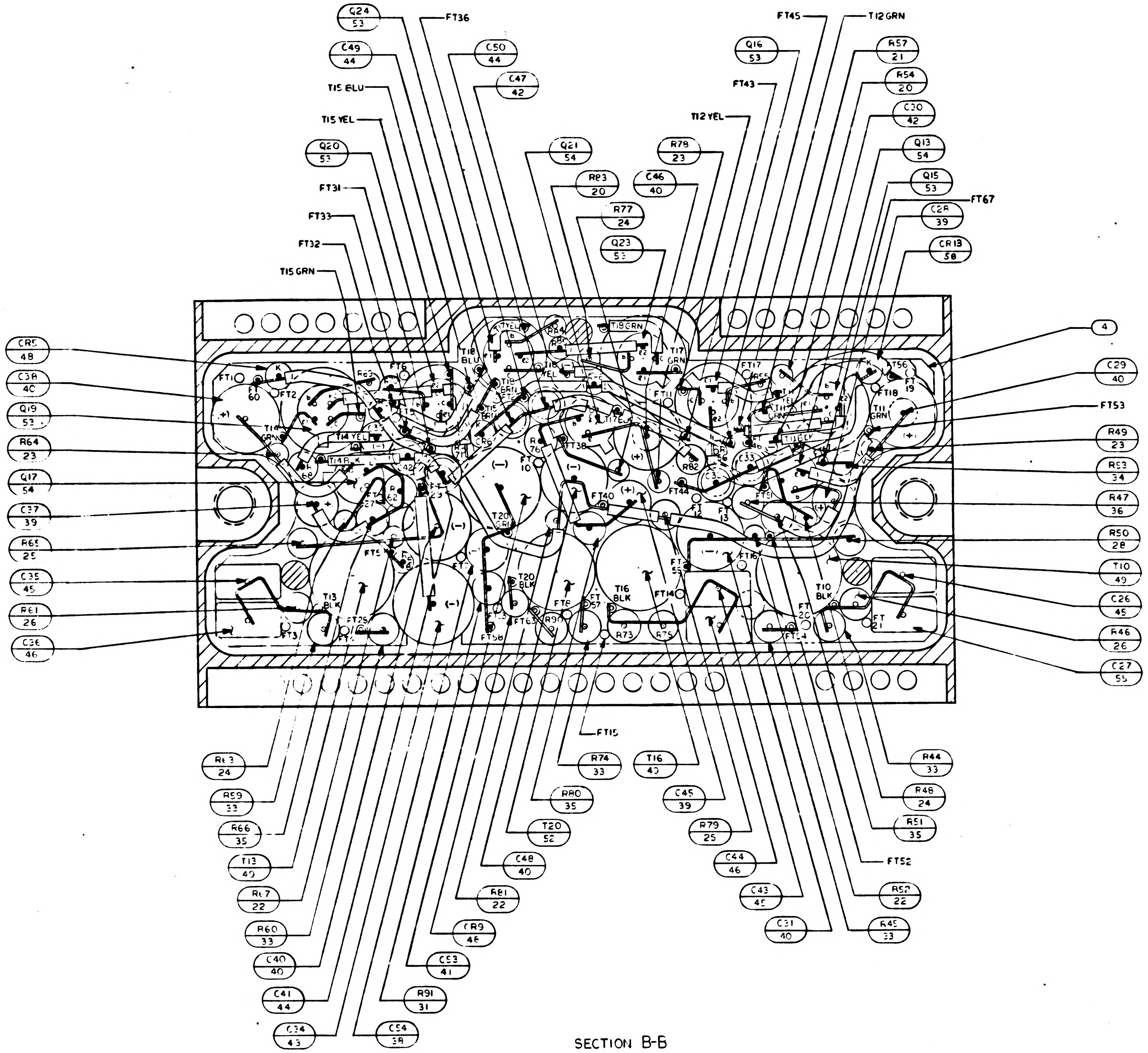
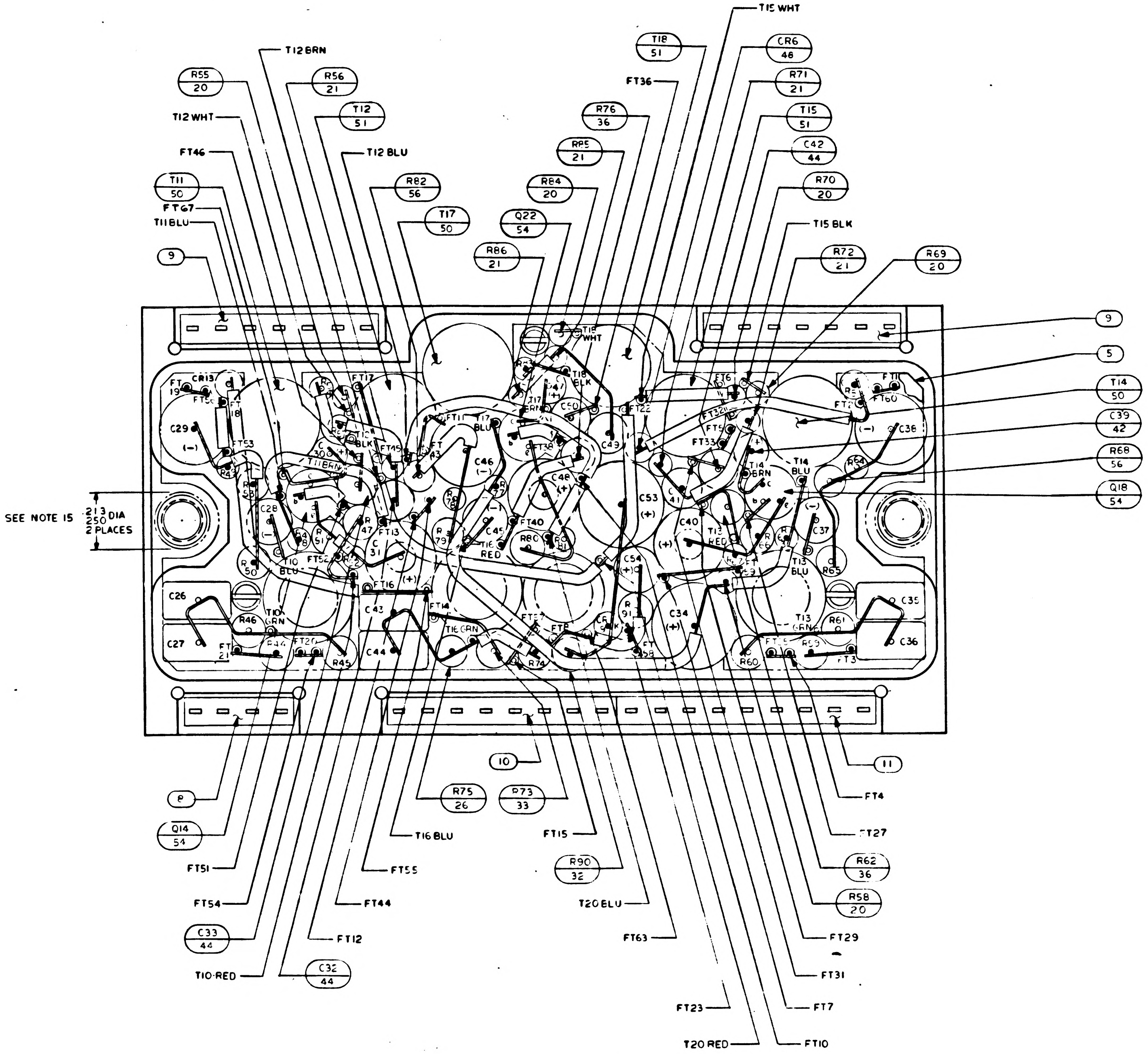

Q24 53
FT36
C49 44
C50 44
C47 42
T15 BLU
T15 YEL
Q20 53
FT31
FT33
FT32
T15 GRN
Q21 54
R83 20
C46 40
R77 24
Q23 53
R78 23
T12 YEL
FT43
Q16 53
FT45
T12 GRN
R57 21
R54 20
C30 42
Q13 54
Q15 53
FT67
C28 39
CR13 58
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
C35 45
R61 26
C36 46
4
C29 40
FT53
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 26
C27 55
T18 BLU
T17 YEL
T18 GRN
T17 GRN
T14 GRN
T14 YEL
T11 GRN
T13 BLK
T20 BLK
T16 BLK
T10 BLK
FT1
FT2
FT6
FT10
FT11
FT14
FT15
FT17
FT18
FT19
FT21
FT25
FT38
FT40
FT44
FT56
FT57
FT58
FT63
R73
R75
R82
R90
(+)
(−)
R63 24
R59 33
R66 35
T13 49
R67 22
R60 33
C40 40
C41 44
C34 43
C54 38
R91 31
C53 41
CR9 46
R81 22
C48 40
T20 52
R80 35
R74 33
T16 40
C45 39
R79 25
C44 46
C43 45
C31 40
R44 33
R48 24
R51 35
FT52
R52 22
R45 33

SECTION B-B



T15 WHT
T18 51
CR6 48
FT36
R71 21
T12 BRN
R55 20
R56 21
T12 51
R76 36
T15 51
T12 WHT
R85 21
C42 44
FT46
T12 BLU
R84 20
R70 20
T11 50
R82 56
FT67
T17 50
Q22 54
T11 BLU
T15 BLK
R86 21
R72 21
R69 20
9
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
C29
C28
C26
C27
C43
C44
C46
C45
C48
C50
C53
C54
C40
C34
C37
C38
C35
C36
T16 RED
T13 RED
T13 BLU
T13 GRN
T14 BRN
T14 BLU
T10 BLU
T10 GRN
T16 GRN
R46
R45
R74
R80
R60
R61
10
11
8
R75 26
R73 33
Q14 54
FT4
FT27
T16 BLU
FT15
R62 36
FT51
FT55
R90 32
R58 20
FT54
FT44
T20 BLU
FT29
C33 44
FT12
FT63
FT31
T10 RED
C32 44
FT23
FT7
T20 RED
FT10

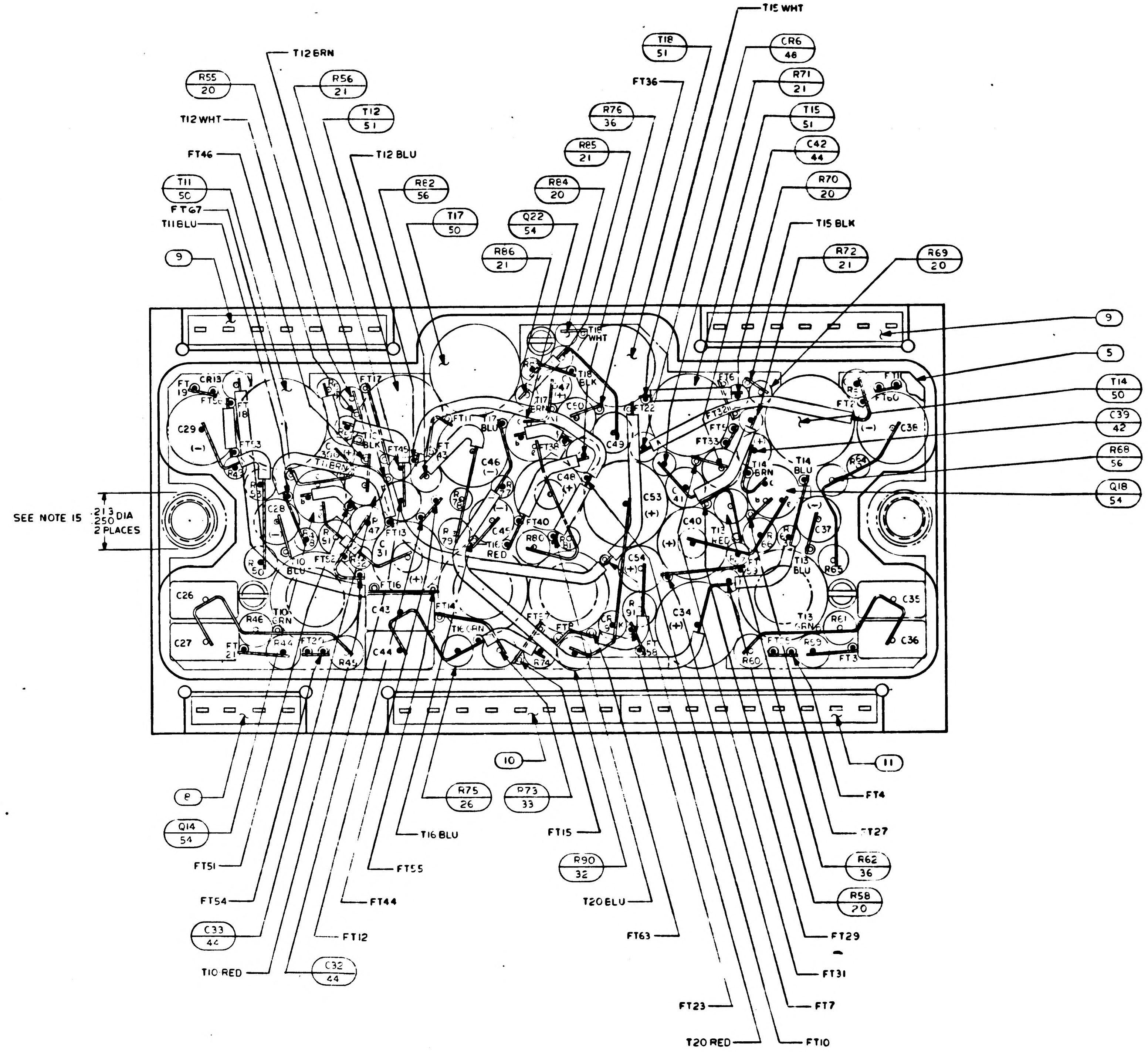
VIEW C-C

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS AN ± — ± — ± DO NOT SCALE THIS DRAWING
		MATERIAL
NEXT ASSY	USED ON	
APPLICATION		

2007240 REV LTR D SH 2 OF 2

2/2007240

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 27408			
A	REVISED PER TDRR 28564	MAY 66	
B	REVISION STATUS CHANGED	13 JUL 66	JAC
C	REVISION STATUS CHANGED	29 JUL 66	W.A.B N.S.
D	REVISED PER TDRR 30282	24 AUG 66	



T15 WHT
T18 51
CR6 48
FT36
R71 21
T12 BRN
R55 20
R56 21
R76 36
T15 51
T12 WHT
T12 51
R85 21
C42 44
FT46
T12 BLU
R84 20
R70 20
T11 50
RE2 56
Q22 54
T15 BLK
FT67
T17 50
T11 BLU
R86 21
R72 21
R69 20
9
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
C29
C26
C27
C28
C43
C44
C46
C48
C49
C50
C53
C54
C34
C40
C37
C35
C36
T18 WHT
T18 BLK
T14 BRN
T14 BLU
T13 BLU
T10 BLU
T10 GRN
T16 GRN
R46
R44
R45
R74
R60
R59
R61
R63
R64
FT16
FT13
FT14
FT17
FT22
FT33
FT40
FT3
10
11
8
Q14 54
R75 26
R73 33
FT4
T16 BLU
FT15
FT27
FT51
FT55
R90 32
R62 36
FT54
FT44
T20 BLU
R58 20
C33 44
FT12
FT63
FT29
T10 RED
C32 44
FT31
FT23
FT7
T20 RED
FT10

VIEW C-C

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 2 OF 2

2007240 REV LTR D SH 2 OF 2

2007240 D

3/2007240

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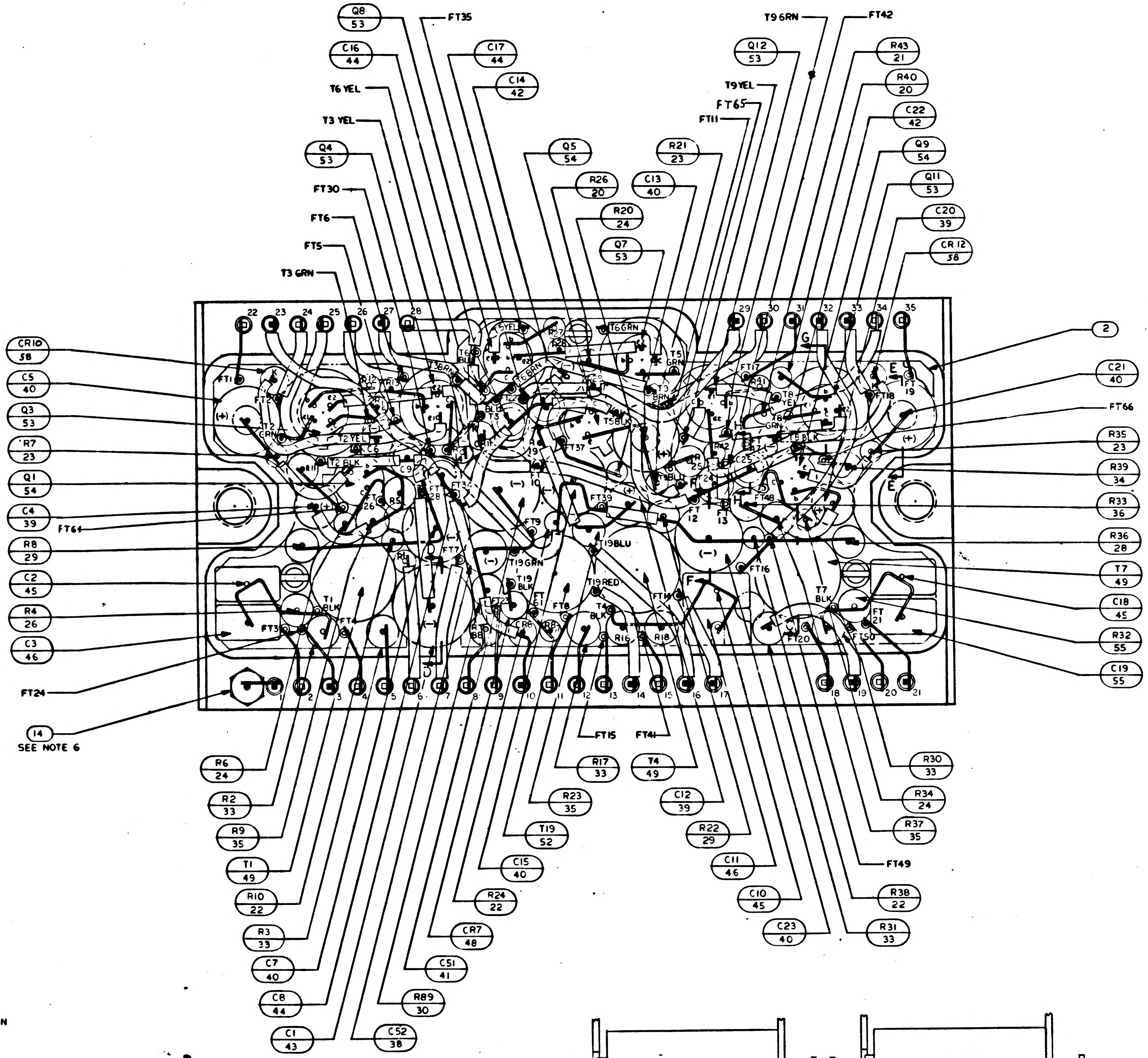
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C17 44
C14 42
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T3 YEL
Q4 53
Q5 54
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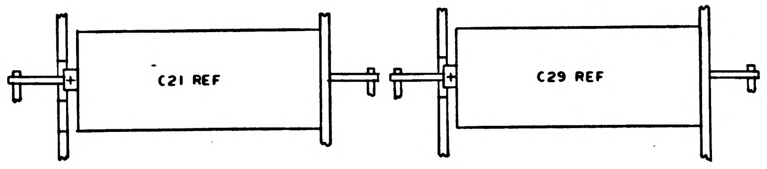
R20 24
Q7 53
FT30
FT6
FT5
T3 GRN
T9 GRN
FT42
Q12 53
R43 21
T9 YEL
R40 20
FT65
FT11
C22 42
Q9 54
Q11 53
C20 39
CR12 58
CR10 58
C5 40
Q3 53
R7 23
Q1 54
C4 39
FT64
R8 29
C2 45
R4 26
C3 46
FT24
14 SEE NOTE 6
2
C21 40
FT66
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 55
C19 55
R6 24
R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
FT15
FT41
R17 33
T4 49
R23 35
C12 39
T19 52
R22 29
C15 40
C11 46
R24 22
C10 45
CR7 48
C23 40
C51 41
R89 30
C52 38
R30 33
R34 24
R37 35
FT49
R38 22
R31 33
22 23 24 25 26 27 28 29 30 31 32 33 34 35
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
T19 BLU
T19 GRN
T19 RED
T19 BLK
T1 BLK
T4 BLK
T7 BLK
E
F
G
(+)
(−)

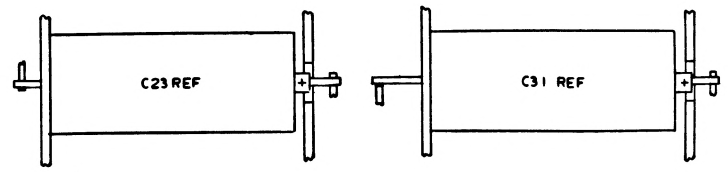
R88	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

NOTES:

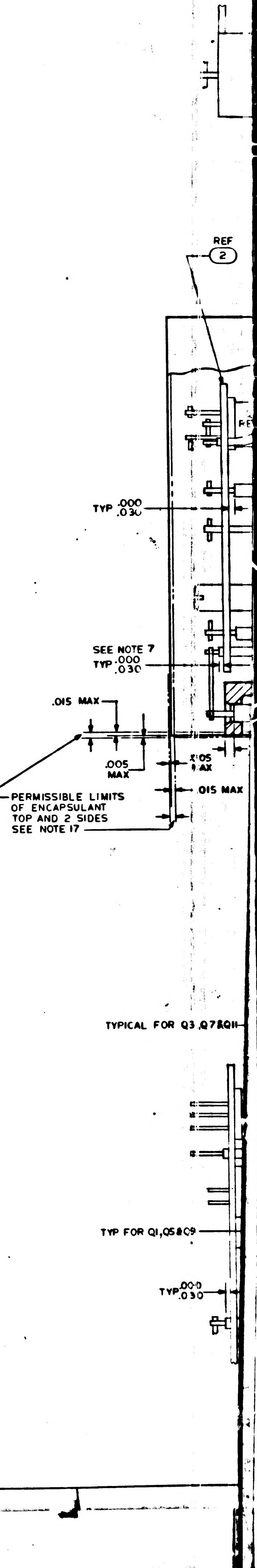
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37,47,48 AND 56
19. BOND FIND NO. 5 TO FIND NO 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO. 2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.


C21 REF
C29 REF

PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48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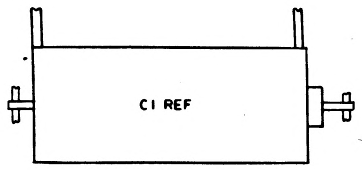
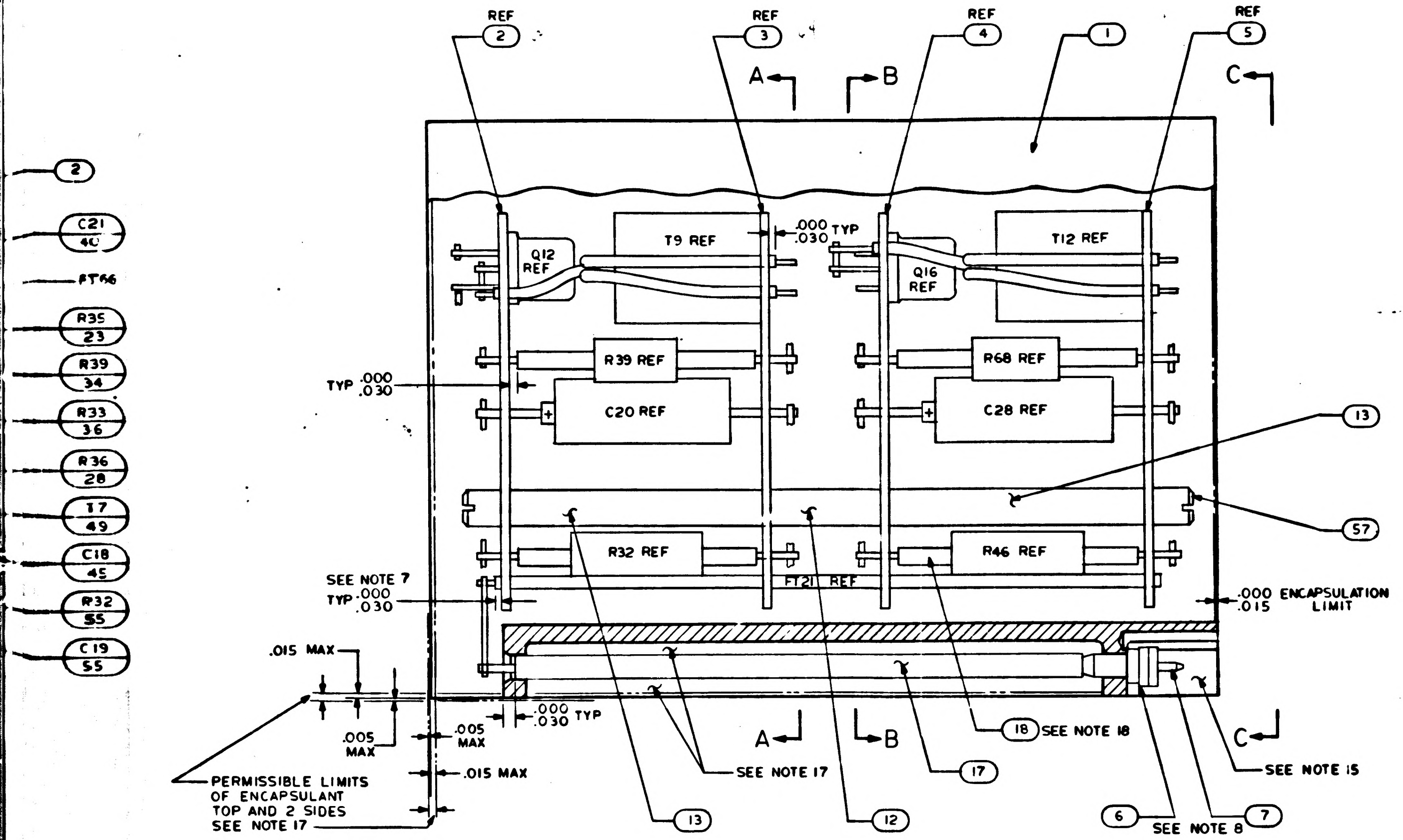
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
.005 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3,Q7&Q11
TYP FOR Q1,Q5&Q9
TYP .000 .030


C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51 & C53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R39
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R33
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R36
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17
49
C18
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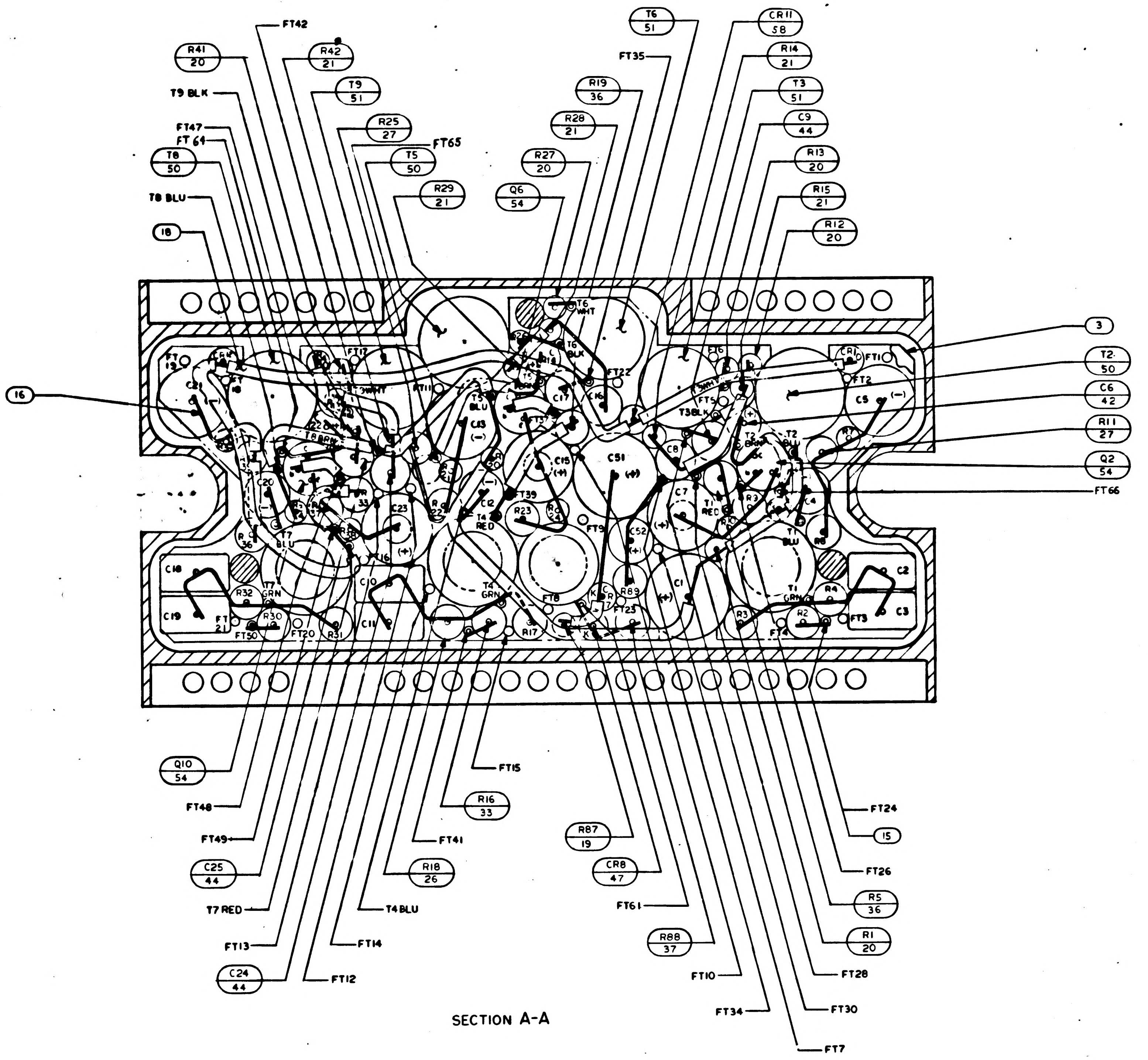
R32
55
C19
55
REF 2
REF 3
REF 4
REF 5
1
A
B
C
Q12 REF
T9 REF
.000 TYP
.030
Q16 REF
T12 REF
R39 REF
R68 REF
TYP .000
.030
C20 REF
C28 REF
13
57
R32 REF
R46 REF
SEE NOTE 7
TYP .000
.030
FT21 REF
.000 ENCAPSULATION
.015 LIMIT
.015 MAX
.005
MAX
.005
MAX
.000
.030 TYP
.015 MAX
PERMISSIBLE LIMITS
OF ENCAPSULANT
TOP AND 2 SIDES
SEE NOTE 17
SEE NOTE 17
18 SEE NOTE 18
SEE NOTE 15
17
13
12
6
SEE NOTE 8
7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R42
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FT35
R14
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T9
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36
T3
51
FT47
FT 64
R25
27
R28
21
C9
44
T8
50
FT65
T5
50
R27
20
R13
20
R29
21
Q6
54
R15
21
T8 BLU
R12
20
18
16
3
T2
50
C6
42
R11
27
Q2
54
FT66
C51
C1
C2
C3
C5
C7
C8
C10
C11
C12
C13
C15
C17
C18
C19
C20
C21
C23
C52
Q10
54
FT15
FT48
R16
33
FT24
R87
19
15
FT49
FT41
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R18
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T4 BLU
FT61
R5
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FT13
FT14
R88
37
R1
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C24
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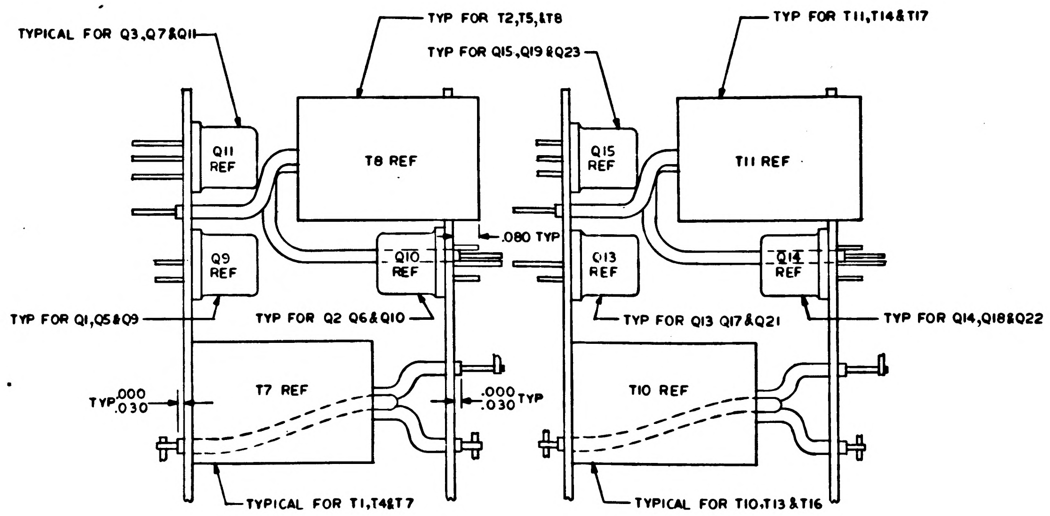
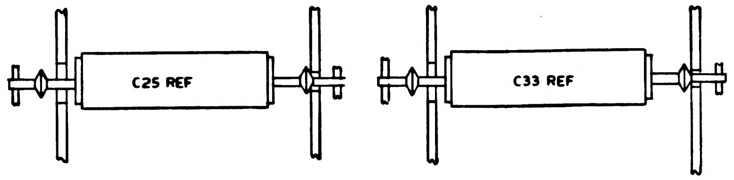
FT28
FT34
FT30
FT7

SECTION A-A


TYPICAL FOR Q3,Q7&Q11
TYP FOR T2,T5,&T8
TYP FOR T11,T14&T17
TYP FOR Q15,Q19&Q23
Q11 REF
T8 REF
Q15 REF
T11 REF
Q9 REF
Q10 REF
.080 TYP
Q13 REF
Q14 REF
TYP FOR Q1,Q5&Q9
TYP FOR Q2 Q6&Q10
TYP FOR Q13 Q17&Q21
TYP FOR Q14,Q18&Q22
T7 REF
T10 REF
TYP .000
.030
.000 TYP
.030
TYPICAL FOR T1,T4&T7
TYPICAL FOR T10,T13&T16

PARTIAL SECTION G-G

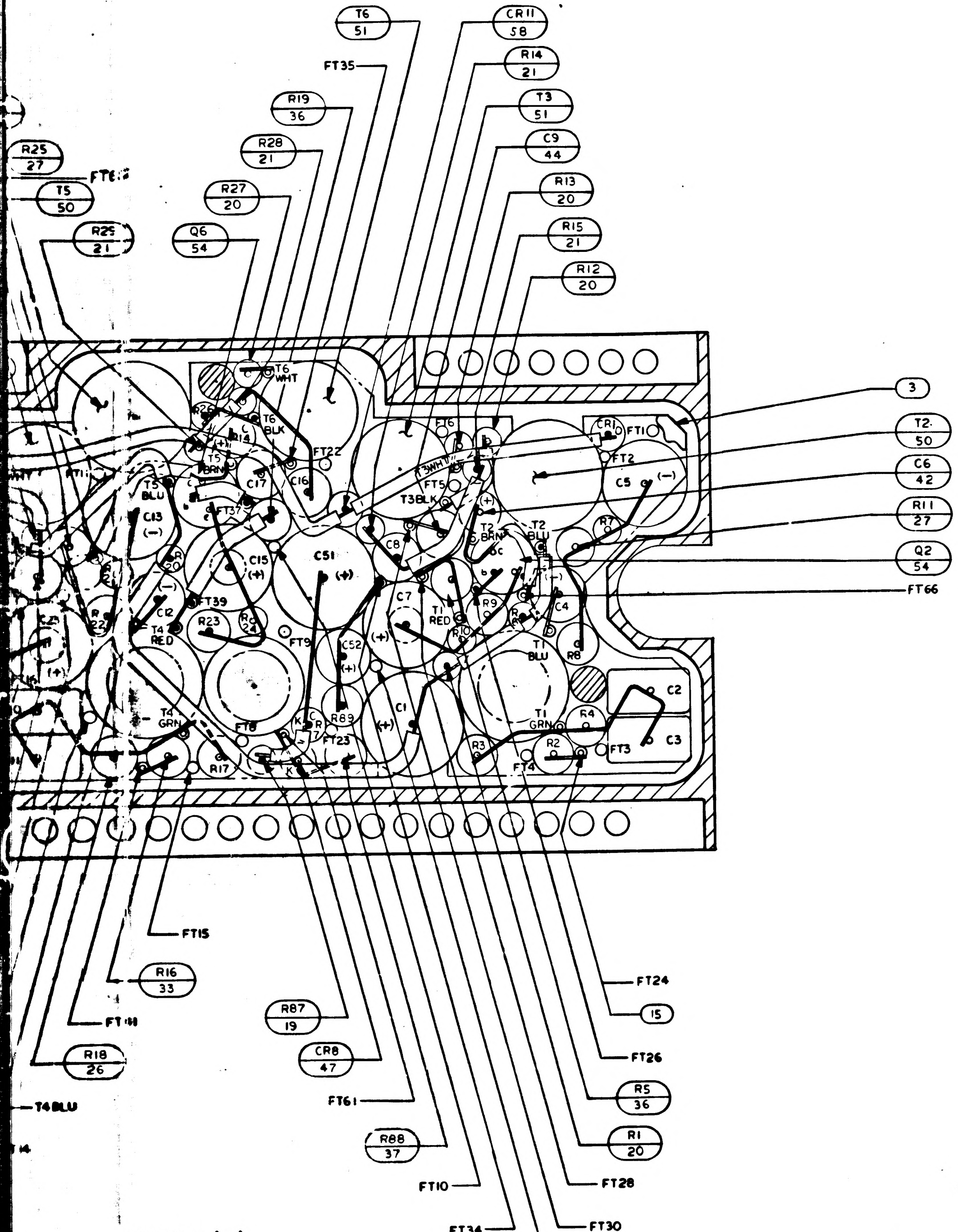

C25 REF
C33 REF

PARTIAL SECTION H-H
TYPICAL FOR C8 C9-C16 C17 C24 C25 C32
C33 C41 C42 C49 AND C50

2007240	REV LTR E	SH 1 OF 2

REVISIONS 27408

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 28564	EM	LSB	5 MAY 66		
B		REVISED PER TDRR 29918			13 JUL 66		
C		REVISED PER TDRR 30249	WAB	N.S.	29 JUL 66		
D		REVISED PER TDRR 30282			24 AUG 66		
E		REVISED PER TDRR 30407	EC		28 SEP 66		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FT35
R19 36
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C9 44
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R27 20
R15 21
Q6 54
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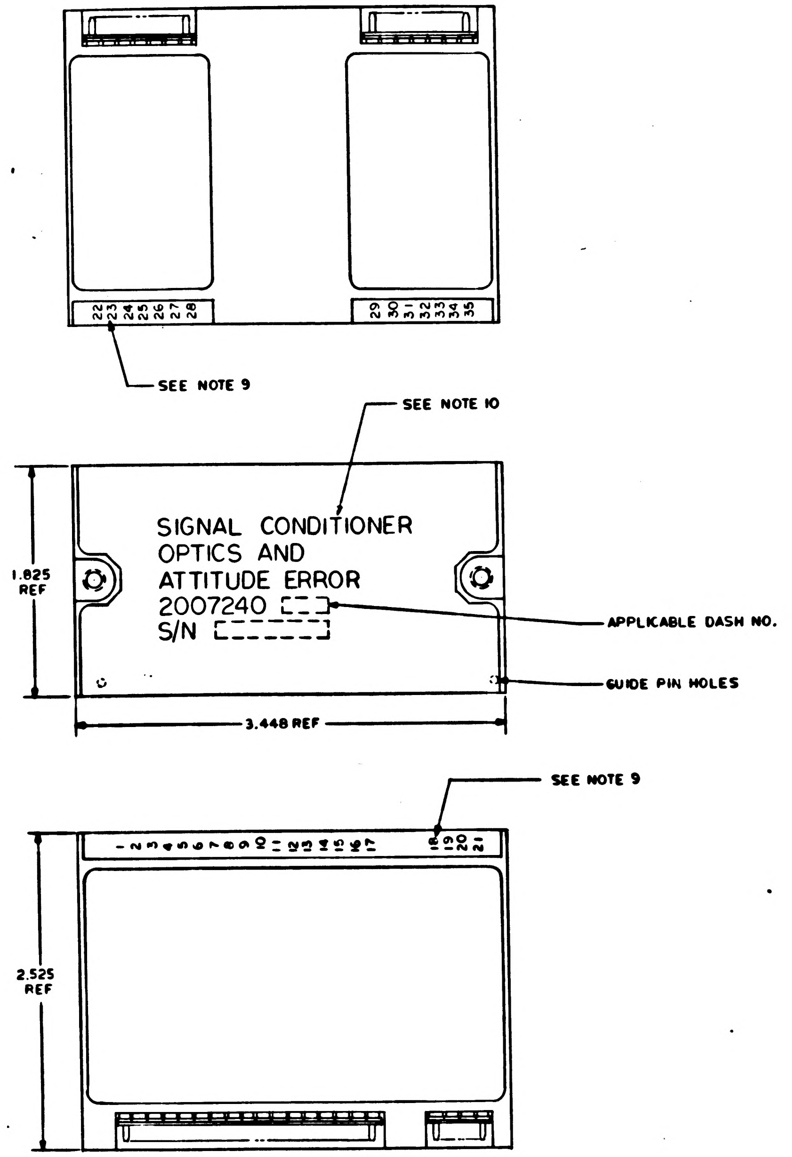
R25 27
T5 50
R25 21
FT6
3
T2 50
C6 42
R11 27
Q2 54
FT66
FT15
R16 33
FT41
R87 19
CR8 47
R18 26
T4BLU
FT61
R88 37
FT10
FT34
FT7
FT30
FT28
R1 20
R5 36
FT26
15
FT24

SECTION A-A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29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
1.825 REF
3.448 REF
APPLICABLE DASH NO.
GUIDE PIN HOLES
SEE NOTE 9
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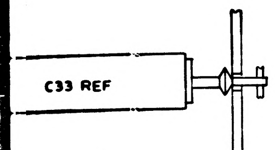
2.525 REF

MARKING VIEWS
SCALE 2/1



QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010123		SCHEMATIC	REF
2	1010364-693		RESISTOR	59
4	1008815-9		DIODE	58
12	1008161-1		SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-198		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
4	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-182		CAPACITOR	43
6	1006755-69		CAPACITOR	42
2	1006755-40		CAPACITOR	41
12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364 SEE NOTE 26		RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-312		RESISTOR	34
12	1010364-653		RESISTOR	33
1	1010364-403		RESISTOR	32
1	1010364-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010311-51		RESISTOR	28
2	1010311-306		RESISTOR	27
4	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
6	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008168-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006782-9		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR.WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD B	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1
-011	LIST OF MATERIALS			

E
2007240

NEXT ASSY	USED ON
2007235	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Scoppcrigo 7 Mar 66
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C.
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 1 OF 2

2007240 REV E SH 1 OF

3/2007240

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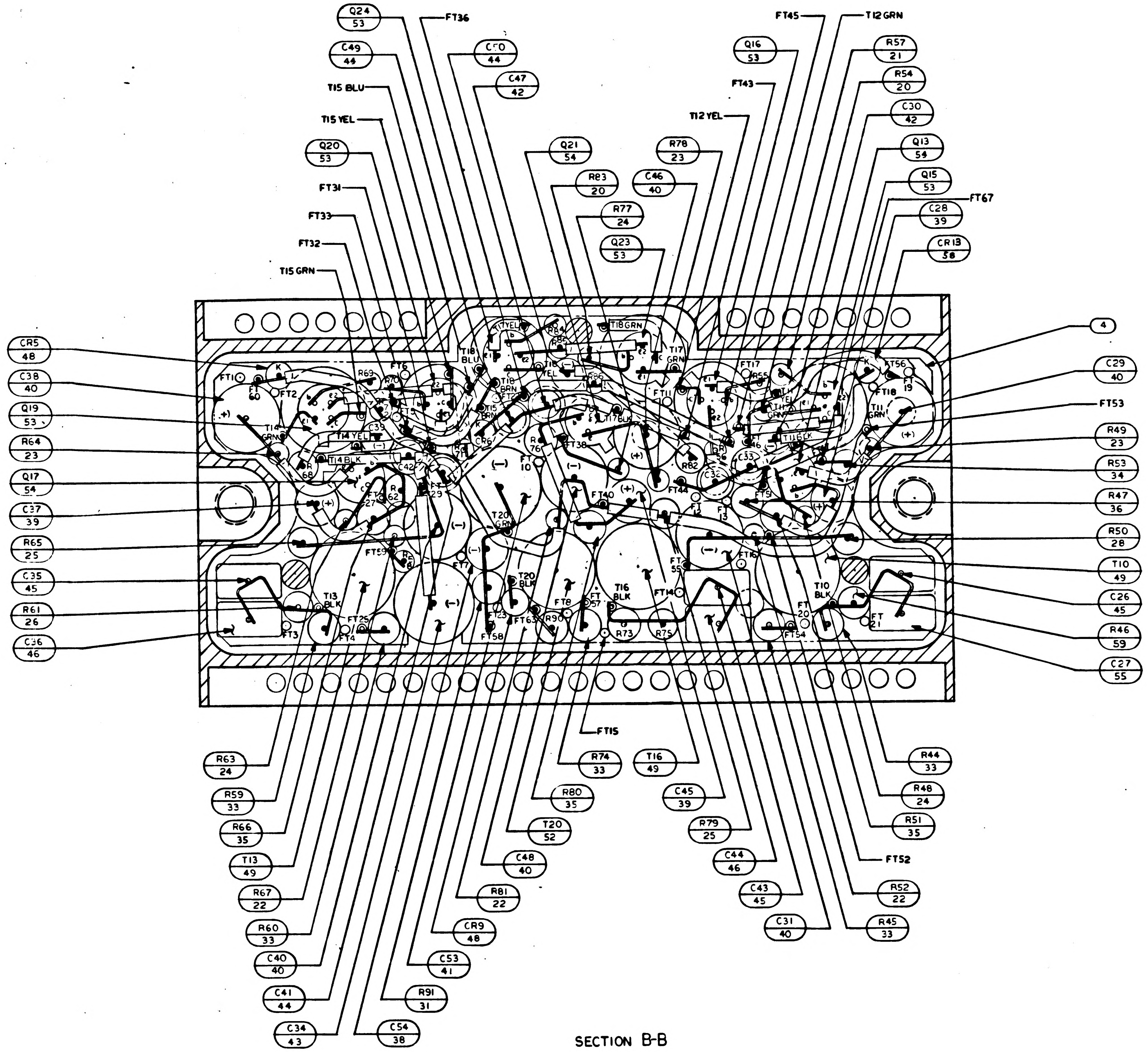
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FT33
FT32
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FT36
C50 44
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T12 GRN
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R54 20
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Q15 53
FT67
C28 39
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CR5 48
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T16 BLK
T13 BLK
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R69
R82
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C33
C32
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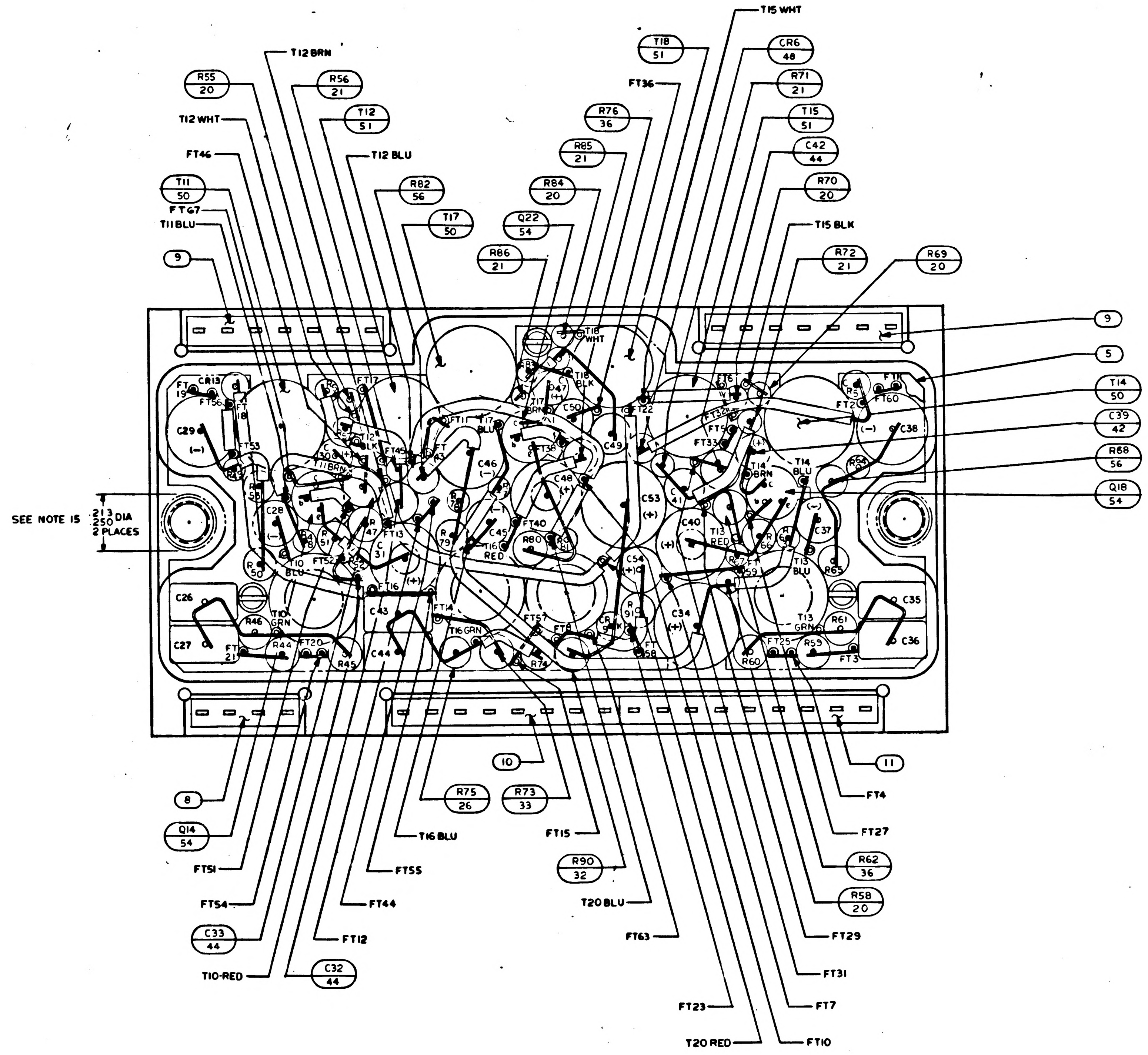
SECTION B-B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9
Q22 54
R86 21
R84 20
R85 21
R76 36
T18 51
FT36
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
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T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
2.13 2.50 DIA 2 PLACES
C29 (−)
C28
C26
C27
C43
C44
C46 (−)
C45
C48 (+)
C53 (+)
C54 (+)
C34 (+)
C40 (+)
C37 (−)
C38 (−)
C35
C36
C47
C49
C50
CR13
FT19
FT56
FT53
FT21
FT20
FT52
FT16
FT14
FT57
FT40
FT38
FT11
FT45
FT13
FT17
FT25
FT3
FT60
FT2
FT33
FT22
R46
R44
R45
R80
R74
R60
R59
R61
R63
T10 BLU
T10 GRN
T11 BRN
T12 BLK
T16 GRN
T16 RED
T17 BLU
T17 BRN
T18 WHT
T18 BLK
T13 RED
T13 BLU
T13 GRN
T14 BRN
T14 BLU
11
FT4
FT27
R62 36
R58 20
FT29
FT31
FT7
FT10
T20 RED
FT23
FT63
T20 BLU
R90 32
FT15
R73 33
R75 26
10
T16 BLU
FT55
FT44
FT12
C32 44
T10-RED
C33 44
FT54
FT51
Q14 54
8

VIEW C-C

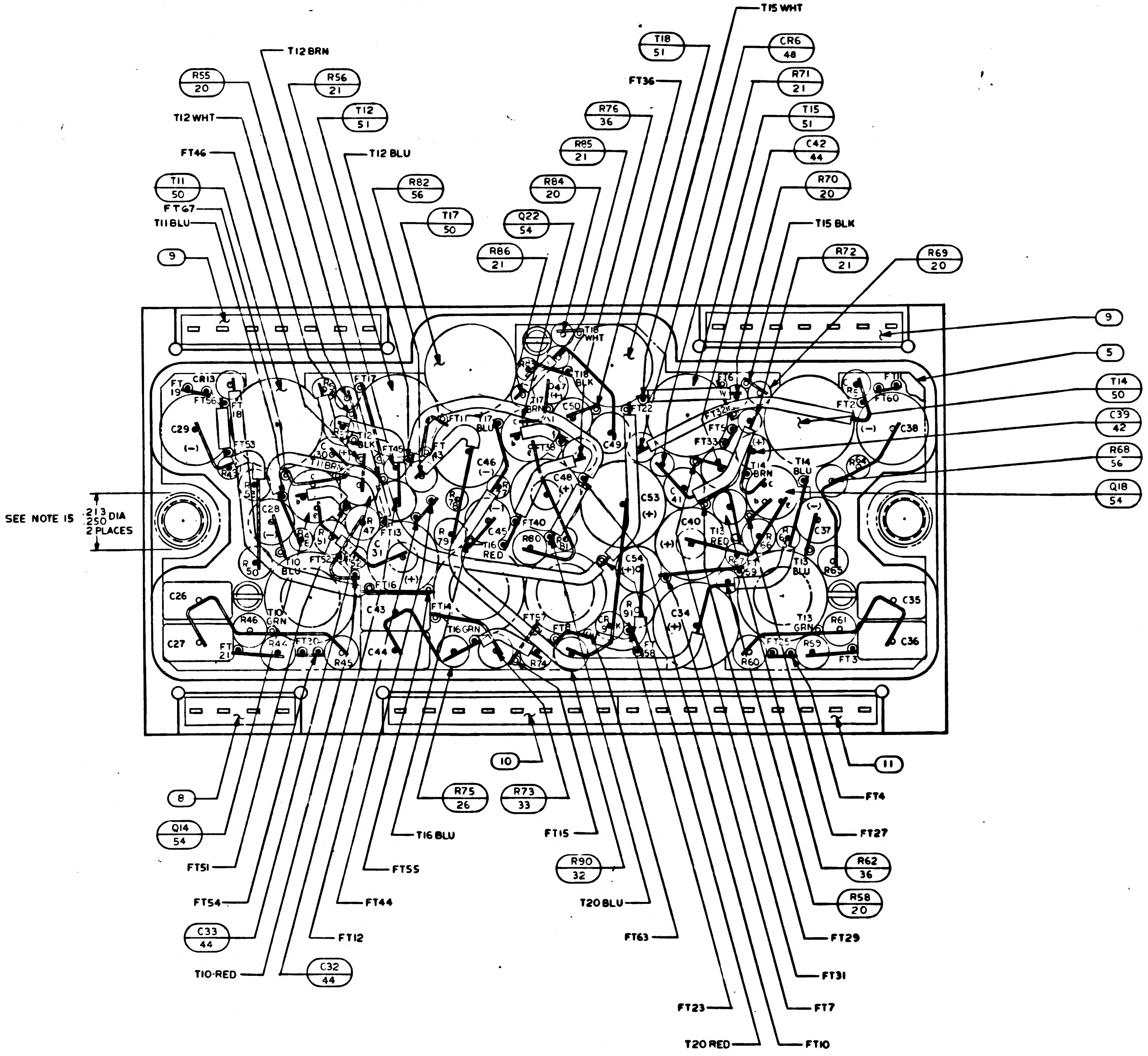
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS AN
± —— ± —— ±
DO NOT SCALE THIS DRAWING

MATERIAL

2007240 REV LTR E SH 2 OF 2

REVISIONS 27408			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28564	5 MAY 66	EMS
B	*REVISION STATUS CHANGED*	13-JUL-66	JRC
C	REVISION STATUS CHANGED	29-JUL-66	W.A.B. N.S
D	REVISED PER TDRR 30282	24-AUG-66	JLC
E	REVISED PER TDRR 30407	28 SEP 66	EC


T12 BRN
R55 20
T12 WHT
R56 21
T12 51
FT46
T12 BLU
T11 50
FT67
T11 BLU
R82 56
T17 50
9
T15 WHT
T18 51
CR6 48
FT36
R71 21
R76 36
T15 51
R85 21
C42 44
R84 20
R70 20
Q22 54
R86 21
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10 RED
10
R75 26
R73 33
T16 BLU
FT55
FT44
FT12
C32 44
FT15
R90 32
T20 BLU
FT63
FT23
T20 RED
11
FT4
FT27
R62 36
R58 20
FT29
FT31
FT7
FT10

VIEW C-C

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Sonarrigo 9/1/66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

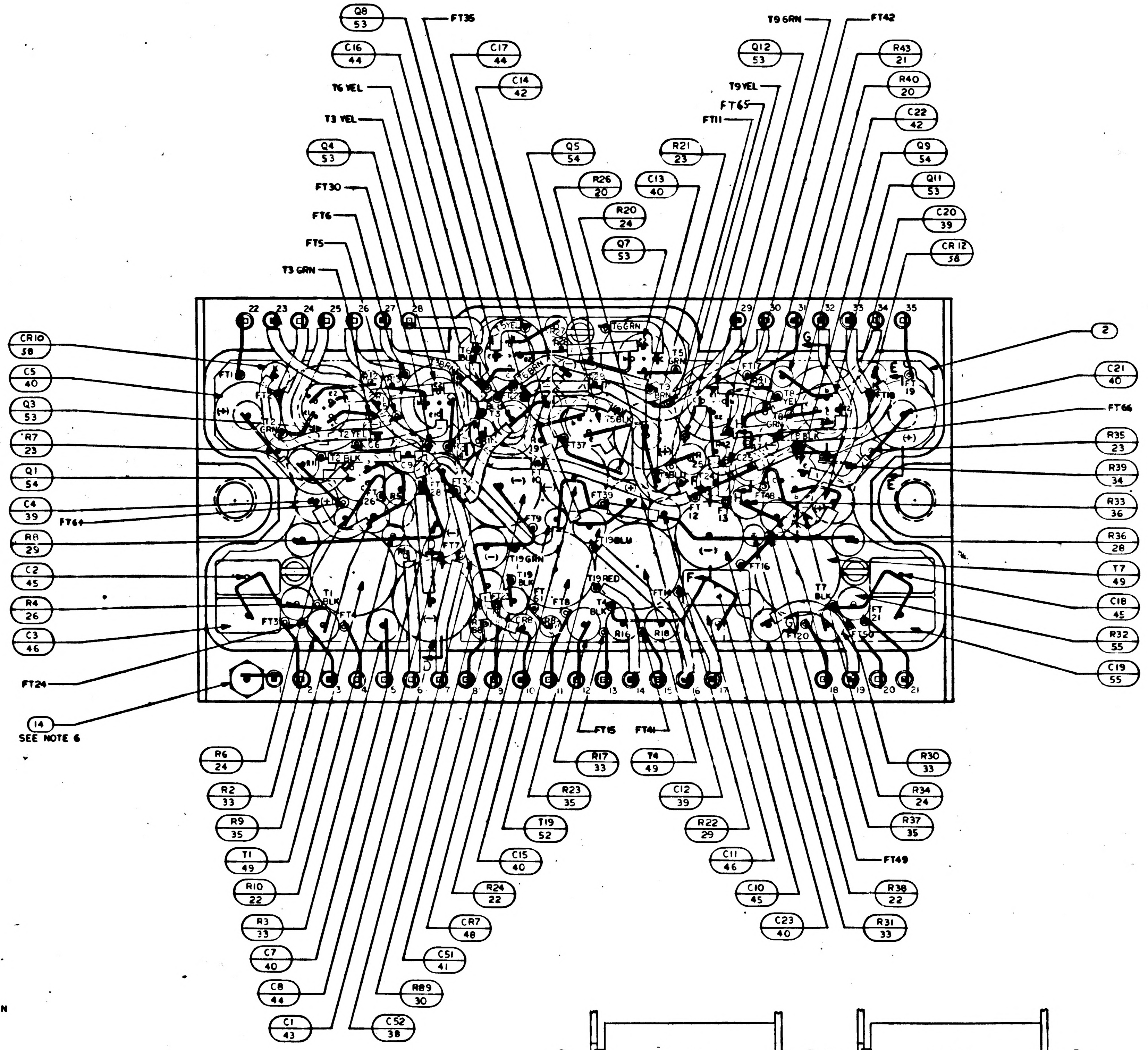
OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 2 OF 2

2007240 E

2007240	REV LTR E	SH 2 OF 2

3/2007240

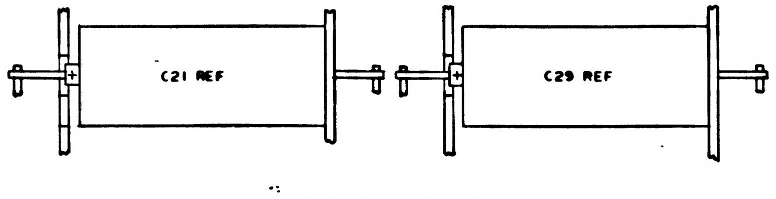


Q8 53
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
FT30
FT6
FT5
T3 GRN
Q5 54
R21 23
C13 40
R26 20
R20 24
Q7 53
T9 GRN
FT42
Q12 53
R43 21
T9 YEL
R40 20
FT65
FT11
C22 42
Q9 54
Q11 53
C20 39
CR12 38
CR10 38
C5 40
Q3 53
R7 23
Q1 54
C4 39
FT64
R8 29
C2 45
R4 26
C3 46
FT24
14
SEE NOTE 6
2
C21 40
FT66
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 55
C19 55
22 23 24 25 26 27 28 29 30 31 32 33 34 35
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
T19 GRN
T19 BLU
T19 RED
T19 BLK
T1 BLK
T4 BLK
T7 BLK
FT15
FT41
R6 24
R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
R17 33
T4 49
R23 35
C12 39
T19 52
R22 29
C15 40
C11 46
R24 22
C10 45
CR7 48
C23 40
C51 41
R89 30
C52 38
R30 33
R34 24
R37 35
FT49
R38 22
R31 33

R88	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

NOTES:

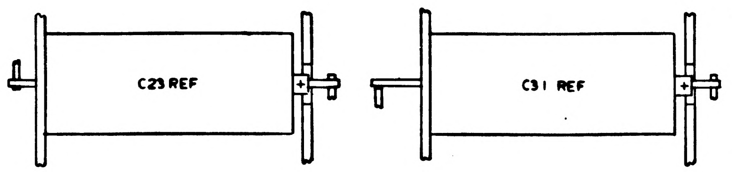
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO. 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37, 47, 48 AND 56
19. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
20. BOND Q1, Q3, Q4, Q5, Q7, Q8, Q9, Q11, Q12, T1, T4, T7 AND T19 TO FIND NO. 2 PER ND1002004 TYPE I
21. BOND Q2, Q6, Q10, T2, T3, T5, T6, T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13, Q15, Q16, Q17, Q19, Q20, Q21, Q23, Q24, T10, T13, T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14, Q18, Q22, T11, T12, T14, T15, T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.



C21 REF
C29 REF

PARTIAL SECTION E-E

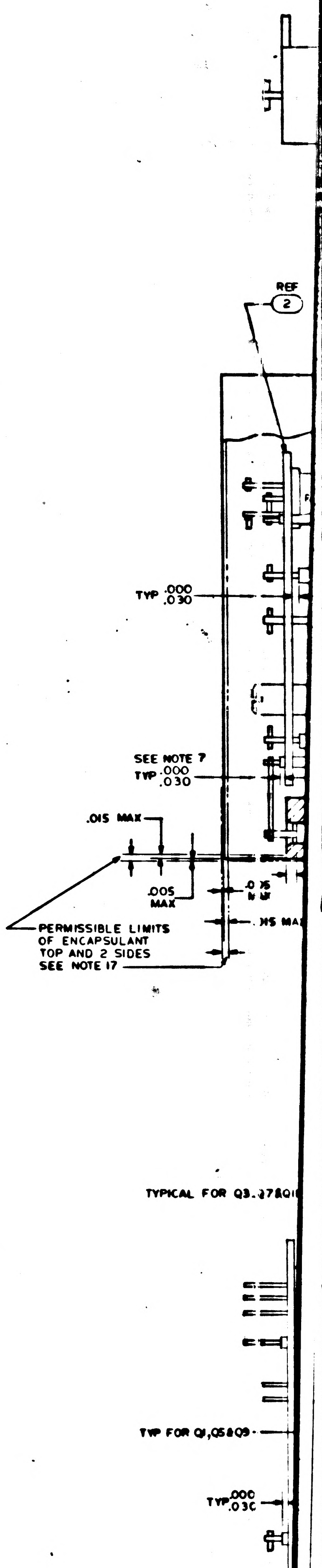
TYPICAL FOR C5, C13, C21, C29, C38 AND C46



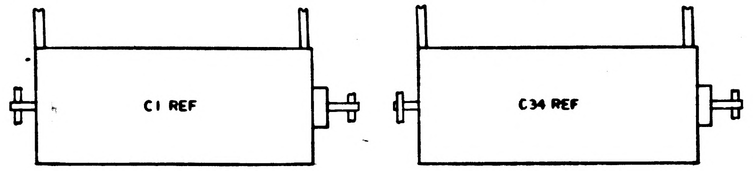
C23 REF
C31 REF

PARTIAL SECTION F-F

TYPICAL FOR C7, C15, C23, C31, C40 AND C48

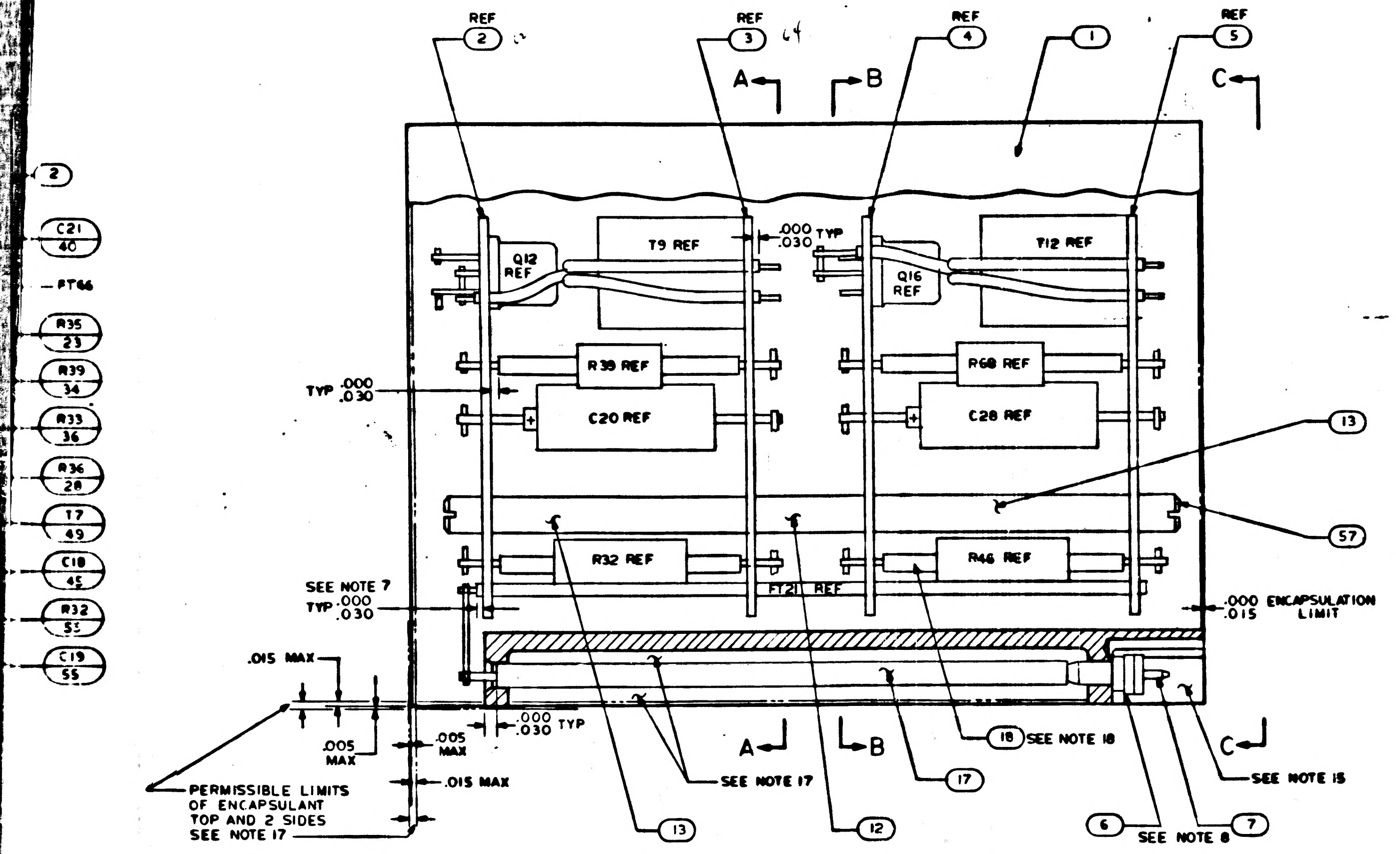


REF
2
TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3, 7 & Q1
TYP FOR Q1, Q5 & Q9
TYP .000 .030

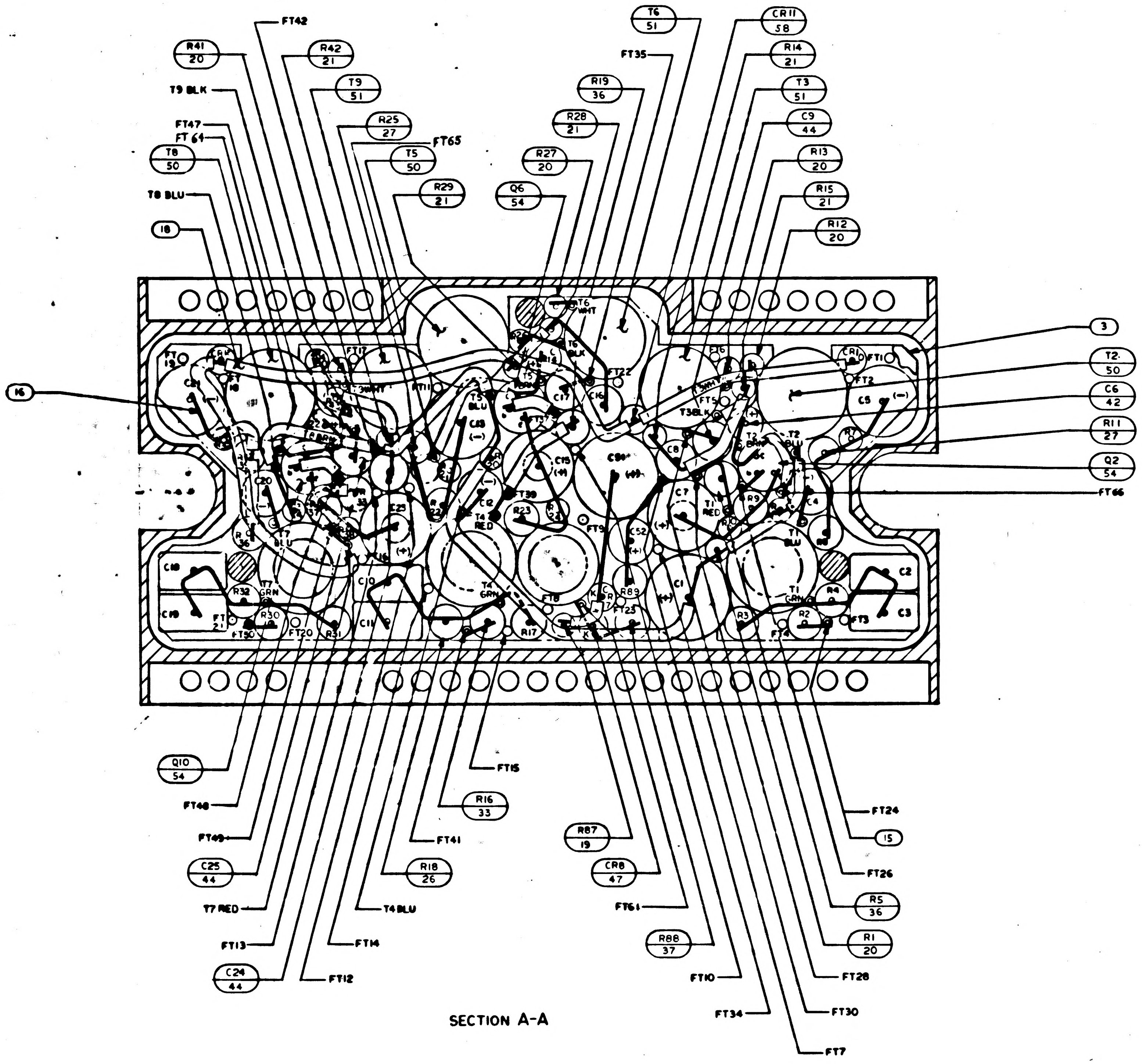


C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51 & C53

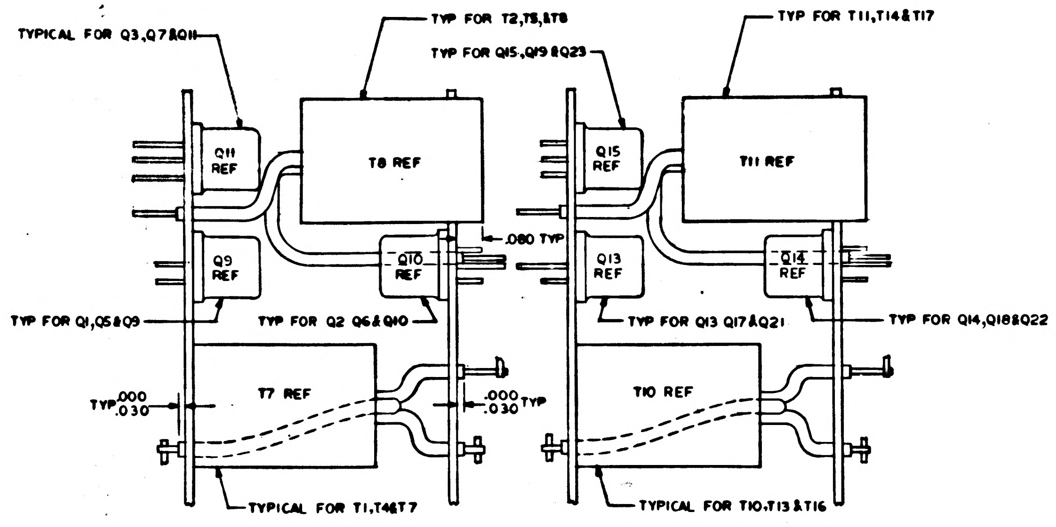


REF 2
REF 3
REF 4
REF 5
1
A
B
C
Q12 REF
T9 REF
.000 .030 TYP
Q16 REF
T12 REF
R39 REF
R68 REF
TYP .000 .030
C20 REF
C28 REF
13
57
R32 REF
R46 REF
FT21 REF
SEE NOTE 7
TYP .000 .030
.000 ENCAPSULATION .015 LIMIT
.015 MAX
.005 MAX
.005 MAX
.000 .030 TYP
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
18 SEE NOTE 18
SEE NOTE 17
SEE NOTE 15
17
13
12
6
SEE NOTE 8
7
2
C21 40
FT66
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 55
C19 55



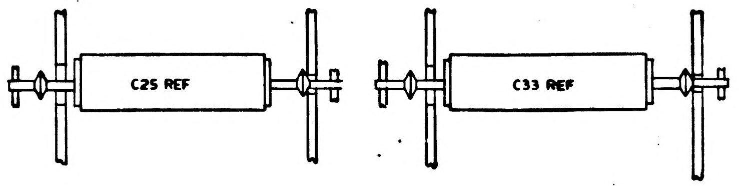
FT42
R41 20
R42 21
T9 BLK
T9 51
R25 27
FT47
FT 64
FT65
T8 50
T5 50
T8 BLU
R29 21
Q6 54
18
16
T6 51
FT35
CR11 58
R14 21
R19 36
R28 21
T3 51
C9 44
R27 20
R13 20
R15 21
R12 20
3
T2 50
C6 42
R11 27
Q2 54
FT66
T6 WHT
T6 BLK
T5 BLU
T3 BLK
T2 BLU
T4 RED
T1 RED
T4 GRN
T7 GRN
T1 GRN
T1 BLU
C5 (−)
C80 (+)
C2
C3
C18
C19
FT22
FT5
FT39
FT9
FT25
FT8
FT20
FT30
FT3
FT4
R32
R30
R31
R17
R89
R23
R2
R3
R4
R9
C1
C7
C8
C10
C11
C12
C13
C15
C16
C17
C25
C52
Q10 54
FT48
FT49
C25 44
T7 RED
FT13
C24 44
FT15
R16 33
FT41
R18 26
T4 BLU
FT14
FT12
R87 19
CR8 47
FT61
R88 37
FT10
FT34
FT7
FT24
15
FT26
R5 36
R1 20
FT28
FT30

SECTION A-A



TYPICAL FOR Q3, Q7 & Q11
TYP FOR T2, T5, & T8
TYP FOR Q15, Q19 & Q23
TYP FOR T11, T14 & T17
Q11 REF
T8 REF
Q15 REF
T11 REF
Q9 REF
Q10 REF
.080 TYP
Q13 REF
Q14 REF
TYP FOR Q1, Q5 & Q9
TYP FOR Q2 Q6 & Q10
TYP FOR Q13 Q17 & Q21
TYP FOR Q14, Q18 & Q22
TYP .000 .030
T7 REF
.000 .030 TYP
T10 REF
TYPICAL FOR T1, T4 & T7
TYPICAL FOR T10, T13 & T16

PARTIAL SECTION G-G



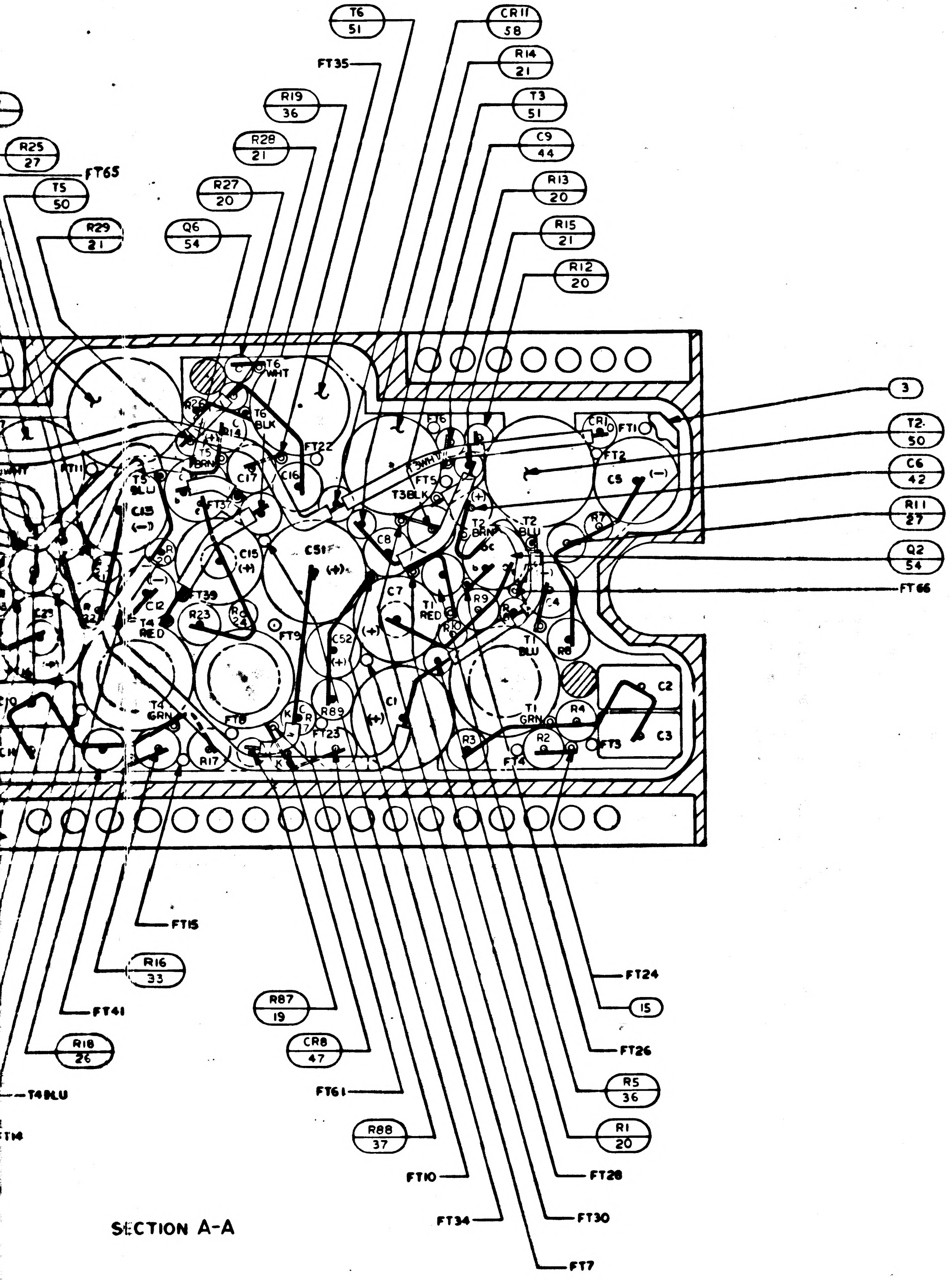
C25 REF
C33 REF

PARTIAL SECTION H-H
TYPICAL FOR C8 C9 C16 C17 C24 C25 C32 C33 C41 C42 C49 AND C50

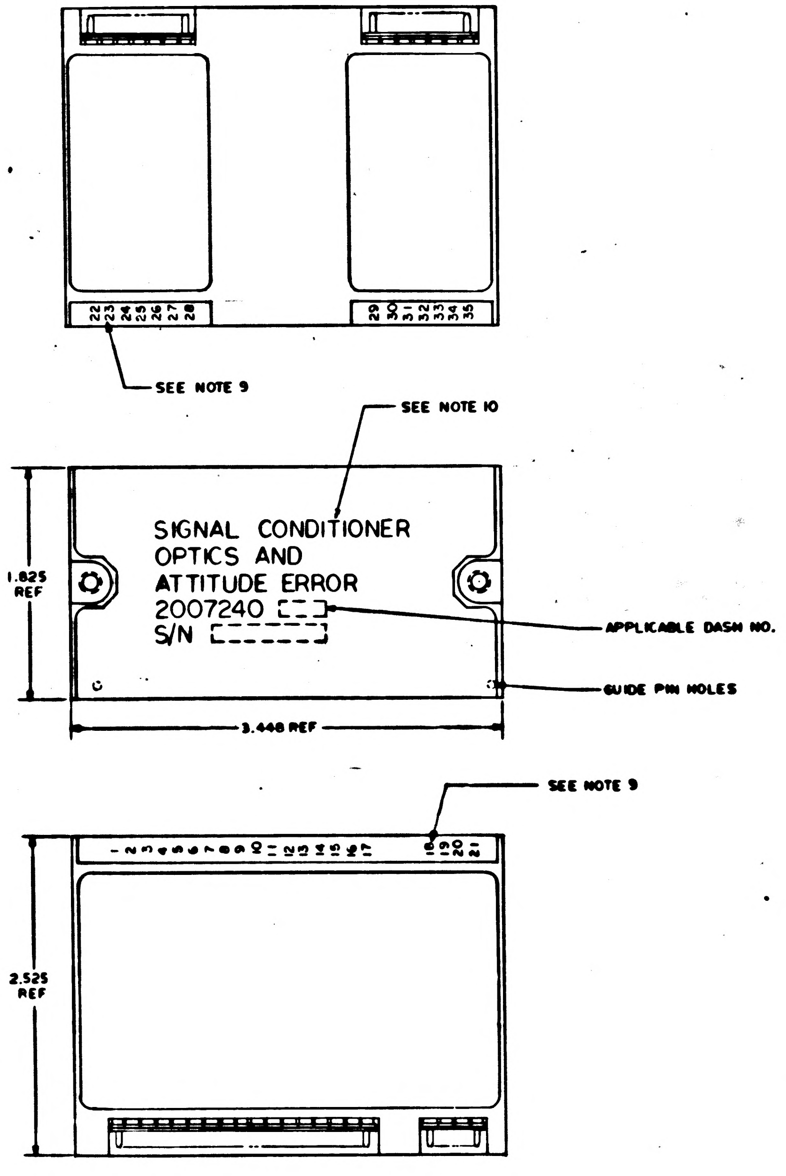
2007240	REV LTR F	SH 1 OF 2

2/2007240

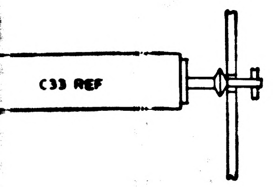
REVISIONS 27408							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 28564	EM	LEB	5 MAY 66		5-3-66
B		REVISED PER TDRR 29918		JRC	19 JUL 66		
C		REVISED PER TDRR 30249	WAB	N.S.	29 JUL 66		
D		REVISED PER TDRR 30282			24 AUG 66		
E		REVISED PER TDRR 30407	EC		28 SEP 66		
F		REVISED PER TDRR 31486	EC		21 OCT 66		


T6
51
CR11
58
R14
21
FT35
R19
36
T3
51
R28
21
C9
44
R25
27
FT65
R27
20
R13
20
T5
50
Q6
54
R15
21
R29
21
R12
20
T6 WHT
T6 BLK
FT22
CR1
FT1
FT2
C5
FT16
FT5
T3 BLK
C16
C17
T5 BLU
T5 GRN
FT11
C15
C51
C8
T2 BRN
T2 BLU
FT39
C12
C7
T1 RED
R9
T4 RED
R23
FT9
C52
T1 BLU
R8
C2
C1
R89
T4 GRN
FT8
FT25
R3
T1 GRN
R4
R2
FT3
C3
R17
FT4
3
T2
50
C6
42
R11
27
Q2
54
FT66
FT15
R16
33
FT41
R87
19
CR8
47
R18
26
T4 BLU
FT61
R88
37
FT10
FT34
FT30
FT7
FT28
R1
20
R5
36
FT26
15
FT24

SECTION A-A


22 23 24 25 26 27 28
29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
APPLICABLE DASH NO.
GUIDE PIN HOLES
1.825 REF
3.448 REF
SEE NOTE 9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
2.525 REF

MARKING VIEWS
SCALE 2/1



☒	2010123		SCHEMATIC	REF
2	1010364-693		RESISTOR	59
4	1008815-9		DIODE	58
12	1008161-1		SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-198		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
4	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-182		CAPACITOR	43
6	1006755-69		CAPACITOR	42
2	1006755-40		CAPACITOR	41
12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364 SEE NOTE 28		RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-312		RESISTOR	34
12	1010364-653		RESISTOR	33
1	1010364-403		RESISTOR	32
1	1010364-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010311-51		RESISTOR	28
2	1010311-306		RESISTOR	27
4	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
6	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008168-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006782-16		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR. WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD B	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS			

2007240

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2007240
SCALE 5/1 | SHEET 1 OF 2

2007240 SIZE J SH 1/2

3/2007240

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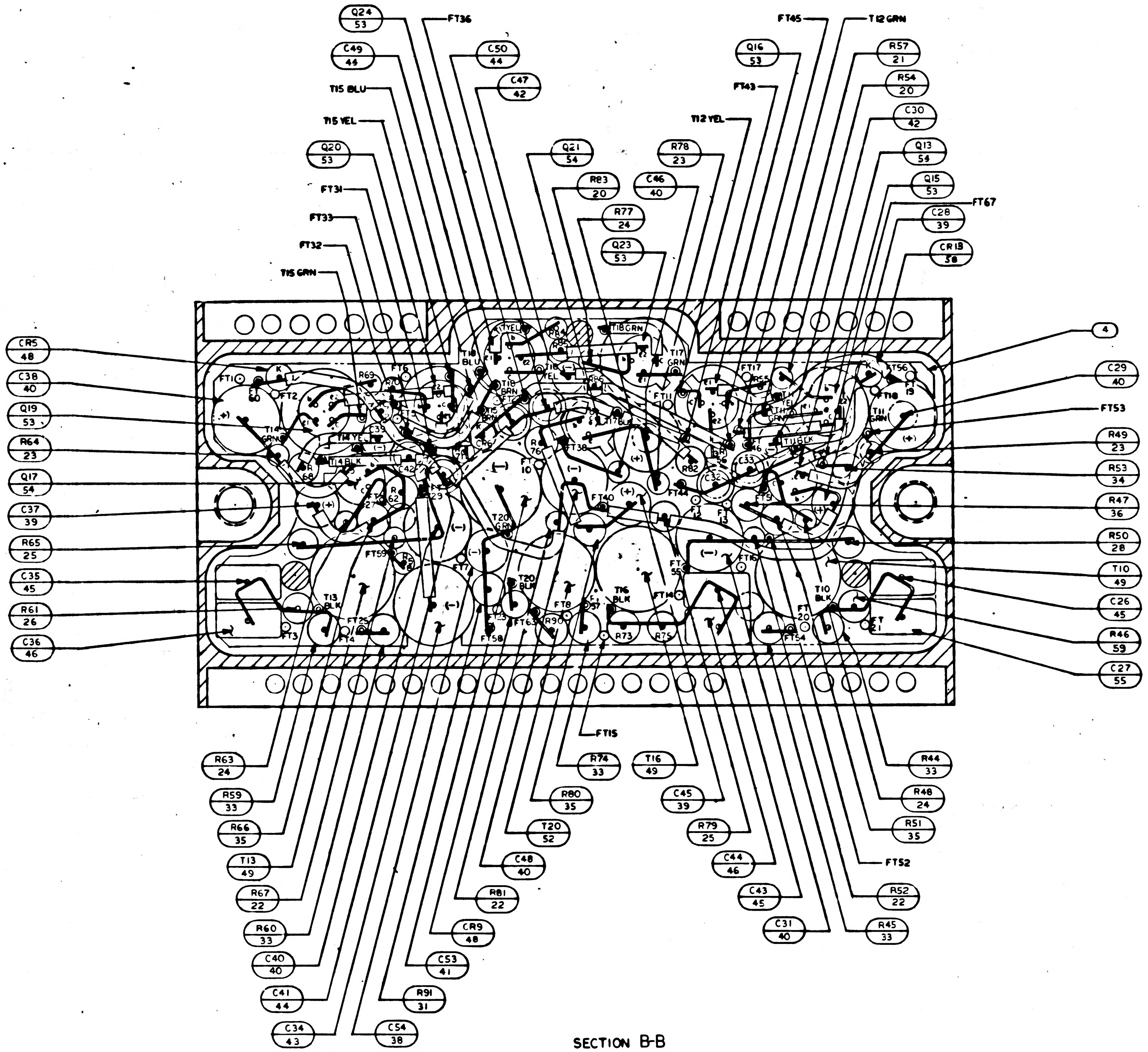
Q24 53
FT36
C49 44
C50 44
C47 42
T15 BLU
T15 YEL
Q20 53
FT31
FT33
FT32
T15 GRN
Q21 54
R83 20
R77 24
Q23 53
R78 23
C46 40
FT45
T12 GRN
Q16 53
R57 21
FT43
R54 20
C30 42
T12 YEL
Q13 54
Q15 53
FT67
C28 39
CR18 38
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
C35 45
R61 26
C36 46
4
C29 40
FT53
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 59
C27 55
T18 BLU
T18 GRN
T17 GRN
T16 BLK
T20 GRN
T20 BLK
T13 BLK
T10 BLK
T11 GRN
T14 GRN
FT1
FT2
FT6
FT11
FT17
FT38
FT40
FT44
FT56
FT59
FT58
FT63
FT54
FT25
FT14
FT18
R69
R73
R75
R82
R90
(+)
(−)
R63 24
R59 33
R66 35
T13 49
R67 22
R60 33
C40 40
C41 44
C34 43
C54 38
R91 31
C53 41
CR9 48
R81 22
C48 40
T20 52
R80 35
R74 33
FT15
T16 49
C45 39
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C31 40
R45 33
R52 22
FT52
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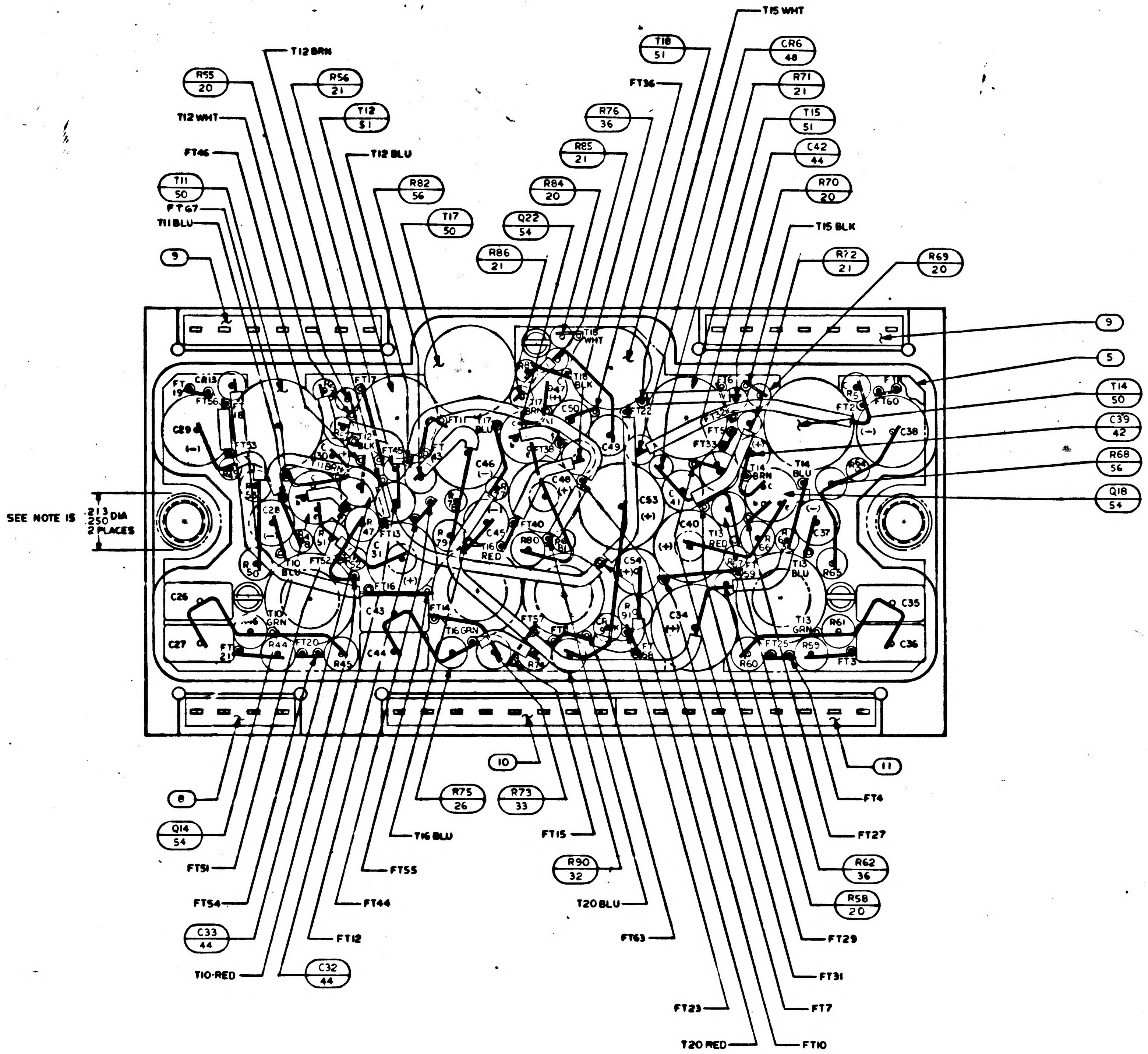
R48 24
R44 33

SECTION B-B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R55 20
R56 21
T12 WHT
T12 51
FT46
T12 BLU
T11 50
FT67
T11 BLU
R82 56
T17 50
9
R86 21
Q22 54
R84 20
R85 21
R76 36
T18 51
FT36
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213
.250 DIA
2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10-RED
C32 44
FT12
FT44
FT55
T16 BLU
R75 26
R73 33
10
FT15
R90 32
T20 BLU
FT63
FT23
T20 RED
FT10
FT7
FT31
FT29
R58 20
R62 36
FT27
FT4
11

VIEW C-C

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

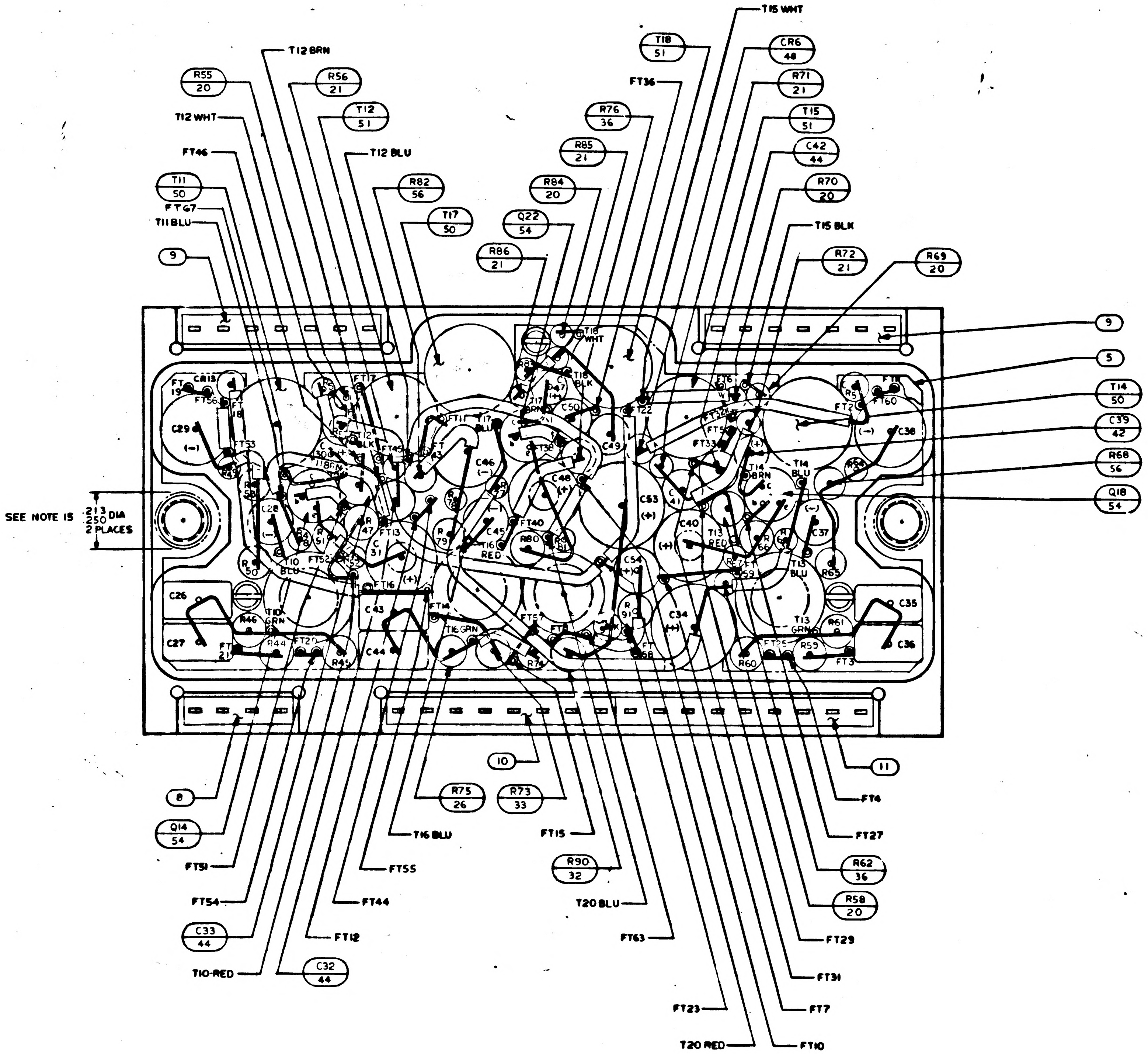
QTY REQD

DRAWN
CHECKED
APPROVED
APPROVED

2007240 REV LTR F SH 2

2/2007240

SYM	REVISIONS 27408 DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28564	5 MAY 66	EMLS
B	REVISION STATUS CHANGED	13 JUL 66	JRC
C	REVISION STATUS CHANGED	25 JUL 66	W.A.B. N.S.
D	REVISED PER TDRR 30282	24 AUG 66	JC
E	REVISED PER TDRR 30407	28 SEP 66	EC
F	REVISION STATUS CHANGED	21 OCT 66	EC



T12 BRN
R55 20
R56 21
T12 WHT
T12 51
T12 BLU
FT46
T11 50
FT67
T11 BLU
R82 56
T17 50
Q22 54
R86 21
R84 20
R85 21
R76 36
T18 51
FT36
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213
.250 DIA
2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10-RED
C32 44
FT12
FT44
FT55
T16 BLU
R75 26
R73 33
10
FT15
R90 32
T20 BLU
FT63
FT23
T20 RED
FT10
FT7
FT31
FT29
R58 20
R62 36
FT27
FT4
11

VIEW C-C

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2007240
SCALE 5/1 | SHEET 2 OF 2

2007240 F

2007240 REV LTR F SH 2 2

3/2007240

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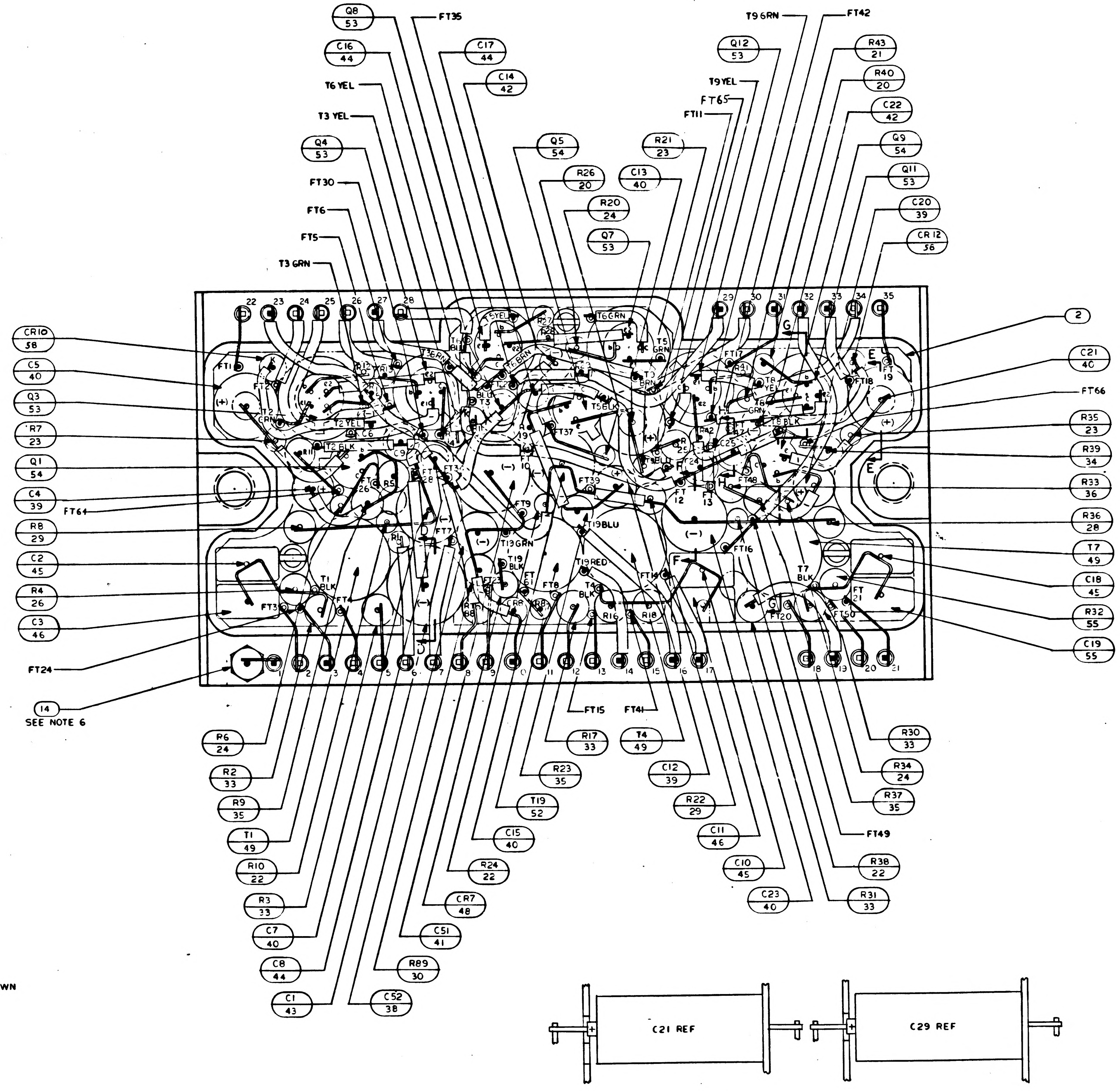
D

R88	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

C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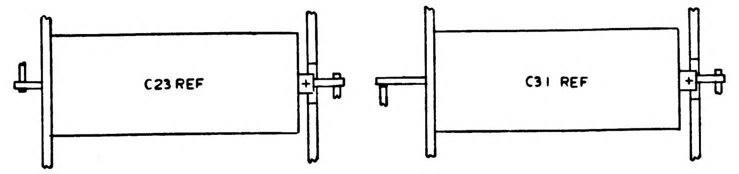
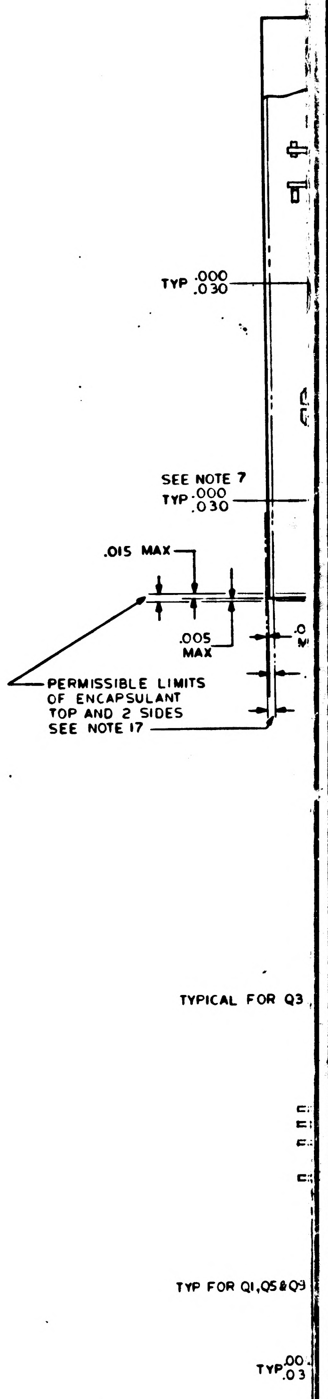
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
Q5 54
R21 23
R26 20
C13 40
R20 24
Q7 53
FT30
FT6
FT5
T3 GRN
T9 6RN
FT42
Q12 53
R43 21
T9 YEL
FT65
FT11
R40 20
C22 42
Q9 54
Q11 53
C20 39
CR12 56
22 23 24 25 26 27 28 29 30 31 32 33 34 35
T5YEL
T6GRN
T5 GRN
CR10 58
C5 40
Q3 53
R7 23
Q1 54
C4 39
FT64
R8 29
C2 45
R4 26
C3 46
FT24
14 SEE NOTE 6
2
C21 40
FT66
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 55
C19 55
T1 BLK
T19 BLK
T4 BLK
T7 BLK
T19BLU
T19GRN
T19RED
E
F
G
(+)
(-)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
FT15
FT41
R6 24
R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
R17 33
T4 49
R23 35
T19 52
C15 40
R24 22
CR7 48
C51 41
R89 30
C52 38
C12 39
R22 29
C11 46
C10 45
C23 40
R30 33
R34 24
R37 35
FT49
R38 22
R31 33
C21 REF
C29 REF

PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48

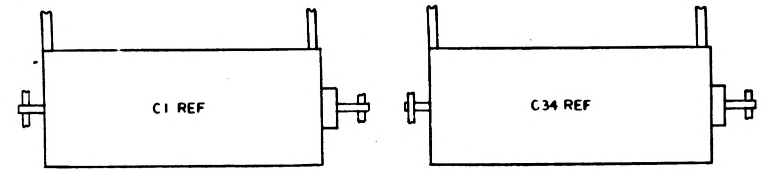

TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3
TYP FOR Q1,Q5&Q9
TYP .00 .03

B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002136
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37,47,48 AND 56
19. BOND FIND NO. 5 TO FIND NO 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO. 2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240
28. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT FOR MODULE MOUNTING SURFACES PER ND1002292. CONNECTOR GASKET AND CONTACTS TO BE FREE OF POLYURETHANE.

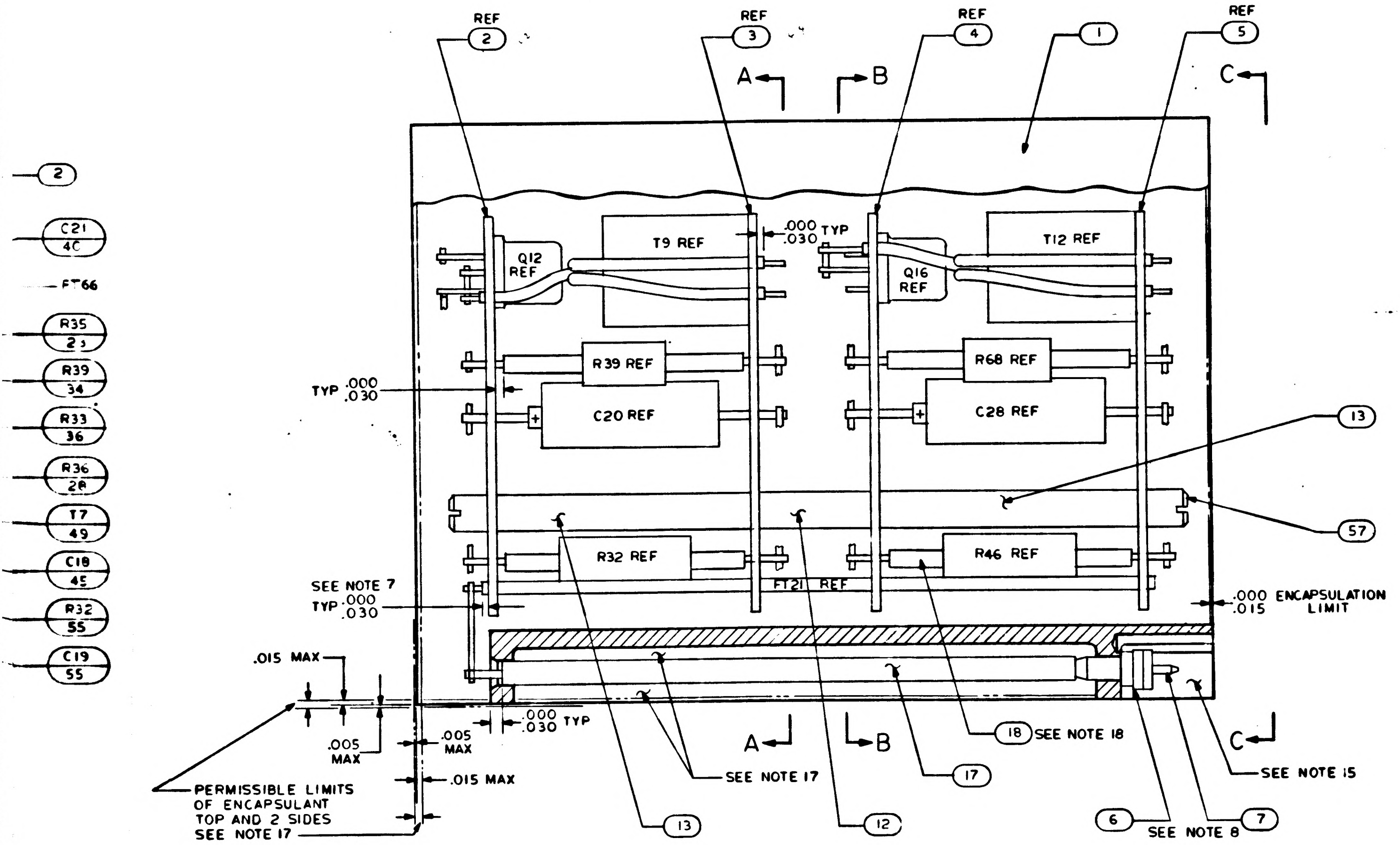
A

2007240 G


C1 REF
C34 REF

PARTIAL SECTION D-D

TYPICAL FOR C51&C53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REF
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REF
4
REF
5
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A
B
C
T9 REF
.000
.030
TYP
T12 REF
Q12
REF
Q16
REF
R39 REF
R68 REF
TYP .000
.030
C20 REF
C28 REF
13
57
R32 REF
R46 REF
FT21 REF
SEE NOTE 7
TYP .000
.030
.000 ENCAPSULATION
.015 LIMIT
.015 MAX
.005
MAX
.005
MAX
.015 MAX
.000
.030 TYP
PERMISSIBLE LIMITS
OF ENCAPSULANT
TOP AND 2 SIDES
SEE NOTE 17
SEE NOTE 17
18 SEE NOTE 18
17
SEE NOTE 15
13
12
6
SEE NOTE 8
7
2
C21
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FT66
R35
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R39
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C18
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R32
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C19
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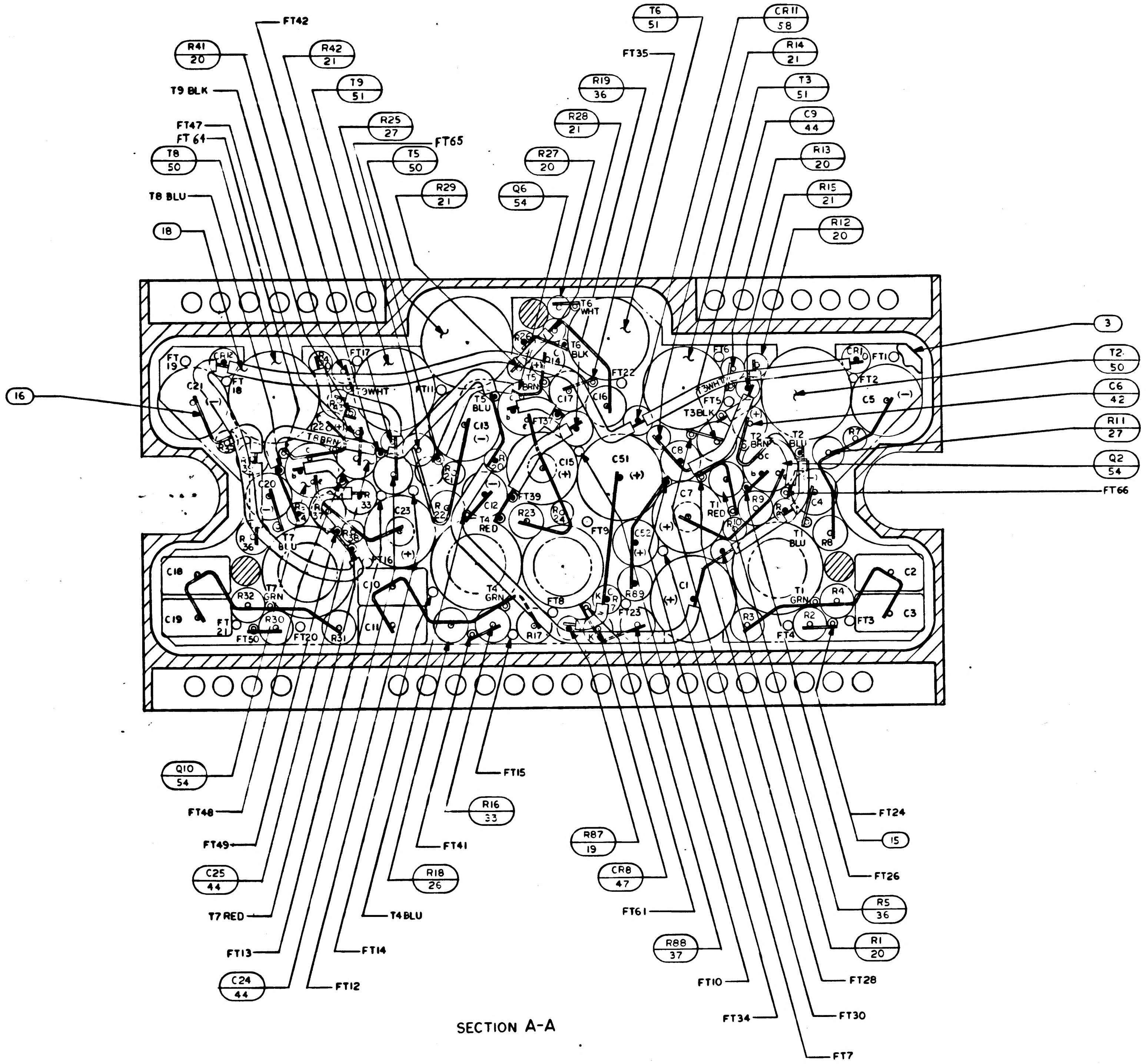
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R27
20
R29
21
Q6
54
R28
21
R19
36
T6
51
FT35
CR11
58
R14
21
T3
51
C9
44
R13
20
R15
21
R12
20
T8 BLU
18
16
3
T2
50
C6
42
R11
27
Q2
54
FT66
T6 WHT
T6 BLK
T5 BLU
T3 BLK
T2 BRN
T2 BLU
FT1
FT2
CR1
C21
C5
C20
C51
C15
C13
C16
C17
C12
C23
C7
C8
C52
C1
C4
C18
C19
C2
C3
C10
C11
T7 BLU
T7 GRN
T4 RED
T4 GRN
T1 RED
T1 BLU
T1 GRN
R23
R9
R8
R7
R3
R4
R2
R30
R31
R32
R17
R69
FT9
FT8
FT4
FT3
FT20
FT21
FT22
FT23
FT39
FT50
FT11
FT17
FT18
FT19
(+)
(-)
Q10
54
FT48
FT49
C25
44
T7 RED
FT13
C24
44
FT12
FT14
T4 BLU
R18
26
FT41
R16
33
FT15
R87
19
CR8
47
FT61
R88
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FT10
FT34
FT7
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FT28
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20
R5
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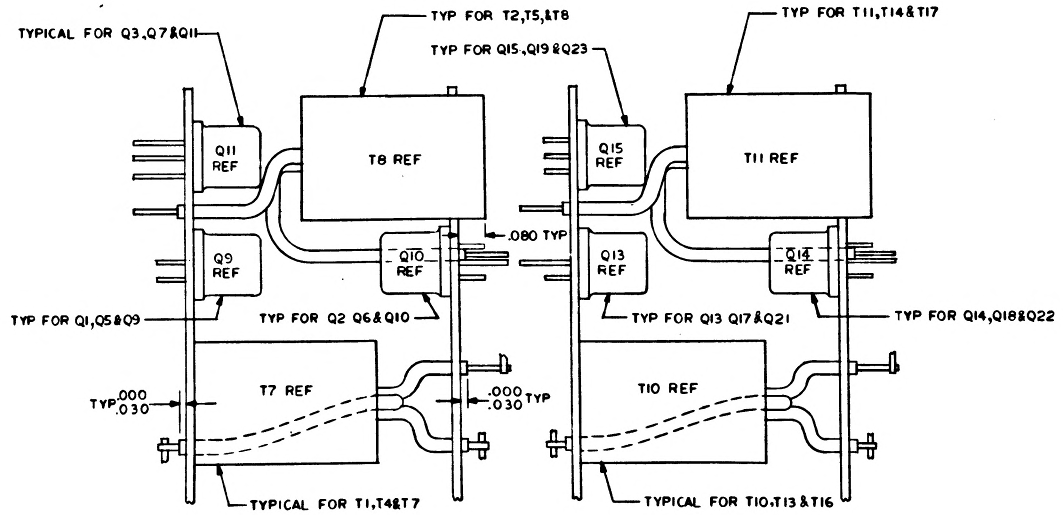
FT26
15
FT24

SECTION A-A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TYP FOR T2,T5,&T8
TYP FOR T11,T14&T17
TYP FOR Q15,Q19&Q23
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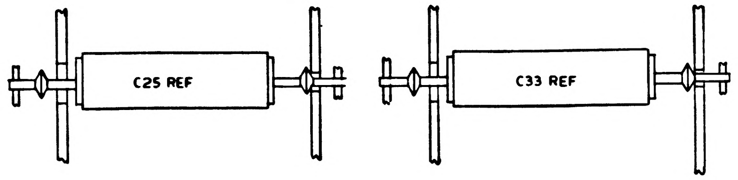
T8 REF
Q15
REF
T11 REF
Q9
REF
Q10
REF
.080 TYP
Q13
REF
Q14
REF
TYP FOR Q1,Q5&Q9
TYP FOR Q2 Q6&Q10
TYP FOR Q13 Q17&Q21
TYP FOR Q14,Q18&Q22
TYP .000
.030
T7 REF
.000
.030 TYP
T10 REF
TYPICAL FOR T1,T4&T7
TYPICAL FOR T10,T13&T16

PARTIAL SECTION G-G

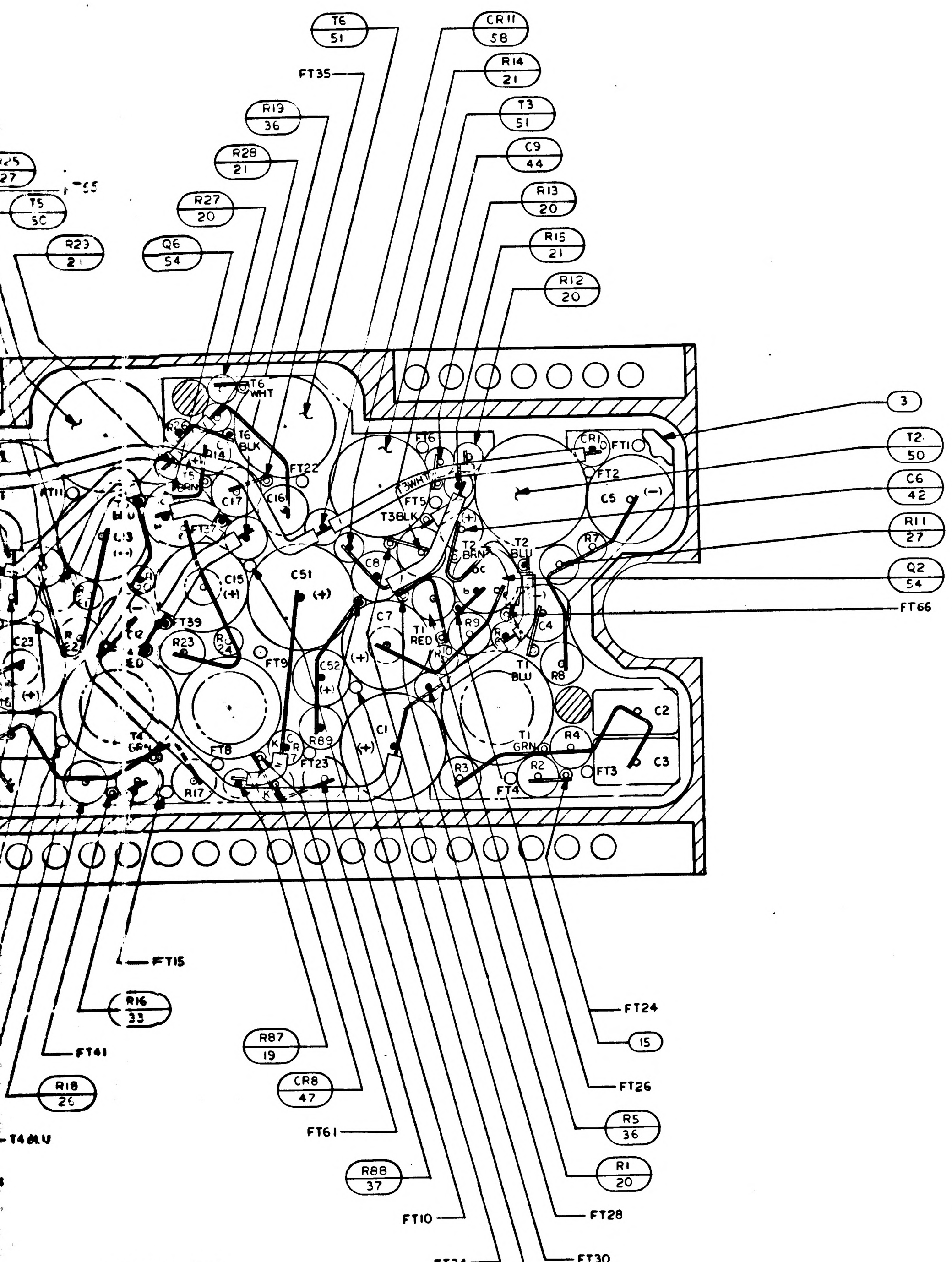

C25 REF
C33 REF

PARTIAL SECTION H-H

TYPICAL FOR C8 C9-C16 C17 C24 C25 C32
C33 C41 C42 C49 AND C50

2007240	REV LTR	SH
	G	1 OF 2

REVISIONS 27408						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28564	EM	LSB	5 MAY 66	
B		*REVISED PER TDRR 29918*		JAC	13 JUL 66	
C		REVISED PER TDRR 30249	WAB	N.S.	29 JUL 66	
D		REVISED PER TDRR 30282			24 AUG 66	
E		REVISED PER TDRR 30407	EC		28 SEP 66	
F		*REVISED PER TDRR 31486*	EC		21 OCT 66	
G		REVISED PER TDRR 31708	JRK	JAC	3 NOV 66	


T6
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CR11
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R14
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T3
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C9
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R13
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R15
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R12
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R28
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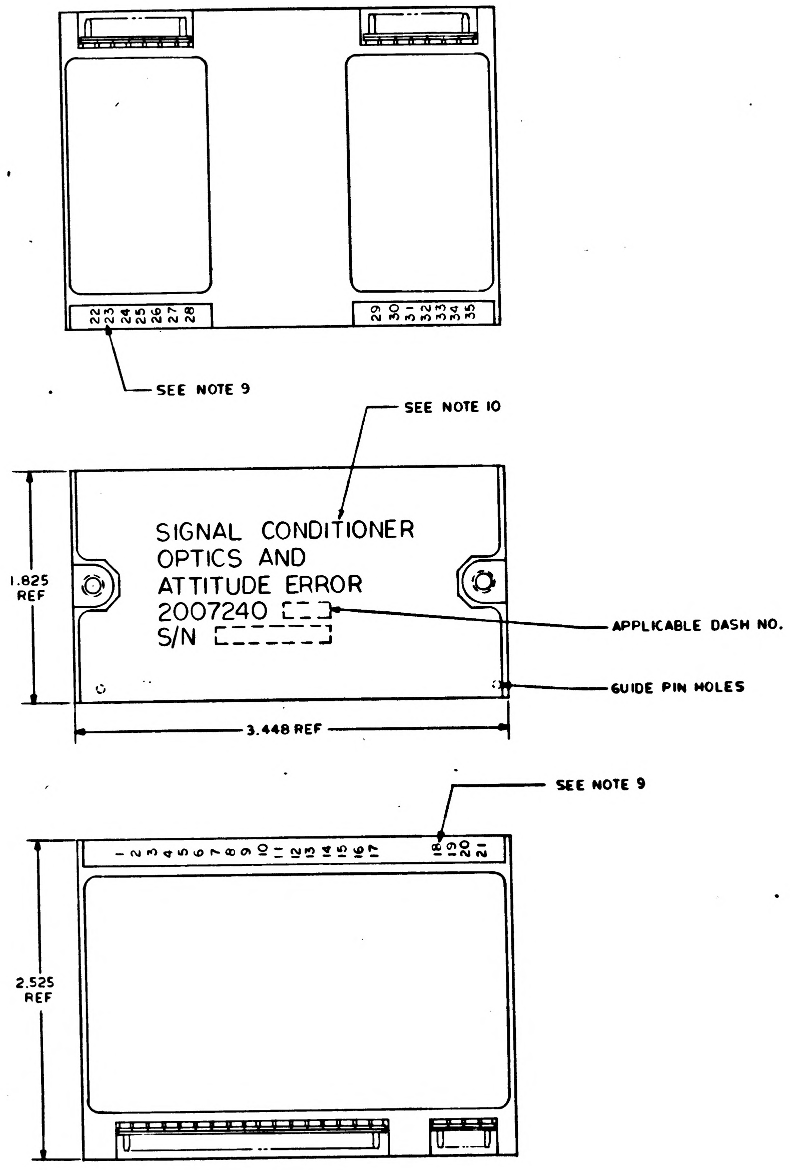
R27
20
Q6
54
R23
21
T5
50
FT35
3
T2
50
C6
42
R11
27
Q2
54
FT66
FT15
R16
33
FT41
R18
26
T4BLU
R87
19
CR8
47
FT61
R88
37
FT10
FT34
FT7
FT30
FT28
R1
20
R5
36
FT26
15
FT24
C51
C5
C1
C7
FT1
FT2
FT3
FT4
FT5
FT8
FT9
FT22
FT23
FT39
T1 RED
T1 BLU
T1 GRN
T2 BRN
T2 BLU
T3 BLK
T6 WHT
T6 BLK
R2
R3
R4
R7
R8
R89
C2
C3
C4
C8
C15
C16
C17
C52

SECTION A-A


SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240 [ ]
S/N [ ]
APPLICABLE DASH NO.
GUIDE PIN HOLES
1.825 REF
3.448 REF
2.525 REF
SEE NOTE 9
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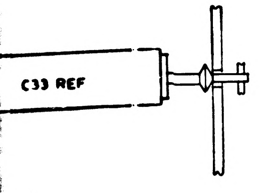
29 30 31 32 33 34 35
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21

MARKING VIEWS
SCALE 2/1



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4	1008815-9		DIODE	58
12	1008161-1		SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-294		RESISTOR	56
2	1010410-5		CAPACITOR	55
12	1010397-1		TRANSISTOR	54
12	1010367		TRANSISTOR	53
2	1010466		TRANSFORMER	52
6	1010323		TRANSFORMER	51
6	1008842		TRANSFORMER	50
6	1008832		TRANSFORMER	49
4	1010837-001		DIODE	48
1	1010259-000		DIODE	47
4	1010410-7		CAPACITOR	46
6	1010410-18		CAPACITOR	45
12	1010279-16		CAPACITOR	44
2	1006755-182		CAPACITOR	43
6	1006755-69		CAPACITOR	42
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12	1006755-34		CAPACITOR	40
6	1006755-31		CAPACITOR	39
2	1006755-4		CAPACITOR	38
1	1010364 SEE NOTE 26		RESISTOR	37
6	1010364-769		RESISTOR	36
6	1010364-707		RESISTOR	35
2	1010311-312		RESISTOR	34
12	1010364-653		RESISTOR	33
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1	1010364-385		RESISTOR	31
1	1010364-225		RESISTOR	30
2	1010364-217		RESISTOR	29
2	1010311-51		RESISTOR	28
2	1010311-306		RESISTOR	27
4	1010364-581		RESISTOR	26
2	1010364-217		RESISTOR	25
6	1006750-72		RESISTOR	24
6	1006750-65		RESISTOR	23
6	1006750-56		RESISTOR	22
12	1006750-36		RESISTOR	21
14	1006750-25		RESISTOR	20
1	1006750-14		RESISTOR	19
AR	1006776-21		INSULATION SLEEVING	18
AR	1006776-20		INSULATION SLEEVING	17
AR	1006757-1		WIRE ELECTRICAL	16
AR	1010848-2		WIRE ELECTRICAL INSULATED	15
1	2008093-000		TERMINAL THREADED	14
6	1015135-011		SPACER	13
3	1008168-3		SPACER	12
1	1008540-9		GASKET	11
1	1008540-8		GASKET	10
2	1008540-7		GASKET	9
1	1008540-4		GASKET	8
35	1006782-16		CONTACT WRAPOST-MALE MINIATURE	7
35	1006775		INSULATOR.WRAPOST MALE MINIATURE	6
1	2008468		WIRING BOARD D	5
1	2008466		WIRING BOARD C	4
1	2008464		WIRING BOARD B	3
1	2008462		WIRING BOARD A	2
1	2008461		FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS			

2007240 G

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Scoccigo 7 MAR 66
CHECKED
APPROVED 18 MAR 66
APPROVED
APPROVED MIT A. C.
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 1 OF 2

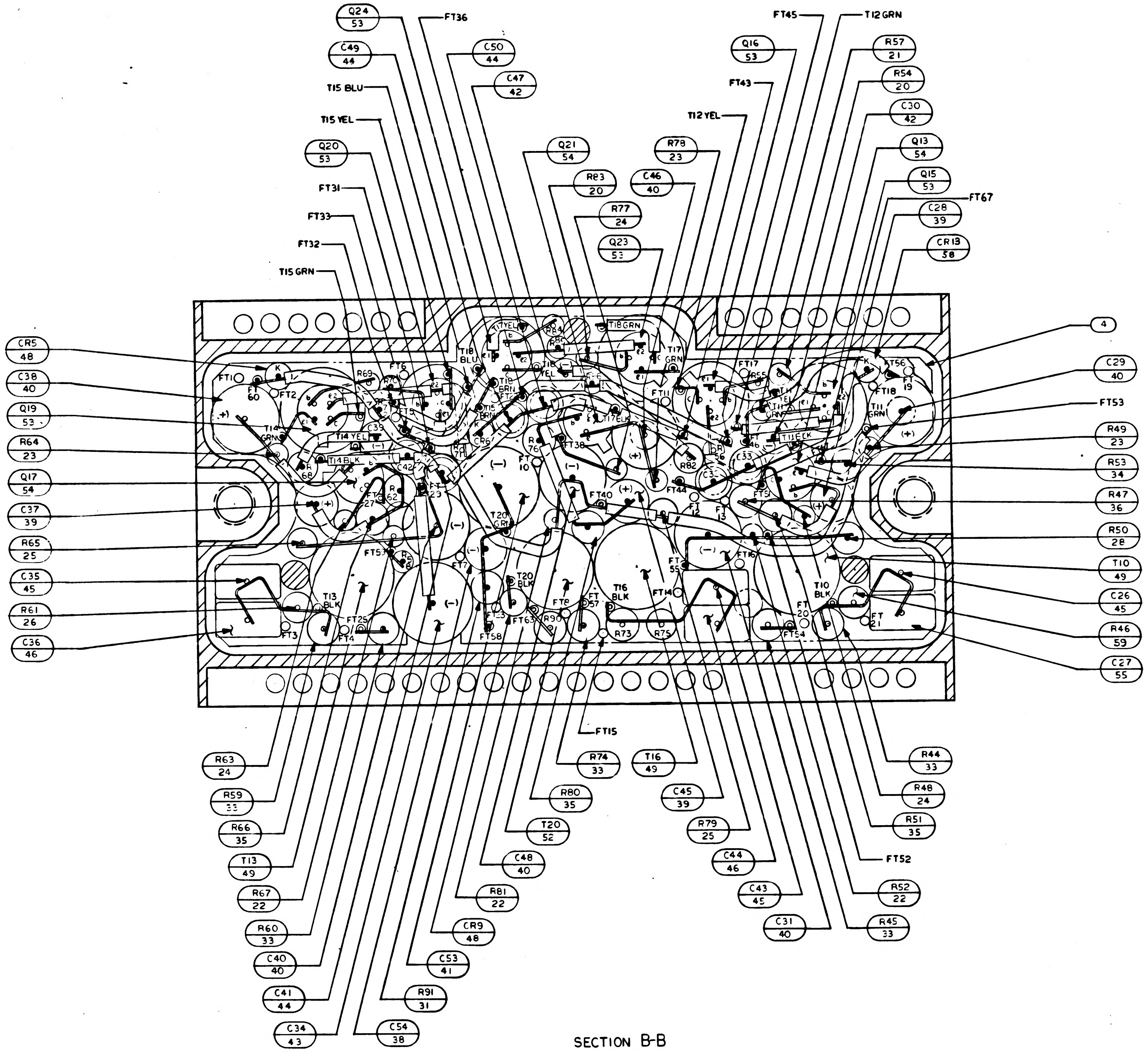
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D

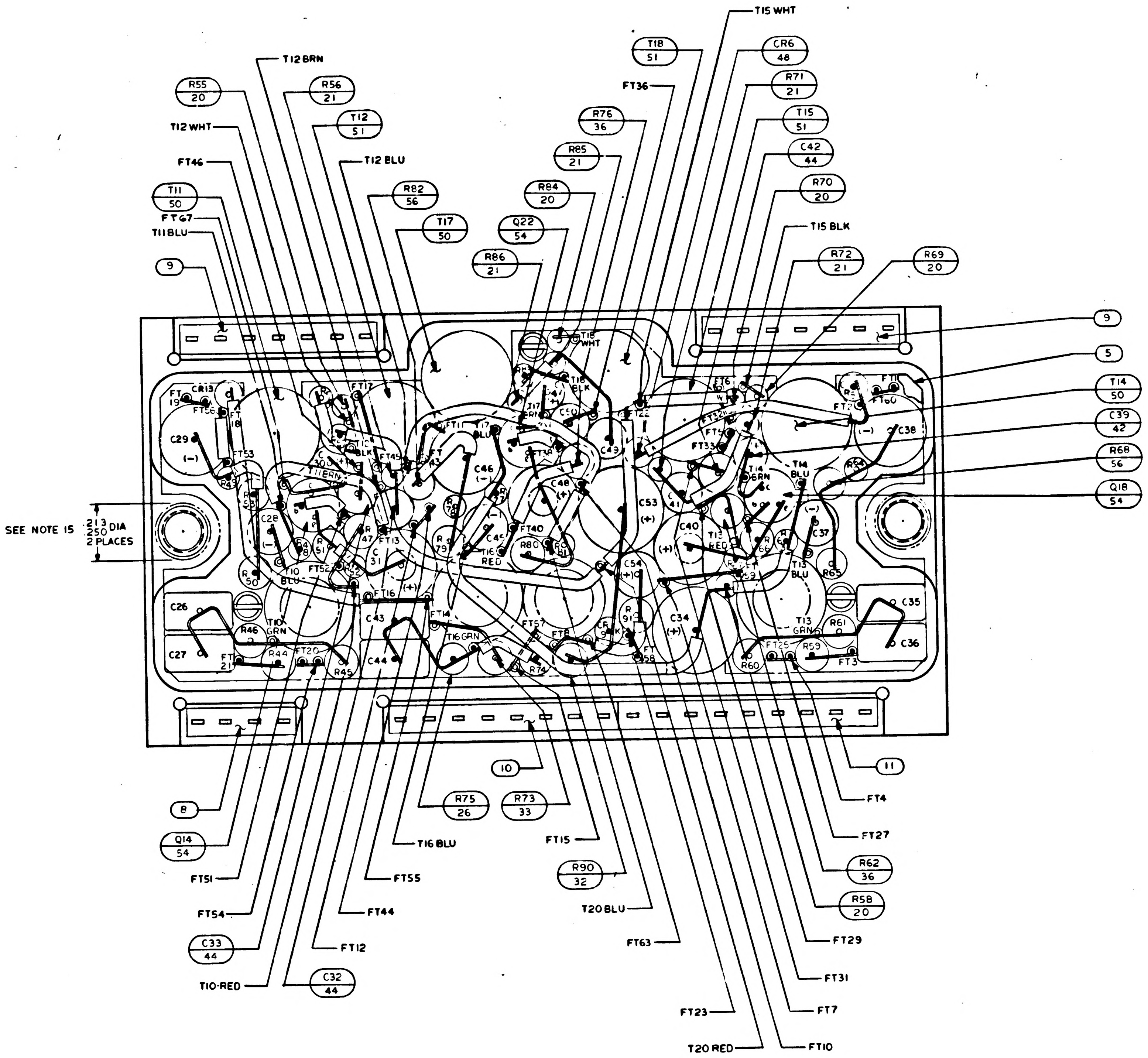
C

B

A


Q24 53
FT36
C49 44
C50 44
C47 42
T15 BLU
T15 YEL
Q20 53
FT31
FT33
FT32
T15 GRN
Q21 54
R78 23
R83 20
C46 40
R77 24
Q23 53
FT45
T12 GRN
Q16 53
R57 21
R54 20
FT43
C30 42
T12 YEL
Q13 54
Q15 53
FT67
C28 39
CR13 58
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
C35 45
R61 26
C36 46
4
C29 40
FT53
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 59
C27 55
FT15
R63 24
R74 33
T16 49
R59 33
R80 35
C45 39
R44 33
R48 24
R66 35
T20 52
R79 25
R51 35
T13 49
C48 40
C44 46
FT52
R67 22
R81 22
C43 45
R52 22
R60 33
CR9 48
C31 40
R45 33
C40 40
C53 41
C41 44
R91 31
C34 43
C54 38

SECTION B-B

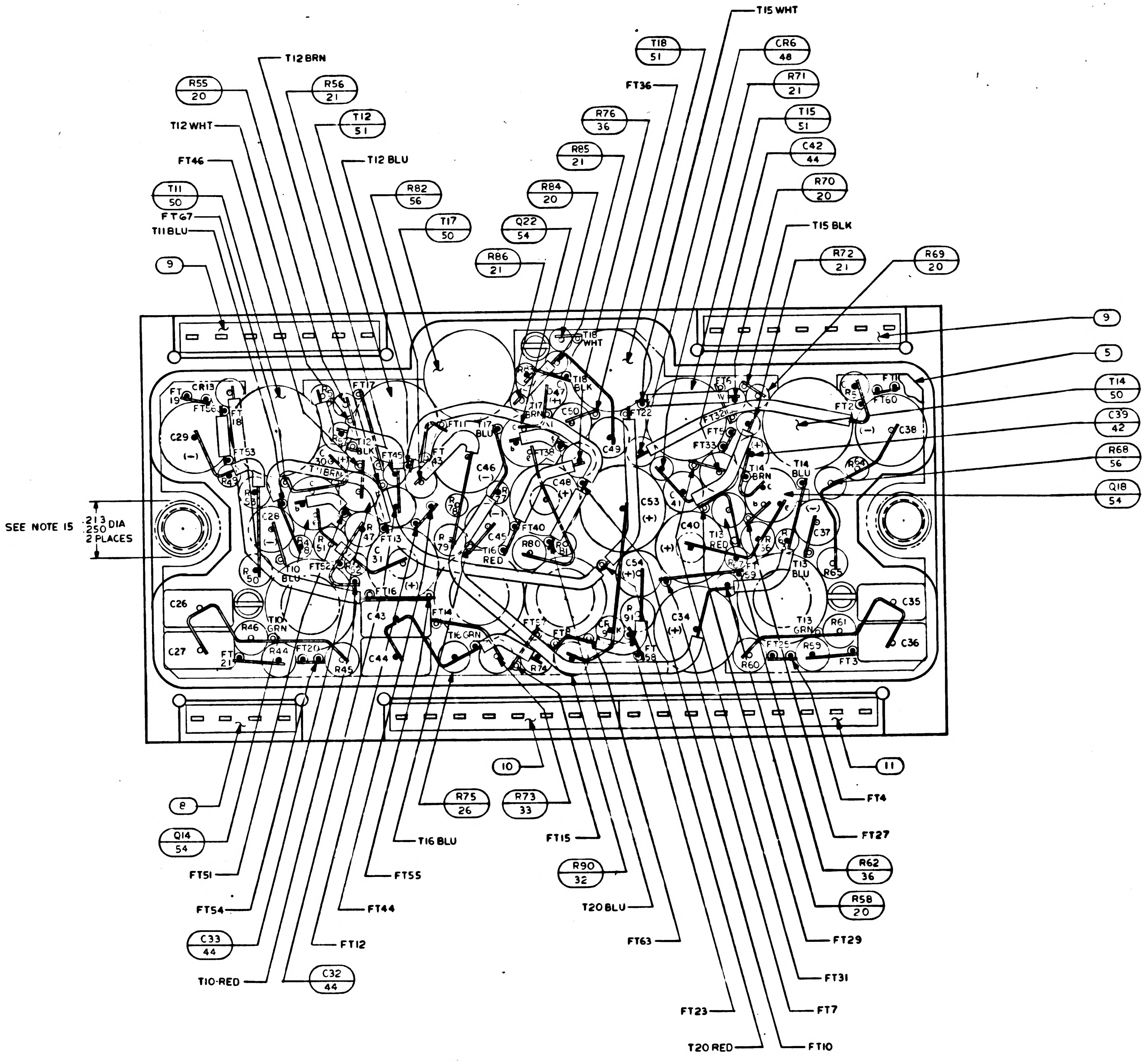

T15 WHT
T18 51
CR6 48
FT36
R71 21
T12 BRN
R55 20
R56 21
T12 51
T12 WHT
T15 51
R76 36
C42 44
R85 21
FT46
T12 BLU
R70 20
R84 20
T11 50
R82 56
FTG7
T17 50
Q22 54
T15 BLK
T11 BLU
R86 21
R72 21
R69 20
9
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
C29
CR13
FT56
FT53
C28
R47
FT13
FT45
FT17
C46
C53
C40
C38
C37
C35
C36
C34
C54
C44
C43
C26
C27
R46
R44
R45
FT20
FT16
FT14
T16 GRN
T16 RED
T10 BLU
T10 GRN
T13 GRN
T13 RED
T14 BLU
T14 BRN
T18 WHT
T18 BLK
FT40
R80
R59
R60
R61
R63
FT25
FT3
R74
FT8
FT57
C48
C50
FT22
10
11
8
R75 26
R73 33
FT4
Q14 54
FT27
T16 BLU
FT15
FT51
R90 32
R62 36
FT55
T20 BLU
R58 20
FT54
FT44
FT63
FT29
C33 44
FT12
FT31
T10-RED
C32 44
FT23
FT7
T20 RED
FT10

VIEW C-C

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± —— ± —— ± DO NOT SCALE THIS DRAWING
		MATERIAL
NEXT ASSY	USED ON	
APPLICATION		

REVISIONS 27408

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28564	5 MAY 66	EMS
B	REVISION STATUS CHANGED	13 JUL 66	B. JAC
C	REVISION STATUS CHANGED	29 JUL 66	W.A.B N.S
D	REVISED PER TDRR 30282	24 AUG 66	
E	REVISED PER TDRR 30407	28 SEP 66	EC
F	REVISION STATUS CHANGED	21 OCT 66	EC
G	REVISION STATUS CHANGED	3 NOV 66	JAC



T12 BRN
R55 20
R56 21
T12 51
T12 WHT
T12 BLU
FT46
R82 56
T11 50
FT67
T11 BLU
T17 50
Q22 54
R84 20
R85 21
R86 21
R76 36
T18 51
FT36
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
8
Q14 54
FT51
FT54
C33 44
T10-RED
C32 44
FT12
FT44
FT55
T16 BLU
R75 26
R73 33
10
FT15
R90 32
T20 BLU
FT63
FT23
T20 RED
FT10
FT7
FT31
FT29
R58 20
R62 36
FT27
FT4
11

VIEW C-C

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

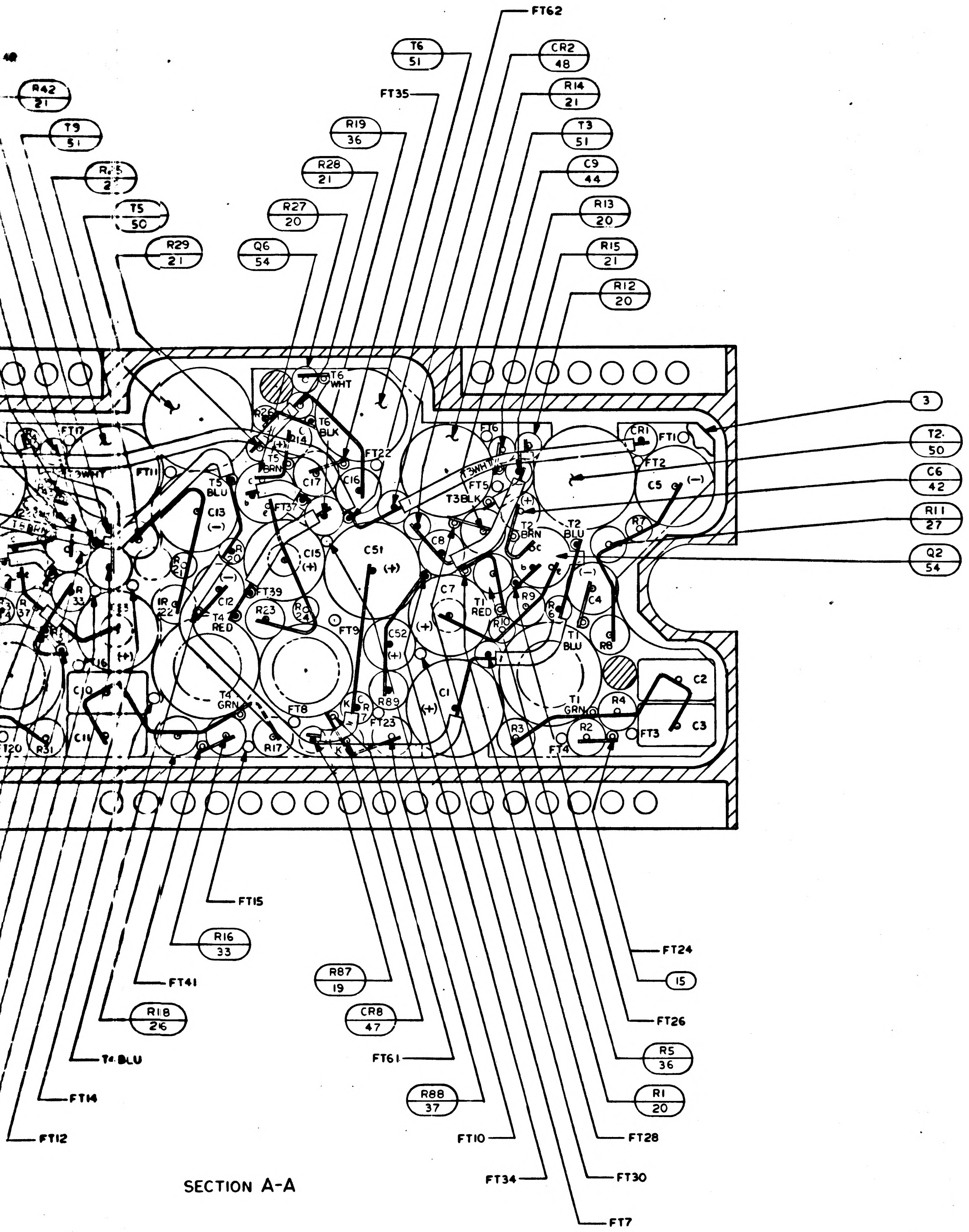
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

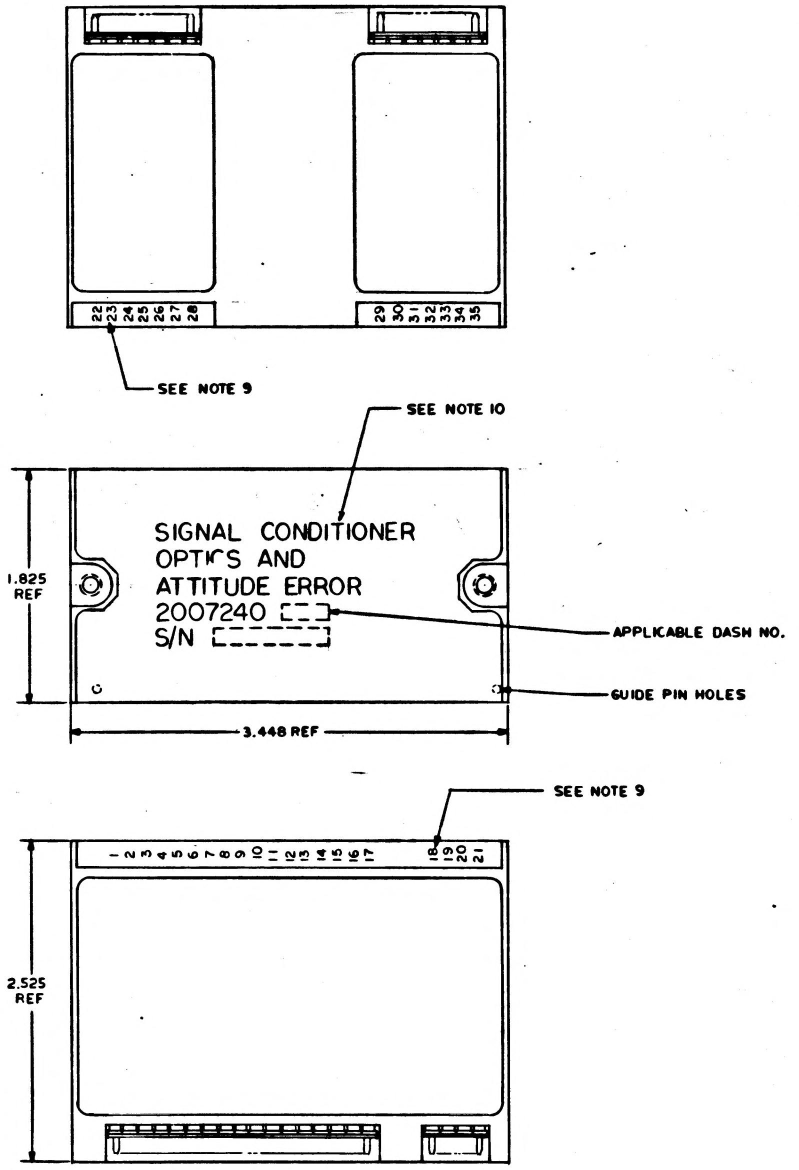
OPTICS AND ATTITUDE
ERROR ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 2 OF 2

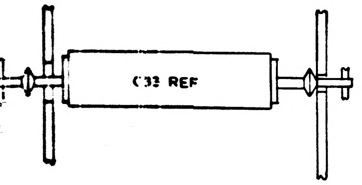
SYM	ZONE	REVISIONS DESCRIPTION	BY	CHK	DATE	APPROVED


FT62
T6 51
CR2 48
R14 21
FT35
T3 51
R19 36
C9 44
R28 21
R13 20
R27 20
R15 21
Q6 54
R12 20
R42 21
T9 51
T5 50
R29 21
3
T2 50
C6 42
R11 27
Q2 54
FT15
R16 33
FT24
15
FT41
R87 19
CR8 47
FT26
R18 26
R5 36
T4 BLU
FT61
R1 20
FT14
R88 37
FT12
FT10
FT28
FT34
FT30
FT7

SECTION A-A


22 23 24 25 26 27 28
29 30 31 32 33 34 35
SEE NOTE 9
SEE NOTE 10
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
2007240
S/N
1.825 REF
APPLICABLE DASH NO.
GUIDE PIN HOLES
3.448 REF
SEE NOTE 9
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21
2.525 REF

MARKING VIEWS
SCALE 2/1



ION H-H
C17 C24 C25 C32
C48 C49 AND C50

2007240

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES / NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010123	SCHEMATIC	REF
12	1008161-1	SCREW CAP SLOTTED HD SPECIAL	57
2	1010311-198	RESISTOR	56
2	1010410-5	CAPACITOR	55
12	1010397-1	TRANSISTOR	54
12	1010367	TRANSISTOR	53
2	1010466	TRANSFORMER	52
6	1010323	TRANSFORMER	51
6	1008842	TRANSFORMER	50
6	1008832	TRANSFORMER	49
8	1010837-001	DIODE	48
1	1010259-000	DIODE	47
4	1010410-7	CAPACITOR	46
6	1010410-18	CAPACITOR	45
12	1010279-16	CAPACITOR	44
2	1006755-89	CAPACITOR	43
6	1006755-69	CAPACITOR	42
2	1006755-40	CAPACITOR	41
12	1006755-34	CAPACITOR	40
6	1006755-31	CAPACITOR	39
2	1006755-4	CAPACITOR	38
1	1010364 SEE NOTE 28	RESISTOR	37
6	1010364-769	RESISTOR	36
6	1010364-707	RESISTOR	35
2	1010311-318	RESISTOR	34
12	1010364-653	RESISTOR	33
1	1010364-403	RESISTOR	32
1	1010364-385	RESISTOR	31
1	1010364-225	RESISTOR	30
2	1010364-217	RESISTOR	29
2	1010364-131	RESISTOR	28
2	1010311-306	RESISTOR	27
7	1010311-291	RESISTOR	26
1	1010311-109	RESISTOR	25
6	1006750-72	RESISTOR	24
6	1006750-65	RESISTOR	23
6	1006750-56	RESISTOR	22
12	1006750-36	RESISTOR	21
14	1006750-25	RESISTOR	20
1	1006750-14	RESISTOR	19
AR	1006776-21	INSULATION SLEEVING	18
AR	1006776-20	INSULATION SLEEVING	17
AR	1006757-1	WIRE ELECTRICAL	16
AR	1010848-2	WIRE ELECTRICAL INSULATED	15
1	2008093-000	TERMINAL THREADED	14
6	1015135-011	SPACER	13
3	1008163-3	SPACER	12
1	1008540-9	GASKET	11
1	1008540-8	GASKET	10
2	1008540-7	GASKET	9
1	1008540-4	GASKET	8
35	1006782-9	CONTACT WRAPOST-MALE MINIATURE	7
35	1006775	INSULATOR.WRAPOST MALE MINIATURE	6
1	2008468	WIRING BOARD D	5
1	2008466	WIRING BOARD C	4
1	2008464	WIRING BOARD B	3
1	2008462	WIRING BOARD A	2
1	2008461	FRAME	1
-011	LIST OF MATERIALS		

2007240

3H

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Boggrano 7/4/66
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

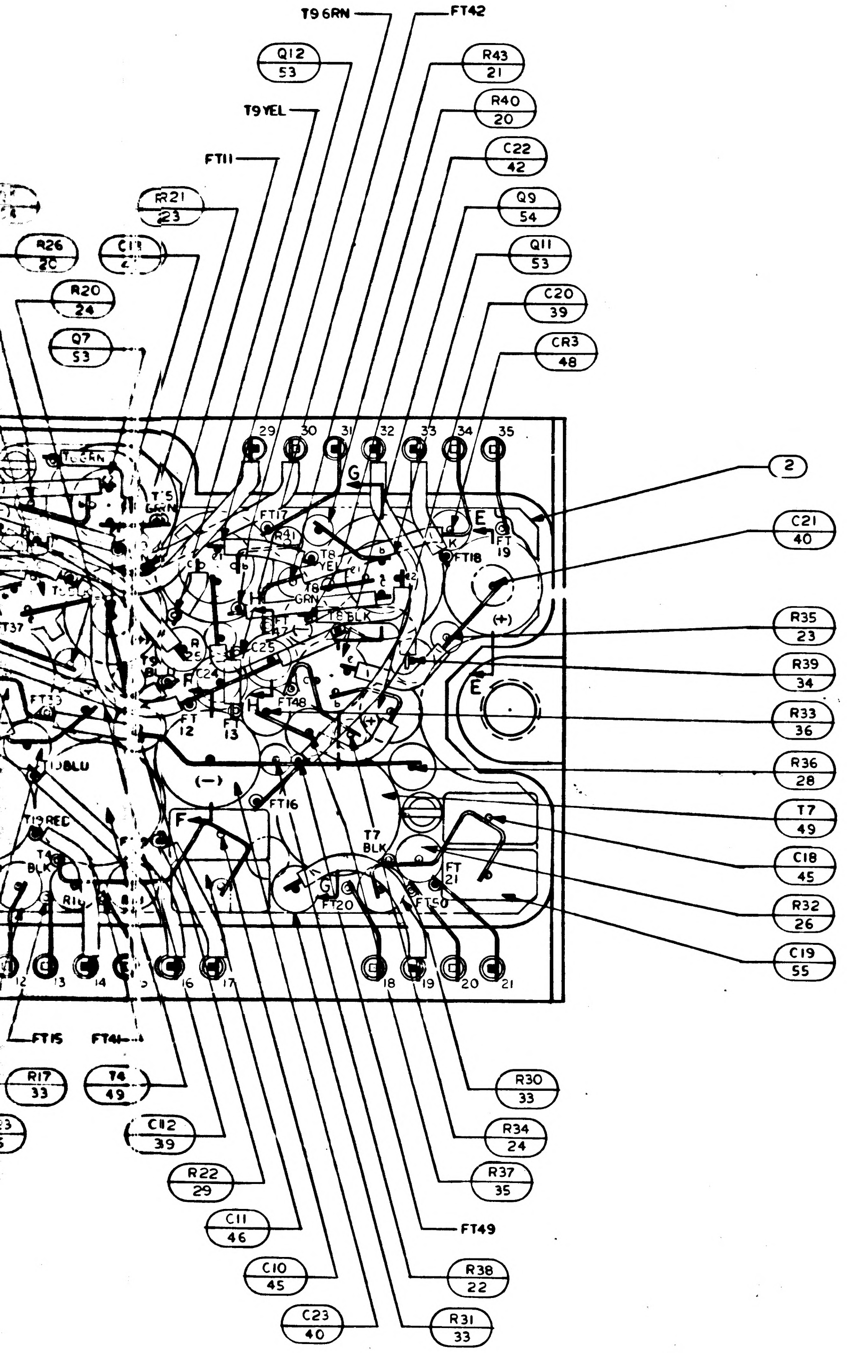
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

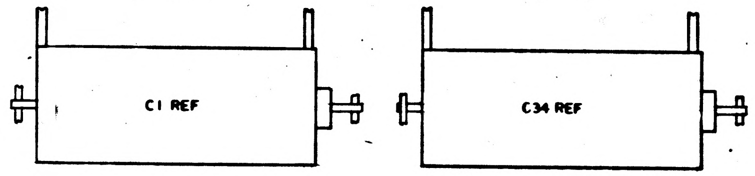
ASSEMBLY
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2007240

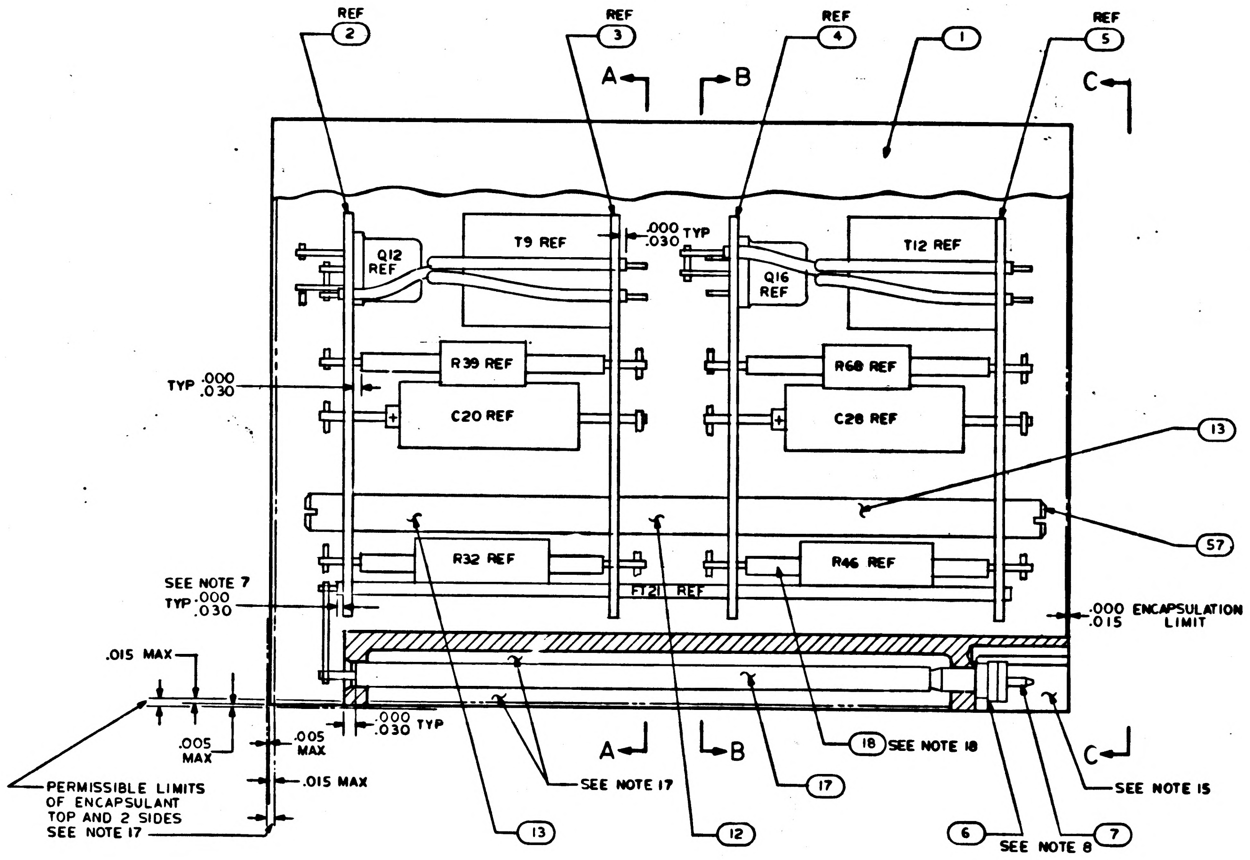
SCALE 5/1 SHEET 1 OF 2

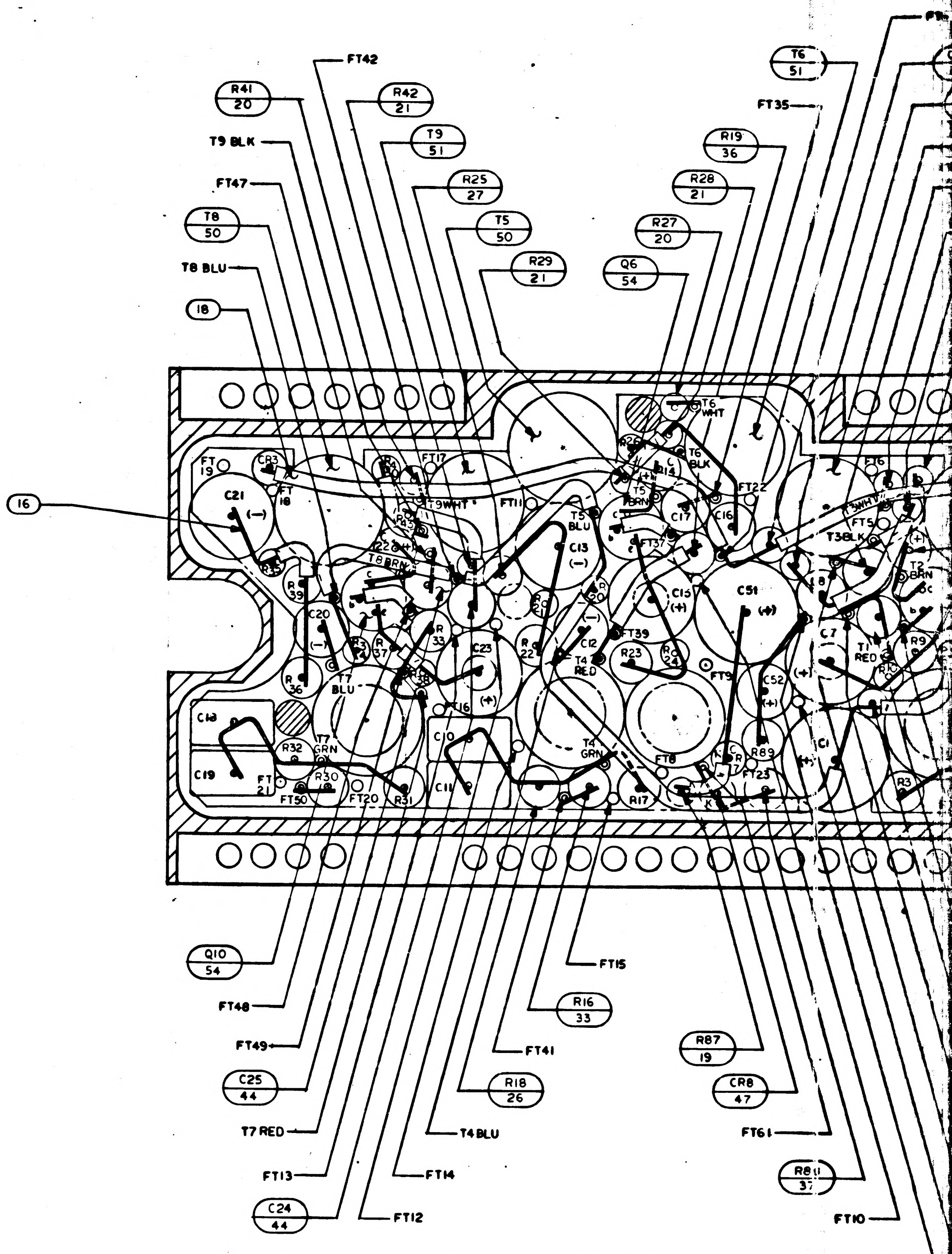
MASTER


T9 GRN
FT42
Q12 53
R43 21
T9 YEL
R40 20
C22 42
FT11
Q9 54
R21 23
Q11 53
R26 20
R20 24
C20 39
Q7 53
CR3 48
29 30 31 32 33 34 35
2
C21 40
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55
FT15
FT41
R17 33
T4 49
C12 39
R22 29
C11 46
C10 45
C23 40
R30 33
R34 24
R37 35
FT49
R38 22
R31 33

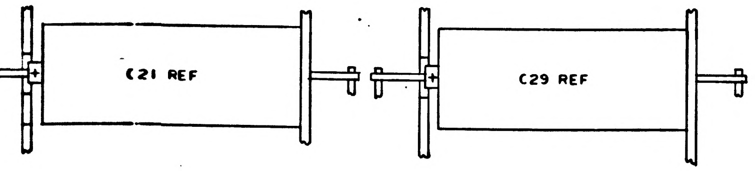

C1 REF
C34 REF

PARTIAL SECTION D-D
TYPICAL FOR C51 & C53

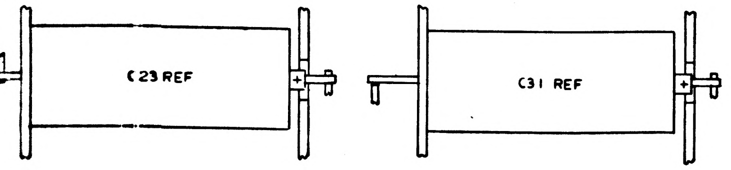

REF 2
REF 3
REF 4
1
REF 5
A
B
C
Q12 REF
T9 REF
.000 .030 TYP
Q16 REF
T12 REF
R39 REF
R68 REF
TYP .000 .030
C20 REF
C28 REF
13
57
R32 REF
R46 REF
SEE NOTE 7
TYP .000 .030
FT21 REF
.000 ENCAPSULATION .015 LIMIT
.015 MAX
.005 MAX
.005 MAX
.000 .030 TYP
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
SEE NOTE 17
18 SEE NOTE 18
17
SEE NOTE 15
13
12
6
SEE NOTE 8
7


FT42
R41 20
R42 21
T6 51
FT35
T9 BLK
T9 51
R19 36
FT47
R25 27
R28 21
T8 50
T5 50
R27 20
T8 BLU
R29 21
Q6 54
18
16
C21
C51
Q10 54
FT48
FT15
R16 33
FT49
FT41
R87 19
C25 44
R18 26
CR8 47
T7 RED
T4 BLU
FT61
FT13
FT14
R81 37
C24 44
FT12
FT10
FT34

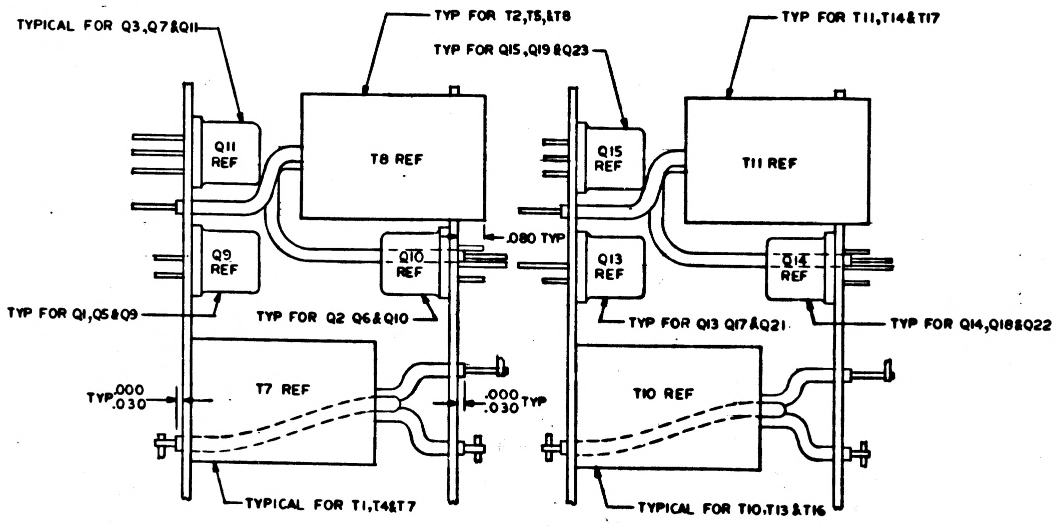
SECTION A-A


C21 REF
C29 REF

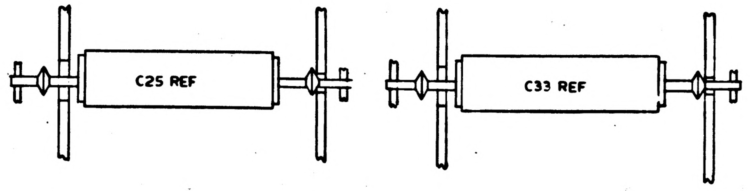
PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48


TYPICAL FOR Q3,Q7&Q11
TYP FOR T2,T5,&T8
TYP FOR Q15,Q19&Q23
TYP FOR T11,T14&T17
Q11 REF
T8 REF
Q15 REF
T11 REF
.080 TYP
Q9 REF
Q10 REF
Q13 REF
Q14 REF
TYP FOR Q1,Q5&Q9
TYP FOR Q2 Q6&Q10
TYP FOR Q13 Q17&Q21
TYP FOR Q14,Q18&Q22
TYP .000 .030
T7 REF
.000 .030 TYP
T10 REF
TYPICAL FOR T1,T4&T7
TYPICAL FOR T10,T13&T16

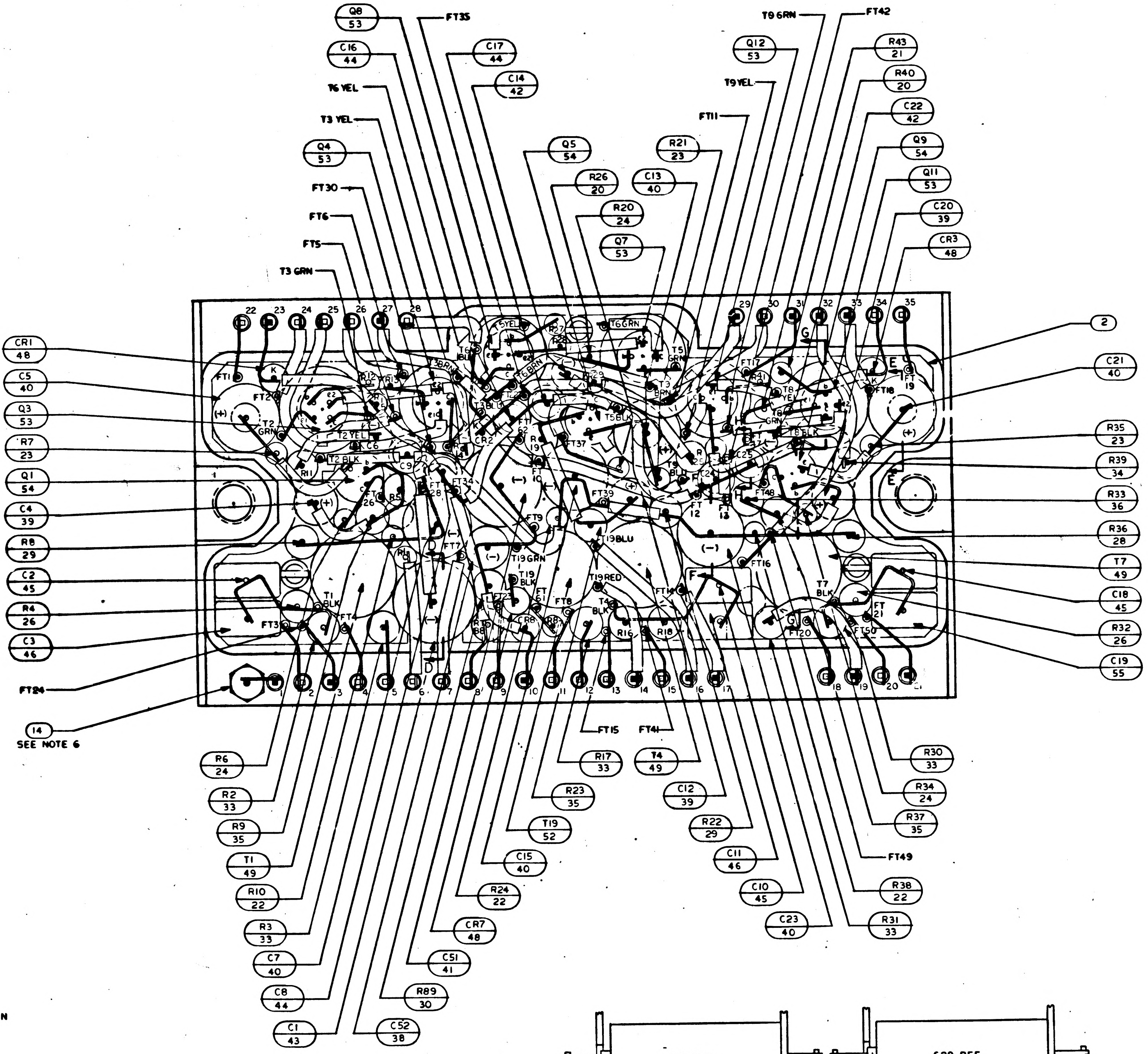
PARTIAL SECTION G-G


C25 REF
C33 REF

PARTIAL SECTION H-H
TYPICAL FOR C8 C9-C16 C17 C24 C25 C32 C33 C41 C42 C49 AND C50

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

R88	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180


Q8 53
FT35
C16 44
C17 44
C14 42
T6 YEL
T3 YEL
Q4 53
FT30
FT6
FT5
T3 GRN
Q5 54
R26 20
C13 40
R21 23
R20 24
Q7 53
T9 GRN
FT42
Q12 53
R43 21
T9 YEL
R40 20
FT11
C22 42
Q9 54
Q11 53
C20 39
CR3 48
2
CR1 48
C5 40
Q3 53
R7 23
Q1 54
C4 39
R8 29
C2 45
R4 26
C3 46
FT24
14
SEE NOTE 6
C21 40
R35 23
R39 34
R33 36
R36 28
T7 49
C18 45
R32 26
C19 55
R6 24
R2 33
R9 35
T1 49
R10 22
R3 33
C7 40
C8 44
C1 43
C52 38
R89 30
C51 41
CR7 48
R24 22
C15 40
T19 52
R23 35
R17 33
FT15
FT41
T4 49
C12 39
R22 29
C11 46
C10 45
C23 40
R31 33
R38 22
FT49
R37 35
R34 24
R30 33
E
F
G
D
(+)
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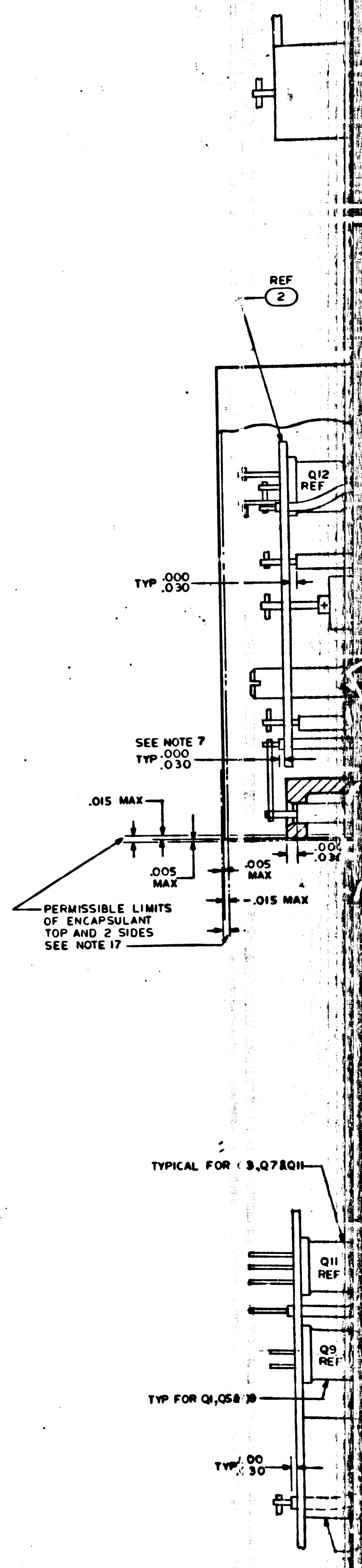
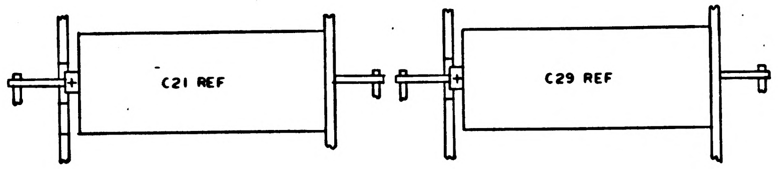
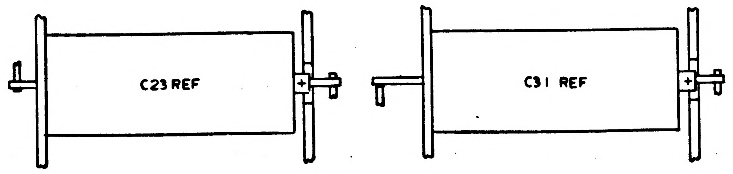
K


REF 2
Q12 REF
TYP .000 .030
SEE NOTE 7
TYP .000 .030
.015 MAX
.005 MAX
.005 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND 2 SIDES SEE NOTE 17
TYPICAL FOR Q3,Q7&Q11
Q11 REF
Q9 REF
TYP FOR Q1,Q5&Q8
TYP .00 .30

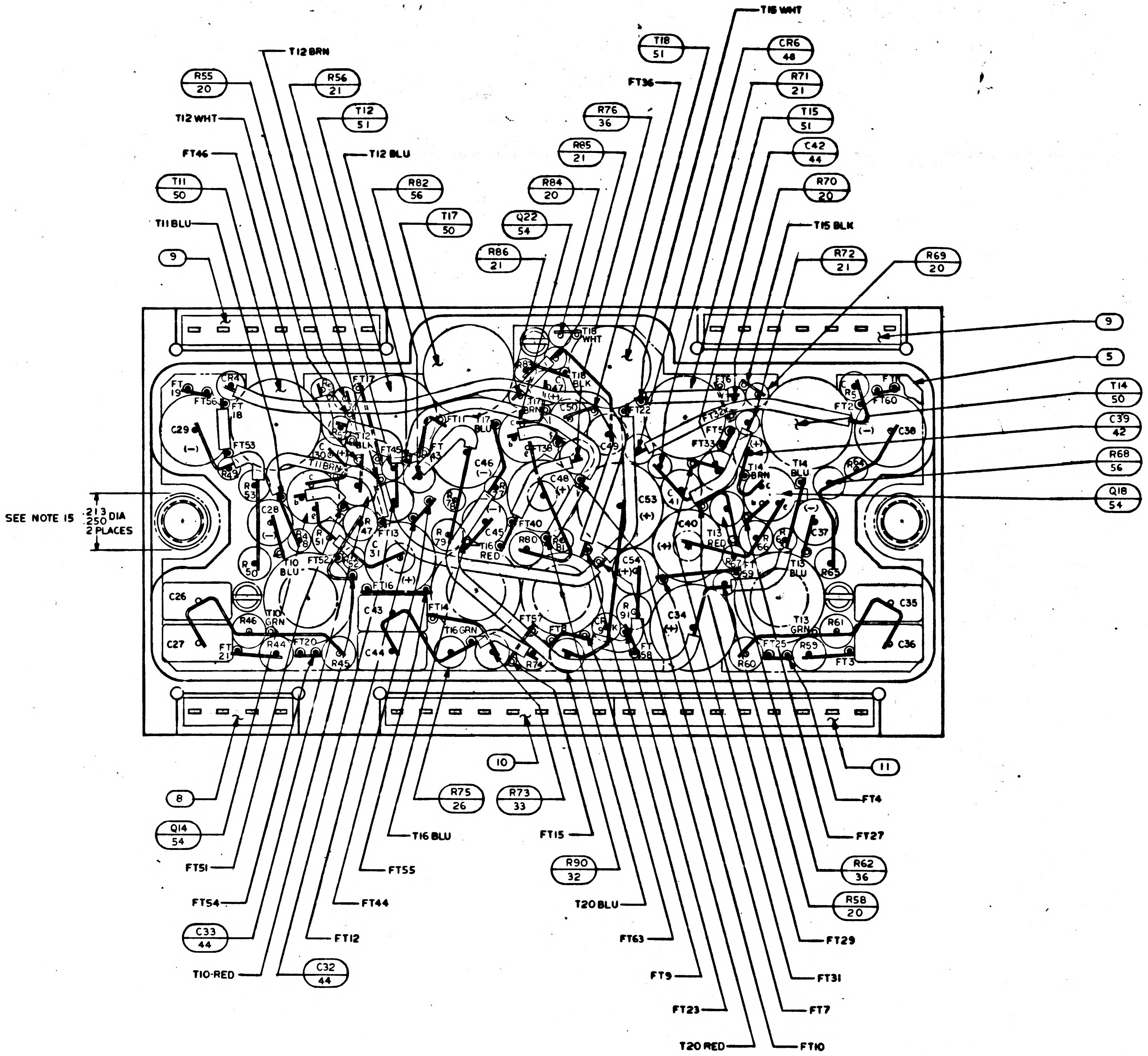
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. + DENOTES POSITIVE SIDE OF CAPACITOR
5. K DENOTES CATHODE SIDE OF DIODE
6. MOUNTING TORQUE OF FIND NO. 14 TO BE 15-20 INCH-OUNCES
7. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
8. ASSEMBLE FIND NO. 6 AND 7 TO FIND NO. 1 PER ND1002036
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. WELD PER ND1002005
12. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
13. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
14. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
15. INDICATED AREA TO BE FREE OF ENCAPSULATION
16. TRIM UNUSED LEADS OF FIND NO. 50 AND 51 .060/.100 FROM CASE
17. ENCAPSULATE PER ND1002002. REMOVING FLASHING
18. TYPICAL SLEEVING FOR FIND NO. 19 THRU 37,47,48 AND 56
19. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
20. BOND Q1,Q3,Q4,Q5,Q7,Q8,Q9,Q11,Q12,T1,T4,T7 AND T19 TO FIND NO. 2 PER ND1002004 TYPE I
21. BOND Q2,Q6,Q10,T2,T3,T5,T6,T8 AND T9 TO FIND NO. 3 PER ND1002004 TYPE I
22. BOND Q13,Q15,Q16,Q17,Q19,Q20,Q21,Q23,Q24,T10,T13,T16 AND T20 TO FIND NO. 4 PER ND1002004 TYPE I
23. BOND Q14,Q18,Q22,T11,T12,T14,T15,T17 AND T18 TO FIND NO. 5 PER ND1002004 TYPE I
24. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
25. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. PIN BLADES AND INSULATORS TO BE FREE OF PAINT
26. SELECT R88 PER APPLICABLE PS FROM APPROP CHART
27. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007240


C21 REF
C29 REF

PARTIAL SECTION E-E
TYPICAL FOR C5,C13,C21,C29,C38 AND C46


C23 REF
C31 REF

PARTIAL SECTION F-F
TYPICAL FOR C7,C15,C23,C31,C40 AND C48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R56 21
T12 51
T12 WHT
T12 BLU
FT46
R82 56
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T17 50
T11 BLU
9
T18 51
FT36
R76 36
R85 21
R84 20
Q22 54
R86 21
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213 .250 DIA 2 PLACES
C29
C28
C26
C27
C44
C43
C46
C45
C48
C49
C53
C54
C34
C40
C41
C38
C37
C35
C36
T10 BLU
T10 GRN
T16 RED
T16 GRN
T17 BLU
T18 WHT
T18 BLK
T13 RED
T13 GRN
T14 BRN
T14 BLU
T15 BLU
(+)
(−)
8
Q14 54
FT51
FT54
C33 44
T10 RED
C32 44
FT12
FT44
FT55
T16 BLU
R75 26
R73 33
10
FT15
R90 32
T20 BLU
FT63
FT9
FT23
T20 RED
11
FT4
FT27
R62 36
R58 20
FT29
FT31
FT7
FT10

VIEW C-C

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
A/C
APPROVED MSC
DATE

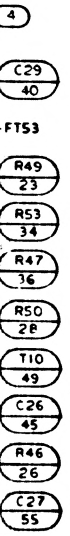
ASSEMBLY
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007240
SCALE 5/1
SHEET 2 OF 2

2007240

2007240

MASTER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C29 40
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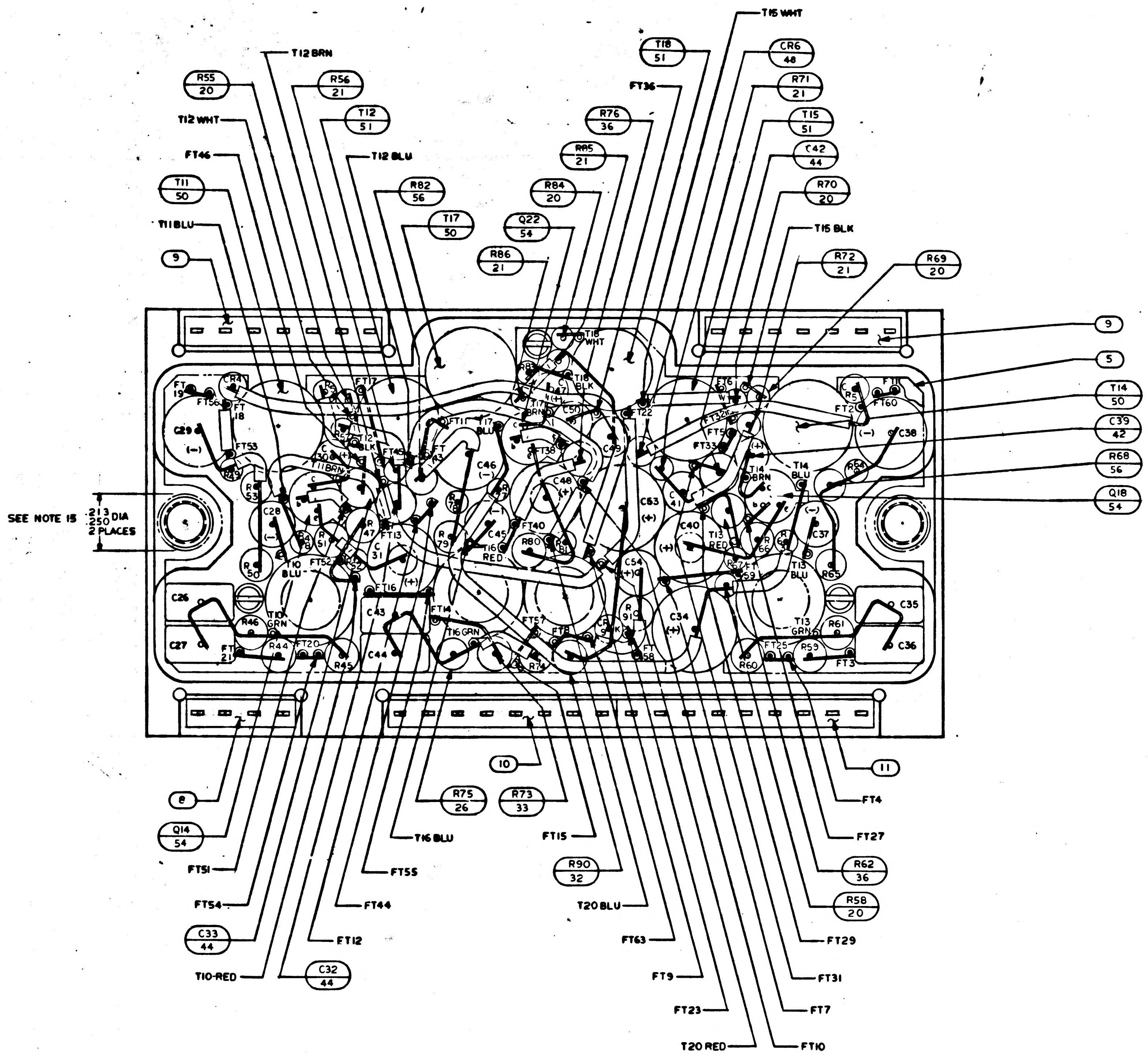
R49 23
R53 34
R47 36
R50 28
T10 49
C26 45
R46 26
C27 55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T12 BLU
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R82 56
T11 BLU
T17 50
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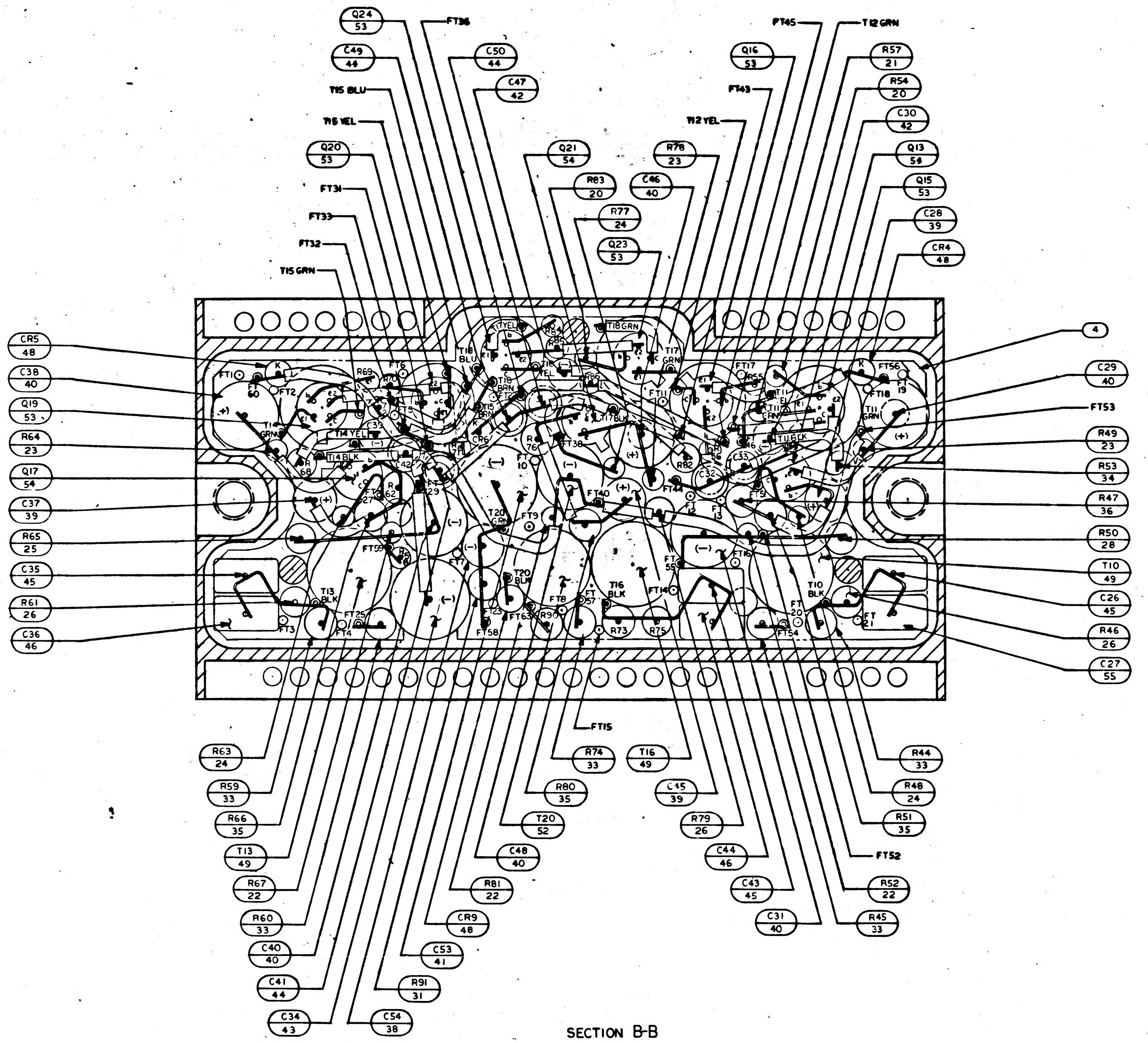
Q22 54
R84 20
R85 21
R76 36
FT36
T18 51
T15 WHT
CR6 48
R71 21
T15 51
C42 44
R70 20
T15 BLK
R72 21
R69 20
9
5
T14 50
C39 42
R68 56
Q18 54
SEE NOTE 15
.213
.250 DIA
2 PLACES
C29
(−)
C38
C28
C40
C63
C46
C48
C34
C35
C36
C26
C27
C43
C44
C37
T10 BLU
T10 GRN
T13 RED
T13 GRN
T14 BRN
T14 BLU
T15 BLU
T16 RED
T16 GRN
T17 BLU
T18 WHT
T18 BLK
10
11
8
Q14 54
R75 26
R73 33
FT4
T16 BLU
FT15
FT27
FT51
FT55
R90 32
R62 36
FT54
FT44
T20 BLU
R58 20
C33 44
FT12
FT63
FT29
T10-RED
C32 44
FT9
FT31
FT23
FT7
T20 RED
FT10

VIEW C-C

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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FT36
C49 44
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C47 42
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FT31
FT33
FT32
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Q21 54
R83 20
R77 24
Q23 53
R78 23
C46 40
FT45
T12 GRN
Q16 53
R57 21
FT43
R54 20
T12 YEL
C30 42
Q13 54
Q15 53
C28 39
CR4 48
CR5 48
C38 40
Q19 53
R64 23
Q17 54
C37 39
R65 25
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R91 31
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CR9 48
R81 22
C48 40
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R79 26
C44 46
C43 45
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R48 24
R51 35
FT52
R52 22
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FT1
FT2
FT6
R69
R70
T14 GRN
T14 YEL
T14 BLK
R68
C42
FT29
FT27
R62
FT59
C39
T18 BLU
T18 BRN
T15 GRN
T18 YEL
T16 YEL
T18 GRN
T17 GRN
T17 BLK
C86
R76
FT10
FT38
FT40
FT44
FT12
FT13
R82
C32
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FT17
R55
FT18
FT19
FT56
T11 GRN
T11 BLK
T20 GRN
T20 BLK
FT7
FT8
FT57
FT58
FT63
R90
R73
R75
FT14
FT55
FT16
T16 BLK
T13 BLK
FT25
FT3
FT4
T10 BLK
FT20
FT21
FT54
(+)
(−)

SECTION B-B

2007240

APOLLO G&N Specification
PS2007240 REV -
Original Issue Date: 7 June 1966
Release Authority: TDRR 29461
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

SIGNAL CONDITIONER, OPTICS AND ATTITUDE ERROR ASSEMBLY

DRAWING NO. 2007240

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 12 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	20 May 66 MIT/IL	G H Krier ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 10.0±1.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 36 ma.

3.1.3 Offset Voltages. The offset voltages of assembly sections a, b, c, d, e, and f shall be ≤10 mvdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Sections a and b. The input voltages of assembly sections a and b shall be 5.00±0.50V rms with a phase angle of 0° ±2° when the respective output voltages are 2.500±0.005 vdc.

3.1.4.2 Assembly Sections c and d. The input voltages of assembly sections c and d shall be 0.50±0.05V rms with a phase angle of 0° ±2° when the assembly section outputs are +2.500±0.005 vdc.

3.1.4.3 Assembly Sections e and f. The input voltages of assembly sections e and f shall be 5.85±0.25V rms with a phase angle of 0° ±2° when the respective output voltage is 2.500±0.005 vdc.

3.1.4.4 Assembly Section g. The output voltage across pins 10 (Hi) and 8 (Lo) shall be -2.500±0.025 vdc when the 800 cps reference input voltage is 28.00±0.28V rms.

3.1.4.5 Assembly Section h. The output voltage of assembly section h shall be 4.50±0.20 . 30 vdc when the reference input voltage is 28.00±0.28V rms.

3.1.5 Gain Stability. The scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than ±1 percent when the +28 vdc supply is enhanced to +33 vdc or degraded to +23 vdc.

3.1.6 Scale Factor Linearity. The individual scale factors of assembly sections a, b, c, d, e, and f shall not deviate by more than 4 percent from the average of 6 scale factors for each assembly section.

3.1.7 Output Impedance. The output impedance of assembly sections a, b, c, d, e, f, and h shall be <5k ohms. The output impedance of assembly section g shall be <500 ohms.

3.1.8 Output Ripple and Noise. The output ripple and noise of assembly sections a, b, c, d, e, f and h shall be less than 10 mv pp. The output ripple and noise of assembly section g shall be less than 0.10 mv pp.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Drawing 2007240 and all drawings and engineering data referenced thereon.

3.2.2 Selection of Resistor R88. With 28.00±0.28V rms, 800.0±1.0 cps applied to pins 16 (Hi) and 14 (Lo) and a 1 megohm ±1 percent load resistor connected across output pins 10 (Hi) and 8 (Lo), R88 shall be selected from the applicable chart on Drawing 2007240 to provide an output of -2.500±0.025 vdc.

3.2.3 Standards of Manufacturing, Manufacturing Process, and Production

3.2.3.1 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be $\geq$100 megohms.

3.2.3.2 Continuity and DC Resistance. The continuity and dc resistance shall be as specified in Table I.

TABLE I

CONTINUITY AND DC RESISTANCE

PINS		RESISTANCE	
From	To	Min	Max
3	5	245kΩ	260kΩ
15	12	↕	↕
20	19		
21	18		
2	4		
17	13	245kΩ	260kΩ
16	14	-	190Ω
28	27	-	100Ω
26	25	-	350Ω
1	Chassis	-	0.5Ω

3.2.3.3 Circuit Isolation. The dc resistance between any two low pins of the power, reference, input, and output circuits shall be ≥100 megohms.

3.2.3.4 Diode Function. A +2.50±0.10 vdc output for assembly sections a, b, c, d, e, and f shall not decrease when pins 8 and 10 are connected together for assembly sections a, b, c, and d, or when pins 24 and 30 are connected together for assembly sections e and f. A -2.50±0.10 vdc output for assembly sections a, b, c, d, e, and f shall decrease below -1.0 vdc for the above pin connections.

4. QUALITY ASSURANCE PROVISIONS

4.1 PRODUCT PERFORMANCE AND CONFIGURATION REQUIREMENTS/QUALITY VERIFICATION CROSS REFERENCE INDEX

Text/Examination	Requirement	Method
DC Current Drain	3.1.1	4.3.7
Reference Input Current	3.1.2.	4.3.8
Offset Voltages	3.1.3	4.3.9
Scale Factor	3.1.4	4.3.10
Gain Stability	3.1.5	4.3.11
Scale Factor Linearity	3.1.6	4.3.12
Output Impedance	3.1.7	4.3.13
Output Ripple and Noise	3.1.8	4.3.15
Drawing Compliance	3.2.1	4.3.1
Selection of Resistor R88	3.2.2	4.3.3
Insulation Resistance	3.2.3.1	4.3.4
Continuity and DC Resistance	3.2.3.2	4.3.5
Circuit Isolation	3.2.3.3	4.3.6
Diode Function	3.2.3.4.	4.3.14

4.2 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.2.1 Test Conditions

4.2.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature: 25°C ±10°C
b. Relative Humidity: 90% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.2.1.2 Inputs. The following inputs are necessary for performance of the tests specified herein.

a. Adjustable DC Supply Voltage: 28.00±0.28 vdc, nominal
33.00±0.33 vdc, enhanced
23.00±0.23 vdc, degraded

b. AC Reference Voltage: 28.00±0.28V rms, 800±1 cps

c. AC Signal Voltages:

(1) 0 to 10V rms, 800±1 cps with phase angles of 0° ±2° and +180° ±2° with respect to the reference voltage.

(2) 0 to 1.0V rms, 800±1 cps with phase angles of 0° ±2° and +180° ±2° with respect to the reference voltage.

(3) 28.00±0.28V rms, 800±1 cps.

4.2.1.3 Test Connections. Unless otherwise specified, the tests herein shall be performed on each assembly section as shown in Figure 1, using the applicable input and output pins as detailed in Table II.

TABLE II

INPUT OUTPUT PIN CONNECTIONS

ASSEMBLY SECTION	INPUT PINS		OUTPUT PINS	
	Hi	Lo	Hi	Lo
a	3	5	23	8
b	15	12	29	8
c	20	19	34	8
d	21	18	35	8
e	2	4	22	30
f	17	13	31	30
g	16	14	10	8
h	—	—	11	9

4.2.2 Nonconforming Units. Failure of the units to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.3 TESTS

4.3.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Drawing 2007240. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 Workmanship-Vibration. The assembly shall be vibrated with the input test voltage, and output loads and voltages connected and monitored as shown in Figure 1. The assembly shall be mounted in the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the axis shown in Figure 2. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibration shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. Previbration output levels shall be set within the range of 2.50±0.10 vdc for assembly sections a, b, c, d, e, f and g. A 4.5±0.2 vdc voltage shall be present at the output pins of assembly section h. During vibration the output voltages shall not deviate by more than ±10 percent of the previbration levels for a period exceeding 1 msec. Any deviation exceeding these requirements shall be cause for rejection of the assembly. After vibration, the assembly shall be examined as specified in 4.3.1.

4.3.3 Selection of Resistor R88. Verification by examination of parts selection data shall be performed to ensure that the requirement of 3.2.2 has been met.

4.3.4 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be ≥100 megohms.

4.3.5 Continuity and DC Resistance. The dc resistance between the pins listed in Table I shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.6 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.3.3 has been met.

4.3.7 DC Current Drain. With all of the input pins specified in Table II connected together and the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 10.0±1.0 ma.

4.3.8 Reference Input Current. With all input pins specified in Table II connected together and the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 36 ma.

4.3.9 Offset Voltages. With the input pins of assembly sections a, b, c, d, e, and f specified in Table II connected together and the operating voltages applied, the voltage at each pair of respective output pins shall be <10 mv dc.

4.3.10 Scale Factor

4.3.10.1 Assembly Sections a, and b. With an output of 2.500±0.005 vdc, plus the measured offset voltage, the input signal shall be between 4.50 and 5.50V rms with a phase angle of 0° ±2°.

4.3.10.2 Assembly Sections c and d. With an output of 2.500±0.005 vdc, plus the measured offset voltage, the input signal shall be between 0.45 and 0.55V rms with a phase angle of 0° ±2° .

4.3.10.3 Assembly Sections e, and f. With an output of +2.500±0.005 vdc, plus the measured offset voltage, the input signal voltage shall be between 5.60 and 6.10V rms with a phase angle of 0° ±2° .

4.3.10.4 Assembly Section g. The voltage at the output pins shall be -2.500±0.025 vdc.

4.3.10.5 Assembly Section h. The voltage at the output pins shall be between 4.30 vdc and 4.70 vdc.

4.3.11 Gain Stability. With the inputs to assembly sections a, b, c, d, e and f adjusted for corresponding outputs of +2.500±0.005 vdc, enhancing or degrading the +28 vdc supply shall not cause the output to deviate by more than ±25 mvdc.

4.3.12 Scale Factor Linearity. With the conditions specified below established for assembly sections a, b, c, d, e, and f, each of six respective assembly section scale factor values shall not deviate from the average of the six values by more than ±4 percent for each respective assembly section.

a. The fixed input level, E_s, determined by adjusting the input to obtain an output of +2.500±0.005 vdc.

b. The input voltage, E_{in}, consecutively adjusted to 0.600 and 0.200 of E_s and the respective outputs measured.

c. The phase of E_s reversed and the outputs measured for inputs of $1.00E_s$, $0.600E_s$, and $0.200E_s$.

d. The offset voltage at the output terminals measured with the input pins connected together.

e. The offset voltage algebraically subtracted from the six output measurements.

f. The outputs at $1.000E_s$ divided by 5, those at $0.600E_s$ by 3, and those at $0.200E_s$ by 1.000.

g. The six calculated values averaged and the deviation of each value from the average determined.

4.3.13 Output Impedance. With the operating voltages applied and the input voltage to assembly sections a, b, c, d, e, and f adjusted for an output of 2.500±0.025 vdc for the respective assembly section, and then a 100k ohm ±1 percent resistor substituted for the 1-megohm load resistor, the respective assembly section output shall not decrease more than 120 mv. With the output of assembly section g set to -2.500±0.025 vdc across the 1 megohm load resistor of assembly section g, and then 50k ohm ±1 percent resistor substituted as the load, the output shall not decrease more than 25 mv. The output voltage of assembly section h shall not decrease more than 220 mv when a 100k ohm ±1 percent load is connected across its output pins.

4.3.14 Diode Function. With the outputs of assembly sections a, b, c, d, e, and f adjusted to +2.50±0.10 vdc, and no input to assembly section g, momentarily connecting pin 8 to pin 10 and pin 24 to pin 30 shall not decrease the output voltage levels. With the output of assembly sections a, b, c, d, e, and f adjusted to -2.50±0.10 vdc, momentarily connecting pin 8 to pin 10 and pin 24 to 30 shall reduce the respective output voltages below -1.0 vdc for assembly sections a, b, c, and d, and for assembly sections e, and f respectively.

4.3.15 Output Ripple and Noise. With the output of assembly sections a, b, c, d, e, and f adjusted to +2.50±0.05 vdc, the ripple and noise voltage at the respective output pins shall be <10 mv pp. The ripple and noise voltage at the output of assembly sections g and h shall be less than 0.1 mv pp and 10 mv pp respectively.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

GWK:jls

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 28517	24 MAR 66	
	—	REPLACED BY CONFIGURATION DWG REV B PER TDRR 28518	3 May 66	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3. SELECT RESISTOR PER APPLICABLE PROCUREMENT SPECIFICATION FOR CONDITION IRIG ± 4°F AS MARKED ON AMPLIFIER 2001466.
4. VENDOR ITEM: SEE SPECIFICATION CONTROL OR SOURCE CONTROL DRAWING.
5. THIS IS AN INCOMPLETE DRAWING.

QUANTITY REQUIRED 011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	
1		1010279-104	CAPACITOR	SEE NOTE 4
2		1010279-16		
1		1006777-31		
2		1006755-132		
1		1006755-130		
1		1006755-79		
3		1006755-69		
1		1006755-33		
1		1006755-31	CAPACITOR	
1		1010368-128	RESISTOR	
1		1010368-121		
1		1010368-105		
1		1010364-471	RESISTOR	SEE NOTE 4
1		1008878-047 THRU 1008878-023	RESISTOR	SEE NOTES 3 & 4
2		1006750-36	RESISTOR	SEE NOTE 4
2		1006750-32		
1		1006750-8		
4		1006750-1	RESISTOR	SEE NOTE 4

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED 011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	
1		1010377-20	RESISTOR	SEE NOTE 4
1		1010377-103		
1		1006750-65		
1		1010364-501		
2		1006750-56		
2		1010364-411		
1		1006750-47		
2		1006750-41		
1		1006750-38	RESISTOR	SEE NOTE 4
1		1010364-443	RESISTOR	SEE NOTE 4
1		1010837-001	DIODE	SEE NOTE 4
3		1010385		
2		1010372-12		
2		1010259-000	DIODE	
1		1010397-1	TRANSISTOR	
1		1010357-1	TRANSISTOR	
1		1010342	TRANSISTOR	
4		1010367-000	SEMICONDUCTOR	
2		1010710	TRANSFORMER	
2		1010365	TRANSFORMER	
2		1010274	TRANSFORMER	
1		1010930-013	CONNECTOR	
1		2001466	AMPLIFIER	SEE NOTE 4

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS.
DRAWN D. Dobbert DATE 21 MAR 66
CHECKED J. G. Cygmoure 22 MAR 66
APPROVAL R. Osberg 22 MAR 66
CONTRACT NAS9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL W K 3 May 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL CONDITIONER,
120V PIPA SUPPLY AND VIB
CONNECTOR ASSEMBLY

SIZE C
CODE IDENT NO. 80230
2007241
SCALE —
SHEET 1 of 1

APOLLO G&N Specification
PS2007241 REV-A
Original Issue Date: 7 June 1966
Release Authority: TDRR 29462
Class A Release
CODE IDENT NO. 80203

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

120V PIPA SUPPLY AND IRIG TEMP (FQ) ASSEMBLY, SIGNAL CONDITIONER ASSEMBLY

DRAWING NO. 2007241

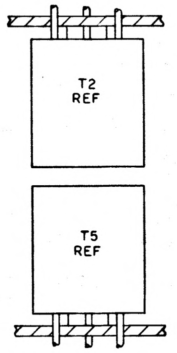
Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/22/66	A	31232	3, 6, 7, 9 RDG/ac	MGM EA	--

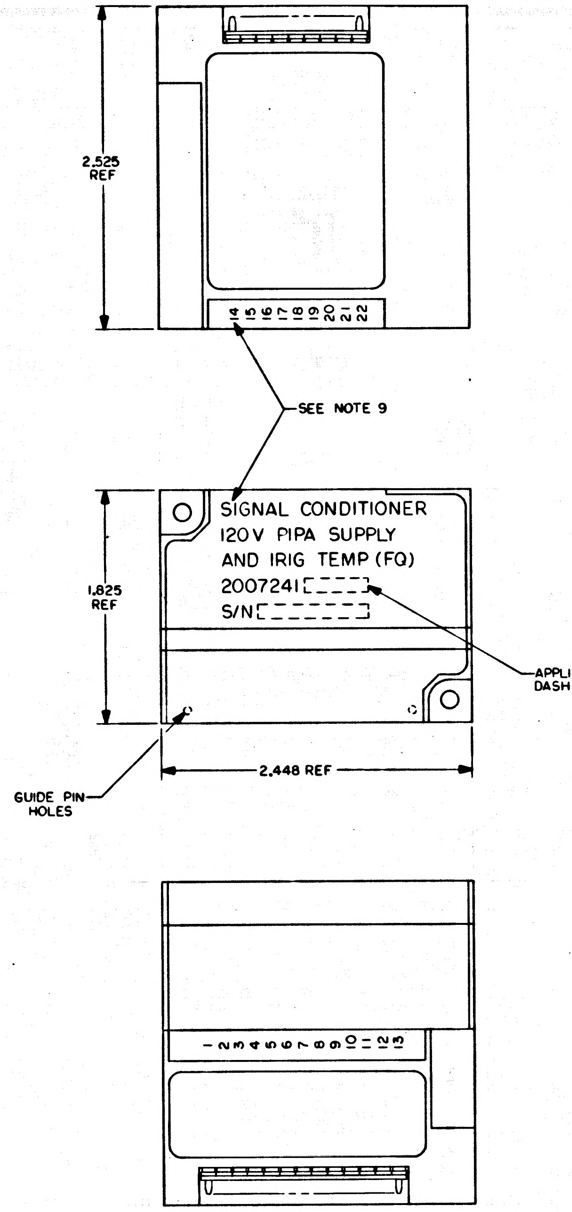
This specification consists of page 1 to 10 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	R M Kowalski 27 May 66 MIT/IL	G H Kriese ACSP

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 28518	EJM			WK



PARTIAL SECTION E-E



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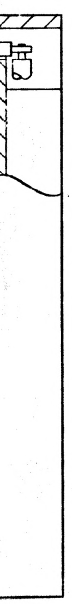
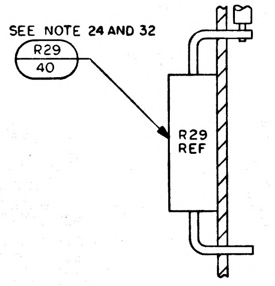
SCALE 2/1





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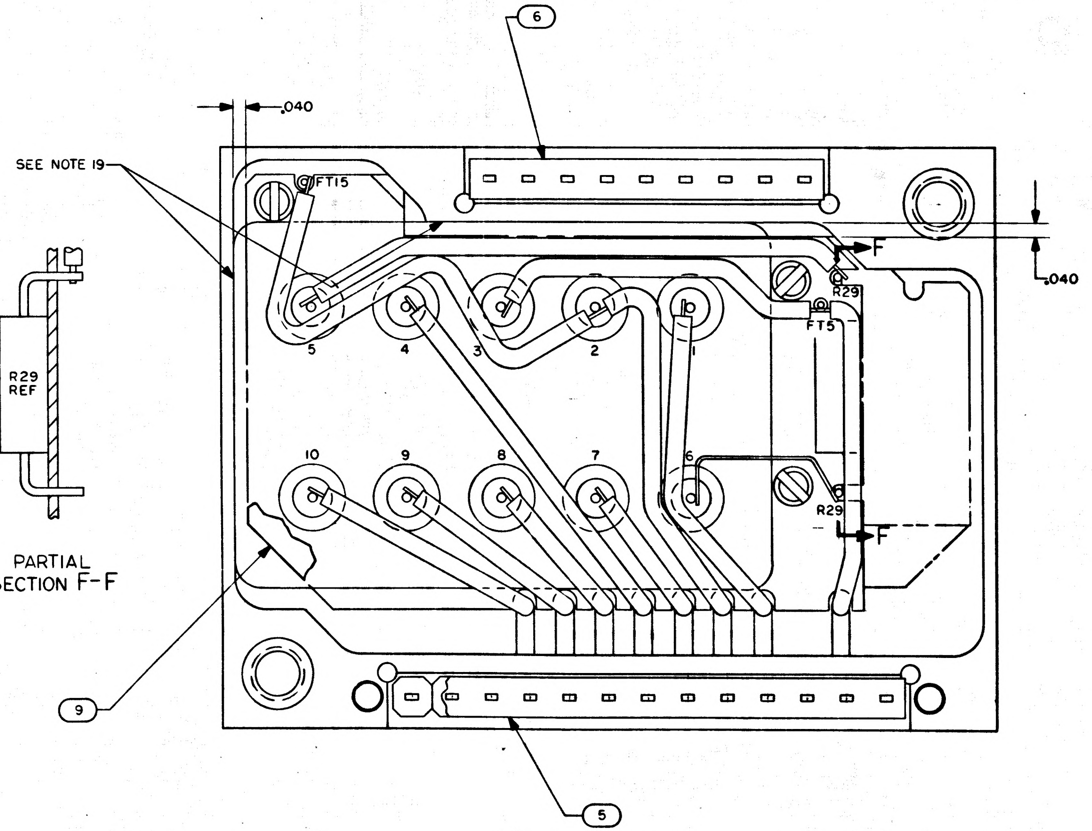

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	2010126		SCHEMATIC	REF
1	1010357-1		TRANSISTOR	60
2	1010274		TRANSFORMER	59
2	1010365		TRANSFORMER	58
2	1010710		TRANSFORMER	57
1	1010397-1		TRANSISTOR	56
1	1010342		TRANSISTOR	55
4	1010367		CHOPPER	54
3	1010385		DIODE	53
2	1010259-000		DIODE	52
2	1010372-12		DIODE	51
1	1010837-001		DIODE	50
1	1006777-31		CAPACITOR	49
2	1010279-16		CAPACITOR	48
1	1010279-104		CAPACITOR	47
1	1006755-33		CAPACITOR	46
2	1006755-132		CAPACITOR	45
1	1006755-79		CAPACITOR	44
3	1006755-69		CAPACITOR	43
1	1006755-31		CAPACITOR	42
1	1006755-130		CAPACITOR	41
1	1008878 SEE NOTE 32		RESISTOR	40
1	1010368-128		RESISTOR	39
1	1010368-121		RESISTOR	38
1	1010368-105		RESISTOR	37
1	1010364-443		RESISTOR	36
1	1010364-501		RESISTOR	35
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1	1010364-471		RESISTOR	33
1	1010377-103		RESISTOR	32
1	1010377-20		RESISTOR	31
2	1006750-41		RESISTOR	30
1	1006750-8		RESISTOR	29
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AR	1006776-21		INSULATION, SLEEVING	17
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1	1008540-13		GASKET, CONNECTOR MINIATURE	5
9	1006782-9		CONTACT, WRAPOST-MALE MINIATURE	4
13	1006782-5		CONTACT, WRAPOST-MALE MINIATURE	3
22	1006775		INSULATOR, WRAPOST-MALE MINIATURE	2
1	2008477		FRAME	1
-011				

LIST OF MATERIALS

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Ed Maloney 18 MAR 66
CHECKED Bonacorgo 29 Apr 66
APPROVED 2 MAY 66
APPROVED 2 MAY 66
APPROVED MIT
APPROVED MSC
DATE

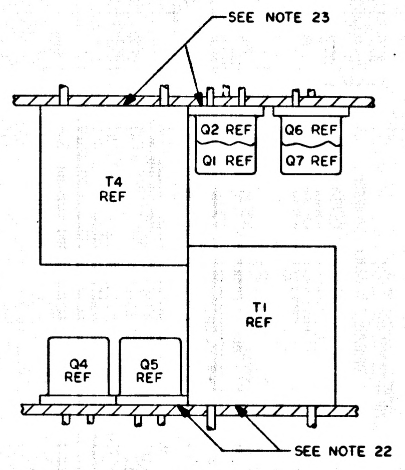
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120 V PIPA
SUPPLY AND IRIG
TEMP(FQ)ASSEMBLY
SIGNAL CONDITIONER ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007241
SCALE 5/1
SHEET 1 OF 1

2007241 B

2007241 B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Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF
SEE NOTE 22

PARTIAL
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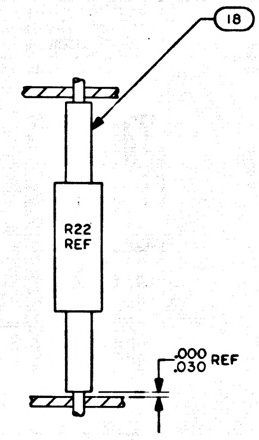
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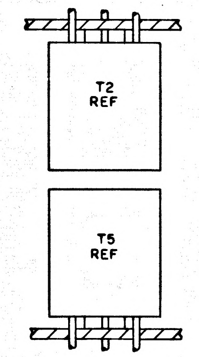
PARTIAL
SECTION D-D
TYP FOR R14,R15 AND R22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T5 REF

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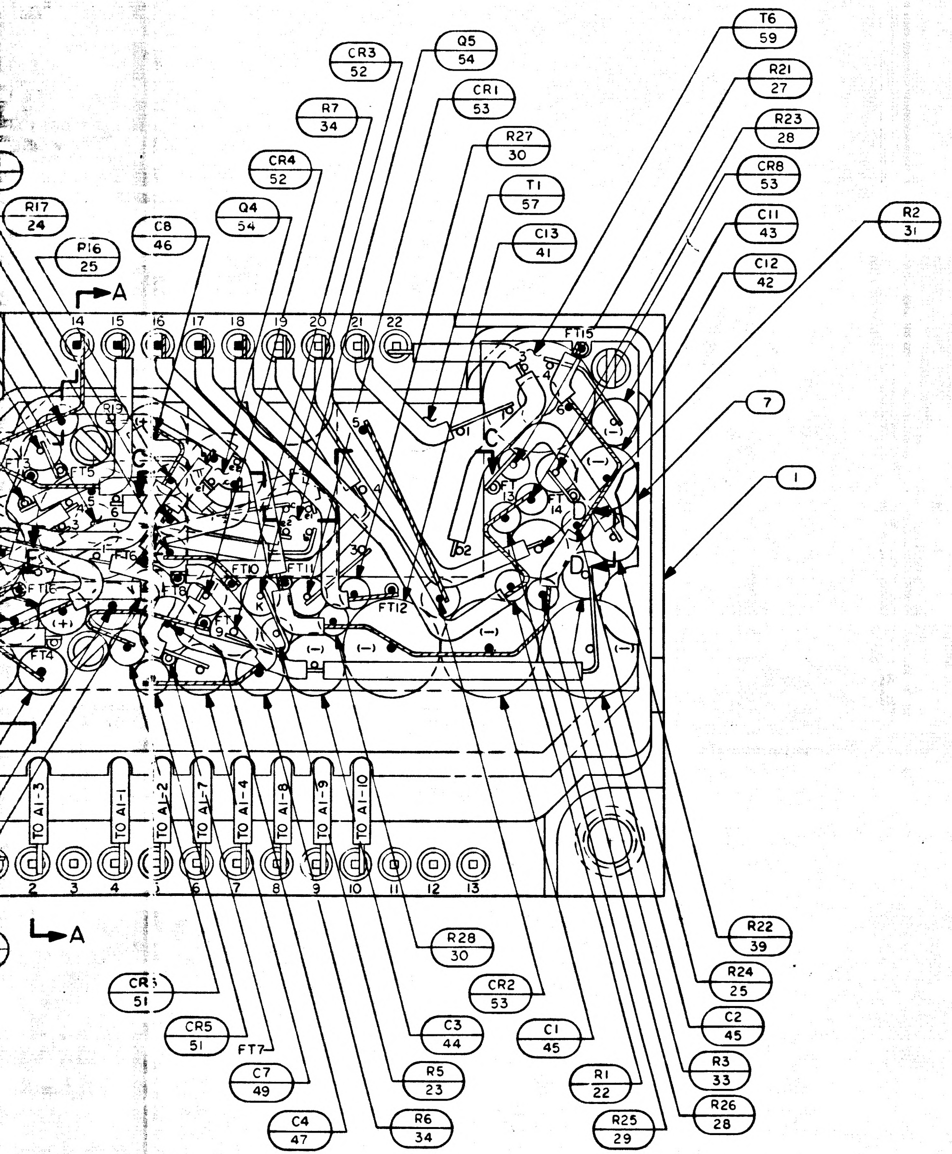
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R23 28
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C11 43
C12 42
R2 31
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CR1 53
R7 34
R27 30
CR4 52
T1 57
Q4 54
C13 41
R17 24
C8 46
P16 25
A
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1
14 15 16 17 18 19 20 21 22
FT15
FT10
FT11
FT12
FT14
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TO A1-7
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2 3 4 5 6 7 8 9 10 11 12 13
A
R28 30
CR5 51
CR5 51
FT7
C7 49
C4 47
CR2 53
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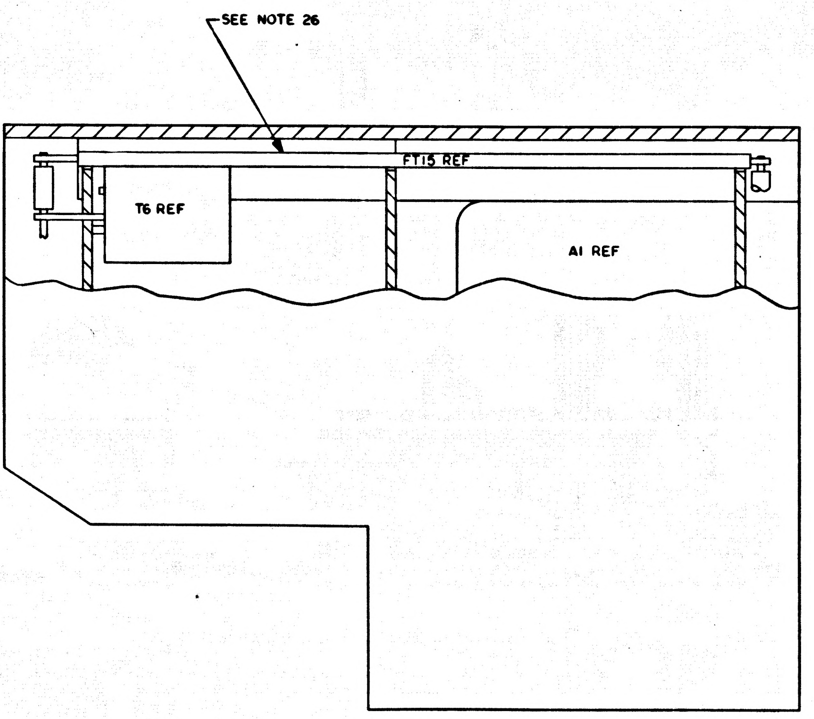
C1 45
R5 23
R6 34
R1 22
R25 29
R22 39
R24 25
C2 45
R3 33
R26 28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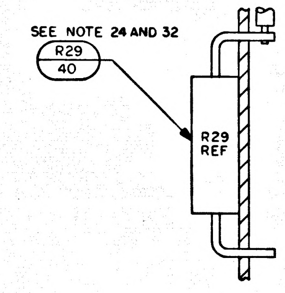
FT15 REF
T6 REF
A1 REF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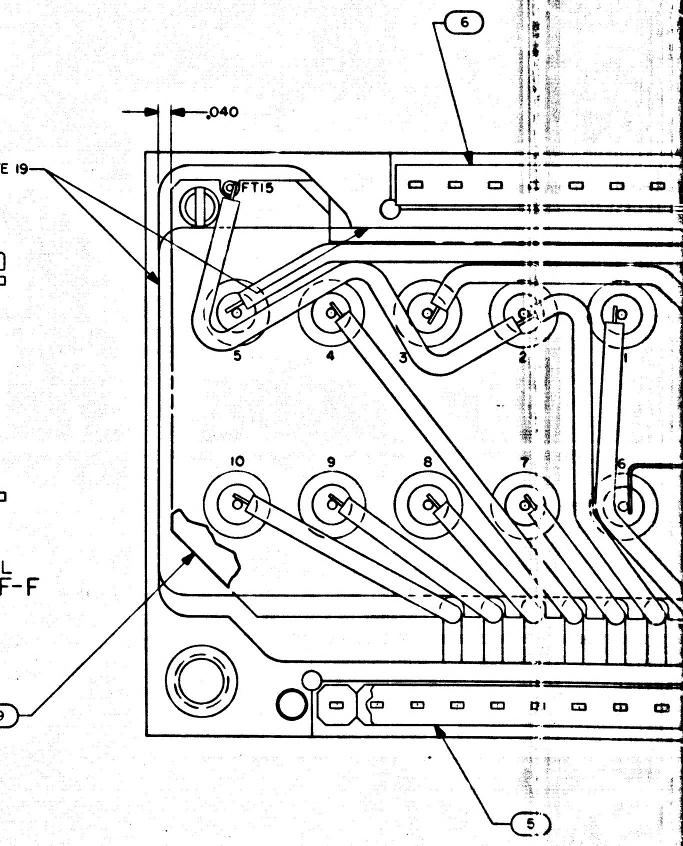
SECTION F-F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SEE NOTE 19
FT15
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10 9 8 7 6
3
5

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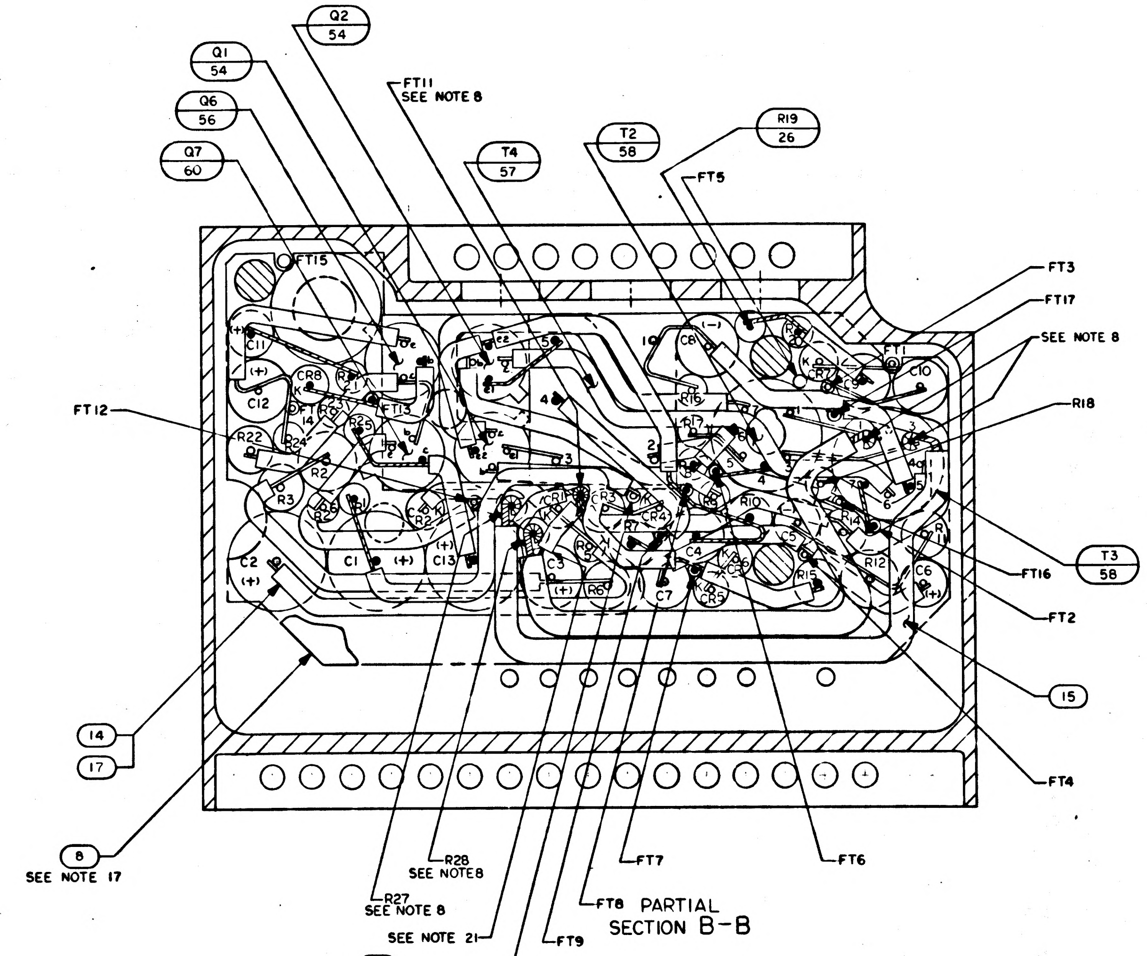
14ST005

3H

R29	
PART NO.	VALUE
1008878-044	14.000K
-045	14.112K
-046	14.225K
-047	14.339K
-048	14.454K
-049	14.570K
-050	14.687K
-051	14.804K
-052	14.922K
-053	15.041K
-054	15.161K
-055	15.282K
-056	15.404K
-057	15.527K
-058	15.651K
-059	15.776K
-060	15.902K
-061	16.029K
-062	16.157K
-063	16.286K
-064	16.416K
-065	16.547K
-066	16.679K
-067	16.812K
1008878-068	16.900K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Q6
56
Q7
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FT11
SEE NOTE 8
T4
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T2
58
R19
26
FT5
FT15
FT3
FT17
SEE NOTE 8
R18
FT12
C11
C12
CR8
R22
R24
R2
R3
C2
C1
C13
C8
R16
R10
R4
R7
C3
C4
C7
R5
R6
R15
R12
C6
C10
T3
58
FT16
FT2
15
FT4
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SEE NOTE 8
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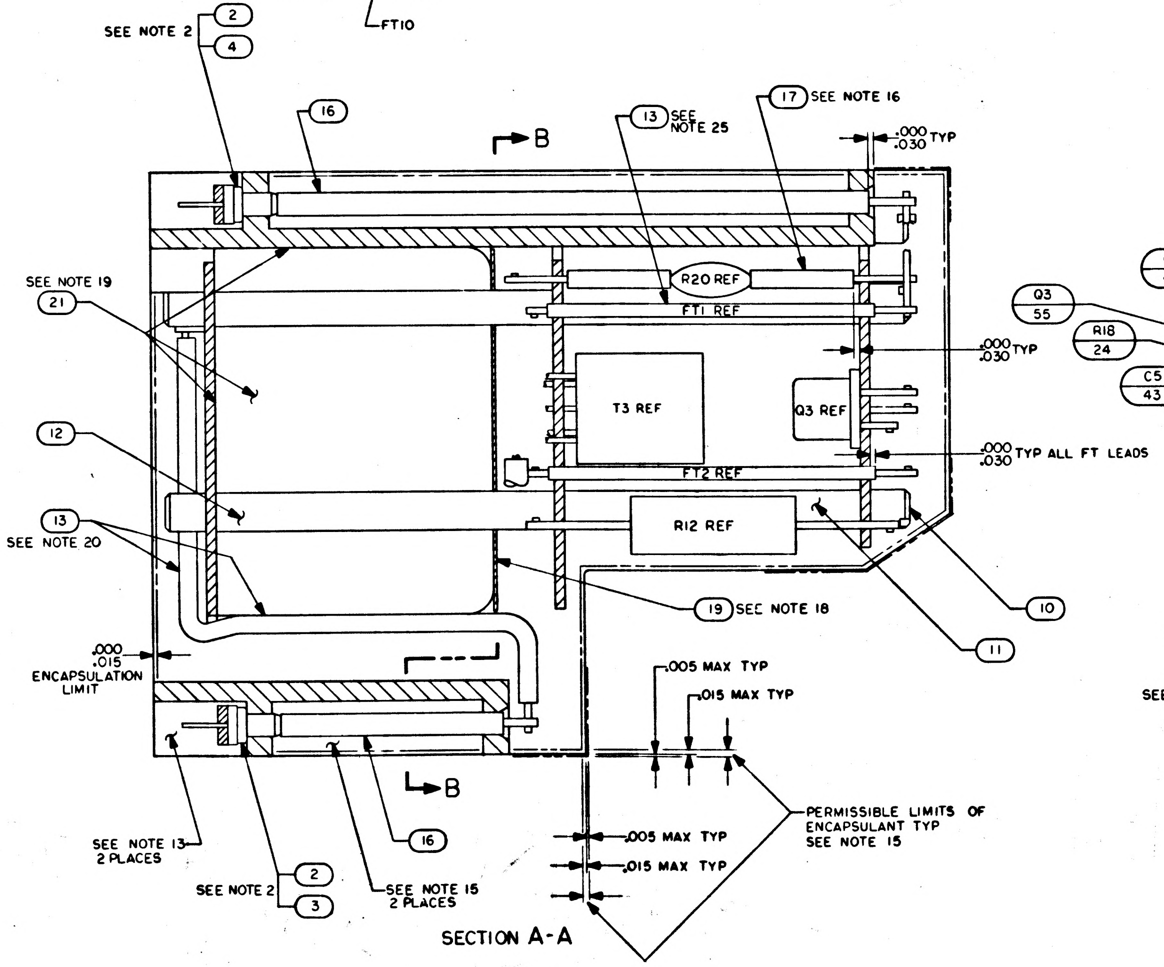
SEE NOTE 8
SEE NOTE 21
FT7
FT8
FT9
FT10
FT6

PARTIAL SECTION B-B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B
13 SEE NOTE 25
17 SEE NOTE 16
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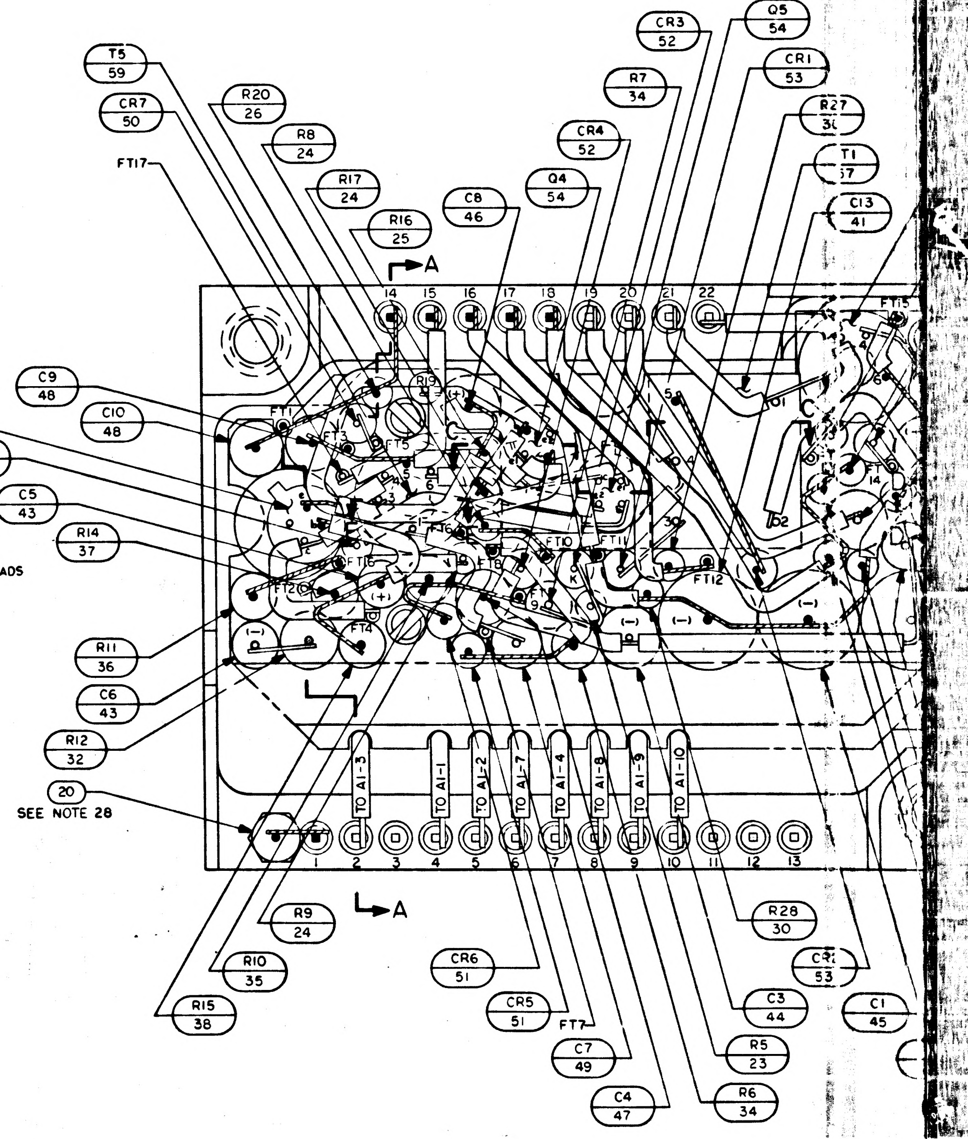
.030 TYP
SEE NOTE 19
21
R20 REF
FT1 REF
.000
.030 TYP
Q3
55
T3 REF
Q3 REF
.000
.030 TYP ALL FT LEADS
FT2 REF
12
R12 REF
13
SEE NOTE 20
19 SEE NOTE 18
10
11
.000
.015
ENCAPSULATION LIMIT
.005 MAX TYP
.015 MAX TYP
PERMISSIBLE LIMITS OF ENCAPSULANT TYP
SEE NOTE 15
B
16
SEE NOTE 13
2 PLACES
.005 MAX TYP
.015 MAX TYP
SEE NOTE 2
2
3
SEE NOTE 15
2 PLACES

SECTION A-A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R7
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CR3
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T1
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C13
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FT15
C9
48
C10
48
R18
24
C5
43
R14
37
R11
36
C6
43
R12
32
20
SEE NOTE 28
FT1
FT3
FT5
R19
FT16
FT2
FT4
FT8
FT9
FT10
FT11
FT12
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R9
24
R10
35
R15
38
CR6
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CR5
51
FT7
C7
49
C4
47
R28
30
CR2
53
C3
44
R5
23
R6
34
C1
45

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2,3 AND 4 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 55,58 AND 59 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 22 THRU 30, 33 THRU 36, 43 AND 50 THRU 53
17. BOND FIND NO.8 TO FIND NO.1 PER ND1002004 TYPE I
18. BOND FIND NO.19 TO FIND NO.21 PER ND1002004 TYPE I. CENTRALIZE
19. BOND FIND NO.21 TO FIND NOS 1 AND 9 PER ND1002004 TYPE I
20. BOND RUNS FROM K1 TO MALCO PINS AGAINST SIDE OF K1 AS SHOWN PER ND1002004 TYPE I
21. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO.15
22. BOND Q3,Q4,Q5,T1, T5 AND T6 TO FIND NO.7 PER ND1002004 TYPE I
23. BOND Q1,Q2,Q6,Q7,T2,T3 AND T4 TO FIND NO 8 PER ND1002004 TYPE I
24. BOND R29 TO FIND NO.9 PER ND1002004 TYPE I
25. BOND FT1 TO FIND NOS 7 AND 8 PER ND1002004 TYPE I
26. BOND FT15 TO FIND NOS 7,8 AND 9 PER ND1002004 TYPE I
27. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
28. MOUNTING TORQUE FOR FOR FIND NO.20 TO BE 15-20 INCH OUNCES
29. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. PIN BLADES AND INSULATORS TO BE FREE OF PAINT
30. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE
31. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S.2007241
32. FIND NO.21 AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON FIND NO.21

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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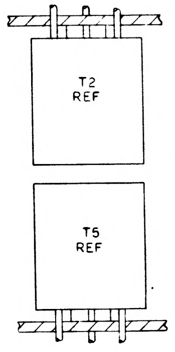
C		REVISED PER TDRR 29918	J.	JAC	13 JUL 66	



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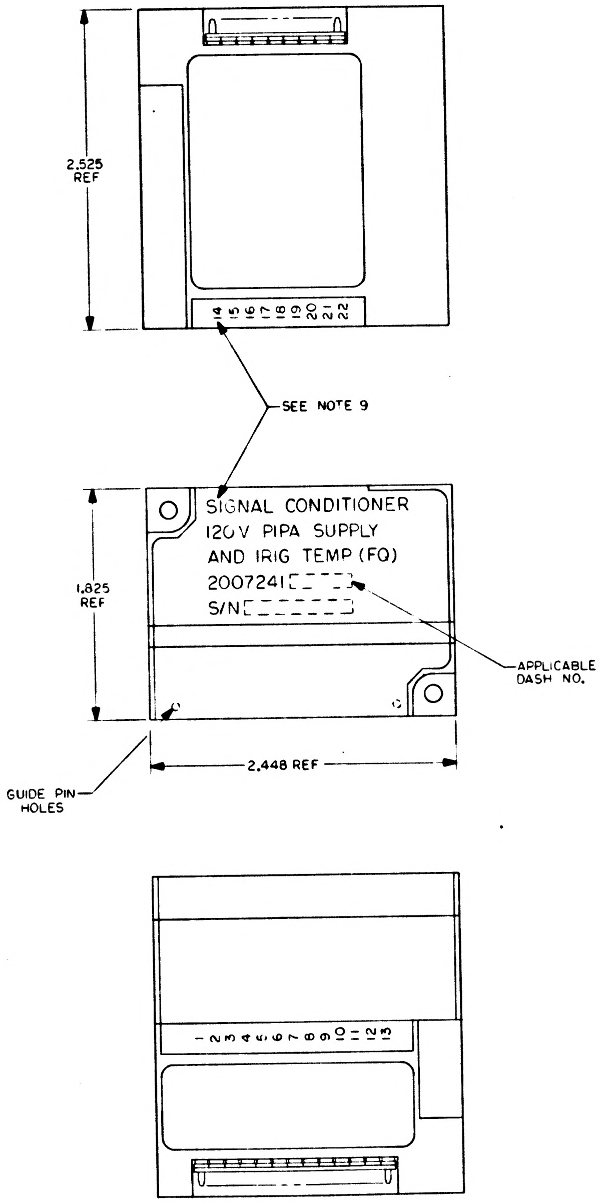

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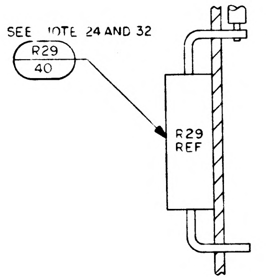

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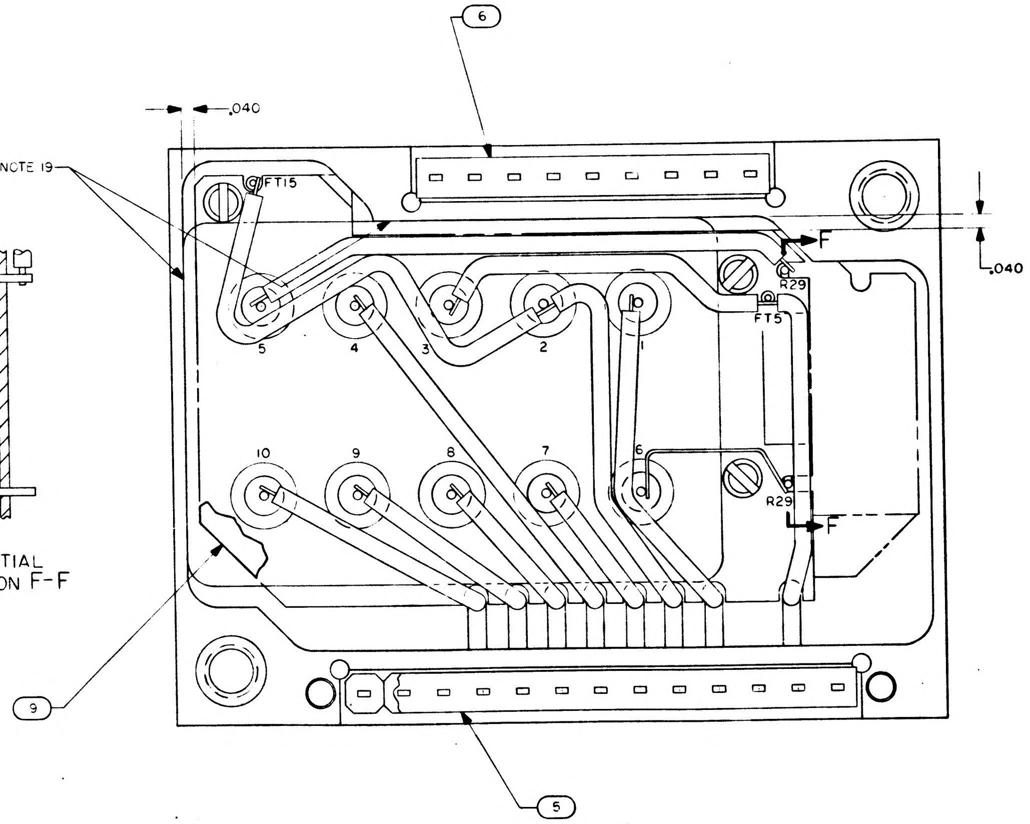

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RESISTOR VALUES ARE IN OHMS
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DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Ed Mahoney 3 Mar 66
CHECKED Bonarrigo 2 Mar 66
APPROVED Rilliot 2 May 66
APPROVED
APPROVED MIT W. Gupper 2 Mar 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

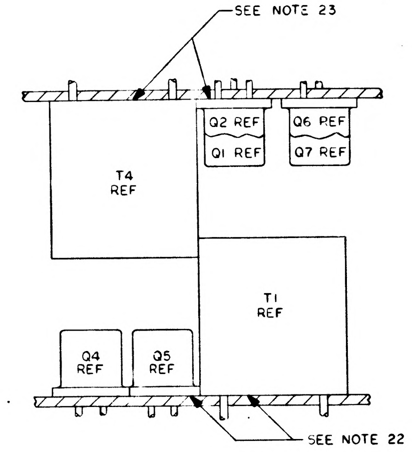
120 V PIPA
SUPPLY AND IRIG
TEMP (FQ) ASSEMBLY
SIGNAL CONDITIONER ASSY

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2007241
SCALE 5/1
SHEET 1 OF 1

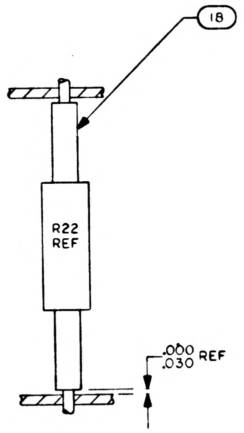
2007241 C

2007241 REV C SH -

3-/-2007241


SEE NOTE 23
Q2 REF
Q6 REF
Q1 REF
Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF
SEE NOTE 22

PARTIAL
SECTION C-C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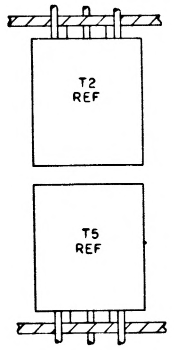
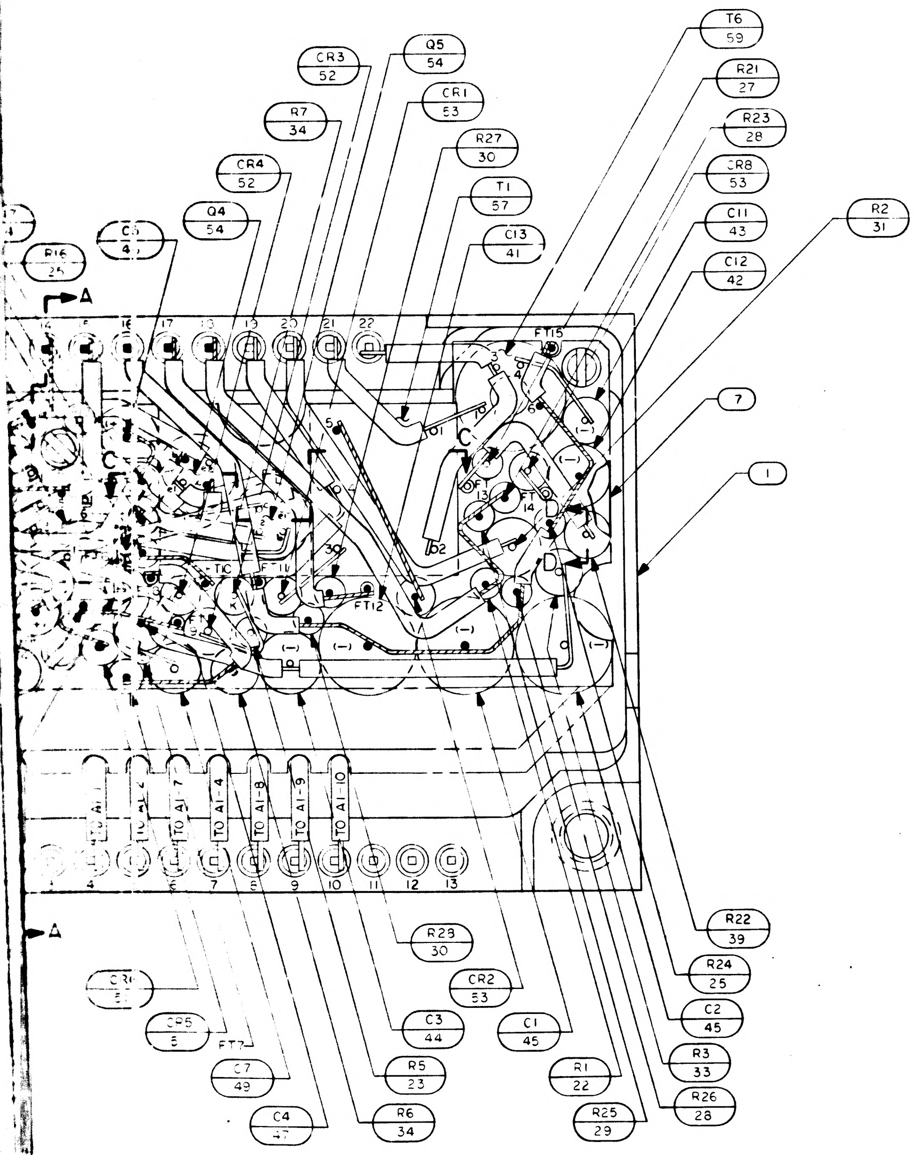
R22 REF
.000
.030 REF

PARTIAL
SECTION D-D
TYP FOR R14,R15 AND R22


T2 REF
T5 REF

PARTIAL
SECTION E-E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Q5 54
R23 28
CR1 53
R7 34
R27 30
CR8 53
T1 57
CR4 52
C13 41
C11 43
R2 31
Q4 54
C12 42
C5 4
R16 24
A
7
1
FT15
FT12
TO A1-4
TO A1-8
TO A1-9
TO A1-10
4 7 9 10 11 12 13
A
R22 39
R28 30
R24 25
CR2 53
C2 45
C3 44
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CR5 5
FT7
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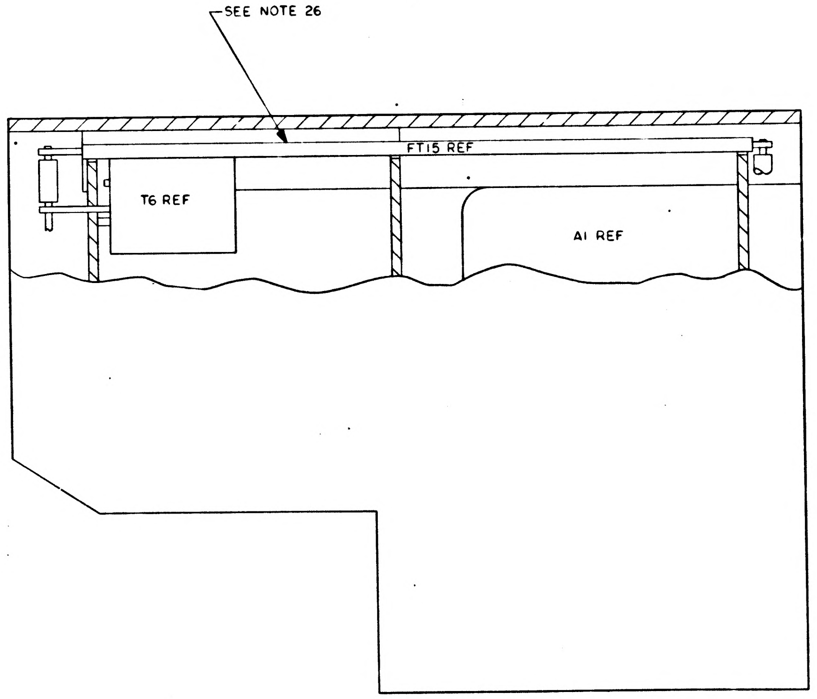
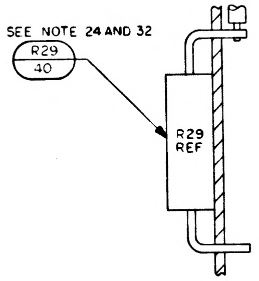
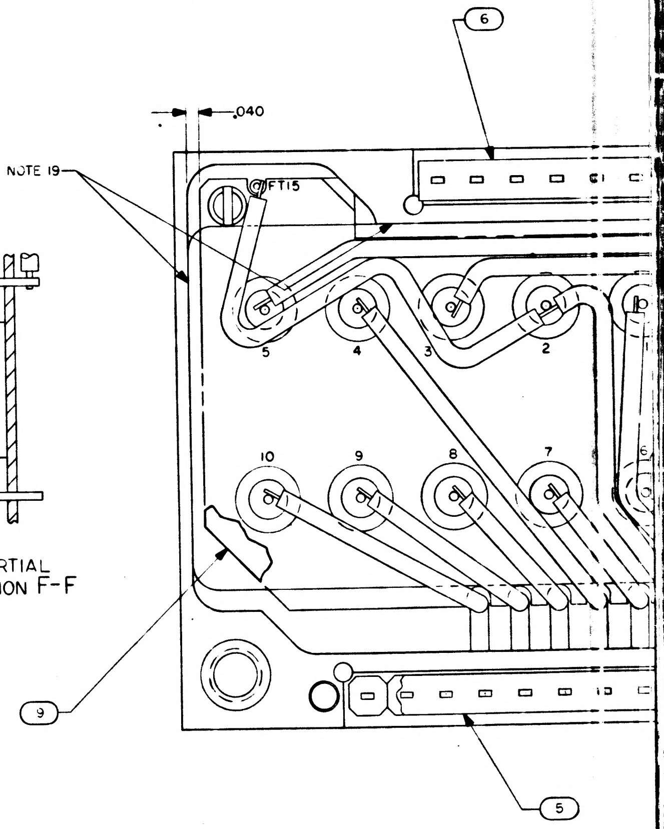
C7 49
R5 23
R1 22
R26 28
C4 47
R6 34
R25 29


SEE NOTE 26
FT15 REF
T6 REF
A1 REF


SEE NOTE 24 AND 32
R29 40
R29 REF

PARTIAL
SECTION F-F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SEE NOTE 19
FT15
5 4 3 2
10 9 8 7
9
5

2007241	REV LTR C	SH 1

2/2007241

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

R29	
PART NO.	VALUE
1008878–044	14.000K
–045	14.112K
–046	14.225K
–047	14.339K
–048	14.454K
–049	14.570K
–050	14.687K
–051	14.804K
–052	14.922K
–053	15.041K
–054	15.161K
–055	15.282K
–056	15.404K
–057	15.527K
–058	15.651K
–059	15.776K
–060	15.902K
–061	16.029K
–062	16.157K
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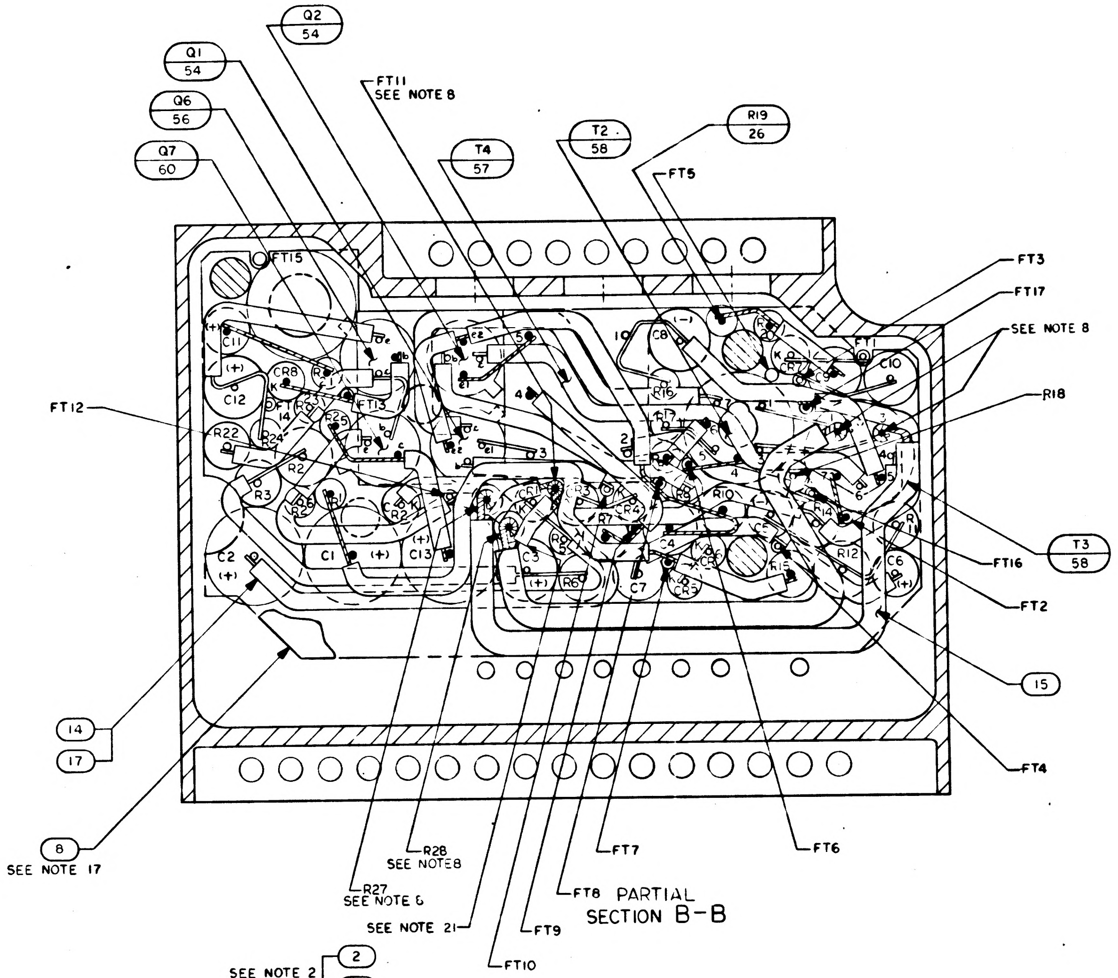
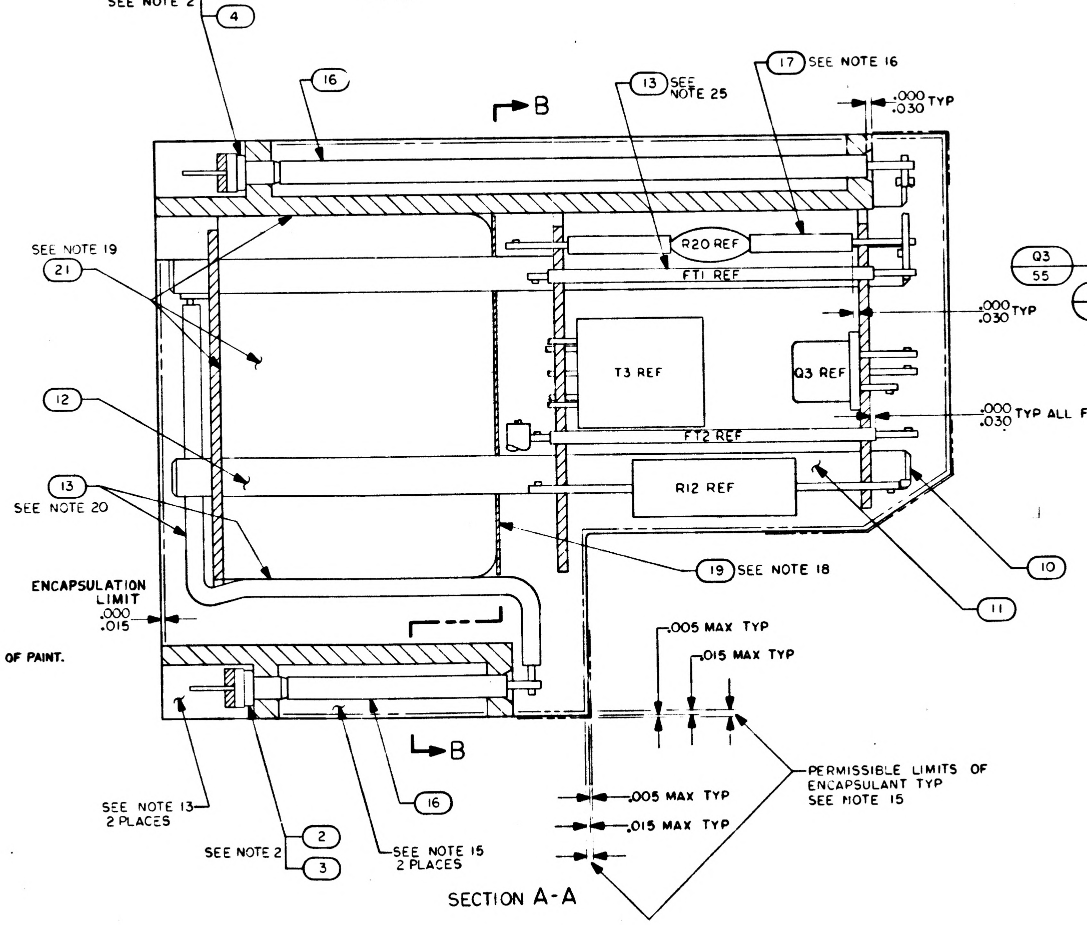
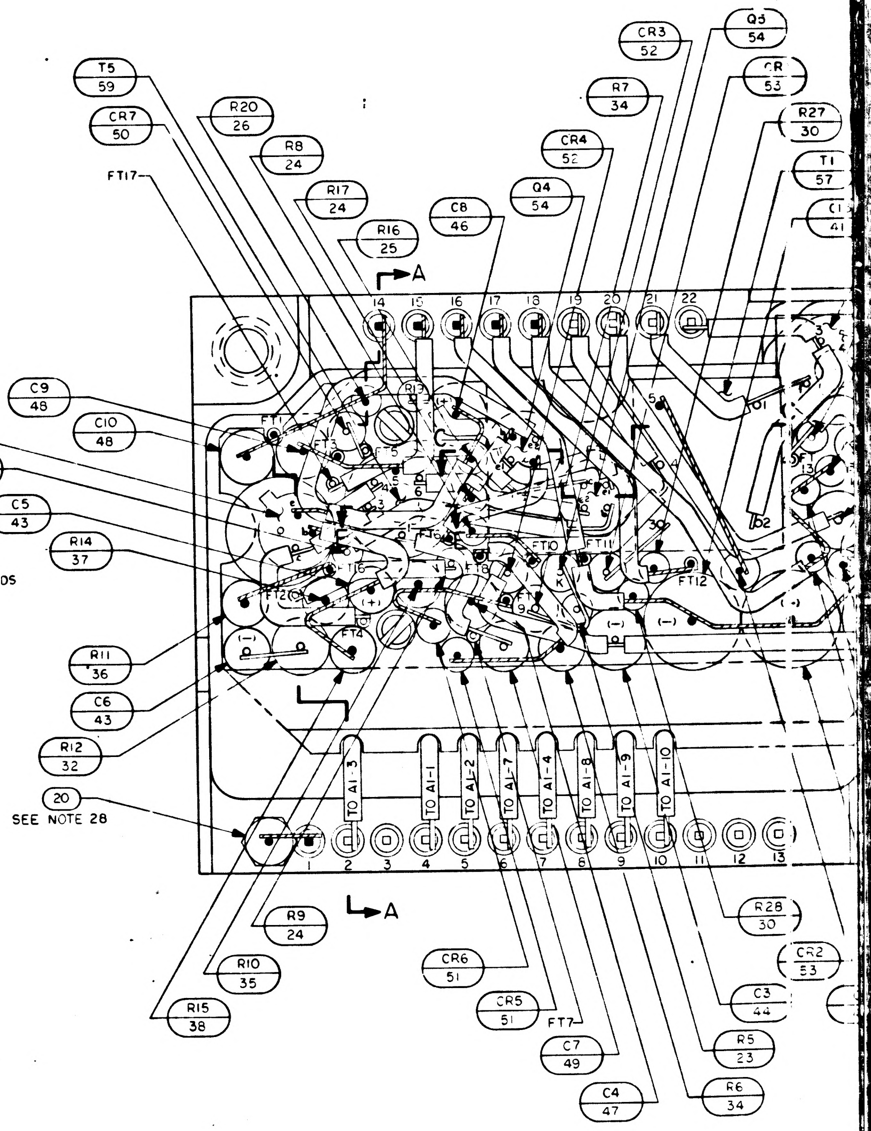
–066	16.679K
–067	16.812K
1008878–068	16.900K


Q1 54
Q2 54
Q6 56
Q7 60
FT11 SEE NOTE 8
T4 57
T2 58
R19 26
FT5
FT3
FT17
SEE NOTE 8
R18
FT12
FT15
C11
C12
CR8
R22
R3
R2
C2
C1
C13
C3
R6
C7
R10
R12
C6
C8
C10
FT16
T3 58
FT2
15
FT4
14
17
8 SEE NOTE 17
R28 SEE NOTE 8
R27 SEE NOTE 6
SEE NOTE 21
FT9
FT10
FT7
FT6
FT8

PARTIAL SECTION B-B


SEE NOTE 2
2
4
16
B
13 SEE NOTE 25
17 SEE NOTE 16
.000 .030 TYP
SEE NOTE 19
21
R20 REF
FT1 REF
.000 .030 TYP
T3 REF
Q3 REF
.000 .030 TYP ALL FT LEADS
FT2 REF
12
R12 REF
13
SEE NOTE 20
10
11
19 SEE NOTE 18
ENCAPSULATION LIMIT
.000 .015
.005 MAX TYP
.015 MAX TYP
B
SEE NOTE 13 2 PLACES
SEE NOTE 2
2
3
16
SEE NOTE 15 2 PLACES
.005 MAX TYP
.015 MAX TYP
PERMISSIBLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15

SECTION A-A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R20 26
R8 24
FT17
R17 24
R16 25
C8 46
Q4 54
CR4 52
R7 34
CR3 52
Q5 54
CR 53
R27 30
T1 57
A
C9 48
C10 48
Q3 55
R18 24
C5 43
R14 37
R11 36
C6 43
R12 32
20 SEE NOTE 28
R9 24
A
R10 35
R15 38
CR6 51
CR5 51
FT7
C7 49
C4 47
R28 30
CR2 53
C3 44
R5 23
R6 34
TO A1-3
TO A1-1
TO A1-2
TO A1-7
TO A1-4
TO A1-8
TO A1-9
TO A1-10
14 15 16 17 18 19 20 21 22
1 2 3 4 5 6 7 8 9 10 11 12 13

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2,3 AND 4 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 55,58 AND 59 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 22 THRU 30, 33 THRU 36, 43 AND 50 THRU 53
17. BOND FIND NO.3 TO FIND NO.1 PER ND1002004 TYPE I
18. BOND FIND NO.19 TO FIND NO.21 PER ND1002004 TYPE I. CENTRALIZE
19. BOND FIND NO.21 TO FIND NOS 1 AND 9 PER ND1002004 TYPE I
20. BOND RUNS FROM K1 TO MALCO PINS AGAINST SIDE OF K1 AS SHOWN PER ND1002004 TYPE I
21. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO.15
22. BOND Q3,Q4,Q5,T1, T5 AND T6 TO FIND NO.7 PER ND1002004 TYPE I
23. BOND Q1,Q2,Q6,Q7,T2,T3 AND T4 TO FIND NO 8 PER ND1002004 TYPE I
24. BOND R29 TO FIND NO.9 PER ND1002004 TYPE I
25. BOND FT1 TO FIND NOS 7 AND 8 PER ND1002004 TYPE I
26. BOND FT15 TO FIND NOS 7.8 AND 9 PER ND1002004 TYPE I
27. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
28. MOUNTING TORQUE FOR FOR FIND NO.20 TO BE 15–20 INCH OUNCES
29. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1003809–4 PAINT. **OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.**
30. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008367 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE
31. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S.2007241
32. FIND NO.21 AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON FIND NO.21

	REV LTR	SH
2007241	C	1

R29	
PART NO.	VALUE
1008878-044	14.000K
-045	14.112K
-046	14.225K
-047	14.339K
-048	14.454K
-049	14.570K
-050	14.687K
-051	14.804K
-052	14.922K
-053	15.041K
-054	15.161K
-055	15.282K
-056	15.404K
-057	15.527K
-058	15.651K
-059	15.776K
-060	15.902K
-061	16.029K
-062	16.157K
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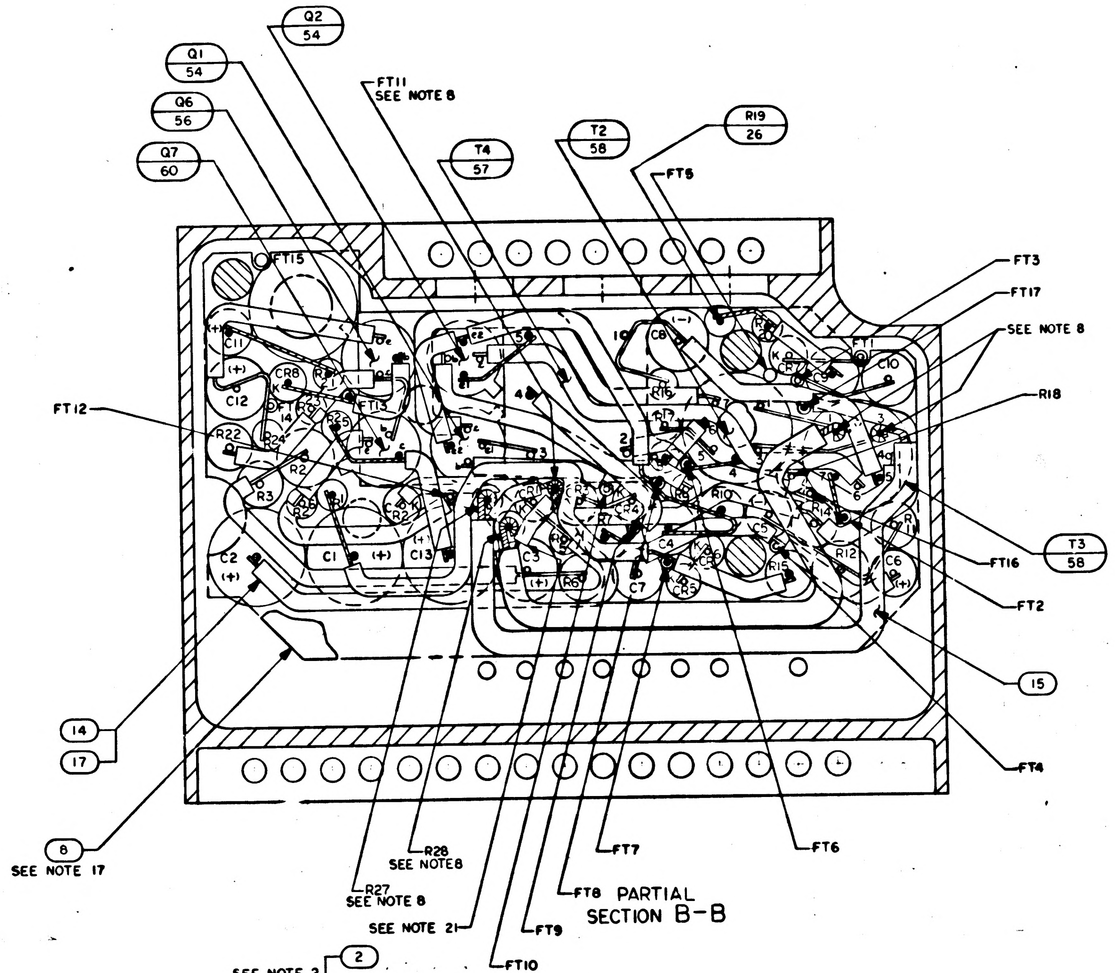
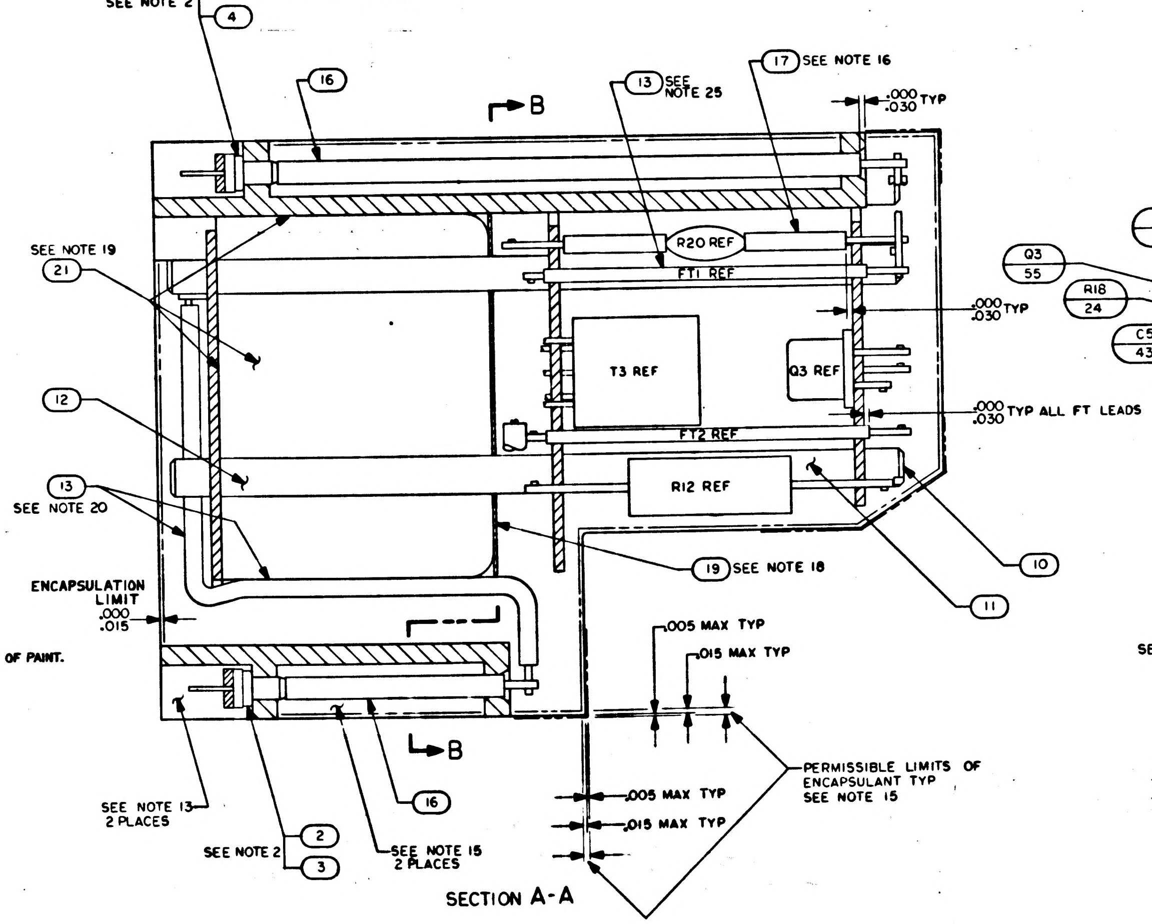
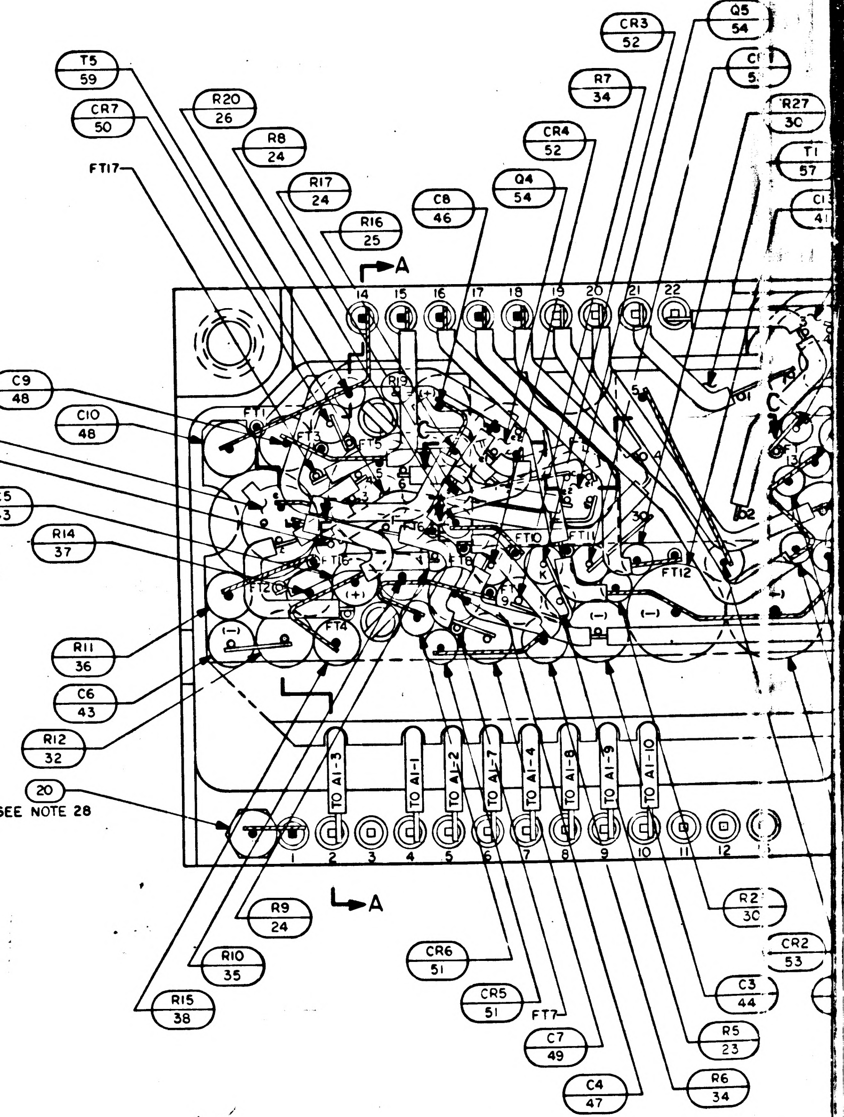
-065	16.547K
-066	16.679K
-067	16.812K
1008878-068	16.900K


Q1 54
Q2 54
Q6 56
Q7 60
FT11 SEE NOTE 8
T4 57
T2 58
R19 26
FT5
FT3
FT17
SEE NOTE 8
R18
FT12
FT15
T3 58
FT16
FT2
15
FT4
14
17
8 SEE NOTE 17
R28 SEE NOTE8
R27 SEE NOTE 8
SEE NOTE 21
FT9
FT10
FT8
FT7
FT6

PARTIAL SECTION B-B


SEE NOTE 2
2
4
16
B
13 SEE NOTE 25
17 SEE NOTE 16
.000 .030 TYP
SEE NOTE 19
21
R20 REF
FT1 REF
T3 REF
Q3 REF
.000 .030 TYP
.000 .030 TYP ALL FT LEADS
12
FT2 REF
R12 REF
13
SEE NOTE 20
19 SEE NOTE 18
10
11
ENCAPSULATION LIMIT .000 .015
.005 MAX TYP
.015 MAX TYP
PERMISSIBLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15
.005 MAX TYP
.015 MAX TYP
SEE NOTE 13 2 PLACES
SEE NOTE 2
2
3
16
SEE NOTE 15 2 PLACES
B

SECTION A-A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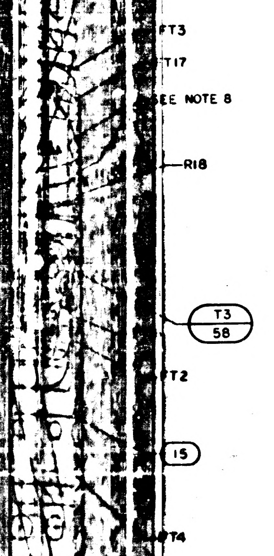
CR7 50
FT17
R20 26
R8 24
R17 24
R16 25
C8 46
Q4 54
CR4 52
R7 34
CR3 52
Q5 54
R27 30
T1 57
A
C9 48
C10 48
Q3 55
R18 24
C5 43
R14 37
R11 36
C6 43
R12 32
20 SEE NOTE 28
TO A1-3
TO A1-1
TO A1-2
TO A1-7
TO A1-4
TO A1-8
TO A1-9
TO A1-10
A
R9 24
R10 35
R15 38
CR6 51
CR5 51
FT7
C7 49
C4 47
C3 44
R5 23
R6 34
CR2 53
R2 30

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2,3 AND 4 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023.CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 55,58 AND 59 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 22 THRU 30, 33 THRU 36, 43 AND 50 THRU 53
17. BOND FIND NO.8 TO FIND NO.1 PER ND1002004 TYPE I
18. BOND FIND NO.19 TO FIND NO.21 PER ND1002004 TYPE I. CENTRALIZE
19. BOND FIND NO.21 TO FIND NOS 1 AND 9 PER ND1002004 TYPE I
20. BOND RUNS FROM K1 TO MALCO PINS AGAINST SIDE OF K1 AS SHOWN PER ND1002004 TYPE I
21. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO.15
22. BOND Q3,Q4,Q5,T1, T5 AND T6 TO FIND NO.7 PER ND1002004 TYPE I
23. BOND Q1,Q2,Q6,Q7,T2,T3 AND T4 TO FIND NO 8 PER ND1002004 TYPE I
24. BOND R29 TO FIND NO.9 PER ND1002004 TYPE I
25. BOND FT1 TO FIND NOS 7 AND 8 PER ND1002004 TYPE I
26. BOND FT15 TO FIND NOS 7,8 AND 9 PER ND1002004 TYPE I
27. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
28. MOUNTING TORQUE FOR FOR FIND NO.20 TO BE 15-20 INCH OUNCES
29. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. **OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.**
30. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE
31. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S.2007241
32. FIND NO.21 AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON FIND NO.21

2007241	REV LTR D	SH 1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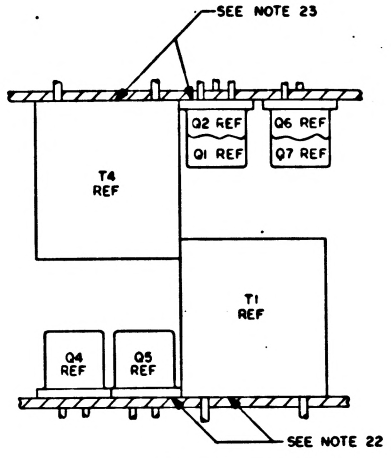
SEE NOTE 8
R18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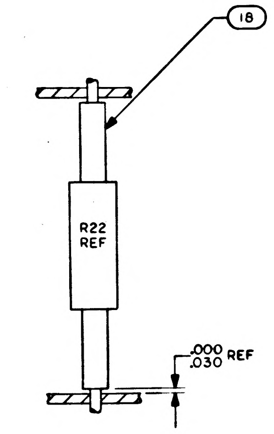
Q7 REF
T1 REF
Q4 REF
Q5 REF
SEE NOTE 22

PARTIAL
SECTION C-C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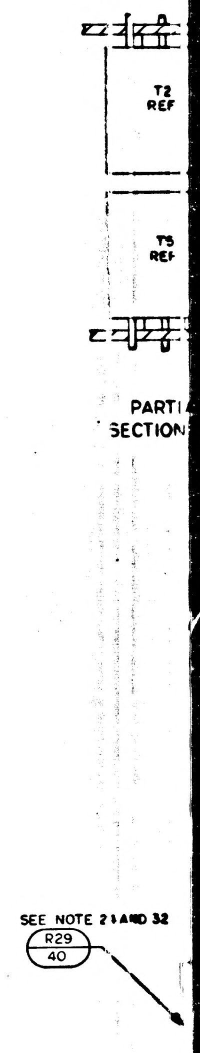
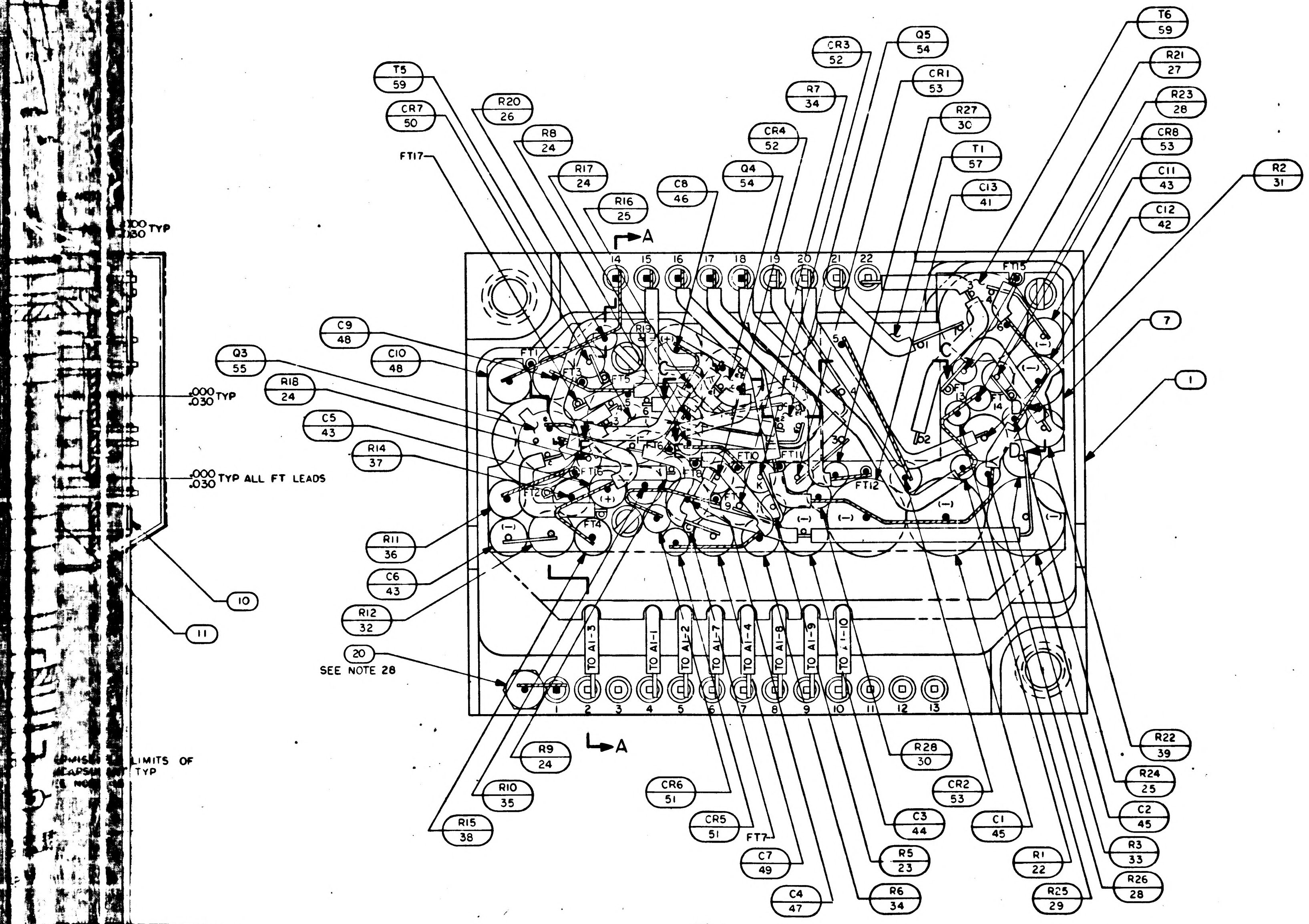
.000 .030 REF

PARTIAL
SECTION D-D
TYP FOR R14,R15 AND R22


T2 REF
T5 REF
SEE NOTE 21 AND 32
R29
40

PARTI
SECTION


T3 58
FT2
15
FT4
.000 .030 TYP
.000 .030 TYP
.000 .030 TYP ALL FT LEADS
10
11
LIMITS OF
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T5 59
CR7 50
R20 26
R8 24
R17 24
R16 25
C8 46
Q4 54
CR4 52
R7 34
CR3 52
Q5 54
CR1 53
R27 30
T1 57
C13 41
T6 59
R21 27
R23 28
CR8 53
C11 43
C12 42
R2 31
7
1
FT17
A
14 15 16 17 18 19 20 21 22
FT15
FT1
FT3
FT5
R19
FT16
FT20
FT4
FT10
FT11
FT12
FT8
FT13
FT14
C
D
C9 48
C10 48
Q3 55
R18 24
C5 43
R14 37
R11 36
C6 43
R12 32
20
SEE NOTE 28
TO A1-3
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TO A1-4
TO A1-8
TO A1-9
TO A1-10
1 2 3 4 5 6 7 8 9 10 11 12 13
A
R9 24
R10 35
R15 38
CR6 51
CR5 51
FT7
C7 49
C4 47
R28 30
C3 44
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R1 22
R25 29
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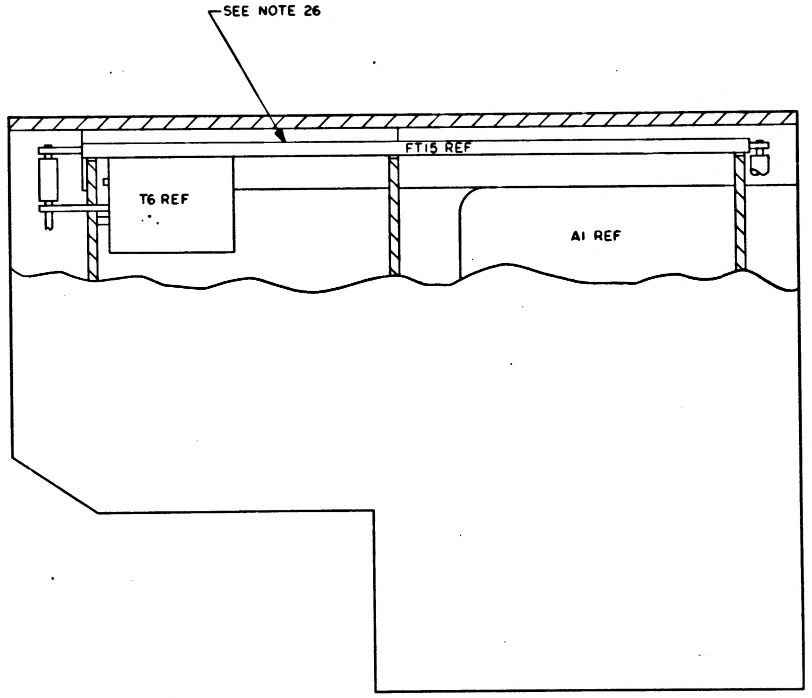
R3 33
R26 28

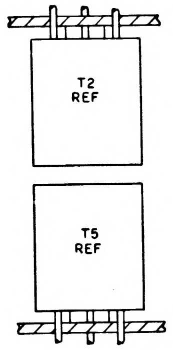

SEE NOTE 26
FT15 REF
T6 REF
A1 REF

REV S-

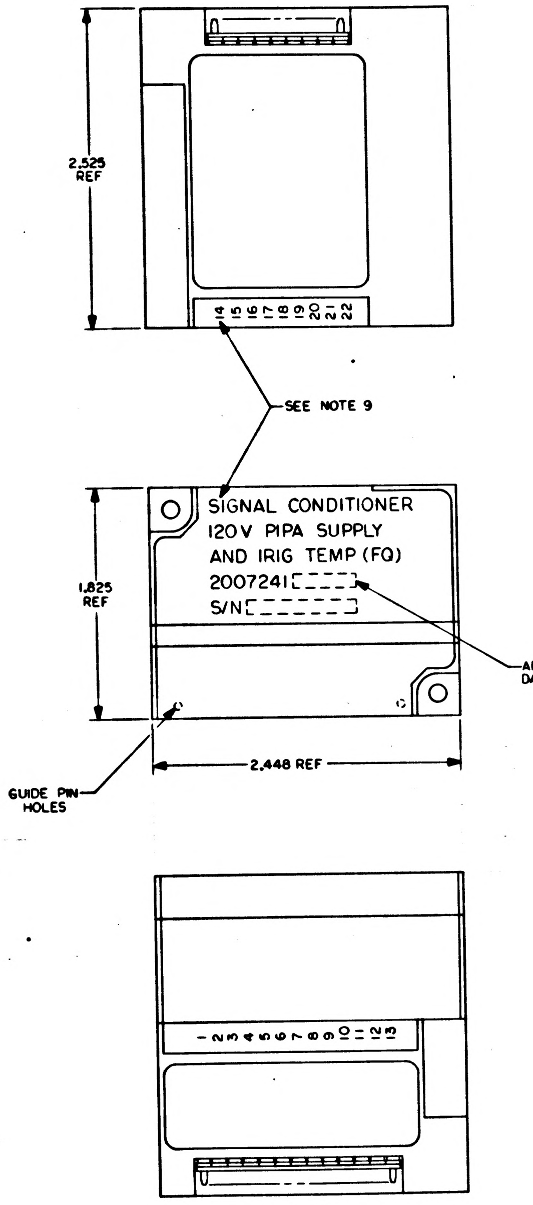
2007241	REV LTR D	SH 1

2/2007241

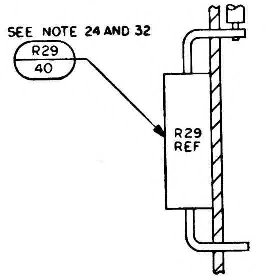
REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 28518	EJM			WK
C		REVISED PER TDRR 29918	J.	JAC	13 JUL 66	
D		REVISED PER TDRR 30430		JL	10 AUG 66	



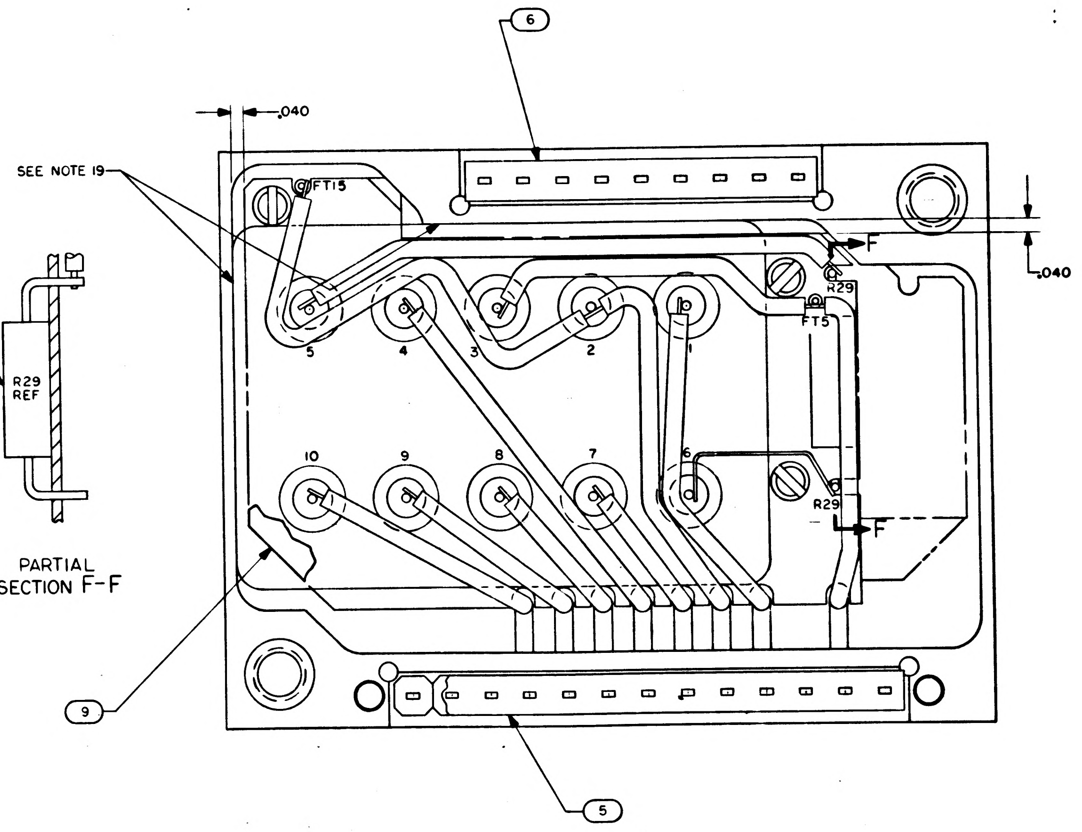
PARTIAL SECTION E-E



MARKING VIEWS
SCALE 2/1



PARTIAL SECTION F-F



QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010126		SCHEMATIC	REF
1	1010357-1		TRANSISTOR	60
2	1010274		TRANSFORMER	59
2	1010365		TRANSFORMER	58
2	1010710		TRANSFORMER	57
1	1010397-1		TRANSISTOR	56
1	1010342		TRANSISTOR	55
4	1010367		CHOPPER	54
3	1010385		DIODE	53
2	1010259-003		DIODE	52
2	1010372-12		DIODE	51
1	1010837-001		DIODE	50
1	1006777-31		CAPACITOR	49
2	1010279-16		CAPACITOR	48
1	1010279-104		CAPACITOR	47
1	1006755-33		CAPACITOR	46
2	1006755-132		CAPACITOR	45
1	1006755-79		CAPACITOR	44
3	1006755-69		CAPACITOR	43
1	1006755-31		CAPACITOR	42
1	1006755-130		CAPACITOR	41
1	1008878 SEE NOTE 32		RESISTOR	40
1	1010368-128		RESISTOR	39
1	1010368-121		RESISTOR	38
1	1010368-105		RESISTOR	37
1	1010364-443		RESISTOR	36
1	1010364-501		RESISTOR	35
2	1010364-411		RESISTOR	34
1	1010364-471		RESISTOR	33
1	1010377-103		RESISTOR	32
1	1010377-20		RESISTOR	31
2	1006750-36		RESISTOR	30
1	1006750-8		RESISTOR	29
2	1006750-56		RESISTOR	28
1	1006750-65		RESISTOR	27
2	1006750-36		RESISTOR	26
2	1006750-32		RESISTOR	25
4	1006750-1		RESISTOR	24
1	1006750-38		RESISTOR	23
1	1006750-47		RESISTOR	22
1	2001466		AMPLIFIER	21
1	2008093-000		TERMINAL, THREADED	20
1	2010728		INSULATOR PLATE	19
AR	1006776-19		INSULATION, SLEEVING	18
AR	1006776-21		INSULATION, SLEEVING	17
AR	1006776-20		INSULATION, SLEEVING	16
AR	1010807-17		WIRE, ELECTRICAL	15
AR	1006757-1		WIRE, ELECTRICAL	14
AR	1010848-2		WIRE, ELECTRICAL INSULATED	13
3	2010729		STUD EXTENSION	12
3	1015135-015		SPACER, NYLON	11
6	1008161-1		SCREW, CAP SLOTTED HEAD, SPECIAL	10
1	2008495		WIRING BOARD C	9
1	2008497		WIRING BOARD B	8
1	2008527		WIRING BOARD A	7
1	1008540-9		GASKET CONNECTOR MINIATURE	6
1	1008540-13		GASKET, CONNECTOR MINIATURE	5
9	1006782-9		CONTACT, WRAPOST-MALE MINIATURE	4
13	1006782-5		CONTACT, WRAPOST-MALE MINIATURE	3
22	1006775		INSULATOR, WRAPOST-MALE MINIATURE	2
1	2008477		FRAME	1

-011 LIST OF MATERIALS

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Ed Mahoney 12 MAR 66
CHECKED Bonarrigo 24 Apr 66
APPROVED 2 MAY 66
APPROVED 3 May 66
APPROVED MIT 4 Mar 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120 V PIPA
SUPPLY AND IRIG
TEMP (FQ) ASSEMBLY
SIGNAL CONDITIONER ASSY

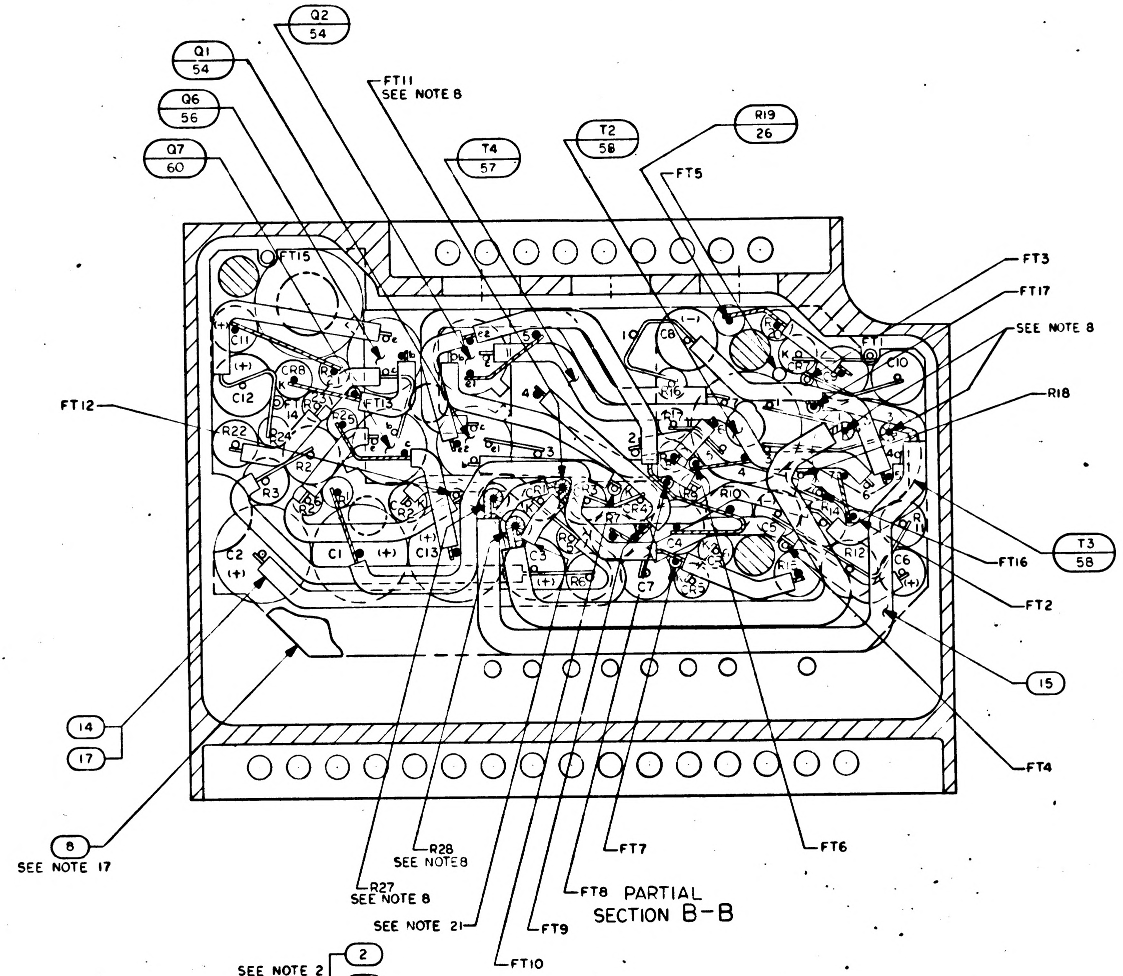
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007241
SCALE 5/1
SHEET 1 OF 1

2007241 REV D SH -

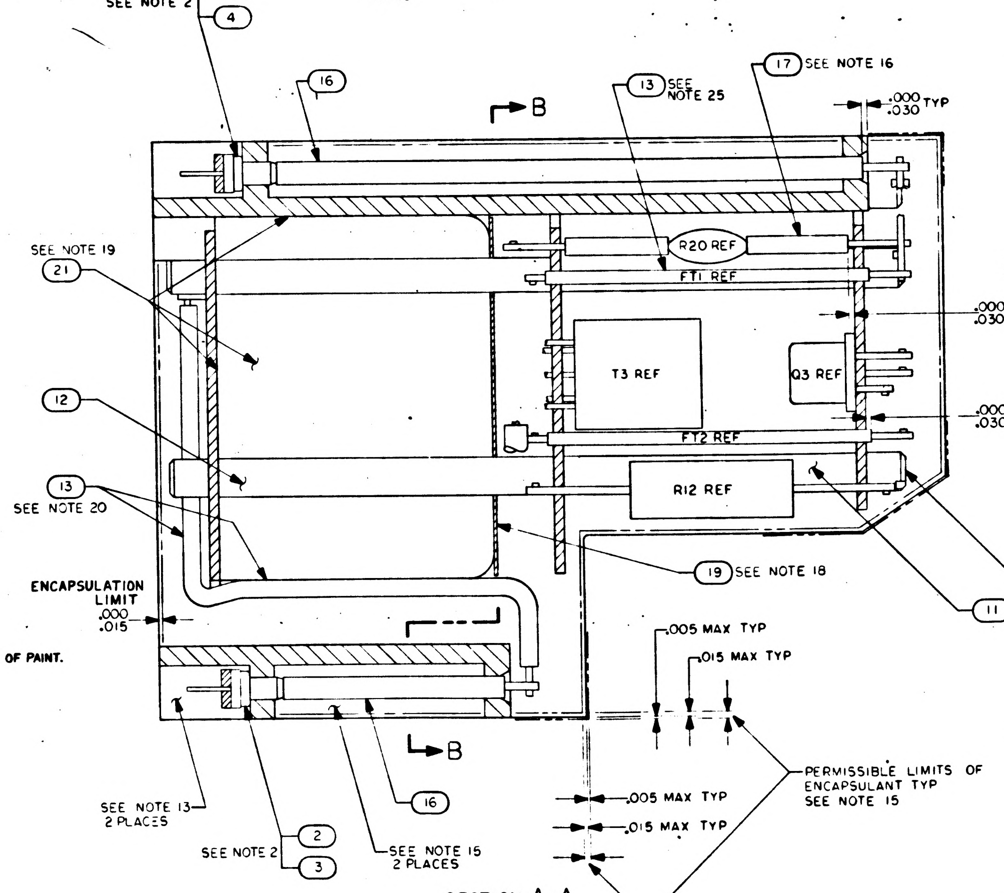
3/2007241

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

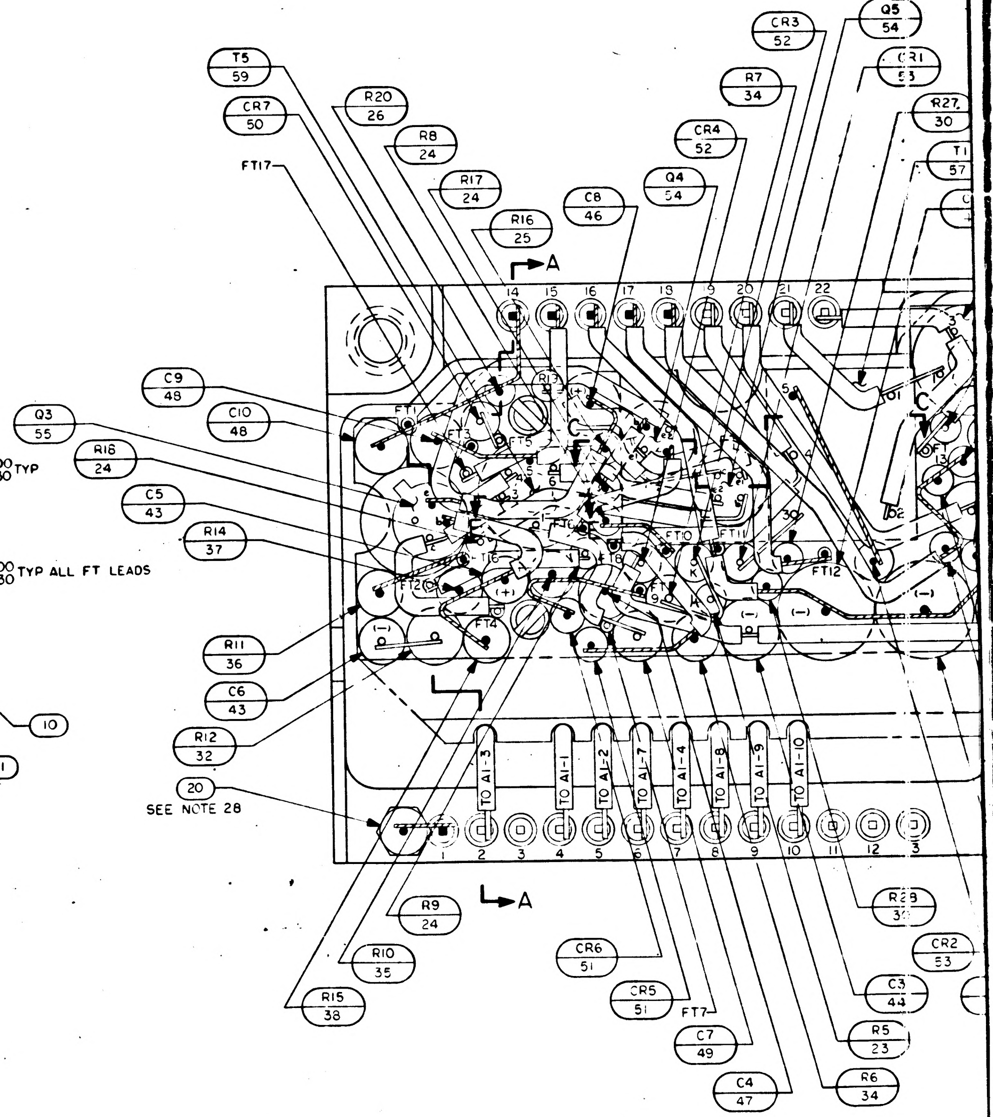
R29	
PART NO.	VALUE
1008878-001	5.300K
-002	5.342K
-003	5.385K
-004	5.428K
-005	5.471 K
-006	5.515 K
-007	5.559K
-008	5.603K
-009	5.648K
-010	5.693K
-011	5.739 K
-012	5.785 K
-013	5.831 K
-014	5.878 K
-015	5.925 K
-016	5.972 K
-017	6.020 K
-018	6.068 K
-019	6.117 K
1008878-020	6.166 K


Q2 54
Q1 54
Q6 56
Q7 60
FT11 SEE NOTE 8
T4 57
T2 58
R19 26
FT5
FT3
FT17
SEE NOTE 8
R18
FT12
FT15
C11
C12
R22
R3
C2
C1
C13
C3
C7
C8
C10
C6
R12
R10
R7
T3 58
FT16
FT2
15
FT4
14
17
8 SEE NOTE 17
R28 SEE NOTE8
R27 SEE NOTE 8
SEE NOTE 21
FT9
FT10
FT8
FT7
FT6

PARTIAL SECTION B-B


SEE NOTE 2
2
4
16
B
13 SEE NOTE 25
17 SEE NOTE 16
.000 .030 TYP
SEE NOTE 19
21
R20 REF
FT1 REF
.000 .030 TYP
T3 REF
Q3 REF
.000 .030 TYP ALL FT LEADS
FT2 REF
12
R12 REF
13
SEE NOTE 20
10
19 SEE NOTE 18
11
ENCAPSULATION LIMIT
.000 .015
.005 MAX TYP
.015 MAX TYP
B
16
SEE NOTE 13 2 PLACES
SEE NOTE 2
2
3
SEE NOTE 15 2 PLACES
.005 MAX TYP
.015 MAX TYP
PERMISSIBLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15

SECTION A-A

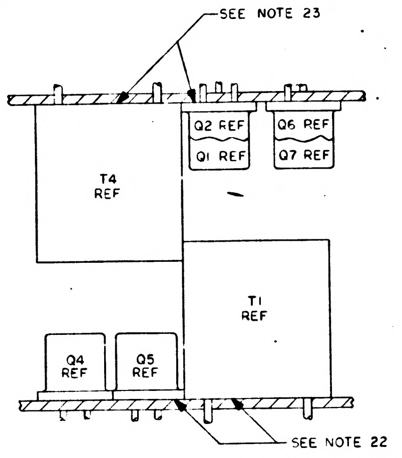

T5 59
CR7 50
R20 26
R8 24
CR3 52
Q5 54
CR1 53
R7 34
R27 30
CR4 52
R17 24
R16 25
C8 46
Q4 54
FT17
A
C9 48
C10 48
Q3 55
R16 24
C5 43
R14 37
R11 36
C6 43
R12 32
20 SEE NOTE 28
FT12
FT14
FT11
FT10
TO A1-3
TO A1-1
TO A1-2
TO A1-7
TO A1-4
TO A1-8
TO A1-9
TO A1-10
A
R9 24
R10 35
R15 38
CR6 51
CR5 51
FT7
C7 49
C4 47
R6 34
R5 23
C3 44
CR2 53
R29 33

NOTES:

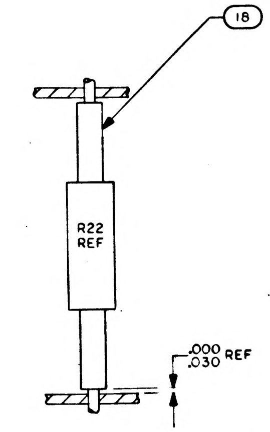
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2,3 AND 4 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 55,58 AND 59 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 22 THRU 30, 33 THRU 36, 43 AND 50 THRU 53
17. BOND FIND NO.8 TO FIND NO.1 PER ND1002004 TYPE I
18. BOND FIND NO.19 TO FIND NO.21 PER ND1002004 TYPE I. CENTRALIZE
19. BOND FIND NO.21 TO FIND NOS 1 AND 9 PER ND1002004 TYPE I
20. BOND RUNS FROM K1 TO MALCO PINS AGAINST SIDE OF K1 AS SHOWN PER ND1002004 TYPE I
21. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO.15
22. BOND Q3,Q4,Q5,T1, T5 AND T6 TO FIND NO.7 PER ND1002004 TYPE I
23. BOND Q1,Q2,Q6,Q7,T2,T3 AND T4 TO FIND NO 8 PER ND1002004 TYPE I
24. BOND R29 TO FIND NO.9 PER ND1002004 TYPE I
25. BOND FT1 TO FIND NOS 7 AND 8 PER ND1002004 TYPE I
26. BOND FT15 TO FIND NOS 7,8 AND 9 PER ND1002004 TYPE I
27. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
28. MOUNTING TORQUE FOR FOR FIND NO.20 TO BE 15-20 INCH OUNCES
29. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1003809-4 PAINT. **OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.**
30. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1003567 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE
31. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S.2007241
32. FIND NO.21 AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON FIND NO.21

	REV LTR	SH
2007241	E	1

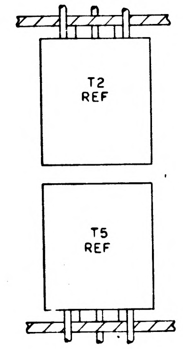
1/2007241


SEE NOTE 23
Q2 REF
Q1 REF
Q6 REF
Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF
SEE NOTE 22

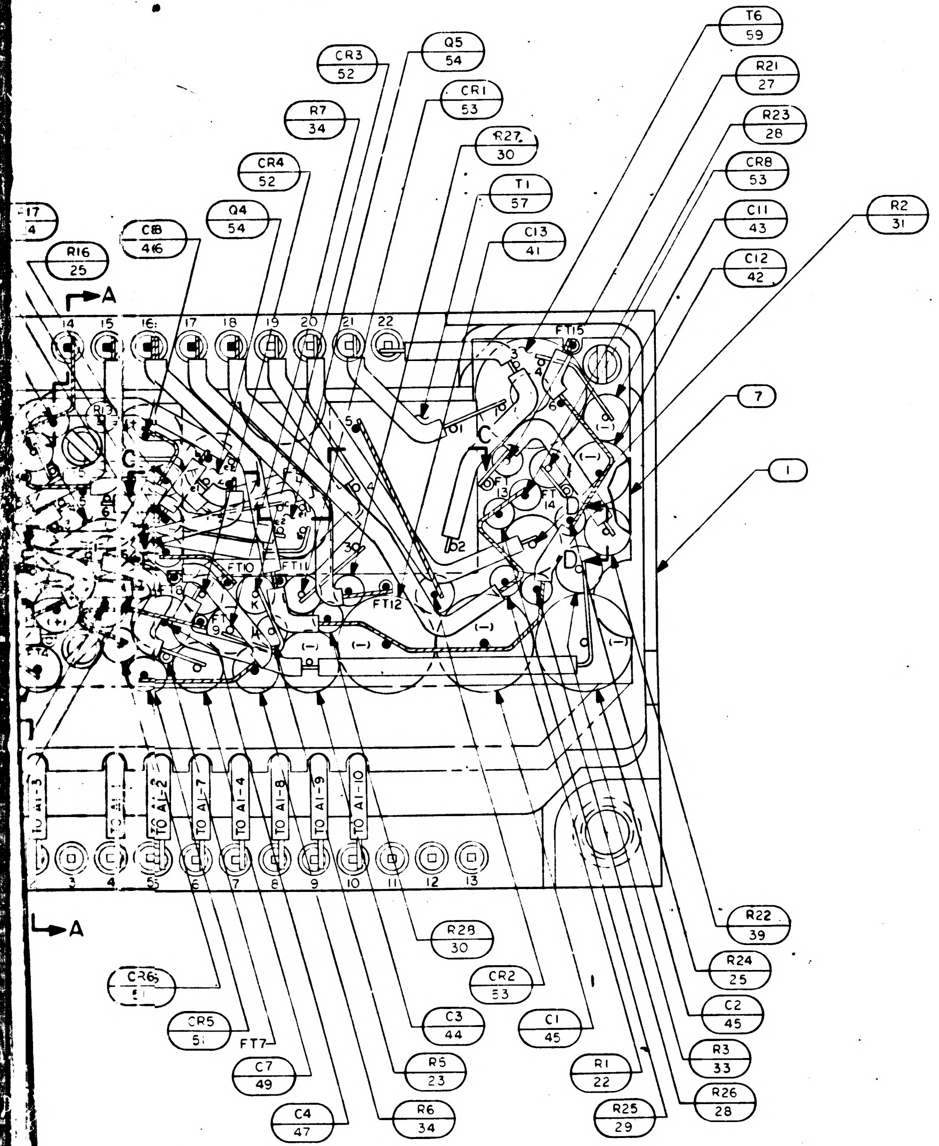
PARTIAL SECTION C-C


18
R22 REF
.000 .030 REF

PARTIAL SECTION D-D
TYP FOR R14,R15 AND R22


T2 REF
T5 REF

PARTIAL SECTION E-E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R21 27
R23 28
CR8 53
C11 43
C12 42
R2 31
7
1
Q5 54
CR3 52
CR1 53
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T1 57
C13 41
R7 34
CR4 52
Q4 54
C18 416
R16 25
17 4
A
FT15
FT10
FT11
FT12
TO A1-3
T6 A1-2
TO A1-7
TO A1-4
TO A1-8
TO A1-9
TO A1-10
A
R22 39
R24 25
C2 45
R3 33
R26 28
R25 29
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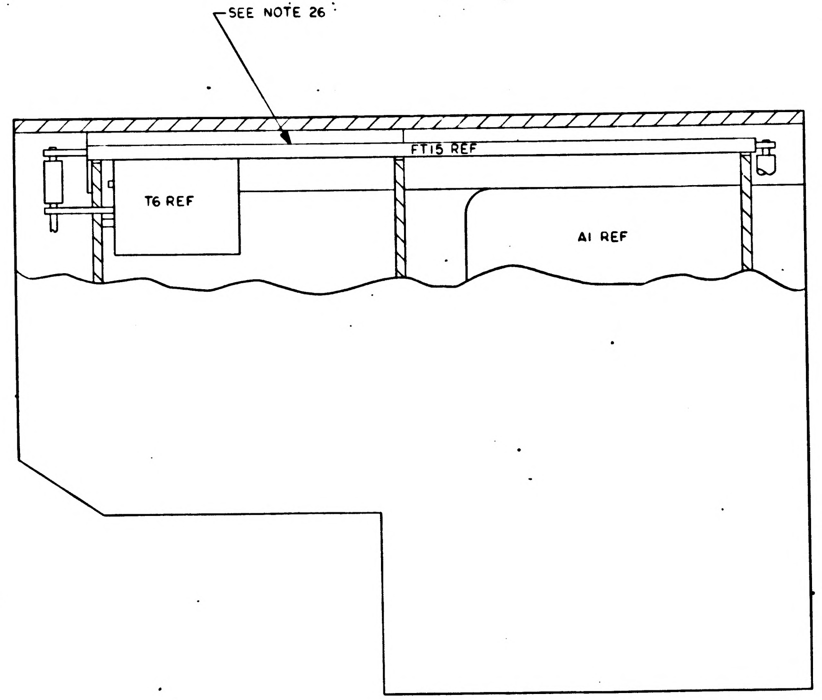
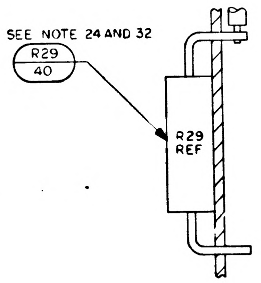
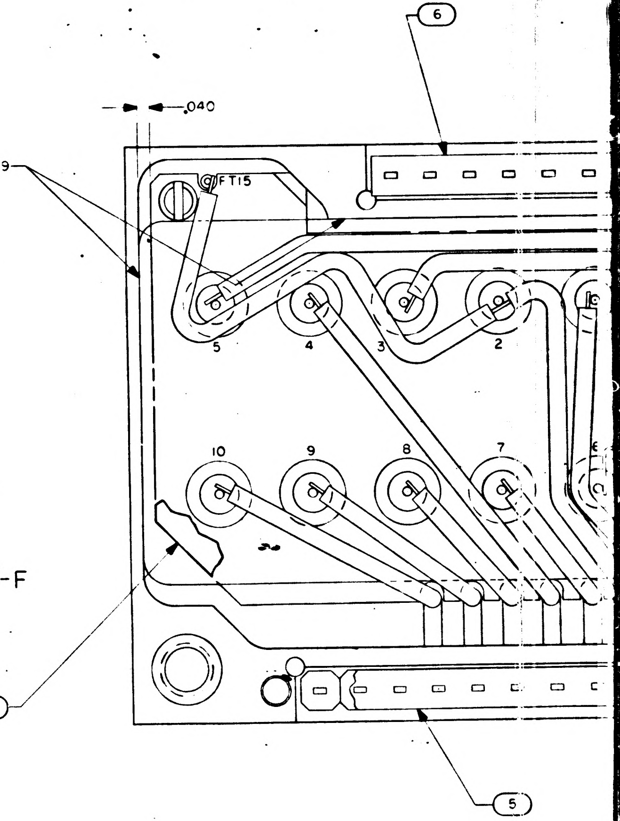
R5 23
R6 34
C4 47
C7 49
FT7
CR5 51
CR6 51


SEE NOTE 26
FT15 REF
T6 REF
A1 REF


SEE NOTE 24 AND 32
R29 40
R29 REF

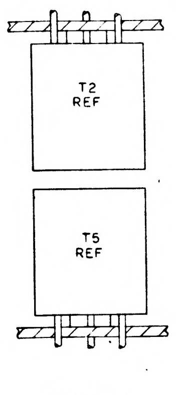
PARTIAL SECTION F-F


6
.040
SEE NOTE 19
FT15
5 4 3 2
10 9 8 7
9
5

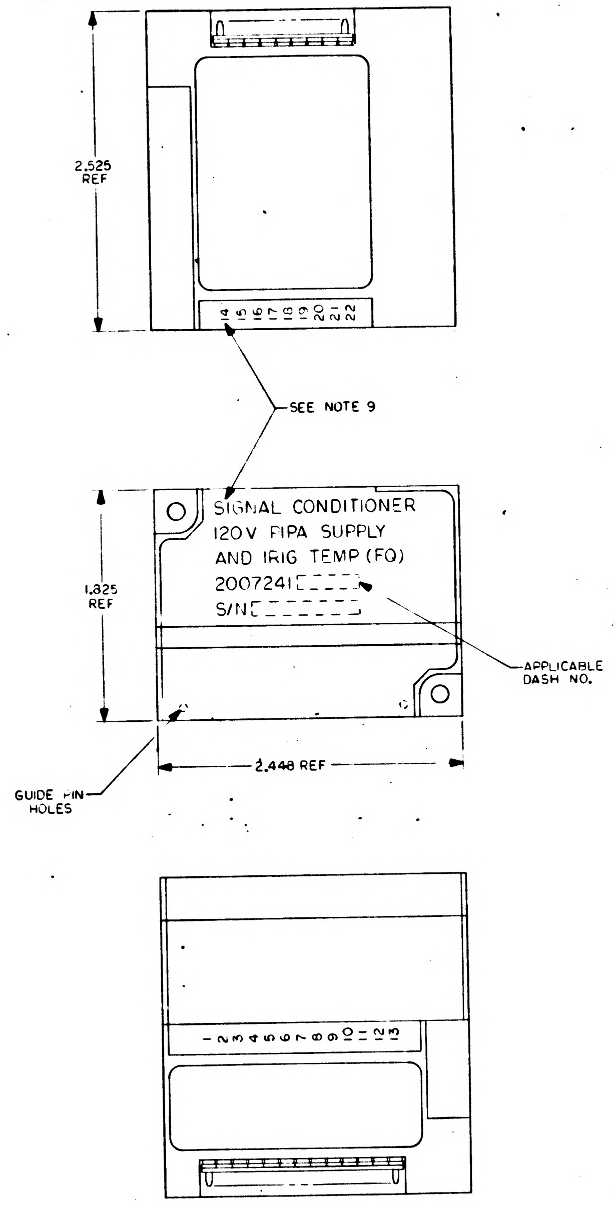
2007241 REV LTR E SH 1

2/2007241

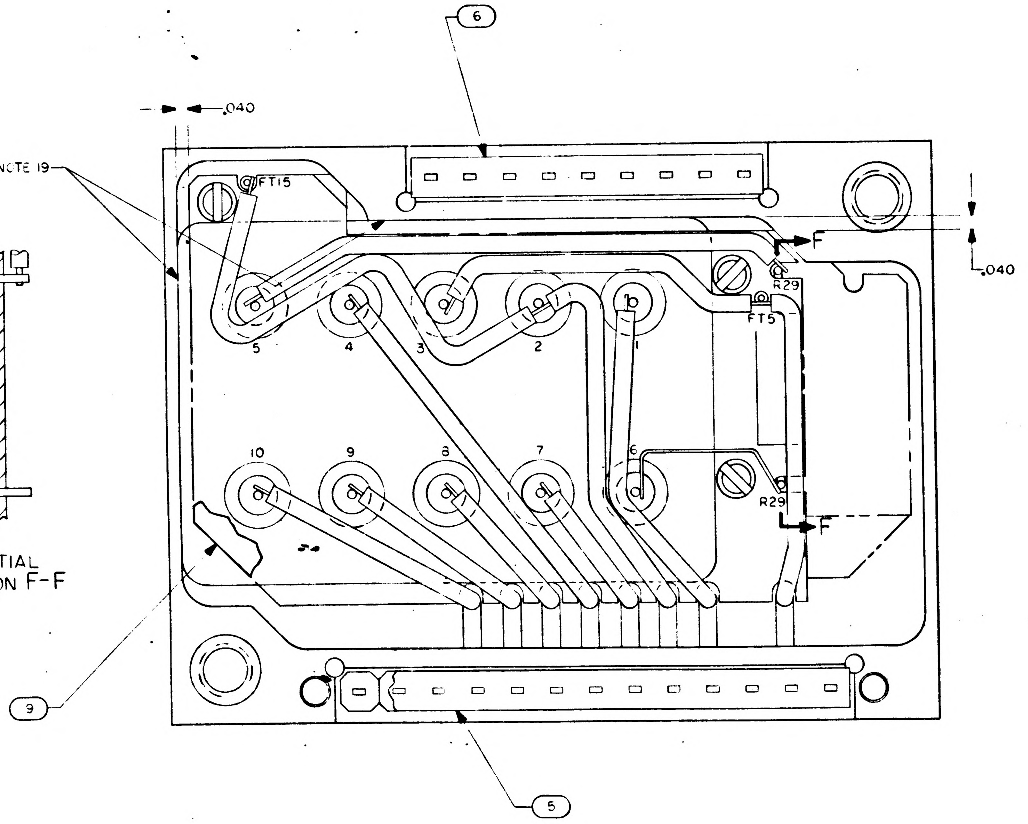
REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		PEPLACES WORD DWG REV A PER TDRR 28518	EJM			WK
C		REVISED PER TDRR 29918	B.	JAC	13 JUL 66	
D		REVISED PER TDRR 30430	EMJ	JL	10 AUG 66	
E		REVISED PER TDRR 31389	SS	RLW	5 OCT 66	

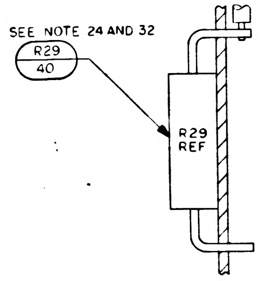


PARTIAL
SECTION E-E



MARKING VIEWS
SCALE 2/1





PARTIAL
SECTION F-F

☒	2010126		SCHEMATIC	REF
1	1010357-1		TRANSISTOR	60
2	1010274		TRANSFORMER	59
2	1010365		TRANSFORMER	58
2	1010710		TRANSFORMER	57
1	1010397-1		TRANSISTOR	56
1	1010342		TRANSISTOR	55
4	1010367		CHOPPER	54
3	1010385		DIODE	53
2	1010259-003		DIODE	52
2	1010372-12		DIODE	51
1	1010337-001		DIODE	50
1	1006777-31		CAPACITOR	49
2	1010279-16		CAPACITOR	48
1	1010279-104		CAPACITOR	47
1	1006755-33		CAPACITOR	46
2	1006755-132		CAPACITOR	45
1	1006755-79		CAPACITOR	44
3	1006755-69		CAPACITOR	43
1	1006755-31		CAPACITOR	42
1	1006755-130		CAPACITOR	41
1	[illegible]3673 SEE NOTE 32		RESISTOR	40
1	1010368-128		RESISTOR	39
1	1010363-121		RESISTOR	38
1	1010363-105		RESISTOR	37
1	1010364-443		RESISTOR	36
1	1010364-501		RESISTOR	35
2	1010364-411		RESISTOR	34
1	1010364-471		RESISTOR	33
1	1010377-103		RESISTOR	32
1	1010377-20		RESISTOR	31
2	1006750-36		RESISTOR	30
1	1006750-3		RESISTOR	29
2	1006750-56		RESISTOR	28
1	1006750-65		RESISTOR	27
2	1006750-36		RESISTOR	26
2	1006750-32		RESISTOR	25
4	1006750-1		RESISTOR	24
1	1006750-38		RESISTOR	23
1	1006750-47		RESISTOR	22
1	2001466		AMPLIFIER	21
1	2008093-000		TERMINAL, THREADED	20
1	2010728		INSULATOR PLATE	19
AR	1006776-19		INSULATION, SLEEVING	18
AR	1006776-21		INSULATION, SLEEVING	17
AR	1006776-20		INSULATION, SLEEVING	16
AR	1010807-17		WIRE, ELECTRICAL	15
AR	1006757-1		WIRE, ELECTRICAL	14
AR	1010848-2		WIRE, ELECTRICAL INSULATED	13
3	2010729		STUD EXTENSION	12
3	1015135-015		SPACER, NYLON	11
6	1003161-1		SCREW, CAP SLOTTED HEAD, SPECIAL	10
1	2008495		WIRING BOARD C	9
1	2008497		WIRING BOARD B	8
1	2003727		WIRING BOARD A	7
1	1008540-9		GASKET CONNECTOR MINIATURE	6
1	1008540-13		GASKET, CONNECTOR MINIATURE	5
9	1006782-9		CONTACT, WRAPOST-MALE MINIATURE	4
13	1006782-5		CONTACT, WRAPOST-MALE MINIATURE	3
22	1006775		INSULATOR, WRAPOST-MALE MINIATURE	2
1	2008477		FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS			

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Ed Mahoney
CHECKED Bouarrig 2/66
APPROVED
APPROVED
APPROVED MIT W Jugler 2 Mar 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120 V PIPA
SUPPLY AND IRIG
TEMP (FQ) ASSEMBLY
SIGNAL CONDITIONER ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007241
SCALE 5/1
SHEET 1 OF 1

2007241 E

2007241 REV LTR E SH 1

3/2007241

R29	
PART NO.	VALUE
1008878-001	5.300K
-002	5.342K
-003	5.385K
-004	5.428K
-005	5.471K
-006	5.515K
-007	5.559K
-008	5.603K
-009	5.648K
-010	5.693K
-011	5.739K
-012	5.785K
-013	5.831K
-014	5.878K
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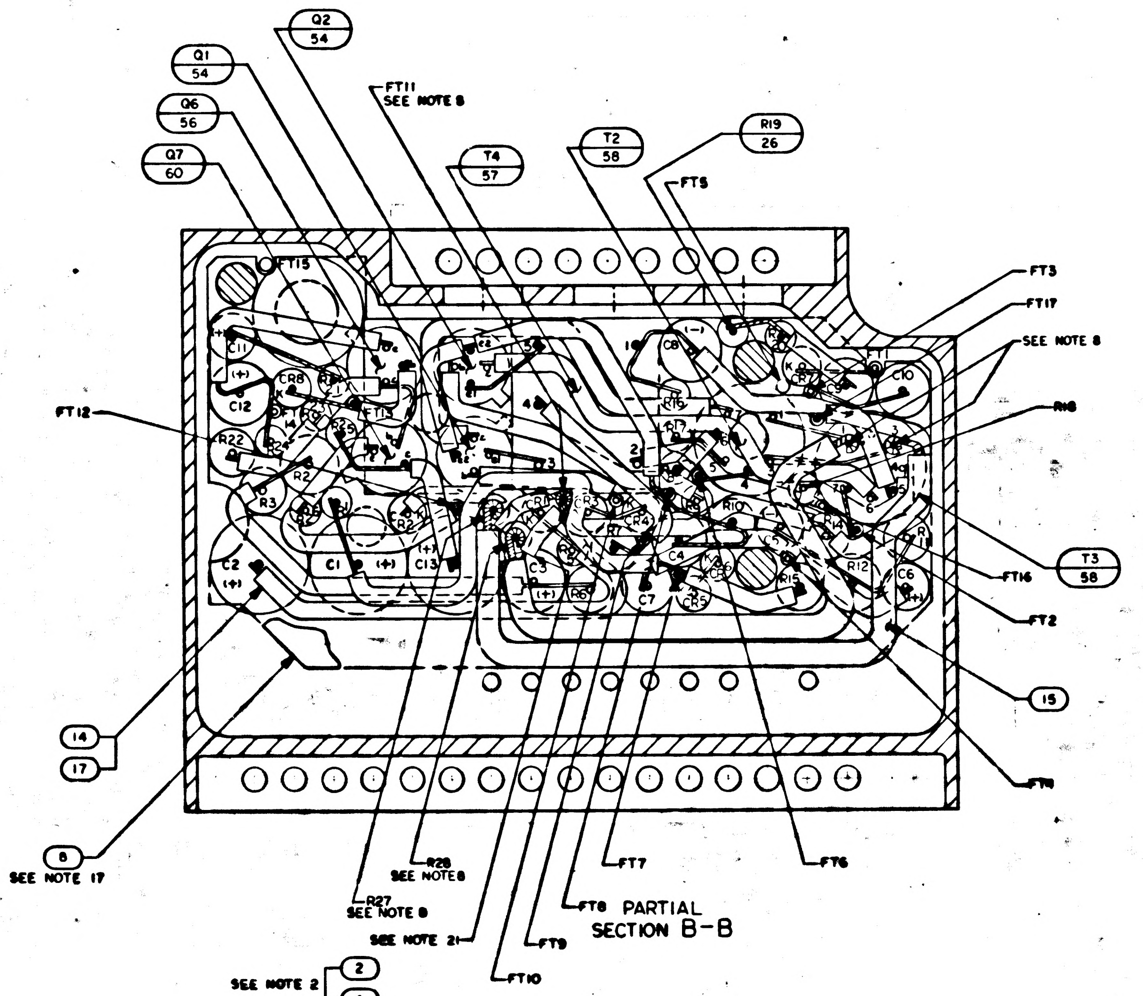
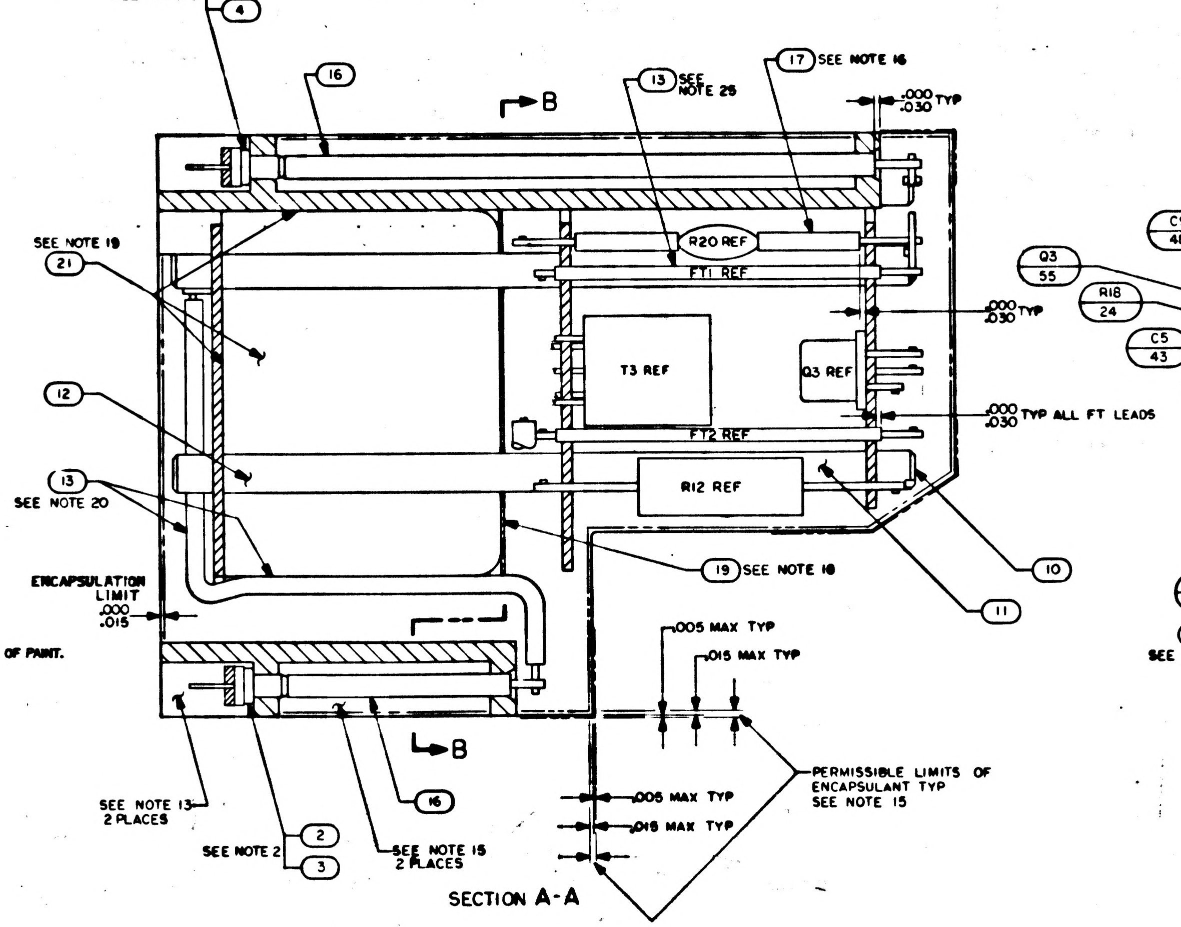
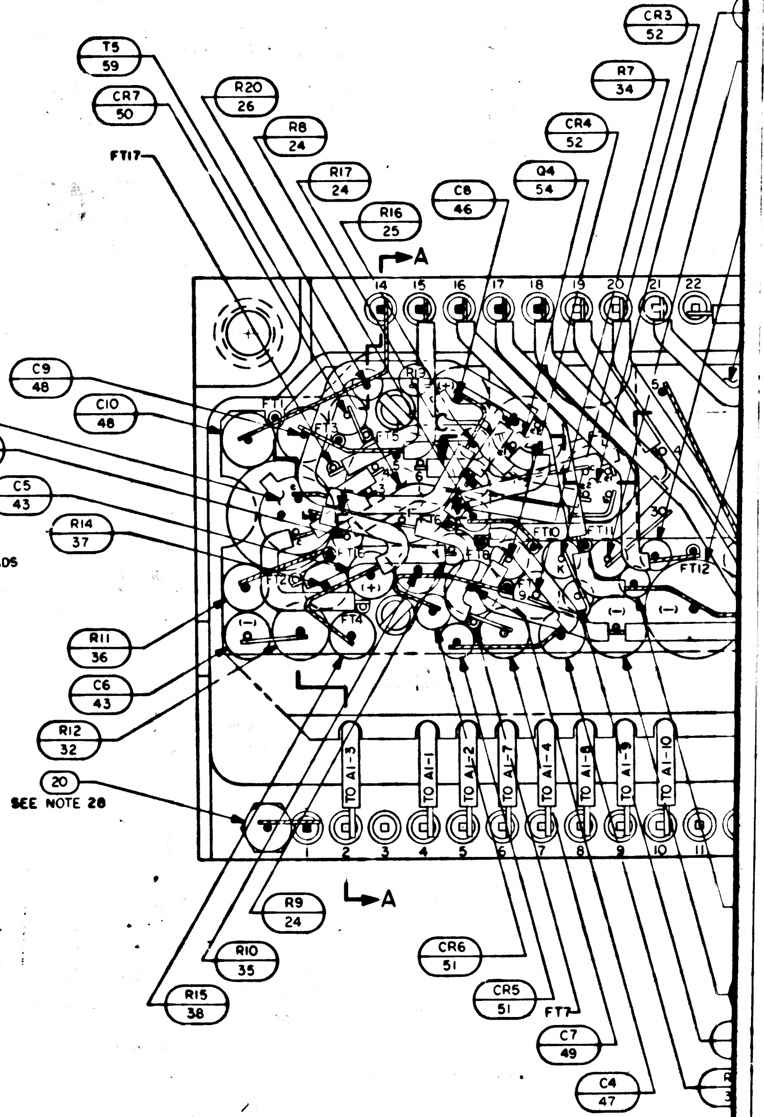
-018	6.068K
-019	6.117K
1008878-020	6.166K


Q1 54
Q2 54
Q6 56
Q7 60
FT11 SEE NOTE 8
T4 57
T2 58
R19 26
FT5
FT3
FT17
SEE NOTE 8
R18
FT12
FT15
T3 58
FT16
FT2
15
FT4
FT6
FT7
14
17
8 SEE NOTE 17
R28 SEE NOTE 8
R27 SEE NOTE 8
SEE NOTE 21
FT8
FT9
FT10

PARTIAL SECTION B-B


SEE NOTE 2
2
4
16
13 SEE NOTE 25
17 SEE NOTE 16
.000 .030 TYP
SEE NOTE 19
21
R20 REF
FT1 REF
T3 REF
Q3 REF
.000 .030 TYP
.000 .030 TYP ALL FT LEADS
FT2 REF
R12 REF
12
13
SEE NOTE 20
19 SEE NOTE 18
10
11
ENCAPSULATION LIMIT .000 .015
.005 MAX TYP
.015 MAX TYP
.005 MAX TYP
.015 MAX TYP
PERMISSIBLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15
SEE NOTE 13 2 PLACES
SEE NOTE 2
2
3
SEE NOTE 15 2 PLACES
16
B
B

SECTION A-A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T5 59
CR7 50
R20 26
R7 34
R8 24
CR4 52
FT17
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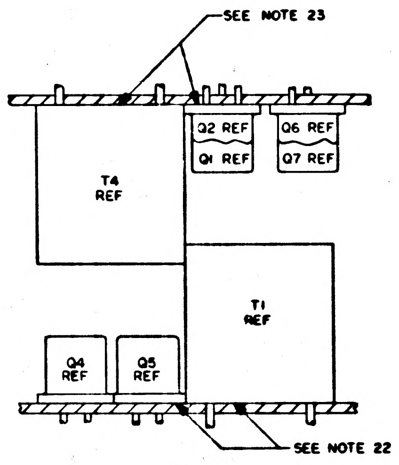
C8 46
Q4 54
A
C9 48
C10 48
Q3 55
R18 24
C5 43
R14 37
R11 36
C6 43
R12 32
20 SEE NOTE 28
R9 24
A
R10 35
R15 38
CR6 51
CR5 51
FT7
C7 49
C4 47
TO A1-3
TO A1-1
TO A1-2
TO A1-7
TO A1-4
TO A1-8
TO A1-9
TO A1-10
FT12
FT10
FT4

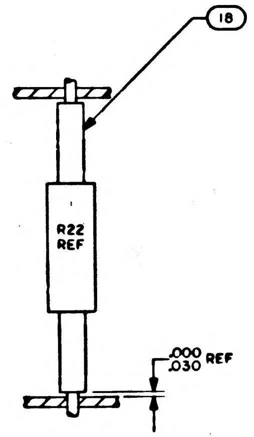
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2,3 AND 4 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 55,58 AND 59 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 22 THRU 30, 33 THRU 36, 43 AND 50 THRU 53
17. BOND FIND NO.8 TO FIND NO.1 PER ND1002004 TYPE I
18. BOND FIND NO.19 TO FIND NO.21 PER ND1002004 TYPE I. CENTRALIZE
19. BOND FIND NO.21 TO FIND NOS 1 AND 9 PER ND1002004 TYPE I
20. BOND RUNS FROM K1 TO MALCO PINS AGAINST SIDE OF K1 AS SHOWN PER ND1002004 TYPE I
21. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO.15
22. BOND Q3,Q4,Q5,T1, T5 AND T6 TO FIND NO.7 PER ND1002004 TYPE I
23. BOND Q1,Q2,Q6,Q7,T2,T3 AND T4 TO FIND NO 8 PER ND1002004 TYPE I
24. BOND R29 TO FIND NO.9 PER ND1002004 TYPE I
25. BOND FT1 TO FIND NOS 7 AND 8 PER ND1002004 TYPE I
26. BOND FT15 TO FIND NOS 7,8 AND 9 PER ND1002004 TYPE I
27. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
28. MOUNTING TORQUE FOR FOR FIND NO.20 TO BE 15-20 INCH OUNCES
29. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
30. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE
31. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S.2007241
32. FIND NO.21 AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON FIND NO.21

2007241	REV LTR F	SH 1


SEE NOTE 23
Q2 REF
Q1 REF
Q6 REF
Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF
SEE NOTE 22

PARTIAL
SECTION C-C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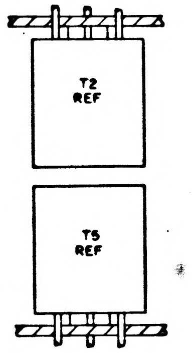
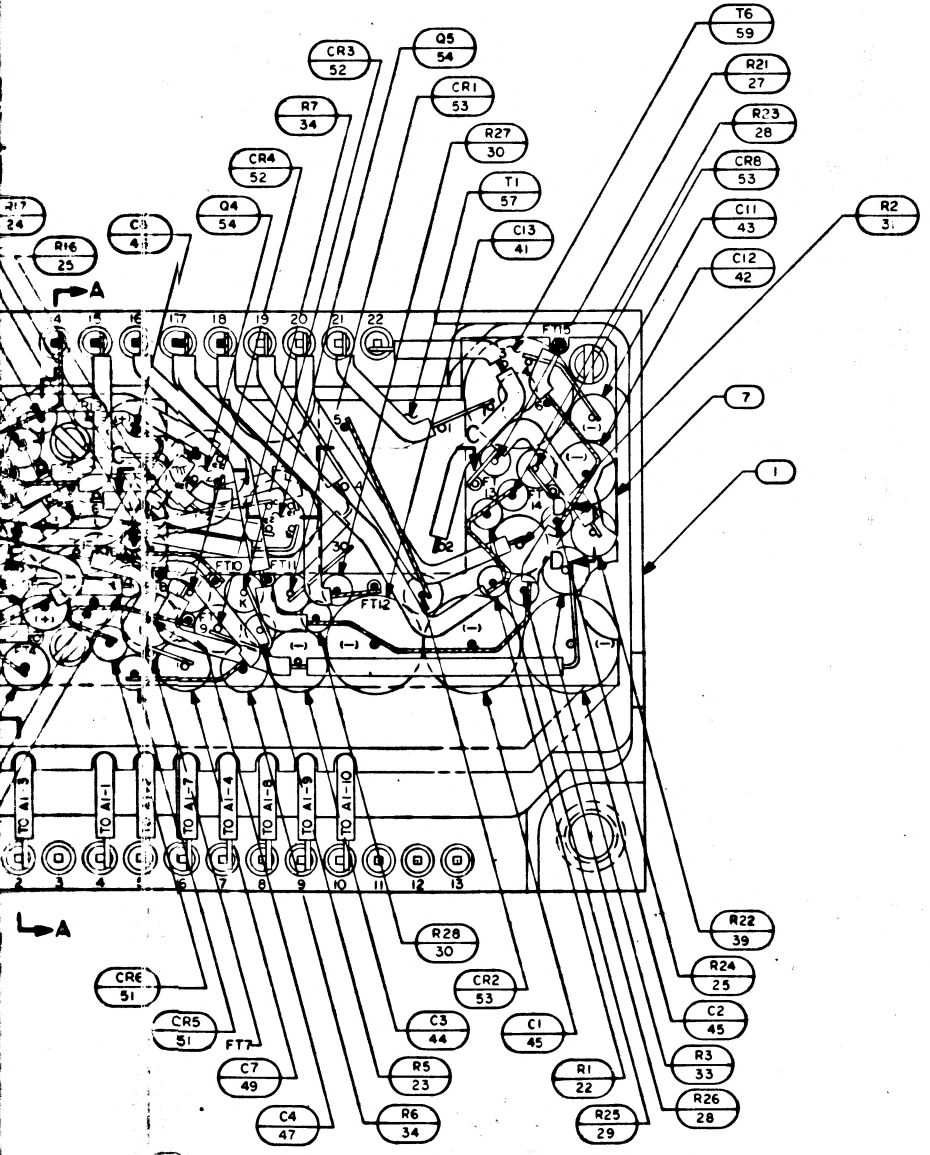
.030 REF

PARTIAL
SECTION D-D
TYP FOR R14,R15 AND R22


T2 REF
T5 REF

PARTIAL
SECTION E-E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CR4 52
R7 34
CR3 52
Q5 54
CR1 53
R27 30
T1 57
C13 41
T6 59
R21 27
R23 28
CR8 53
C11 43
C12 42
R2 3
7
1
FT15
FT10
FT11
FT12
TO A1-3
TO A1-1
TO A1-7
TO A1-4
TO A1-8
TO A1-5
TO A1-10
A
R22 39
R24 25
C2 45
R3 33
R26 28
R25 29
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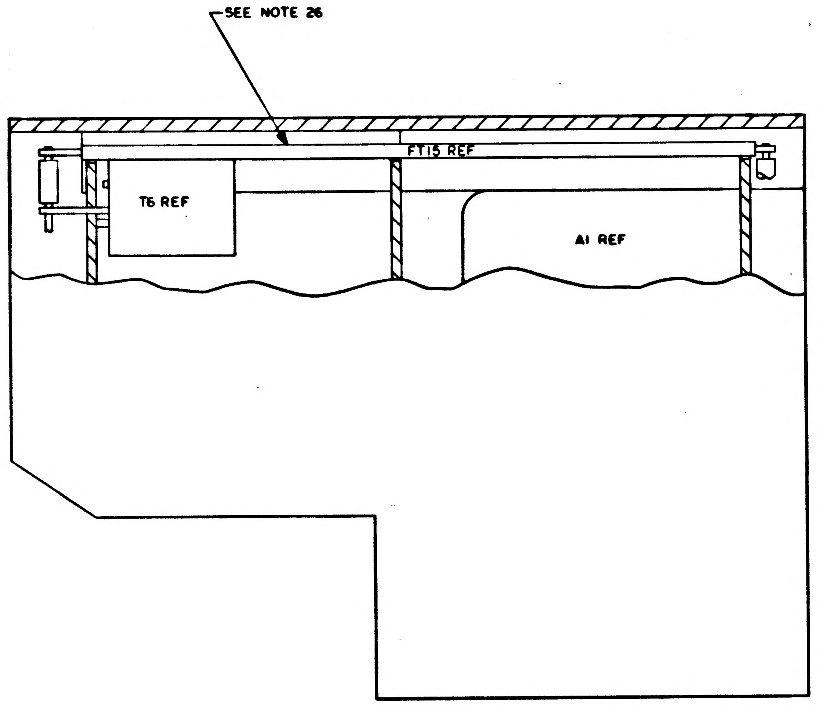
C7 49
CR5 51
FT7
CR6 51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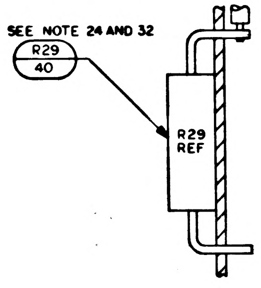
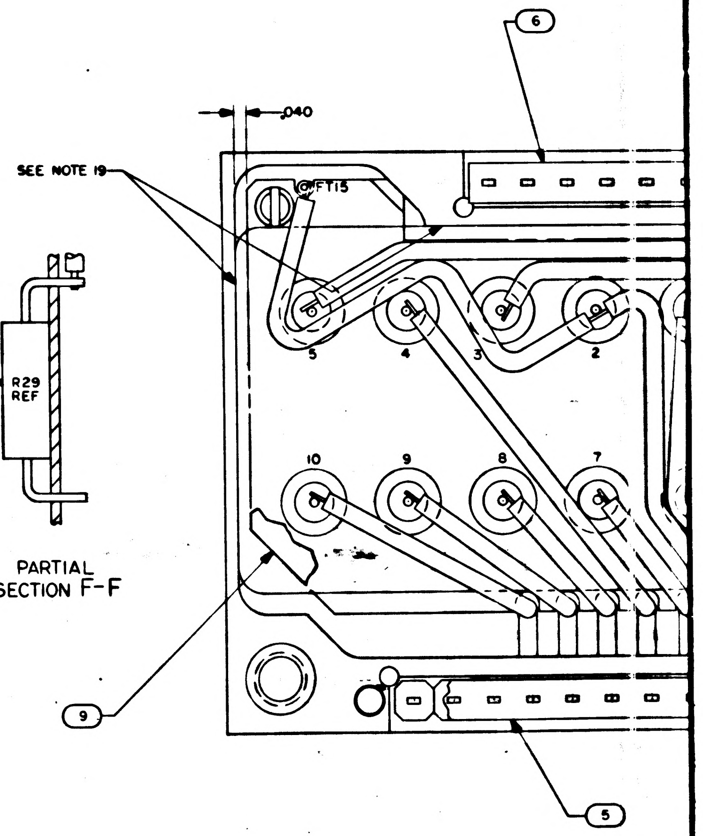
A1 REF


SEE NOTE 24 AND 32
R29 40
R29 REF

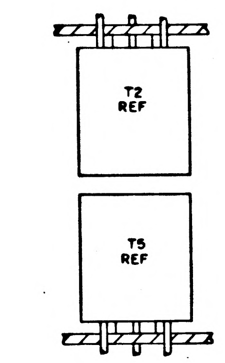
PARTIAL
SECTION F-F


6
.040
SEE NOTE 19
FT15
5
4
3
2
10
9
8
7
9
5

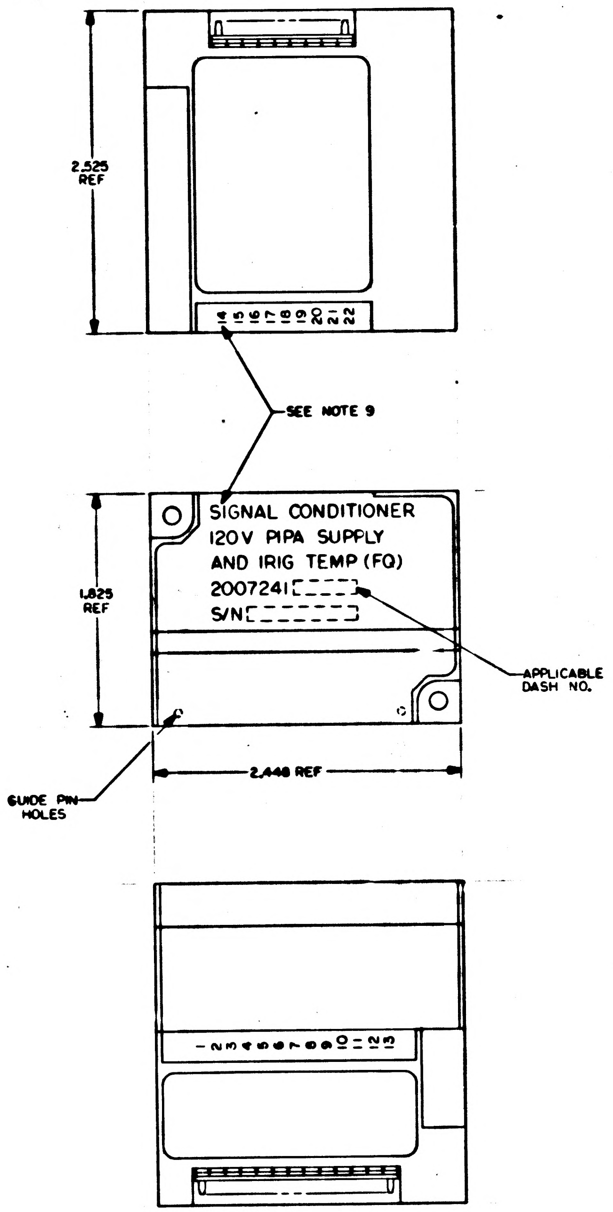
2007241 REV LTR F SH 1

2/2007241

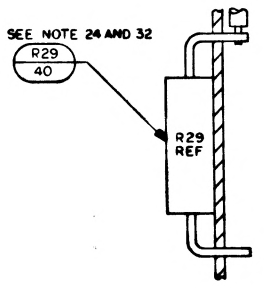
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 28518	EJM			WK
C		REVISED PER TDRR 29918			13 JUL 66	
D		REVISED PER TDRR 30430		JL	10 AUG 66	
E		REVISED PER TDRR 31389	DS		5 OCT 66	
F		REVISED PER TDRR 31486	EC		OCT 66	



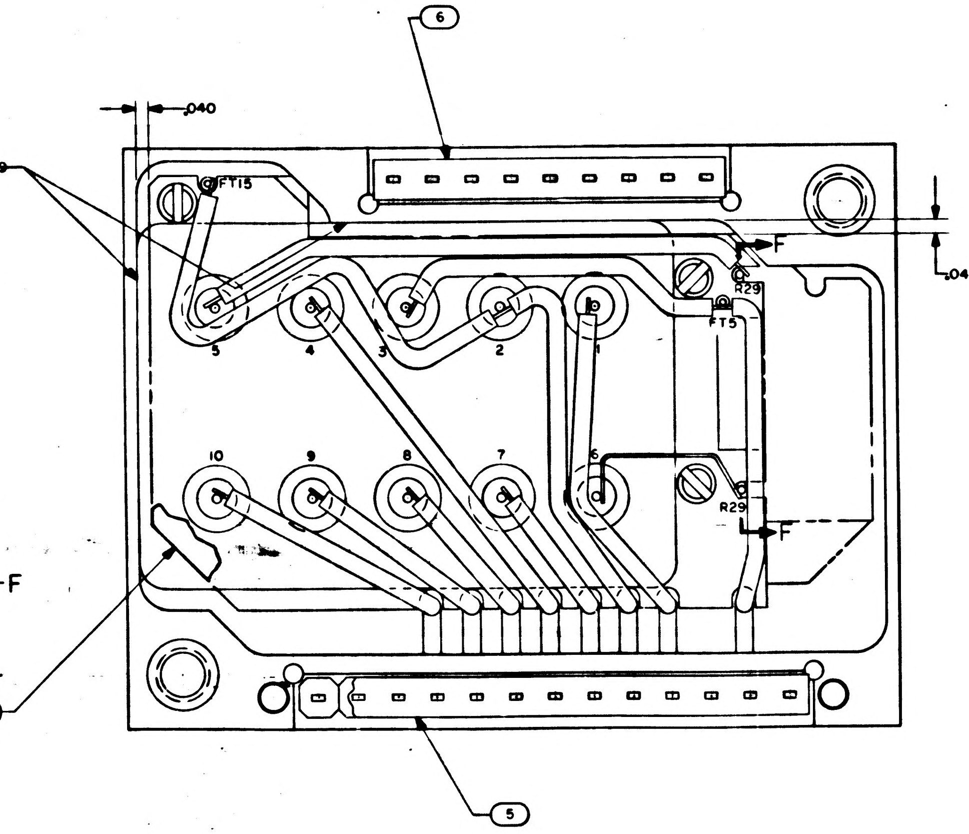
PARTIAL
SECTION E-E



MARKING VIEWS
SCALE 2/1



PARTIAL
SECTION F-F



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1	1010357-1	TRANSISTOR	60
2	1010274	TRANSFORMER	59
2	1010365	TRANSFORMER	58
2	1010710	TRANSFORMER	57
1	1010397-1	TRANSISTOR	56
1	1010342	TRANSISTOR	55
4	1010367	CHOPPER	54
3	1010385	DIODE	53
2	1010259-003	DIODE	52
2	1010372-12	DIODE	51
1	1010837-001	DIODE	50
1	1006777-31	CAPACITOR	49
2	1010279-16	CAPACITOR	48
1	1010279-104	CAPACITOR	47
1	1006755-33	CAPACITOR	46
2	1006755-132	CAPACITOR	45
1	1006755-79	CAPACITOR	44
3	1006755-69	CAPACITOR	43
1	1006755-31	CAPACITOR	42
1	1006755-130	CAPACITOR	41
1	1008878 SEE NOTE 32	RESISTOR	40
1	1010368-128	RESISTOR	39
1	1010368-121	RESISTOR	38
1	1010368-105	RESISTOR	37
1	1010364-443	RESISTOR	36
1	1010364-501	RESISTOR	35
2	1010364-411	RESISTOR	34
1	1010364-471	RESISTOR	33
1	1010377-103	RESISTOR	32
1	1010377-20	RESISTOR	31
2	1006750-36	RESISTOR	30
1	1006750-8	RESISTOR	29
2	1006750-56	RESISTOR	28
1	1006750-65	RESISTOR	27
2	1006750-36	RESISTOR	26
2	1006750-32	RESISTOR	25
4	1006750-1	RESISTOR	24
1	1006750-38	RESISTOR	23
1	1006750-47	RESISTOR	22
1	2001466	AMPLIFIER	21
1	2008093-000	TERMINAL, THREADED	20
1	2010728	INSULATOR PLATE	19
AR	1006776-19	INSULATION, SLEEVING	18
AR	1006776-21	INSULATION, SLEEVING	17
AR	1006776-20	INSULATION, SLEEVING	16
AR	1010807-17	WIRE, ELECTRICAL	15
AR	1006757-1	WIRE, ELECTRICAL	14
AR	1010848-2	WIRE, ELECTRICAL INSULATED	13
3	2010729	STUD EXTENSION	12
3	1015135-015	SPACER, NYLON	11
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	10
1	2008495	WIRING BOARD C	9
1	2008497	WIRING BOARD B	8
1	2008527	WIRING BOARD A	7
1	1008540-9	GASKET CONNECTOR MINIATURE	6
1	1008540-13	GASKET, CONNECTOR MINIATURE	5
9	1006782-16	CONTACT, WRAPOST-MALE MINIATURE	4
13	1006782-5	CONTACT, WRAPOST-MALE MINIATURE	3
22	1006775	INSULATOR, WRAPOST-MALE MINIATURE	2
1	2008477	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES / NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS		

2007241 F

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Ed Mahoney
CHECKED Bonarrigo 7/66
APPROVED 2 NOV 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

120 V PIPA SUPPLY AND IRIG TEMP (FQ) ASSEMBLY
SIGNAL CONDITIONER ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007241
SCALE 5/1
SHEET 1 OF 1

	REV LTR	SH
2007241	F	1

372007241

APOLLO G&N Specification
PS2007241 REV-
Original Issue Date: 7 June 1966
Release Authority: TDRR 29462
Class A Release
CODE IDENT NO. 80203

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURA N ACCEPTANCE TEST REQUIREMENTS

120V PIPA SUPPLY AND IRIG T P ASSEMBLY, SIGNAL CONDITIONER ASSEMBLY

G NO. 2007241

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 10 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	R M Kowalski 27 May 66 MIT/IL	G H Krier ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 51.0±5.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 12.0 ma.

3.1.3 Offset Voltage. The offset voltage of assembly section a shall be less than 100 mv dc with an input of 110.0±0.1 vdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Section a. The input voltage of assembly section a shall be 85.0 vdc ±10 percent and 135.0 vdc ±10 percent when the output voltage is -2.500±0.005 vdc and +2.500±0.005 vdc respectively.

3.1.4.2 Assembly Section b. The output voltage of assembly section b shall be a 25V pp minimum, 800 pps square wave, and a 22V pp minimum, 800 pps square wave for a 1 megohm load and a 2k ohm load respectively.

3.1.4.3 Assembly Section c. The output voltages of assembly section c shall be as specified in Table I when the respective simulated sensor resistances listed in Table I are connected individually across the input pins.

TABLE I

SECTION c SCALE FACTOR

SIMULATED SENSOR RESISTANCE (ohms ±0.05%)	OUTPUT VOLTAGE (vdc)
2037.4	5.00±0.20
2384.3	2.50±0.10
2816.0	0.00±0.20

3.1.5 Gain Stability. The scale factor of assembly section a specified in 3.1.4.1 shall not deviate by more than ±1 percent when the +28 vdc supply is enhanced to +33 vdc or degraded to +23 vdc. The output voltage of assembly section b shall not be less than 18V pp, 800 pps, when the 28 vdc supply voltage is degraded to +23 vdc with an output load of 2k ohms.

4.2.1.3 **Test Connections.** Unless otherwise specified, the tests specified herein shall be performed on each assembly section as shown in Figure 1, using the applicable input and output pins detailed in Table III.

TABLE III

INPUT OUTPUT PIN CONNECTIONS

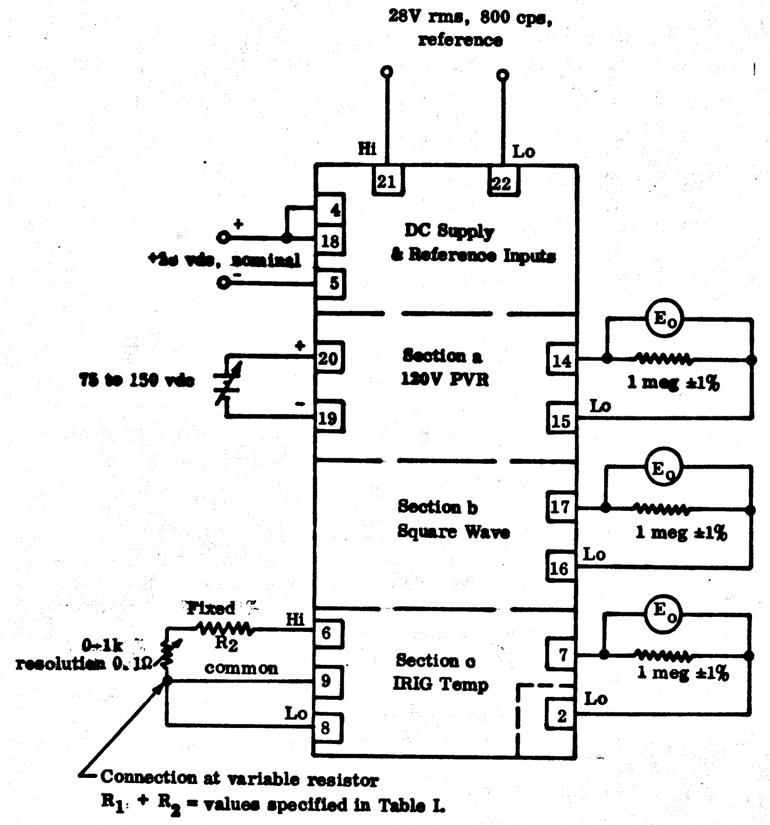
ASSEMBLY SECTION	INPUT PINS		OUTPUT PINS	
	Hi	Lo	Hi	Lo
a	20	19	14	15
b	—	—	17	16
c	6	8 and 9	7	2

4.2.2 **Nonconforming Units.** Failure of the units to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.3 TESTS

4.3.1 **Drawing Compliance.** The assembly shall be visually examined for compliance to the requirements of Drawing 2007241. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 **Workmanship-Vibration.** The assembly shall be vibrated with the input test voltage, and output loads and voltages connected and monitored as shown in Figure 1. The assembly shall be mounted in the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the axis shown in Figure 2. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibrations shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. Previbration output levels shall be set within the range of 2.50±0.10 vdc for assembly sections a and c. A 24.0±4.0V pp, 800 pps, square wave shall be present at the output pins of assembly section b. During vibration the output voltages shall not deviate by more than ±10 percent of the previbration levels for a period greater than 1 msec. Any deviation exceeding these requirements shall be cause for rejection of the assembly. After vibration, the assembly shall be examined as specified in 4.3.1.


28V rms, 800 cps, reference
Hi
Lo
21
22
4
18
5
+
-
+28 vdc, nominal
DC Supply & Reference Inputs
Section a 120V PVR
20
19
75 to 150 vdc
14
15
Lo
Eo
1 meg ±1%
Section b Square Wave
17
16
Lo
Eo
1 meg ±1%
Fixed
R2
Hi
0-1k
resolution 0.1Ω
common
6
9
8
Lo
Section c IRIG Temp
7
2
Lo
Eo
1 meg ±1%
Connection at variable resistor
R1 + R2 = values specified in Table I.

ASSEMBLY TEST SETUP

FIGURE 1

4.3.3 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be ≥100 megohms.

4.3.4 Continuity and DC Resistance. The dc resistance between the pins listed in Table II shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.5 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.2.3 has been met.

4.3.6 DC Current Drain. With the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 51.0±5.0 ma.

4.3.7 Reference Current Drain. With the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 12.0 ma.

4.3.8 Offset Voltage. With an input voltage of 110.00±0.10 vdc applied to the input pins of assembly section a as specified in Table III the voltage at the respective output pins shall be less than 100 mvdc.

4.3.9 Scale Factor

4.3.9.1 Assembly Section a. With the output of assembly section a adjusted to -2.500±0.005 vdc, the input voltage shall be between 76.50 and 93.50 vdc. With the output of assembly section a adjusted to +2.500±0.005 vdc, the input voltage shall be between 121.50 and 148.50 vdc.

4.3.9.2 Assembly Section b. With a 1 megohm load across the output of assembly section b, the output voltage shall be an 800 pps square wave with a minimum amplitude of 25.0V pp. With a 2k ohm load across the output of assembly section b, the output voltage shall be ≥22.0V pp.

4.3.9.3 Assembly Section c. With the resistances specified in Table I individually connected across the input pins of assembly section c as shown in Figure 1, the respective output voltages shall be as specified in Table I.

4.3.10 Gain Stability. With the input to assembly section a adjusted for an output of +2.500±0.005 vdc, enhancing or degrading the +28 vdc supply shall not cause the output to deviate by more than ±25 mvdc. Degrading the +28 vdc supply shall not cause the 800 pps square wave output of assembly section b to decrease below 18V pp with a 2k ohm ±2 percent load resistor.

4.3.11 Scale Factor Linearity. With the conditions specified below established for assembly section a, each of four calculated scale factor values shall not deviate from the average of the four values by more than ±4 percent.

a. The dc input signal voltage adjusted and recorded to obtain an output of 0.000±0.005 vdc.

b. The input consecutively adjusted to the following deviations from the input recorded in a:

(1) -25.00 vdc
(2) -10.00 vdc
(3) +10.00 vdc
(4) +25.00 vdc

c. The output voltage obtained from b. (2) and b. (3) normalized by multiplying each value by 2.50 and the output voltages obtained from b. (1) and b. (4) normalized by multiplying each value by 1.00.

d. The 4 normalized outputs of c. averaged.

e. Each normalized output shall not deviate by more than 4 percent from the average obtained in d.

4.3.12 Output Impedance. With the input to assembly section a adjusted for an output of 2.500±0.005 vdc, and then a 100k ohm ±1 percent resistor substituted for a 1 megohm load resistor, the output shall not drop below 2.380 vdc.

4.3.13 Diode Function. With the output of assembly section a adjusted for +2.50±0.10 vdc, the output voltage shall remain constant when pins 2 and 15 are momentarily connected together. With the output adjusted to -2.50±0.10 vdc, repeating the above, test shall cause the output to decrease below -1.0 vdc.

4.3.14 Output Ripple and Noise. With the output of assembly sections a and c at 2.50±0.20 vdc, the ripple and noise voltage shall be <10 mv pp and <50 mv pp, respectively.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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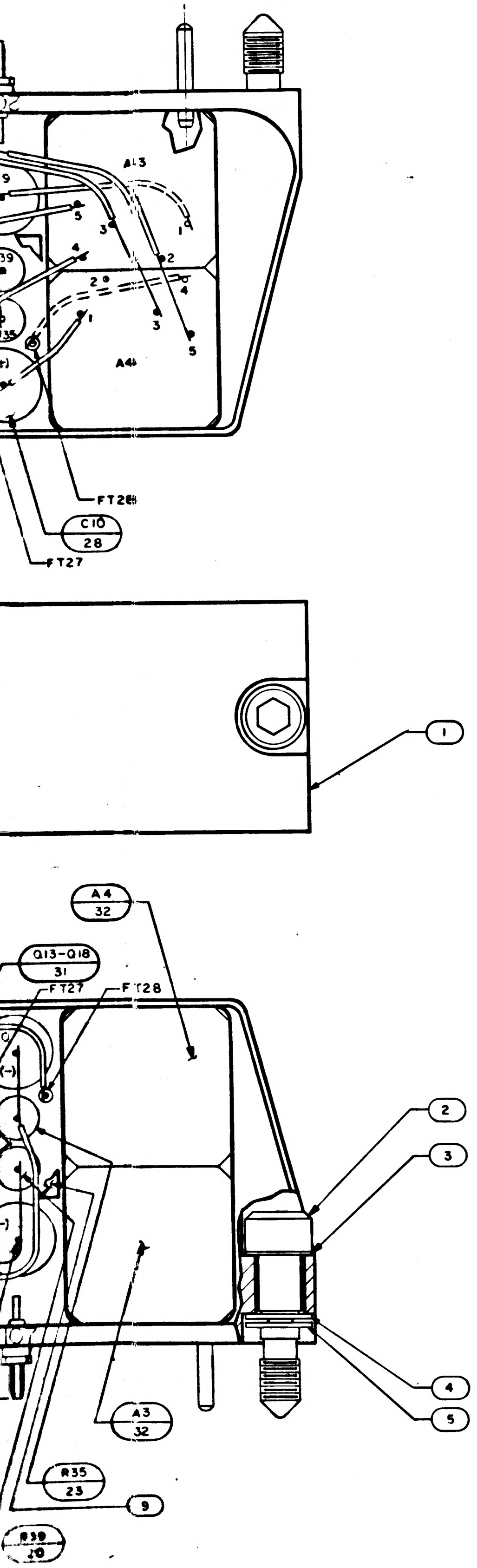
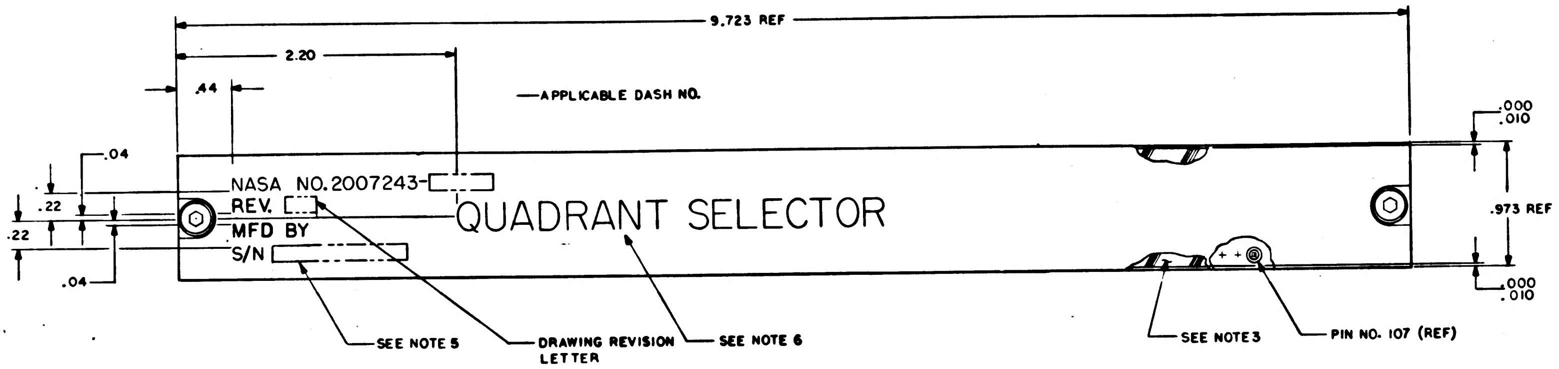


A13
A14
FT28
C10
28
FT27
1
A4
32
Q13-Q18
31
FT27
FT28
2
3
4
5
A3
32
R35
23
9
R39
20



9.723 REF
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.22
.22
.04
NASA NO. 2007243-
REV.
MFD BY
S/N
QUADRANT SELECTOR
.000
.010
.973 REF
.000
.010
SEE NOTE 5
DRAWING REVISION LETTER
SEE NOTE 6
SEE NOTE 3
PIN NO. 107 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010059	SCHEMATIC	REF
36	2008319	INSULATOR, WASHER	36
10	1008161 – 4	SCREW, CAP SLOTTED HEAD	35
1	2008093 – 001	TERMINAL, THREADED	34
AR	1006776 – 21	INSULATION, SLEEVING	33
6	2007144	AMPLIFIER, OPERATIONAL	32
36	1010343 – 3	TRANSISTOR	31
18	1010385	DIODE	30
18	1006755 – 79	CAPACITOR	29
6	1006755 – 14	CAPACITOR	28
2	1010733 – 12	RESISTOR	27
2	1010377 – 313	RESISTOR	26
2	1010377 – 311	RESISTOR	25
2	1010377 – 310	RESISTOR	24
4	1010377 – 309	RESISTOR	23
2	1010377 – 308	RESISTOR	22
16	1010377 – 307	RESISTOR	21
2	1010377 – 306	RESISTOR	20
2	1010377 – 346	RESISTOR	19
18	1006750 – 60	RESISTOR	18
18	1006750 – 56	RESISTOR	17
18	1006750 – 44	RESISTOR	16
18	1006750 – 36	RESISTOR	15
2	1006750 – 3	RESISTOR	14
AR	1006776 – 22	INSULATION, SLEEVING	13
AR	1006757 – 1	WIRE, ELECTRICAL	12
AR	1006757 – 8	WIRE, ELECTRICAL	11
18	1008025 – 1	INSULATOR, BUSHING	10
1	2008312	WIRING BOARD (D)	9
1	2008310	WIRING BOARD (C)	8
1	2008308	WIRING BOARD (B)	7
1	2008306	WIRING BOARD (A)	6
2	MS16633 – 4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546 – 3	WASHER, FLAT	4
2	1004546 – 1	WASHER, FLAT	3
2	1004579 – 1	SCREW, JACKING	2
1	2007207 – 011	HEADER HOUSING ASSEMBLY	1
-011	LIST OF MATERIALS		

3.H

NEXT ASSY	USED ON
2007222	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±
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MATERIAL
HEAT TREATMENT
FINAL FINISH

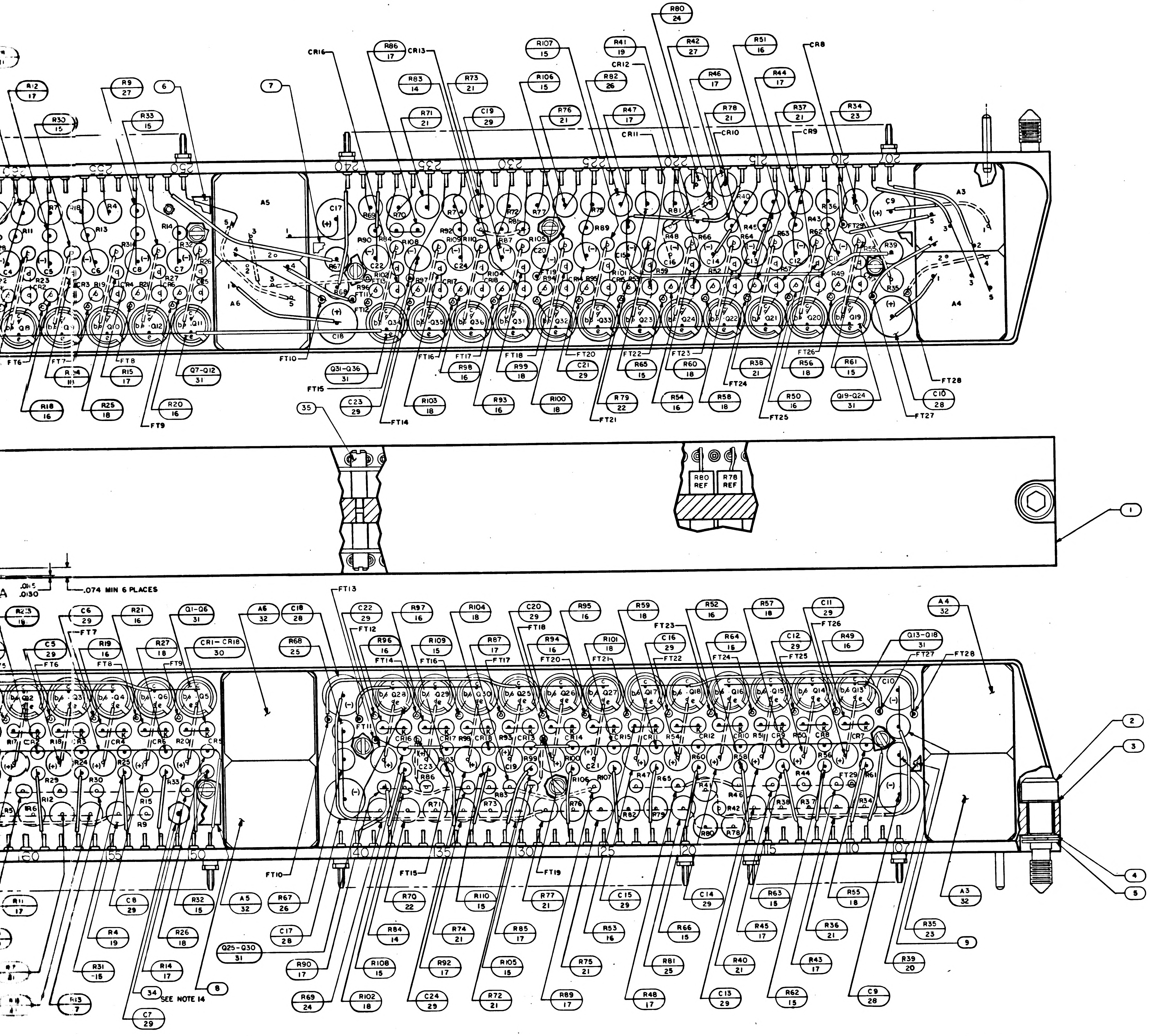
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO CONTRACT
DRAWN DATE 5-25-65
CHECKED 20/5/65
APPROVAL
APPROVAL A.R. Test 5/21/65
NASA APPROVAL 7/2/6
MIT APPROVAL 26 May

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

QUADRANT SELECTOR
ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2007243
SCALE 4/1
WT
SHEET 1 OF 1

2007243 A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R107 15
R86 17
CR13
R106 15
CR12
R82 26
R46 17
R44 17
CR16
R83 14
R73 21
R9 27
6
7
R12 17
R30 15
R33 15
R71 21
C19 29
R76 21
R47 17
R78 21
R37 21
R34 23
CR11
CR10
CR9
A5
A3
A4
A6
C17
C18
C9
C10 28
Q8 Q11 Q10 Q12 Q11 Q34 Q35 Q36 Q31 Q32 Q33 Q23 Q24 Q22 Q21 Q20 Q19
250 240 235 230 225 220 215 210 207
FT6 FT7 FT8 FT9 FT10 FT14 FT15 FT16 FT17 FT18 FT20 FT21 FT22 FT23 FT24 FT25 FT26 FT27 FT28
R18 16
R25 18
R20 16
R24 18
R15 17
Q7-Q12 31
Q31-Q36 31
C23 29
R103 18
R93 16
R98 16
R99 18
R100 18
C21 29
R79 22
R65 15
R54 16
R60 18
R58 18
R38 21
R56 18
R50 16
R61 15
Q19-Q24 31
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R78 REF
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C12 29
R49 16
Q13-Q18 31
FT11 FT19 FT29
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160 155 150 140 135 130 125 120 115 110 107
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34 SEE NOTE 14
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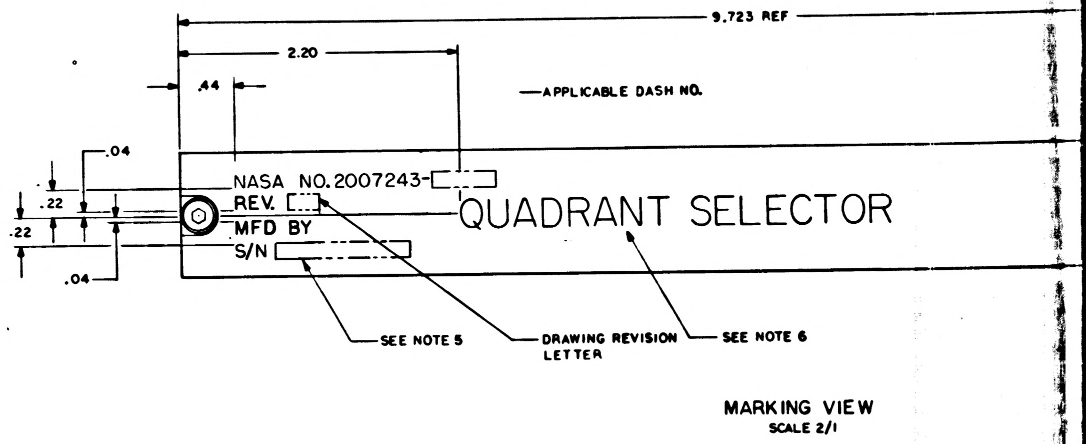
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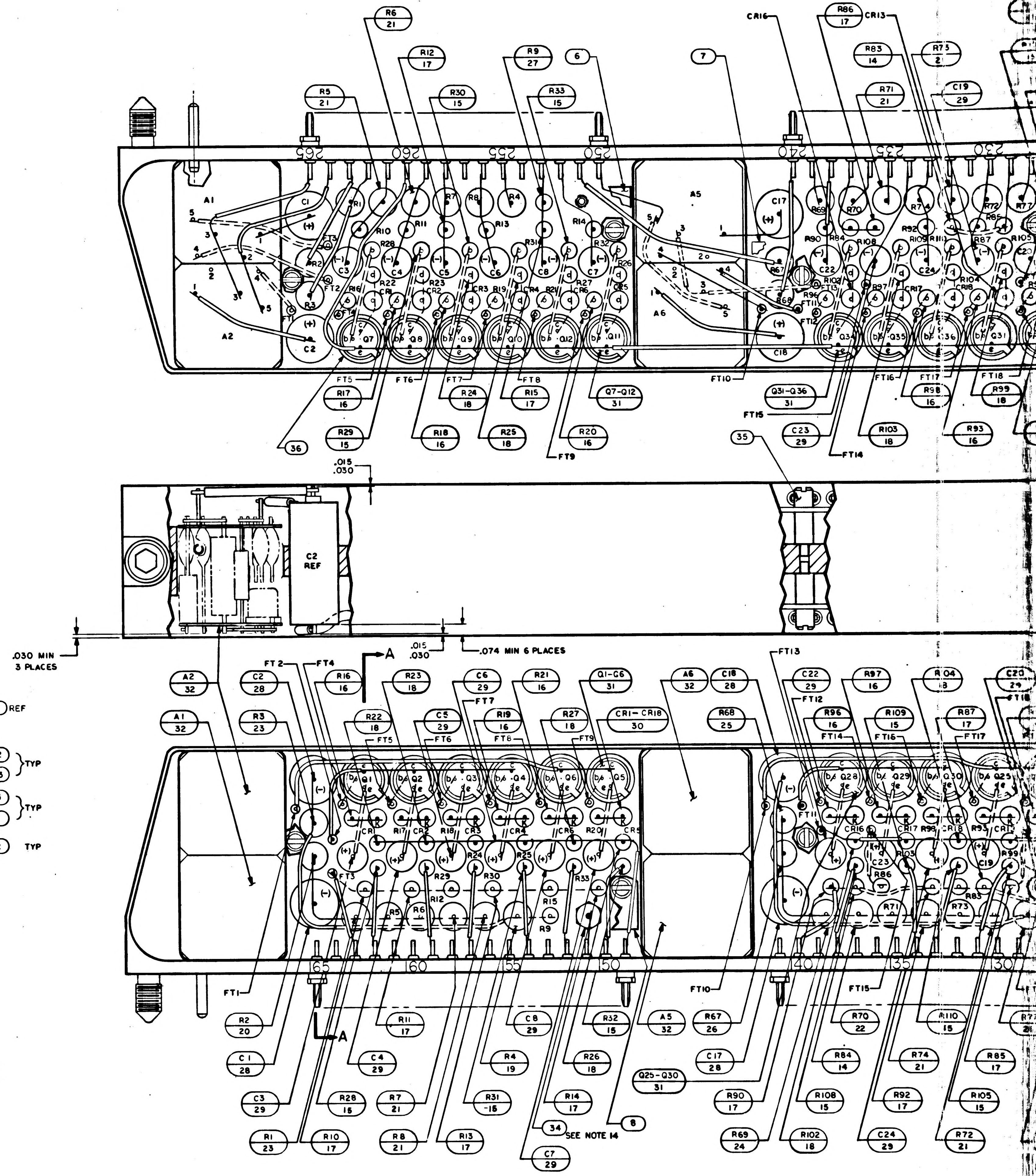
REV.
MFD BY
S/N
QUADRANT SELECTOR
SEE NOTE 5
DRAWING REVISION LETTER
SEE NOTE 6

MARKING VIEW
SCALE 2/1

2007243	A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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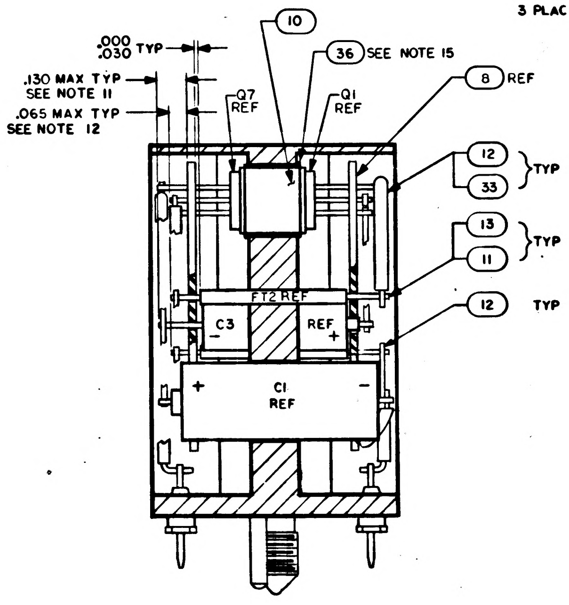
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FT2 REF
C3
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C1 REF

SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND 1002005
3. ENCAPSULATE PER ND 1002002 BLACK. REMOVE ALL FLASHING
4. STAKE ALL COMPONENTS PER ND 1002009 METHOD C OR D
5. MARK .10/.08 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
6. MARK .26/.24 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 USING INK 1006271-1
7. AR DENOTES AS REQUIRED
8. FT DENOTES FEED THRU
9. K DENOTES CATHODE SIDE OF DIODE
10. + DENOTES POSITIVE SIDE OF CAPACITOR
11. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
12. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
13. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND 1002069
14. MOUNTING TORQUE FOR FIND NO. 34 TO BE 15 TO 20 INCH OUNCES
15. BOND FIND NO.36 TO FIND NO.1 PER ND1002004 TYPE I
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF R.S.2007243

2007243	A

APOLLO G&C Specification
PS2007243 REV—A
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25162	3, 6, 8, 13	WK	ACM

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	19 Oct 65 MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

3. REQUIREMENTS

3.1 Performance

3.1.1 Inputs. The assembly shall function as specified herein with the following inputs:

a. 28±4 vdc
b. 0-6V rms, 800±8 cps sine wave
c. 4.0±0.1 vdc, 4KΩ ± 10% source impedance

3.1.2 Characteristics

3.1.2.1 Gain. The gain of each amplifier shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the outputs at pins 237 and 229 shall be within ±5 percent of the nominal values, the outputs of pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the outputs at pins 261, 211, 230 and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase.

3.1.2.2 Gain Stability. The amplifier gains under the conditions specified in Table II shall be within ±0.5 percent of the corresponding gain values determined under the conditions specified in Table I when dc supply voltages are 24.0±0.5 vdc and 32.0±0.5 vdc and when the input signal level is 2.5±0.1V rms.

3.1.2.3 Gain Linearity. The gain linearity of each amplifier input specified in Table II at 1.0, 3.5 and 5.0V rms input shall be within ±0.05 percent of the gain obtained at an input of 2.5±0.1V rms.

3.1.2.4 Phase Shift. The output phase shift of each amplifier at the output levels specified in 3.1.2.3 shall be as specified in Table I.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawings 2007243 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. - The maximum weight of the assembly shall be 0.484 lb.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Insulation Resistance. The resistance between pin 151 and the remaining assembly pins shall be not less than 100 megohms.

TABLE I (Continued)

INPUT SIGNAL PINS		4.0±0.1 VDC TO PINS		PINS CONNECTED		OUTPUT			
						Pins		Gain	Phase Shift (° ±2°)
Hi	Lo	Hi	Lo	From	To	Hi	Lo	Nominal	
239	250	124 133 138 131	260	234 226 238 232 235	228 233 217 225 227	227	250	0.830970	180
239	250	133 131 138 127	260	↑	↑	225	250	0.830970	180
239	250	133 131 127 134	260			238	250	0.830500	0
219	250	127 134 138 124	260			230	250	0.830500	0
222	250	127 134 124 133	260			238	250	0.980160	180
219	250	127 134 124 133	260			238	250	0.830970	180
220	250	127 134 124 133	260			238	250	0.555200	180
223	250	127 134 124 133	260			238	250	0.195000	180
219	250	127 124 133 138	260			237	250	0.005200	180
219	250	127 124 133 138	260	↓	↓	234	250	0.830970	180
219	250	127 124 138 134	260	234 226 238 232 235	228 233 217 225 227	233	250	0.830970	180

3.2.3.2 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table III.

TABLE III

DC RESISTANCE

PINS		RESISTANCE (OHMS)
From	To	
151	Chassis	≤0.5
264	163	≤0.5
207	210	≤0.5
260	264	≥100 meg
264	207	≥100 meg
207	250	≥ 100 meg

4.2.3 **Insulation Resistance.** The insulation resistance between pin 151 and the remaining assembly pins shall be greater than 100 megohms when measured in accordance with Method 302 of Standard MIL-STD-202. The megohmmeter used shall have an output voltage of 225±75 vdc limited to a short circuit current of 6.0 μa.

4.2.4 **Continuity and DC Resistance.** The DC resistance between the points specified in Table III shall be measured in accordance with Method 303 of Standard MIL-STD-202 and shall be as specified in Table III. To assure a good electrical connection to the chassis, the anodizing may be penetrated.

4.2.5 **Gain.** With 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo), an 800±8 cps input signal adjusted to 2.5±0.1V rms and a 4.0±0.1 vdc voltage applied and pins connected as specified in Table I, the gain shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the gain at pins 237 and 229 shall be within ±5 percent of the nominal values, the gain at pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the gain at pins 261, 211, 230, and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase

4.2.6 **Gain Stability.** With the conditions specified below established, the gains shall be within ±0.5 percent of the corresponding gains obtained in 4.2.5. Under these same conditions, except with a supply voltage of 32.0±0.5 vdc, gains shall again be within ±0.5 percent of the corresponding gains obtained in 4.2.5.

a. A supply voltage of 24.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi) and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An input signal of 2.5±0.1V rms applied to the inputs as specified in Table II.

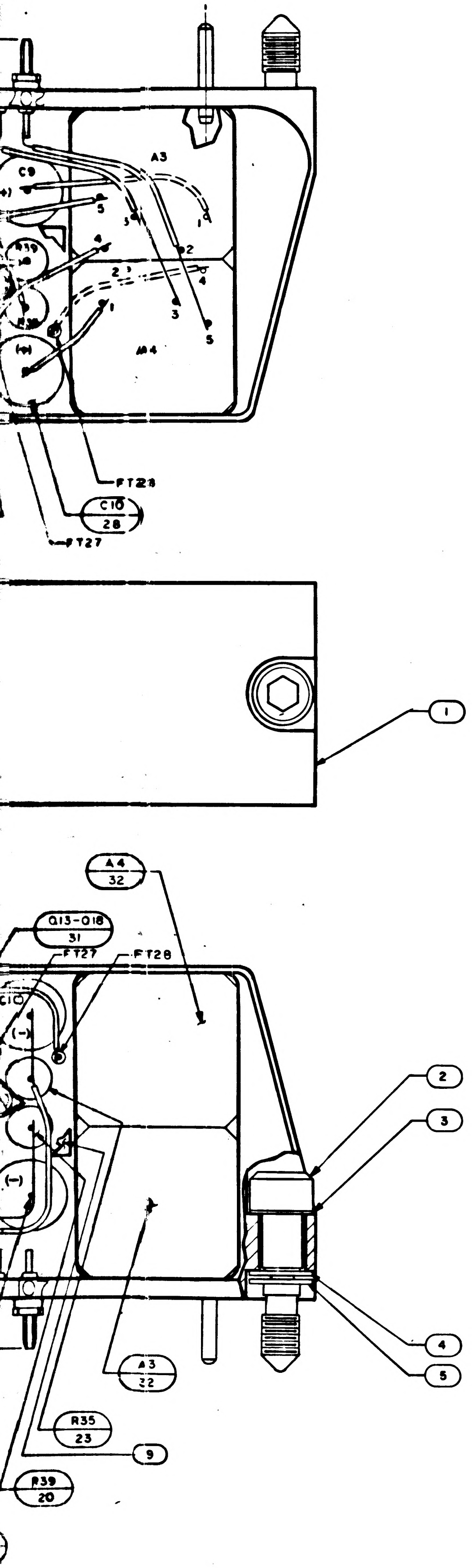
4.2.7 **Gain Linearity and Phase Shift.** With the conditions specified below established, the gain shall be within ±0.05 percent of the corresponding gain obtained in 4.2.5 and the phase shift shall be within the corresponding phase tolerance specified in Table I.

a. 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An 800±8 cps signal of 1, 3.5, and 5V rms applied to the inputs, specified in Table II.

REVISIONS 13-3-5			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 20777		
B	REVISED PER TDRR 22998	11 OCT 65	



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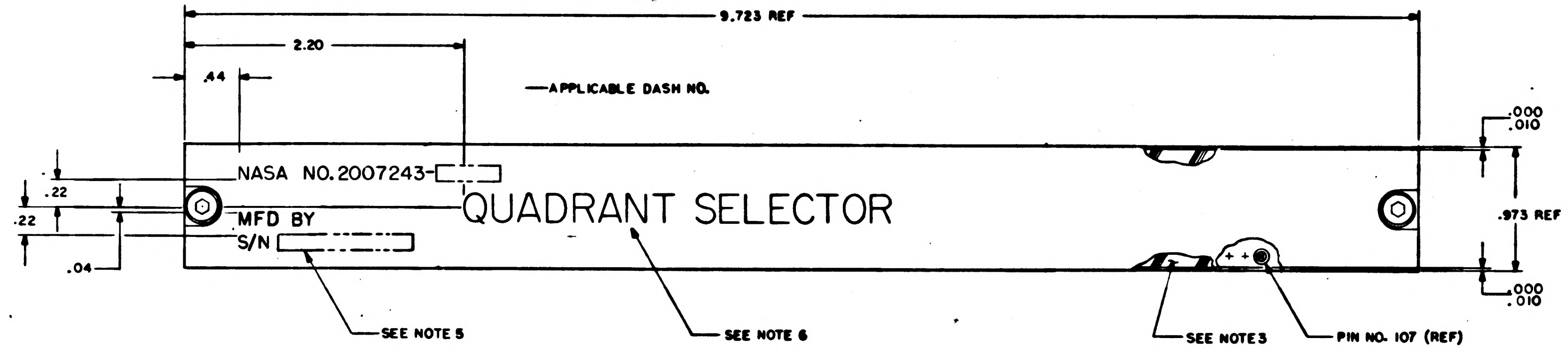

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APPLICABLE DASH NO.
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.04
NASA NO. 2007243-
MFD BY
S/N
QUADRANT SELECTOR
.000
.010
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SEE NOTE 5
SEE NOTE 6
SEE NOTE 3
PIN NO. 107 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010059	SCHEMATIC	REF
36	2008319	INSULATOR, WASHER	36
10	1008161 – 4	SCREW, CAP SLOTTED HEAD	35
1	2008093 – 001	TERMINAL, THREADED	34
AR	1006776 – 21	INSULATION, SLEEVING	33
6	2007144	AMPLIFIER, OPERATIONAL	32
36	1010343 – 3	TRANSISTOR	31
18	1010385	DIODE	30
18	1006755 – 79	CAPACITOR	29
6	1006755 – 14	CAPACITOR	28
2	1010733 – 12	RESISTOR	27
2	1010377 – 313	RESISTOR	26
2	1010377 – 311	RESISTOR	25
2	1010377 – 310	RESISTOR	24
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2	1010377 – 308	RESISTOR	22
16	1010377 – 307	RESISTOR	21
2	1010377 – 306	RESISTOR	20
2	1010377 – 346	RESISTOR	19
18	1006750 – 60	RESISTOR	18
18	1006750 – 56	RESISTOR	17
18	1006750 – 44	RESISTOR	16
18	1006750 – 36	RESISTOR	15
2	1006750 – 3	RESISTOR	14
AR	1006776 – 22	INSULATION, SLEEVING	13
AR	1006757 – 1	WIRE, ELECTRICAL	12
AR	1006757 – 8	WIRE, ELECTRICAL	11
18	1008025 – 1	INSULATOR, BUSHING	10
1	2008312	WIRING BOARD (D)	9
1	2008310	WIRING BOARD (C)	8
1	2008308	WIRING BOARD (B)	7
1	2008306	WIRING BOARD (A)	6
2	MS16633 – 4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546 – 3	WASHER, FLAT	4
2	1004546 – 1	WASHER, FLAT	3
2	1004579 – 1	SCREW, JACKING	2
1	2007207 – 011	HEADER HOUSING ASSEMBLY	1
-011	LIST OF MATERIALS		

MASTER

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 5/21/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

QUADRANT SELECTOR ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2007243
SCALE 4/1
WT
SHEET 1 OF 1

2007243 B

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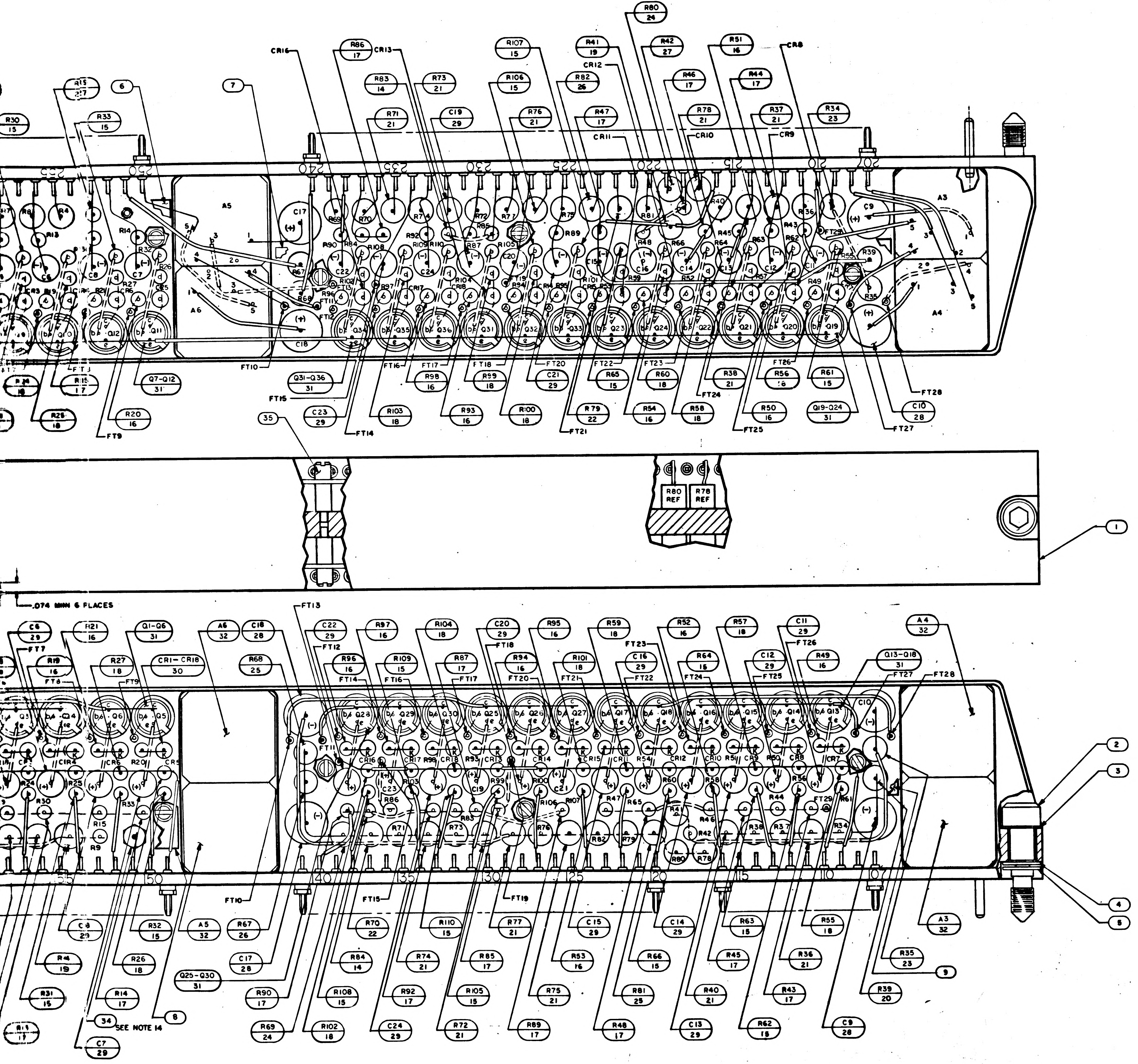
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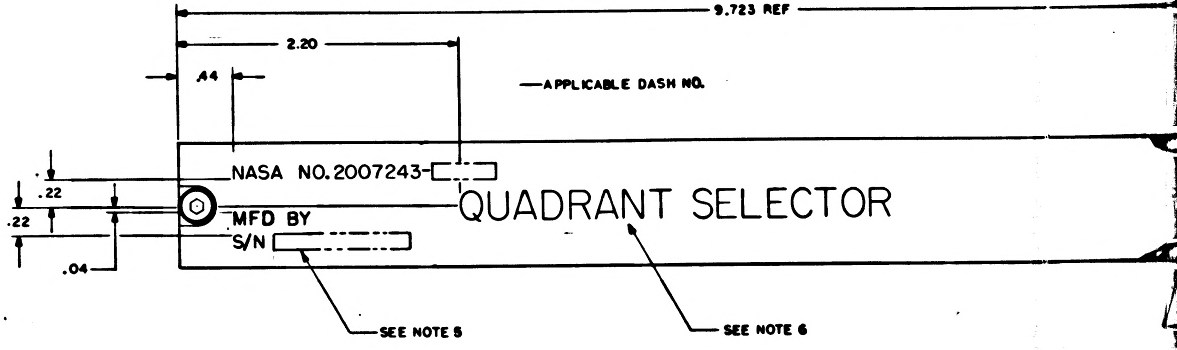
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QUADRANT SELECTOR
MFD BY
S/N
SEE NOTE 5
SEE NOTE 6

MARKING VIEW
SCALE 2/1

2007243 B

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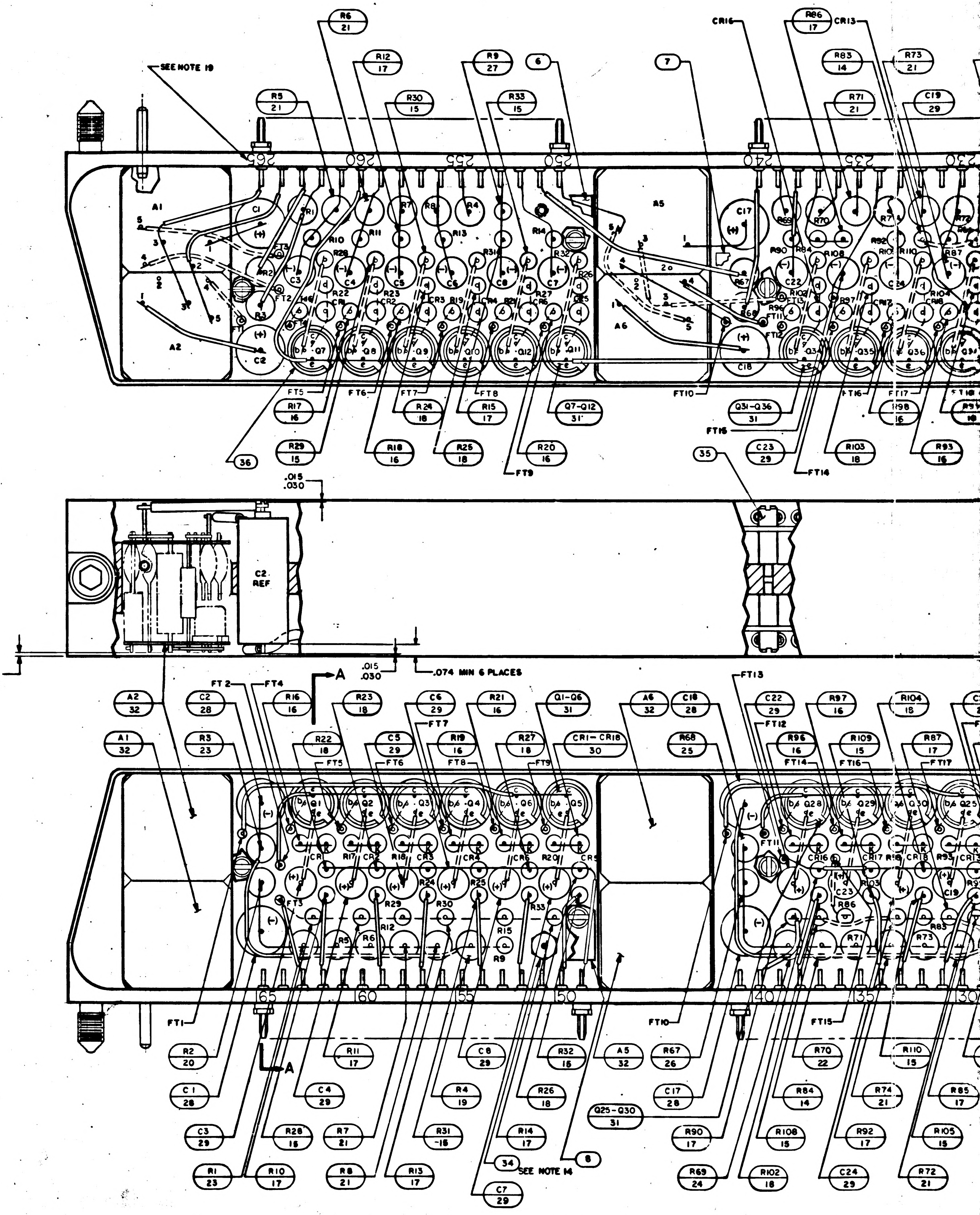
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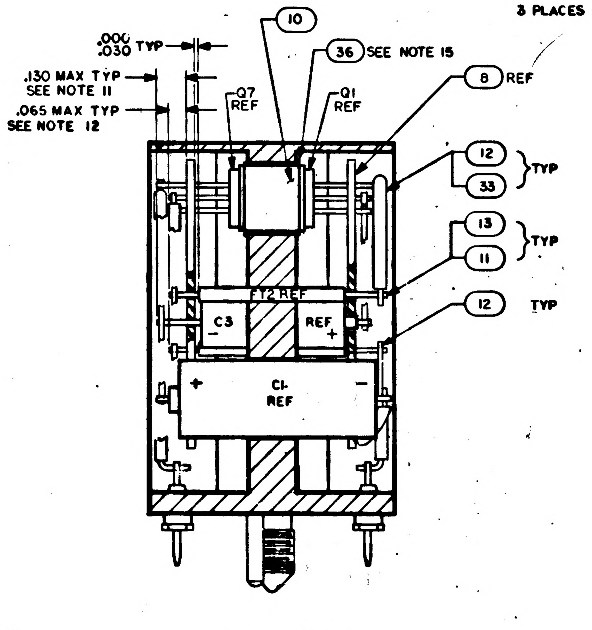
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C1
REF

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND 1002005
3. ENCAPSULATE PER ND 1002002 BLACK. REMOVE ALL FLASHING
4. STAKE ALL COMPONENTS PER ND 1002009 METHOD J
5. MARK .10/.08 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
6. MARK .26/.24 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 USING INK 1006271-1
7. AR DENOTES AS REQUIRED
8. FT DENOTES FEED THRU
9. K DENOTES CATHODE SIDE OF DIODE
10. + DENOTES POSITIVE SIDE OF CAPACITOR
11. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
12. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
13. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND 1002069
14. MOUNTING TORQUE FOR FIND NO. 34 TO BE 15 TO 20 INCH OUNCES
15. BOND FIND NO. 36 TO FIND NO. 1 PER ND 1002004 TYPE I
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF RS. 2007243
17. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSALATION
18. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND 1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
19. MARK .060/.080 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II

3H

APOLLO G&C Specification
PS2007243 REV- B
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
(M) 1/11/66	A	25162	3, 6, 8, 13 RDG/AC	WK	ACM
3/29/66	B	27472	3 RDG/AC	WK	--

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	19 Oct 65 MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

3. REQUIREMENTS

3.1 Performance

3.1.1 Inputs. The assembly shall function as specified herein with the following inputs:

- a. 28±4 vdc
- b. 0-6V rms, 800±8 cps sine wave
- c. 4.0±0.1 vdc, 4KΩ ± 10% source impedance

3.1.2 Characteristics

3.1.2.1 Gain. The gain of each amplifier shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the outputs at pins 237 and 229 shall be within ±5 percent of the nominal values, the outputs of pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the outputs at pins 261, 211, 230 and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase.

3.1.2.2 Gain Stability. The amplifier gains under the conditions specified in Table II shall be within ±0.5 percent of the corresponding gain values determined under the conditions specified in Table I when dc supply voltages are 24.0±0.5 vdc and 32.0±0.5 vdc and when the input signal level is 2.5±0.1V rms.

3.1.2.3 Gain Linearity. The gain linearity of each amplifier input specified in Table II at 1.0, 3.5 and 5.0V rms input shall be within ±0.05 percent of the gain obtained at an input of 2.5±0.1V rms.

3.1.2.4 Phase Shift. The output phase shift of each amplifier at the output levels specified in 3.1.2.3 shall be as specified in Table I.

3.2 PRODUCT CONFIGURATION

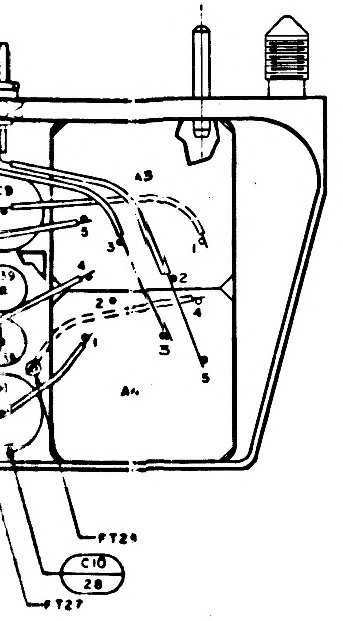
3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawings 2007243 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. - The maximum weight of the assembly shall be 0.59 lb..

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Insulation Resistance. The resistance between pin 151 and the remaining assembly pins shall be not less than 100 megohms.

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 20777		
B	REVISED PER TDRR 22998		
C	REVISED PER TDRR 23888		



43
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3
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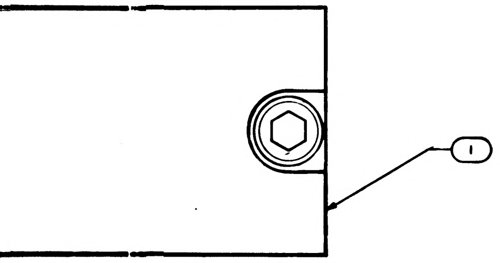
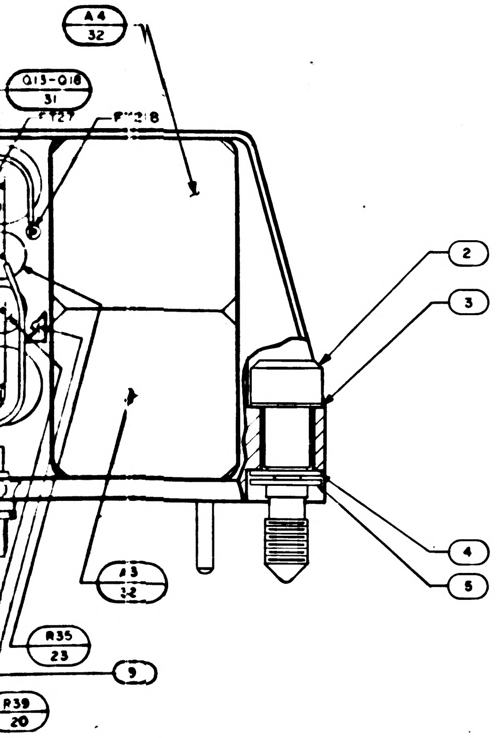
A4
FT24
C10
28
FT27





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Q13-Q16
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FT28
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3
4
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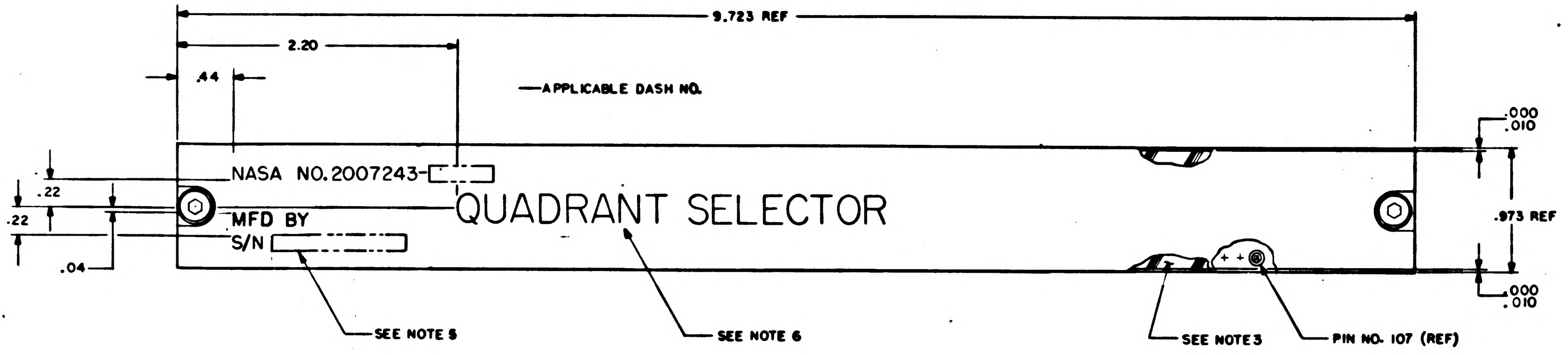
R35
23
9
R39
20



9.723 REF
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.44
APPLICABLE DASH NO.
.000
.010
NASA NO. 2007243-
QUADRANT SELECTOR
MFD BY
S/N
.22
.22
.04
.973 REF
.000
.010
SEE NOTE 5
SEE NOTE 6
SEE NOTE 3
PIN NO. 107 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
⊠	2010059	SCHEMATIC	REF
AR	1010848-2	WIRE, ELECTRICAL	37
36	2008319	INSULATOR, WASHER	36
10	1008161 - 4	SCREW, CAP SLOTTED HEAD	35
1	2008093-001	TERMINAL, THREADED	34
AR	1006776 - 21	INSULATION, SLEEVING	33
6	2007144	AMPLIFIER, OPERATIONAL	32
36	1010343 - 3	TRANSISTOR	31
18	1010385	DIODE	30
18	1006755 - 79	CAPACITOR	29
6	1006755 - 14	CAPACITOR	28
2	1010733 - 12	RESISTOR	27
2	1010377 - 313	RESISTOR	26
2	1010377 - 311	RESISTOR	25
2	1010377 - 310	RESISTOR	24
4	1010377 - 309	RESISTOR	23
2	1010377 - 308	RESISTOR	22
16	1010377 - 307	RESISTOR	21
2	1010377 - 306	RESISTOR	20
2	1010377 - 346	RESISTOR	19
18	1006750 - 60	RESISTOR	18
18	1006750 - 56	RESISTOR	17
18	1006750 - 44	RESISTOR	16
18	1006750 - 36	RESISTOR	15
2	1006750 - 3	RESISTOR	14
			13
AR	1006757 - 1	WIRE, ELECTRICAL	12
			11
18	1008025 - 1	INSULATOR, BUSHING	10
1	2008312	WIRING BOARD (D)	9
1	2008310	WIRING BOARD (C)	8
1	2008308	WIRING BOARD (B)	7
1	2008306	WIRING BOARD (A)	6
2	MS16633 - 4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546 - 3	WASHER, FLAT	4
2	1004546 - 1	WASHER, FLAT	3
2	1004579 - 1	SCREW, JACKING	2
1	2007207 - 011	HEADER HOUSING ASSEMBLY	1

-011 LIST OF MATERIALS

2007243 C

3H

2007222	
NEXT ASSY	USED ON
APPLICATION	

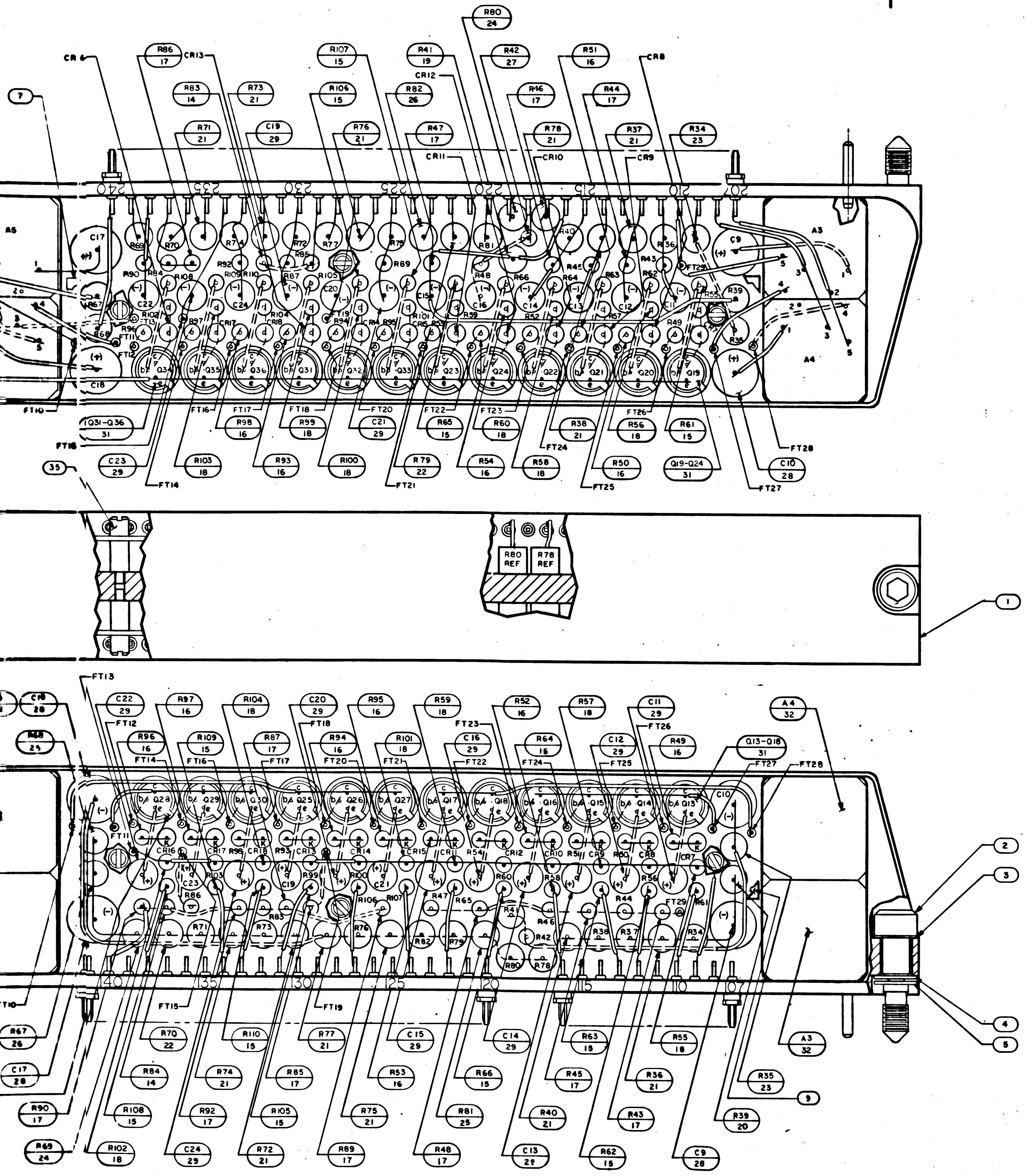
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 5/21/65
NASA APPROVAL
MIT APPROVAL 24 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

QUADRANT SELECTOR
ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2007243
SCALE 4/1
WT
SHEET 1 OF 1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CR6
R107 15
R41 19
R42 27
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R46 17
R44 17
R71 21
C19 29
R76 21
R47 17
R78 21
R37 21
R34 23
CR11
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CR9
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FT25
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FT27
FT28
Q31-Q36 31
C23 29
R103 18
R98 16
R93 16
R99 18
R100 18
C21 29
R79 22
R65 15
R60 18
R54 16
R58 18
R38 21
R56 18
R50 16
R61 15
Q19-Q24 31
C10 28
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C18 28
R68 25
C22 29
R97 16
R104 18
C20 29
R95 16
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R52 16
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C11 29
A4 32
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R109 15
R87 17
R94 16
R101 18
C16 29
R64 15
C12 29
R49 16
Q13-Q18 31
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FT15
FT19
R67 26
C17 28
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R110 15
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C14 29
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R36 21
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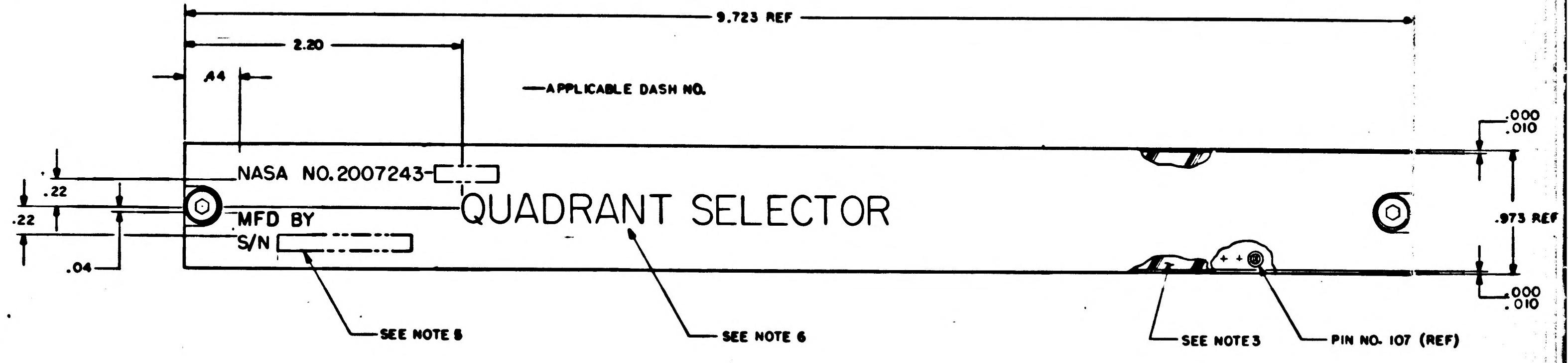
9.723 REF
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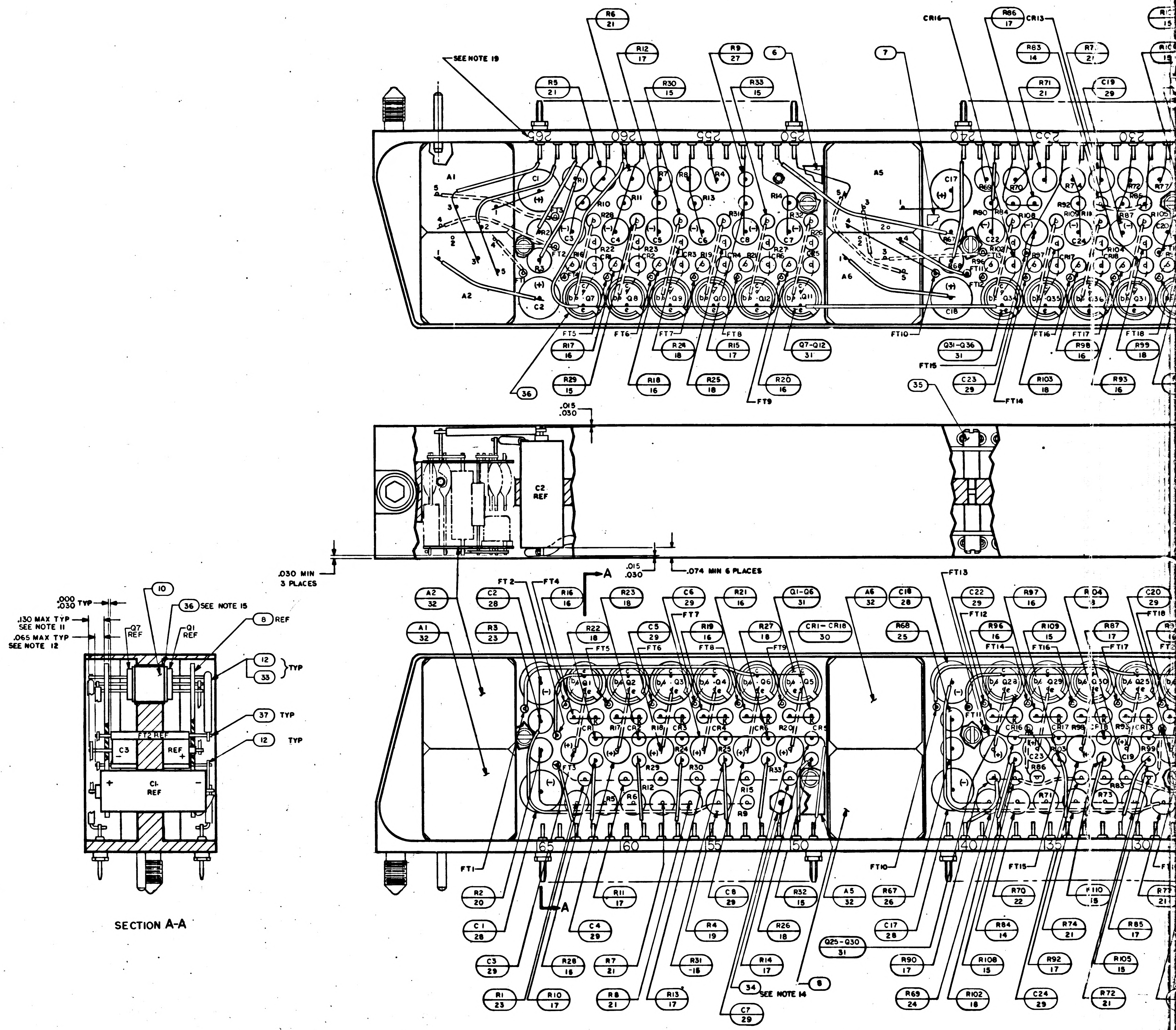
.44
APPLICABLE DASH NO.
NASA NO. 2007243-
QUADRANT SELECTOR
MFD BY
S/N
.22
.22
.04
.000
.010
.973 REF
.000
.010
SEE NOTE 5
SEE NOTE 6
SEE NOTE 3
PIN NO. 107 (REF)

MARKING VIEW
SCALE 2/1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


SEE NOTE 19
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A5
A6
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3 PLACES
.074 MIN 6 PLACES
A
.000
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.130 MAX TYP
SEE NOTE 11
.065 MAX TYP
SEE NOTE 12
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REF
Q1
REF
36 SEE NOTE 15
8 REF
12
33
TYP
37 TYP
12 TYP
C3
REF
C1
REF
C2
REF
FT2 REF
34 SEE NOTE 14
FT1
FT10
FT13
FT15
CR1–CR18
30
Q1–Q6
31
Q7–Q12
31
Q25–Q30
31
Q31–Q36
31

SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND1002005
3. ENCAPSULATE PER ND 1002002 BLACK. REMOVE ALL FLASHING
4. STAKE ALL COMPONENTS PER ND 1002009 METHOD J
5. MARK .10/.08 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
6. MARK .26/.24 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 USING INK 1006271-1
7. AR DENOTES AS REQUIRED
8. FT DENOTES FEED THRU
9. K DENOTES CATHODE SIDE OF DIODE
10. + DENOTES POSITIVE SIDE OF CAPACITOR
11. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
12. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
13. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND 1002069
14. MOUNTING TORQUE FOR FIND NO. 34 TO BE 15 TO 20 INCH OUNCES
15. BOND FIND NO.36 TO FIND NO.1 PER ND1002004 TYPE I
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S.2007243
17. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSALATION
18. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
19. MARK .060/.080 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II

APOLLO G&C Specification
PS2007243 REV– C
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25162	3, 6, 8, 13 RDG/AL	WK	ACM
3/29/66	B	27472	3 RDG/AL	WK	--
5/3/66	C	28460	3, 13 RDG/AL	WK	--

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	W Kupfer 19 Oct 65 MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

3. REQUIREMENTS

3.1 Performance

3.1.1 Inputs. The assembly shall function as specified herein with the following inputs:

a. 28±4 vdc
b. 0–6V rms, 800±8 cps sine wave
c. 4.0±0.1 vdc, 4KΩ ± 10% source impedance

3.1.2 Characteristics

3.1.2.1 Gain. The gain of each amplifier shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the outputs at pins 237 and 229 shall be within ±5 percent of the nominal values, the outputs of pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the outputs at pins 261, 211, 230 and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase.

3.1.2.2 Gain Stability. The amplifier gains under the conditions specified in Table II shall be within ±0.5 percent of the corresponding gain values determined under the conditions specified in Table I when dc supply voltages are 24.0±0.5 vdc and 32.0±0.5 vdc and when the input signal level is 2.5±0.1V rms.

3.1.2.3 Gain Linearity. The gain linearity of each amplifier input specified in Table II at 1.5, 3.5 and 5.0V rms input shall be within ±0.05 percent of the gain obtained at an input of 2.5±0.1V rms.

3.1.2.4 Phase Shift. The output phase shift of each amplifier at the output levels specified in 3.1.2.3 shall be as specified in Table I.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawings 2007243 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. - The maximum weight of the assembly shall be 0.59 lb.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Insulation Resistance. The resistance between pin 151 and the remaining assembly pins shall be not less than 100 megohms.

4.2.3 Insulation Resistance. The insulation resistance between pin 151 and the remaining assembly pins shall be greater than 100 megohms when measured in accordance with Method 302 of Standard MIL-STD-202. The megohmmeter used shall have an output voltage of 225±75 vdc limited to a short circuit current of 6.0 μa.

4.2.4 Continuity and DC Resistance. The DC resistance between the points specified in Table III shall be measured in accordance with Method 303 of Standard MIL-STD-202 and shall be as specified in Table III. To assure a good electrical connection to the chassis, the anodizing may be penetrated.

4.2.5 Gain. With 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo), an 800±8 cps input signal adjusted to 2.5±0.1V rms and a 4.0±0.1 vdc voltage applied and pins connected as specified in Table I, the gain shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the gain at pins 237 and 229 shall be within ±5 percent of the nominal values, the gain at pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the gain at pins 261, 211, 230, and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase

4.2.6 Gain Stability. With the conditions specified below established, the gains shall be within ±0.5 percent of the corresponding gains obtained in 4.2.5. Under these same conditions, except with a supply voltage of 32.0±0.5 vdc, gains shall again be within ±0.5 percent of the corresponding gains obtained in 4.2.5.

a. A supply voltage of 24.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi) and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An input signal of 2.5±0.1V rms applied to the inputs as specified in Table II.

4.2.7 Gain Linearity and Phase Shift. With the conditions specified below established, the gain shall be within ±0.05 percent of the corresponding gain obtained in 4.2.5 and the phase shift shall be within the corresponding phase tolerance specified in Table I.

a. 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An 800±8 cps signal of 1.50±0.05, 3.50±0.05, 5.0±0.1V rms applied to the inputs, specified in Table II.

APOLLO G&C Specification
PS2007243 REV-D
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25162	3, 6, 8, 13 RDG/AC	WK	ACM
3/29/66	B	27472	3 RDG/AC	WK	--
5/3/66	C	28460	3, 13 RDG/AC	WK	--
5/11/66	D	28705	3 RDG/AC	MGM	---

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	MIT/IL	ACSP
		W Kupfer 19 Oct 65	D. Grassell R. Mura

NOT REQUIRED PER LETTER
NASA PP7-65-612

3. REQUIREMENTS

3.1 Performance

3.1.1 Inputs. The assembly shall function as specified herein with the following inputs:

a. 28±4 vdc
b. 0–6V rms, 800±8 cps sine wave
c. 4.0±0.1 vdc, 4KΩ ± 10% source impedance

3.1.2 Characteristics

3.1.2.1 Gain. The gain of each amplifier shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the outputs at pins 237 and 229 shall be within ±5 percent of the nominal values, the outputs of pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the outputs at pins 261, 211, 230 and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase.

3.1.2.2 Gain Stability. The amplifier gains under the conditions specified in Table II shall be within ±0.5 percent of the corresponding gain values determined under the conditions specified in Table I when dc supply voltages are 24.0±0.5 vdc and 32.0±0.5 vdc and when the input signal level is 2.5±0.1V rms.

3.1.2.3 Gain Linearity. The gain linearity of each amplifier input specified in Table II at 1.6, 3.5 and 5.0V rms input shall be within ±0.05 percent of the gain obtained at an input of 2.5±0.1V rms.

3.1.2.4 Phase Shift. The output phase shift of each amplifier at the output levels specified in 3.1.2.3 shall be as specified in Table I.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawings 2007243 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. - The maximum weight of the assembly shall be 0.62 lb.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Insulation Resistance. The resistance between pin 151 and the remaining assembly pins shall be not less than 100 megohms.

APOLLO G&C Specification
PS2007243 REV- E
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25162	3, 6, 8, 13 RO6/AC	WK	ACM
3/29/66	B	27472	3 RO6/AC	WK	--
5/3/66	C	28460	3, 13 RO6/AC	WK	--
5/11/66	D	28705	3 RO6/AC	MGM	---
6/8/66	E	29540	14 RO6/AC	MGM	---

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	W. Ragan 19 Oct 65 MIT/IL	D. Grassell R. Mura ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

4.2.8 Weight. The assembly shall be weighed to determine that the weight of the assembly is less than 0.62 lb.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

JD:efo

APOLLO G&C Specification
PS2007243 REV- F
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

	Date	Revision Letter	TDRR No.	Pages Revised		Approvals	
						MIT	NASA
M	1/11/66	A	25162	3, 6, 8, 13	RDG/AC	WK	ACM
M	3/29/66	B	27472	3	RDG/AC	WK	--
M	5/3/66	C	28460	3, 13	RDG/AC	WK	--
M	5/11/66	D	28705	3	RDG/AC	MGM	---
M	6/8/66	E	29540	14	RDG/AC	MGM	---
	6/28/66	F	29833	13		MGM	---

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	W. Kupfer 19 Oct 65 MIT/IL	D. Grassell R. Mura ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

4.2.3 Insulation Resistance. The insulation resistance between pin 151 and the remaining assembly pins shall be greater than 100 megohms when measured in accordance with Method 302 of Standard MIL-STD-202. The megohmmeter used shall have an output voltage of 225±75 vdc limited to a short circuit current of 6.0 μa.

4.2.4 Continuity and DC Resistance. The DC resistance between the points specified in Table III shall be measured in accordance with Method 303 of Standard MIL-STD-202 and shall be as specified in Table III. To assure a good electrical connection to the chassis, the anodizing may be penetrated.

4.2.5 Gain. With 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo), an 800±8 cps input signal adjusted to 2.5±0.1V rms and a 4.0±0.1 vdc voltage applied and pins connected as specified in Table I, the gain shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the gain at pins 237 and 229 shall be within ±5 percent of the nominal values, the gain at pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the gain at pins 261, 211, 230, and 238 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase. The dc level at the outputs shall not exceed 0.5 vdc.

4.2.6 Gain Stability. With the conditions specified below established, the gains shall be within ±0.5 percent of the corresponding gains obtained in 4.2.5. Under these same conditions, except with a supply voltage of 32.0±0.5 vdc, gains shall again be within ±0.5 percent of the corresponding gains obtained in 4.2.5.

a. A supply voltage of 24.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi) and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An input signal of 2.5±0.1V rms applied to the inputs as specified in Table II.

4.2.7 Gain Linearity and Phase Shift. With the conditions specified below established, the gain shall be within ±0.05 percent of the corresponding gain obtained in 4.2.5 and the phase shift shall be within the corresponding phase tolerance specified in Table I.

a. 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An 800±8 cps signal of 1.50±0.05, 3.50±0.05, 5.0±0.1V rms applied to the inputs, specified in Table II.

APOLLO G&C Specification
PS2007243 REV- G
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25162	3, 6, 8, 13	WK	ACM
3/29/66	B	27472	3	WK	-- -
5/3/66	C	28460	3, 13	WK	--
5/11/66	D	28705	3	MGM	---
6/8/66	E	29540	14	MGM	---
6/28/66	F	29833	13	MGM	---
7/21/66	G	30245	8	EA	--

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	19 Oct 65 MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

APOLLO G&C Specification
PS2007243 REV H
Original Issue Date: 19 Oct 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
Ⓜ 1/11/66	A	25162	3, 6, 8, 13 RDG/AC	WK	ACM
Ⓜ 3/29/66	B	27472	3 RDG/AC	WK	-- -
Ⓜ 5/3/66	C	28460	3, 13 RDG/AC	WK	--
Ⓜ 5/11/66	D	28705	3 RDG/AC	MGM	---
Ⓜ 6/8/66	E	29540	14 RDG/AC	MGM	---
Ⓜ 6/28/66	F	29833	13	MGM	---
7/21/66	G	30245	8 JH/AC	EA	--
Ⓜ 9/29/66	H	31392	3, 13 RDG/AC	MGM EA	--

This specification consists of page 1 to 14 inclusive.

APPROVALS		19 Oct 65	
	NASA/MSC	MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

3. REQUIREMENTS

3.1 Performance

3.1.1 Inputs. The assembly shall function as specified herein with the following inputs:

a. 28±4 vdc
b. 0-6V rms, 800±8 cps sine wave
c. 4.0±0.1 vdc, 4KΩ ± 10% source impedance

3.1.2 Characteristics

3.1.2.1 Gain. The gain of each amplifier shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the outputs at pins 237 and 229 shall be within ±5 percent of the nominal values, the outputs of pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the outputs at pins 261, 211, 230 and 238 shall be within ±0.1 percent of the nominal values during measurements of zero degrees phase.

3.1.2.2 Gain Stability. The amplifier gains under the conditions specified in Table II shall be within ±0.5 percent of the corresponding gain values determined under the conditions specified in Table I when dc supply voltages are 24.0±0.5 vdc and 32.0±0.5 vdc and when the input signal level is 2.5±0.1V rms.

3.1.2.3 Gain Linearity. The gain linearity of each amplifier input specified in Table II at 1.5, 3.5 and 5.0V rms input shall be within ±0.05 percent of the gain obtained at an input of 2.5±0.1V rms.

3.1.2.4 Phase Shift. The output phase shift of each amplifier at the output levels specified in 3.1.2.3 shall be as specified in Table I.

3.2 PRODUCT CONFIGURATION

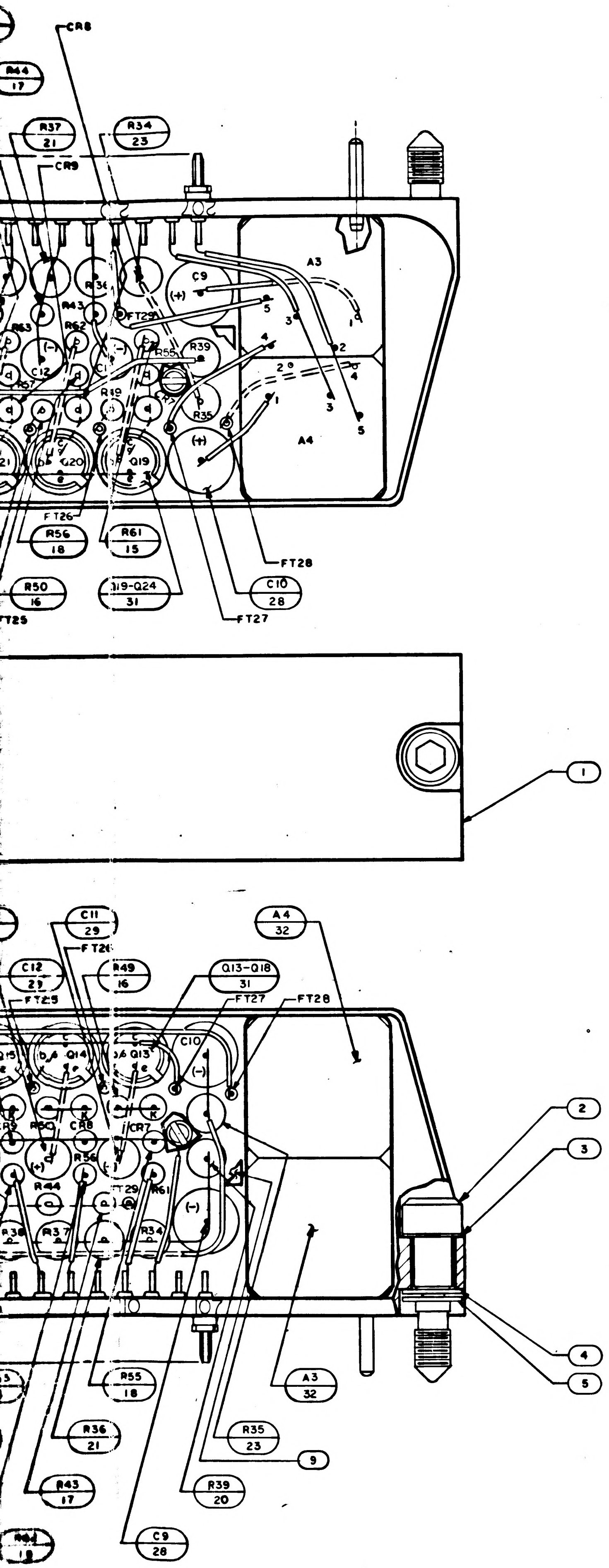
3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawings 2007243 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. - The maximum weight of the assembly shall be 0.62 lb.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Insulation Resistance. The resistance between pin 151 and the remaining assembly pins shall be not less than 100 megohms.

SYM	REVISIONS DESCRIPTION	DATE	APPROV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R34 23
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Q20
Q19
R35
A4
FT26
R56 18
R61 15
FT28
R50 16
Q19-Q24 31
C10 28
FT27
FT25
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C11 29
FT29
A4 32
C12 29
R49 16
Q13-Q18 31
FT27
FT28
FT25
Q14
Q13
C10
CR8
CR7
R44
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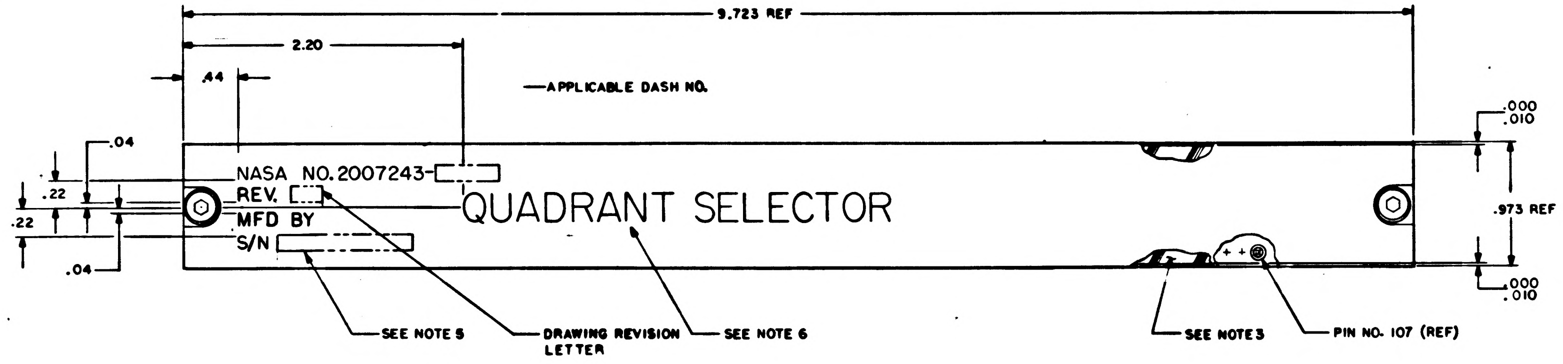
R43 17
R39 20
C9 28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NASA NO. 2007243-
REV.
MFD BY
S/N
QUADRANT SELECTOR
.000
.010
.973 REF
.000
.010
SEE NOTE 5
DRAWING REVISION LETTER
SEE NOTE 6
SEE NOTE 3
PIN NO. 107 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010059	SCHEMATIC	REF
36	2008319	INSULATOR, WASHER	36
10	1008161 – 4	SCREW, CAP SLOTTED HEAD	35
1	2008093 – 001	TERMINAL, THREADED	34
AR	1006776 – 21	INSULATION, SLEEVING	33
6	2007144	AMPLIFIER, OPERATIONAL	32
36	1010343 – 3	TRANSISTOR	31
18	1010385	DIODE	30
18	1006755 – 79	CAPACITOR	29
6	1006755 – 14	CAPACITOR	28
2	1010733 – 12	RESISTOR	27
2	1010377 – 313	RESISTOR	26
2	1010377 – 311	RESISTOR	25
2	1010377 – 310	RESISTOR	24
4	1010377 – 309	RESISTOR	23
2	1010377 – 308	RESISTOR	22
16	1010377 – 307	RESISTOR	21
2	1010377 – 306	RESISTOR	20
2	1010377 – 334	RESISTOR	19
18	1006750 – 60	RESISTOR	18
18	1006750 – 56	RESISTOR	17
18	1006750 – 44	RESISTOR	16
18	1006750 – 36	RESISTOR	15
2	1006750 – 1	RESISTOR	14
AR	1006776 – 22	INSULATION, SLEEVING	13
AR	1006757 – 1	WIRE, ELECTRICAL	12
AR	1006757 – 8	WIRE, ELECTRICAL	11
18	1008025 – 1	INSULATOR, BUSHING	10
1	2008312	WIRING BOARD (D)	9
1	2008310	WIRING BOARD (C)	8
1	2008308	WIRING BOARD (B)	7
1	2008306	WIRING BOARD (A)	6
2	MS16633 – 4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546 – 3	WASHER, FLAT	4
2	1004546 – 1	WASHER, FLAT	3
2	1004579 – 1	SCREW, JACKING	2
1	2007207 – 011	HEADER HOUSING ASSEMBLY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007222	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 5/21/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

QUADRANT SELECTOR
ASSEMBLY
CDU ELECTRONICS

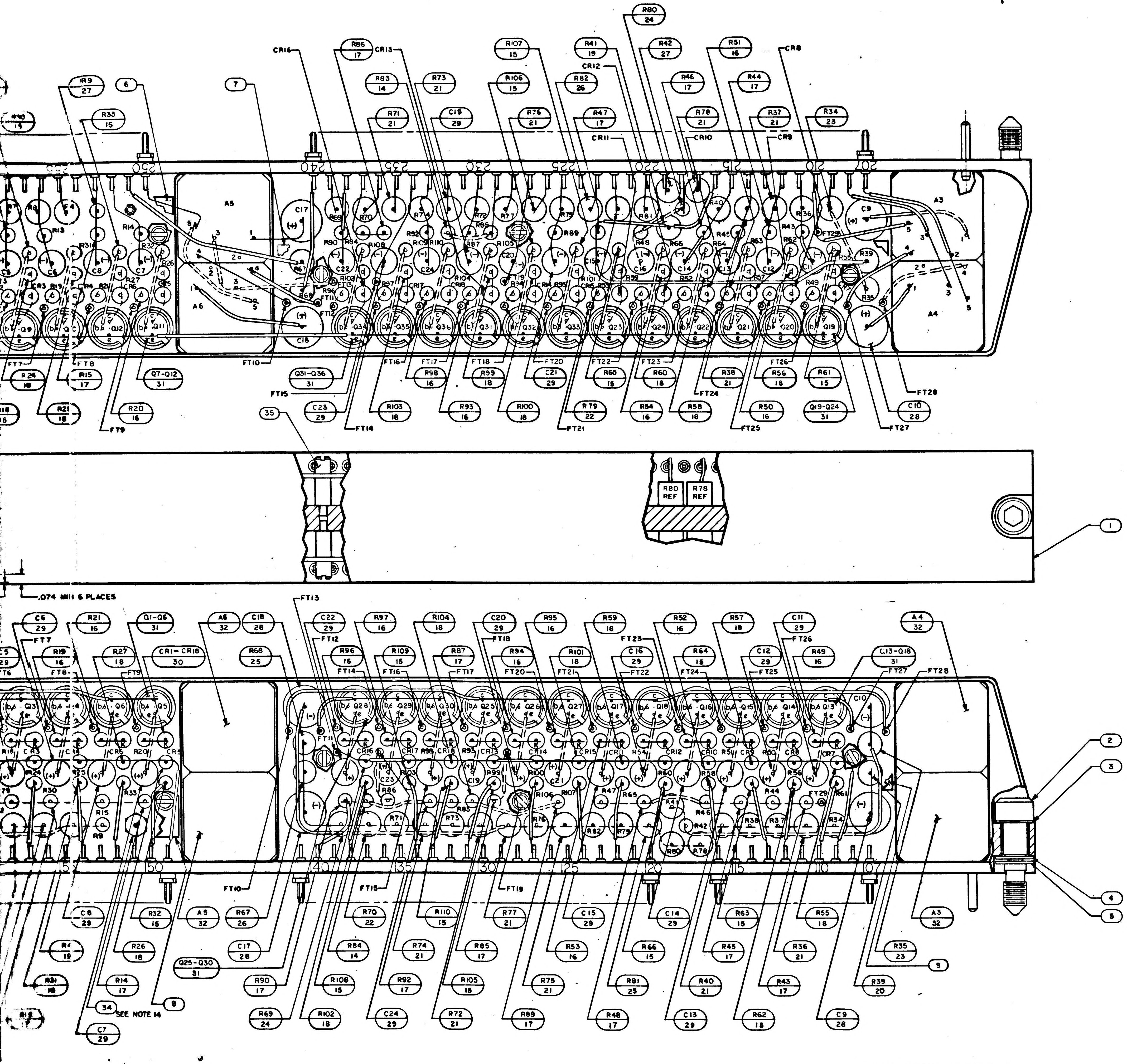
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2007243
SCALE 4/1
WT
SHEET 1 OF 1

2007243

3.H

MASTER

E3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Q19-Q24 31
Q25-Q30 31
Q31-Q36 31
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C17 28
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C9 28
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R69 24
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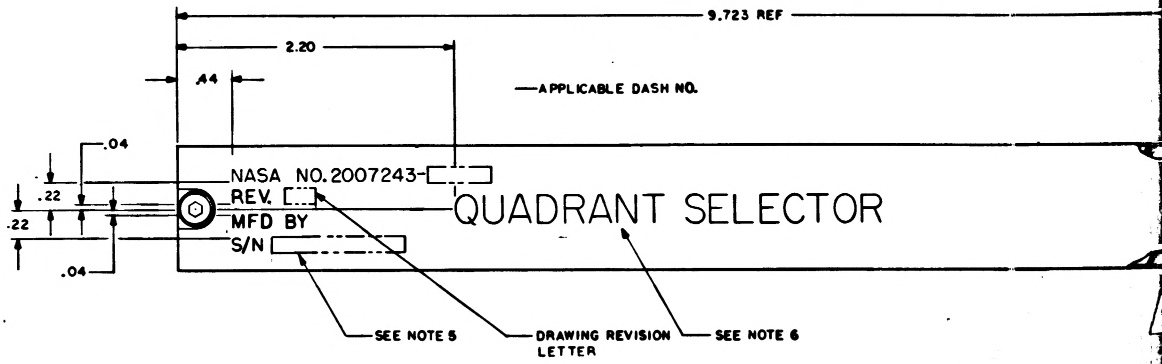
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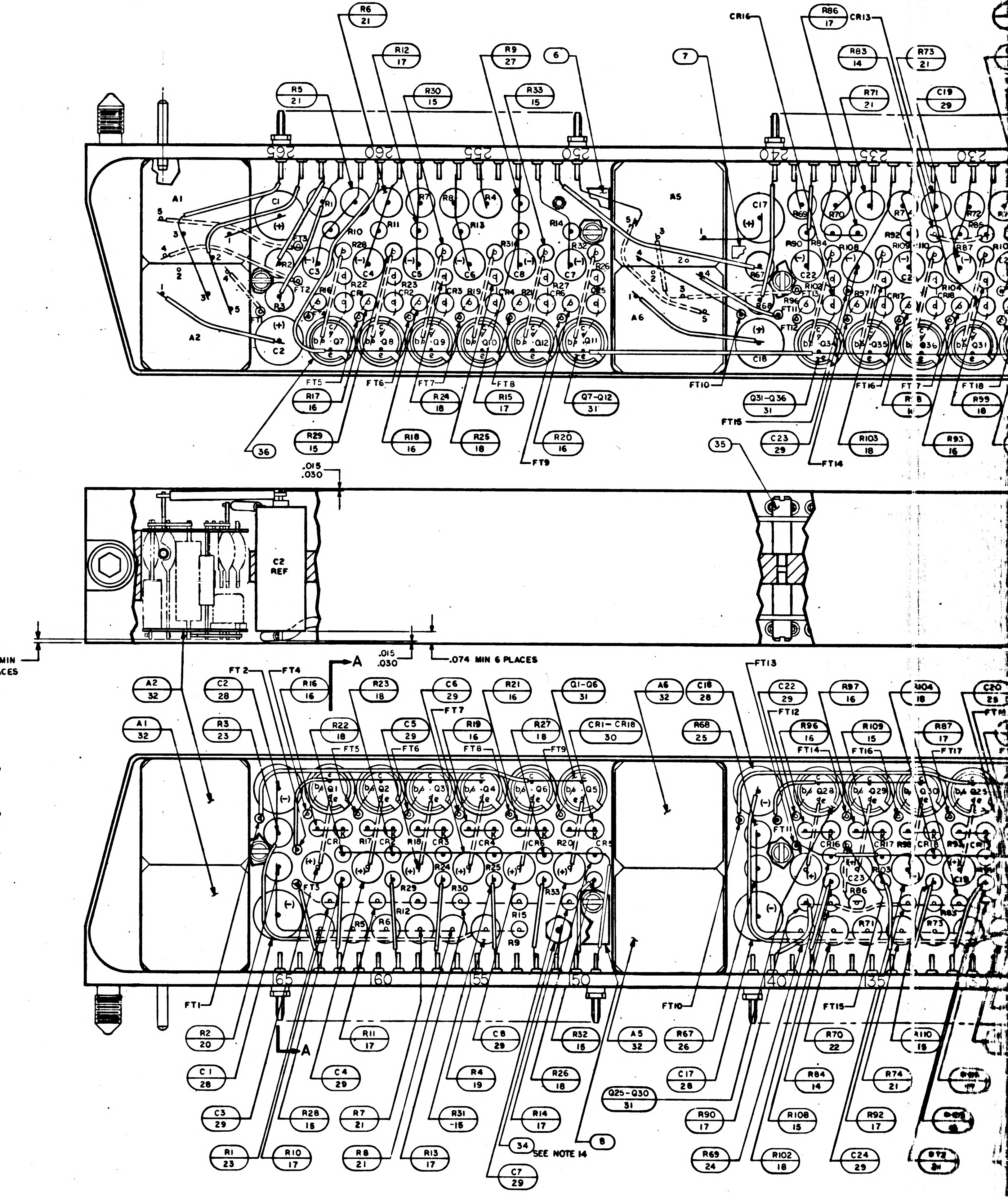
APPLICABLE DASH NO.
NASA NO. 2007243-
REV.
MFD BY
S/N
QUADRANT SELECTOR
SEE NOTE 5
DRAWING REVISION LETTER
SEE NOTE 6

MARKING VIEW
SCALE 2/1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO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Q36
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R28
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R90
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R108
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R92
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SEE NOTE 14
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R102
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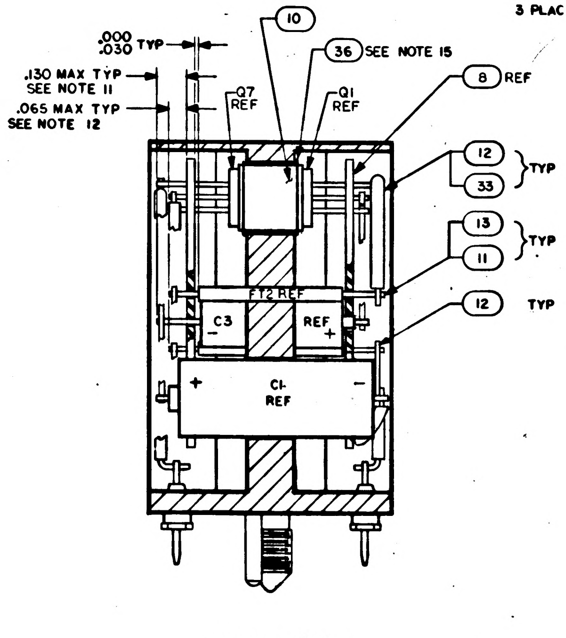
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SEE NOTE 11
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SEE NOTE 12
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33
TYP
13
11
TYP
12
TYP
FT2 REF
C3
REF
C1
REF

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND 1002005
3. ENCAPSULATE PER ND 1002002 BLACK. REMOVE ALL FLASHING
4. STAKE ALL COMPONENTS PER ND 1002009 METHOD C OR D
5. MARK .10/.08 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
6. MARK .26/.24 HIGH WHITE CHARACTERS PER ND 1002019 AND ND 1002122 TYPE II CLASS 2 USING INK 1006271-1
7. AR DENOTES AS REQUIRED
8. FT DENOTES FEED THRU
9. K DENOTES CATHODE SIDE OF DIODE
10. + DENOTES POSITIVE SIDE OF CAPACITOR
11. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
12. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
13. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND 1002069
14. MOUNTING TORQUE FOR FIND NO. 34 TO BE 15 TO 20 INCH OUNCES
15. BOND FIND NO. 36 TO FIND NO. 1 PER ND 1002004 TYPE I
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF RS.2007243

2007243

APOLLO G&C Specification
PS2007243 REV -
Original Issue Date: 19 OCT 1965
Release Authority: TDRR 23336
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

QUADRANT SELECTOR ASSEMBLY

DRAWING NO. 2007243

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 14 inclusive.

APPROVALS	NASA/MSC	W Kupfer 19 Oct 65 G T Cushman MIT/IL	D. Grassell R. Mura ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

3. REQUIREMENTS

3.1 Performance

3.1.1 Inputs. The assembly shall function as specified herein with the following inputs:

a. 28±4 vdc
b. 0-6V rms, 800±8 cps sine wave
c. 4.0±0.1 vdc, 4KΩ ± 10% source impedance

3.1.2 Characteristics

3.1.2.1 Gain. The gain of each amplifier shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the outputs at pins 237 and 229 shall be within ±5 percent of the nominal values, the outputs of pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the outputs at pins 261 and 211 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase.

3.1.2.2 Gain Stability. The amplifier gains under the conditions specified in Table II shall be within ±0.5 percent of the corresponding gain values determined under the conditions specified in Table I when dc supply voltages are 24.0±0.5 vdc and 32.0±0.5 vdc and when the input signal level is 2.5±0.1V rms.

3.1.2.3 Gain Linearity. The gain linearity of each amplifier input specified in Table II at 1.0, 3.5 and 5.0V rms input shall be within ±0.05 percent of the gain obtained at an input of 2.5±0.1V rms.

3.1.2.4 Phase Shift. The output phase shift of each amplifier at the output levels specified in 3.1.2.3 shall be as specified in Table I.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawings 2007243 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. - The maximum weight of the assembly shall be 0.484 lb.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Insulation Resistance. The resistance between pin 151 and the remaining assembly pins shall be not less than 100 megohms.

3.2.3.2 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table III.

TABLE III

DC RESISTANCE

PINS		RESISTANCE (OHMS)
From	To	
151	Chassis	≤0.5
264	163	≤0.5
207	210	≤0.5
260	264	≥100 meg
264	207	≥100 meg
250	207	≥ 100 meg

4.2.3 Insulation Resistance. The insulation resistance between pin 151 and the remaining assembly pins shall be greater than 100 megohms when measured in accordance with Method 302 of Standard MIL-STD-202. The megohmmeter used shall have an output voltage of 225±75 vdc limited to a short circuit current of 6.0 μa.

4.2.4 Continuity and DC Resistance. The DC resistance between the points specified in Table III shall be measured in accordance with Method 303 of Standard MIL-STD-202 and shall be as specified in Table III. To assure a good electrical connection to the chassis, the anodizing may be penetrated.

4.2.5 Gain. With 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo), an 800±8 cps input signal adjusted to [illegible] 2.5±0.1V rms [illegible], and a 4.0±0.1 vdc voltage applied and pins connected as specified in Table I, the gain shall be within ±0.03 percent of the nominal values specified in Table I with the exception that the gain at pins 237 and 229 shall be within ±5 percent of the nominal values, the gain at pins 253 and 218 shall be within ±0.2 percent of the nominal values, and the gain at pins 261 and 211 shall be within ±0.06 percent of the nominal values during measurements of zero degrees phase.

4.2.6 Gain Stability. With the conditions specified below established, the gains shall be within ±0.5 percent of the corresponding gains obtained in 4.2.5. Under these same conditions, except with a supply voltage of 32.0±0.5 vdc, gains shall again be within ±0.5 percent of the corresponding gains obtained in 4.2.5.

a. A supply voltage of 24.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi) and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An input signal of 2.5±0.1V rms applied to the inputs as specified in Table II.

4.2.7 Gain Linearity and Phase Shift. With the conditions specified below established, the gain shall be within ±0.5 percent of the corresponding gain obtained in 4.2.5 and the phase shift shall be within the corresponding phase tolerance specified in Table I.

a. 28.0±0.5 vdc applied to pins 265, 208, 149 and 109 (Hi), and 163, 210, 260, 250 and 140 (Lo).

b. 4.0±0.1 vdc applied to the pins specified in Table II.

c. An 800±8 cps signal of 1, 2.5, and 5V rms applied to the inputs, specified in Table II. [illegible]

4.2.8 **Weight.** The assembly shall be weighed to determine that the weight of the assembly is less than 0.464 lb.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

JD:efo

APOLLO G&N Specification
PS2007244 REV-A
Original Issue Date: 14 JUNE 1966
Release Authority: TDRR 29567
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

120V PIPA SUPPLY (OP) ASSEMBLY SIGNAL CONDITIONER ASSEMBLY

DRAWING NO. 2007244

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/22/66	A	31231	3, 9	MGM EA	—

This specification consists of page 1 to 10 inclusive.

APPROVALS	A. C. METZGER	RmKowalski 7 June 66	M G Hurley 6-14-66	G W Krier	G.C. Hamren
	NASA/MSC	MIT/IL		ACSP	

4.3.3 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be ≥100 megohms.

4.3.4 Continuity and DC Resistance. The dc resistance between the pins listed in Table I shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.5 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.2.3 has been met.

4.3.6 DC Current Drain. With the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 9.0±3.0 ma.

4.3.7 Reference Current Drain. With the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 25.0 ma.

4.3.8 Offset Voltage. With an input voltage of 110.00±0.10 vdc applied to the input pins of assembly section a as specified in Table II the voltage at the respective output pins shall be less than 250 mvdc.

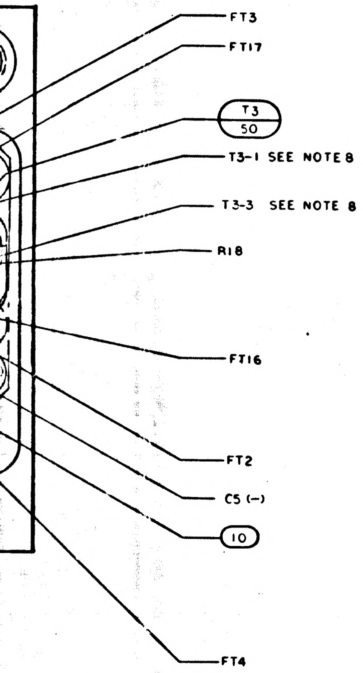
4.3.9 Scale Factor

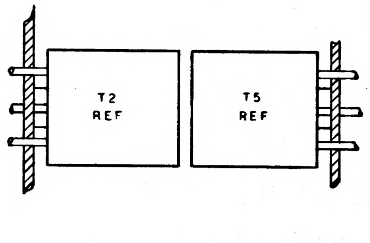
4.3.9.1 Assembly Section a. With the output of assembly section a adjusted to -2.500±0.005 vdc, the input voltage shall be between 80.00 and 90.00 vdc. With the output of assembly section a adjusted to +2.500±0.005 vdc, the input voltage shall be between 130.0 and 140.0 vdc.

4.3.9.2 Assembly Section b. With a 1 megohm load across the output of assembly section b, the output voltage shall be a 800 pps square wave with a minimum amplitude of 25.0V pp. With a 2k ohm load across the output of assembly section b, the output voltage shall be ≥22.0V pp.

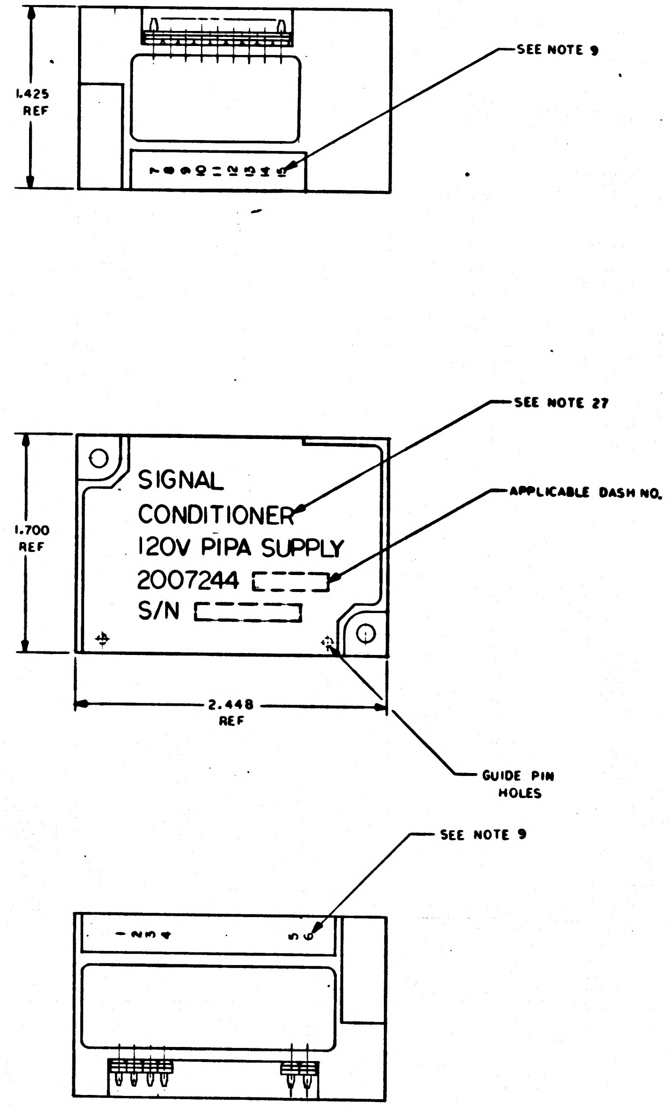
4.3.10 Gain Stability. With the input to assembly section a adjusted for an output of +2.500±0.005 vdc, enhancing or degrading the +28 vdc supply shall not cause the output to deviate by more than ±75 mvdc. Degrading the +28 vdc supply shall not cause the 800 pps square wave output of assembly section b to decrease below 18V pp with a 2k ohm ±2 percent load resistance.

4.3.11 Scale Factor Linearity. With the conditions specified below established for assembly section a, each of four calculated scale factor values shall not deviate from the average of the four values by more than ±4 percent.





PARTIAL SECTION B-B



MARKING VIEWS

SCALE: 2/1

REVISIONS 2850

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DRAWING REVISION A PER TDRR	FLE			

☒	2010128	SCHEMATIC	REF
1	1010357-1	TRANSISTOR	55
1	1008540-2	GASKET, CONNECTOR, MINIATURE	54
1	1008540-4	GASKET, CONNECTOR, MINIATURE	53
1	1008540-9	GASKET, CONNECTOR, MINIATURE	52
2	1010274	TRANSFORMER	51
2	1010365	TRANSFORMER	50
2	1010710	TRANSFORMER	49
1	1010397-1	TRANSISTOR	48
1	1010342	TRANSISTOR	47
4	1010367	CHOPPER	46
3	1010385	DIODE	45
2	1010259-000	DIODE	44
2	1010372-12	DIODE	43
1	1010837-001	DIODE	42
1	1006777-31	CAPACITOR	41
2	1010279-16	CAPACITOR	40
1	1010279-104	CAPACITOR	39
1	1006755-33	CAPACITOR	38
2	1006755-132	CAPACITOR	37
1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
1	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-41	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-5	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011		LIST OF MATERIALS	

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN F.L. Eckert
CHECKED
APPROVED 2 MAY 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

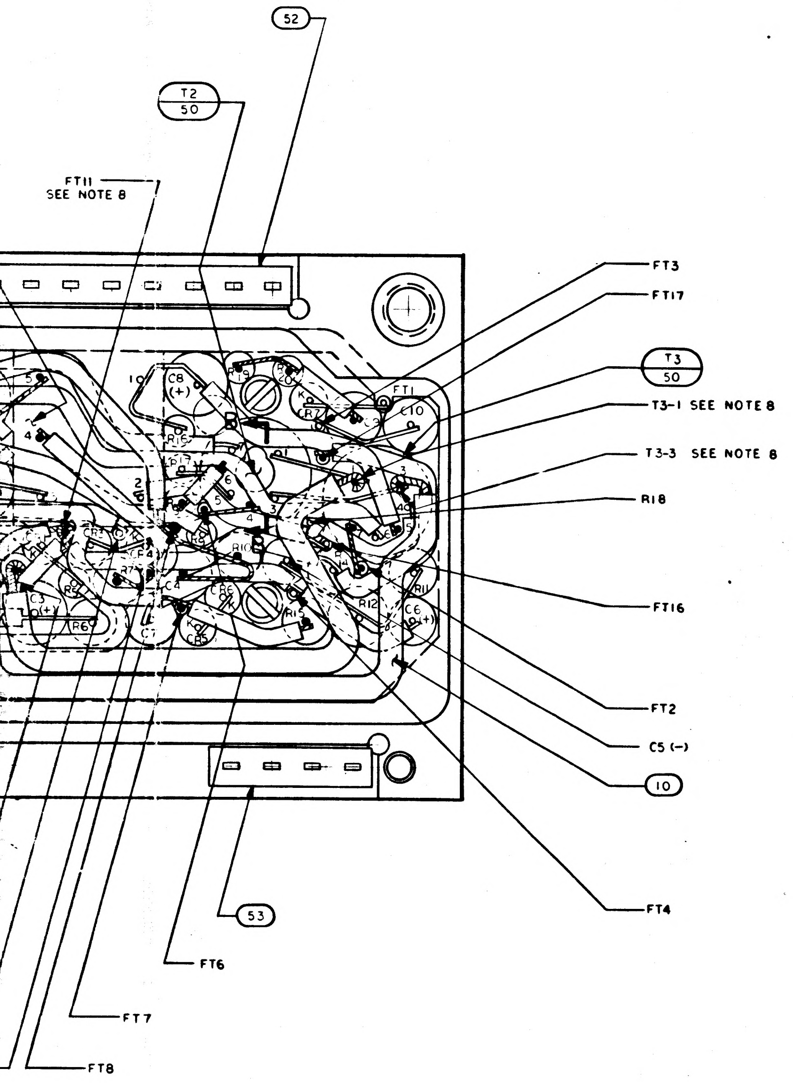
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V PIPA SUPPLY (OP)
ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007244
SCAL 5/1
SHEET 1 OF 1

2007244 B

SYM	ZONE	DESCRIPTION	DR	CHK
B		REPLACES WORD DRAWING REVISION A PER TDRR		



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SEE NOTE 8
FT3
FT17
T3
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T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
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FT16
FT2
C5 (-)
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FT4
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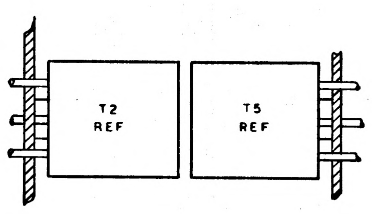
FT6
FT7
FT8
C8 (+)
C10
FT1



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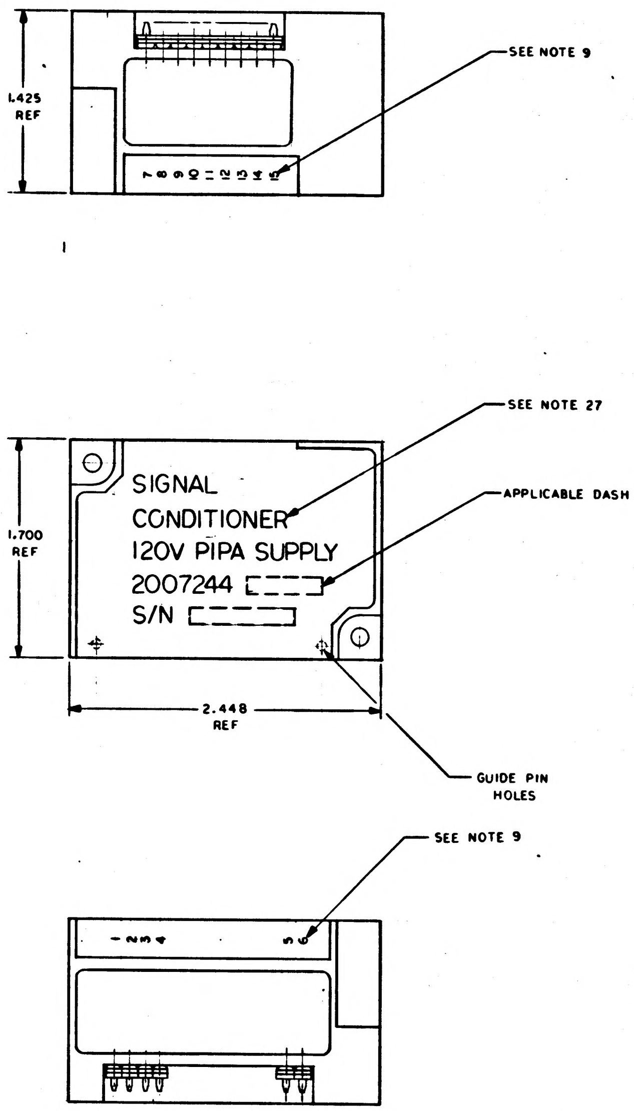
REF

PARTIAL SECTION B-B



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SEE NOTE 9
SEE NOTE 27
APPLICABLE DASH NO.
SIGNAL
CONDITIONER
120V PIPA SUPPLY
2007244
S/N
1.700
REF
2.448
REF
GUIDE PIN
HOLES
SEE NOTE 9

MARKING VIEWS
SCALE: 2/1

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2	1010259-000	DIODE
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1	1010837-001	DIODE
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1	1010364-443	RESISTOR
1	1010364-501	RESISTOR
2	1010364-411	RESISTOR
1	1010364-471	RESISTOR
1	1010377-103	RESISTOR
1	1010377-20	RESISTOR
2	1006750-41	RESISTOR
1	1006750-8	RESISTOR
2	1006750-56	RESISTOR
1	1006750-65	RESISTOR
2	1006750-36	RESISTOR
2	1006750-32	RESISTOR
4	1006750-1	RESISTOR
1	1006750-38	RESISTOR
1	1006750-47	RESISTOR
1	2008093-000	TERMINAL, THREADED
AR	1006776-19	INSULATION, SLEEVING
AR	1006776-21	INSULATION, SLEEVING
AR	1006776-20	INSULATION, SLEEVING
AR	1010807-17	WIRE, ELECTRICAL
AR	1006757-1	WIRE, ELECTRICAL
AR	1010848-2	WIRE, ELECTRICAL, INSULATED
3	1015135-015	SPACER, NYLON
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECI
1	2008497	WIRING BOARD B
1	2008527	WIRING BOARD A
15	1006782-5	CONTACT, WRAPOST MALE, MINIAT
15	1006775	INSULATOR, WRAPOST MALE, MINI
1	2008528	FRAME

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007234	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

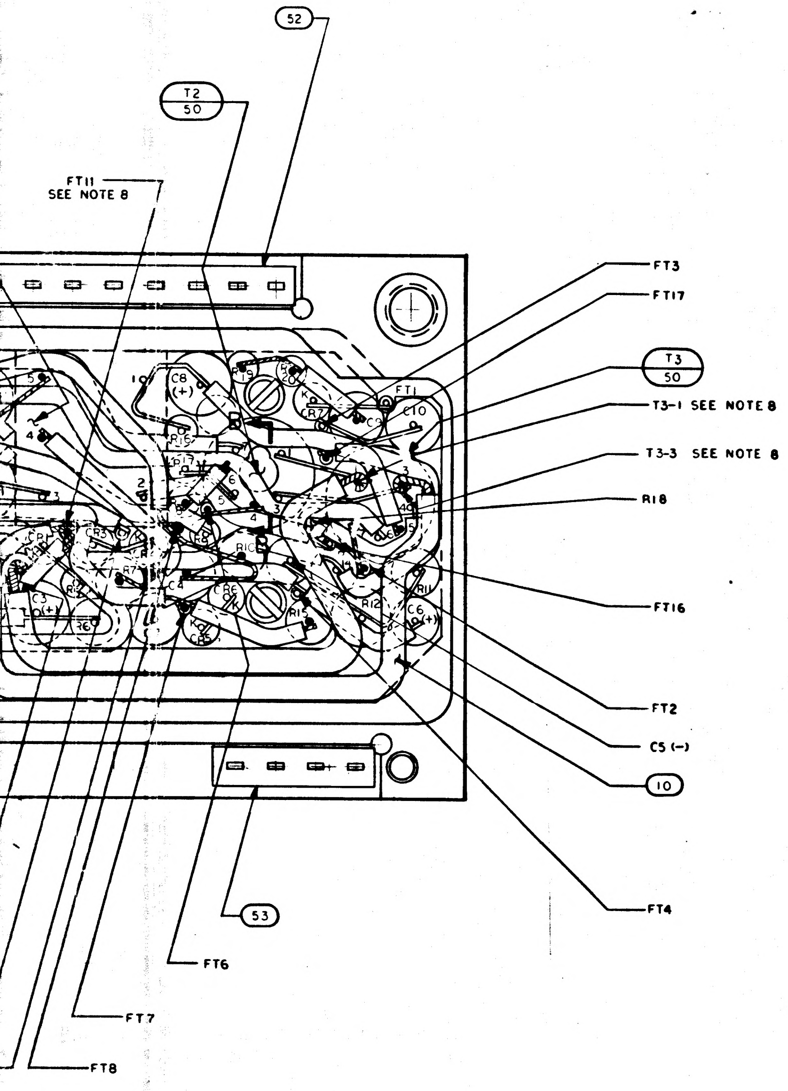
DRAWN
CHECKED
APPROVED 2 MAY 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CE
HOUSTON, TEXAS

120V PIPA SUPP
ASSEMBLY
SIGNAL CONDITIONER A

CODE IDENT NO. 80230 J
2007
SCALE 5/1

SYM	ZONE	DESCRIPTION	DR	CHK
B		REPLACES WORD DRAWING REVISION A PER TDRP		



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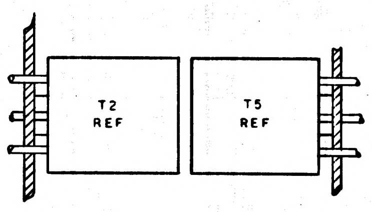
T2
50
FT11
SEE NOTE 8
FT3
FT17
T3
50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
FT2
C5 (−)
10
53
FT4
FT6
FT7
FT8
C8
(+)
R15
C4
R11
R12
C6
C10



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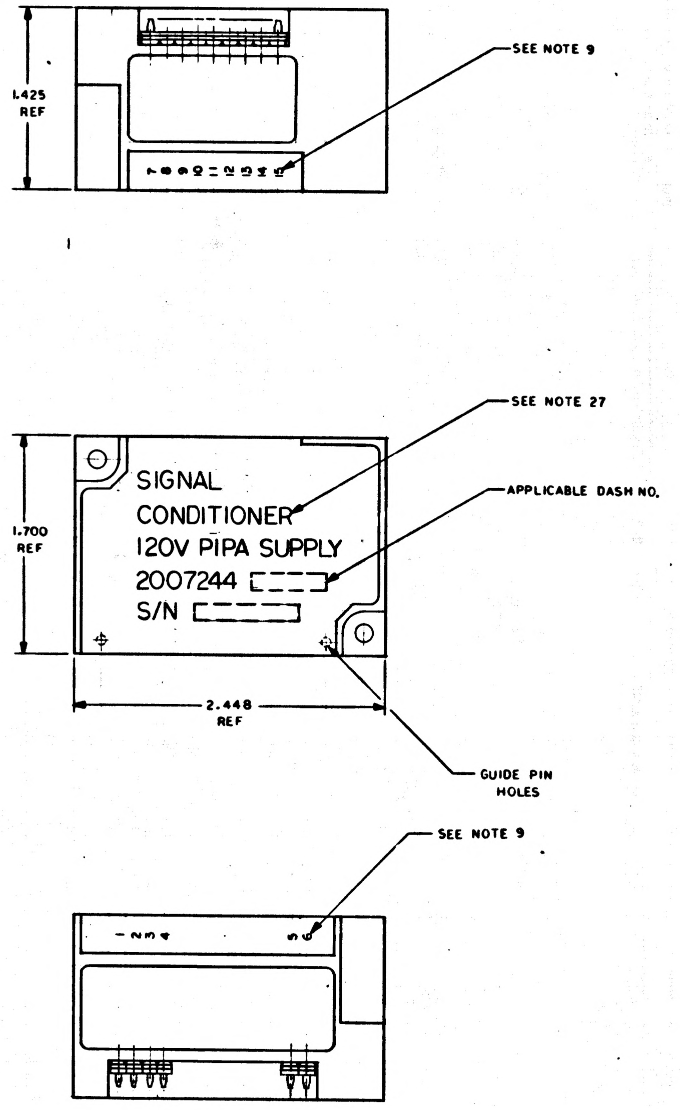
REF
T5
REF

PARTIAL SECTION B-B



1.425
REF
SEE NOTE 9
SEE NOTE 27
SIGNAL
CONDITIONER
120V PIPA SUPPLY
2007244
S/N
APPLICABLE DASH NO.
1.700
REF
2.448
REF
GUIDE PIN
HOLES
SEE NOTE 9

MARKING VIEWS

SCALE: 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
☒	2010128	SCHEMATIC
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1	1008540-9	GASKET, CONNECTOR, MINIATURE
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2	1010365	TRANSFORMER
2	1010710	TRANSFORMER
1	1010397-1	TRANSISTOR
1	1010342	TRANSISTOR
4	1010367	CHOPPER
3	1010[illegible]85	DIODE
2	1010259-000	DIODE
2	1010372-12	DIODE
1	1010837-001	DIODE
1	1006777-31	CAPACITOR
2	1010279-16	CAPACITOR
1	1010279-104	CAPACITOR
1	1006755-33	CAPACITOR
2	1006755-132	CAPACITOR
1	1006755-79	CAPACITOR
3	1006755-69	CAPACITOR
1	1006755-31	CAPACITOR
1	1006755-130	CAPACITOR
1	1010368-128	RESISTOR
1	1010368-121	RESISTOR
1	1010368-105	RESISTOR
1	1010364-443	RESISTOR
1	1010364-501	RESISTOR
2	1010364-411	RESISTOR
1	1010364-471	RESISTOR
1	1010377-103	RESISTOR
1	1010377-20	RESISTOR
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2	1006750-36	RESISTOR
2	1006750-32	RESISTOR
4	1006750-1	RESISTOR
1	1006750-38	RESISTOR
1	1006750-47	RESISTOR
1	2008093-000	TERMINAL, THREADED
AR	1006776-19	INSULATION, SLEEVING
AR	1006776-21	INSULATION, SLEEVING
AR	1006776-20	INSULATION, SLEEVING
AR	1010807-17	WIRE, ELECTRICAL
AR	1006757-1	WIRE, ELECTRICAL
AR	1010848-2	WIRE, ELECTRICAL, INSULATED
3	1015135-015	SPACER, NYLON
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPEC
1	2008497	WIRING BOARD B
1	2008527	WIRING BOARD A
15	1006782-5	CONTACT, WRAPOST MALE, MINIAT
15	1006775	INSULATOR, WRAPOST MALE, MIN
1	2008528	FRAME
-011		

LIST OF MATERIALS

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CE
HOUSTON, TEXAS

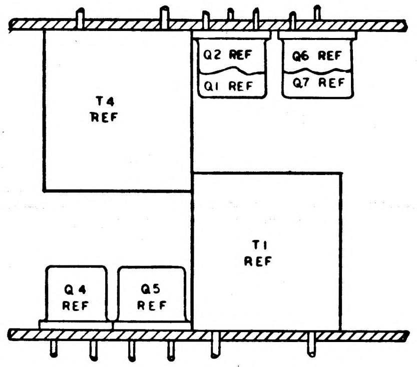
DRAWN	F.L.E. Rest	2 66
CHECKED	Bonaccorgo	66
APPROVED		2 MAY 66
APPROVED		
APPROVED MIT		3 May
APPROVED MSC		DATE

120V PIPA SUPP
ASSEMBL
SIGNAL CONDITIONER

CODE IDENT NO. 80230
SIZE J
2007
SCALE 5/1

2007244 B

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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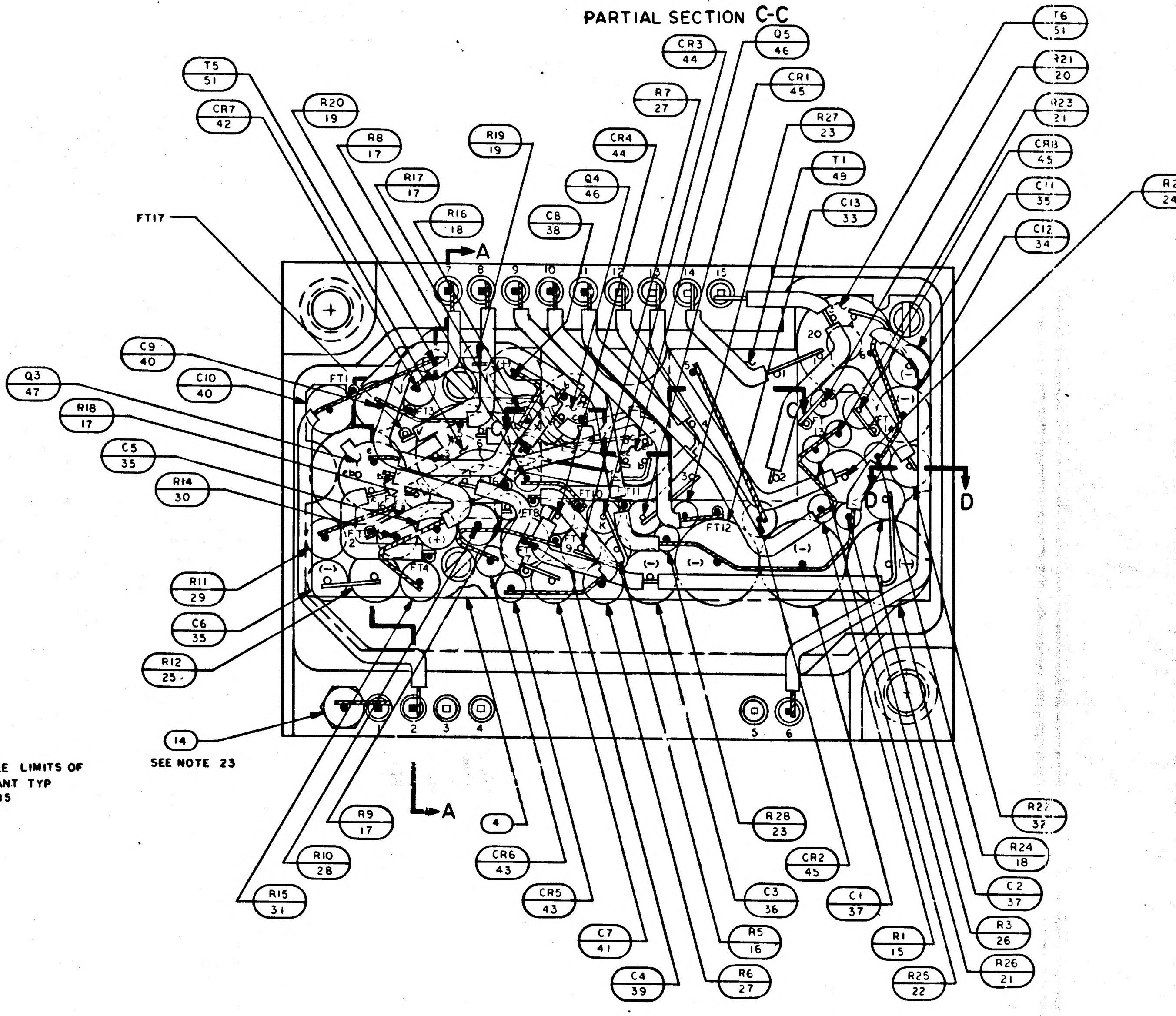
Q1 REF
Q6 REF
Q7 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C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CR8 45
C11 35
C12 34
R2 24
CR3 44
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CR1 45
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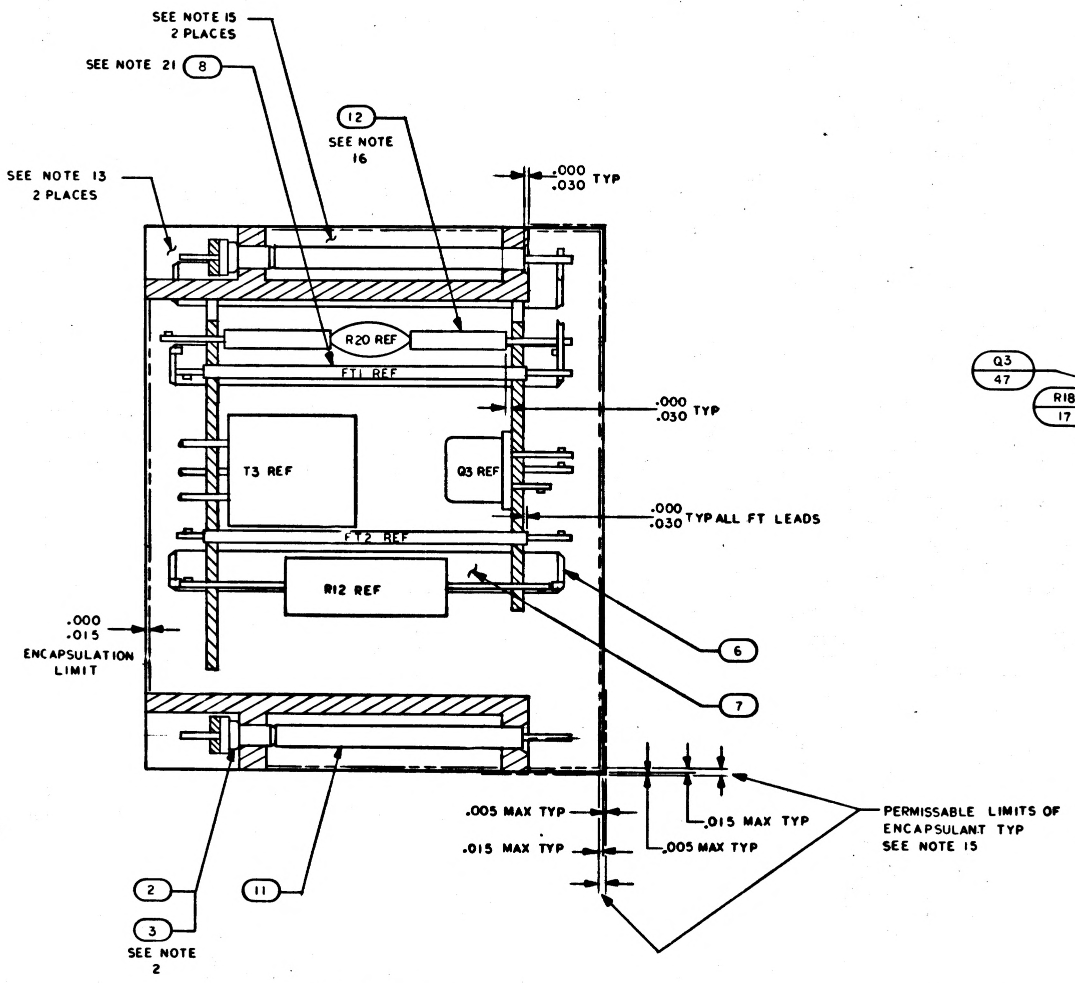
T5 51
CR7 42
R20 19
R7 27
R8 17
R19 19
CR4 44
Q4 46
R17 17
R16 18
C8 38
FT17
A
7 8 9 10 11 12 13 14 15
C9 40
C10 40
Q3 47
R18 17
C5 35
R14 30
FT1
FT3
FT12
FT10
FT11
FT8
FT4
FT13
FT14
D
R11 29
C6 35
R12 25
14
SEE NOTE 23
1 2 3 4
5 6
A
R9 17
R10 28
R15 31
4
CR6 43
CR5 43
C7 41
C4 39
R28 23
CR2 45
C3 36
C1 37
R5 16
R6 27
R1 15
R25 22
R22 32
R24 18
C2 37
R3 26
R26 21

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO.5 TO FIND NO.1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO.4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3, AND T4 TO FIND NO.5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO.14 TO BE 15–20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 PRIMER AND 1008809-4 PAINT. PIN BLADES AND INSULATORS TO BE FREE OF PAINT
25. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE OF POLYURETHANE -
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN


SEE NOTE 15
2 PLACES
SEE NOTE 21
8
12
SEE NOTE 16
SEE NOTE 13
2 PLACES
.000
.030 TYP
R20 REF
FT1 REF
.000
.030 TYP
T3 REF
Q3 REF
FT2 REF
.000
.030 TYP ALL FT LEADS
R12 REF
.000
.015
ENCAPSULATION LIMIT
6
7
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP
PERMISSABLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15
2
3
SEE NOTE 2
11

SECTION A-A

APOLLO G&N Specification
PS2007244 REV B
Original Issue Date: 14 June 1966
Release Authority: TDRR 29567
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

120V PIPA SUPPLY (OP) ASSEMBLY SIGNAL CONDITIONER ASSEMBLY

DRAWING NO. 2007244

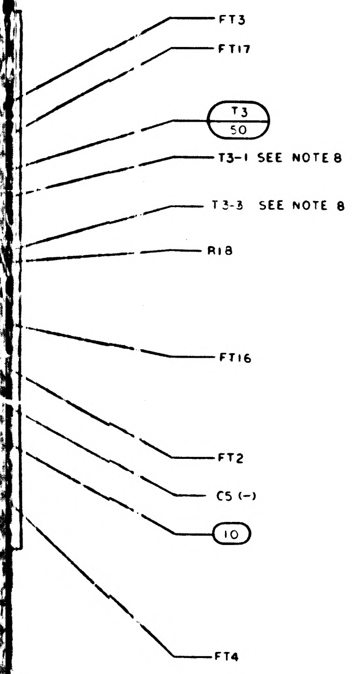
Record of Revisions

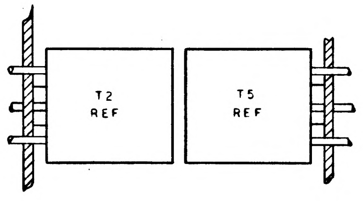
Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
Ⓜ 9/22/66	A	31231	3, 9 RDG/ac	MGM EA	—
2/9/67	B	32944	9 RDG/ac	MGM EA	--

This specification consists of page 1 to 10 inclusive.

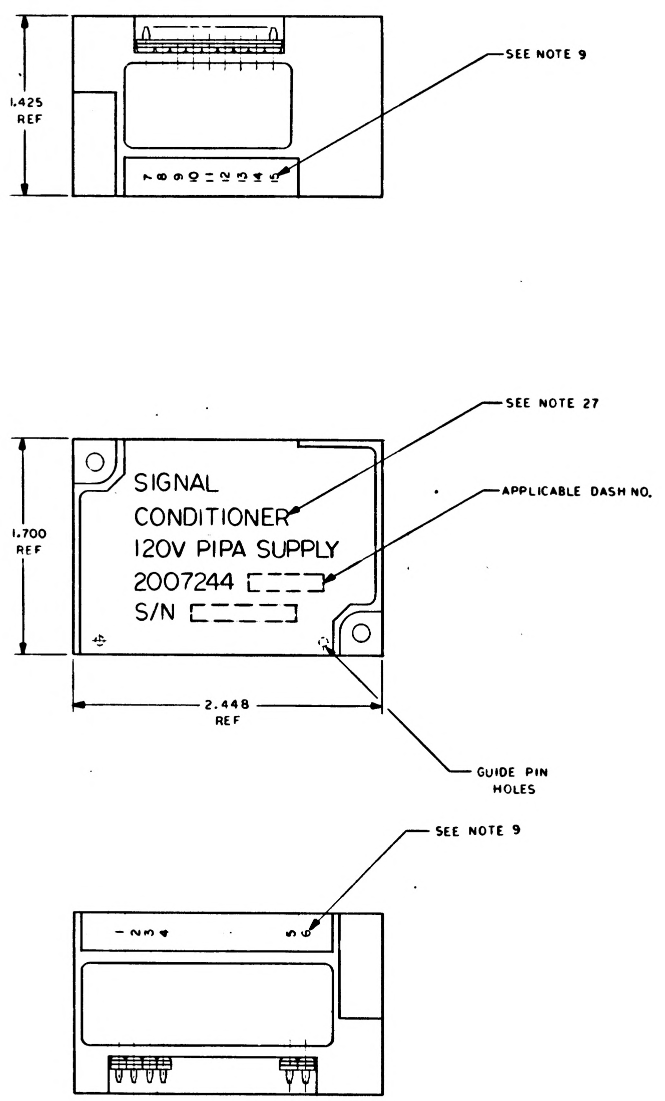
APPROVALS	A. C. METZGER NASA/MSC	RMKowalski 7 June 66	M G Trageser 6-14-66		S H Krier	H C. Hamren
		MIT/IL			ACSP	

REVISIONS 2F510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DRAWING REVISION A PER TDRR				
C		REVISED PER TDRR 29819				





PARTIAL SECTION B-B



MARKING VIEWS
SCALE: 2/1

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1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
1	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-41	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-5	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1
-011	LIST OF MATERIALS		

2007244 C

4H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING

MATERIAL
———

NEXT ASSY	USED ON
2007234	
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 23 Apr 66
CHECKED Bonarrigo 24 Apr 66
APPROVED 2 MAY 66
APPROVED
APPROVED MIT 3 May 66
APPROVED MSC
DATE

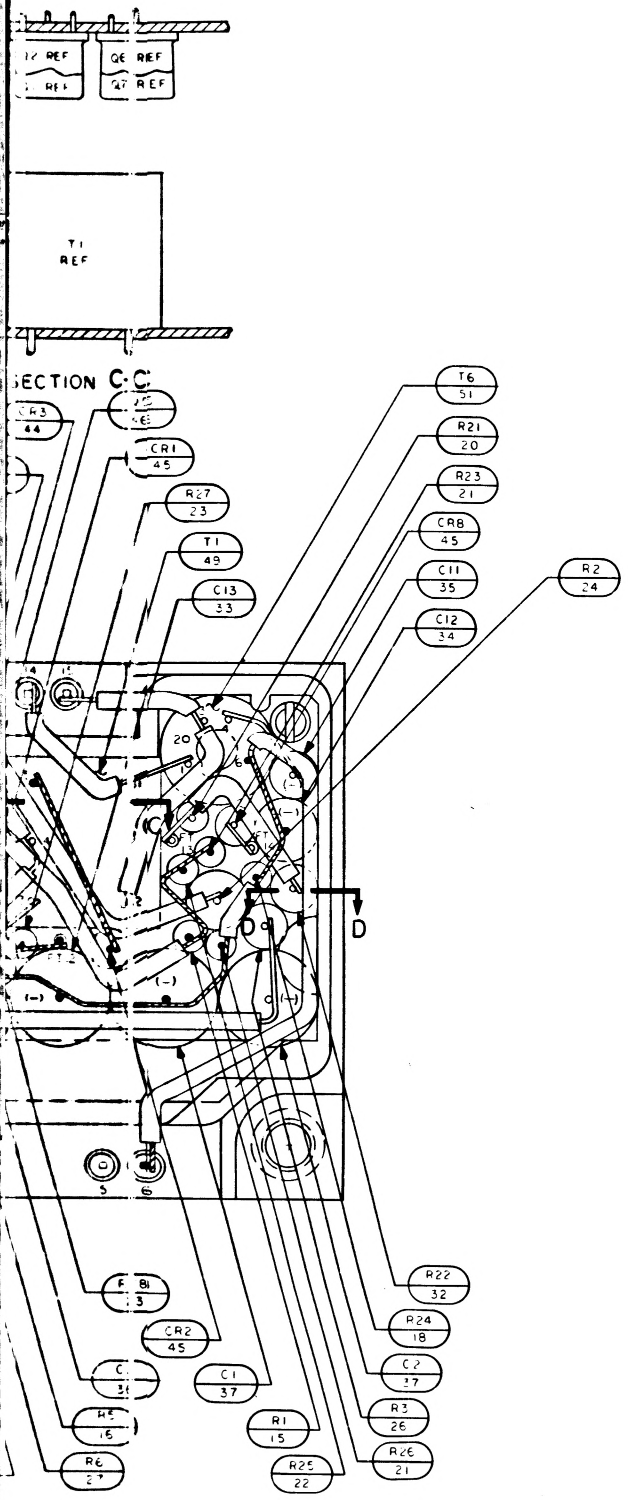
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V PIPA SUPPLY (OP)
ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

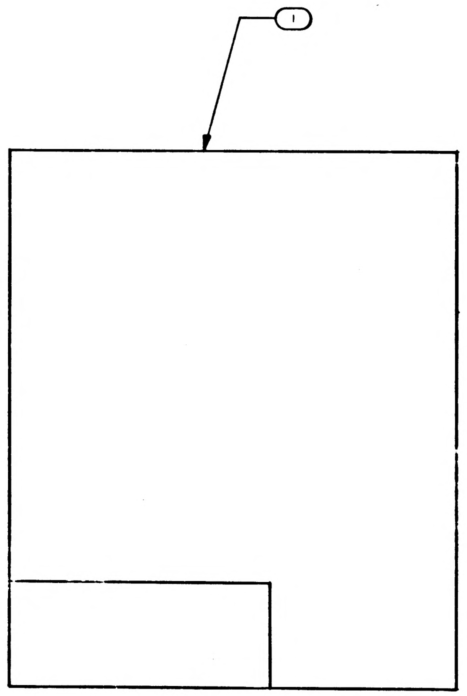
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2007244
SCALE 5/1		SHEET 1 OF 1

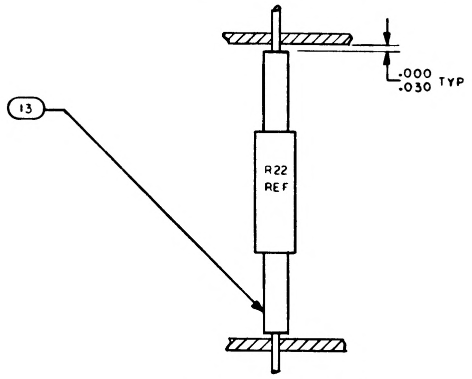
2007244 REV C

372007244


Q? REF
Q? REF
QE REF
Q7 REF
T1 REF
T6 51
R21 20
R23 21
CR8 45
C11 35
C12 34
R2 24
CR1 45
R27 23
T1 49
C13 33
R22 32
R24 18
C2 37
R3 26
R26 21
R25 22
R1 15
C1 37
CR2 45
R6 27
D
3
6

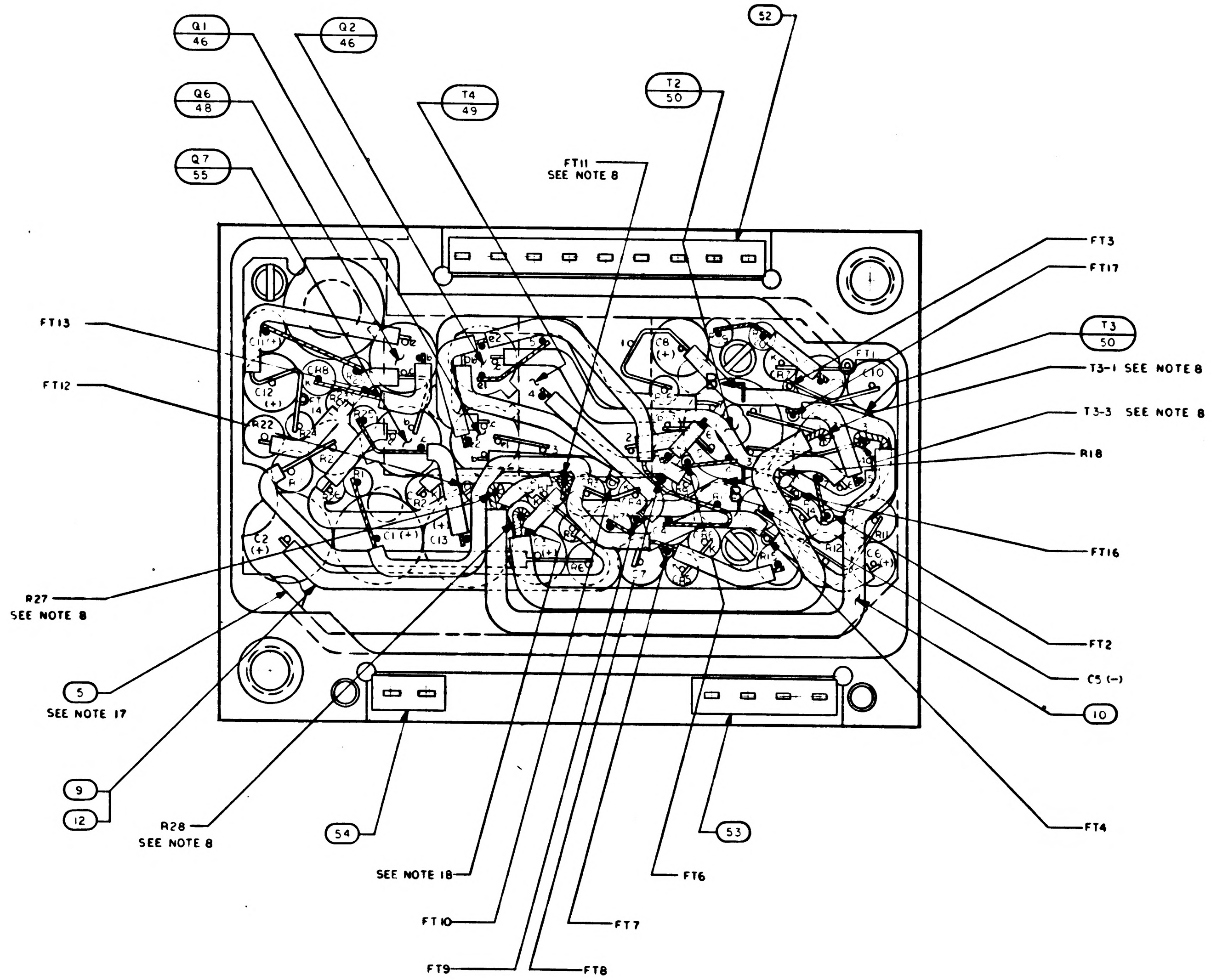
ECTION C-C

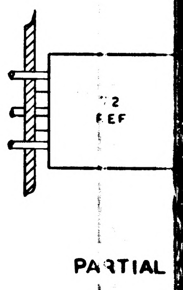



13
R22 REF
.000
.030 TYP

PARTIAL SECTION D-D

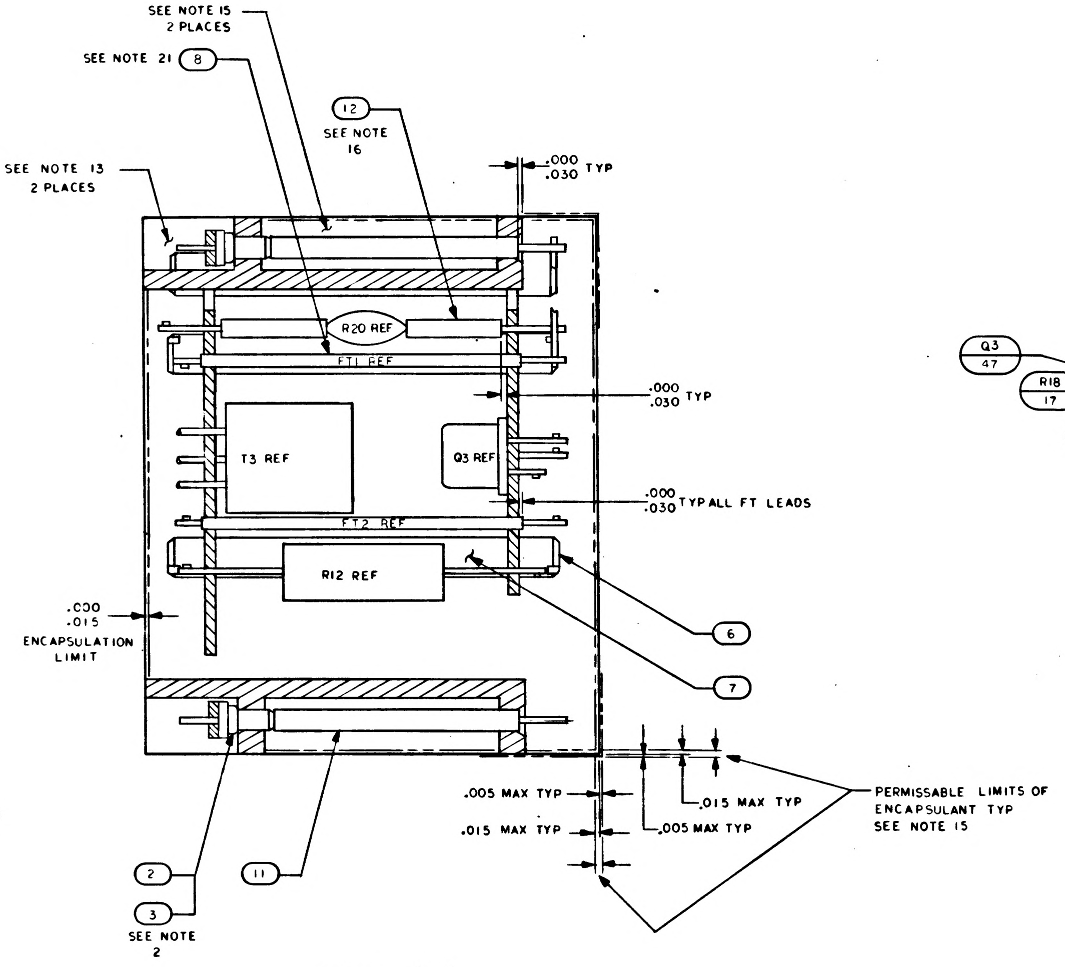
TYPICAL FOR R14, R15, AND R22


Q1 46
Q2 46
Q6 48
Q7 55
T4 49
T2 50
52
FT11 SEE NOTE 8
FT13
FT12
FT3
FT17
T3 50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
FT2
C5 (-)
10
FT4
R27 SEE NOTE 8
5 SEE NOTE 17
9
12
R28 SEE NOTE 8
54
53
SEE NOTE 18
FT10
FT9
FT8
FT7
FT6



PARTIAL

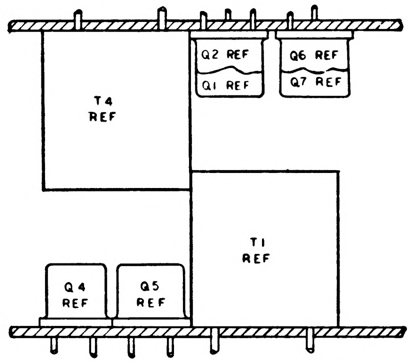
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


SEE NOTE 15
2 PLACES
SEE NOTE 21
8
12
SEE NOTE 16
SEE NOTE 13
2 PLACES
.000
.030 TYP
R20 REF
FT1 REF
.000
.030 TYP
T3 REF
Q3 REF
.000
.030 TYP ALL FT LEADS
FT2 REF
R12 REF
.000
.015
ENCAPSULATION LIMIT
6
7
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP
PERMISSABLE LIMITS OF ENCAPSULANT TYP
SEE NOTE 15
2
3
SEE NOTE 2
11

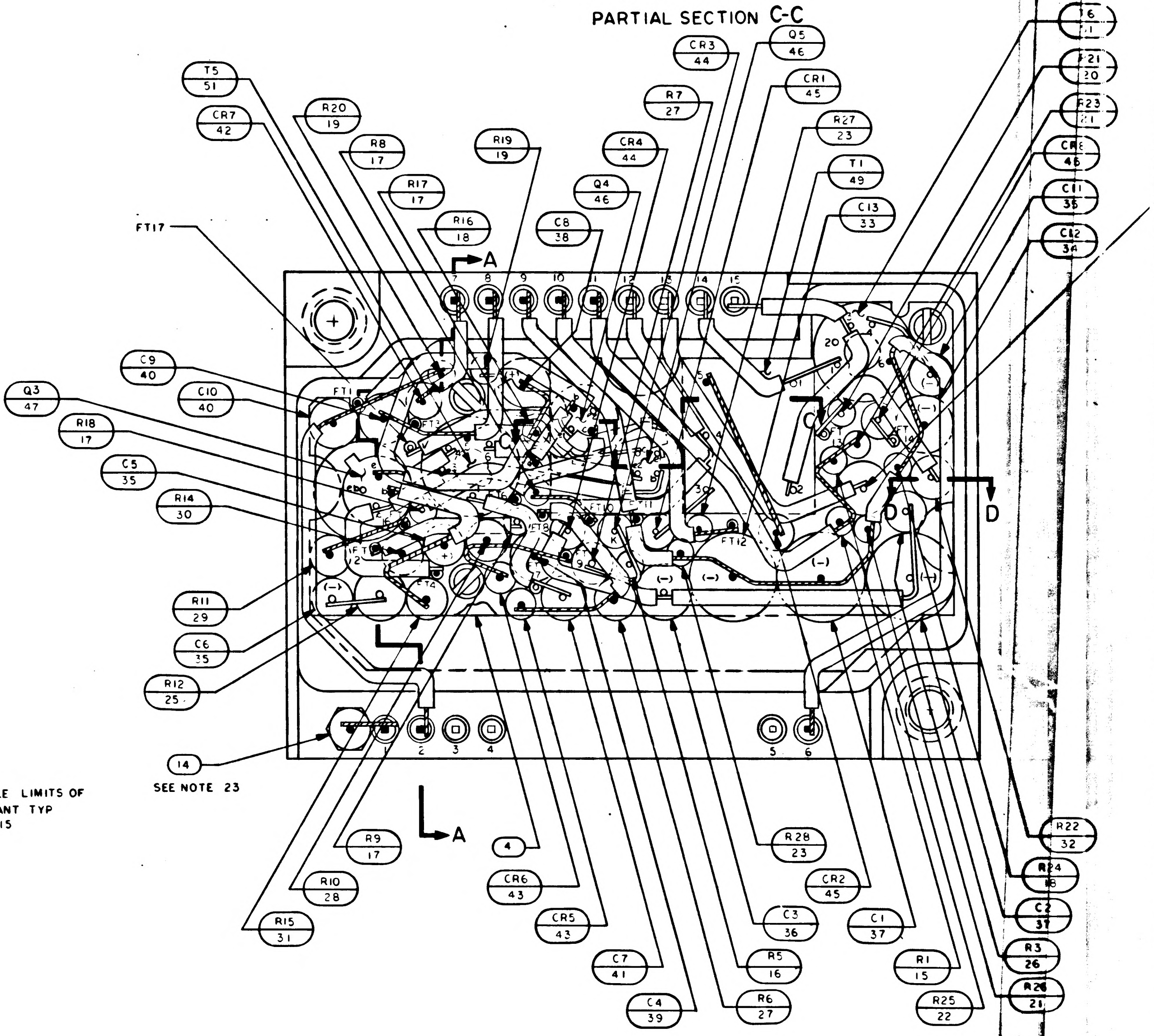
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO. 4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3, AND T4 TO FIND NO. 5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 *USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.*
25. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE OF POLYURETHANE -
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN


T4 REF
Q2 REF
Q1 REF
Q6 REF
Q7 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C


T5 51
CR7 42
R20 19
R8 17
R19 19
R17 17
R16 18
C8 38
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Q4 46
R7 27
CR3 44
Q5 46
CR1 45
R27 23
T1 49
C13 33
T6 51
R21 20
R23 21
CR8 45
C11 35
C12 34
FT17
A
D
C9 40
C10 40
Q3 47
R18 17
C5 35
R14 30
R11 29
C6 35
R12 25
14
SEE NOTE 23
R9 17
R10 28
R15 31
A
4
CR6 43
CR5 43
C7 41
C4 39
R28 23
CR2 45
C3 36
R5 16
R6 27
C1 37
R1 15
R25 22
R22 32
R24 33
C2 37
R3 26
R26 21
2
3
4
5
6
7
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9
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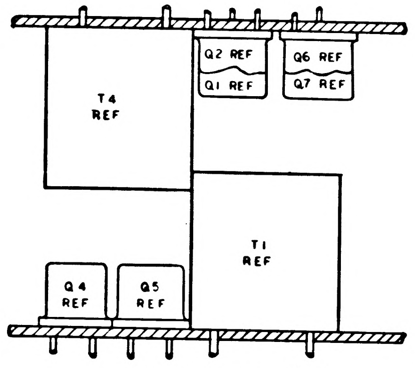
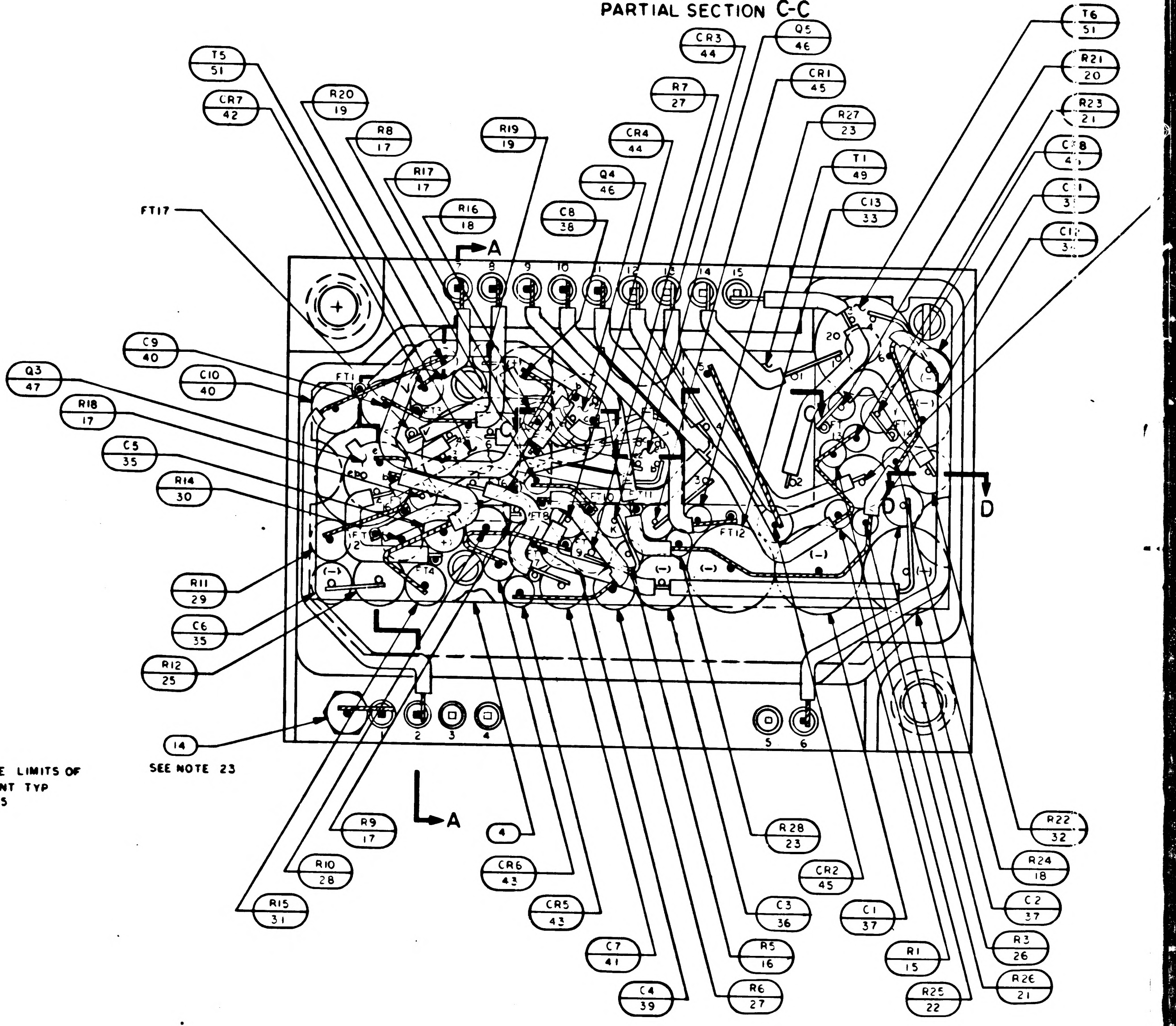
11
12
13
14
15
FT1
FT12
20
K

2007244 REV LTR C

1/2007244


T4 REF
Q2 REF
Q1 REF
Q6 REF
Q7 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C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Q5 46
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CR1 45
R27 23
T1 49
C13 33
T5 51
CR7 42
R20 19
R8 17
R7 27
R19 19
CR4 44
R17 17
Q4 46
R16 18
C8 38
FT17
A
C9 40
C10 40
Q3 47
R18 17
C5 35
R14 30
R11 29
C6 35
R12 25
14
SEE NOTE 23
D
FT1
FT12
FT14
1 2 3 4 5 6
8 9 10 11 12 13 14 15
20
R9 17
R10 28
R15 31
4
CR6 43
CR5 43
C7 41
C4 39
R28 23
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R5 16
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C1 37
R1 15
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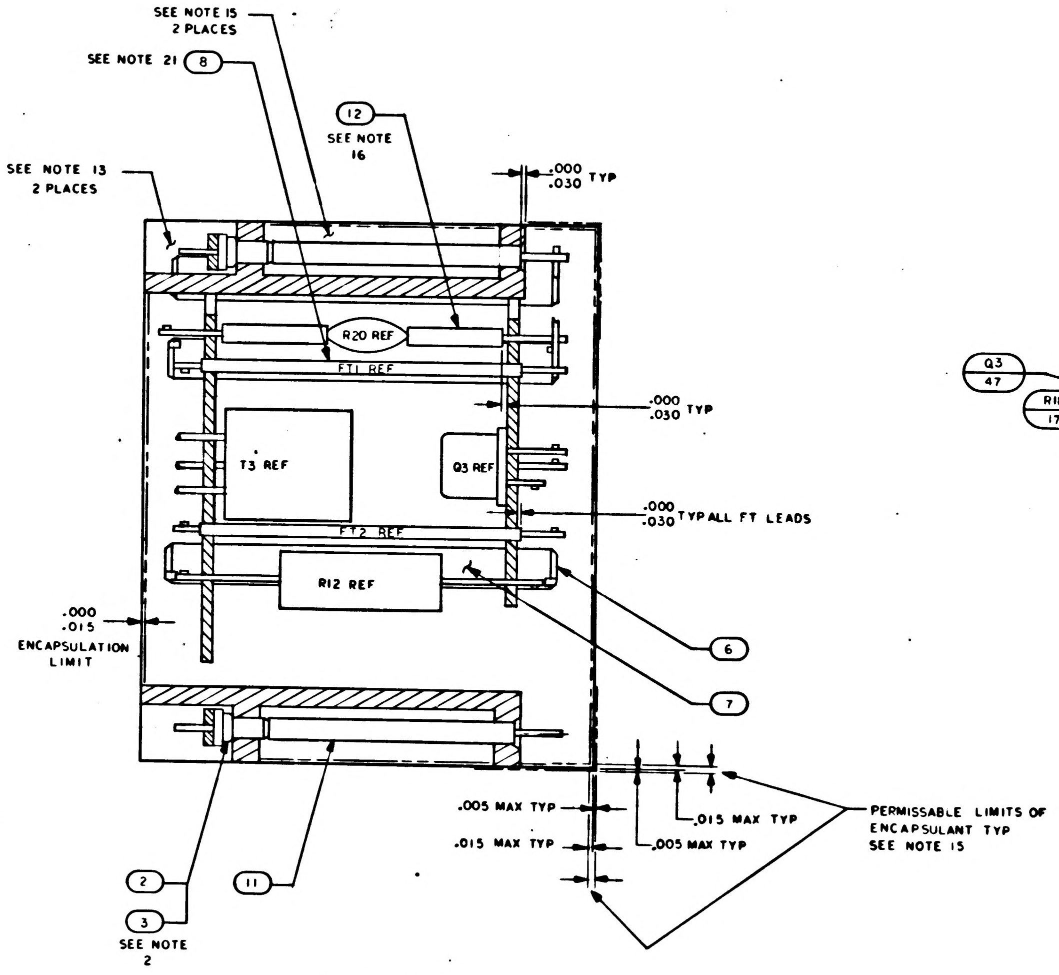
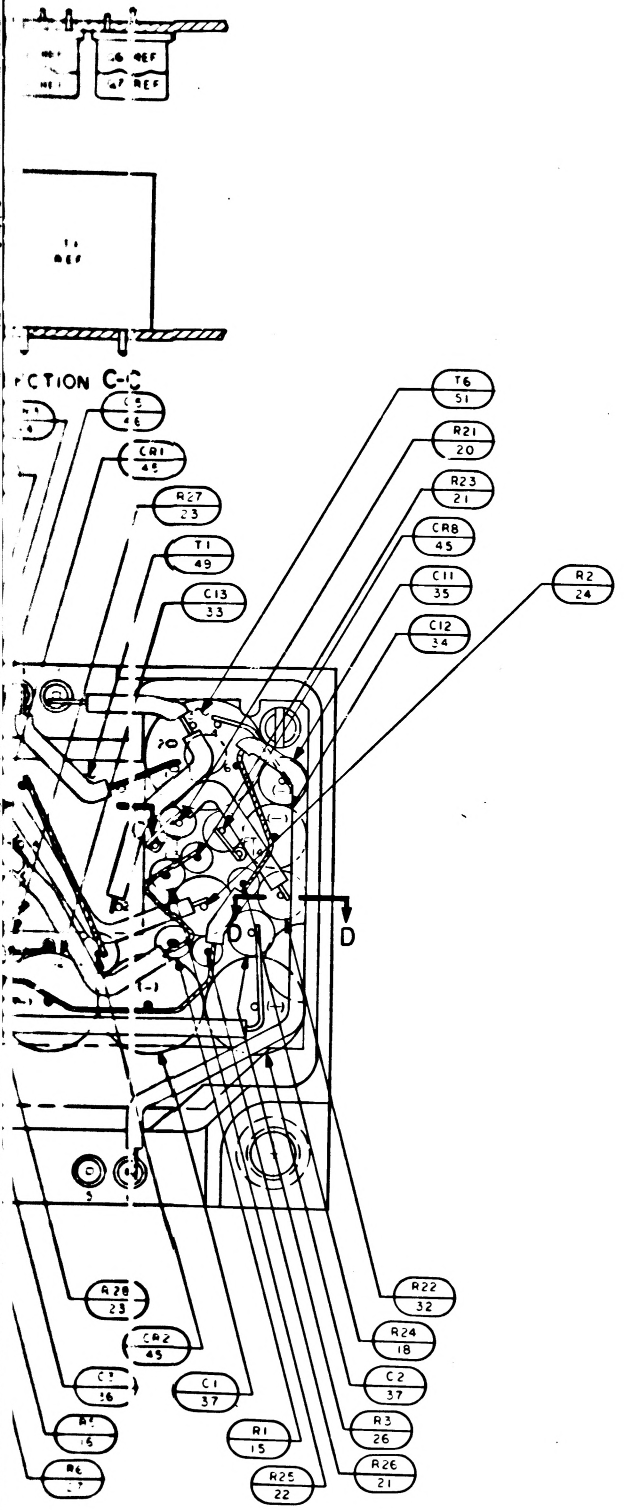
R24 18
C2 37
R3 26
R26 21
A


SEE NOTE 15
2 PLACES
SEE NOTE 21
8
12
SEE NOTE 16
SEE NOTE 13
2 PLACES
.000
.030 TYP
R20 REF
FT1 REF
.000
.030 TYP
T3 REF
Q3 REF
.000
.030 TYP ALL FT LEADS
FT2 REF
R12 REF
.000
.015
ENCAPSULATION LIMIT
6
7
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP
PERMISSABLE LIMITS OF ENCAPSULANT TYP
SEE NOTE 15
2
3
SEE NOTE 2
11

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHUDE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO. 4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3 AND T4 TO FIND NO. 5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
25. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE OF POLYURETHANE -
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN


REF
T1
REF
T6
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R21
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R23
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CR8
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C11
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C12
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R2
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CR1
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R27
23
T1
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C13
33
D
D
R28
23
CR2
45
C1
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R1
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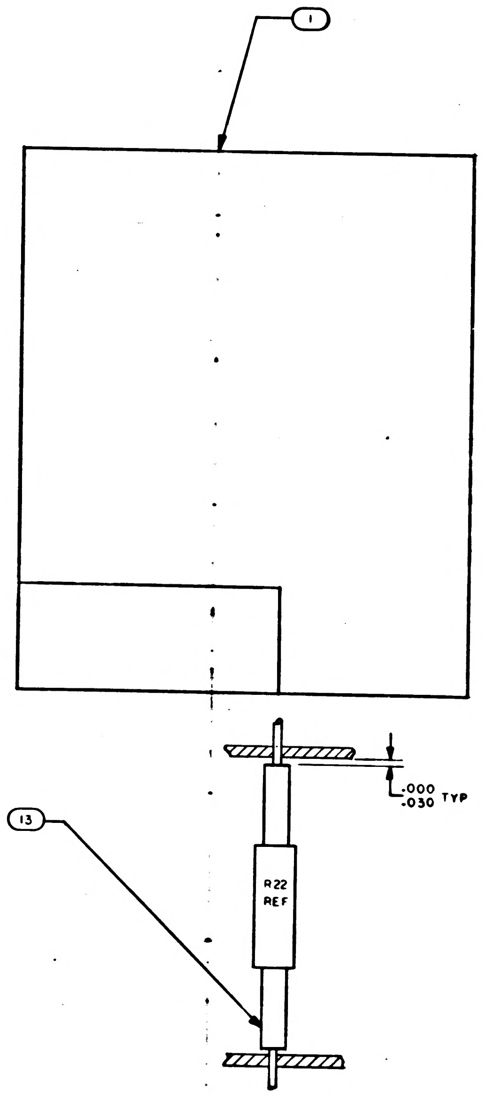
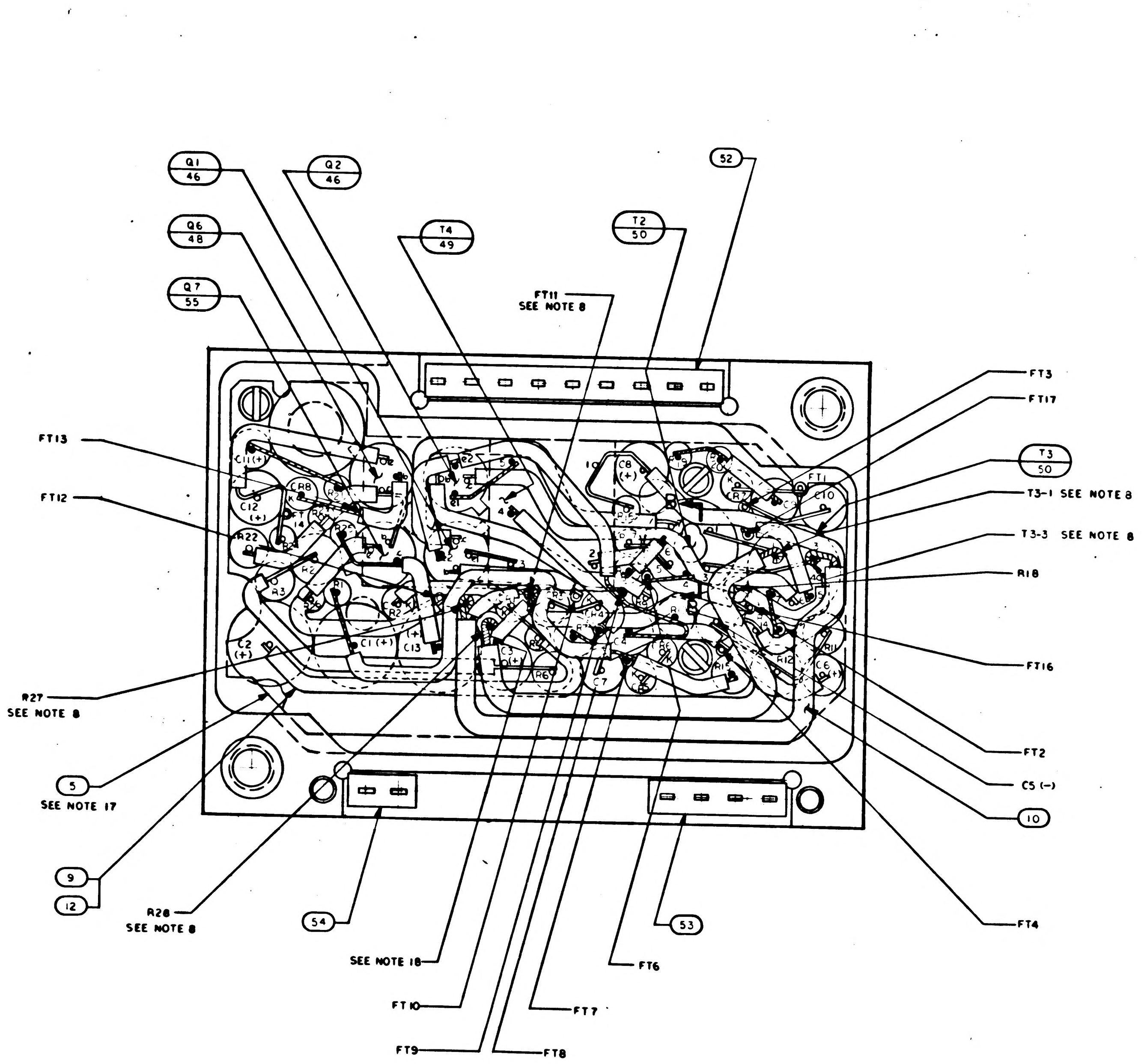
R25
22
R22
32
R24
18
C2
37
R3
26
R26
21

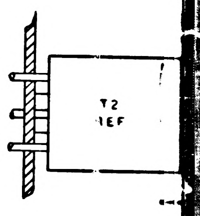
ECTION C-C


1
13
R22
REF
.000
.030 TYP

PARTIAL SECTION D-D

TYPICAL FOR R14, R15, AND R22

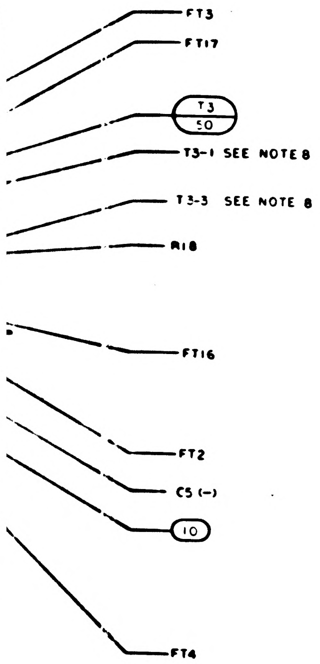

Q1
46
Q2
46
Q6
48
Q7
55
T4
49
T2
50
52
FT11
SEE NOTE 8
FT13
FT12
FT3
FT17
T3
50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
FT2
C5 (−)
10
FT4
R27
SEE NOTE 8
5
SEE NOTE 17
9
12
R28
SEE NOTE 8
54
53
SEE NOTE 18
FT10
FT9
FT8
FT7
FT6
C11(+)
C12
(+)
R22
R3
C2
(+)
CR8
C1 (+)
C13
C8
(+)
FT1
C10
C3
R6
C7
C4
R15
R12
R11
C6
(+)

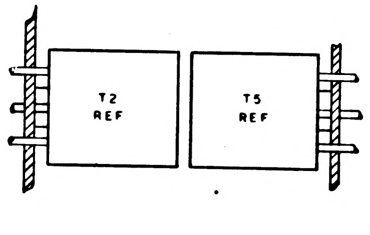


PARTIAL

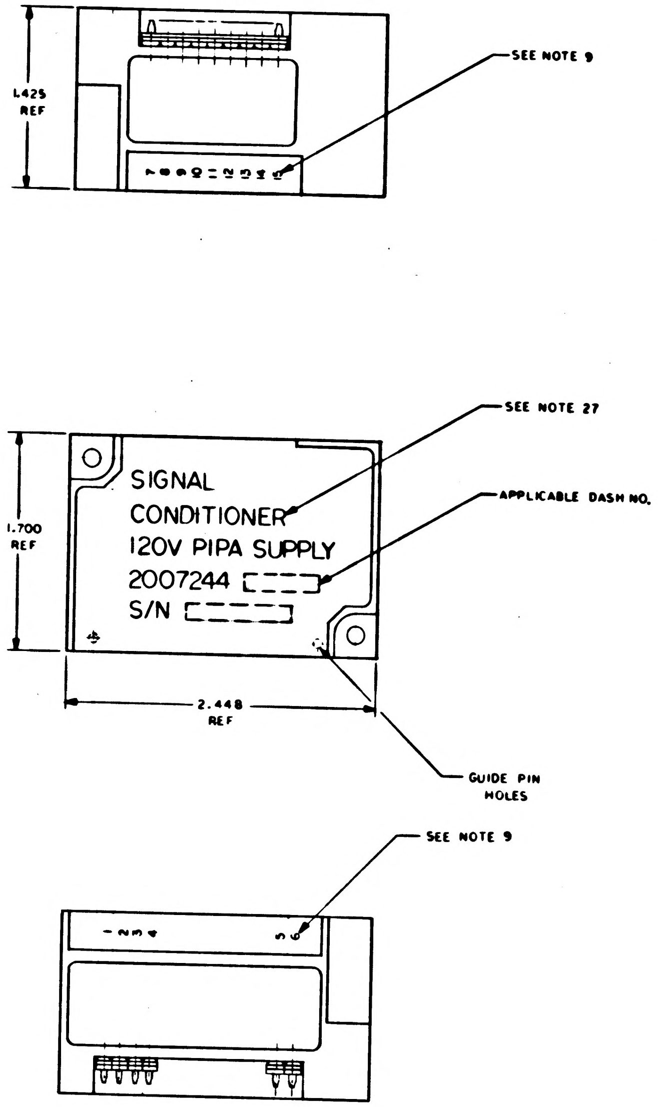
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DRAWING REVISION A PER TDRR				
C		REVISED PER TDRR 29919				
D		REVISED PER TDRR 30431	EMF	JI	AUG 66	





PARTIAL SECTION B-B



MARKING VIEWS

SCALE: 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010128	SCHEMATIC	REF
1	1010357-1	TRANSISTOR	55
1	1008540-2	GASKET, CONNECTOR, MINIATURE	54
1	1008540-4	GASKET, CONNECTOR, MINIATURE	53
1	1008540-9	GASKET, CONNECTOR, MINIATURE	52
2	1010274	TRANSFORMER	51
2	1010365	TRANSFORMER	50
2	1010710	TRANSFORMER	49
1	1010397-1	TRANSISTOR	48
1	1010342	TRANSISTOR	47
4	1010367	CHOPPER	46
3	1010385	DIODE	45
2	1010259-003	DIODE	44
2	1010372-12	DIODE	43
1	1010837-001	DIODE	42
1	1006777-31	CAPACITOR	41
2	1010279-16	CAPACITOR	40
1	1010279-104	CAPACITOR	39
1	1006755-33	CAPACITOR	38
2	1006755-132	CAPACITOR	37
1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
1	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-36	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-5	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1
-011			

LIST OF MATERIALS

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	[illegible]	66
CHECKED	[illegible]	66
APPROVED	[illegible]	2 MAY 66
APPROVED	[illegible]	
APPROVED MIT	[illegible]	
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V PIPA SUPPLY (OP)
ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2007244
SCALE 5/1		SHEET 1 OF 1

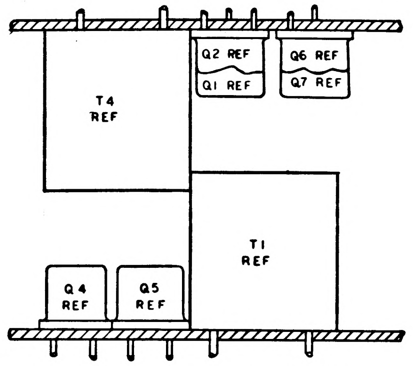
2007244 D

2007244 REV D

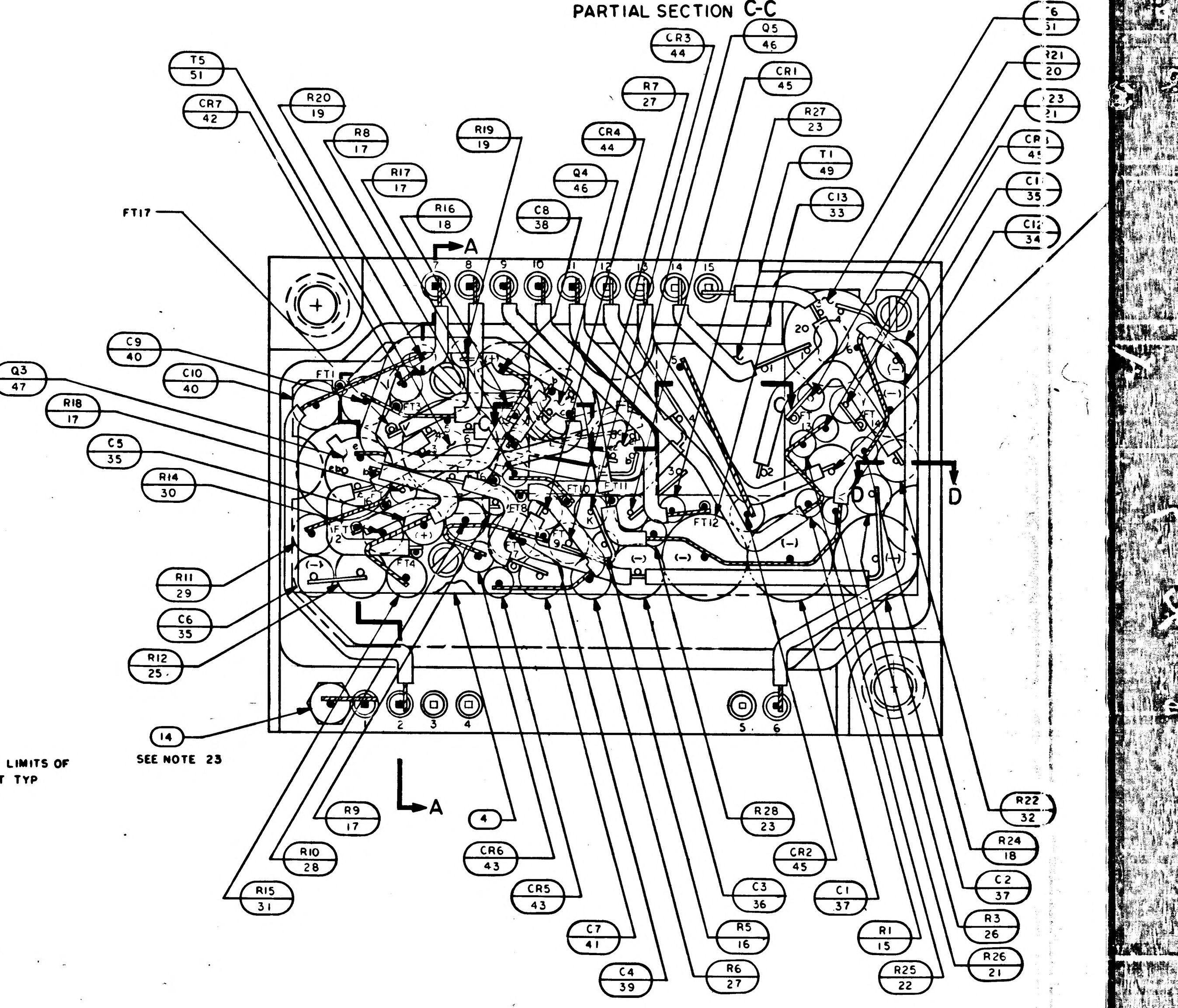
3/2007244

4 #

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


Q2 REF
Q1 REF
Q6 REF
Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C


T5 51
CR7 42
R20 19
R8 17
R17 17
R16 18
R19 19
C8 38
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CR4 44
R7 27
CR3 44
Q5 46
CR1 45
R27 23
T1 49
C13 33
6 51
21 20
23 21
CR 45
C1 35
C12 34
FT17
A
7 8 9 10 11 12 13 14 15
C9 40
C10 40
Q3 47
R18 17
C5 35
R14 30
FT1
FT3
FT10
FT11
FT12
FT8
FT4
FT 13
FT 14
K
D
D
R11 29
C6 35
R12 25
14
SEE NOTE 23
1 2 3 4
5 6
A
R9 17
R10 28
R15 31
4
CR6 43
CR5 43
C7 41
C4 39
R5 16
R6 27
R28 23
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CR2 45
C1 37
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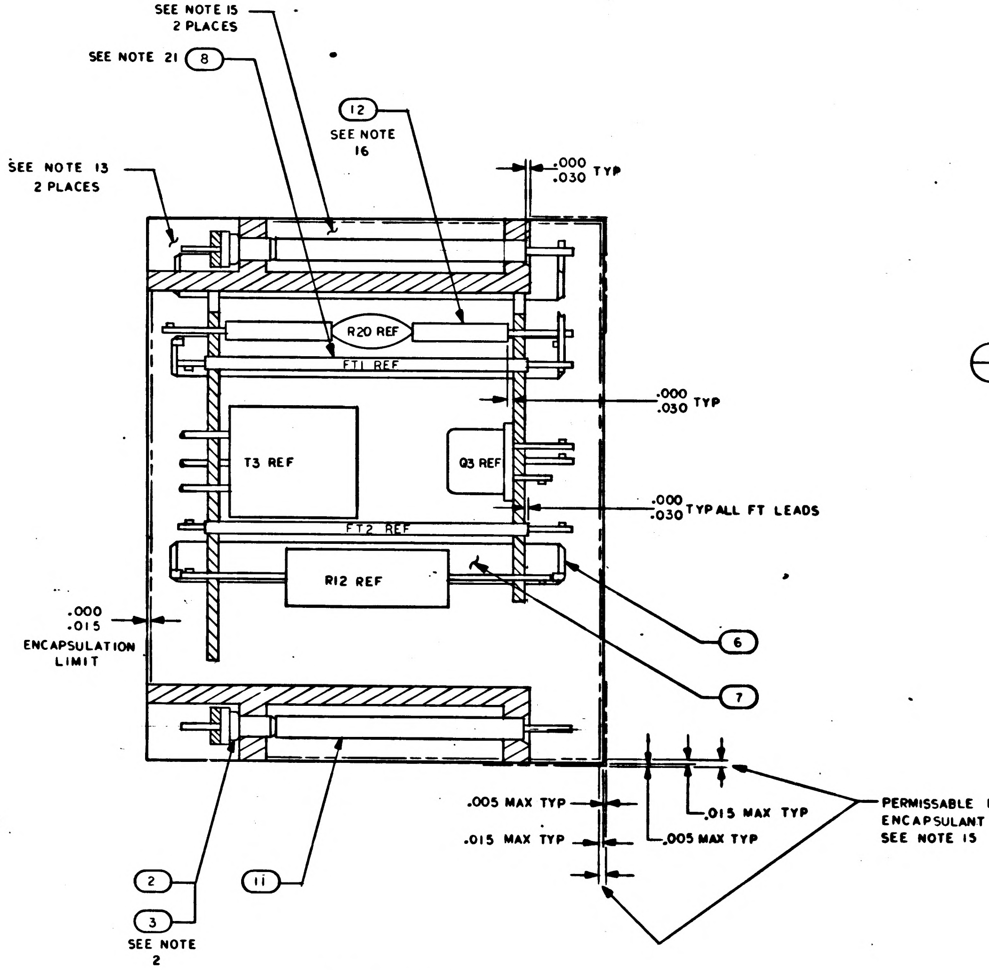
R22 32
R24 18
C2 37
R3 26
R26 21


SEE NOTE 15 2 PLACES
SEE NOTE 21 8
12
SEE NOTE 16
.000 .030 TYP
SEE NOTE 13 2 PLACES
R20 REF
FT1 REF
.000 .030 TYP
T3 REF
Q3 REF
.000 .030 TYP ALL FT LEADS
FT2 REF
R12 REF
.000 .015 ENCAPSULATION LIMIT
6
7
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP
PERMISSABLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15
2
3
SEE NOTE 2
11

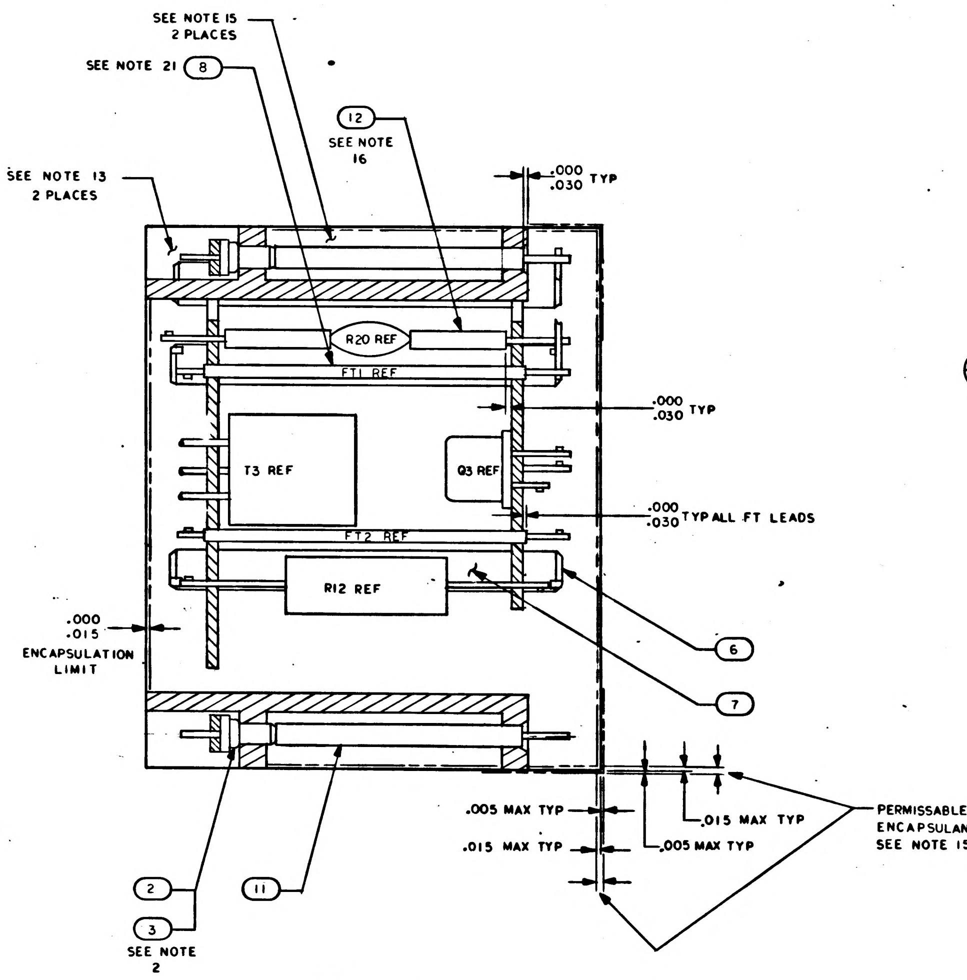
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO.5 TO FIND NO.1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO. 4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3 AND T4 TO FIND NO. 5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 *USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.*
25. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE OF POLYURETHANE -
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN

2007244 E

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

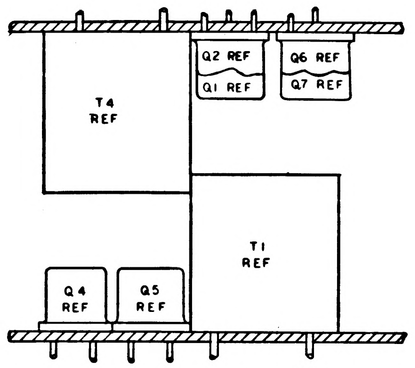

SEE NOTE 15
2 PLACES
SEE NOTE 21
8
12
SEE NOTE 16
.000
.030 TYP
SEE NOTE 13
2 PLACES
R20 REF
FT1 REF
.000
.030 TYP
T3 REF
Q3 REF
.000
.030 TYP ALL FT LEADS
FT2 REF
R12 REF
.000
.015
ENCAPSULATION LIMIT
6
7
2
3
SEE NOTE 2
11
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP

PERMISSABLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO. 5 TO FIND NO. 1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO. 4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3 AND T4 TO FIND NO. 5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 *USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291. USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.*
25. AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE OF POLYURETHANE -
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN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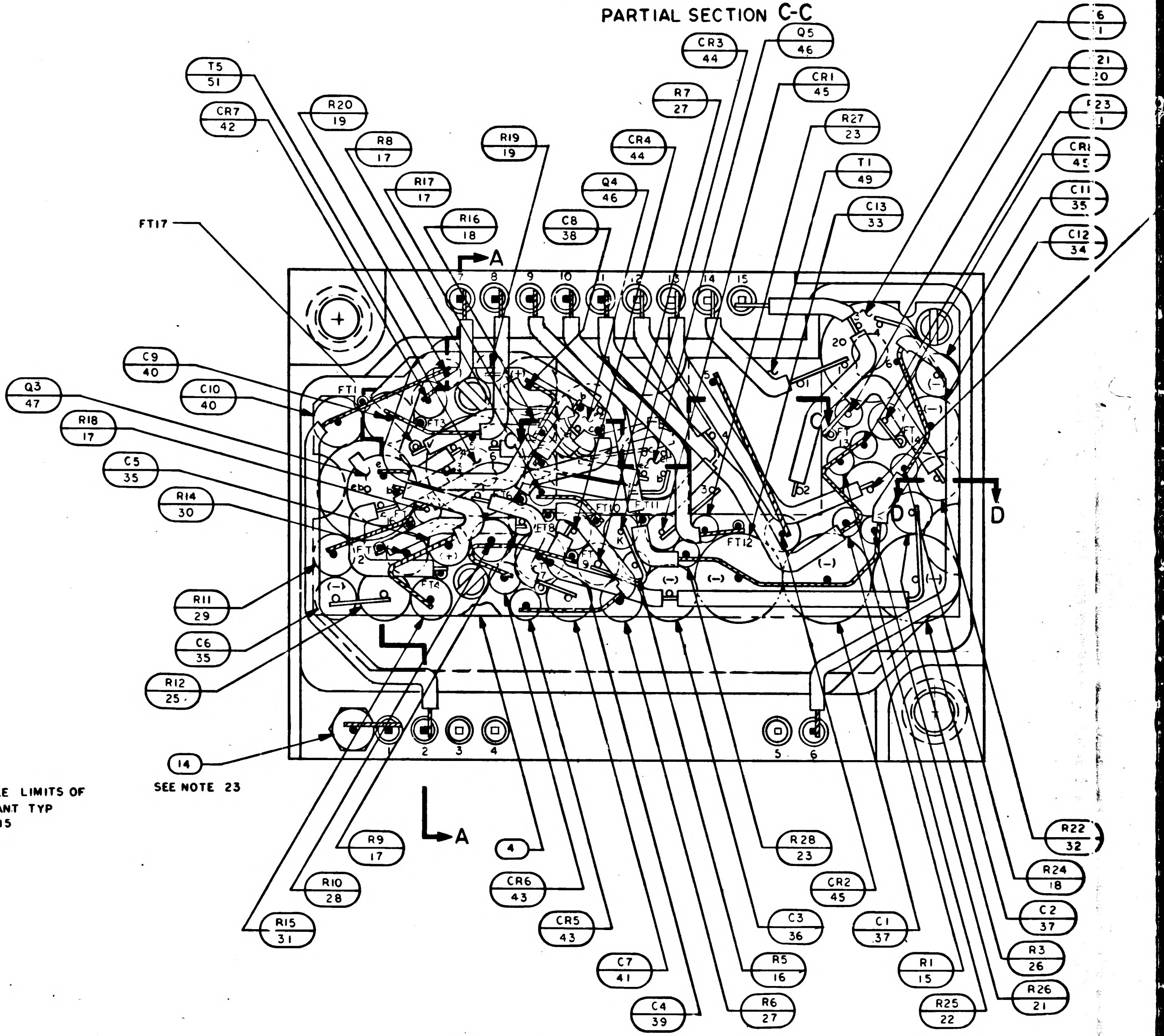
Q6 REF
Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C


6/1
21/20
23/1
CR3/44
Q5/46
CR1/45
R7/27
R27/23
T1/49
C13/33
CR4/44
Q4/46
C8/38
R19/19
T5/51
CR7/42
R20/19
R8/17
R17/17
R16/18
CR/45
C11/35
C12/34
FT17
A
7 8 9 10 11 12 13 14 15
20
FT1
FT3
FT7
FT8
FT10
FT11
FT12
FT13
FT14
FT4
(+)
(–)
K
D
C9/40
C10/40
Q3/47
R18/17
C5/35
R14/30
R11/29
C6/35
R12/25
14
SEE NOTE 23
1 2 3 4
5 6
A
R9/17
R10/28
R15/31
4
CR6/43
CR5/43
C7/41
C4/39
R28/23
CR2/45
C3/36
R5/16
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C1/37
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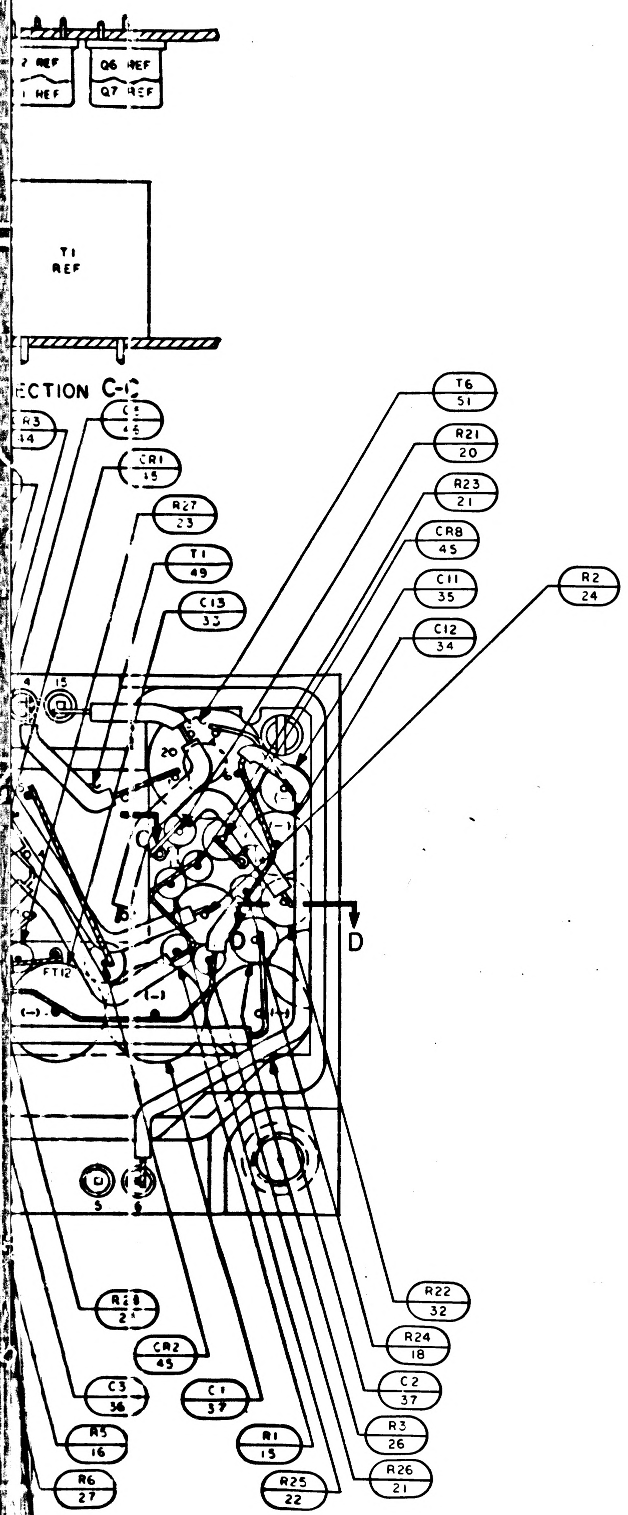
R22/32
R24/18
C2/37
R3/26
R26/21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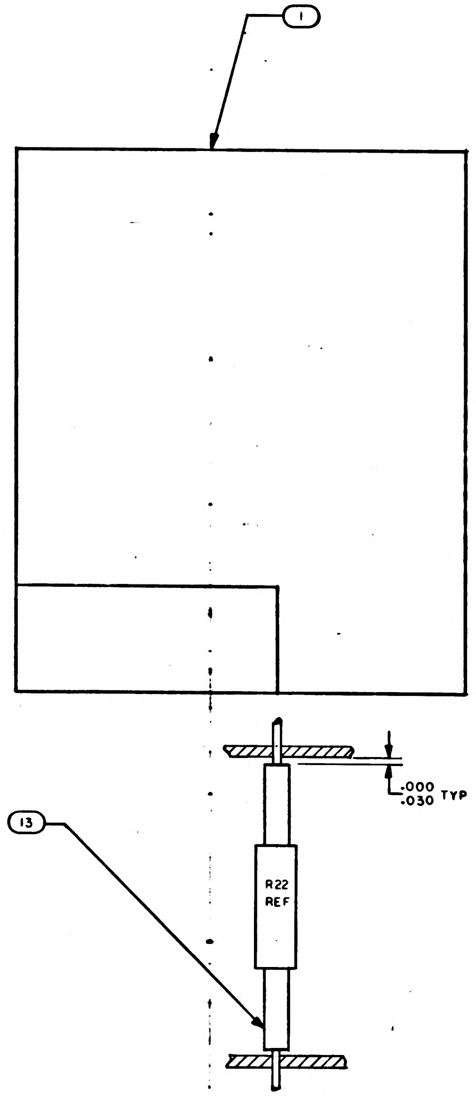
Q6 REF
Q7 REF
REF
T1 REF
R3 14
C 46
CR1 15
R27 23
T1 49
C13 33
T6 51
R21 20
R23 21
CR8 45
C11 35
C12 34
R2 24
4
15
20
(-)
(+)
FT12
(-)
D
5
6
R22 32
R24 18
C2 37
R3 26
R26 21
R28 2
CR2 45
C3 36
C1 37
R1 15
R25 22
R5 16
R6 27

ECTION C-C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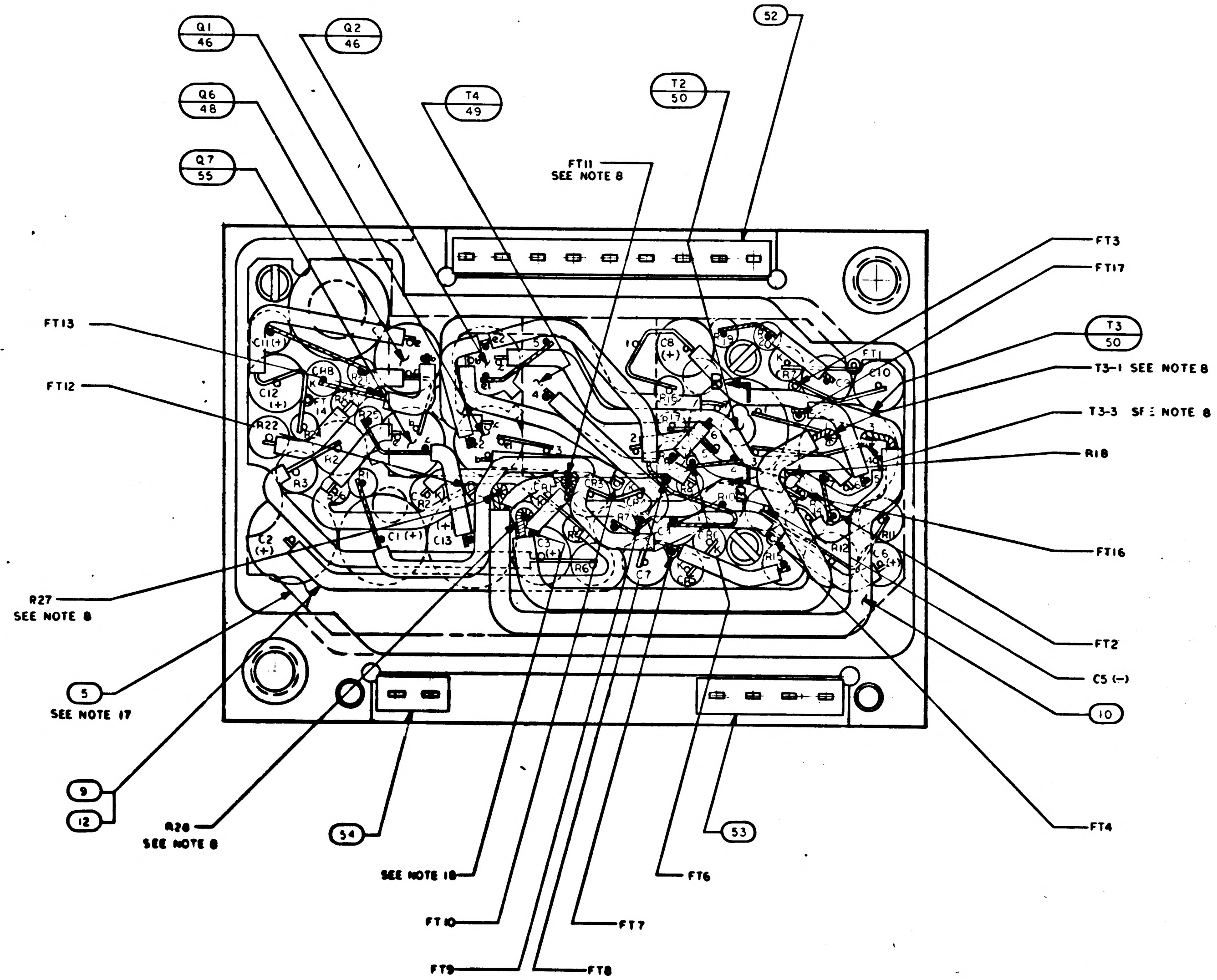
.030 TYP
13
R22 REF

PARTIAL SECTION D-D
TYPICAL FOR R14, R15, AND R22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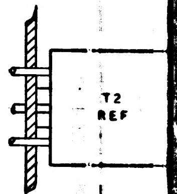
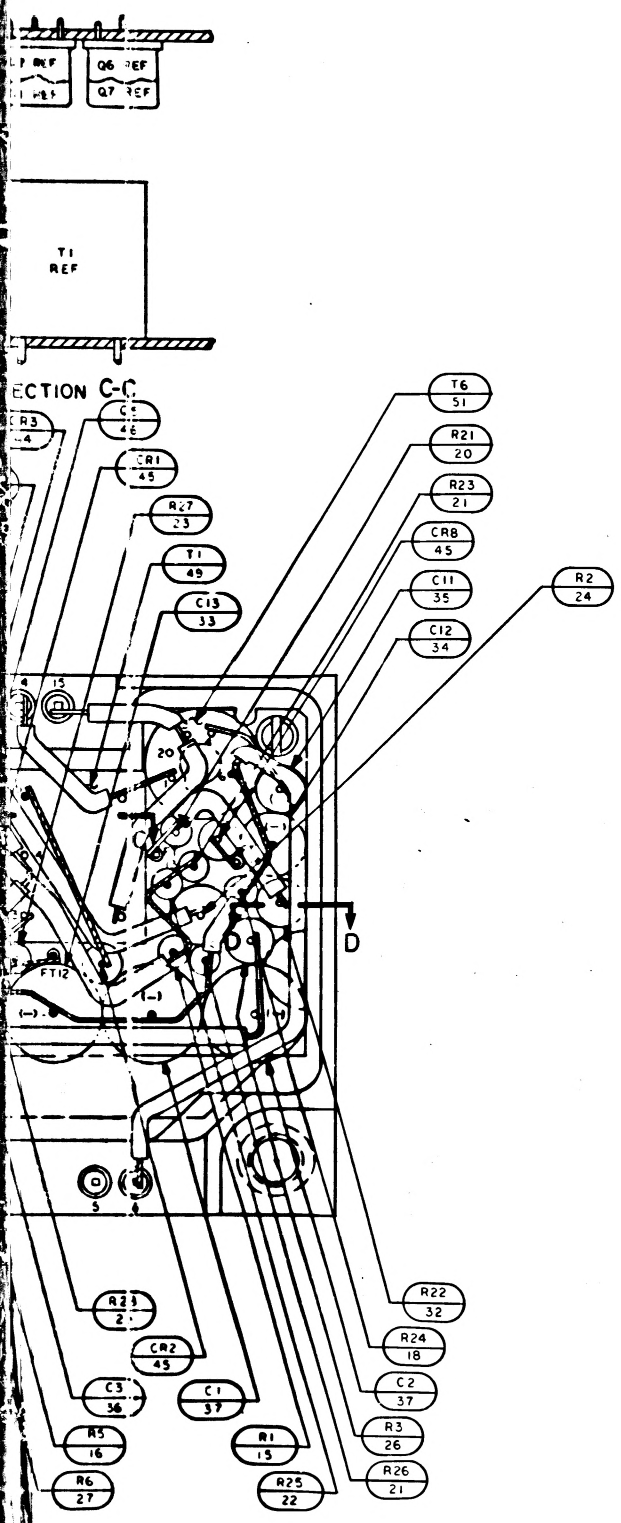
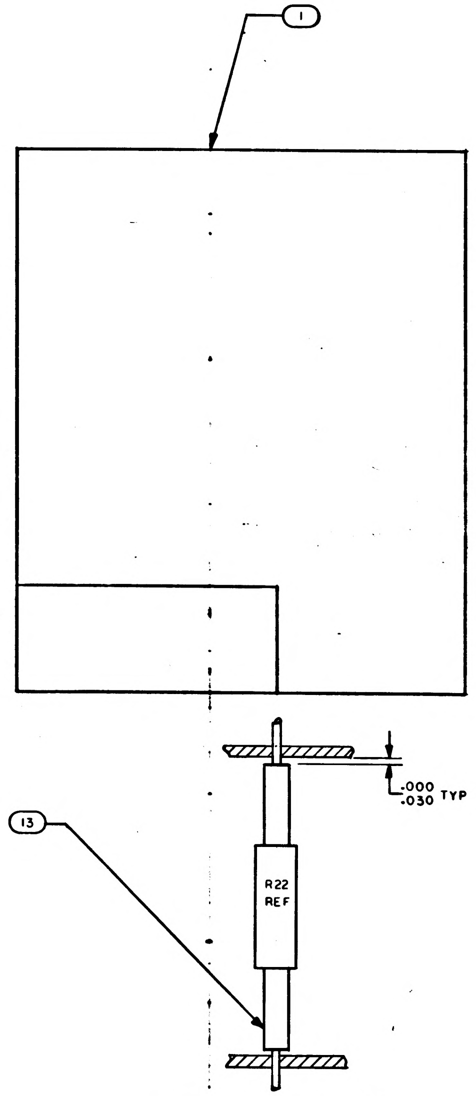
Q2 46
Q6 48
Q7 55
T4 49
T2 50
52
FT11 SEE NOTE 8
FT13
FT12
C11(+)
C12 (+)
CR8
R22
R24
R25
R2
R3
R1
C1 (+)
C13
C2 (+)
C3 (+)
R6
C7
C8 (+)
R16
R17
R19
R20
R7
C9
FT1
C10
R10
R15
R12
R11
C6 (+)
FT3
FT17
T3 50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
FT2
C5 (-)
10
FT4
R27 SEE NOTE 8
5 SEE NOTE 17
9
12
R28 SEE NOTE 8
54
SEE NOTE 18
FT10
FT9
FT8
FT7
FT6
53



PARTIAL



Q6 REF
Q7 REF
T1 REF
SECTION C-C
CR3
CR1 45
R27 23
T1 49
C13 33
T6 51
R21 20
R23 21
CR8 45
C11 35
C12 34
R2 24
15
20
FT12
(-)
D
5
R22 32
R24 18
C2 37
R3 26
R26 21
R25 22
R1 15
C1 37
CR2 45
C3 36
R5 16
R6 27



1
13
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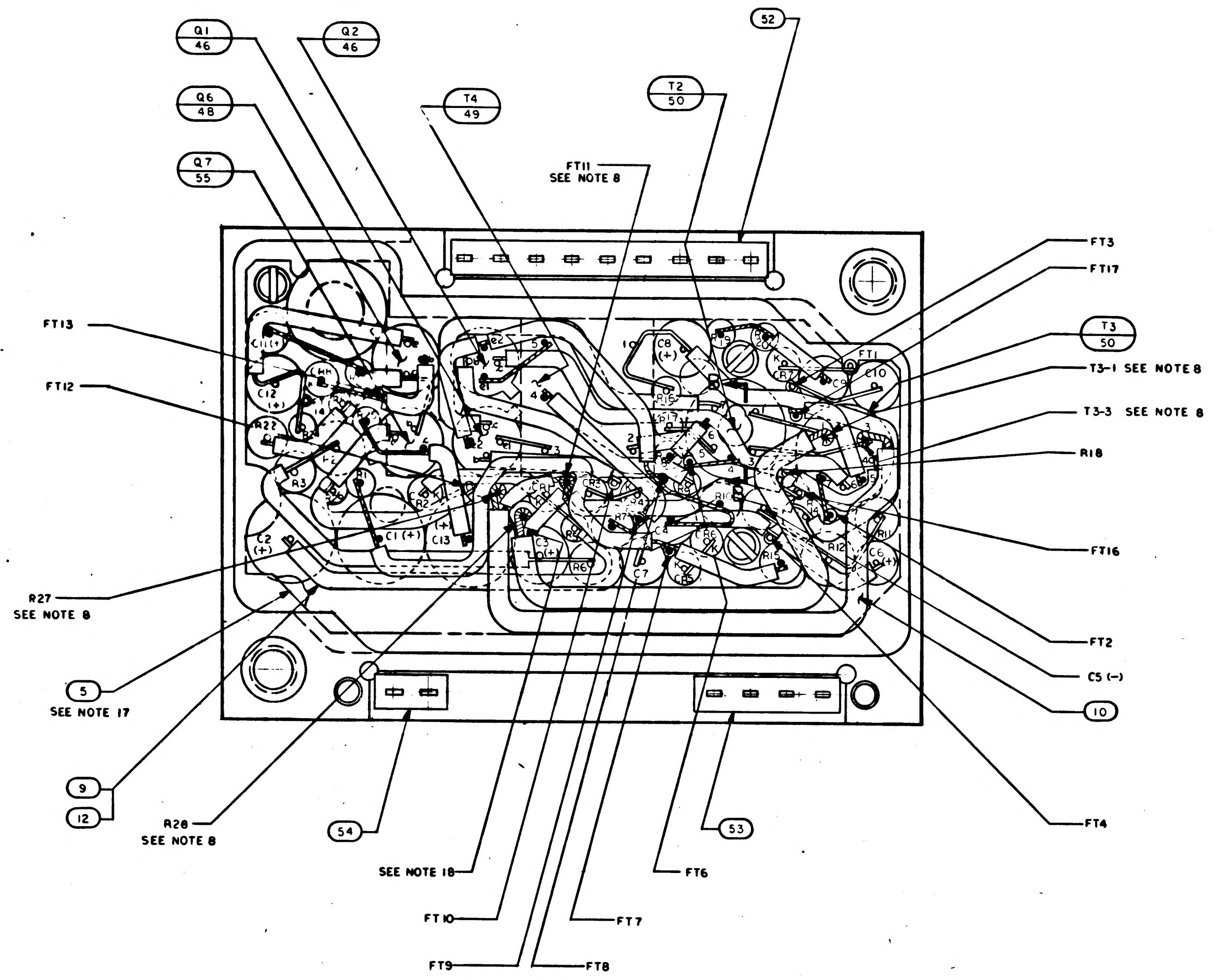
.030 TYP
R22 REF

PARTIAL SECTION D-D

TYPICAL FOR R14, R15, AND R22



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Q2 46
Q6 48
Q7 55
T4 49
T2 50
52
FT11 SEE NOTE 8
FT13
FT12
FT3
FT17
T3 50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
FT2
C5 (-)
10
FT4
R27 SEE NOTE 8
5 SEE NOTE 17
9
12
R28 SEE NOTE 8
54
53
SEE NOTE 18
FT10
FT9
FT8
FT7
FT6
C11 (+)
C12 (+)
R22
R3
R1
C1 (+)
C13
C2 (+)
C3 (+)
R6
C7
C8 (+)
R15
R17
R19
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R12
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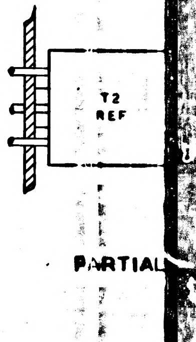
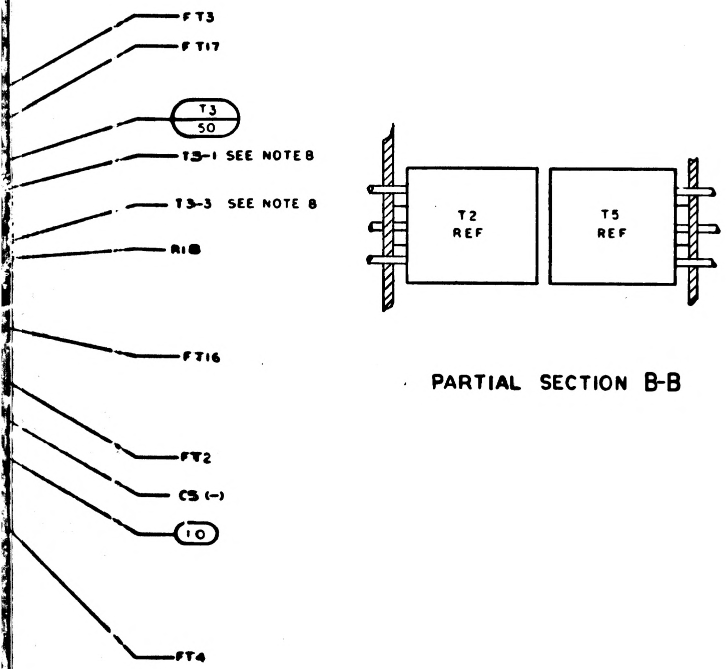
CR3
CR6
R10
R8
C4

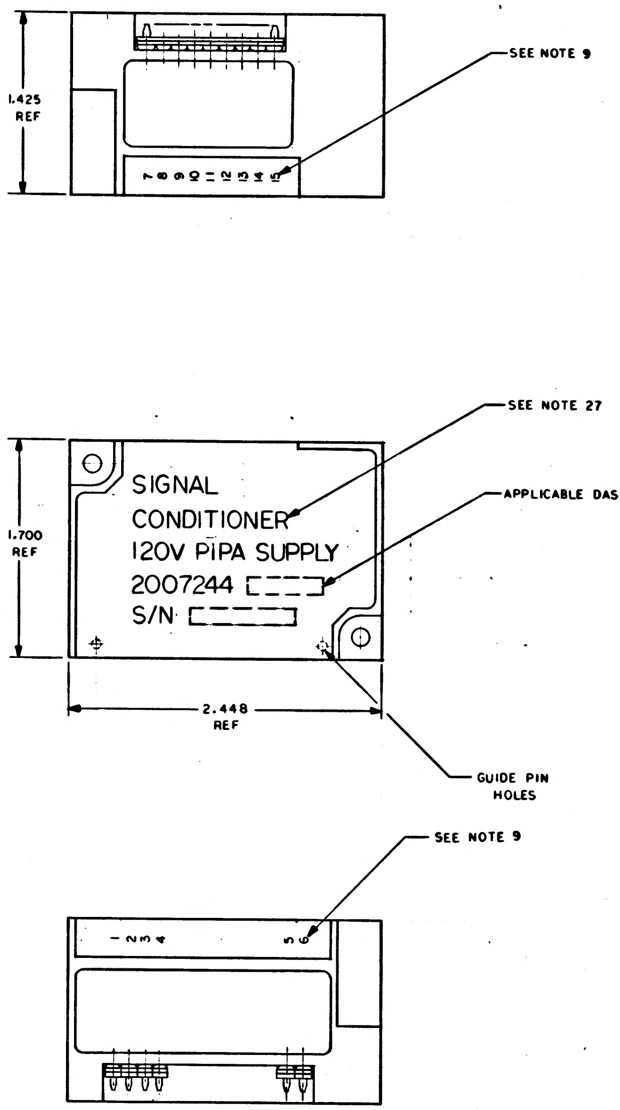


T2 REF
PARTIAL

REVISIONS 28510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DRAWING REVISION A PER TDRR				
C		REVISED PER TDRR 29919	J.E.G.			
D		REVISED PER TDRR 30431	EMF	JI	11 AUG 66	
E		REVISED PER TDRR 32081	REF	CP	10 DEC 66	



PARTIAL SECTION B-B



MARKING VIEWS

SCALE: 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	2010128	SCHEMATIC	REF
1	1010357-1	TRANSISTOR	55
1	1008540-2	GASKET, CONNECTOR, MINIATURE	54
1	1008540-4	GASKET, CONNECTOR, MINIATURE	53
1	1008540-9	GASKET, CONNECTOR, MINIATURE	52
2	1010274	TRANSFORMER	51
2	1010365	TRANSFORMER	50
2	1010710	TRANSFORMER	49
1	1010397-1	TRANSISTOR	48
1	1010342	TRANSISTOR	47
4	1010367	CHOPPER	46
3	1010385	DIODE	45
2	1010259-003	DIODE	44
2	1010372-12	DIODE	43
1	1010837-001	DIODE	42
1	1006777-31	CAPACITOR	41
2	1010279-16	CAPACITOR	40
1	1010279-104	CAPACITOR	39
1	1006755-33	CAPACITOR	38
2	1006755-132	CAPACITOR	37
1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
1	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-36	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-17	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007234	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	F.L. Eckert	25 Feb 66
CHECKED	Bonarrigo	2 Mar 66
APPROVED	Ellinga	2 MAY 66
APPROVED		2 May 66
APPROVED MIT	W Crifer	3 May 66
APPROVED MSC	C. METZGER	
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V PIPA SUPPLY (OP)
ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2007244
SCALE 5/1		SHEET 1 OF 1

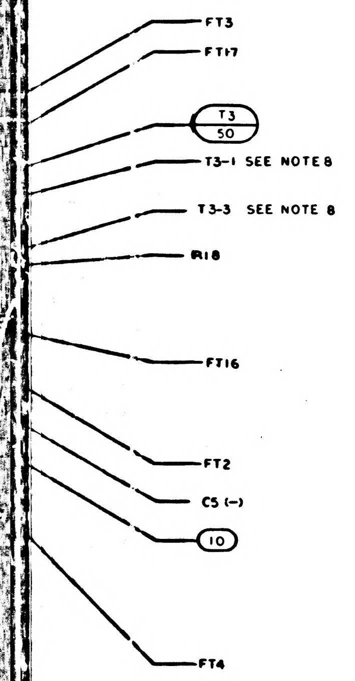
2007244 E

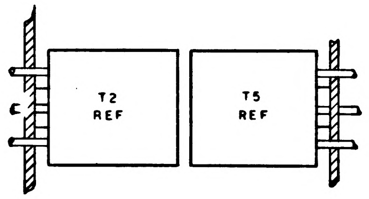
2007244 E

4H

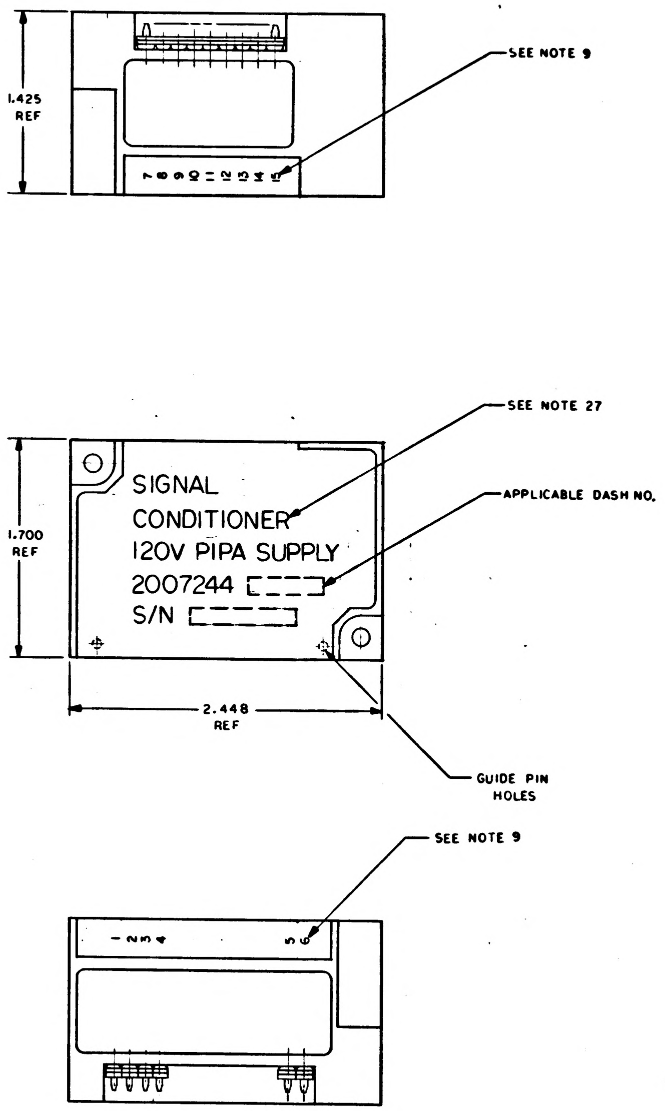
3/2007244

REVISIONS 28510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DRAWING REVISION A PER TDRR	J.L.E.			
C		REVISED PER TDRR 29919	J.E.G.			
D		REVISED PER TDRR 30431	E.M.F.	JI	11 AUG 66	
E		REVISED PER TDRR 32081	REF	CP	10 DEC 66	





PARTIAL SECTION B-B



MARKING VIEWS
SCALE: 2/1

☒	2010128	SCHEMATIC	REF
1	1010357-1	TRANSISTOR	55
1	1008540-2	GASKET, CONNECTOR, MINIATURE	54
1	1008540-4	GASKET, CONNECTOR, MINIATURE	53
1	1008540-9	GASKET, CONNECTOR, MINIATURE	52
2	1010274	TRANSFORMER	51
2	1010365	TRANSFORMER	50
2	1010710	TRANSFORMER	49
1	1010397-1	TRANSISTOR	48
1	1010342	TRANSISTOR	47
4	1010367	CHOPPER	46
3	1010385	DIODE	45
2	1010259-003	DIODE	44
2	1010372-12	DIODE	43
1	1010837-001	DIODE	42
1	1006777-31	CAPACITOR	41
2	1010279-16	CAPACITOR	40
1	1010279-104	CAPACITOR	39
1	1006755-33	CAPACITOR	38
2	1006755-132	CAPACITOR	37
1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
1	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-36	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-17	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011		LIST OF MATERIALS	

2007244 E

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN F.L.E. Rest 23 Apr 66
CHECKED Bonarriga 24 Apr 66
APPROVED 2 MAY 66
APPROVED 2 May 66
APPROVED MIT W. Crofts 3 May 66
APPROVED MSC METZGER
DATE

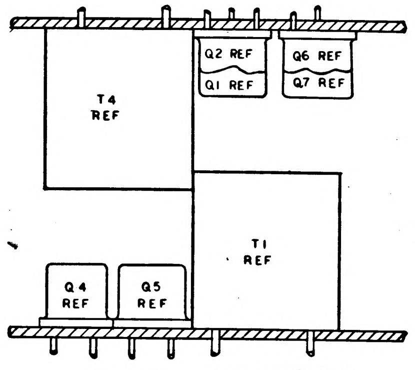
120V PIPA SUPPLY (OP) ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007244
SCALE 5/1
SHEET 1 OF 1

2007244

4H

3/2007244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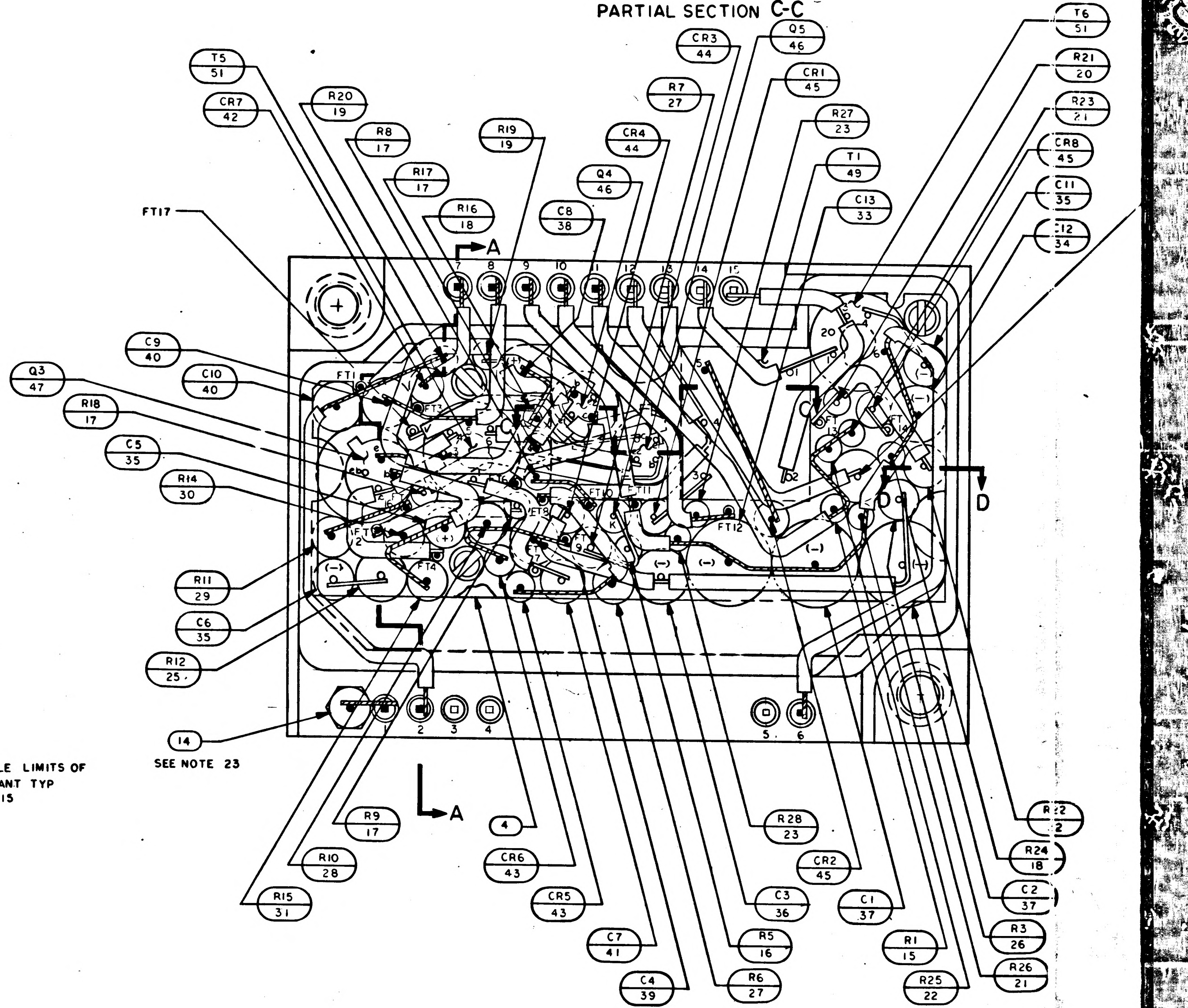
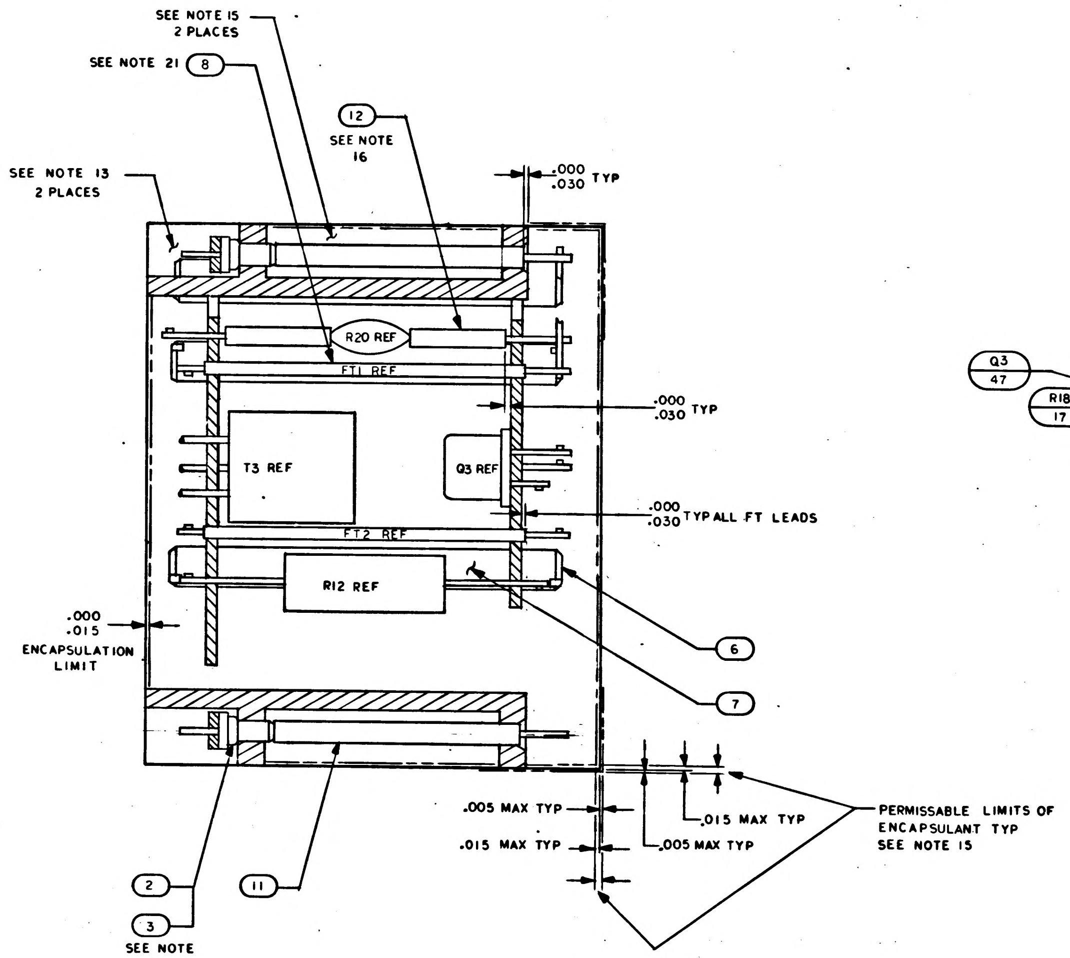
Q1 REF
Q6 REF
Q7 REF
T4 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C

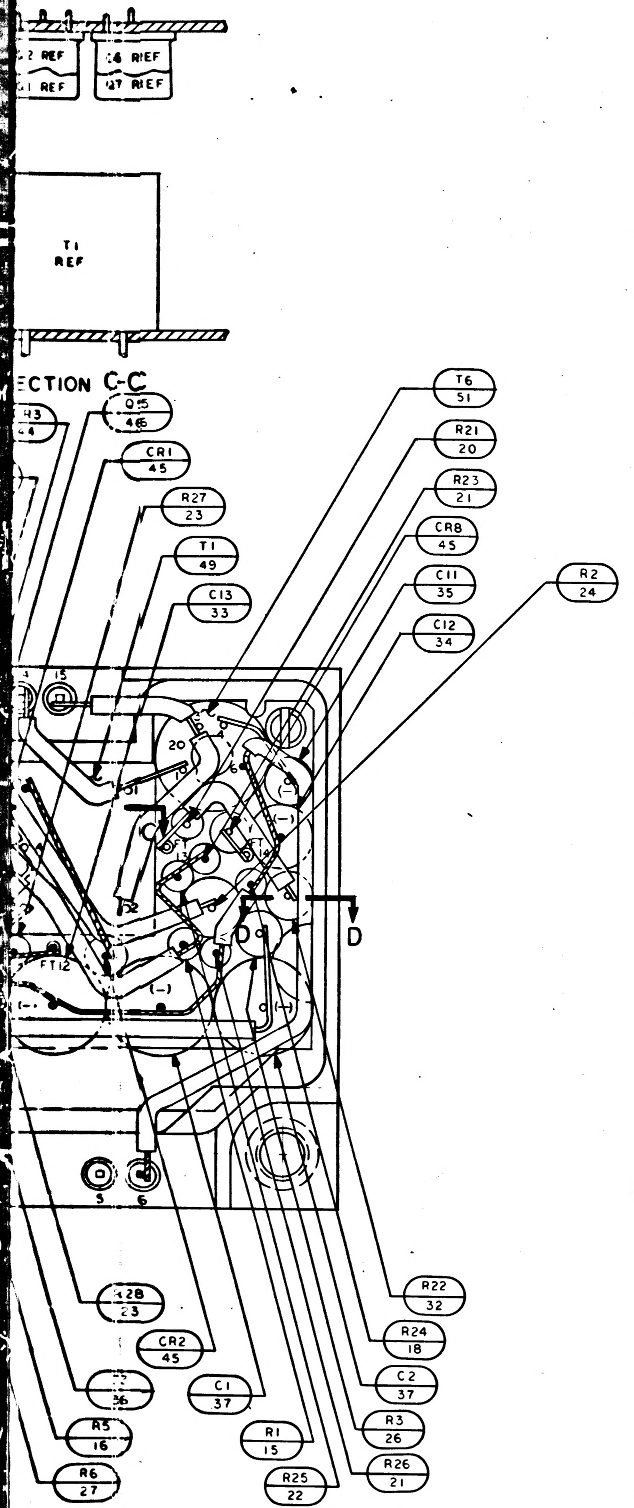

T6 51
R21 20
R23 21
CR8 45
C11 35
C12 34
T5 51
CR7 42
R20 19
R8 17
R17 17
R16 18
R19 19
C8 38
CR4 44
Q4 46
R7 27
CR3 44
Q5 46
CR1 45
R27 23
T1 49
C13 33
FT17
C9 40
C10 40
Q3 47
R18 17
C5 35
R14 30
R11 29
C6 35
R12 25
14
SEE NOTE 23
A
D
R9 17
R10 28
R15 31
4
CR6 43
CR5 43
C7 41
C4 39
R28 23
C3 36
R5 16
R6 27
CR2 45
C1 37
R1 15
R25 22
R22 2
R24 18
C2 37
R3 26
R26 21
FT12
FT14
K
(+)
(–)
2
3
4
5
6


SEE NOTE 15
2 PLACES
SEE NOTE 21
8
12
SEE NOTE 16
SEE NOTE 13
2 PLACES
.000
.030 TYP
R20 REF
FT1 REF
.000
.030 TYP
T3 REF
Q3 REF
.000
.030 TYP ALL FT LEADS
FT2 REF
R12 REF
6
7
.000
.015
ENCAPSULATION LIMIT
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP
PERMISSABLE LIMITS OF ENCAPSULANT TYP
SEE NOTE 15
2
3
SEE NOTE 2
11

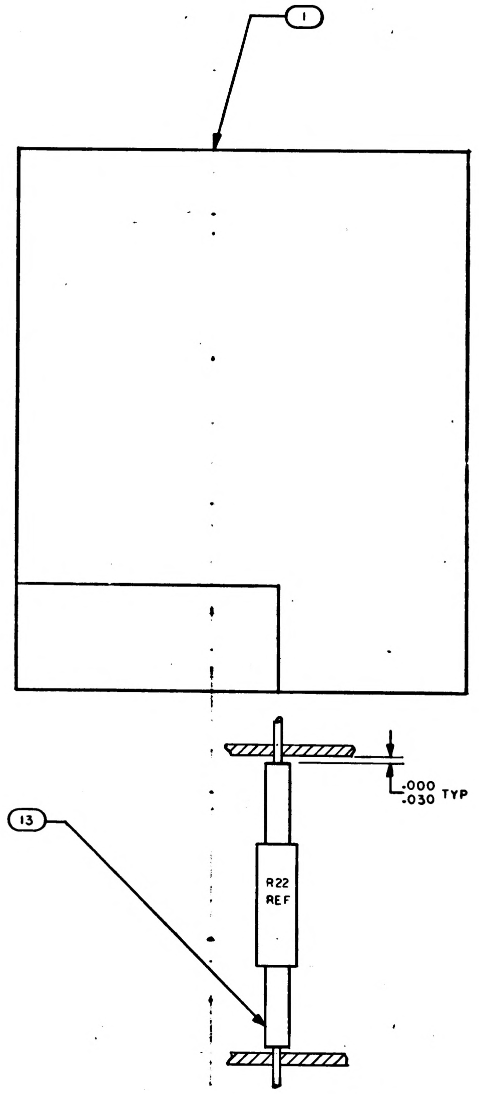
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO.5 TO FIND NO.1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO. 4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3 AND T4 TO FIND NO. 5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
25. ~~AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE 1008867 TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER ND1002292. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE.~~
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN
28. PAINT MODULE MOUNTING SURFACE PER ND 1002291, USING MIL-P-8585 ZINC CHROMATE PRIMER FOLLOWED BY 1012543-003 PAINT. MODULE GUIDE PIN HOLES TO BE FREE OF PAINT. TOTAL DRY FILM THICKNESS MUST NOT EXCEED 2 MILS.

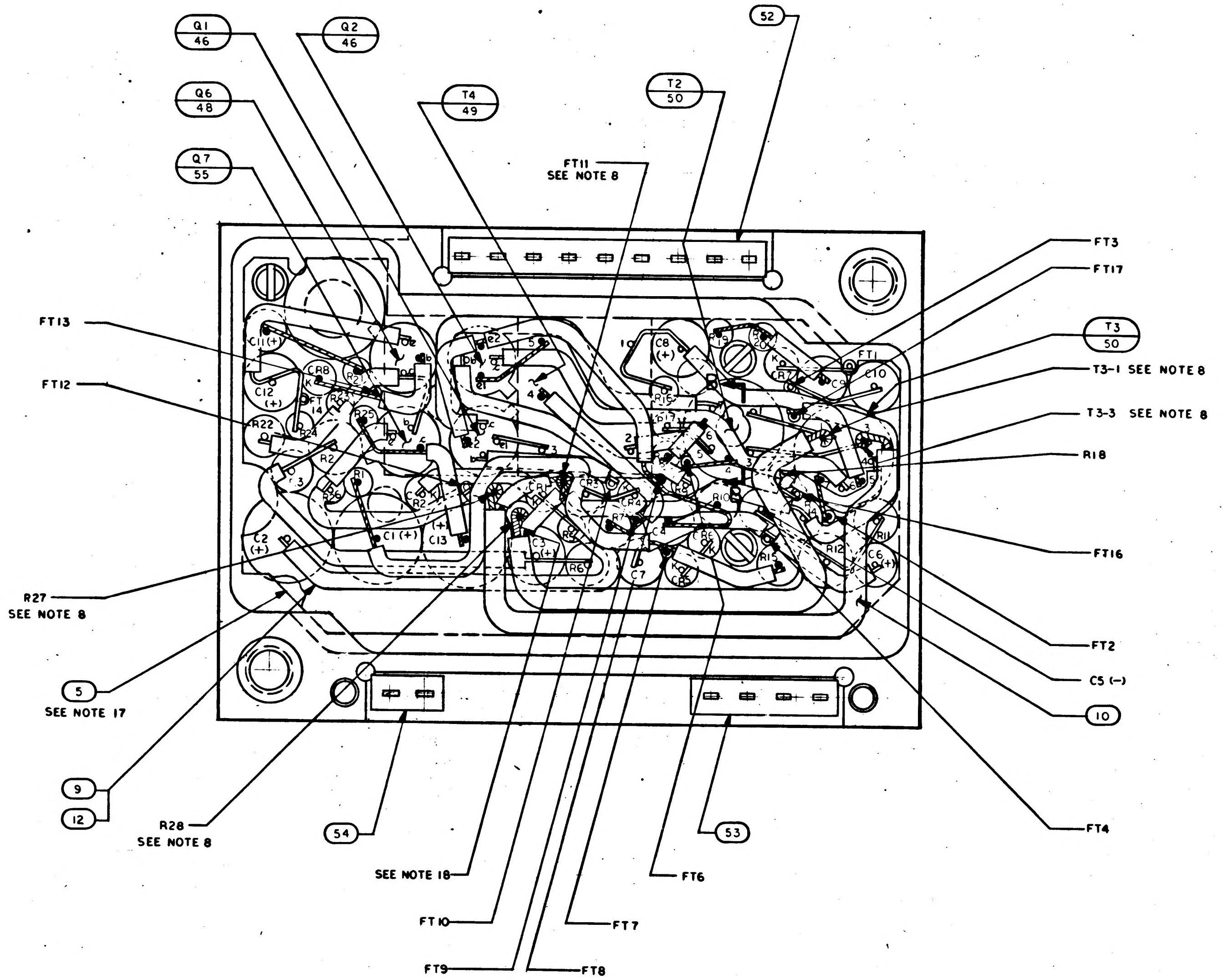

2 REF
1 REF
6 REF
27 REF
T1 REF
43
44
Q15 46
CR1 45
R27 23
T1 49
C13 33
T6 51
R21 20
R23 21
CR8 45
C11 35
C12 34
R2 24
15
20
31
FT12
(-)
D
5
6
R22 32
R24 18
C2 37
R3 26
R26 21
R25 22
R1 15
C1 37
CR2 45
R28 23
36
R5 16
R6 27

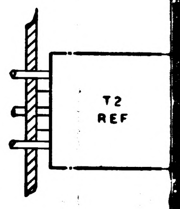
ECTION C-C


1
13
R22 REF
.000
.030 TYP

PARTIAL SECTION D-D

TYPICAL FOR R14, R15, AND R22


Q1 46
Q2 46
Q6 48
Q7 55
T4 49
T2 50
52
FT11 SEE NOTE 8
FT13
FT12
C11 (+)
C12 (+)
CR8
R22
C2 (+)
C1 (+)
C13
C8 (+)
C10
FT1
C6 (+)
FT3
FT17
T3 50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
FT2
C5 (-)
10
FT4
53
FT6
FT7
FT8
FT9
FT10
SEE NOTE 18
54
R28 SEE NOTE 8
9
12
5 SEE NOTE 17
R27 SEE NOTE 8



PARTIAL

REVISIONS 28510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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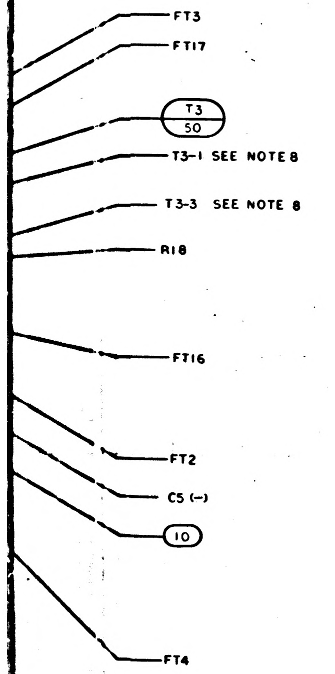
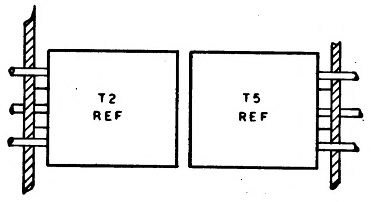
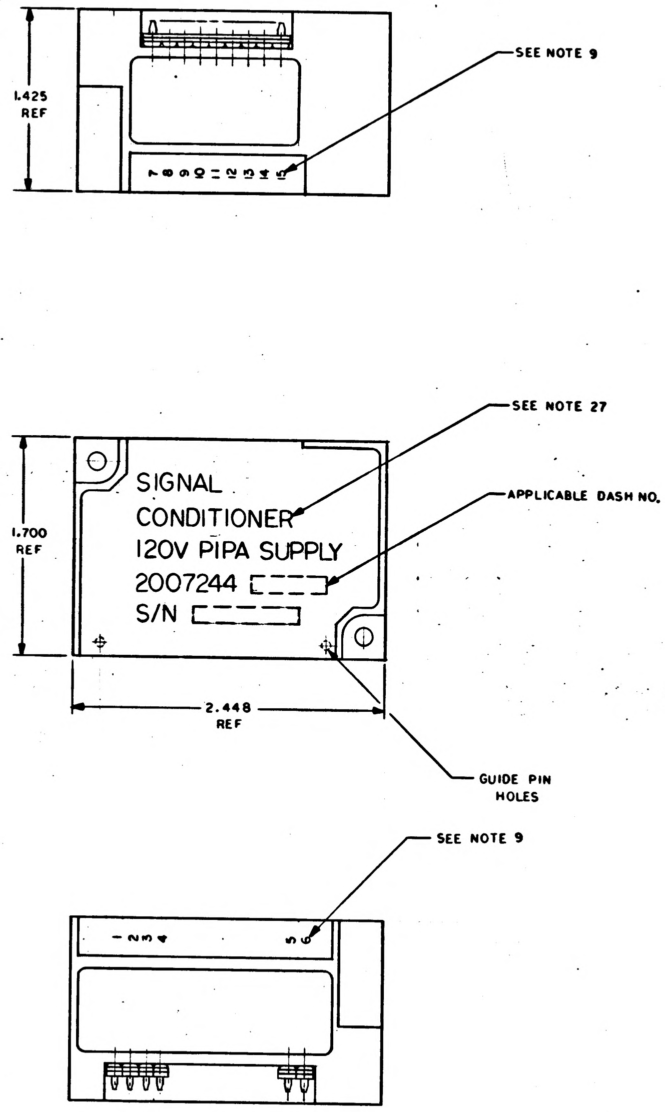
ⓜ C		REVISED PER TDRR 29919	J.E.G.			
ⓜ D		REVISED PER TDRR 30431	EMF	JI	11 AUG 66	
ⓜ E		REVISED PER TDRR 32081	REF	CP	10 DEC 66	
F		REVISED PER TDRR 32412	AF	WH	10 JAN 67	





PARTIAL SECTION B-B



MARKING VIEWS

SCALE: 2/1

	2010128	SCHEMATIC	REF
1	1010357-1	TRANSISTOR	55
1	1008540-2	GASKET, CONNECTOR, MINIATURE	54
1	1008540-4	GASKET, CONNECTOR, MINIATURE	53
1	1008540-9	GASKET, CONNECTOR, MINIATURE	52
2	1010274	TRANSFORMER	51
2	1010365	TRANSFORMER	50
2	1010710	TRANSFORMER	49
1	1010397-1	TRANSISTOR	48
1	1010342	TRANSISTOR	47
4	1010367	CHOPPER	46
3	1010385	DIODE	45
2	1010259-003	DIODE	44
2	1010372-12	DIODE	43
1	1010837-001	DIODE	42
1	1006777-31	CAPACITOR	41
2	1010279-16	CAPACITOR	40
1	1010279-104	CAPACITOR	39
1	1006755-33	CAPACITOR	38
2	1006755-132	CAPACITOR	37
1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-36	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-17	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS		

F 2007244

4H

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN F.L.E. Rest 23 Feb 66
CHECKED Bonarrigo 24 Feb 66
APPROVED 2 MAY 66
APPROVED 2 May 66
APPROVED MIT 3 May 66
APPROVED MSC
DATE

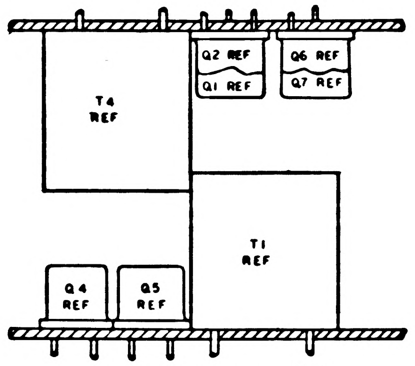
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V PIPA SUPPLY (OP)
ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

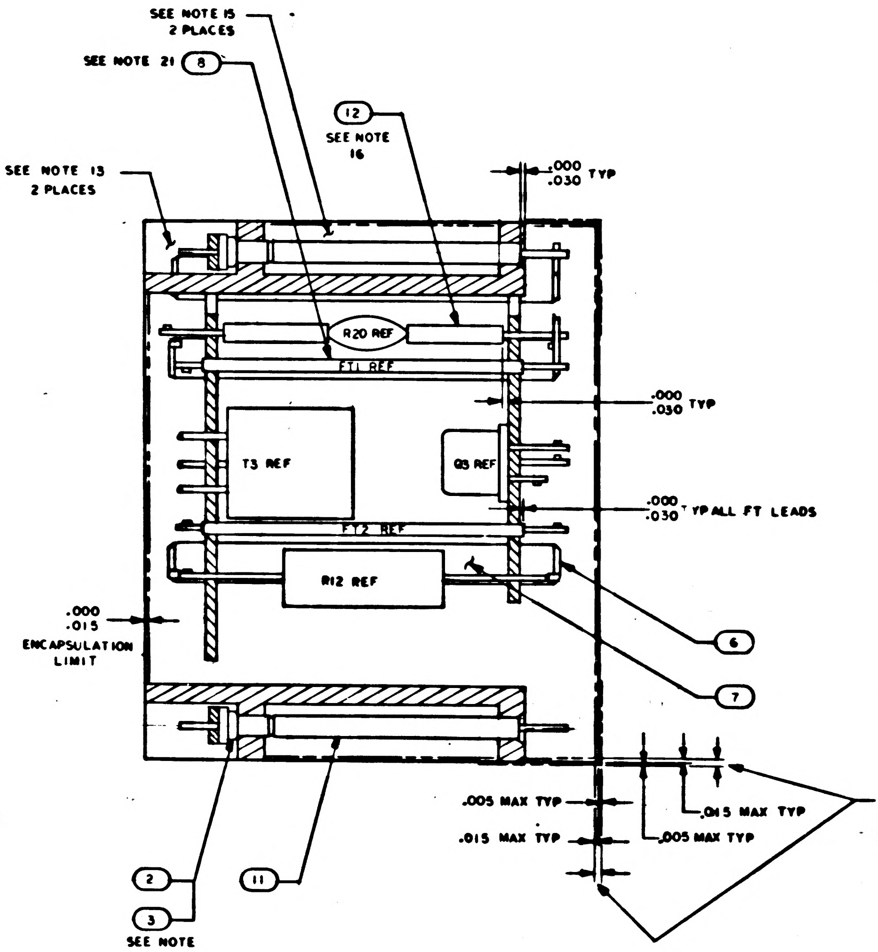
CODE IDENT NO. 80230 SIZE J DRAWING NO. 2007244
SCALE 5/1 SHEET 1 OF 1

2007244 REV F

3/2007244

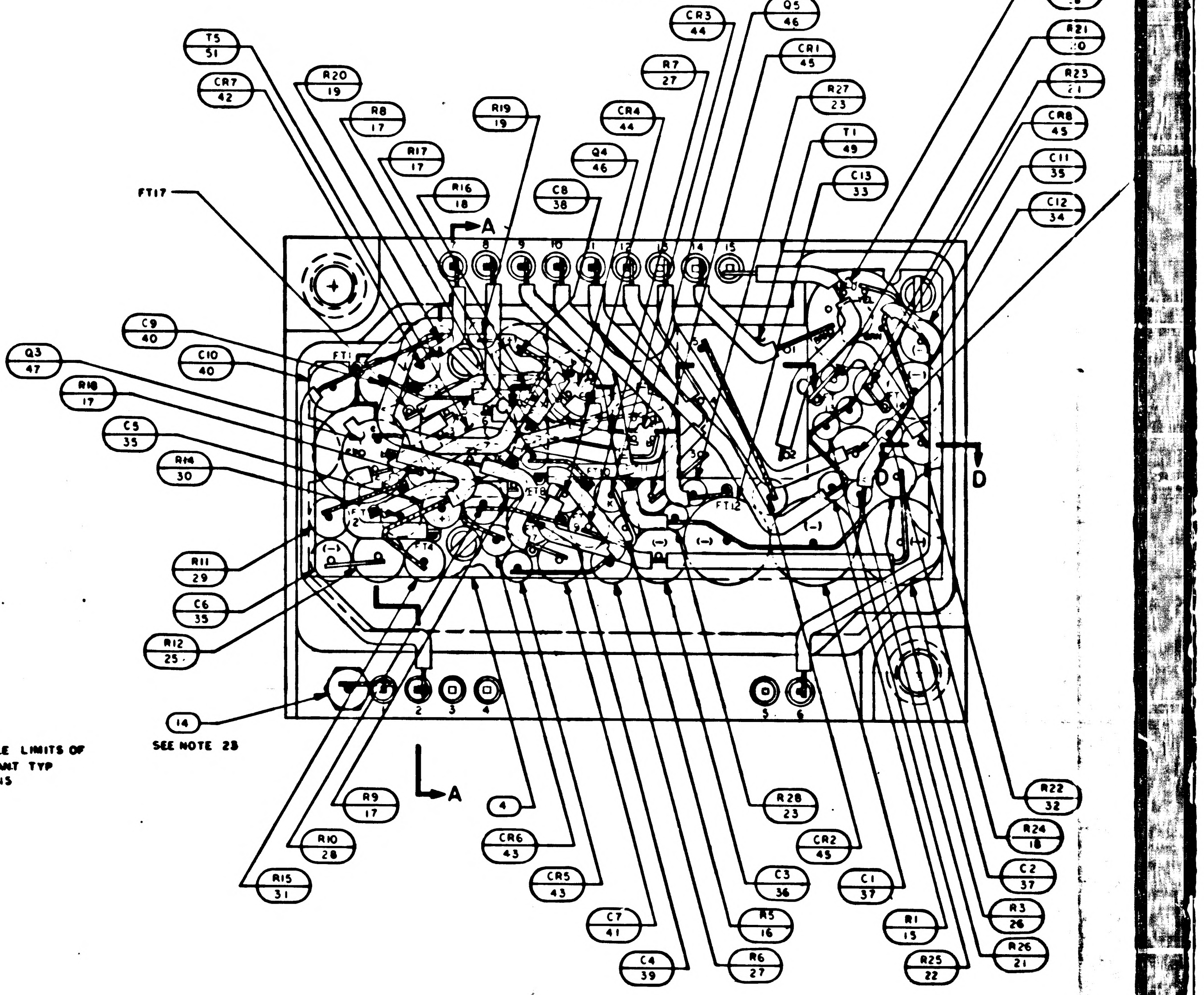

T4 REF
Q2 REF
Q1 REF
Q6 REF
Q7 REF
T1 REF
Q4 REF
Q5 REF

PARTIAL SECTION C-C


SEE NOTE 15 2 PLACES
SEE NOTE 21 8
12 SEE NOTE 16
.000 .030 TYP
SEE NOTE 13 2 PLACES
R20 REF
FT1 REF
T3 REF
Q3 REF
.000 .030 TYP
.000 .030 TYP ALL FT LEADS
FT2 REF
R12 REF
6
7
.000 .015 ENCAPSULATION LIMIT
2
3 SEE NOTE 2
11
.005 MAX TYP
.015 MAX TYP
.015 MAX TYP
.005 MAX TYP

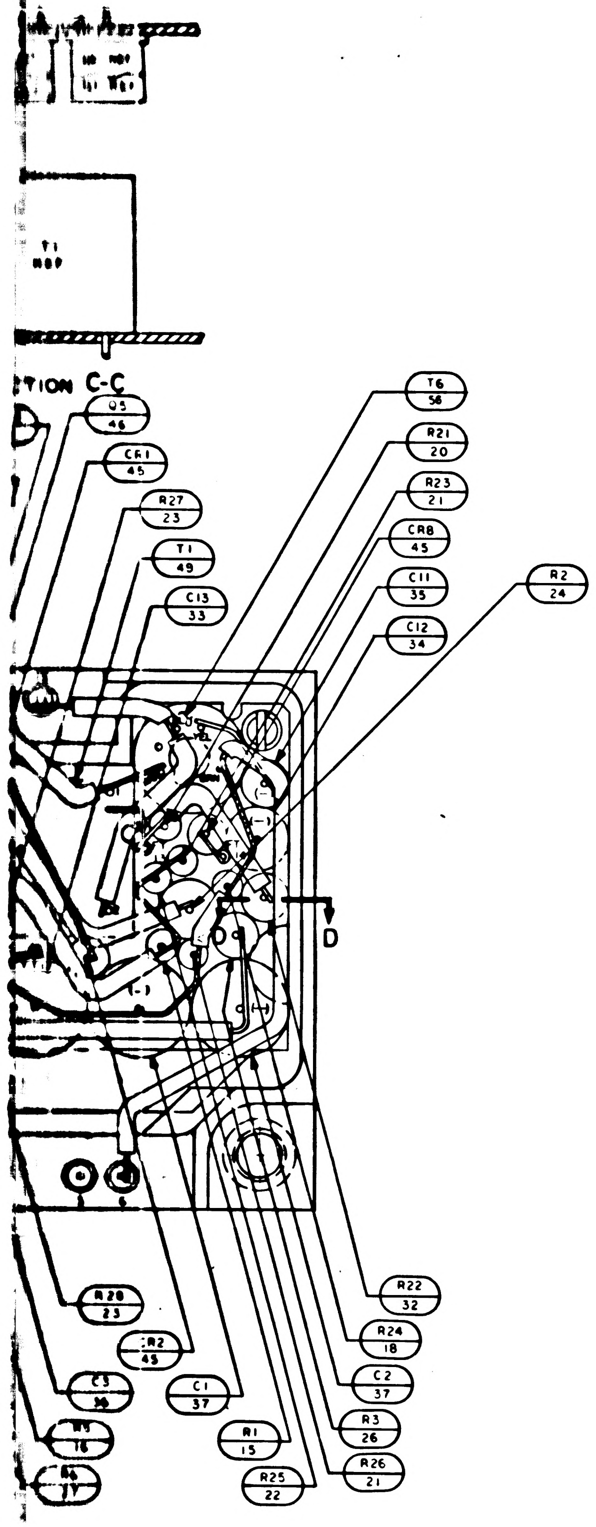
PERMISSABLE LIMITS OF ENCAPSULANT TYP SEE NOTE 15

SECTION A-A


FT17
T5 51
CR7 42
R20 19
R8 17
R17 17
R16 18
R19 19
C8 38
CR4 44
Q4 46
CR3 44
Q5 46
R7 27
CR1 45
R27 23
T1 49
C13 33
T6 58
R21 20
R23 21
CR8 45
C11 35
C12 34
C9 40
C10 40
Q3 47
R18 17
C5 35
R14 30
R11 29
C6 35
R12 25
14 SEE NOTE 23
A
D
FT1
FT12
7 8 9 10 11 12 13 14 15
1 2 3 4 5 6
R9 17
R10 28
R15 31
4
CR6 43
CR5 43
C7 41
C4 39
R5 16
R6 27
R28 23
CR2 45
C3 36
C1 37
R1 15
R25 22
R22 32
R24 18
C2 37
R3 26
R26 21

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NOS 2 AND 3 TO FIND NO.1 PER ND1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND1002005
8. SOLDER PER ND1002071
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
10. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
11. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
12. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
13. INDICATED AREA TO BE FREE OF ENCAPSULATION
14. TRIM UNUSED LEADS OF FIND NOS 47, 50, AND 51 .010/.030 FROM CASE
15. ENCAPSULATE PER ND1002002. REMOVE FLASHING
16. TYPICAL SLEEVING FOR FIND NOS 15 THRU 23, 26 THRU 29, 35, AND 42 THRU 46
17. BOND FIND NO.5 TO FIND NO.1 PER ND1002004 TYPE I
18. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 10
19. BOND Q3, Q4, Q5, T1, T5, AND T6 TO FIND NO. 4 PER ND1002004 TYPE I
20. BOND Q1, Q2, Q6 Q7, T2, T3, AND T4 TO FIND NO. 5 PER ND1002004 TYPE I
21. BOND FT1 TO FIND NOS 4 AND 5 PER ND1002004 TYPE I
22. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO PROPYL ALCOHOL PRIOR TO ENCAPSULATION
23. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. OVERCOAT PER ND1002291 USING 1012543-003. PIN BLADES AND INSULATORS TO BE FREE OF PAINT.
25. ~~AFTER PAINTING AND MARKING APPLY A COAT OF POLYURETHANE [illegible] TO ALL SURFACES EXCEPT MODULE MOUNTING SURFACE PER [illegible]. CONNECTOR GASKETS AND CONTACTS TO BE FREE OF POLYURETHANE.~~
26. COMPLETETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUREMENTS OF P.S. 2007244
27. MARK .14/.10 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023 CENTRALIZE AS SHOWN
28. PAINT MODULE MOUNTING SURFACE PER ND 1002291, USING MIL-P-8585 ZINC CHROMATE PRIMER FOLLOWED BY 1012543-003 PAINT. MODULE GUIDE PIN HOLES TO BE FREE OF PAINT. TOTAL DRY FILM THICKNESS MUST NOT EXCEED 2 MILS.
29. TRIM UNUSED LEADS OF FIND NO. 56 .060/.000 FROM CASE



TION C-C
T1 REF
Q5 46
CF1 45
R27 23
T1 49
C13 33
T6 58
R21 20
R23 21
CR8 45
C11 35
C12 34
R2 24
D
R22 32
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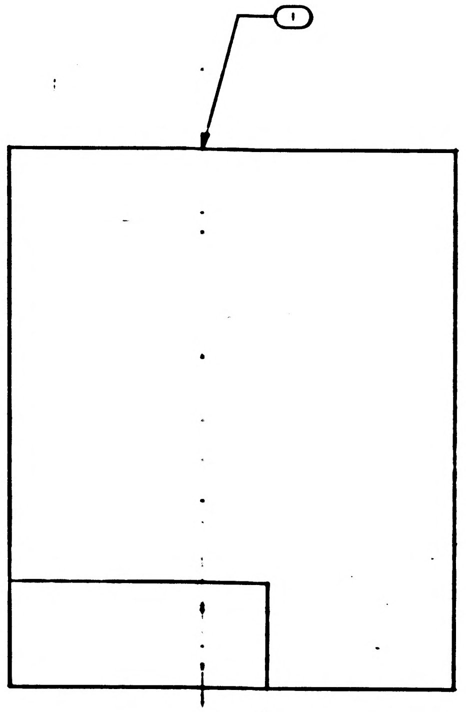
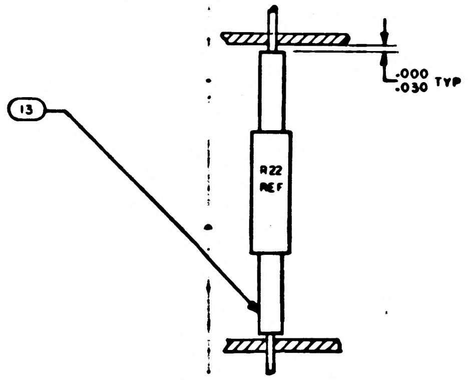
R1 15
R25 22
R5 16
R4 17

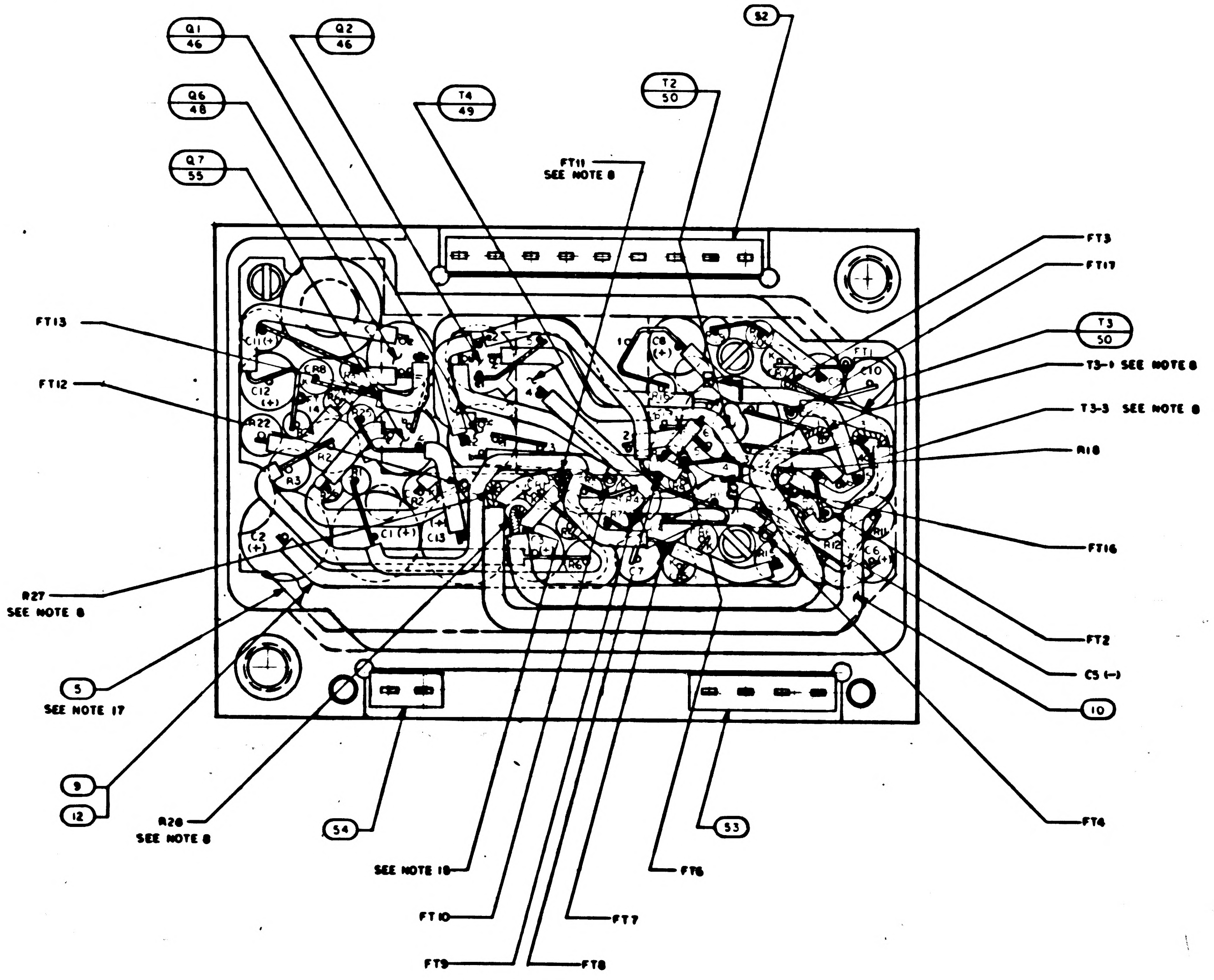




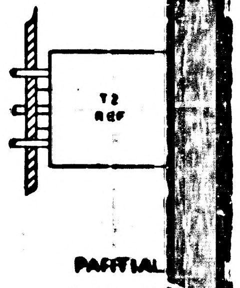
13
R22 REF
.000 -.030 TYP

PARTIAL SECTION D-D

TYPICAL FOR R14, R15, AND R22



Q1 46
Q2 46
Q6 48
Q7 55
T4 49
T2 50
S2
FT11 SEE NOTE 8
FT13
FT12
FT3
FT17
T3 50
T3-1 SEE NOTE 8
T3-3 SEE NOTE 8
R18
FT16
R27 SEE NOTE 8
5 SEE NOTE 17
FT2
C5 (-)
10
9
12
R28 SEE NOTE 8
S4
S3
FT4
SEE NOTE 18
FT6
FT10
FT7
FT9
FT8



T2 REF
PARTIAL

REVISIONS 2F510

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
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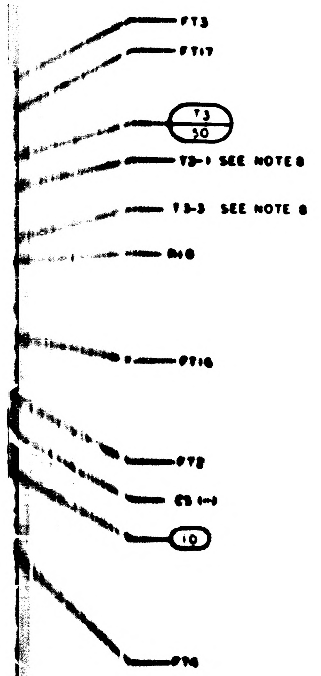
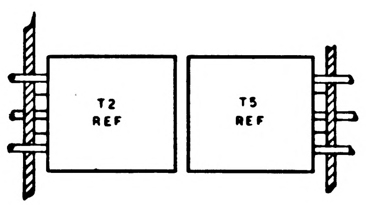
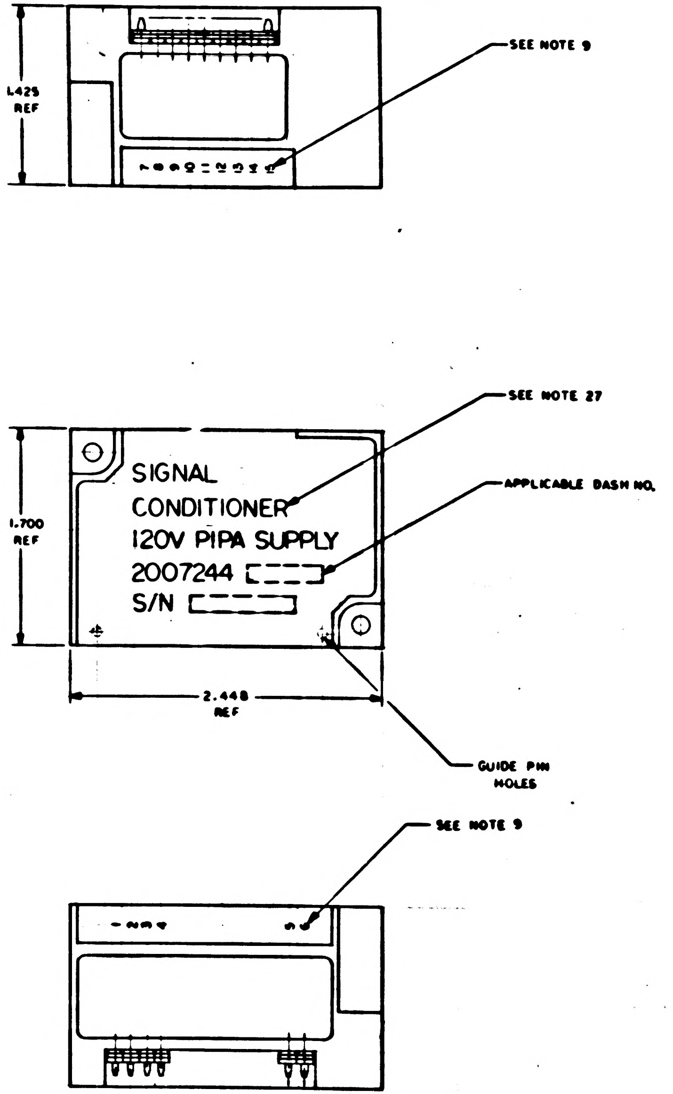
C		REVISED PER TDRR 29919				
D		REVISED PER TDRR 30431	EMS	JI	AUG 66	
E		REVISED PER TDRR 32081	KEF	CP	66	
F		REVISED PER TDRR 32412	AF	WH		
G		REVISED PER TDRR 33006	KES			





PARTIAL SECTION B-B



MARKING VIEWS
SCALE: 2/1

4H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
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1	1010324	TRANSFORMER	56
1	1010357-1	TRANSISTOR	55
1	1008540-2	GASKET, CONNECTOR, MINIATURE	54
1	1008540-4	GASKET, CONNECTOR, MINIATURE	53
1	1008540-9	GASKET, CONNECTOR, MINIATURE	52
1	1010274	TRANSFORMER	51
2	1010365	TRANSFORMER	50
2	1010710	TRANSFORMER	49
1	1010397-1	TRANSISTOR	48
1	1010342	TRANSISTOR	47
4	1010367	CHOPPER	46
3	1010385	DIODE	45
2	1010259-008	DIODE	44
2	1010372-12	DIODE	43
1	1010837-001	DIODE	42
1	1006777-31	CAPACITOR	41
2	1010279-16	CAPACITOR	40
1	1010279-104	CAPACITOR	39
1	1006755-33	CAPACITOR	38
2	1006755-132	CAPACITOR	37
1	1006755-79	CAPACITOR	36
3	1006755-69	CAPACITOR	35
1	1006755-31	CAPACITOR	34
1	1006755-130	CAPACITOR	33
1	1010368-128	RESISTOR	32
1	1010368-121	RESISTOR	31
1	1010368-105	RESISTOR	30
1	1010364-443	RESISTOR	29
1	1010364-501	RESISTOR	28
2	1010364-411	RESISTOR	27
1	1010364-471	RESISTOR	26
1	1010377-103	RESISTOR	25
1	1010377-20	RESISTOR	24
2	1006750-36	RESISTOR	23
1	1006750-8	RESISTOR	22
2	1006750-56	RESISTOR	21
1	1006750-65	RESISTOR	20
2	1006750-36	RESISTOR	19
2	1006750-32	RESISTOR	18
4	1006750-1	RESISTOR	17
1	1006750-38	RESISTOR	16
1	1006750-47	RESISTOR	15
1	2008093-000	TERMINAL, THREADED	14
AR	1006776-19	INSULATION, SLEEVING	13
AR	1006776-21	INSULATION, SLEEVING	12
AR	1006776-20	INSULATION, SLEEVING	11
AR	1010807-17	WIRE, ELECTRICAL	10
AR	1006757-1	WIRE, ELECTRICAL	9
AR	1010848-2	WIRE, ELECTRICAL, INSULATED	8
3	1015135-015	SPACER, NYLON	7
6	1008161-1	SCREW, CAP SLOTTED HEAD, SPECIAL	6
1	2008497	WIRING BOARD B	5
1	2008527	WIRING BOARD A	4
15	1006782-17	CONTACT, WRAPOST MALE, MINIATURE	3
15	1006775	INSULATOR, WRAPOST MALE, MINIATURE	2
1	2008528	FRAME	1

-011 LIST OF MATERIALS

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED
APPROVED 2 MAY 66
APPROVED
APPROVED MIT
APPROVED NASA

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V PIPA SUPPLY (OP)
ASSEMBLY
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007244
SCALE 2/1
SHEET 1 OF 1

MASTER

2007244 G

APOLLO G&N Specification
PS2007244 REV–

Original Issue Date: 14 June 1966
Release Authority: TDRR 29567
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

120V PIPA SUPPLY (OP) ASSEMBLY SIGNAL CONDITIONER ASSEMBLY

DRAWING NO. 2007244

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 10 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	R M Kowalski 7 June 66	M G Mierley 6-14-66		G W Krier	G.C. Hansen
		MIT/IL			ACSP	

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 DC Current Drain. The dc current drain of the assembly shall be 11.0±1.0 ma.

3.1.2 Reference Input Current. The 28V rms, 800 cps, input current shall be less than 12.0 ma.

3.1.3 Offset Voltage. The offset voltage of assembly section a shall be less than 100 mvdc with an input of 110.0±0.1 vdc.

3.1.4 Scale Factor

3.1.4.1 Assembly Section a. The input voltage of assembly section a shall be 85.0 vdc ±10 percent and 135.0 vdc ±10 percent when the output voltage is -2.500±0.005 vdc and +2.500±0.005 vdc respectively.

3.1.4.2 Assembly Section b. The output voltage of assembly section b shall be 25V pp minimum, 800 pps square wave, and a 22V pp minimum, 800 pps square wave for a 1 megohm load and a 2k ohm load respectively.

3.1.5 Gain Stability. The scale factor of assembly section a specified in 3.1.4.1 shall not deviate by more than ±1 percent when the +28 vdc supply is enhanced to +33 vdc or degraded to +23 vdc. The output voltage of assembly section b shall not be less than 18V pp, 800 pps, when the 28 vdc supply voltage is degraded to +23 vdc with an output load of 2k ohms.

3.1.6 Scale Factor Linearity. The scale factor linearity of assembly section a shall not deviate by more than 4 percent from the average of 4 scale factors.

3.1.7 Output Impedance. The output impedance of assembly section a shall be <5k ohms.

3.1.8 Output Ripple and Noise. The output ripple and noise of assembly section a shall be less than 10 mv pp.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Drawing 2007244 and all drawings and engineering data referenced thereon.

3.2.2 Standards of Manufacturing, Manufacturing Process, and Production

3.2.2.1 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be ≥100 megohms.

4.3.3 Insulation Resistance. The dc resistance between all assembly pins and pin 1 shall be measured in accordance with Method 302 of MIL-STD-202 using a megohmmeter having an output voltage of 225±75 vdc and limited to a short circuit current of 6.0 microamperes. The insulation resistance shall be $\geq$100 megohms.

4.3.4 Continuity and DC Resistance. The dc resistance between the pins listed in Table II shall be as specified when measured with a low-voltage, resistance measuring device using Method 303 of MIL-STD-202. To assure a good electrical connection when measuring between pin 1 and the chassis, the anodizing may be penetrated on the top of the module.

4.3.5 Circuit Isolation. Verification records shall be examined to verify that the requirement of 3.2.2.3 has been met.

4.3.6 DC Current Drain. With the reference voltage off, the dc current drain on the 28.0 vdc supply shall be 11.0±1.0 ma.

4.3.7 Reference Current Drain. With the dc supply voltage applied, the current drain on the 28V rms, 800 cps reference supply shall be less than 12.0 ma.

4.3.8 Offset Voltage. With an input voltage of 110.00±0.10 vdc applied to the input pins of assembly section a as specified in Table II the voltage at the respective output pins shall be less than 100 mvdc.

4.3.9 Scale Factor

4.3.9.1 Assembly Section a. With the output of assembly section a adjusted to -2.500±0.005 vdc, the input voltage shall be between 76.50 and 93.50 vdc. With the output of assembly section a adjusted to +2.500±0.005 vdc, the input voltage shall be between 121.50 and 148.50 vdc.

4.3.9.2 Assembly Section b. With a 1 megohm load across the output of assembly section b, the output voltage shall be a 800 pps square wave with a minimum amplitude of 25.0V pp. With a 2k ohm load across the output of assembly section b, the output voltage shall be $\geq$22.0V pp.

4.3.10 Gain Stability. With the input to assembly section a adjusted for an output of +2.500±0.005 vdc, enhancing or degrading the +28 vdc supply shall not cause the output to deviate by more than ±25 mvdc. Degrading the +28 vdc supply shall not cause the 800 pps square wave output of assembly section b to decrease below 18V pp with a 2k ohm ±2 percent load resistance.

4.3.11 Scale Factor Linearity. With the conditions specified below established for assembly section a, each of four calculated scale factor values shall not deviate from the average of the four values by more than ±4 percent.

a. The dc input signal voltage adjusted and recorded to obtain an output of 0.000±0.005 vdc.

b. The input consecutively adjusted to the following deviations from the input recorded in a:

(1) -25.00 vdc
(2) -10.00 vdc
(3) +10.00 vdc
(4) +25.00 vdc

c. The output voltage obtained from b. (2) and b. (3) normalized by multiplying each value by 2.50 and the output voltages obtained from b. (1) and b. (4) normalized by multiplying each value by 1.00.

d. The 4 normalized outputs of c. averaged.

e. Each normalized output shall not deviate by more than 4 percent from the average obtained in d.

4.3.12 Output Impedance. With the input to assembly sections a adjusted for an output of 2.500±0.005 vdc, and then a 100k ohm ±1 percent resistor substituted for the 1 megohm load resistor, the output shall not drop below 2.380 vdc.

4.3.13 Diode Function. With the output of assembly section a adjusted for +2.50±0.10 vdc, the output voltage shall remain constant when pins 7 and 8 are momentarily connected together. With the output adjusted to -2.500±0.010 vdc, repeating the above test shall cause the output to decrease below -1.0 vdc.

4.3.14 Output Ripple and Noise. With the output of assembly section a at 2.50±0.05 vdc, the ripple and noise voltage at the output shall be <10 mv pp.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

REVISIONS · 21079						
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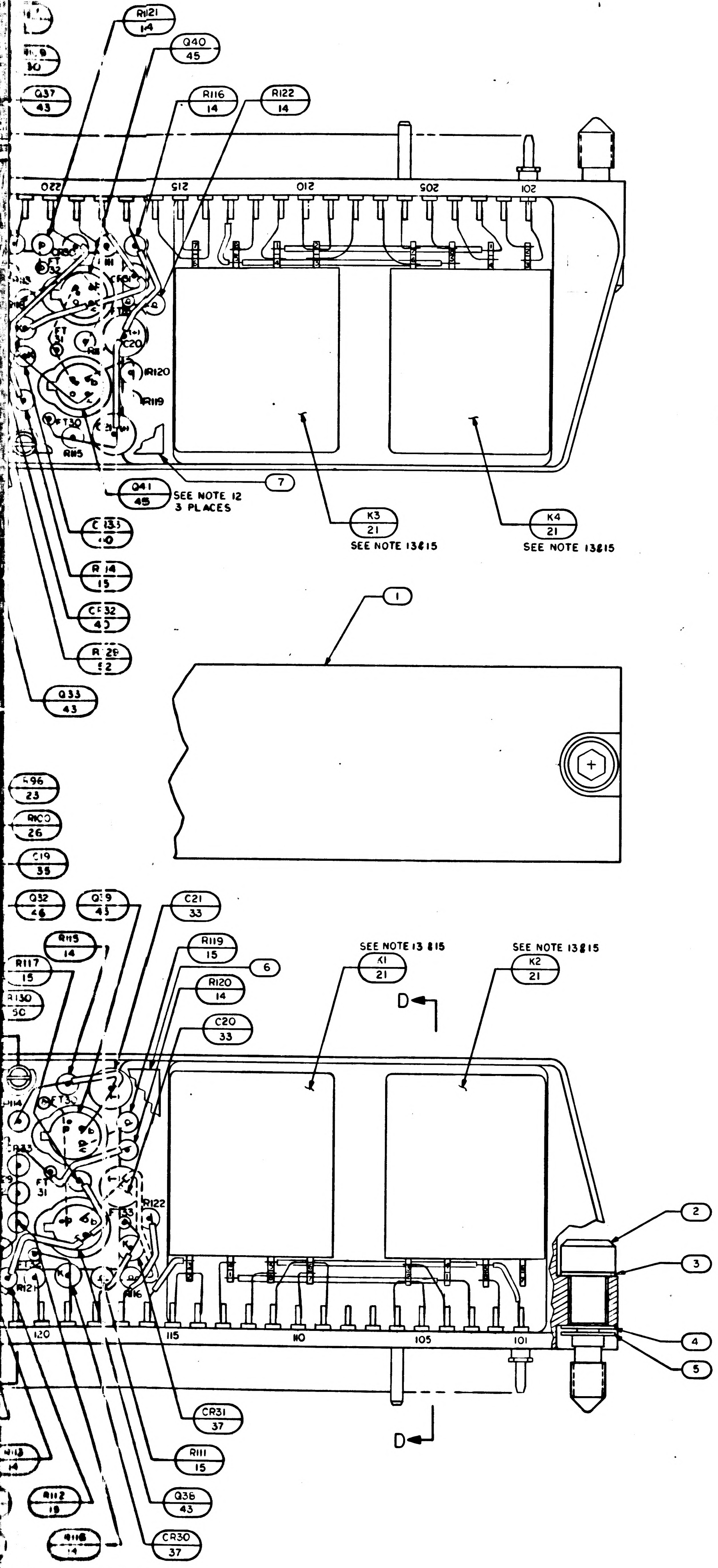
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R122
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201
C20
R120
R119
SEE NOTE 12
3 PLACES
7
Q41
45
K3
21
SEE NOTE 13&15
K4
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SEE NOTE 13&15
R114
15
1
Q33
43
R96
23
Q32
46
Q39
43
C21
33
R115
14
R117
15
R119
15
6
R120
14
C20
33
SEE NOTE 13 &15
K1
21
SEE NOTE 13&15
K2
21
D
2
3
4
5
120
115
110
105
101
CR31
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R111
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Q36
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R112
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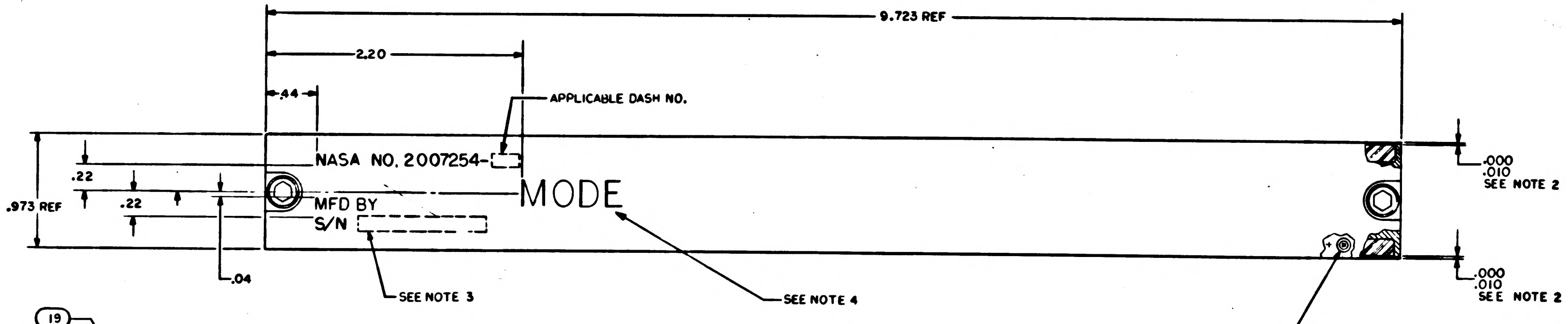
CR30
37
R118
14
D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.22
.04
SEE NOTE 3
SEE NOTE 4
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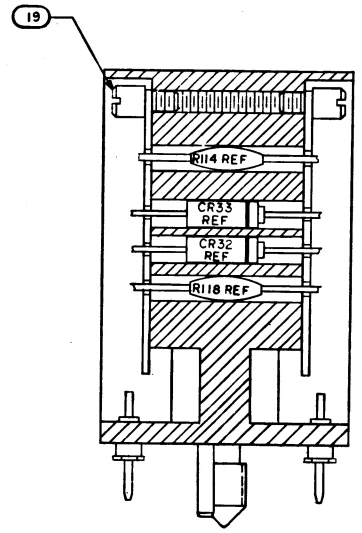
.010
SEE NOTE 2
.000
.010
SEE NOTE 2
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1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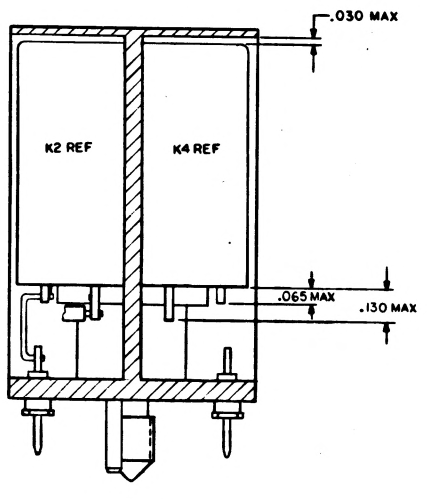
CR32 REF
R118 REF

SECTION C-C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K4 REF
.065 MAX
.130 MAX

SECTION D-D

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2	1006750-47	RESISTOR	52
1	1006750--31	RESISTOR	51
1	1006750-35	RESISTOR	50
1	1010279-112	CAPACITOR	49
1	1006777-34	CAPACITOR	48
1	1010604-16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
2	1010372-18	DIODE	42
4	1010372-16	DIODE	41
3	1010830-19	DIODE	40
1	1010830-9	DIODE	39
2	1010362-002	DIODE	38
19	1010385	DIODE	37
2	1006755-85	CAPACITOR	36
6	1006755-69	CAPACITOR	35
5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
2	1010369-101	RESISTOR	32
2	1010369-95	RESISTOR	31
6	1006750-49	RESISTOR	30
2	1006750-52	RESISTOR	29
2	1006750-64	RESISTOR	28
2	1006750-84	RESISTOR	27
22	1006750-80	RESISTOR	26
9	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
7	1006750-25	RESISTOR	23
1	1006750-20	RESISTOR	22
4	1010353-7	RELAY	21
10	2008319	INSULATOR, WASHER	20
4	1008161-4	SCREW, CAP SLOTTED HEAD	19
2	1006750-46	RESISTOR	18
14	1006750-56	RESISTOR	17
8	1006750-36	RESISTOR	16
17	1006750-63	RESISTOR	15
24	1006750-39	RESISTOR	14
1	2008093-001	TERMINAL, THREADED	13
AR	1006776-21	INSULATION SLEEVING	12
AR	1006776-22	INSULATION SLEEVING	11
AR	1006757-1	WIRE ELECTRICAL	10
AR	1006757-8	WIRE, ELECTRICAL	9
46	1008025-1	INSULATOR, BUSHING	8
1	2008344	WIRING BOARD B	7
1	2008342	WIRING BOARD A	6
2	MS16633-4015	RING, RETAINING, EXTERNAL 'E'	5
2	1004546-3	WASHER, FLAT	4
2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
1	2007211-011	HEADER HOUSING ASSEMBLY	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS		

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

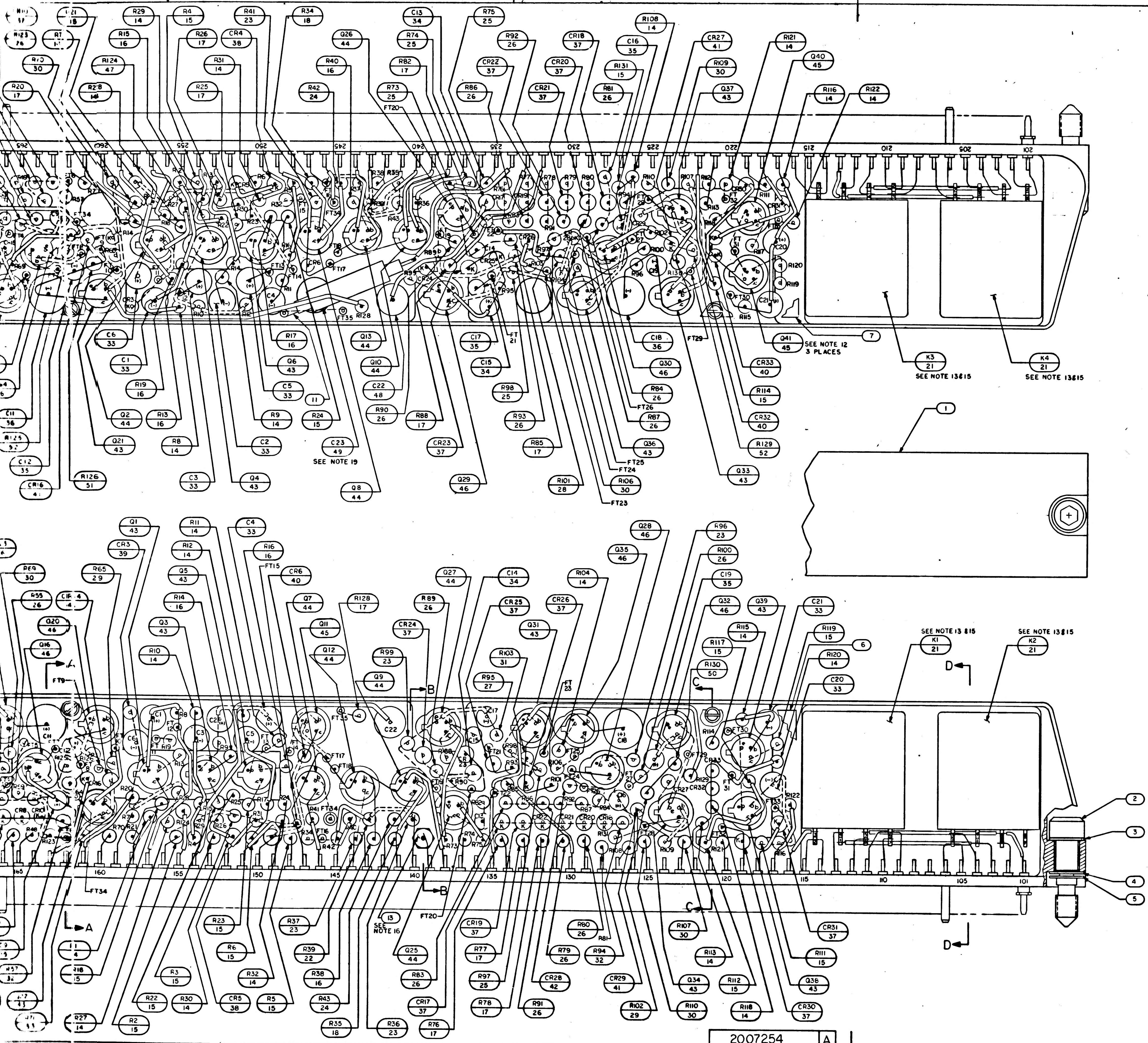
DRAWN W.F. Troy 5/11/65
CHECKED 7 Jun 65
APPROVED 8 Jun 65
APPROVED 9 Jun 65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MODE ASSY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007254
SCALE 4/1
SHEET 1 OF 1

2007254 A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SEE NOTE 12
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SEE NOTE 13&15
K4
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SEE NOTE 13&15
SEE NOTE 19
SEE NOTE 13 &15
K1
21
SEE NOTE 13&15
K2
21
SEE NOTE 16
FT20
FT23
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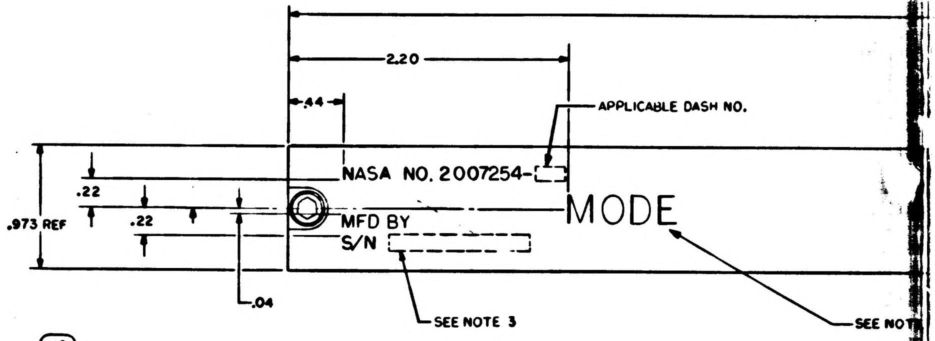
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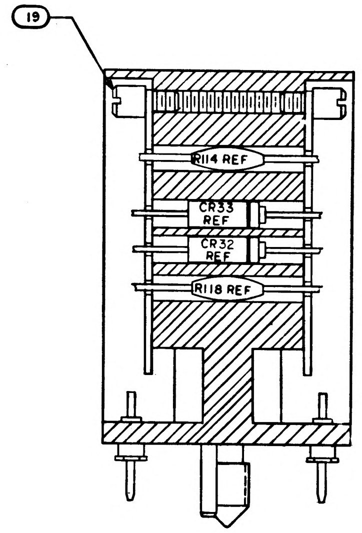
MFD BY
MODE
S/N
.04
SEE NOTE 3
SEE NOTE

MARKING VIEW
SCALE 2/1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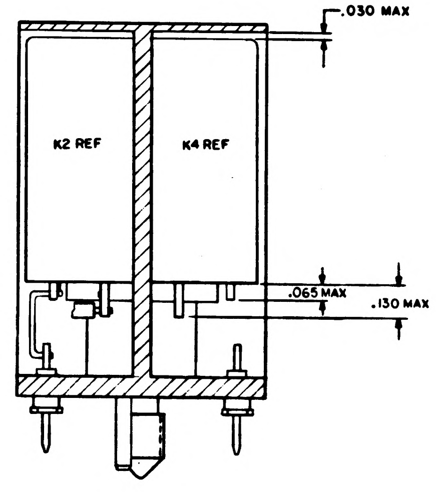
SECTION C-C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K2 REF
K4 REF
.065 MAX
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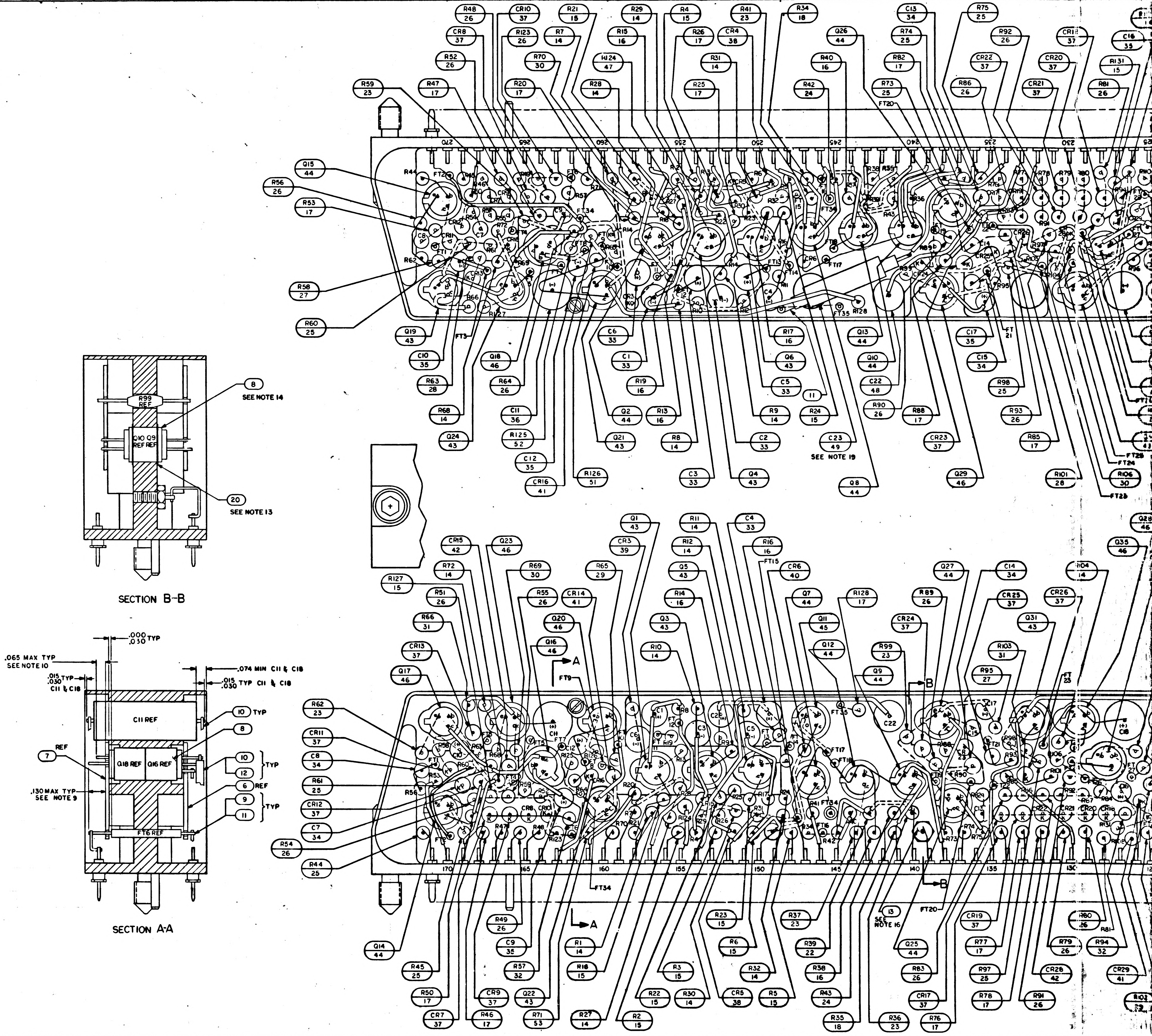
SECTION D-D

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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SEE NOTE 14
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SEE NOTE 13
SECTION B-B
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.015/.030 TYP C11 & C18
C11 REF
Q18 REF
Q16 REF
REF
7
10 TYP
8
10
12
TYP
6 REF
9
11
TYP
.130 MAX TYP SEE NOTE 9
FT6 REF
SECTION A-A
SEE NOTE 19
SEE NOTE 16
A
B
FT34
FT20

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD C OR D
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND 1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER ND1002203

2007254	A

APOLLO G&N Specification
PS2007254 REV A
Original Issue Date: 23 Nov 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----

This specification consists of page 1 to 20 inclusive.

APPROVALS	METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

TABLE I

DIGITAL MODE DRIVE CIRCUITRY

SIGNAL	INPUT PULSE	TO PINS		OUTPUT PULSE	AT PINS	
		Hi	Lo		Hi	Lo
FAZ 3DR	Negative	141	152	Positive	142	138
FAZ 2DR/	Negative	248	152	Positive	245	249
FAZ 4DR	Positive	238	152	Negative	237	239
FAZ 2DR	Positive	246	152	Negative	146	147

3.1.2.2 Enable Drive Circuitry. The assembly shall be capable of producing the outputs specified in Tables II, III, IV and V under the conditions specified in 4.3.6.

TABLE II

COMPUTER CONTROLLED ENABLES - PART "A"

SIGNAL	PINS		OUTPUT VOLTAGE	CONDITIONS
	Hi	Lo		
IMUOPR	158	152	22.0±0.5 vdc	22.0±0.5 vdc supply voltage
IMUOPR	158	152	33.0±0.5 vdc	33.0±0.5 vdc supply voltage
U +14 TP	159	152	14.0 +1.5, -1.0 vdc	
U +14 TP	159	152	7±1 vdc	2K to ground
A +14V	259	152	14.0 +1.5, -1.0 vdc	1K to ground
CARPSA	151	152	≤1.5 vdc	

TABLE III

COMPUTER CONTROLLED ENABLES - PART "B"

MODE DRIVE CONNECTION			OUTPUT					
Signal	To Pin		Signal	Pins		High Voltage	Low Voltage	Risetime & Falltime
	Hi	Lo		Hi	Lo			
AGCCA	156	152	ISSCA	257	244	2±1 vdc	≤250 mv	2.5+2.5, -2.0 msec
AGCZ	153	152	ISSZ	254	244	↑	↑	↑
AGCEEC	255	152	ISSEEC	253	244			
AGCRRZ	148	152	RRZ	250	244	↓	↓	↓
AGCDAE	251	152	RRDAE	149	244	2±1 vdc	≤250 mv	2.5+2.5, -2.0 msec
AGCCA	156	152	CARPSA	151	244	39±2 vdc	≤1.5 vdc	0.3±0.28 msec

3.1.2.4 RR/Optics CDU Fail Detect Circuitry. The assembly shall furnish a non-fail output (a voltage of less than 0.5 vdc) at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent upon application of 27.5±5.5 vdc at pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all of the non-fail signals of Table VIII. A fail indication of +26.5±6.5 vdc shall be available at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table VIII. A non-fail output shall be furnished again by the assembly within 1.0 second after removal of the fail input.

TABLE VIII

RR/OPTICS CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NONFAIL	FAIL	CONDITIONS
DUPLVL	171	0.80±0.05V, square wave	≤100 cps	≥200 cps	
EUPLVL	269	0.80±0.05V, square wave	≤100 cps	≥200 cps	
DFINER	168	800 cps sine wave	≤0.5V rms	≥1.0V rms	
EFINER	167	↑	≤0.5V rms	≥1.0V rms	
ECRSER	166		≤1.5V rms	≥2.0V rms	
DCRSER	165		≤1.5V rms	≥2.0V rms	
DCSRFH	160	↓	≥2.0V rms	≤0.8V rms	
ECSRFH	262	800 cps sine wave	↑	↑	
DCSRFH (cos θ- ψ)	160	800 cps ∠0° sine wave	↓	↓	Pin 154 connected to pin 162. Pins 233 & 234 connected to ground.
ECSRFH (cos θ- ψ)	262	800 cps ∠50° ±15°	≥2.0V rms	≤0.8V rms	
O +14 TP	163	DC through 2K resistor	≥10 vdc	≤7 vdc	
O +14 TP	163	Resistor to ground	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 163

3.1.2.5 IMU CDU Fail Detect Circuitry. A non-fail indication (a voltage less than 0.5 vdc) shall be furnished by the assembly at pins 127 (Hi) and 122 (Lo) when loaded with 20K ±5 percent upon application of +27.5±5.5 vdc at pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all non-fail signals of Table IX. There shall be a fail indication (+26.5±6.5 vdc) available at pins 127 (Hi) and 122 (Lo), when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table IX. A non-fail output shall be furnished again within 1.0 second after removal of the fail input.

4.3.3 Continuity and DC Resistance. Resistance between the pins listed in Table X shall be as specified when measured with a low voltage resistance measuring device using method 303 of Standard MIL-STD-202. To assure a good electrical connection between pin 139 and the chassis (see Table X), the anodizing may be penetrated on the top of the module.

4.3.4 Insulation Resistance. The insulation resistance between pin 139 and the remaining assembly pins shall be as specified in 3.2.3.2 when measured in accordance with Method 302 of Standard MIL-STD-202. The megohmmeter used shall have an output voltage of 225±75 vdc limited to a short circuit current of 6.0 μa.

4.3.5 Digital Mode Drive Circuitry. With a supply voltage of 3.5±0.1 vdc applied to pins 140 (Hi) and 150 (Lo) and with the input driving source and input pulses having the characteristics of 3.1.1.3 applied as specified in Table I, the output pulses shall be as specified in Table I and shall have the characteristics described in 3.1.2.1 (High Value: 3.5±0.2 vdc). With this test repeated when the supply voltage is 4.5±0.1 vdc, the output pulses shall have the same characteristics except that the High Value shall be 4.5±0.2 vdc.

4.3.6 Enable Drive Circuitry

4.3.6.1 Computer Controlled Enables. With the following tests conducted using a 22.0±0.5 vdc supply voltage and then repeated using a 33.0±0.5 vdc supply voltage, outputs shall be as specified.

a. With the following conditions established, outputs shall be as specified in Table II:

(1) Supply voltage applied to pins 155 (Hi), 157 (Hi), 258 (Hi) and 152 (Lo).
(2) Supply voltage applied to pin 150 through a 300 ohm ±5 percent, 5 watt resistor.
(3) Pin 156 grounded through a 2K ±10 percent resistor.

b. With the following conditions established, outputs shall be as specified in Table III:

(1) Supply voltage applied to pins 155 (Hi), 157 (Hi), 258 (Hi) and 152 (Lo).
(2) 45±1 vdc applied to pin 150 through a 2.4K ±5 percent resistor.
(3) The output of the mode driver circuit (Figure 1 or equivalent) applied to the inputs specified in Table III.

c. With the conditions specified in 4.3.6.1.b (above) established and with a ground applied to pin 252, outputs shall be as specified in Table III except that the outputs at pins 253 and 149 shall continuously be ≤250 mv and the output at pin 151 shall continuously be ≤1.5 vdc.

4.3.6.2 Digital Mode Controlled Enables. With the following tests conducted using a 3.5±0.1 vdc supply voltage and then repeated using a 4.5±0.1 vdc supply voltage, outputs shall be as specified.

a. With the following conditions established, outputs shall be as specified in Table IV:

(1) Supply voltage applied to pins 247 (Hi) and 152 (Lo).

(2) 300 mv dc applied to the input pins specified in Table IV from a source resistance less than or equal to 100 ohms.

b. With the following conditions established, outputs shall be as specified in Table V:

(1) Supply voltage applied to pins 247 (Hi) and 152 (Lo).

(2) 3.5±0.1 vdc applied to the input pins specified in Table V through a 2.7K ±5 percent resistor.

4.3.7 Relay Circuits. Relay circuits shall be checked as follows:

a. When the following input conditions exist, the outputs specified in Table VI shall be present:

(1) A supply voltage of 33.0±0.5 vdc applied to pins 103 (Hi), 119 (Hi), 118 (Hi), 203 (Hi), 217 (Hi) and 121 (Lo).

(2) Pin 101 connected to pin 220 and pin 213 connected to pin 218.

(3) The output of the mode driver circuit (Figure 1 or equivalent) connected to the inputs specified in Table VI, and the input of the mode driver circuit connected to ground.

b. When the following input conditions exist, the outputs specified in Table VII shall be present:

(1) A supply voltage of 22.0±0.5 vdc applied to pins 103 (Hi), 119 (Hi), 118 (Hi), 203 (Hi), 217 (Hi) and 121 (Lo).

(2) Pin 101 connected to pin 220 and pin 213 connected to pin 218.

(3) The output of the mode driver circuit (Figure 1 or equivalent) connected to the inputs specified in Table VII, and the input of the mode driver circuit connected to 3.5±0.1 vdc.

4.3.8 RR/Optics CDU Fail Detect Circuitry. With 33.0±0.5 vdc applied to pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all the non-fail limit input signals of Table VIII applied, there shall be a non-fail indication at pin 169 as evidenced by a voltage of less than 0.5 vdc into a 20K ±5 percent load. With the fail signal limits of Table VIII applied sequentially, while maintaining all other non-fail limit signals, there shall be a fail indication at pin 169 of 30±1 vdc with a 20K ±50 percent load, 5±2 seconds after application of the fail input. After removal of the last fail input, a non-fail indication (a voltage less than 0.5 vdc) shall be present within 1 second. The ECSRFH input shall be checked at both the +15° phase shift and a -15° phase shift for both non-fail limit and fail limit conditions while the other CSRFH input is maintained at 2.2V rms, 0 phase as specified in Table VIII. With this entire test repeated, except for the CSRFH channels and UPLVL channels, using a supply voltage of 22.0±0.5 vdc, the fail indication shall be 20±1 vdc, 7±3 seconds after application of the fail input.

4.3.9 IMU CDU Fail Detect Circuitry. With +33.0±0.5 vdc applied to pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all the non-fail signal limit inputs of Table IX applied, there shall be a non-fail indication at pin 127 as evidenced by a voltage of less than 0.5 vdc into a 20K ±5 percent load. Maintaining all other non-fail inputs and with the fail signal limit inputs specified in Table IX applied sequentially, there shall be a fail indication at pin 127 of 30±1 vdc, into a 20K ±5 percent load, 5±3 seconds after application of the fail input. After removal of the last fail input, a non-fail indication (a voltage of less than 0.5 vdc) shall be present within 1 second. With this entire test repeated, except for the CSRFH and UPLVL channels, using a supply voltage of 22.0±0.5 vdc, the fail indication shall be 20±1 vdc, 7±3 seconds after application of the fail input.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

REVISIONS 21079

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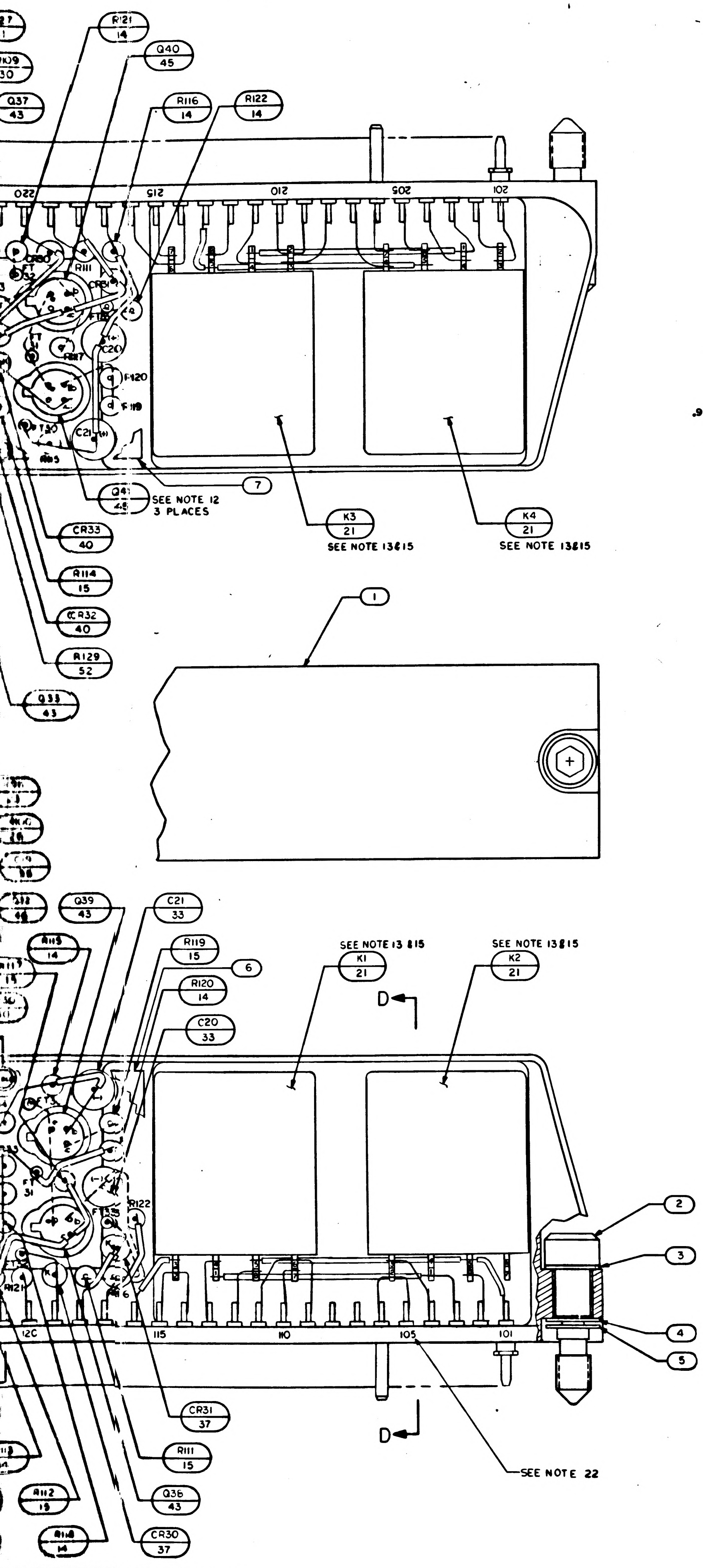
B		REVISED PER TDRR 22990	ADL			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R116 14
R122 14
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210
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201
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7
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SEE NOTE 13&15
K4 21
SEE NOTE 13&15
CR33 40
R114 15
CR32 40
R129 52
Q38 43
1
Q39 43
C21 33
R119 15
6
R120 14
C20 33
SEE NOTE 13 &15
K1 21
SEE NOTE 13&15
K2 21
D
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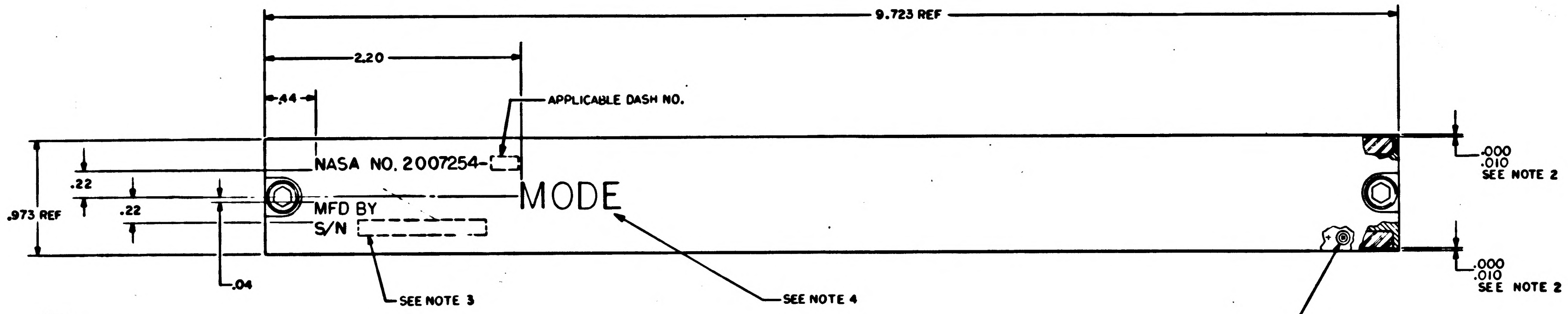
R112 15
R118 14
SEE NOTE 22
D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NASA NO. 2007254-
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SEE NOTE 3
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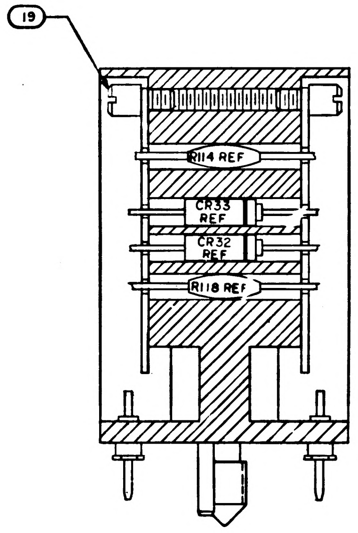
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1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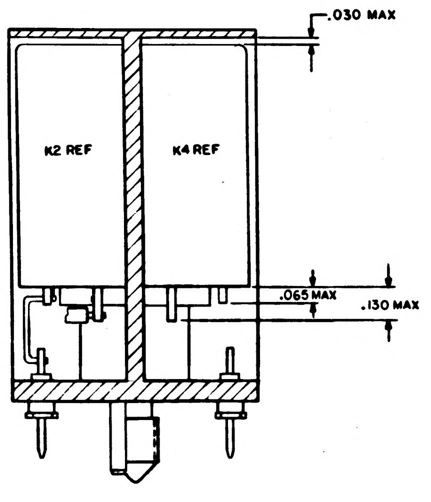
SECTION C-C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K2 REF
K4 REF
.065 MAX
.130 MAX

SECTION D-D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
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1	1006750 - 51	RESISTOR	53
2	1006750 - 47	RESISTOR	52
1	1006750 - 31	RESISTOR	51
1	1006750 - 35	RESISTOR	50
1	1010279 - 112	CAPACITOR	49
1	1006777 - 34	CAPACITOR	48
1	1010604 - 16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
2	1010372 -18	DIODE	42
4	1010372 - 16	DIODE	41
3	1010830-19	DIODE	40
1	1010830-9	DIODE	39
2	1010362-002	DIODE	38
19	1010385	DIODE	37
2	1006755 -85	CAPACITOR	36
6	1006755 - 69	CAPACITOR	35
5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
2	1010369-101	RESISTOR	32
2	1010369 - 95	RESISTOR	31
6	1006750 - 49	RESISTOR	30
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2	1006750 - 64	RESISTOR	28
2	1006750 - 84	RESISTOR	27
22	1006750 - 80	RESISTOR	26
9	1006750 - 73	RESISTOR	25
2	1006750 - 11	RESISTOR	24
7	1006750 - 25	RESISTOR	23
1	1006750 - 20	RESISTOR	22
4	1010353 - 7	RELAY	21
10	2008319	INSULATOR, WASHER	20
4	1008161 - 4	SCREW, CAP SLOTTED HEAD	19
2	1006750 - 46	RESISTOR	18
14	1006750 - 56	RESISTOR	17
8	1006750 - 36	RESISTOR	16
17	1006750 - 63	RESISTOR	15
24	1006750 - 39	RESISTOR	14
1	2008093-001	TERMINAL, THREADED	13
AR	1006776 - 21	INSULATION SLEEVING	12
AR	1006776 - 22	INSULATION SLEEVING	11
AR	1006757 - 1	WIRE ELECTRICAL	10
AR	1006757 - 8	WIRE, ELECTRICAL	9
46	1008025 - 1	INSULATOR, BUSHING	8
1	2008344	WIRING BOARD B	7
1	2008342	WIRING BOARD A	6
2	MS16633-4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546 - 3	WASHER, FLAT	4
2	1004546 - 1	WASHER, FLAT	3
2	1004579 - 1	SCREW, JACKING	2
1	2007211 - 011	HEADER HOUSING ASSEMBLY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007222	

APPLICATION

UNLESS OTHERWISE SPECIFIED
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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W F Troy 5/11/65
CHECKED 7 MAY 65
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

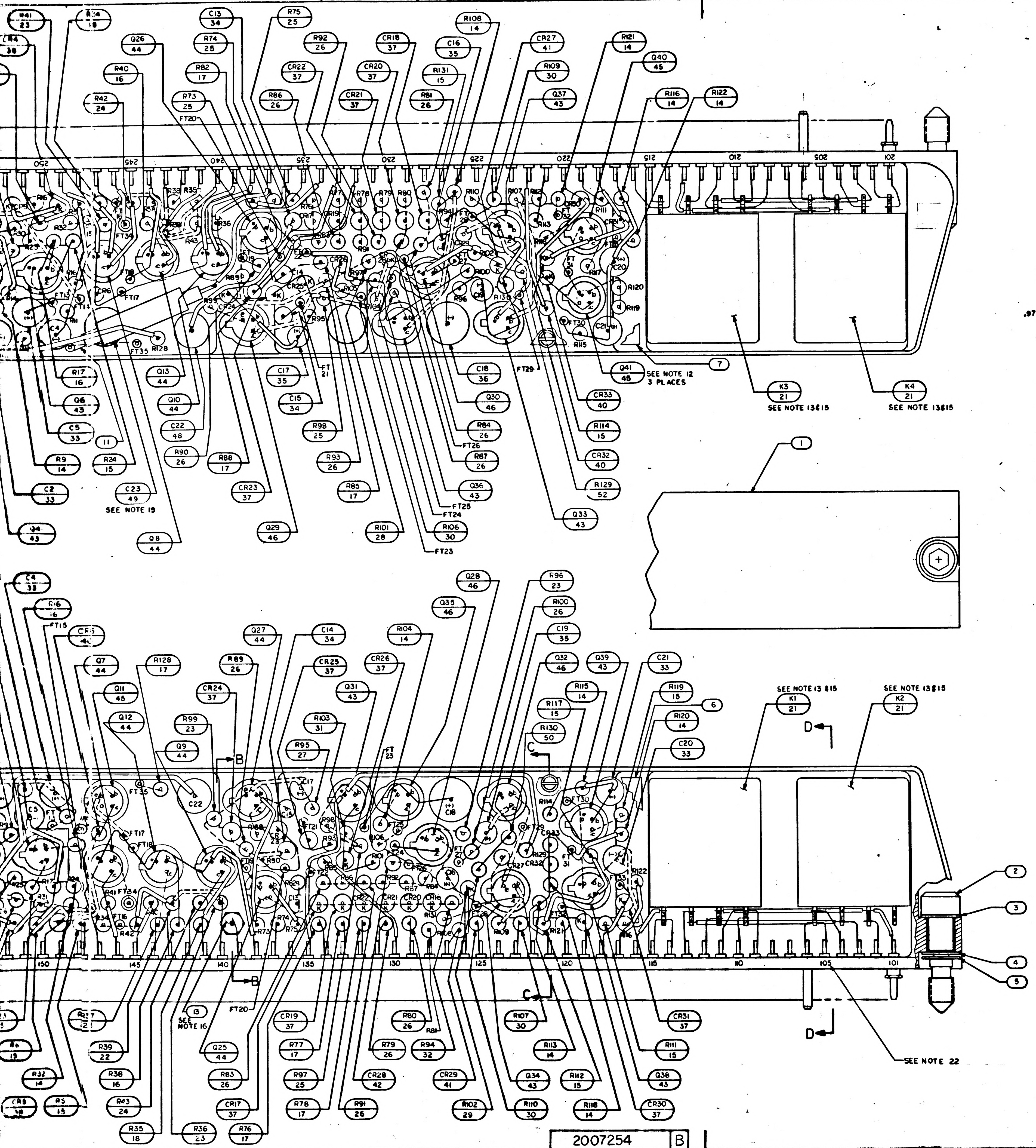
MODE ASSY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007254
SCALE 4/1
SHEET 1 OF 1

2007254 B

MASTER

F-3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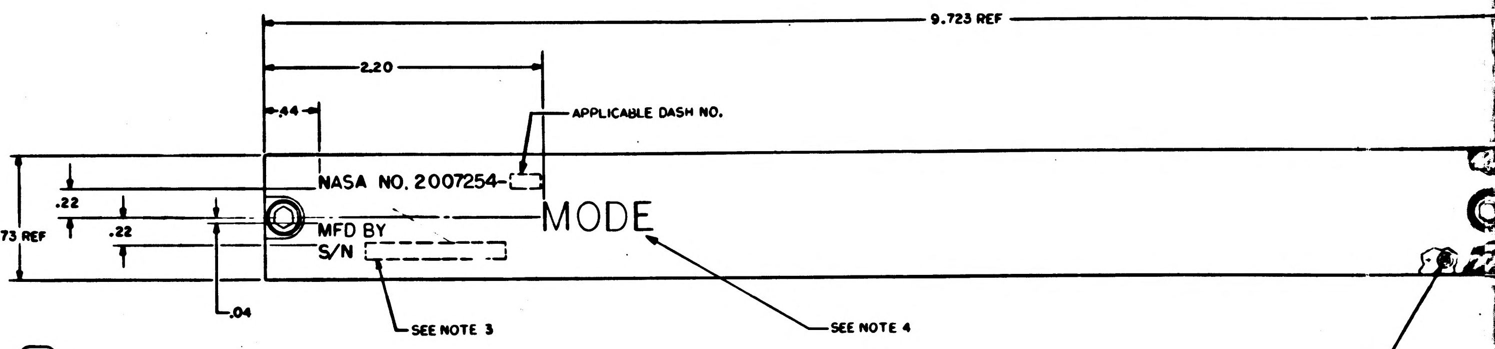
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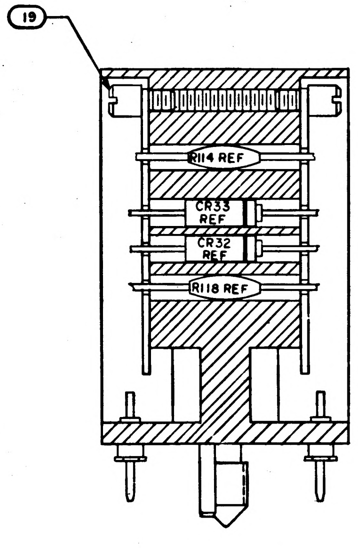
SEE NOTE 3
SEE NOTE 4
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1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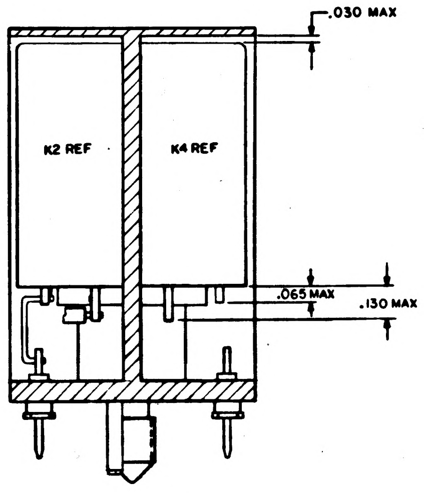
SECTION C-C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.065 MAX
.130 MAX

SECTION D-D

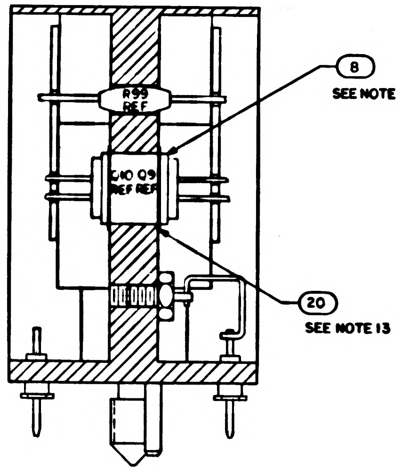
MASTER

2007222	
NEXT ASSY	USED ON
APPLICATION	

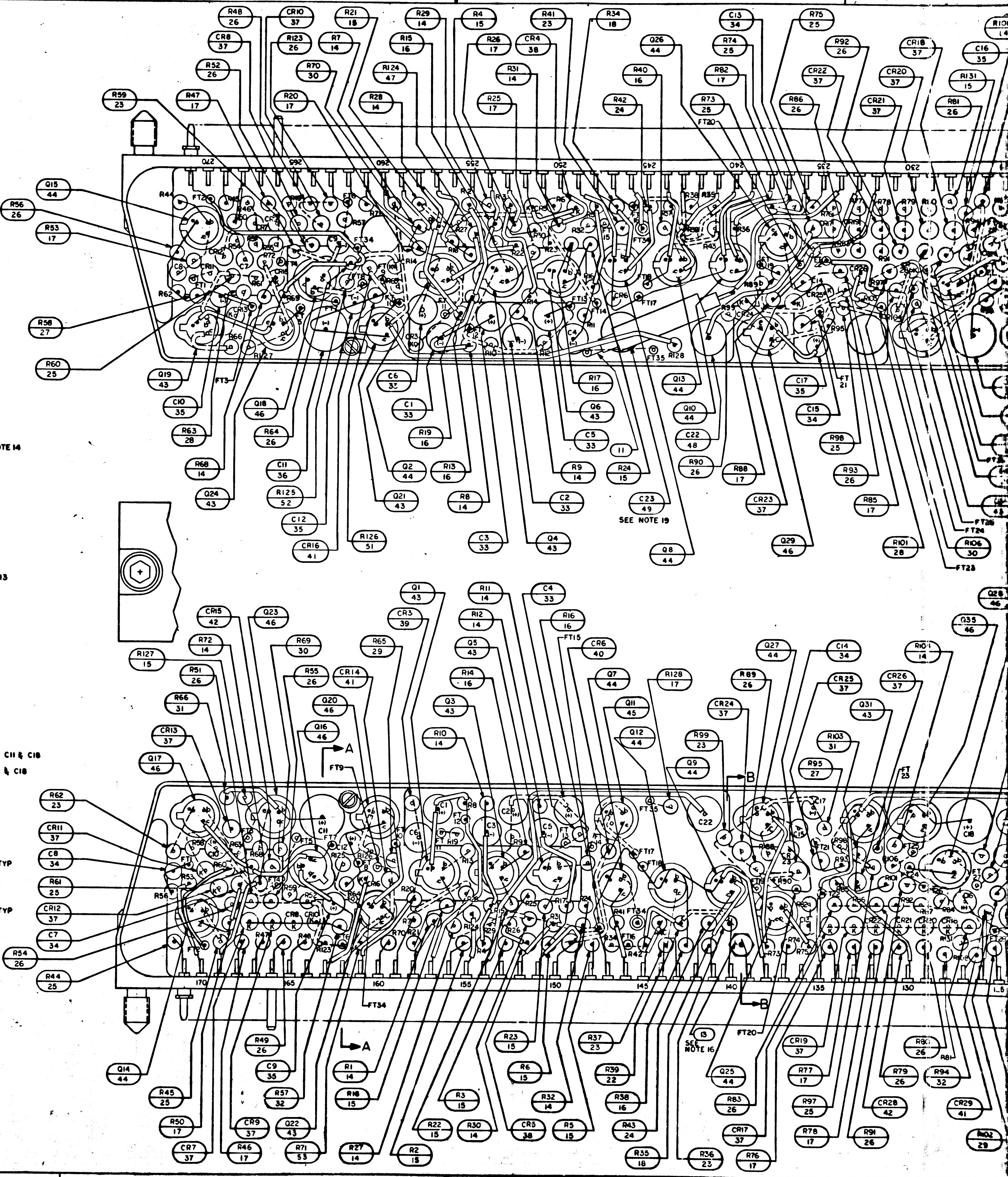
2007254 B

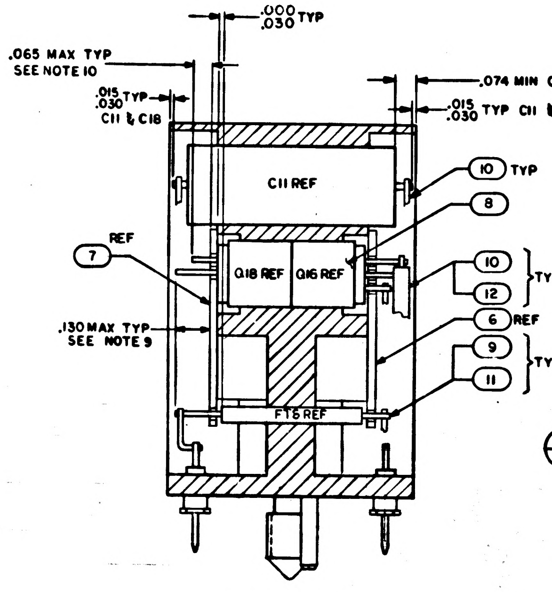
E-2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



SECTION B-B





SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10 /.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26 /.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD J
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER ND1002203
20. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
21. EXCEPT FOR MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
22. MARK .060 /.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II

APOLLO G&N Specification
PS2007254 REV B
Original Issue Date: 23 Nov 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20	WK	ACM

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

3.1.2.4 RR/Optics CDU Fail Detect Circuitry. The assembly shall furnish a non-fail output (a voltage of less than 0.5 vdc) at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent upon application of 27.5±5.5 vdc at pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all of the normal signals or the application of a non-fail signal of Table VIII while maintaining all other normal signals. A fail indication of +26.5±6.5 vdc shall be available at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table VIII. A non-fail output shall be furnished again by the assembly within 1.0 second after removal of the fail input.

TABLE VIII

RR/OPTICS CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
DUPLVL	171	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
EUPLVL	269	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
DFINER	168	800 cps sine wave	0 vac	≤0.5V rms	≥1.0V rms	
EFINER	167		0 vac	≤0.5V rms	≥1.0V rms	
ECRSER	166		0 vac	≤1.5V rms	≥2.0V rms	
DCRSER	165		0 vac	≤1.5V rms	≥2.0V rms	
DCSRFH	160		≥2.0V	≥2.0V rms	≤0.8V rms	
ECSRFH	262	800 cps sine wave	≥2.0V			
DCSRFH (cos θ−ψ)	160	800 cps $\angle 0^\circ$ sine wave	≥2.0V			Pin 154 connected to pin 162. Pins 233 &234 connected to ground
ECSRFH (cos θ−ψ)	262	800 cps $\angle 50^\circ$ ±15°	≥2.0V	≥2.0V rms	≤0.8V rms	
O +14 TP	163	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	
O +14 TP	163	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 163

3.1.2.5 IMU CDU Fail Detect Circuitry. A non-fail indication (a voltage less than 0.5 vdc) shall be furnished by the assembly at pins 127 (Hi) and 122 (Lo) when loaded with 20K ±5 percent upon application of +27.5±5.5 vdc at pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all normal signals or the application of a non-fail signal of Table IX while maintaining all other normal signals. There shall be a fail indication (+26.5±6.5 vdc) available at pins 127 (Hi) and 122 (Lo), when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table IX. A non-fail output shall be furnished again within 1.0 second after removal of the fail input.

TABLE IX

IMU CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
BUPLVL	137	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
CUPLVL	235	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AUPLVL	236	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AFINER	134	800 cps, sine wave	0 vac	≤0.5V rms	≥1.0V rms	±0.1V rms
BFINER	133	↑	0 vac	≤0.5V rms	≥1.0V rms	↑
C FINER	132		0 vac	≤0.5V rms	≥1.0V rms	
ACRSER	131		0 vac	≤1.5V rms	≥2.0V rms	
BCRSER	129		0 vac	≤1.5V rms	≥2.0V rms	
CCRSER	128		0 vac	≤1.5V rms	≥2.0V rms	
CCSRFH	125		≥2.0V	≥2.0V rms	≤0.8V rms	
ACSRFH	123	↓	≥2.0V	≥2.0V rms	≤0.8V rms	↓
BCSRFH	224	800 cps, sine wave	≥2.0V	≥2.0V rms	≤0.8V rms	±0.1V rms
U +14 TP	126	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	±0.5 vdc
U +14 TP	126	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 126

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2007254 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. The maximum weight of the assembly shall be 0.484 pound.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table X.

3.2.3.2 Insulation Resistance. The resistance between pin 139 and the remaining assembly pins shall be not less than 100 megohms.

TABLE XII

SECOND VIBRATION TEST INPUTS

SIGNAL	PIN	INPUT	SIGNAL	PIN	INPUT
U+28VH SATCON SATCON GCAPC GCAPC	217 103 119 203 118	33.0±0.5 vdc ↕ 33.0±0.5 vdc	DDACL EDACL	216 210	Jumper
			ENGYH O28RFH	212 207	Jumper
+4VLO	121	Ground	K28RFH K28RFL	204 205	Jumper
SATPH SATYH	113 112	Jumper	ADACL	111	4.0±0.5 vdc
BDACL CDACL	115 106	Jumper	REJMPA REJMPA	101 220	Jumper
SATRh ENGPH	102 211	Jumper	REJMPB REJMPB	213 218	Jumper

TABLE XIII

VIBRATION TEST OUTPUTS

SIGNAL	PIN	OUTPUT
FAZ4HI	237	100±10 cps square wave, 4.0±0.5 vdc Hi, ≤200 mvdc Lo
CARPSA	151	≤1.5 vdc
ISSCA ISSZ ISSEEC RRZ RRDAE TVCDA	257 254 253 250 149 221	2.8±1.0 vdc ↕ 2.8±1.0 vdc
U28RFL	201	4.0±0.5 vdc
OFAIL UFAIL	169 127	20±2 vdc, 20K ±5% load to ground 20±2 vdc, 20K ±5% load to ground
U+14TP	159	14 +1.5, -1.0 vdc

b. With the following conditions established, outputs shall be as specified in Table V:

   (1) Supply voltage applied to pins 247 (Hi) and 152 (Lo).

   (2) 3.5±0.1 vdc applied to the input pins specified in Table V through a 2.7K ±5 percent resistor.

4.3.7 Relay Circuits. Relay circuits shall be checked as follows:

a. When the following input conditions exist, the outputs specified in Table VI shall be present.

   (1) A supply voltage of 33.0±0.5 vdc applied to pins 103 (Hi), 119 (Hi), 118 (Hi), 203 (Hi), 217 (Hi) and 121 (Lo).

   (2) Pin 101 connected to pin 220 and pin 213 connected to pin 218.

   (3) The output of the mode driver circuit (Figure 1 or equivalent) connected to the inputs specified in Table VI, and the input of the mode driver circuit connected to ground.

b. When the following input conditions exist, the outputs specified in Table VII shall be present:

   (1) A supply voltage of 22.0±0.5 vdc applied to pins 103 (Hi), 119 (Hi), 118 (Hi), 203 (Hi), 217 (Hi) and 121 (Lo).

   (2) Pin 101 connected to pin 220 and pin 213 connected to pin 218.

   (3) The output of the mode driver circuit (Figure 1 or equivalent) connected to the inputs specified in Table VII, and the input of the mode driver circuit connected to 3.5±0.1 vdc.

4.3.8 RR/Optics CDU Fail Detect Circuitry. With 33.0±0.5 vdc applied to pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all the normal input signals of Table VIII applied, there shall be a non-fail indication at pin 169 as evidenced by a voltage of less than 0.5 vdc into a 20K ±5 percent load. With the non-fail input signal limits of Table VIII applied sequentially, while maintaining all other normal input signals, there shall be a non-fail indication at pin 169. With the fail signal limits of Table VIII applied sequentially, while maintaining all other non-fail limit signals, there shall be a fail indication at 10 in 169 of 30±1 vdc with a 20K ±50 percent load, 5±3 seconds after application of the fail input. After removal of the last fail input, a non-fail indication (a voltage less than 0.5 vdc) shall be present within 1 second. The ECSRFH input shall be checked at both the +15° phase shift and a -15° phase shift for both non-fail limit and fail limit conditions while the other CSRFH input is maintained at 2.2V rms, 0 phase as specified in Table VIII. With this entire test repeated, except for the CSRFH channels and UPLVL channels, using a supply voltage of 22.0±0.5 vdc, the fail indication shall be 20±1 vdc, 7±3 seconds after application of the fail input.

4.3.9 IMU CDU Fail Detect Circuitry. With +33.0±0.5 vdc applied to pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all the normal signal inputs of Table IX applied, there shall be a non-fail indication at pin 127 as evidenced by a voltage of less than 0.5 vdc into a 20K ±5 percent load. Maintaining all other normal signal inputs and with the non-fail signal limit inputs specified in Table IX applied sequentially, there shall be a non-fail indication at pin 127. Maintaining all other non-fail inputs and with the fail signal limit inputs specified in Table IX applied sequentially, there shall be a fail indication at pin 127 of 30±1 vdc, into a 20K ±5 percent load, 5±3 seconds after application of the fail input. After removal of the last fail input, a non-fail indication (a voltage of less than 0.5 vdc) shall be present within 1 second. With this entire test repeated, except for the CSRFH and UPLVL channels, using a supply voltage of 22.0±0.5 vdc, the fail indication shall be 20±1 vdc, 7±3 seconds after application of the fail input.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

JD:efo

REVISIONS ·21099						
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
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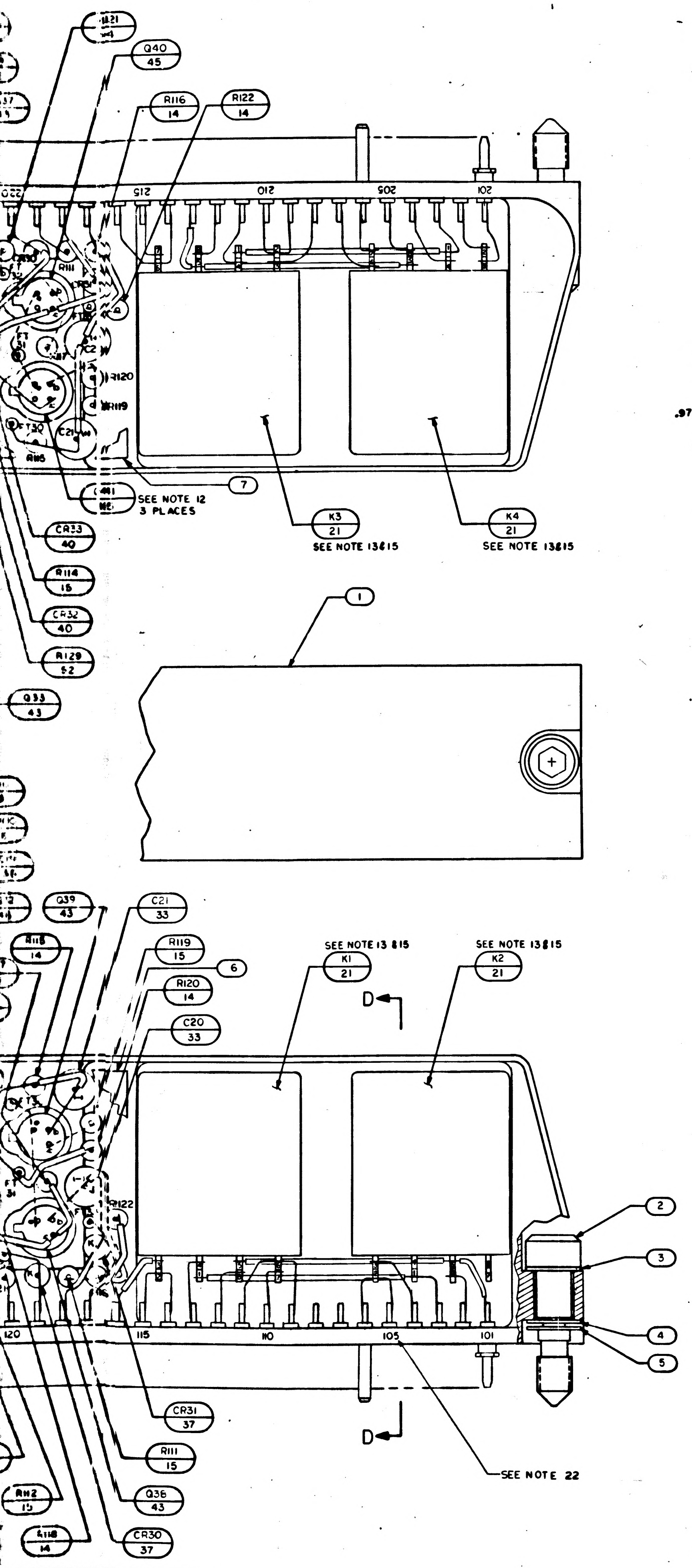
B		REVISED PER TDRR 22990	ADL			
C		REVISED PER TDRR 23888	KCH		15 Mar 65	



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K4 21 SEE NOTE 13&15
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CR32 40
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Q39 43
C21 33
R118 14
R119 15
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R120 14
C20 33
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SEE NOTE 13&15 K2 21
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SEE NOTE 22
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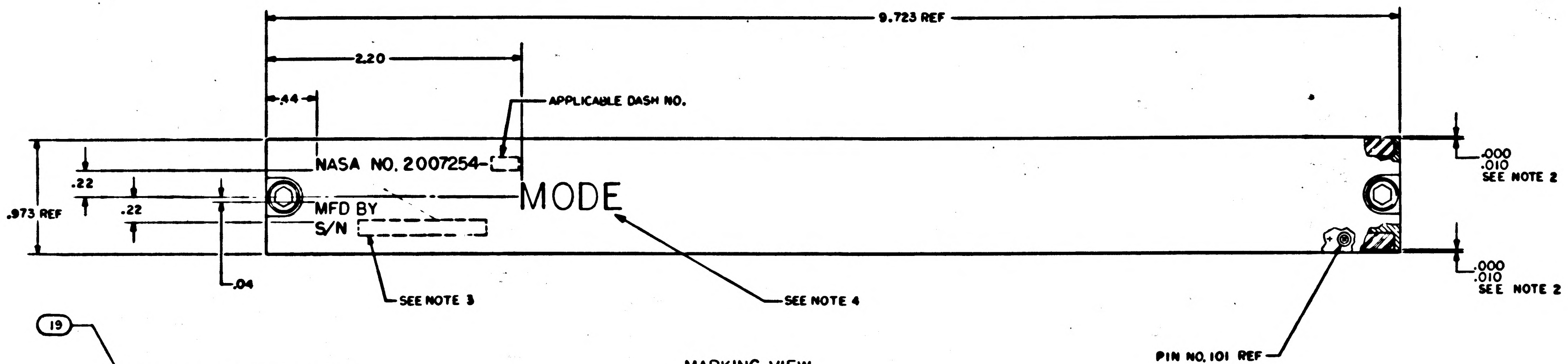

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SEE NOTE 4
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PIN NO. 101 REF

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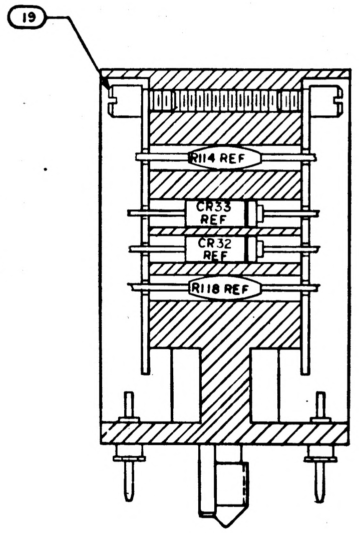
SCALE 2/1



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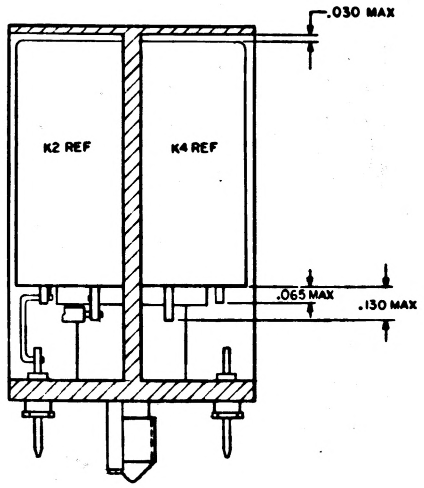
SECTION C-C



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SECTION D-D

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1	1006750-51	RESISTOR	53
2	1006750-47	RESISTOR	52
1	1006750-31	RESISTOR	51
1	1006750-35	RESISTOR	50
1	1010279-112	CAPACITOR	49
1	1006777-34	CAPACITOR	48
1	1010604-16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
2	1010372-18	DIODE	42
4	1010372-16	DIODE	41
3	1010830-19	DIODE	40
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2	1010362-002	DIODE	38
19	1010385	DIODE	37
2	1006755-85	CAPACITOR	36
6	1006755-69	CAPACITOR	35
5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
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6	1006750-49	RESISTOR	30
2	1006750-52	RESISTOR	29
2	1006750-64	RESISTOR	28
2	1006750-84	RESISTOR	27
22	1006750-80	RESISTOR	26
9	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
7	1006750-25	RESISTOR	23
1	1006750-20	RESISTOR	22
4	1010353-7	RELAY	21
10	2008319	INSULATOR, WASHER	20
4	1008161-4	SCREW, CAP SLOTTED HEAD	19
2	1006750-46	RESISTOR	18
14	1006750-56	RESISTOR	17
8	1006750-36	RESISTOR	16
17	1006750-63	RESISTOR	15
24	1006750-39	RESISTOR	14
1	2008093-001	TERMINAL, THREADED	13
AR	1006776-21	INSULATION SLEEVING	12
AR	1006776-22	INSULATION SLEEVING	11
AR	1006757-1	WIRE ELECTRICAL	10
			9
46	1008025-1	INSULATOR, BUSHING	8
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1	2008342	WIRING BOARD A	6
2	MS16633-4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546-3	WASHER, FLAT	4
2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
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2007222	
NEXT ASSY	USED ON
APPLICATION	

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CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W F Troy 5/11/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MODE ASSY
CDU ELECTRONICS

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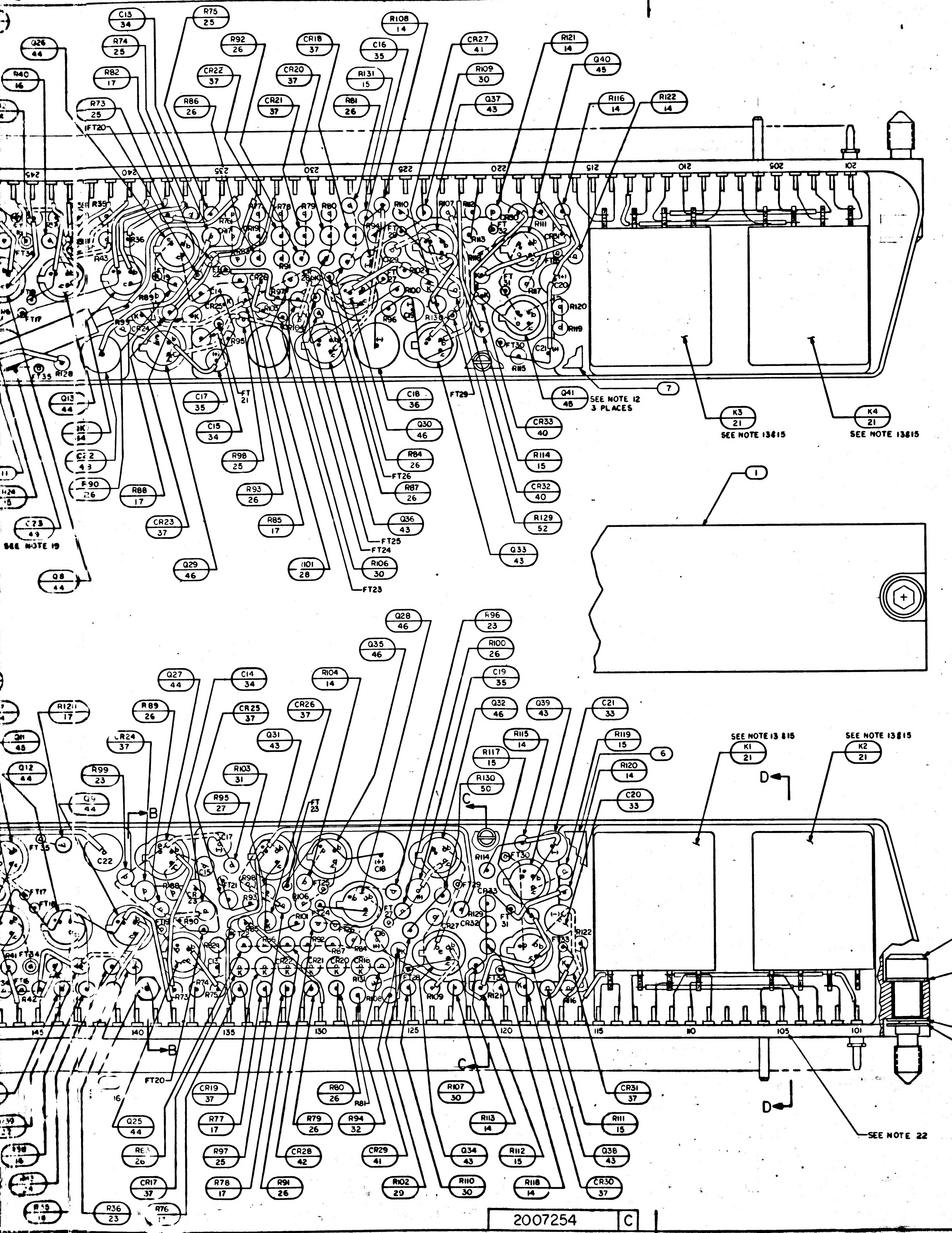
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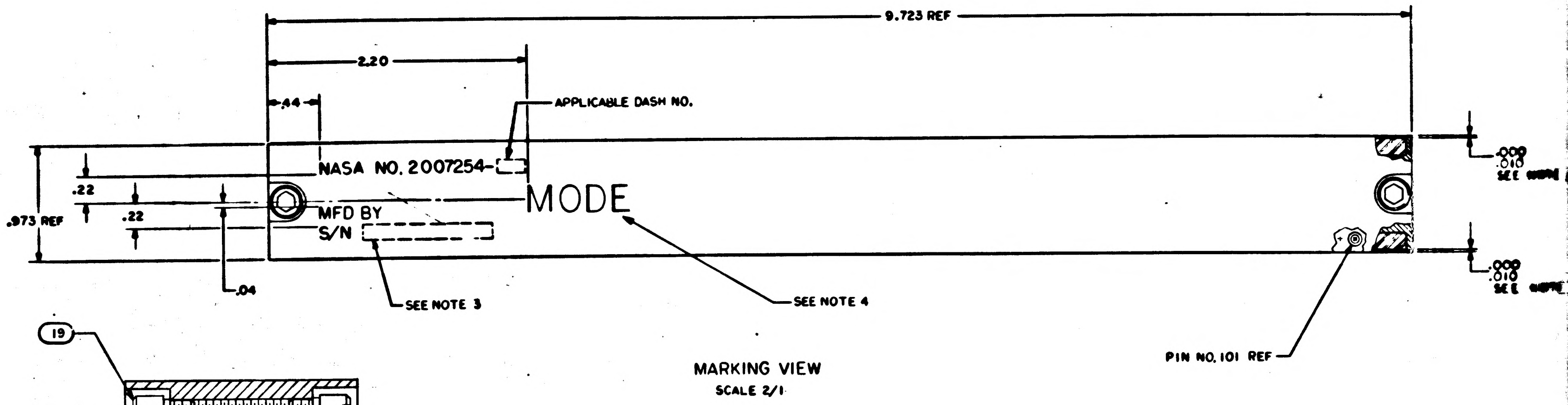
SEE NOTE 22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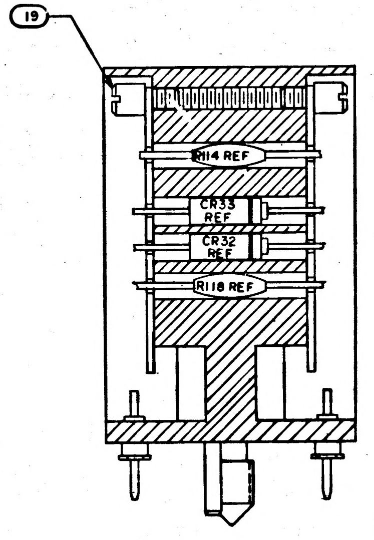
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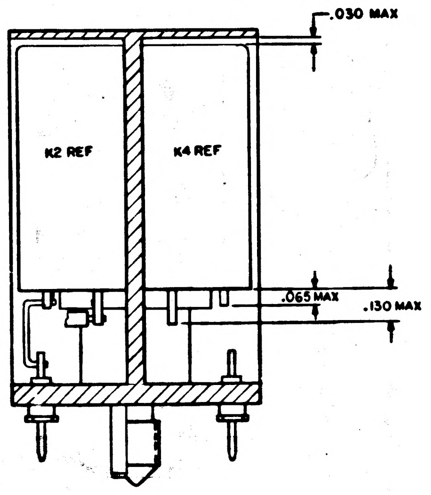
SECTION C-C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SECTION D-D

MASTER

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APPLICATION	

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RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
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DO NOT SCALE THIS DRAWING
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2007254 C

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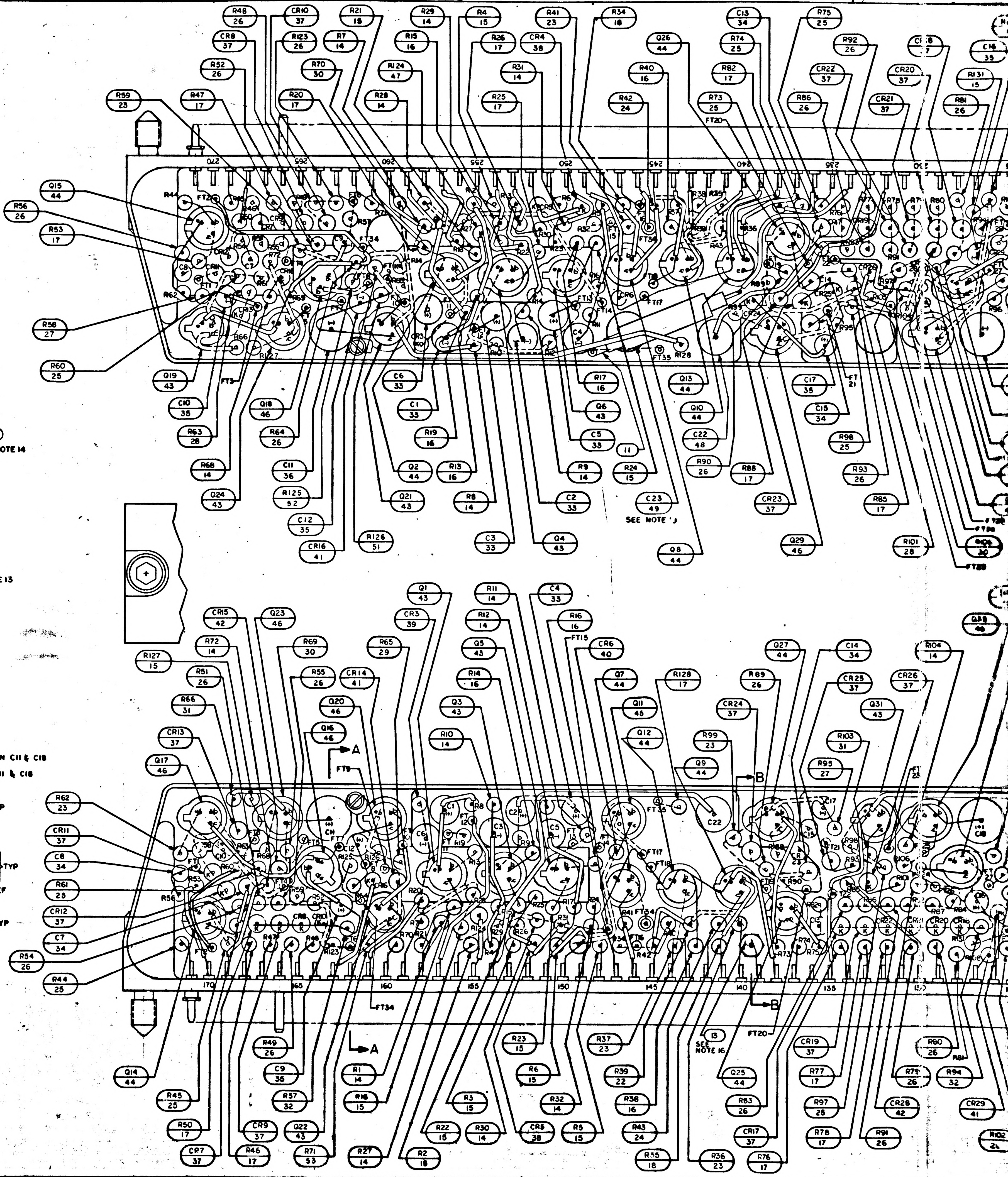

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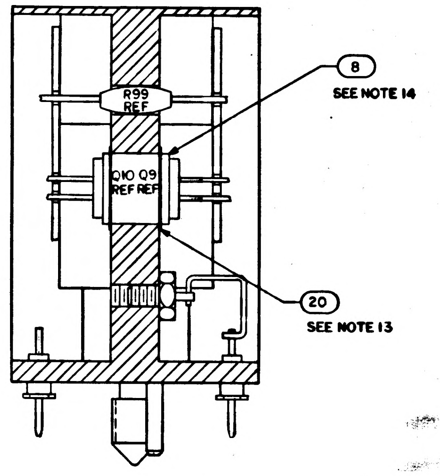

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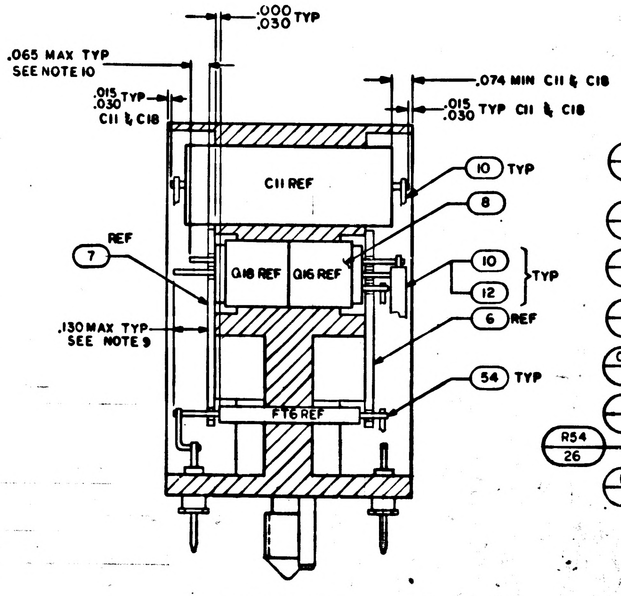

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Q18 REF
Q16 REF
FT6 REF
REF
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10 TYP
8
10
12
TYP
6 REF
.130 MAX TYP SEE NOTE 9
54 TYP

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10 /.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26 /.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO.8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD J
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND 1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER ND1002203
20. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
21. EXCEPT FOR MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
22. MARK .060 /.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II

2007254	C

APOLLO G&N Specification
PS2007254 REV C
Original Issue Date: 23 NOV 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20	WK	ACM
2-8-66	C	26018	6	WK	---

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

TABLE I

DIGITAL MODE DRIVE CIRCUITRY

SIGNAL	INPUT PULSE	TO PINS		OUTPUT PULSE	AT PINS	
		Hi	Lo		Hi	Lo
FAZ 3DR	Negative	141	152	Positive	142	138
FAZ 2DR/	Negative	248	152	Positive	245	249
FAZ 4DR	Positive	238	152	Negative	237	239
FAZ 2DR	Positive	246	152	Negative	146	147

3.1.2.2 **Enable Drive Circuitry.** The assembly shall be capable of producing the outputs specified in Tables II, III, IV and V under the conditions specified in 4.3.6.

TABLE II

COMPUTER CONTROLLED ENABLES - PART "A"

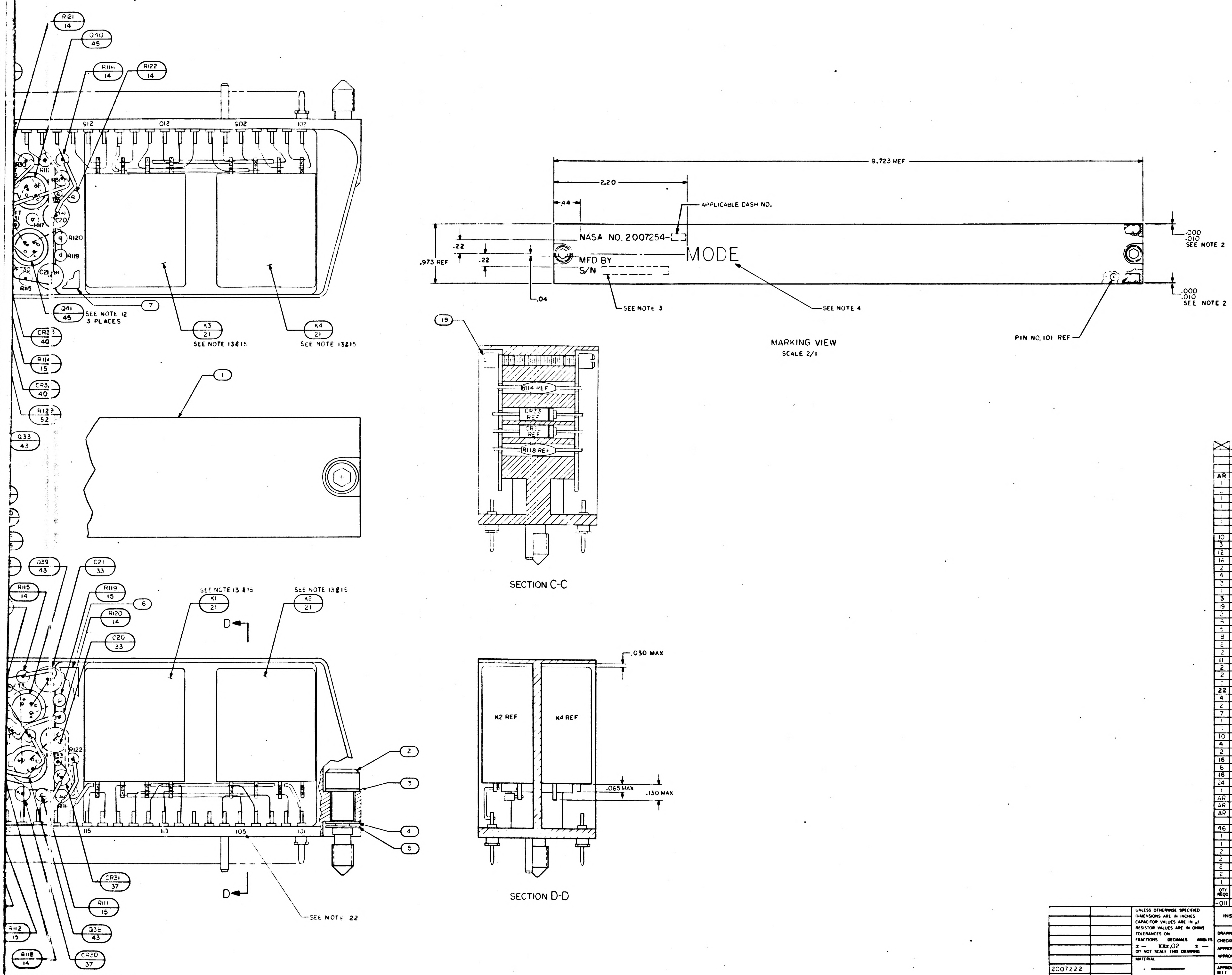
SIGNAL	PINS		OUTPUT VOLTAGE	CONDITIONS
	Hi	Lo		
IMUOPR	158	152	22.0±0.5 vdc	22.0±0.5 vdc supply voltage
IMUOPR	158	152	33.0±0.5 vdc	33.0±0.5 vdc supply voltage
U +14 TP	159	152	14.0 +1.5, -1.0 vdc	
U +14 TP	159	152	7±1 vdc	2K to ground
A +14V	259	152	14.0 +1.5, -1.0 vdc	1K to ground
CARPSA	151	152	≤1.5 vdc	

TABLE III

COMPUTER CONTROLLED ENABLES - PART "B"

MODE DRIVE CONNECTION			OUTPUT					
Signal	To Pin		Signal	Pins		High Voltage	Low Voltage	Risetime & Falltime
	Hi	Lo		Hi	Lo			
AGCCA	156	152	ISSCA	257	244	2.5±1 vdc	≤250 mv	2.5+2.5, -2.0 msec
AGCZ	153	152	ISSZ	254	244	↑	↑	↑
AGCEEC	255	152	ISSEEC	253	244			
AGCRRZ	148	152	RRZ	250	244	↓	↓	↓
AGCDAE	251	152	RRDAE	149	244	2.5±1 vdc	≤250 mv	2.5+2.5, -2.0 msec
AGCCA	156	152	CARPSA	151	244	39±2 vdc	≤1.5 vdc	0.3±0.28 msec

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVICED PER TDRR 22170			65	
B		REVISED PER TDRR 22 90				
C		REVISED PER TDRR 23888	KLH		15 Nov 65	WR
D		REVISED PER TDRR 27207	A.N.		22 MAR 66	



R121 14
Q40 45
R116 14
R122 14
215
210
205
102
R111
C20
R117
R120
R119
C21
R115
SEE NOTE 12
3 PLACES
7
Q41 45
K3 21
SEE NOTE 13&15
K4 21
SEE NOTE 13&15
CR33 40
R114 15
CR32 40
R123 52
Q33 43
1
Q39 43
C21 33
R115 14
R119 15
R120 14
6
C20 33
SEE NOTE 13 &15
K1 21
SEE NOTE 13&15
K2 21
D
R122
115
110
105
101
2
3
4
5
CR31 37
R111 15
Q36 43
CR30 37
R112 15
R118 14
SEE NOTE 22
9.723 REF
2.20
.44
APPLICABLE DASH NO.
NASA NO. 2007254-
MODE
MFD BY
S/N
.22
.22
.973 REF
.04
.000
.010
SEE NOTE 2
SEE NOTE 3
SEE NOTE 4
PIN NO. 101 REF
MARKING VIEW
SCALE 2/1
19
R114 REF
CR33 REF
CR32 REF
R118 REF
SECTION C-C
.030 MAX
K2 REF
K4 REF
.065 MAX
.130 MAX
SECTION D-D

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010084	SCHEMATIC	REF
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2	1006750-47	RESISTOR	52
1	1006750-31	RESISTOR	51
1	1006750-35	RESISTOR	50
1	1010279-112	CAPACITOR	49
1	1006777-34	CAPACITOR	48
	[illegible]-16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
2	1010372-18	DIODE	42
4	1010372-16	DIODE	41
3	1010830-19	DIODE	40
1	1010830-9	DIODE	39
3	1010362-002	DIODE	38
19	1010385	DIODE	37
2	1006755-85	CAPACITOR	36
6	1006755-69	CAPACITOR	35
5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
2	1010369-101	RESISTOR	32
2	1010369-95	RESISTOR	31
11	1006750-49	RESISTOR	30
2	1006750-52	RESISTOR	29
2	1006750-64	RESISTOR	28
2	1006750-84	RESISTOR	27
22	1006750-80	RESISTOR	26
4	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
7	1006750-25	RESISTOR	23
1	1006750-20	RESISTOR	22
4	1010353-7	RELAY	21
10	2008319	INSULATOR, WASHER	20
4	[illegible] 4	SCREW CAP SLOTTED HEAD	19
2	1006750-46	RESISTOR	18
16	1006750-56	RESISTOR	17
8	1006750-36	RESISTOR	16
16	1006750-63	RESISTOR	15
24	1006750-39	RESISTOR	14
1	2008093-001	TERMINAL, THREADED	13
AR	1006776-21	INSULATION SLEEVING	12
AR	1006776-22	INSULATION SLEEVING	11
AR	1006757-1	WIRE ELECTRICAL	10
			9
46	1008025-1	INSULATOR, BUSHING	8
1	2008344	WIRING BOARD B	7
1	2008342	WIRING BOARD A	6
2	MS16633-4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546-3	WASHER, FLAT	4
2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
1	2007211-011	HEADER HOUSING ASSEMBLY	1
-011	LIST OF MATERIALS		

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED 7 JUN 65
APPROVED 8 JUN 65
APPROVED
APPROVED MIT W Mayfor
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

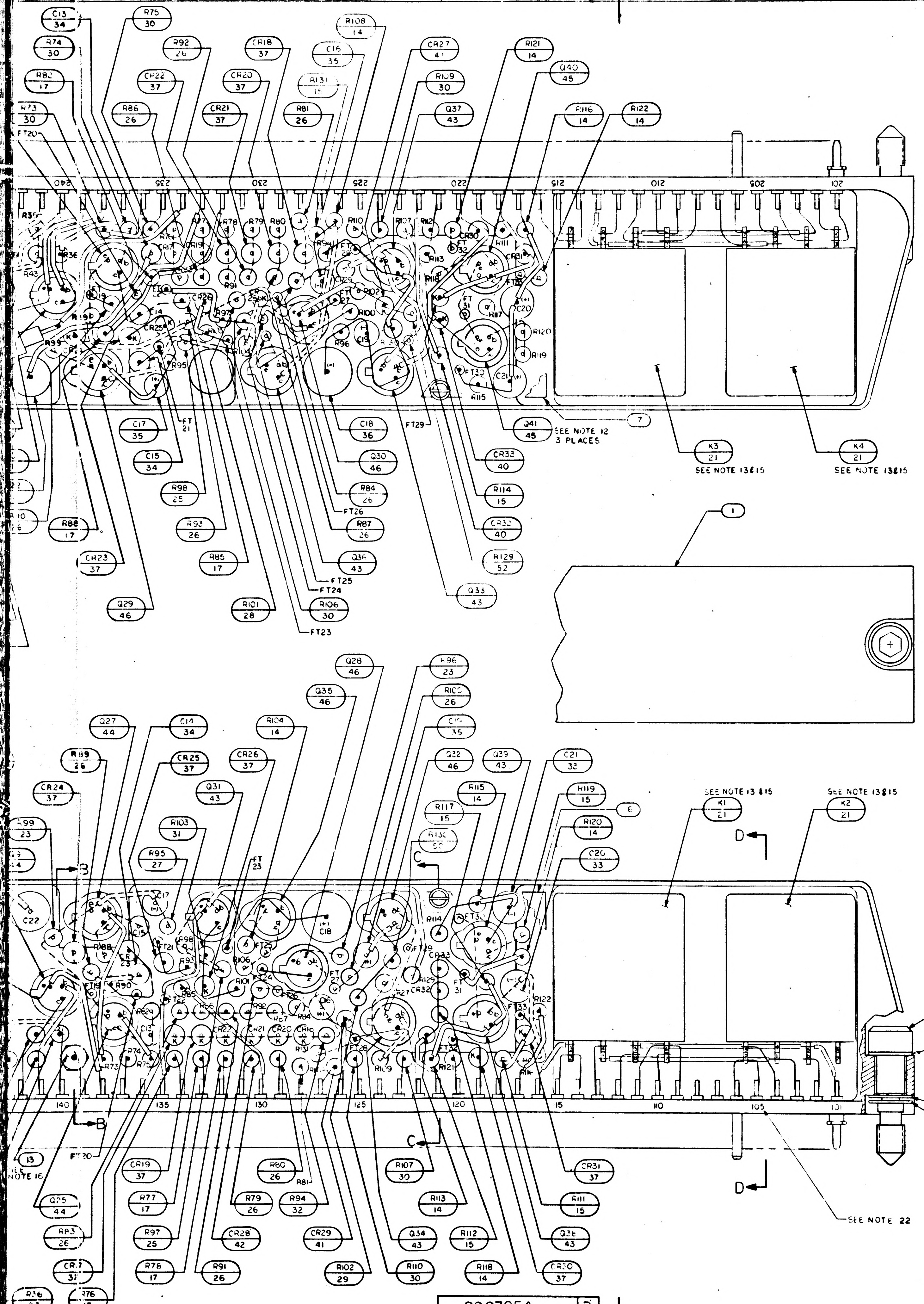
MODE ASSY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007254
SCALE 4/1
SHEET 1 OF 1

2007254 D

2007254

3/2007254



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R74 30
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CP22 37
CR20 37
R131 15
R109 30
Q40 45
R73 30
R86 26
CR21 37
R81 26
Q37 43
R116 14
R122 14
FT20
240
235
230
225
220
215
210
205
201
C17 35
C15 34
R98 25
R93 26
R85 17
R101 28
R106 30
Q36 43
R87 26
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Q30 46
C18 36
Q41 45
CR33 40
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R129 52
Q33 43
R88 17
CR23 37
Q29 46
FT21
FT23
FT24
FT25
FT26
FT29
SEE NOTE 12 3 PLACES
7
K3 21 SEE NOTE 13&15
K4 21 SEE NOTE 13&15
1
Q28 46
R96 23
Q35 46
R105 26
R104 14
C19 35
Q27 44
C14 34
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CR26 37
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Q39 43
C21 33
CR24 37
Q31 43
R115 14
R119 15
R117 15
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R99 23
R103 31
R120 14
R95 27
C20 33
SEE NOTE 13 & 15
K1 21
SEE NOTE 13&15
K2 21
B
C
D
140
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125
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115
110
105
101
2
3
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13
SEE NOTE 16
FT20
CR19 37
R77 17
R80 26
R79 26
R94 32
R107 30
R113 14
CR31 37
R111 15
Q25 44
R83 26
R97 25
CR28 42
CR29 41
Q34 43
R112 15
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CR17 37
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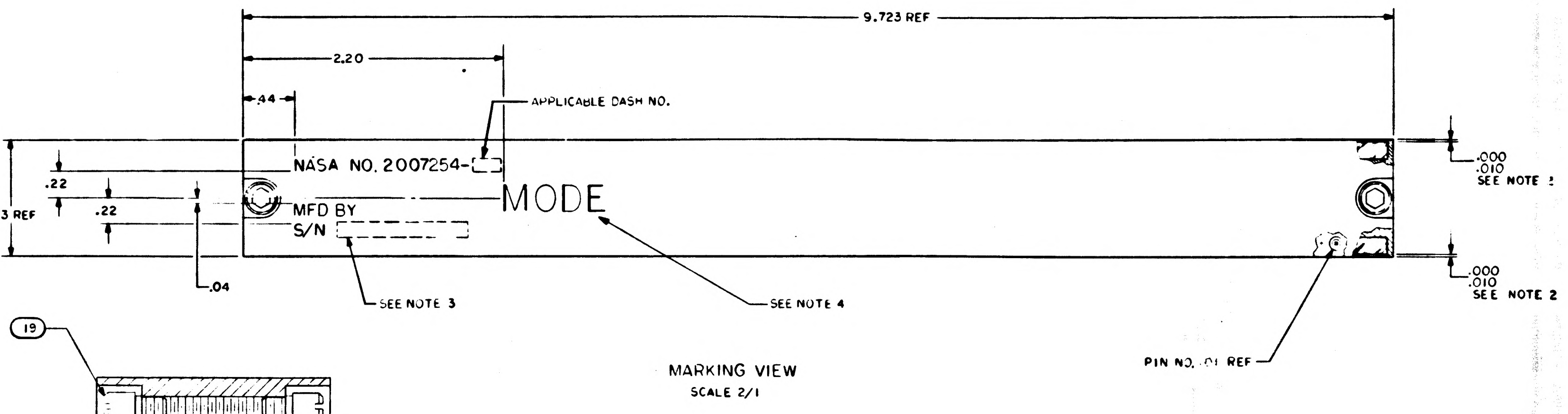
R110 30
R118 14
CR30 37
R76 23
R76 17
SEE NOTE 22



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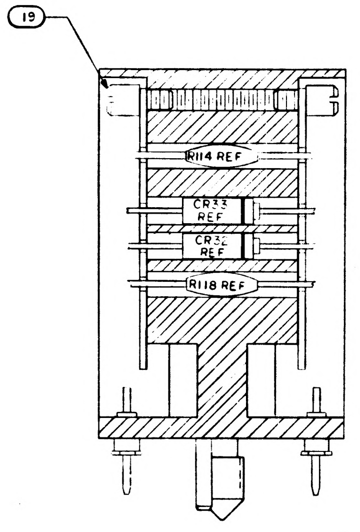
APPLICABLE DASH NO.
NASA NO. 2007254-
MODE
MFD BY
S/N
.973 REF
.22
.22
.04
.000
.010
SEE NOTE 2
.000
.010
SEE NOTE 2
SEE NOTE 3
SEE NOTE 4
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1



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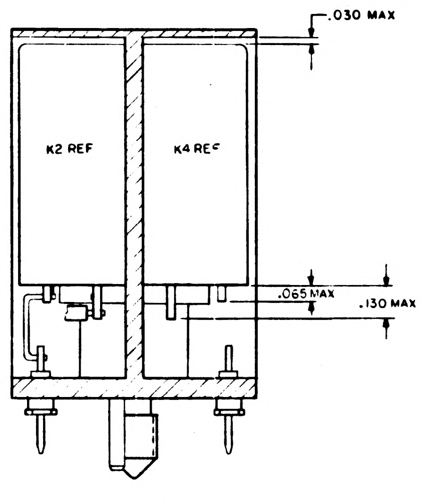
R118 REF

SECTION C-C



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K2 REF
K4 REF
.065 MAX
.130 MAX

SECTION D-D

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R	100677
R	100675
E	100802
1	20083
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2	MS1663
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QTY REQD	PA IDENT

INSTRUMEN
CAMBRID

DRAWN
CHECKED
APPROVED
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APPROVED
APPROVED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XX±.02 ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

NEXT ASSY	USED ON
2007222	

APPLICATION

2007254 D

2/2007254

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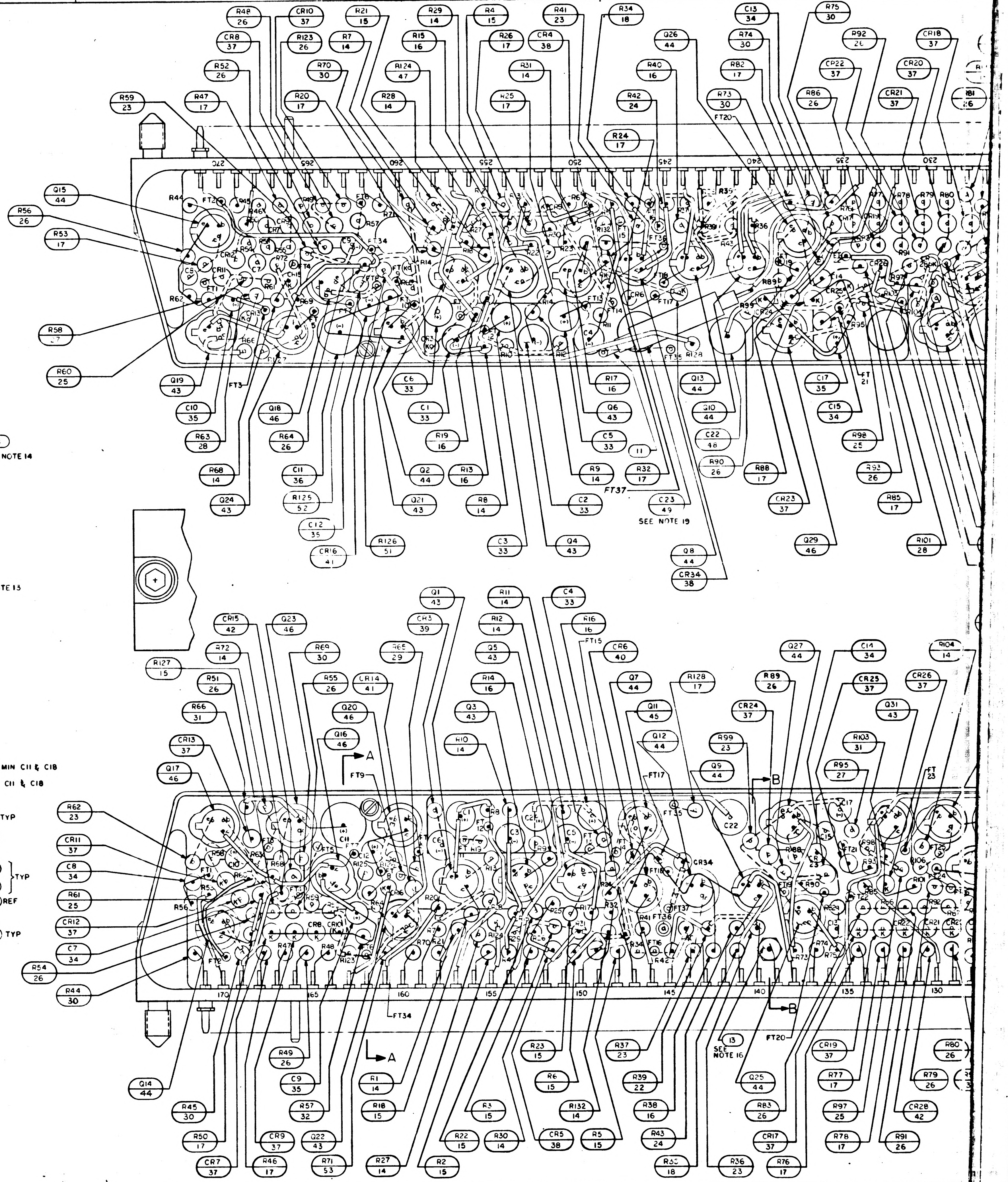

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FT37
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CR34 38
Q8 44
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C8 34
R61 25
CR12 37
C7 34
R54 26
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R50 17
CR7 37
R46 17
R71 53
R27 14
R2 15
SEE NOTE 16
FT34
FT9
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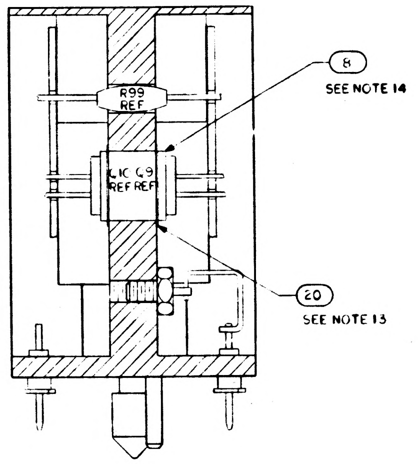

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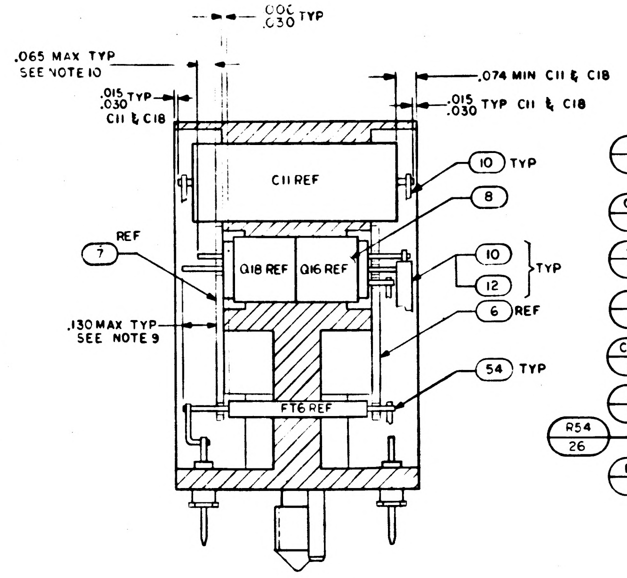
SEE NOTE 14
20
SEE NOTE 13

SECTION B-B



.006 .030 TYP
.065 MAX TYP SEE NOTE 10
.015 .030 TYP C11 & C18
.074 MIN C11 & C18
.015 .030 TYP C11 & C18
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8
C11 REF
REF
7
Q18 REF
Q16 REF
10
12
TYP
6 REF
.130 MAX TYP SEE NOTE 9
54 TYP
FT6 REF

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD J
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER ND1002203
20. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
21. EXCEPT FOR MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
22. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II

2007254	D

APOLLO G&N Specification
PS2007254 REV D
Original Issue Date: 23 Nov 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

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2-8-66	C	26018	6	WK	---
2/23/66	D	26578	11 and 17	WK	---

This specification consists of page 1 to 20 inclusive.

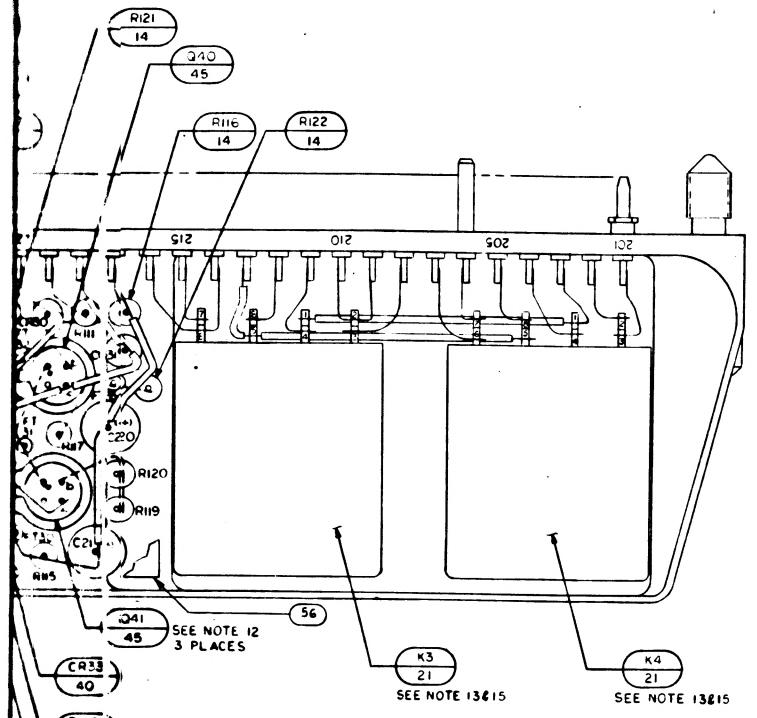
APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

TABLE X

CONTINUITY AND DC RESISTANCE

SIGNAL	PINS		RESISTANCE (ohms)
	From (+)	To (-)	
STRUCT GND	139	Chassis	≤0.5
+4 VHI	140	247	↑
CARPSA	150	151	
FAZ3LO	161	138	
FAZ2LO	161	147	
+4 VLO	161	152	
FAZ4LO	161	239	
MODCOM	161	244	
FAZ2LO/	161	249	
ACDUZ BCDUZ	243	240	
CCDUZ	243	241	
ECDUZ	143	144	
A +14V B +14V	259	260	↓
C +14V	259	261	≤0.5
DCDUZ	247	144	510 ±2%
FAZ2HI	247	146	510 ±2%
FAZ4HI	247	237	510 ±2%
ACDUZ	247	243	330 ±2%
FAZ2HI/	247	245	130 ±2%
FAZ3HI	247	142	130 ±2%
GCAPC-GCAPOP	118	117	2K ±2%
RRZ	250	152	↑
SATCON-SATOP	119	120	
RRDAE	149	152	
IMUOPR	158	258	
ISSZ	254	152	↓
U +14 TP - A +14V	159	259	2K ±2%
ISSCA	257	152	1.95K ±5%
ISSEEC	253	152	2K ±2%
GCAPC	203	213	975 ±10%
SATCON	103	101	975 ±10%
GCACP	118	218	>100K
REJMPB	218	118	≤1K
SATCON	119	220	>100K
REJMPA	220	119	<1K

REVISIONS						
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
A		REVISED PER TDRR 22170	[illegible]	[illegible]	[illegible] 65	
B		REVISED PER TDRR 22390		[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 23888	KCH	[illegible]	15 NOV 65	WR
D		REVISED PER TDRR 27207	A.N.	[illegible]	22 MAR 66	
E		REVISED PER TDRR 27770	K	[illegible]	28 APR 66	



R121
14
Q40
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R116
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R122
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215
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R119
C21
R85
Q41
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SEE NOTE 12
3 PLACES
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SEE NOTE 13&15
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SEE NOTE 13&15
CR33
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CR32
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R120
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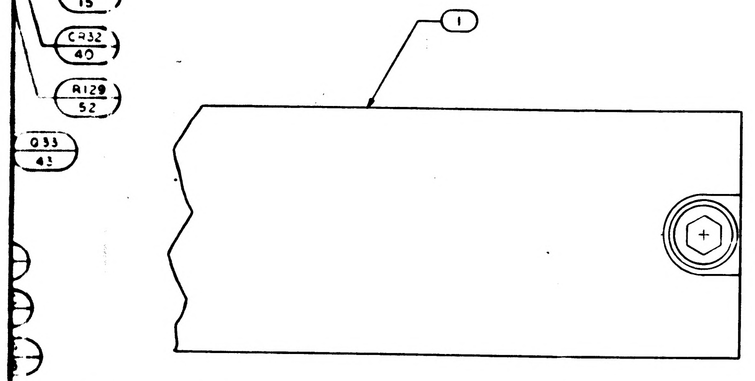
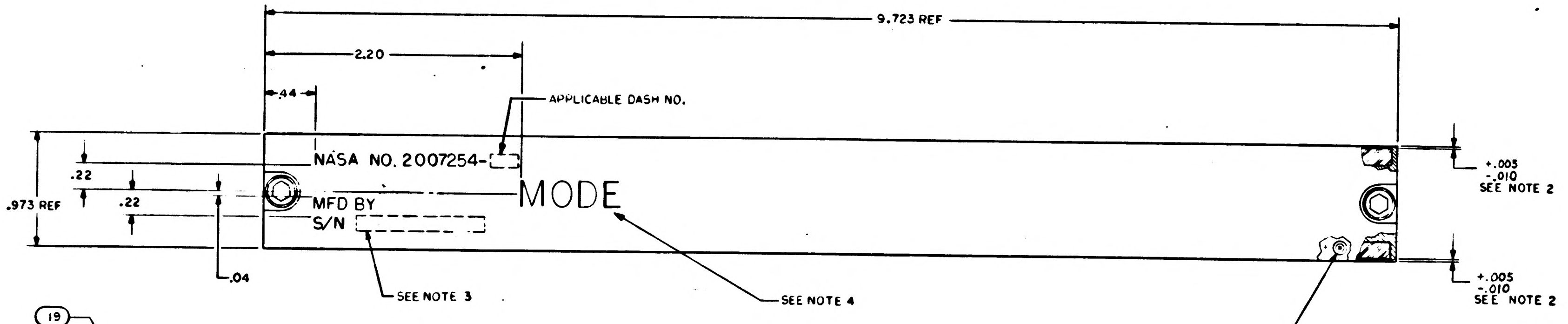
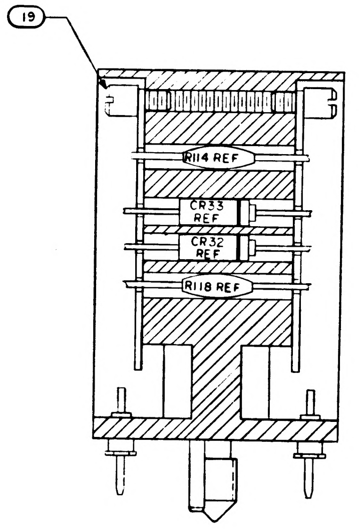




9.723 REF
2.20
.44
APPLICABLE DASH NO.
NASA NO. 2007254-
MFD BY
MODE
S/N
.22
.22
.973 REF
.04
+.005
-.010
SEE NOTE 2
SEE NOTE 3
SEE NOTE 4
+.005
-.010
SEE NOTE 2
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1



19
R114 REF
CR33 REF
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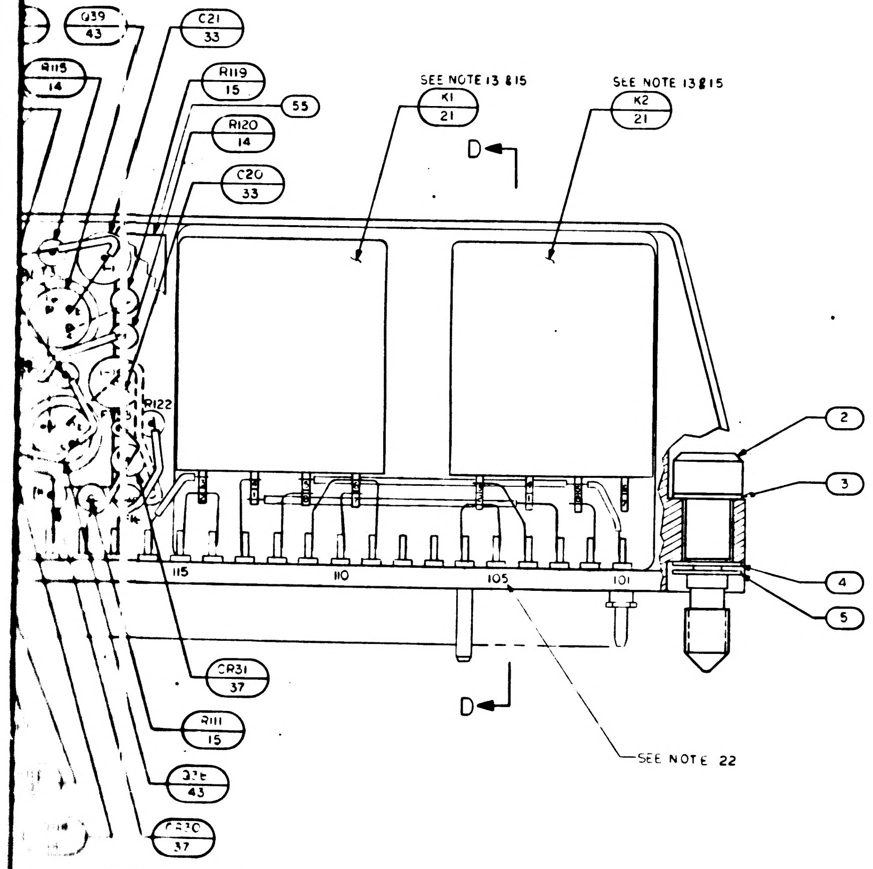
R118 REF

SECTION C-C



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R115
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R119
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R120
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C20
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SEE NOTE 13 & 15
K1
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SEE NOTE 13 & 15
K2
21
D
D
R122
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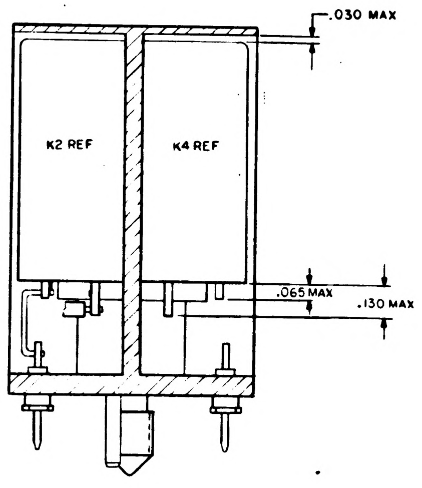
SEE NOTE 22



.030 MAX
K2 REF
K4 REF
.065 MAX
.130 MAX

SECTION D-D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010084	SCHEMATIC	REF
1	2010713	WIRING BOARD F	60
1	2010711	WIRING BOARD E	59
1	2010707	WIRING BOARD D	58
1	2010705	WIRING BOARD C	57
1	2010709	WIRING BOARD B	56
1	2010703	WIRING BOARD A	55
AR	1010848-2	WIRE, ELECTRICAL	54
1	1006750-51	RESISTOR	53
2	1006750-47	RESISTOR	52
1	1006750-31	RESISTOR	51
1	1006750-35	RESISTOR	50
1	1010279-112	CAPACITOR	49
1	1006777-34	CAPACITOR	48
	[illegible]-16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
2	1010372-18	DIODE	42
4	1010372-16	DIODE	41
3	1010830-19	DIODE	40
1	1010830-9	DIODE	39
3	1010362-002	DIODE	38
19	1010385	DIODE	37
2	1006755-85	CAPACITOR	36
6	1006755-69	CAPACITOR	35
5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
2	1010369-101	RESISTOR	32
2	1010369-95	RESISTOR	31
11	1006750-49	RESISTOR	30
2	1006750-52	RESISTOR	29
2	1006750-64	RESISTOR	28
[illegible]	1006750-84	RESISTOR	27
22	1006750-80	RESISTOR	26
4	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
7	1006750-25	RESISTOR	23
1	1006750-20	RESISTOR	22
4	1010353-7	RELAY	21
13	2008319	INSULATOR, WASHER	20
10	1008161-4	SCREW CAP SLOTTED HEAD	19
2	1006750-46	RESISTOR	18
16	1006750-56	RESISTOR	17
8	1006750-36	RESISTOR	16
16	1006750-63	RESISTOR	15
24	1006750-39	RESISTOR	14
1	2008093-003	TERMINAL, THREADED	13
AR	1006776-21	INSULATION SLEEVING	12
AR	1006776-22	INSULATION SLEEVING	11
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~~1~~	~~2008342~~	~~WIRING BOARD A~~	~~6~~
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2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
1	2007211-011	HEADER HOUSING ASSEMBLY	1
-011	LIST OF MATERIALS		

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

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CHECKED	[illegible]	7 JUN 65
APPROVED	[illegible]	8 JUN 65
APPROVED		
APPROVED MIT	W. Meyer	[illegible]
APPROVED MSC	[illegible]	DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

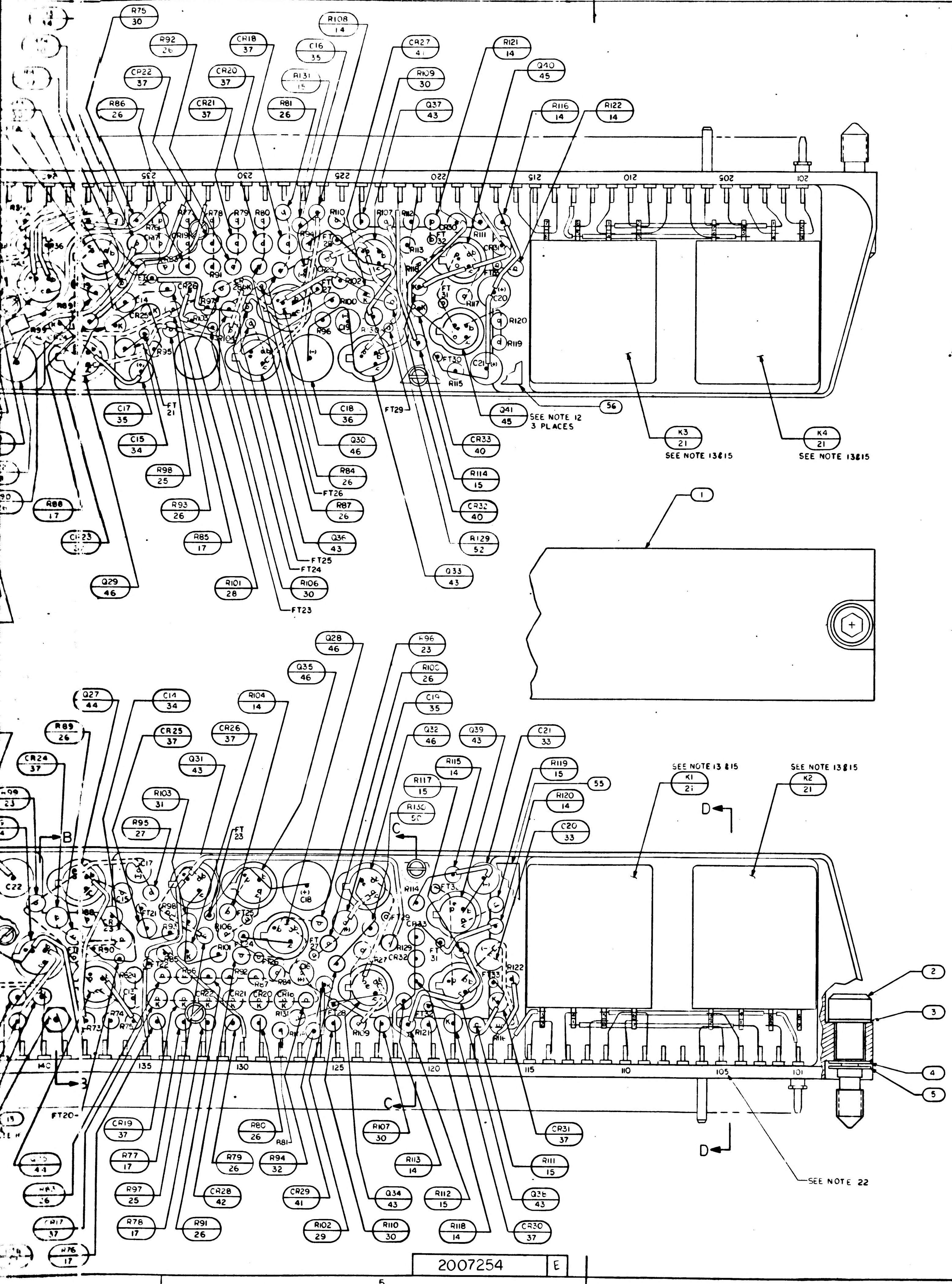
MODE ASSY
CDU ELECTRONICS

CODE IDENT NO	SIZE	DRAWING NO.
80230	J	2007254
SCALE 4/1		SHEET 1 OF 1

2007254

E

31/2007254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Q37 43
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C15 34
R98 25
R88 17
R93 26
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CR23
Q29 46
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FT24
FT25
FT26
FT29
FT21
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SEE NOTE 12 3 PLACES
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CR33 40
R114 15
CR32 40
R129 52
K3 21 SEE NOTE 13&15
K4 21 SEE NOTE 13&15
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Q35 46
R96 23
R100 26
C19 35
Q27 44
C14 34
R104 14
R89 26
CR25 37
CR26 37
CR24 37
Q32 46
Q39 43
C21 33
Q31 43
R115 14
R119 15
R117 15
55
R103 31
R130 50
R120 14
R95 27
C20 33
SEE NOTE 13 & 15 K1 21
SEE NOTE 13&15 K2 21
C
D
B
FT20
CR19 37
R77 17
R97 25
R78 17
R79 26
R94 32
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R81
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R91 26
CR29 41
R102 29
R107 30
R113 14
Q34 43
R110 30
R112 15
R118 14
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R111 15
SEE NOTE 22
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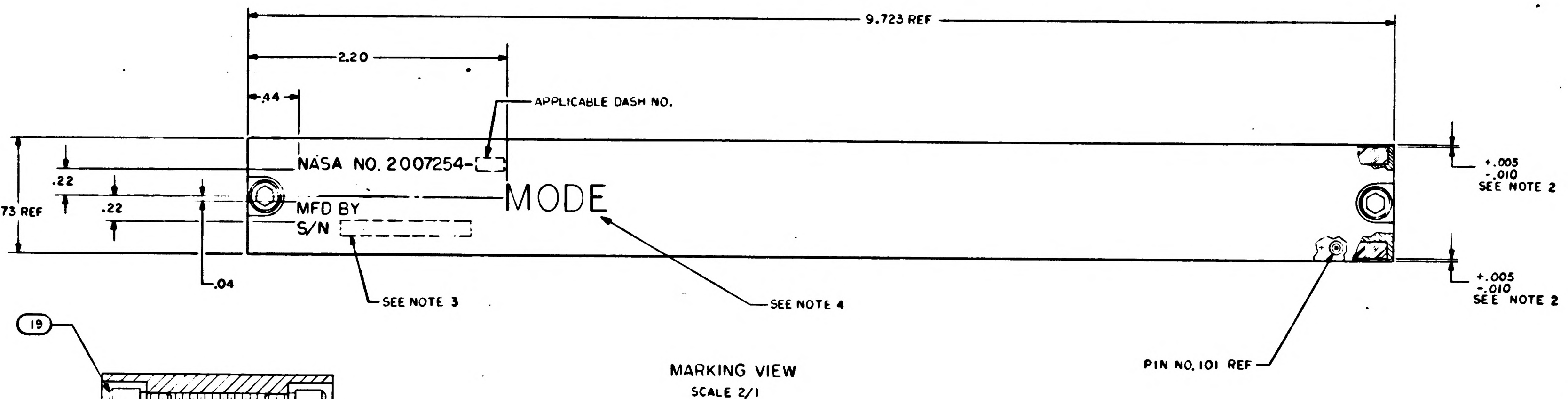
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APPLICABLE DASH NO.
NASA NO. 2007254-
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MODE
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.22
.04
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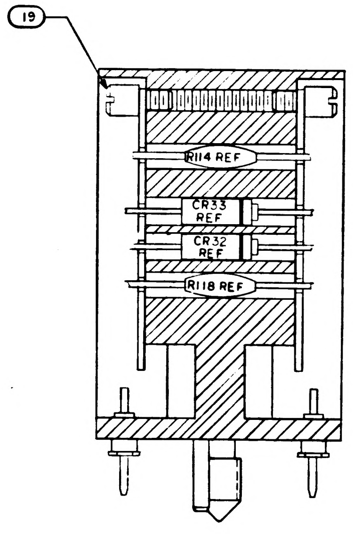
+.005 -.010 SEE NOTE 2
SEE NOTE 3
SEE NOTE 4
PIN NO. 101 REF

MARKING VIEW

SCALE 2/1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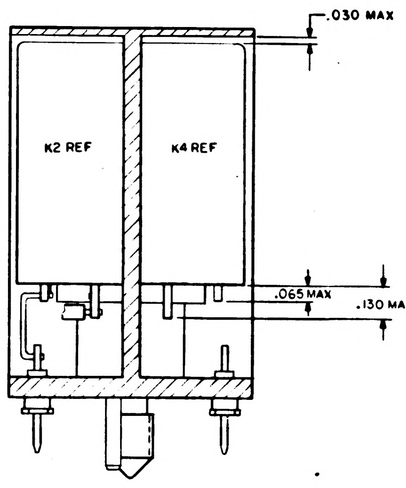
CR32 REF
R118 REF

SECTION C-C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K4 REF
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SECTION D-D

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1	20107
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1	100677
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QTY REQD	
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2007222	
NEXT ASSY	USED ON
APPLICATION	

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RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

—

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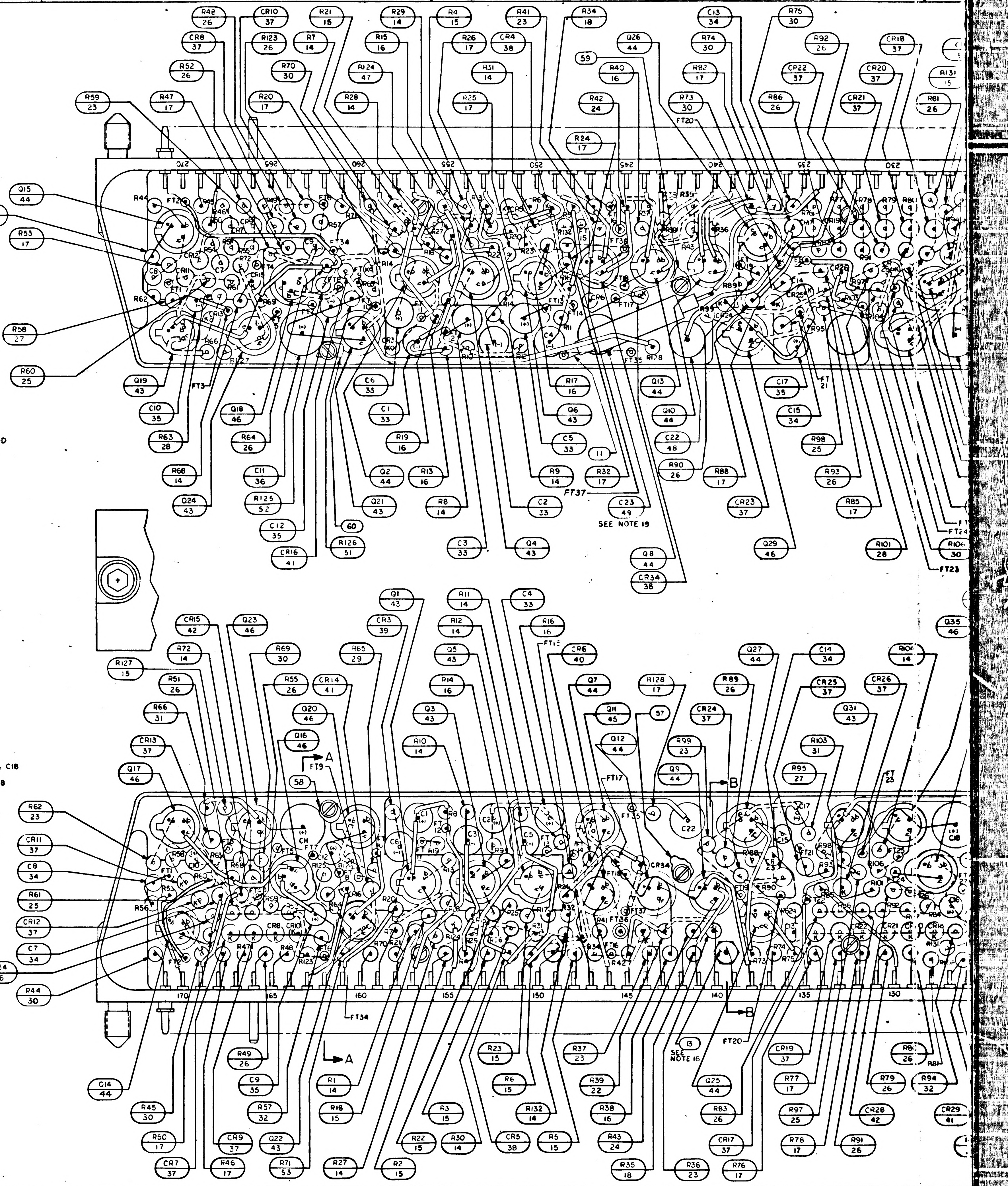
INS UMENTA

DRAWN
CHECKED
APPRO
APPRO
APPRO MIT
NASA MSC

2007254 | E

2/2007254

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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R26 17
CR4 38
Q26 44
R74 30
R92 26
CR18 37
R52 26
R70 30
R124 47
R31 14
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R40 16
R82 17
CR22 37
CR20 37
R131 15
R47 17
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R28 14
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R59 23
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Q18 46
C6 33
C1 33
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Q6 43
Q13 44
C17 35
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R88 17
R93 26
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R125 52
Q21 43
R8 14
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FT37
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SEE NOTE 19
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R85 17
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R126 51
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Q8 44
CR34 38
Q29 46
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CR13 37
Q16 46
R10 14
Q12 44
R99 23
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FT9
A
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FT17
Q9 44
B
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CR12 37
C7 34
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FT34
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FT20
13 SEE NOTE 16
R49 26
R23 15
R37 23
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C9 35
R1 14
R6 15
R39 22
Q25 44
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R79 26
R94 32
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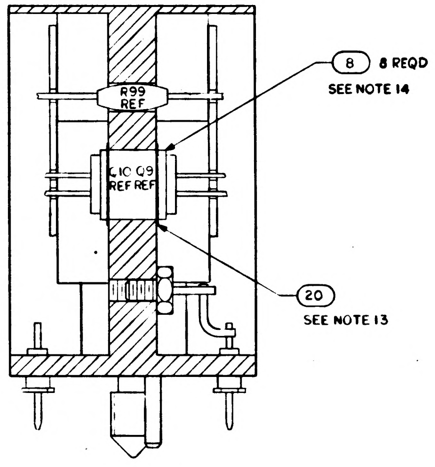
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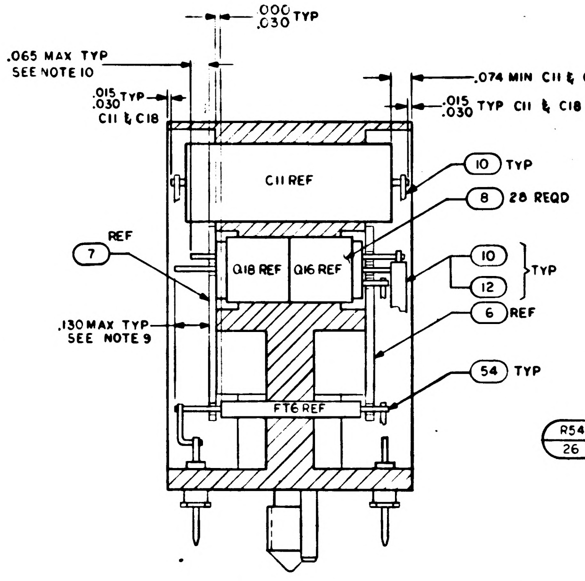
C10 Q9 REF REF
8 8 REQD
SEE NOTE 14
20
SEE NOTE 13

SECTION B-B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10 TYP
8 28 REQD
7 REF
Q18 REF
Q16 REF
10
12 TYP
6 REF
.130 MAX TYP SEE NOTE 9
FT6 REF
54 TYP

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD J
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER 1002004 TYPE I
20. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
21. EXCEPT FOR MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
22. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II

2007254	E

APOLLO G&N Specification
PS2007254 REV E
Original Issue Date: 23 NOV 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
M 1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AL	WK	ACM
M 2-8-66	C	26018	6 RDG/AL	WK	---
M 2/23/66	D	26578	11 and 17 RDG/AL	WK	---
3/22/66	E	27420	9 RDG/AL	WK	TM

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

3.1.2.4 RR/Optics CDU Fail Detect Circuitry. The assembly shall furnish a non-fail output (a voltage of less than 0.5 vdc) at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent upon application of 27.5±5.5 vdc at pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all of the normal signals or the application of a non-fail signal of Table VIII while maintaining all other normal signals. A fail indication of +26.5±6.5 vdc shall be available at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table VIII. A non-fail output shall be furnished again by the assembly within 1.0 second after removal of the fail input.

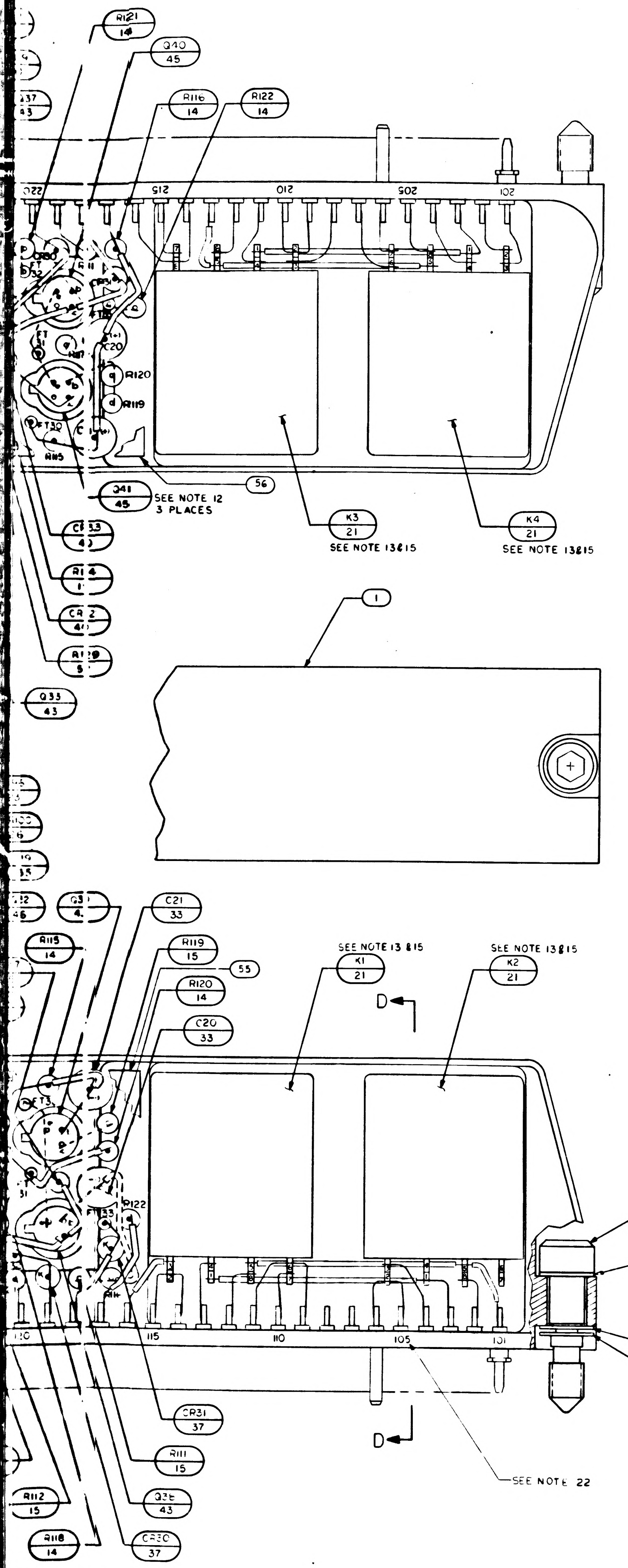
TABLE VIII

RR/OPTICS CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
DUPLVL	171	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
EUPLVL	269	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
DFINER	168	800 cps sine wave	0 vac	≤0.5V rms	≥1.0V rms	
EFINER	167	↑	0 vac	≤0.5V rms	≥1.0V rms	
ECRSER	166		0 vac	≤1.5V rms	≥2.0V rms	
DCRSER	165		0 vac	≤1.5V rms	≥2.0V rms	
DCSRFH	160	↓	≥2.0V	≥2.0V rms	≤0.8V rms	
ECSRFH	262	800 cps sine wave	≥2.0V	↑	↑	
DCSRFH (cos $\theta-\psi$)	160	800 cps /0° sine wave	≥2.0V	↓	↓	Pin 154 connected to pin 162. Pins 233 &234 connected to ground
ECSRFH (cos $\theta-\psi$)	262	800 cps /40° ±15°	≥2.0V	≥2.0V rms	≤0.8V rms	
O +14 TP	163	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	
O +14 TP	163	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 163

3.1.2.5 IMU CDU Fail Detect Circuitry. A non-fail indication (a voltage less than 0.5 vdc) shall be furnished by the assembly at pins 127 (Hi) and 122 (Lo) when loaded with 20K ±5 percent upon application of +27.5±5.5 vdc at pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all normal signals or the application of a non-fail signal of Table IX while maintaining all other normal signals. There shall be a fail indication (+26.5±6.5 vdc) available at pins 127 (Hi) and 122 (Lo), when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table IX. A non-fail output shall be furnished again within 1.0 second after removal of the fail input.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 22170			3 MAY 65	
B		REVISED PER TDRR 22390				
C		REVISED PER TDRR 23888	KCH		15 NOV 65	
D		REVISED PER TDRR 27207			22 MAR 66	
E		REVISED PER TDRR 27970			28 APR 66	
F		REVISED PER TDRR 28184			MAY 66	



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SEE NOTE 12 3 PLACES
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Q41 45
CR33 40
R114
CR32 40
R129 5
Q33 43
K3 21 SEE NOTE 13&15
K4 21 SEE NOTE 13&15
1
Q31
C21 33
R115 14
R119 15
R120 14
55
C20 33
SEE NOTE 13 & 15 K1 21
SEE NOTE 13&15 K2 21
D
120
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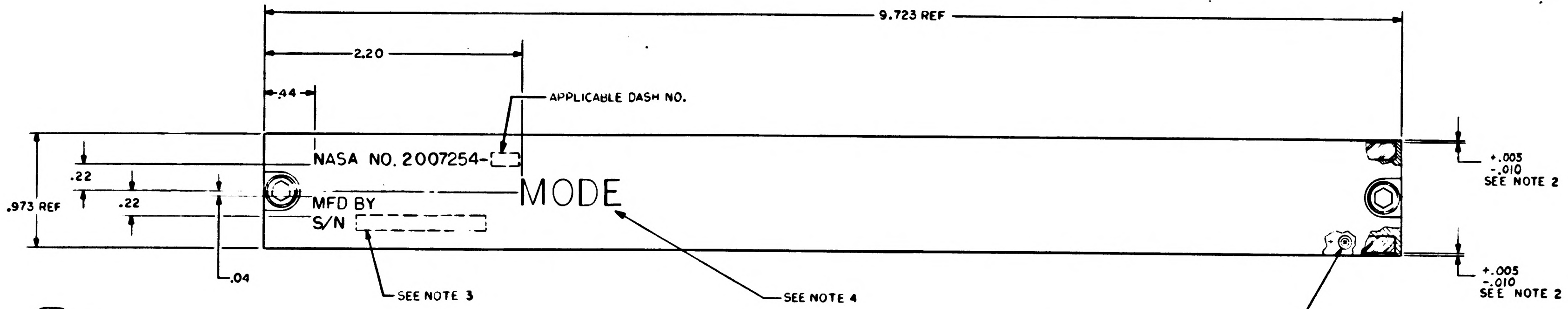
R118 14
CR30 37
SEE NOTE 22



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APPLICABLE DASH NO.
NASA NO. 2007254-
MODE
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S/N
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.973 REF
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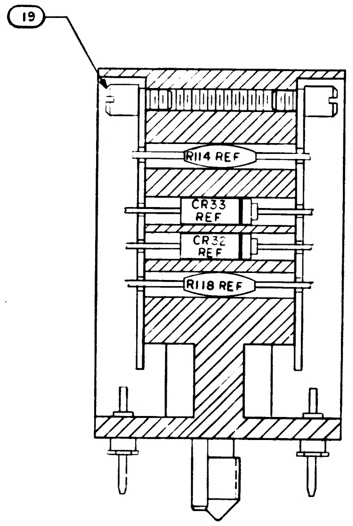
+.005 -.010 SEE NOTE 2
SEE NOTE 3
SEE NOTE 4
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1



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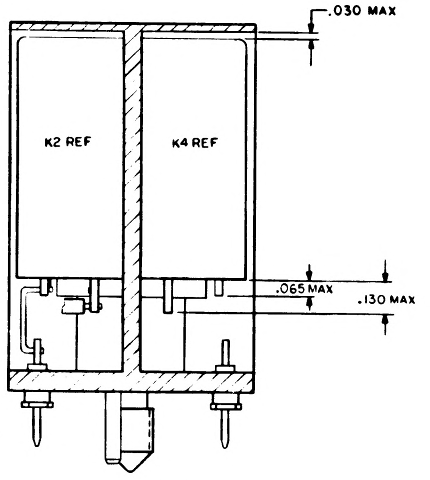
CR32 REF
R118 REF

SECTION C-C



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.130 MAX

SECTION D-D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
☒	2010084	SCHEMATIC	REF
1	2010713	WIRING BOARD F	60
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1	2010707	WIRING BOARD D	58
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1	2010703	WIRING BOARD A	55
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1	1006750-51	RESISTOR	53
2	1006750-47	RESISTOR	52
1	1006750-31	RESISTOR	51
1	1006750-35	RESISTOR	50
1	1010279-112	CAPACITOR	49
1	1006777-34	CAPACITOR	48
	[illegible]-16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
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3	1008815-19	DIODE	40
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3	1010362-002	DIODE	38
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5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
2	1010369-101	RESISTOR	32
2	1010369-95	RESISTOR	31
11	1006750-49	RESISTOR	30
2	1006750-52	RESISTOR	29
2	1006750-64	RESISTOR	28
2	1006750-84	RESISTOR	27
22	1006750-80	RESISTOR	26
4	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
7	1006750-25	RESISTOR	23
1	1006750-20	RESISTOR	22
4	1010353-7	RELAY	21
13	2008319	INSULATOR, WASHER	20
10	1008161-4	SCREW CAP SLOTTED HEAD	19
2	1006750-46	RESISTOR	18
16	1006750-56	RESISTOR	17
8	1006750-36	RESISTOR	16
16	1006750-63	RESISTOR	15
24	1006750-39	RESISTOR	14
1	2008093-003	TERMINAL, THREADED	13
AR	1006776-21	INSULATION SLEEVING	12
AR	1006776-22	INSULATION SLEEVING	11
AR	1006757-1	WIRE ELECTRICAL	10
			9
36	1008025-1	INSULATOR, BUSHING	8
~~1~~	~~2008344~~	~~WIRING BOARD B~~	~~7~~
~~1~~	~~2008342~~	~~WIRING BOARD A~~	~~6~~
2	MS16633-4015	RING, RETAINING, EXTERNAL "E"	5
2	1004546-3	WASHER, FLAT	4
2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
1	2007211-011	HEADER HOUSING ASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007222	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XX .02 ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED 7 JUN 65
APPROVED 8 JUN 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MODE ASSY
CDU ELECTRONICS

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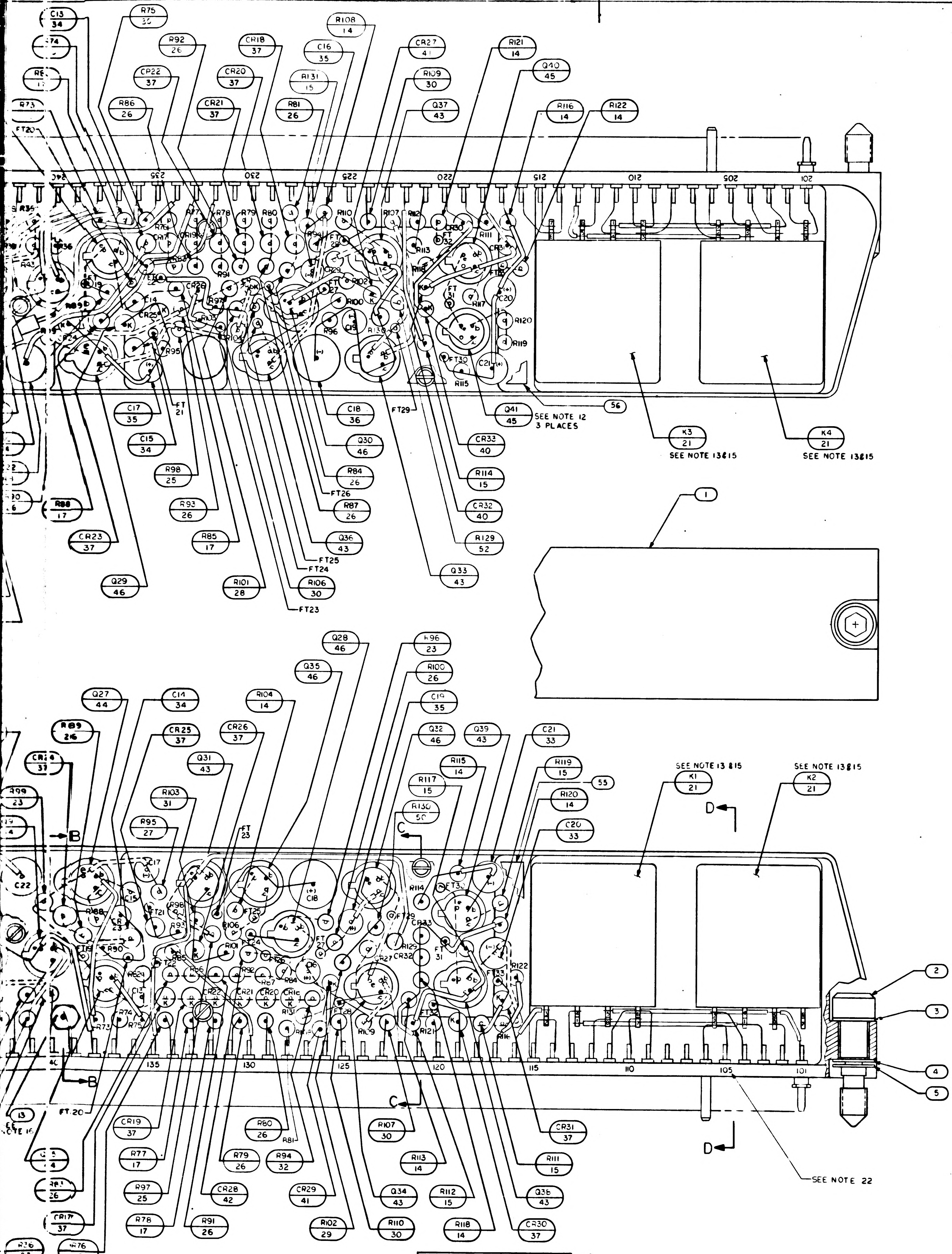
80230	J	2007254
SCALE 4/1		SHEET 1 OF 1

2007254

2007 F4 F

3/2007254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Q37 43
R116 14
R122 14
R73
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205
201
C17 35
C15 34
R98 25
R93 26
R85 17
R101 28
R106 30
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FT24
FT25
FT26
C18 36
Q30 46
R84 26
R87 26
Q36 43
Q33 43
Q41 45
SEE NOTE 12 3 PLACES
56
CR33 40
R114 15
CR32 40
R129 52
K3 21 SEE NOTE 13&15
K4 21 SEE NOTE 13&15
CR23 37
Q29 46
R88 17
FT 21
FT29
1
Q28 46
R96 23
Q35 46
R100 26
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C14 34
R104 14
CR25 37
CR26 37
Q31 43
Q32 46
Q39 43
C21 33
R115 14
R117 15
R119 15
R130 50
R120 14
55
C20 33
R103 31
R95 27
R99 23
FT 23
SEE NOTE 13 &15 K1 21
SEE NOTE 13&15 K2 21
B
C
D
2
3
4
5
135
130
125
120
115
110
105
101
FT 20
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R97 25
R78 17
CR17 37
R76 17
R91 26
CR28 42
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R94 32
R81
CR29 41
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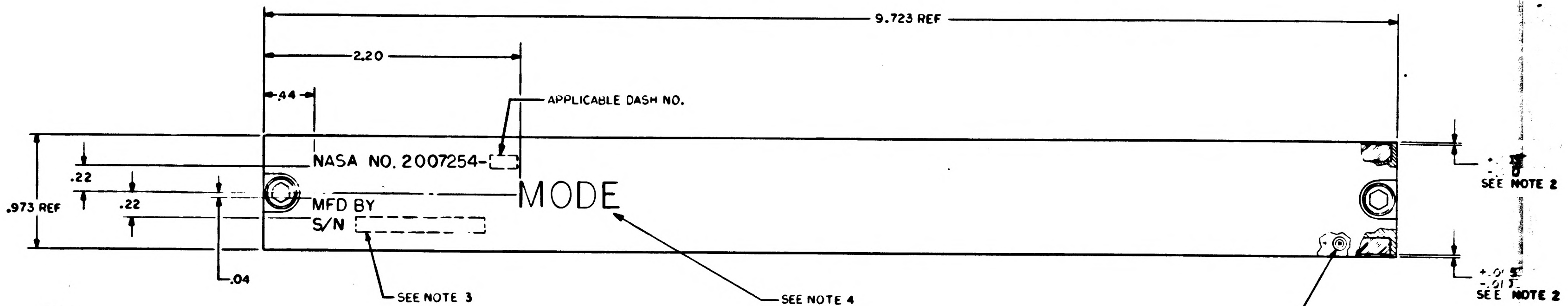
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NASA NO. 2007254-
MODE
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S/N
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.04
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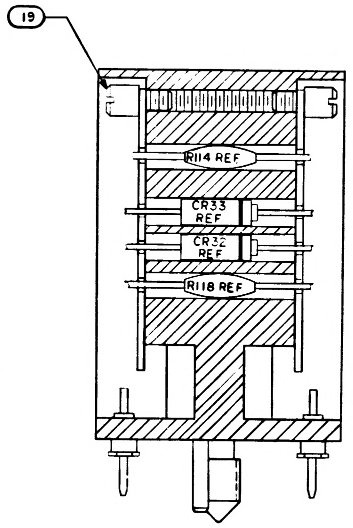
SEE NOTE 4
SEE NOTE 2
SEE NOTE 2
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1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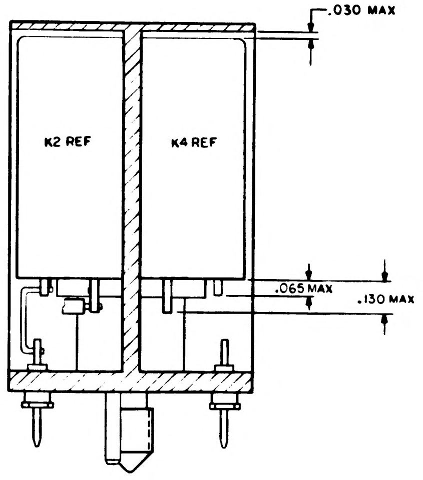
CR32 REF
R118 REF

SECTION C-C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K4 REF
.065 MAX
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SECTION D-D

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QTY REQD	
-011	

2007222	
NEXT ASSY	USED ON
APPLICATION	

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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XX±.02 ± —
DO NOT SCALE THIS DRAWING

MATERIAL

INSTRUME
CAMBR

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

2007254 F

2/2007254

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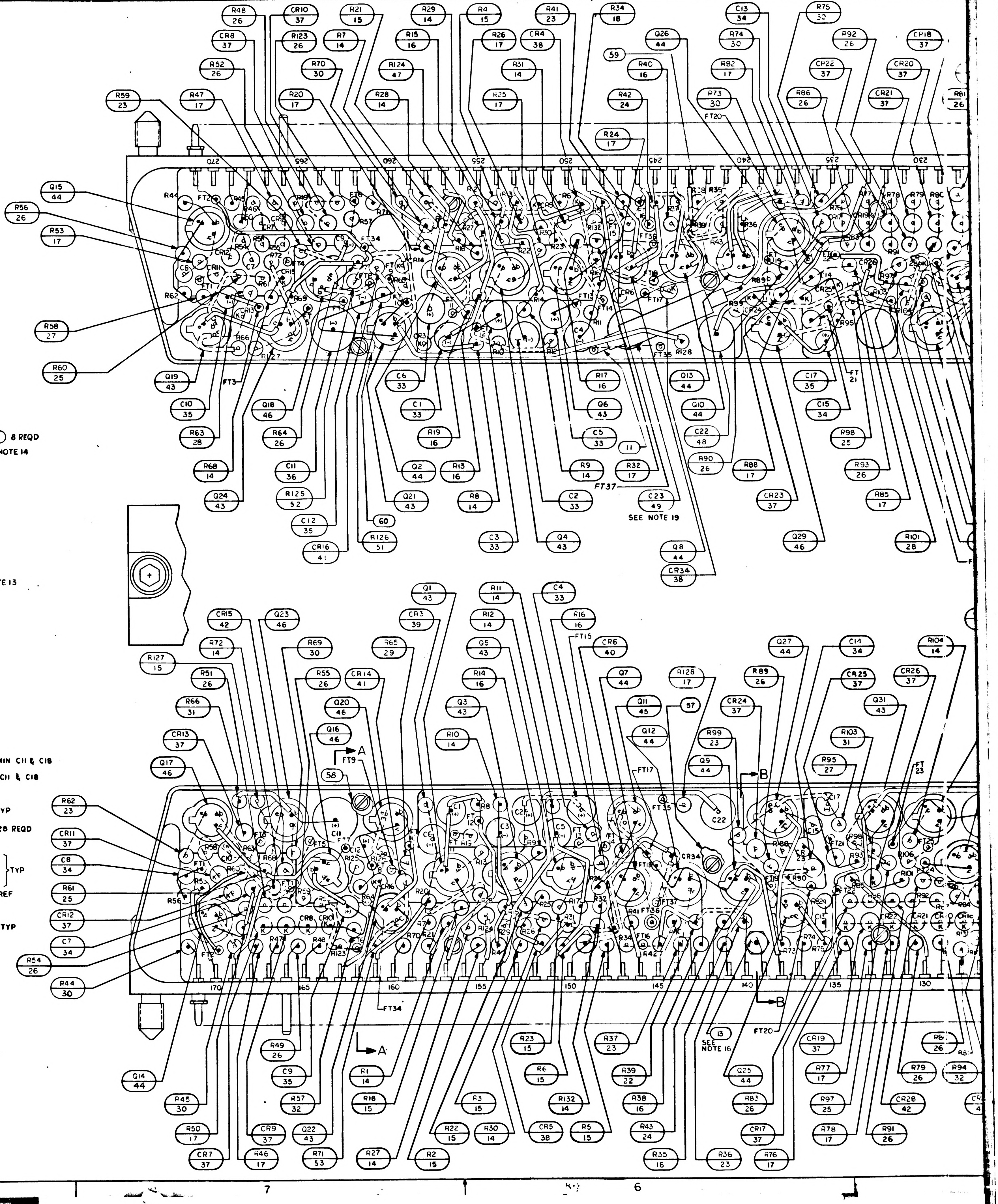
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R124 47
R28 14
R4 15
R26 17
R31 14
R25 17
R41 23
CR4 38
R34 18
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R40 16
R42 24
R24 17
Q26 44
C13 34
R74 30
R82 17
R73 30
FT20
R75 30
R92 26
CP22 37
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CR18 37
CR20 37
CR21 37
R81 26
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R58 27
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C10 35
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R68 14
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R125 52
C12 35
CR16 41
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R126 51
C6 33
C1 33
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Q21 43
R13 16
R8 14
C3 33
R17 16
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C5 33
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R9 14
R32 17
C2 33
FT37
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SEE NOTE 19
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R88 17
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C17 35
C15 34
FT 21
R98 25
R93 26
CR23 37
R85 17
Q29 46
R101 28
Q1 43
R11 14
C4 33
CR15 42
Q23 46
CR3 39
R12 14
R16 16
FT15
R72 14
R69 30
R65 29
Q5 43
CR6 40
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R55 26
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R89 26
Q27 44
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R10 14
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R99 23
R103 31
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FT17
Q9 44
B
R95 27
FT 23
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R61 25
CR12 37
C7 34
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130
FT34
B
FT20
13 SEE NOTE 16
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R49 26
C9 35
A
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R23 15
R6 15
R37 23
R39 22
Q25 44
R77 17
CR19 37
R6 26
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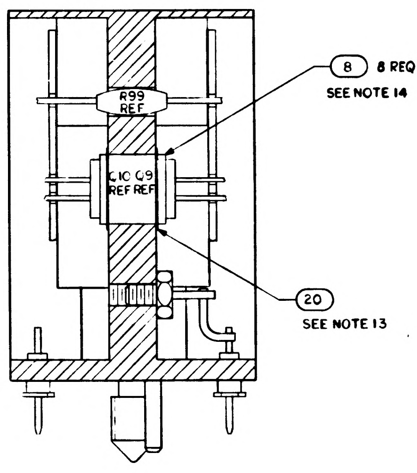
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8 8 REQD
SEE NOTE 14
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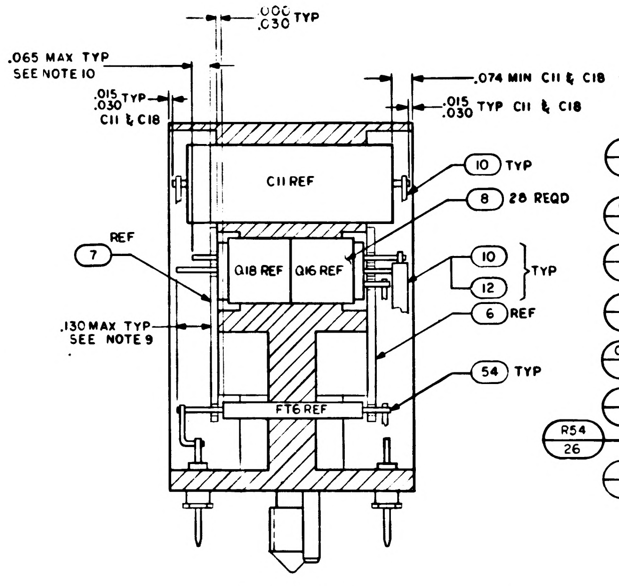
SEE NOTE 13

SECTION B-B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SEE NOTE 10
.015 .030 TYP
C11 & C18
.074 MIN C11 & C18
.015 .030 TYP C11 & C18
C11 REF
10 TYP
8 28 REQD
7 REF
Q18 REF
Q16 REF
10
12
TYP
6 REF
.130 MAX TYP
SEE NOTE 9
54 TYP
FT6 REF

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD J
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER 1002004 TYPE I
20. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
21. EXCEPT FOR MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
22. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II

2007254	F

APOLLO G&N Specification
PS2007254 REV F
Original Issue Date: 23 Nov 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
2-8-66	C	26018	6 RDG/AC	WK	---
2/23/66	D	26578	11 and 17 RDG/AC	WK	---
3/22/66	E	27420	9 RDG/AC	WK	TM
3/29/66	F	27470	10 RDG/AC	WK	---

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 MIT/IL 11/23/65	ACSP

TABLE IX

IMU CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
BUPLVL	137	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
CUPLVL	235	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AUPLVL	236	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AFINER	134	800 cps, sine wave	0 vac	≤0.5V rms	≥1.0V rms	±0.1V rms
BFINER	133	↑	0 vac	≤0.5V rms	≥1.0V rms	↑
C FINER	132		0 vac	≤0.5V rms	≥1.0V rms	
ACRSER	131		0 vac	≤1.5V rms	≥2.0V rms	
BCRSER	129		0 vac	≤1.5V rms	≥2.0V rms	
CCRSER	128		0 vac	≤1.5V rms	≥2.0V rms	
CCSRFH	125		≥2.0V	≥2.0V rms	≤0.8V rms	
ACSRFH	123	↓	≥2.0V	≥2.0V rms	≤0.8V rms	↓
BCSRFH	224	800 cps, sine wave	≥2.0V	≥2.0V rms	≤0.8V rms	±0.1V rms
U +14 TP	126	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	±0.5 vdc
U +14 TP	126	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 126

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2007254 and all drawings and engineering data referenced thereon.

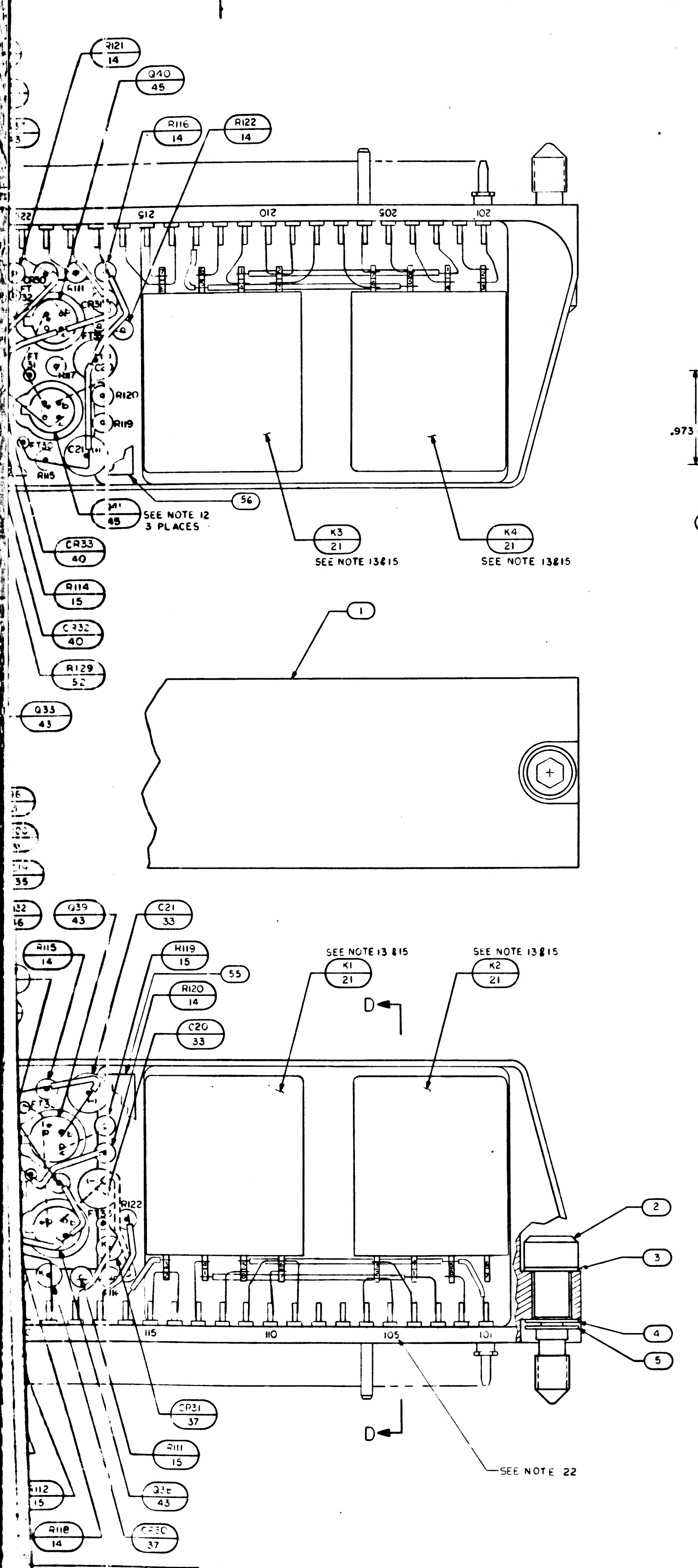
3.2.2 Maximum Weight. The maximum weight of the assembly shall be 0.71 pound.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table X.

3.2.3.2 Insulation Resistance. The resistance between pin 139 and the remaining assembly pins shall be not less than 100 megohms.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 22170			3 Sep 65	
B		REVISED PER TDRR 22990				
C		REVISED PER TDRR 23888	KCH		15 Nov 65	
D		REVISED PER TDRR 27207			22 MAR 66	
E		REVISED PER TDRR 27970			28 APR 66	
F		REVISED PER TDRR 28184			13 MAY 66	
G		REVISED PER TDRR 29960	LK			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R117
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SEE NOTE 12
3 PLACES
56
K3
21
SEE NOTE 13&15
K4
21
SEE NOTE 13&15
CR33
40
R114
15
CR32
40
R129
52
Q33
43
1
Q39
43
C21
33
R115
14
R119
15
R120
14
55
C20
33
SEE NOTE 13 &15
K1
21
SEE NOTE 13&15
K2
21
D
R122
2
3
4
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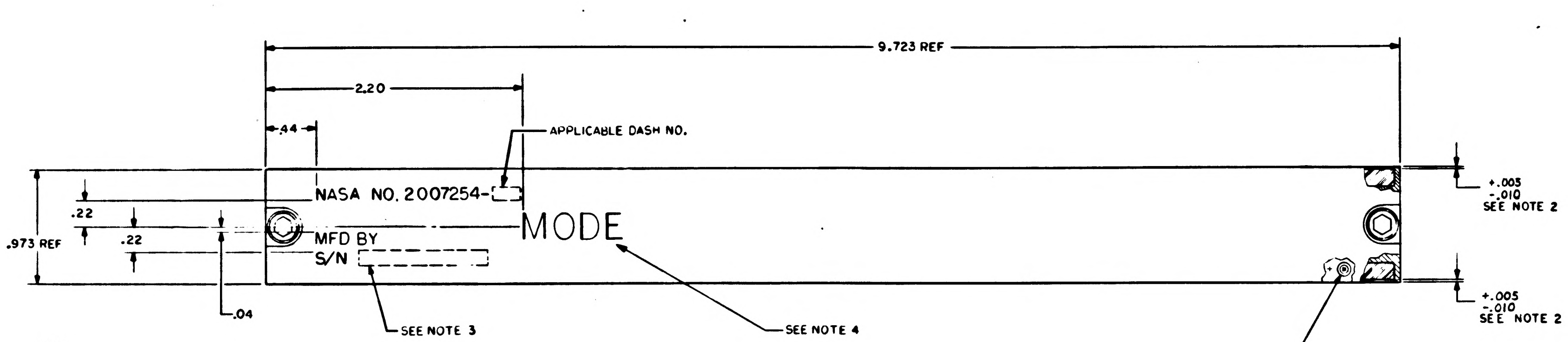
SEE NOTE 22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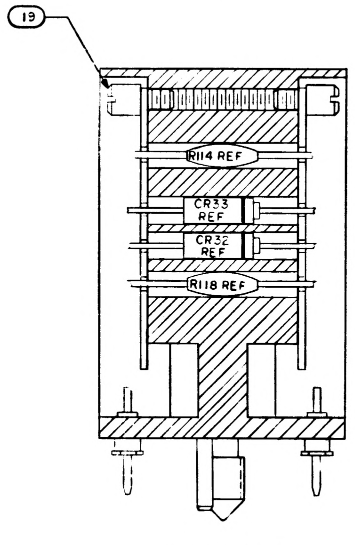
2.20
.44
APPLICABLE DASH NO.
NASA NO. 2007254-
MFD BY
S/N
MODE
.973 REF
.22
.22
.04
+.005
-.010
SEE NOTE 2
+.005
-.010
SEE NOTE 2
SEE NOTE 3
SEE NOTE 4
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1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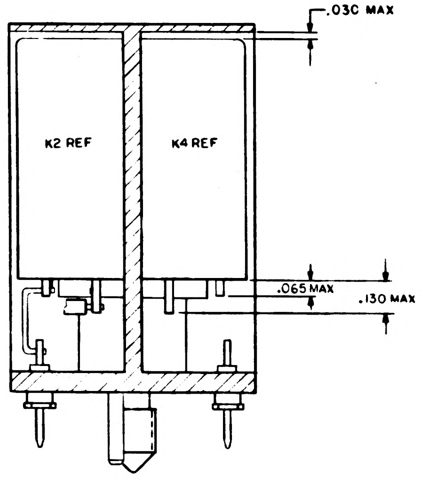
CR33 REF
CR32 REF
R118 REF

SECTION C-C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K2 REF
K4 REF
.065 MAX
.130 MAX

SECTION D-D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
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1	2010711	WIRING BOARD E	59
1	2010707	WIRING BOARD D	58
1	2010705	WIRING BOARD C	57
1	2010709	WIRING BOARD B	56
1	2010703	WIRING BOARD A	55
AR	1010848-2	WIRE, ELECTRICAL	54
1	1006750-51	RESISTOR	53
2	1006750-47	RESISTOR	52
1	1006750-31	RESISTOR	51
1	1006750-35	RESISTOR	50
1	1010279-112	CAPACITOR	49
1	1006777-34	CAPACITOR	48
1	[illegible]-16	RESISTOR	47
10	1010397-1	TRANSISTOR	46
3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1008814-2	TRANSISTOR	43
2	1010372-18	DIODE	42
4	1010372-16	DIODE	41
3	1008815-19	DIODE	40
1	1008815-9	DIODE	39
3	1010362-002	DIODE	38
19	1010385	DIODE	37
2	1006755-85	CAPACITOR	36
6	1006755-69	CAPACITOR	35
5	1006777-26	CAPACITOR	34
8	1006755-79	CAPACITOR	33
2	1010369-101	RESISTOR	32
2	1010369-95	RESISTOR	31
11	1006750-49	RESISTOR	30
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2	1006750-64	RESISTOR	28
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22	1006750-80	RESISTOR	26
4	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
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			9
36	1008025-1	INSULATOR, BUSHING	8
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~~1~~	~~2008342~~	~~WIRING BOARD A~~	~~6~~
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2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
1	2007211-011	HEADER HOUSING ASSEMBLY	1
-011	LIST OF MATERIALS		

G

2007254

NEXT ASSY	USED ON
2007222	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED 7 JUN 65
APPROVED 8 JUN 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

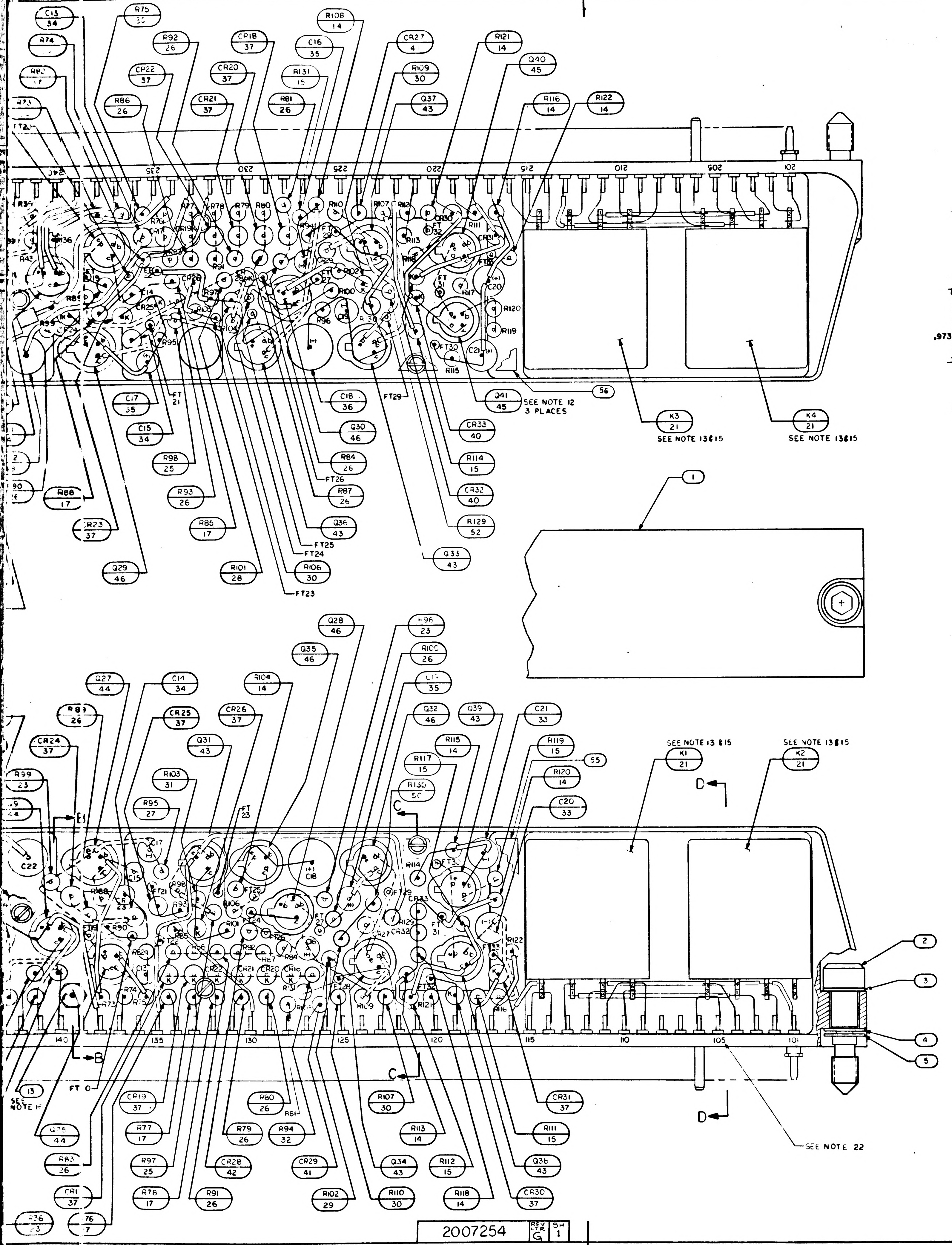
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MODE ASSY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007254
SCALE 4/1
SHEET 1 OF 1

2007254 G

3/2007254


C13 34
R75 32
R108 14
R74
R92 26
CR18 37
C16 35
CR27 41
R121 14
R82 17
CP22 37
CR20 37
R131 15
R109 30
Q40 45
R86 26
CR21 37
R81 26
Q37 43
R116 14
R122 14
235
230
225
220
215
210
205
201
C17 35
C15 34
R98 25
R93 26
R85 17
R101 28
R106 30
Q36 43
R87 26
R84 26
Q30 46
C18 36
CR33 40
R114 15
CR32 40
R129 52
Q33 43
Q41 45
SEE NOTE 12 3 PLACES
56
K3 21 SEE NOTE 13&15
K4 21 SEE NOTE 13&15
FT23
FT24
FT25
FT26
FT29
R88 17
CR23 37
Q29 46
1
Q28 46
R96 23
Q35 46
R100 26
C19 35
Q27 44
C14 34
R104 14
R89 26
CR25 37
CR26 37
Q32 46
Q39 43
C21 33
CR24 37
Q31 43
R115 14
R119 15
R99 23
R103 31
R117 15
R120 15
R95 27
R130 50
C20 33
53
SEE NOTE 13 &15 K1 21
SEE NOTE 13&15 K2 21
C
D
E
B
140
135
130
125
120
115
110
105
101
2
3
4
5
13 SEE NOTE 11
FT 0
CR19 37
R80 26
R81
R107 30
R113 14
CR31 37
R111 15
R77 17
R79 26
R94 32
R83 26
R97 25
CR28 42
CR29 41
Q34 43
R112 15
Q38 43
CR1 37
R78 17
R91 26
R102 29
R110 30
R118 14
CR30 37
R76 7
SEE NOTE 22

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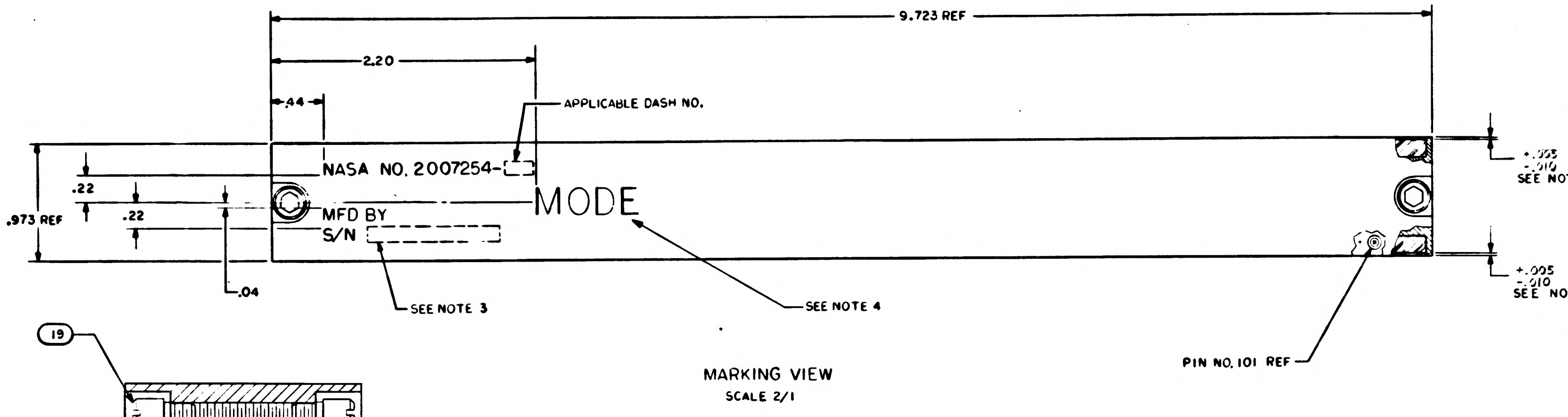
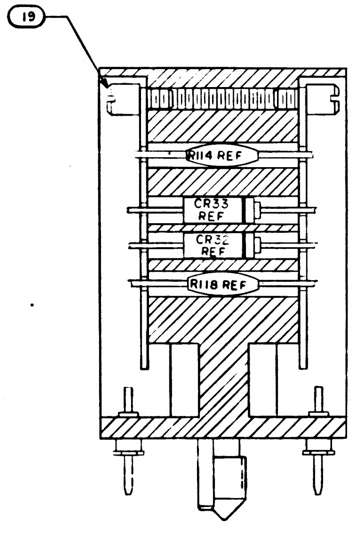

9.723 REF
2.20
.44
APPLICABLE DASH NO.
NASA NO. 2007254-
MODE
MFD BY
S/N
.973 REF
.22
.22
.04
SEE NOTE 3
SEE NOTE 4
+.005 -.010 SEE NOTE 2
+.005 -.010 SEE NOTE 2
PIN NO. 101 REF

MARKING VIEW
SCALE 2/1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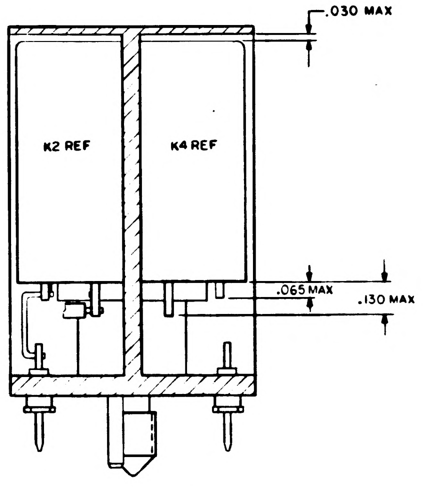
R114 REF
CR33 REF
CR32 REF
R118 REF

SECTION C-C


.030 MAX
K2 REF
K4 REF
.065 MAX
.130 MAX

SECTION D-D

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

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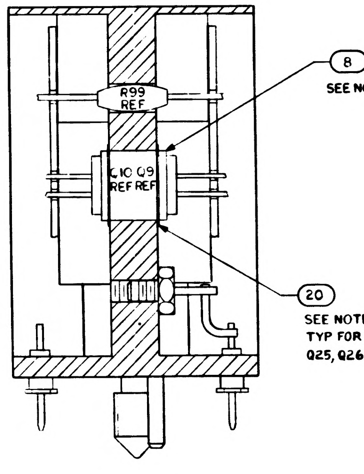
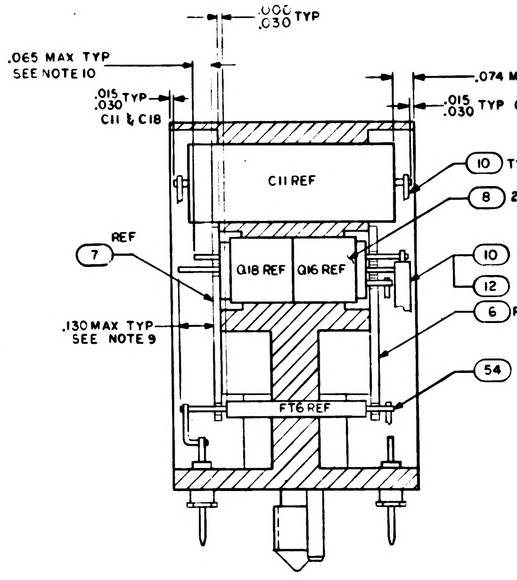
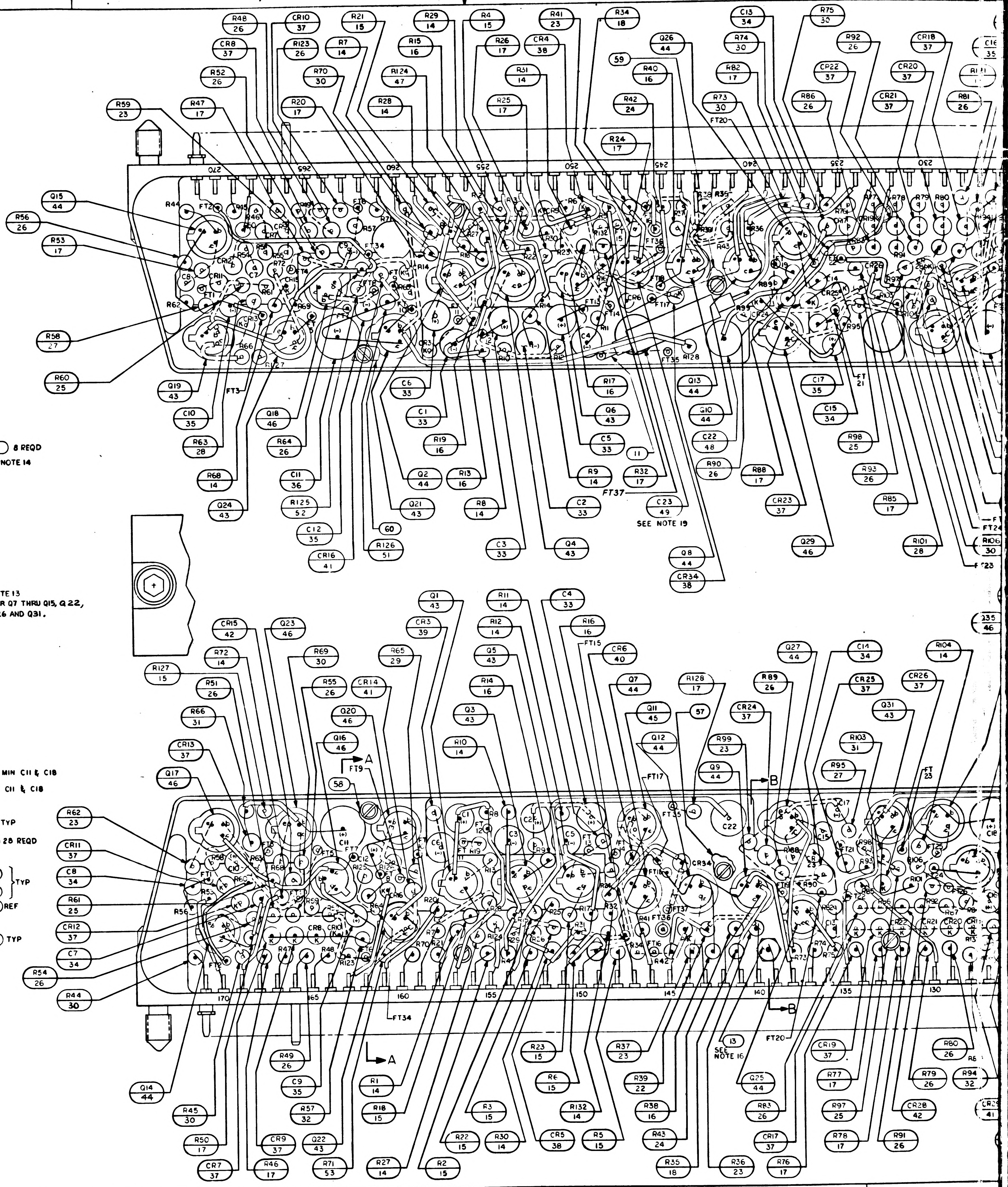
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


R99 REF
C10 REF
Q9 REF
8 8 REQD
SEE NOTE 14
20
SEE NOTE 13
TYP FOR Q7 THRU Q15, Q22, Q25, Q26 AND Q31.

SECTION B-B


.006 .030 TYP
.065 MAX TYP SEE NOTE 10
.015 .030 TYP C11 & C18
.074 MIN C11 & C18
.015 .030 TYP C11 & C18
C11 REF
10 TYP
8 28 REQD
REF
7
Q18 REF
Q16 REF
10
12
TYP
6 REF
.130 MAX TYP SEE NOTE 9
54 TYP
FT6 REF

SECTION A-A
TYP FOR Q1 THRU Q6, Q16 THRU Q21, Q23, Q24, Q27 THRU Q30, Q32 THRU Q41.


FT37
SEE NOTE 19
SEE NOTE 16
A
B
FT9
FT34
FT20

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD J
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 59 PER 1002004 TYPE I
20. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
21. EXCEPT FOR MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT
22. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002122 TYPE II

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
2-8-66	C	26018	6 RDG/AC	WK	---
2/23/66	D	26578	11 and 17 RDG/AC	WK	---
3/22/66	E	27420	9 RDG/AC	WK	TM
3/29/66	F	27470	10 RDG/AC	WK	---
4/5/66	G	27758	11 RDG/AC	WK	TM

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

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PROCUREMENT SPECIFICATION

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MODE MODULE

DRAWING NO. 2007254

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				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
2-8-66	C	26018	6 RDG/AC	WK	---
2/23/66	D	26578	11 and 17 RDG/AC	WK	---
3/22/66	E	27420	9 RDG/AC	WK	TM
3/29/66	F	27470	10 RDG/AC	WK	---
4/5/66	G	27758	11 RDG/AC	WK	TM
6/7/66	H	29472	12 RDG/AC	MGM	----

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	W Kayton 23 Nov 65 11/23/65 MIT/IL	ACSP

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

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				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
2-8-66	C	26018	6 RDG/AC	WK	---
2/23/66	D	26578	11 and 17 RDG/AC	WK	---
3/22/66	E	27420	9 RDG/AC	WK	TM
3/29/66	F	27470	10 RDG/AC	WK	---
4/5/66	G	27758	11 RDG/AC	WK	TM
6/7/66	H	29472	12 RDG/AC	MGM	----
7/28/66	J	30293	9, 19, 20 RDG/AC	EA	WLS

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

3.1.2.4 RR/Optics CDU Fail Detect Circuitry. The assembly shall furnish a non-fail output (a voltage of less than 0.5 vdc) at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent upon application of 27.5±5.5 vdc at pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all of the normal signals or the application of a non-fail signal of Table VIII while maintaining all other normal signals. A fail indication of +26.5±6.5 vdc shall be available at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table VIII. A non-fail output shall be furnished again by the assembly within 1.0 second after removal of the fail input.

TABLE VIII

RR/OPTICS CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
DUPLVL	171	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
EUPLVL	269	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
DFINER	168	800 cps sine wave	0 vac	≤0.5V rms	≥1.0V rms	
EFINER	167	↑	0 vac	≤0.5V rms	≥1.0V rms	
ECRSER	166		0 vac	≤1.5V rms	≥2.0V rms	
DCRSER	165		0 vac	≤1.5V rms	≥2.0V rms	
DCSRFH	160	↓	2.2±0.1V rms	≥2.0V rms	≤0.8V rms	
ECSRFH	262	800 cps sine wave	2.2±0.1V rms	↑	↑	
DCSRFH $(\cos \theta - \psi)$	160	800 cps $\angle 0^\circ$ sine wave	2.2±0.1V rms			Pin 154 connected to pin 162. Pins 233 &234 connected to ground
ECSRFH $(\cos \theta - \psi)$	262	800 cps $\angle 40^\circ$ ±15°	2.2±0.1V rms	↓ ≥2.0V rms	↓ ≤0.8V rms	
O +14 TP	163	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	
O +14 TP	163	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 163

3.1.2.5 IMU CDU Fail Detect Circuitry. A non-fail indication (a voltage less than 0.5 vdc) shall be furnished by the assembly at pins 127 (Hi) and 122 (Lo) when loaded with 20K ±5 percent upon application of +27.5±5.5 vdc at pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all normal signals or the application of a non-fail signal of Table IX while maintaining all other normal signals. There shall be a fail indication (+26.5±6.5 vdc) available at pins 127 (Hi) and 122 (Lo), when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table IX. A non-fail output shall be furnished again within 1.0 second after removal of the fail input.

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MODE MODULE

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Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25159	6, 9, 18, 19, 20	WK	----
1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
2-8-66	C	26018	6 RDG/AC	WK	---
2/23/66	D	26578	11 and 17 RDG/AC	WK	---
3/22/66	E	27420	9 RDG/AC	WK	TM
3/29/66	F	27470	10 RDG/AC	WK	---
4/5/66	G	27758	11 RDG/AC	WK	TM
6/7/66	H	29472	12 RDG/AC	MGM	----
7/28/66	J	30293	9, 19, 20 RDG/AC	EA	WLS
9/22/66	K	31223	10 RDG/AC	MGM EA	WLS

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

TABLE IX

IMU CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
BUPLVL	137	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
CUPLVL	235	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AUPLVL	236	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AFINER	134	800 cps, sine wave	0 vac	≤0.5V rms	≥1.0V rms	±0.1V rms
BFINER	133	↑	0 vac	≤0.5V rms	≥1.0V rms	↑
C FINER	132		0 vac	≤0.5V rms	≥1.0V rms	
ACRSER	131		0 vac	≤1.5V rms	≥2.0V rms	
BCRSER	129		0 vac	≤1.5V rms	≥2.0V rms	
CCRSER	128		0 vac	≤1.5V rms	≥2.0V rms	
CCSRFH	125		2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	
ACSRFH	123	↓	2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	↓
BCSRFH	224	800 cps, sine wave	2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	±0.1V rms
U +14 TP	126	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	±0.5 vdc
U +14 TP	126	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 126

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2007254 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. The maximum weight of the assembly shall be 0.71 pound.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table X.

3.2.3.2 Insulation Resistance. The resistance between pin 139 and the remaining assembly pins shall be not less than 100 megohms.

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MODE MODULE

DRAWING NO. 2007254

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Date	Revision Letter	TDRR No.	Pages Revised	Approvals AC	Approvals NASA
1/11/66	A	25159	6, 9, 18, 19, 20 /AC	WK	----
Ⓜ 1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
Ⓜ 2-8-66	C	26018	6 RDG/AC	WK	---
Ⓜ 2/23/66	D	26578	11 and 17 RDG/AC	WK	---
Ⓜ 3/22/66	E	27420	9 RDG/AC	WK	TM
Ⓜ 3/29/66	F	27470	10 RDG/AC	WK	---
Ⓜ 4/5/66	G	27758	11 RDG/AC	WK	TM
Ⓜ 6/7/66	H	29472	12 RDG/AC	MGM	----
Ⓜ 7/28/66	J	30293	9, 19, 20 RDG/AC	EA	WLS
Ⓜ 9/22/66	K	31223	10 RDG/AC	MGM EA	WLS
1/12/67	L	32624	10 RDG/AC	MGM EA	---

This specification consists of page 1 to 20 inclusive.

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NASA/MSC
MIT/IL 11/23/65
AC

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

	Date	Revision Letter	TDRR No.	Pages Revised	Approvals AC	Approvals NASA
	1/11/66	A	25159	6, 9, 18, 19, 20 [illegible] AC	WK	----
M	1/11/66	B	25170	9, 10, 15, 17, 19, 20 RDG/AC	WK	ACM
M	2-8-66	C	26018	6 RDG/AC	WK	---
M	2/23/66	D	26578	11 and 17 RDG/AC	WK	---
M	3/22/66	E	27420	9 RDG/AC	WK	TM
M	3/29/66	F	27470	10 RDG/AC	WK	---
M	4/5/66	G	27758	11 RDG/AC	WK	TM
M	6/7/66	H	29472	12 RDG/AC	MGM	----
M	7/28/66	J	30293	9, 19, 20 RDG/AC	EA	WLS
M	9/22/66	K	31223	10 RDG/AC	MGM EA	WLS
	1/12/67	L	32624	10 RDG/AC	MGM EA	---

This specification consists of page 1 to 20 inclusive.

APPROVALS	C. METZGER NASA/MSC	23 Nov 65 MIT/IL 11/23/65	AC

TABLE IX

IMU CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
BUPLVL	137	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
CUPLVL	235	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AUPLVL	236	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AFINER	134	800 cps, sine wave	0 vac	≤0.5V rms	≥1.0V rms	±0.1V rms
BFINER	133	↑	0 vac	≤0.5V rms	≥1.0V rms	↑
C FINER	132		0 vac	≤0.5V rms	≥1.0V rms	
ACRSER	131		0 vac	≤1.5V rms	≥2.0V rms	
BCRSER	129		0 vac	≤1.5V rms	≥2.0V rms	
CCRSER	128		0 vac	≤1.5V rms	≥2.0V rms	
CCSRFH	125		2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	
ACSRFH	123	↓	2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	↓
BCSRFH	224	800 cps, sine wave	2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	±0.1V rms
U +14 TP	126	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	±0.5 vdc
U +14 TP	126	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 126

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2007254 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. The maximum weight of the assembly shall be [illegible].71 pounds.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table X.

3.2.3.2 Insulation Resistance. The resistance between pin 139 and the remaining assembly pins shall be not less than 100 megohms.

3.1.2.4 RR/Optics CDU Fail Detect Circuitry. The assembly shall furnish a non-fail output (a voltage of less than 0.5 vdc) at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent upon application of 27.5±5.5 vdc at pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all of the normal signals or the application of a non-fail signal of Table VIII while maintaining all other normal signals. A fail indication of +26.5±6.5 vdc shall be available at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table VIII. A non-fail output shall be furnished again by the assembly within 1.0 second after removal of the fail input.

TABLE VIII

RR/OPTICS CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
DUPLVL	171	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
EUPLVL	269	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	
DFINER	168	800 cps sine wave	0 vac	≤0.5V rms	≥1.0V rms	
EFINER	167	↑	0 vac	≤0.5V rms	≥1.0V rms	
ECRSER	166		0 vac	≤1.5V rms	≥2.0V rms	
DCRSER	165		0 vac	≤1.5V rms	≥2.0V rms	
DCSRFH	160	↓	2.2±0.1V rms	≥2.0V rms	≤0.8V rms	
ECSRFH	262	800 cps sine wave	2.2±0.1V rms	↑	↑	
DCSRFH (cos θ-ψ)	160	800 cps /0° sine wave	2.2±0.1V rms	↓	↓	Pin 154 connected to pin 162. Pins 233 &234 connected to ground
ECSRFH (cos θ-ψ)	262	800 cps /40° ±15°	2.2±0.1V rms	≥2.0V rms	≤0.8V rms	
O +14 TP	163	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	
O +14 TP	163	Resistor to ground	⏚	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 163

3.1.2.5 IMU CDU Fail Detect Circuitry. A non-fail indication (a voltage less than 0.5 vdc) shall be furnished by the assembly at pins 127 (Hi) and 122 (Lo) when loaded with 20K ±5 percent upon application of +27.5±5.5 vdc at pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all normal signals or the application of a non-fail signal of Table IX while maintaining all other normal signals. There shall be a fail indication (+26.5±6.5 vdc) available at pins 127 (Hi) and 122 (Lo), when loaded with 20K ±5 percent, 6±4 seconds after application of any one of the fail signals of Table IX. A non-fail output shall be furnished again within 1.0 second after removal of the fail input.

TABLE IX

IMU CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NORMAL	NONFAIL	FAIL	CONDITIONS
BUPLVL	137	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
CUPLVL	235	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AUPLVL	236	0.80±0.05V, square wave	GRD	≤100 cps	≥200 cps	±10 cps
AFINER	134	800 cps, sine wave	0 vac	≤0.5V rms	≥1.0V rms	±0.1V rms
BFINER	133		0 vac	≤0.5V rms	≥1.0V rms	
C FINER	132		0 vac	≤0.5V rms	≥1.0V rms	
ACRSER	131		0 vac	≤1.0V rms	≥2.0V rms	
BCRSER	129		0 vac	≤1.0V rms	≥2.0V rms	
CCRSER	128		0 vac	≤1.0V rms	≥2.0V rms	
CCSRFH	125		2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	
ACSRFH	123		2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	
BCSRFH	224	800 cps, sine wave	2.2±0.1Vrms	≥2.0V rms	≤0.8V rms	±0.1V rms
U +14 TP	126	DC through 2K resistor	≥10 vdc	≥10 vdc	≤7 vdc	±0.5 vdc
U +14 TP	126	Resistor to ground	--	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 126

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2007254 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. The maximum weight of the assembly shall be 0.71 pounds.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 Continuity and DC Resistance. Continuity and dc resistance shall be as specified in Table X.

3.2.3.2 Insulation Resistance. The resistance between pin 139 and the remaining assembly pins shall be not less than 100 megohms.

APOLLO G&N Specification
PS2007254 REV P
Original Issue Date: 23 Nov 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals AC	Approvals NASA
Ⓜ 6/15/67	N	33938	3 R06/AC	MGM EA	--
7-20-67	P	34193	18 R06/AC	MGM SB	--

This specification consists of page 1 to 20 inclusive.

APPROVALS	A. C. Metzger NASA/MSC	W. Kupfer 11/23/65 John E. Miller 11/23/65 MIT/IL	J. Durrenberger G. Hinrichs AC

APOLLO G&N Specification
PS2007254 REV R
Original Issue Date: 23 Nov 1965
Release Authority: TDRR 24297
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

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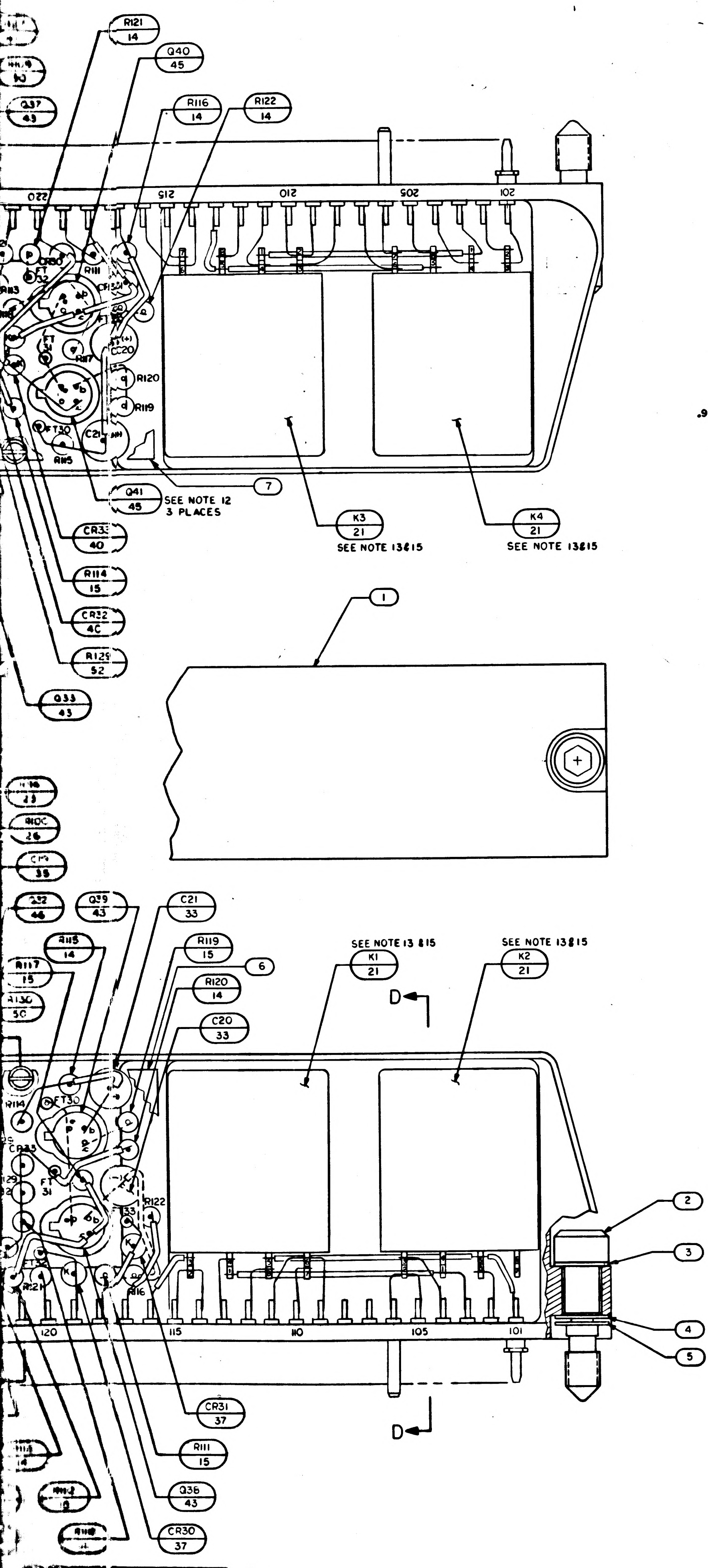
Ⓜ 6/15/67	N	33958	3 RDG/AC	MGM EA	--
Ⓟ 7-20-67	P	34193	18 RDG/AC	MGM SB	--
9/7/67	R	34539	6 RDG/AC	MGM EA	--

This specification consists of page 1 to 20 inclusive.

APPROVALS	A. C. Metzger NASA/MSC	W. Kupfer 11/23/65 John E. Miller 11/23/65 MIT/IL	J. Durrenberger AC	G. Hinrichs

SYM	ZONE	REVISIONS DESCRIPTION	DR	CHK	DATE	APPROVED



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RT30
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R117 15
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R120 14
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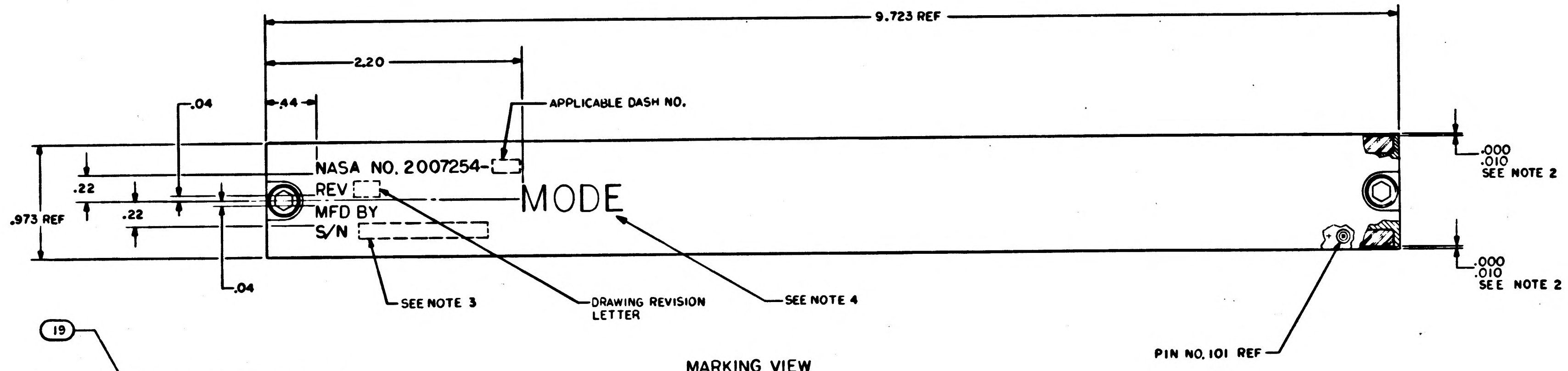

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MFD BY
S/N
MODE
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SEE NOTE 2
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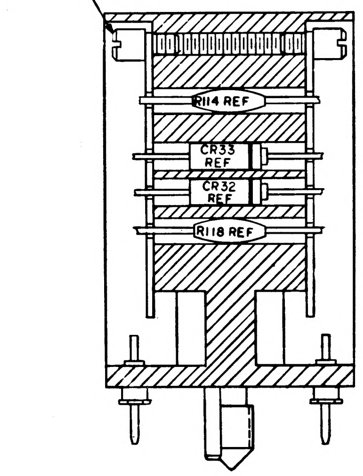
SEE NOTE 2
SEE NOTE 3
DRAWING REVISION LETTER
SEE NOTE 4
PIN NO. 101 REF
19

MARKING VIEW
SCALE 2/1



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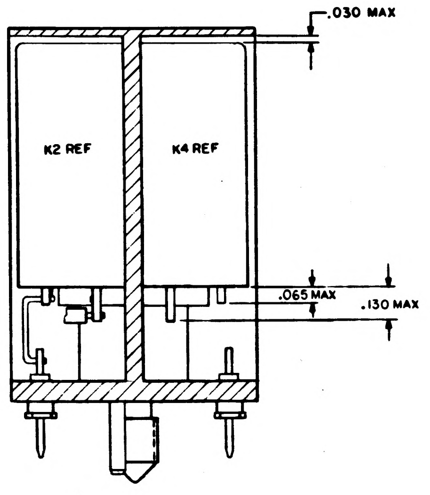
SECTION C-C



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1	1006750-35	RESISTOR	50
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1	1006777-34	CAPACITOR	48
1	1010604-16	RESISTOR	47
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3	1010342	TRANSISTOR	45
12	1010343-3	TRANSISTOR	44
16	1010998	TRANSISTOR	43
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4	1010372-16	DIODE	41
3	1010830-19	DIODE	40
1	1010830-9	DIODE	39
2	1010362-002	DIODE	38
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2	1006750-77	RESISTOR	27
27	1006750-80	RESISTOR	26
9	1006750-73	RESISTOR	25
2	1006750-11	RESISTOR	24
7	1006750-25	RESISTOR	23
1	1006750-20	RESISTOR	22
4	1010353-7	RELAY	21
10	2008319	INSULATOR, WASHER	20
4	1008161-4	SCREW, CAP SLOTTED HEAD	19
2	1006750-46	RESISTOR	18
9	1006750-56	RESISTOR	17
8	1006750-36	RESISTOR	16
17	1006750-63	RESISTOR	15
24	1006750-39	RESISTOR	14
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AR	1006776-22	INSULATION SLEEVING	11
AR	1006757-1	WIRE ELECTRICAL	10
AR	1006757-8	WIRE, ELECTRICAL	9
46	1008025-1	INSULATOR, BUSHING	8
1	2008344	WIRING BOARD B	7
1	2008342	WIRING BOARD A	6
2	MS16633-4015	RING, RETAINING, EXTERNAL 'E'	5
2	1004546-3	WASHER, FLAT	4
2	1004546-1	WASHER, FLAT	3
2	1004579-1	SCREW, JACKING	2
1	2007211-011	HEADER HOUSING ASSEMBLY	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS		

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W F Troy 5/11/65
CHECKED 7 JUN 65
APPROVED 8 JUN 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MODE ASSY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007254
SCALE 4/1
SHEET 1 OF 1

2007254

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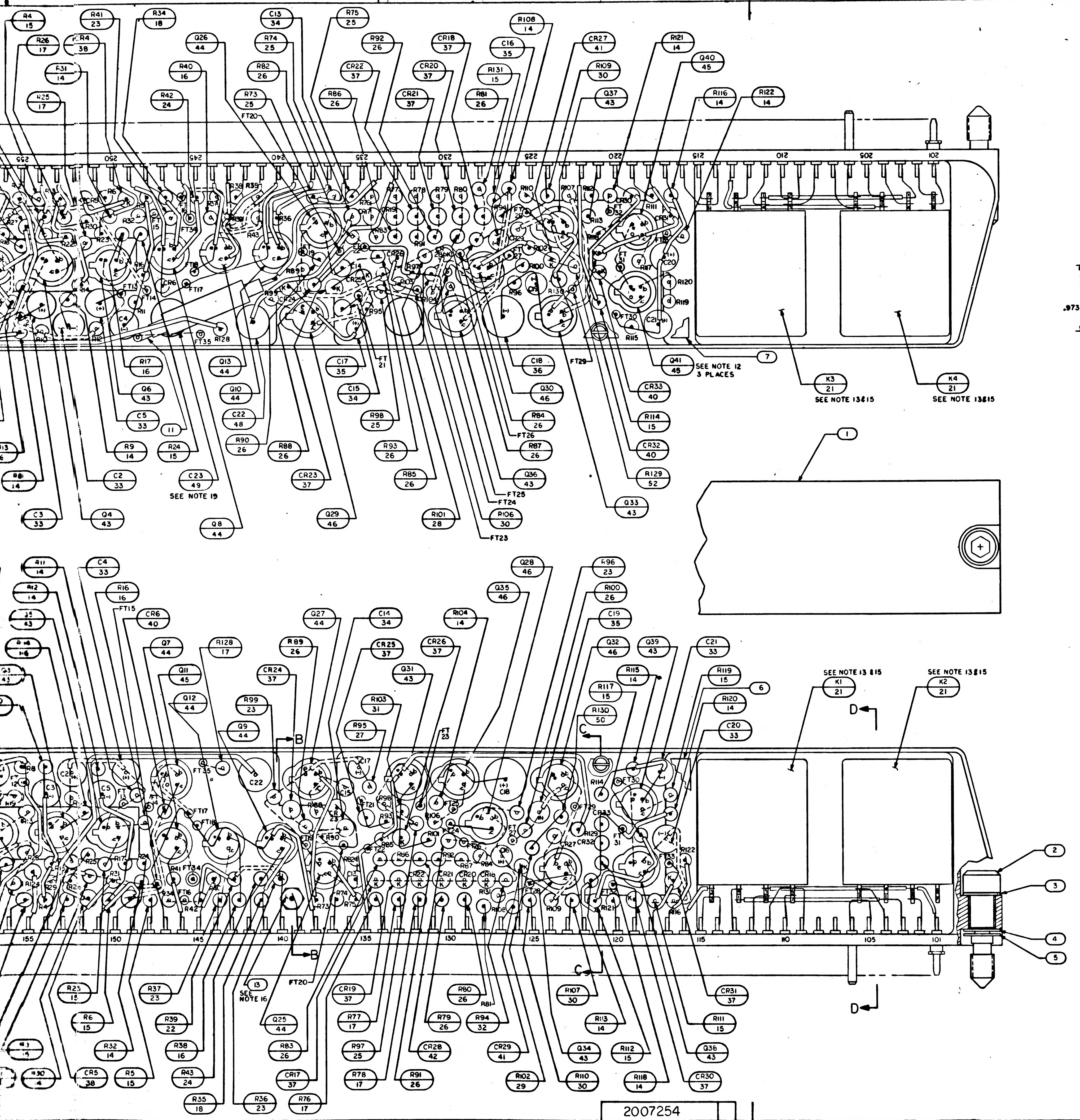

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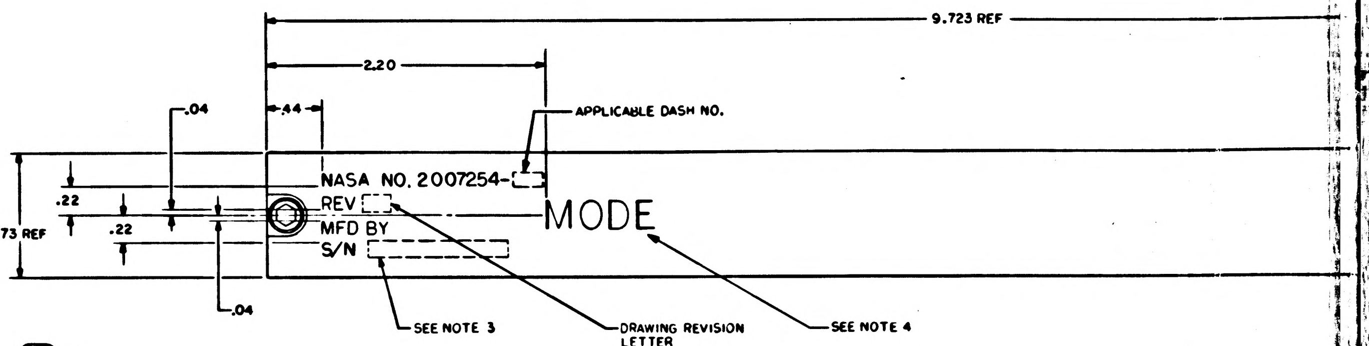

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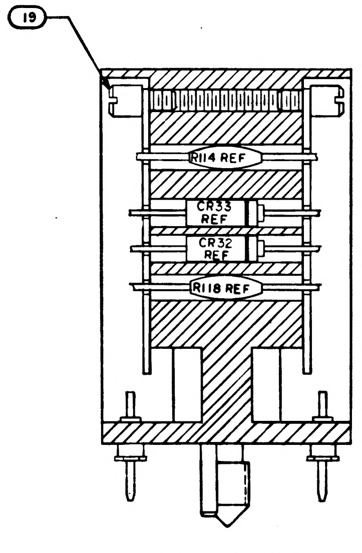
SEE NOTE 3
DRAWING REVISION LETTER
SEE NOTE 4

MARKING VIEW
SCALE 2/1

PIN NO. 101 REF



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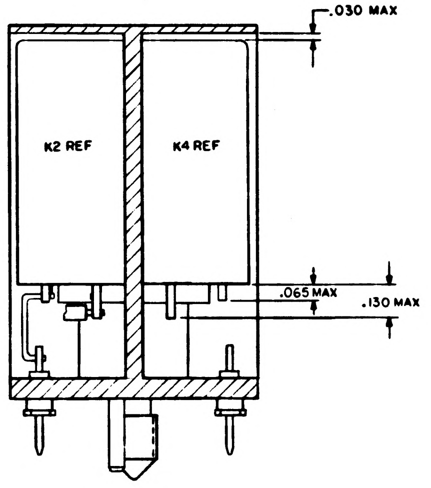
SECTION C-C



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SECTION D-D

2007254

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F-2

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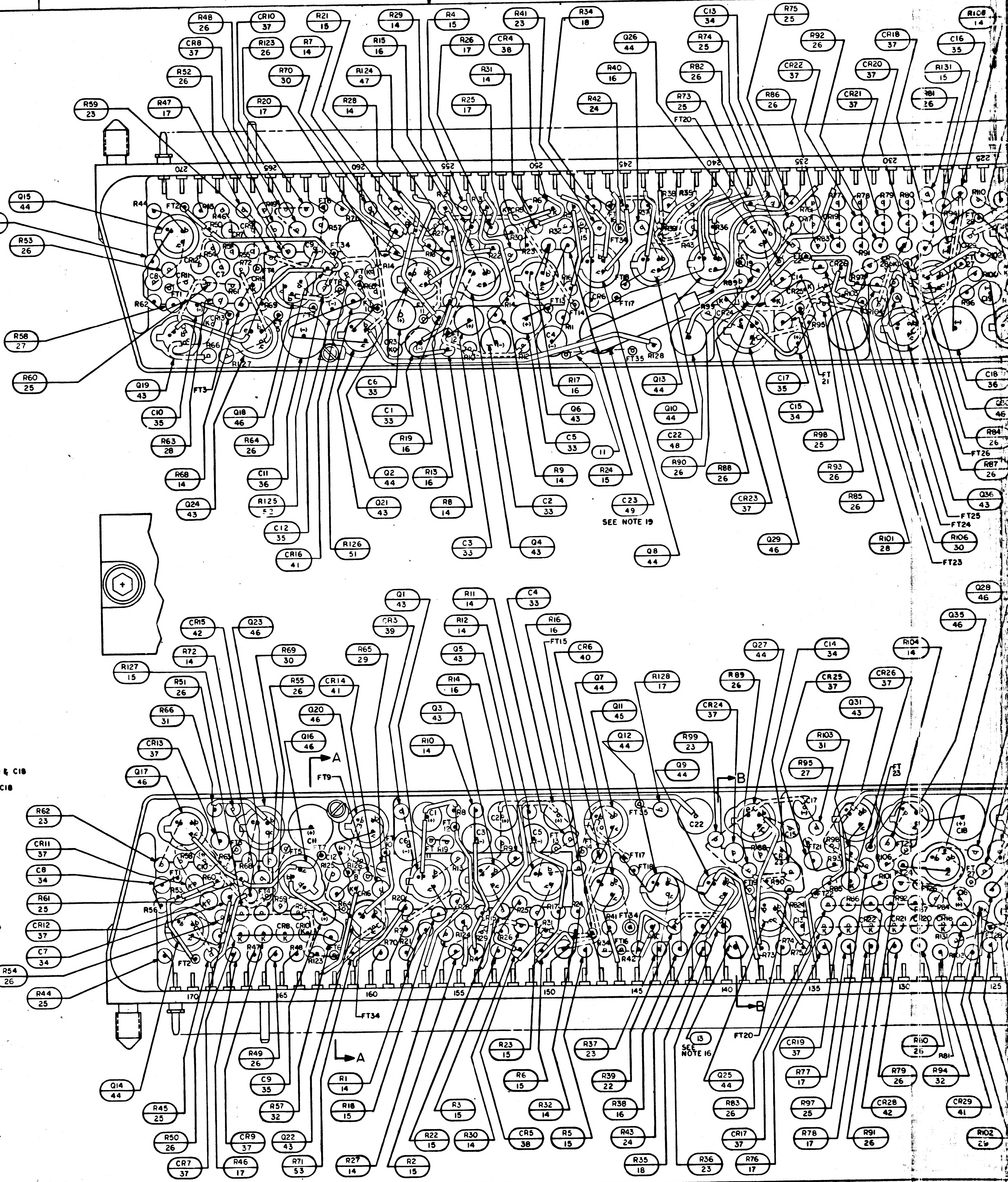
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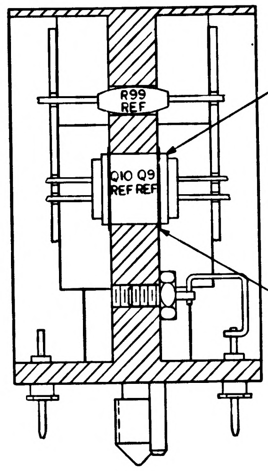
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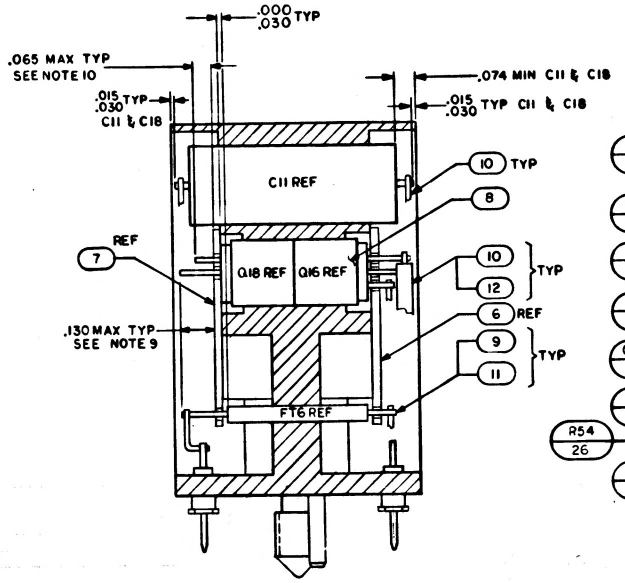
SECTION B-B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7 REF
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Q16 REF
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12
TYP
6 REF
9
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TYP
.130 MAX TYP SEE NOTE 9
FT6 REF

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ENCAPSULATE PER ND1002002. REMOVE FLASHING
3. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
4. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
5. AR DENOTES AS REQUIRED
6. FT DENOTES FEED THRU
7. K DENOTES CATHODE SIDE OF DIODE
8. + DENOTES POSITIVE SIDE OF CAPACITOR
9. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
10. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
11. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. TRIM UNUSED LEADS OF FIND NO. 45 .010/.030 FROM CASE
13. BOND FIND NO. 20 AND FIND NO. 21 TO FIND NO. 1 PER ND1002004, TYPE I
14. STAKE FIND NO. 8, FIND NO. 14 THRU 18 AND FIND NO. 22 THRU FIND NO. 46 TO FIND NO. 1 PER ND1002009 METHOD C OR D
15. WELD ALL JUMPER LEADS AS INDICATED PRIOR TO BONDING COMPONENTS TO FIND NO. 1
16. MOUNTING TORQUE FOR FIND NO. 13 TO BE 15-20 INCH OUNCES
17. WELD PER ND1002005
18. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007254
19. BOND FIND NO. 49 TO FIND NO. 7 PER ND1002203

APOLLO G&N Specification
PS2007254 REV —
Original Issue Date: 23 Nov 1965
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PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MODE MODULE

DRAWING NO. 2007254

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 20 inclusive.

APPROVALS:	C. METZGER NASA/MSC	23 Nov 65 11/23/65 MIT/IL	ACSP

TABLE I

DIGITAL MODE DRIVE CIRCUITRY

SIGNAL	INPUT PULSE	TO PINS		OUTPUT PULSE	AT PINS	
		Hi	Lo		Hi	Lo
FAZ 3DR	Negative	141	152	Positive	142	138
FAZ 2DR/	Negative	248	152	Positive	245	249
FAZ 4DR	Positive	238	152	Negative	237	239
FAZ 2DR	Positive	246	152	Negative	146	147

3.1.2.2 Enable Drive Circuitry. The assembly shall be capable of producing the outputs specified in Tables II, III, IV and V under the conditions specified in 4.3.6.

TABLE II

COMPUTER CONTROLLED ENABLES – PART "A"

SIGNAL	PINS		OUTPUT VOLTAGE	CONDITIONS
	Hi	Lo		
IMUOPR	158	152	22.0±0.5 vdc	22.0±0.5 vdc supply voltage
IMUOPR	158	152	33.0±0.5 vdc	33.0±0.5 vdc supply voltage
U +14 TP	159	152	14.0 +1.5, –1.0 vdc	
U +14 TP	159	152	7±1 vdc	2K to ground
A +14V	259	152	14.0 +1.5, –1.0 vdc	1K to ground
CARPSA	151	152	≤1.5 vdc	

TABLE III

COMPUTER CONTROLLED ENABLES – PART "B"

MODE DRIVE CONNECTION			OUTPUT					
Signal	To Pin		Signal	Pins		High Voltage	Low Voltage	Risetime & Falltime
	Hi	Lo		Hi	Lo			
AGCCA	156	152	ISSCA	257	244	2±1 vdc	≤250 mv	2.5+2.5, –2.0 msec
AGCZ	153	152	ISSZ	254	244	↑	↑	↑
AGCEEC	255	152	ISSEEC	253	244			
AGCRRZ	148	152	RRZ	250	244	↓	↓	
AGCDAE	251	152	RRDAE	149	244	2±1 vdc	≤250 mv	↓
AGCCA	156	152	CARPSA	151	244	39±2 vdc	≤1.5 vdc	2.5+2.5, –2.0 msec

3.1.2.4 RR/Optics CDU Fail Detect Circuitry. The assembly shall furnish a non-fail output (a voltage of less than 0.5 vdc) at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent upon application of 27.5±5.5 vdc at pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all of the non-fail signals of Table VIII. A fail indication of +26.5±6.5 vdc shall be available at pins 169 (Hi) and 263 (Lo) when loaded with 20K ±5 percent, 7±3 seconds after application of any one of the fail signals of Table VIII. A non-fail output shall be furnished again by the assembly within 1.0 second after removal of the fail input.

TABLE VIII

RR/OPTICS CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NONFAIL	FAIL	CONDITIONS
DUPLVL	171	0.80±0.05V, square wave	≤100 cps	≥200 cps	
EUPLVL	269	0.80±0.05V, square wave	≤100 cps	≥200 cps	
DFINER	168	800 cps sine wave	≤0.5V rms	≥1.0V rms	
EFINER	167	↑	≤0.5V rms	≥1.0V rms	
ECRSER	166		≤1.5V rms	≥2.0V rms	
DCRSER	165		≤1.5V rms	≥2.0V rms	
DCSRFH	160	↓	≥2.0V rms	≤0.8V rms	
ECSRFH	262	800 cps sine wave	↑	↑	
DCSRFH (cos θ− ψ)	160	800 cps ∠0° sine wave	↓	↓	Pin 154 connected to pin 162. Pins 233 & 234 connected to ground.
ECSRFH (cos θ− ψ)	262	800 cps ∠50° ±15°	≥2.0V rms	≤0.8V rms	
O +14 TP	163	DC through 2K resistor	≥10 vdc	≤7 vdc	
O +14 TP	163	Resistor to ground	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 163

3.1.2.5 IMU CDU Fail Detect Circuitry. A non-fail indication (a voltage less than 0.5 vdc) shall be furnished by the assembly at pins 127 (Hi) and 122 (Lo) when loaded with 20K ±5 percent upon application of +27.5±5.5 vdc at pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all non-fail signals of Table IX. There shall be a fail indication (+26.5±6.5 vdc) available at pins 127 (Hi) and 122 (Lo), when loaded with 20K ±5 percent, 7±3 seconds after application of any one of the fail signals of Table IX. A non-fail output shall be furnished again within 1.0 second after removal of the fail input.

TABLE IX

IMU CDU FAIL DETECT CIRCUITRY

SIGNAL	PIN	INPUT	NONFAIL	FAIL	CONDITIONS
BUPLVL	137	0.80±0.05V, square wave	≤100 cps	≥200 cps	±10 cps
CUPLVL	235	0.80±0.05V, square wave	≤100 cps	≥200 cps	±10 cps
AUPLVL	236	0.80±0.05V, square wave	≤100 cps	≥200 cps	±10 cps
AFINER	134	800 cps, sine wave	≤0.5V rms	≥1.0V rms	±0.1V rms
BFINER	133	↑	≤0.5V rms	≥1.0V rms	↑
CFINER	132		≤0.5V rms	≥1.0V rms	
ACRSER	131		≤1.5V rms	≥2.0V rms	
BCRSER	129		≤1.5V rms	≥2.0V rms	
CCRSER	128		≤1.5V rms	≥2.0V rms	
CCSRFH	125		≥2.0V rms	≤0.8V rms	
ACSRFH	123	↓	≥2.0V rms	≤0.8V rms	↓
BCSRFH	224	800 cps, sine wave	≥2.0V rms	≤0.8V rms	±0.1V rms
U +14 TP	126	DC through 2K resistor	≥10 vdc	≤7 vdc	±0.5 vdc
U +14 TP	126	Resistor to ground	8K ±2%	3K ±2%	14±1 vdc through 2K to pin 126

3.2 PRODUCT CONFIGURATION

3.2.1 **Drawings.** The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2007254 and all drawings and engineering data referenced thereon.

3.2.2 **Maximum Weight.** The maximum weight of the assembly shall be 0.484 pound.

3.2.3 **Standards of Manufacturing, Manufacturing Process and Production**

3.2.3.1 **Continuity and DC Resistance.** Continuity and dc resistance shall be as specified in Table X.

3.2.3.2 **Insulation Resistance.** The resistance between pin 139 and the remaining assembly pins shall be not less than 100 megohms.

TABLE X

CONTINUITY AND DC RESISTANCE

SIGNAL	PINS		RESISTANCE (ohms)
	From (+)	To (-)	
STRUCT GND	139	Chassis	≤0.5
+4 VHI	140	247	↑
CARPSA	150	151	
FAZ3LO	161	138	
FAZ2LO	161	147	
+4 VLO	161	152	
FAZ4LO	161	239	
MODCOM	161	244	
FAZ2LO/	161	249	
ACDUZ BCDUZ	243	240	
CCDUZ	243	241	
ECDUZ	143	144	
A +14V B +14V	259	260	↓
C +14V	259	261	≤0.5
DCDUZ	247	144	510 ±2%
FAZ2HI	247	146	510 ±2%
FAZ4HI	247	237	510 ±2%
ACDUZ	247	243	330 ±2%
FAZ2HI/	247	245	130 ±2%
FAZ3HI	247	142	130 ±2%
GCAPC-GCAPOP	118	117	2K ±2%
RRZ	250	152	↑
SATCON-SATOP	119	120	
RRDAE	149	152	
IMUOPR	158	258	
ISSZ	254	152	
U +14 TP - A +14V	159	259	
ISSCA	257	152	↓
ISSEEC	253	152	2K ±2%
GCAPC	203	213	975 ±10%
SATCON	103	101	975 ±10%
GCACP	118	218	>100K
REJMPB	218	118	≤1K
SATCON	119	220	>100K
REJMPA	220	119	<1K

4. QUALITY ASSURANCE PROVISIONS

4.1 PRODUCT PERFORMANCE AND CONFIGURATION REQUIREMENTS/QUALITY VERIFICATION CROSS REFERENCE INDEX

Test/Examination	Requirement	Method
Digital Mode Drive Circuitry	3.1.2.1	4.3.5
Enable Drive Circuitry	3.1.2.2	4.3.6
Relay Circuits	3.1.2.3	4.3.7
RR/Optics CDU Fail Detect Circuitry	3.1.2.4	4.3.8
IMU CDU Fail Detect Circuitry	3.1.2.5	4.3.9
Continuity and DC Resistance	3.2.3.1	4.3.3
Insulation Resistance	3.2.3.2	4.3.4

4.2 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.2.1 Test Conditions

4.2.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C
b. Relative Humidity: 90% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.2.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and re-examination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative. Retest of 3.1.2.3 and 4.3.7 shall be required whenever a reinspection is performed.

4.3 TESTS

4.3.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 2007254. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 Workmanship-Vibration. With all of the inputs specified in Table XI applied simultaneously, the assembly shall be vibrated along the axis shown in Figure 3. The vibration shall be simple harmonic motion swept from 10 to 2000 cps as a rate of 1 octave/15 sec. The magnitude of vibration shall be 6.0g rms limited to a 0.4 inch pp constant displacement from 10 cps to the crossover frequency. A missing or additional pulse or any out of tolerance condition of the outputs specified in Table XIII which exist for 1 msec or more shall constitute a failure. After vibration, the assembly shall be visually examined as specified in 4.3.1. With inputs installed per Table XIII, the mode module shall be vibrated again. Any loss of the 4.0±0.5 vdc voltage at pin 202 which exists for 0.1 msec or more shall constitute a failure.

TABLE XI (Continued)

SIGNAL	PIN	INPUT
ENGYH	212	Jumper
U28RFH	206	
K28RFH	204	Jumper
K28RFL	205	
GCAPC	118	22.0±0.5 vdc
GCAPC	203	
SATCON	119	22.0±0.5 vdc
SATCON	103	
REJMPA	101	Jumper
REJMPA	220	
REJMPB	213	Jumper
REJMPB	218	
DUPLVL	171	1.0±0.2V square wave, 100 cps
EUPLVL	269	
AUPLVL	236	↕
BUPLVL	137	
CUPLVL	235	1.0±0.2V square wave, 100 cps
DFINER	168	0.4±0.1V rms sine wave, 800 cps
EFINER	167	
AFINER	134	↕
BFINER	133	
CFINER	132	0.4±0.1V rms sine wave, 800 cps
DCRSER	165	1.3±0.2V rms sine wave 800 cps
ECRSER	166	
ACRSER	131	↕
BCRSER	129	
CCRSER	128	1.3±0.2V rms sine wave 800 cps
DCSRFH	160	2.2±0.1V rms sine wave, 800 cps
ECSRFH	262	
ACSRFH	123	↕
BCSRFH	224	
CCSRFH	125	2.2±0.1V rms sine wave, 800 cps
+4VHI	140	4.0±0.5 vdc

TABLE XII

SECOND VIBRATION TEST INPUTS

SIGNAL	PIN	INPUT	SIGNAL	PIN	INPUT
U+28VH SATCON SATCON GCAPC GCAPC	217 103 119 203 118	33.0±0.5 vdc ↕ 33.0±0.5 vdc	DDACL EDACL	216 210	Jumper
			ENGYH O28RFH	212 207	Jumper
+4VLO	121	Ground	K28RFH K28RFL	204 205	Jumper
SATPH SATYH	113 112	Jumper	ADACL	111	4.0±0.5 vdc
BDACL CDACL	115 106	Jumper	REJMPA REJMPA	101 220	Jumper
SATRH ENGPH	102 211	Jumper	REJMPB REJMPB	213 218	Jumper

TABLE XIII

VIBRATION TEST OUTPUTS

SIGNAL	PIN	OUTPUT
FAZ4HI	237	100±10 cps square wave, 4.0±0.5 vdc Hi, ≤200 mvdc Lo
CARPSA	151	≤1.5 vdc
ISSCA ISSZ ISSEEC RRZ RRDAE TVCDA	257 254 253 250 149 221	2.8±1.0 vdc ↕ 2.8±1.0 vdc
U28RFL	201	4.0±0.5 vdc
OFAIL UFAIL	169 127	<0.5 vdc, 20K ±5% load to ground <0.5 vdc, 20K ±5% load to ground
U+14TP	159	14 +1.5, -1.0 vdc

4.3.3 Continuity and DC Resistance. Resistance between the pins listed in Table X shall be as specified when measured with a low voltage resistance measuring device using method 303 of Standard MIL-STD-202. To assure a good electrical connection between pin 139 and the chassis (see Table X), the anodizing may be penetrated on the top of the module.

4.3.4 Insulation Resistance. The insulation resistance between pin 139 and the remaining assembly pins shall be as specified in 3.2.3.2 when measured in accordance with Method 302 of Standard MIL-STD-202. The megohmmeter used shall have an output voltage of 225±75 vdc limited to a short circuit current of 6.0 μa.

4.3.5 Digital Mode Drive Circuitry. – With a supply voltage of 3.5±0.1 vdc applied to pins 140 (Hi) and 150 (Lo) and with the input driving source and input pulses having the characteristics of 3.1.1.3 applied as specified in Table I, the output pulses shall be as specified in Table I and shall have the characteristics described in 3.1.2.1 (High Value: 3.5±0.2 vdc). With this test repeated when the supply voltage is 4.5±0.1 vdc, the output pulses shall have the same characteristics except that the High Value shall be 4.5±0.2 vdc.

4.3.6 Enable Drive Circuitry

4.3.6.1. Computer Controlled Enables. With the following tests conducted using a 22.0±0.5 vdc supply voltage and then repeated using a 33.0±0.5 vdc supply voltage, outputs shall be as specified.

a. With the following conditions established, outputs shall be as specified in Table II:

  (1) Supply voltage applied to pins 155 (Hi), 157 (Hi), 258 (Hi) and 152 (Lo).
  (2) Supply voltage applied to pin 150 through a 300 ohm ±5 percent, 5 watt resistor.
  (3) Pin 156 grounded through a 2K ±10 percent resistor.

b. With the following conditions established, outputs shall be as specified in Table III:

  (1) Supply voltage applied to pins 155 (Hi), 157 (Hi), 258 (Hi) and 152 (Lo).
  (2) 45±1 vdc applied to pin 150 through a 2.4K ±5 percent resistor.
  (3) The output of the mode driver circuit (Figure 1 or equivalent) applied to the inputs specified in Table III.

c. With the conditions specified in 4.3.6.1.b (above) established and with a ground applied to pin 252, outputs shall be as specified in Table III except that the outputs at pins 253 and 149 shall continuously be ≤250 mv.

4.3.6.2 Digital Mode Controlled Enables. With the following tests conducted using a 3.5±0.1 vdc supply voltage and then repeated using a 4.5±0.1 vdc supply voltage, outputs shall be as specified.

a. With the following conditions established, outputs shall be as specified in Table IV:

  (1) Supply voltage applied to pins 247 (Hi) and 152 (Lo).

  (2) 300 mv dc applied to the input pins specified in Table IV from a source resistance less than or equal to 100 ohms.

b. With the following conditions established, outputs shall be as specified in Table V:

  (1) Supply voltage applied to pins 247 (Hi) and 152 (Lo).

  (2) 3.5±0.1 vdc applied to the input pins specified in Table V through a 2.7K ±5 percent resistor.

4.3.7 Relay Circuits. Relay circuits shall be checked as follows:

a. When the following input conditions exist, the outputs specified in Table VI shall be present:

  (1) A supply voltage of 33.0±0.5 vdc applied to pins 103 (Hi), 119 (Hi), 118 (Hi), 203 (Hi), 217 (Hi) and 121 (Lo).

  (2) Pin 101 connected to pin 220 and pin 213 connected to pin 218.

  (3) The output of the mode driver circuit (Figure 1 or equivalent) connected to the inputs specified in Table VI, and the input of the mode driver circuit connected to ground.

b. When the following input conditions exist, the outputs specified in Table VII shall be present:

  (1) A supply voltage of 22.0±0.5 vdc applied to pins 103 (Hi), 119 (Hi), 118 (Hi), 203 (Hi), 217 (Hi) and 121 (Lo).

  (2) Pin 101 connected to pin 220 and pin 213 connected to pin 218.

  (3) The output of the mode driver circuit (Figure 1 or equivalent) connected to the inputs specified in Table VII, and the input of the mode driver circuit connected to 3.5±0.1 vdc.

4.3.8 RR/Optics CDU Fail Detect Circuitry. With 33.0±0.5 vdc applied to pins 271 (Hi) and 263 (Lo), 14.0±1.5 vdc applied to pins 170 (Hi), 268 (Hi) and 263 (Lo), and all the non-fail limit input signals of Table VIII applied, there shall be a non-fail indication at pin 169 as evidenced by a voltage of less than 0.5 vdc into a 20K ±5 percent load. With the fail signal limits of Table VIII applied sequentially, while maintaining all other non-fail limit signals, there shall be a fail indication at pin 169 of 30±1 vdc with a 20K ±50 percent load, 7±3 seconds after application of the fail input. After removal of the last fail input, a non-fail indication (a voltage less than 0.5 vdc) shall be present within 1 second. The ECSRFH input shall be checked at both the +15° phase shift and a -15° phase shift for both non-fail limit and fail limit conditions while the other ECSRFH input is maintained at 2.2V rms, 0 phase as specified in Table VIII. With this entire test repeated, except for the ECSRFH channels and UPLVL channels, using a supply voltage of 22.0±0.5 vdc, the fail indication shall be 20±1 vdc, 7±3 seconds after application of the fail input.

4.3.9 IMU CDU Fail Detect Circuitry. With +33.0±0.5 vdc applied to pins 135 (Hi) and 122 (Lo), 14.0±1.5 vdc applied to pins 232 (Hi), 130 (Hi) and 122 (Lo), and all the non-fail signal limit inputs of Table IX applied, there shall be a non-fail indication at pin 127 as evidenced by a voltage of less than 0.5 vdc into a 20K ±5 percent load. Maintaining all other non-fail inputs and with the fail signal limit inputs specified in Table IX applied sequentially, there shall be a fail indication at pin 127 of 30±1 vdc, into a 20K ±5 percent load, 7±3 seconds after application of the fail input. After removal of the last fail input, a non-fail indication (a voltage of less than 0.5 vdc) shall be present within 1 second. With this entire test repeated, except for the CSRFH and UPLVL channels, using a supply voltage of 22.0±0.5 vdc, the fail indication shall be 20±1 vdc, 7±3 seconds after application of the fail input.

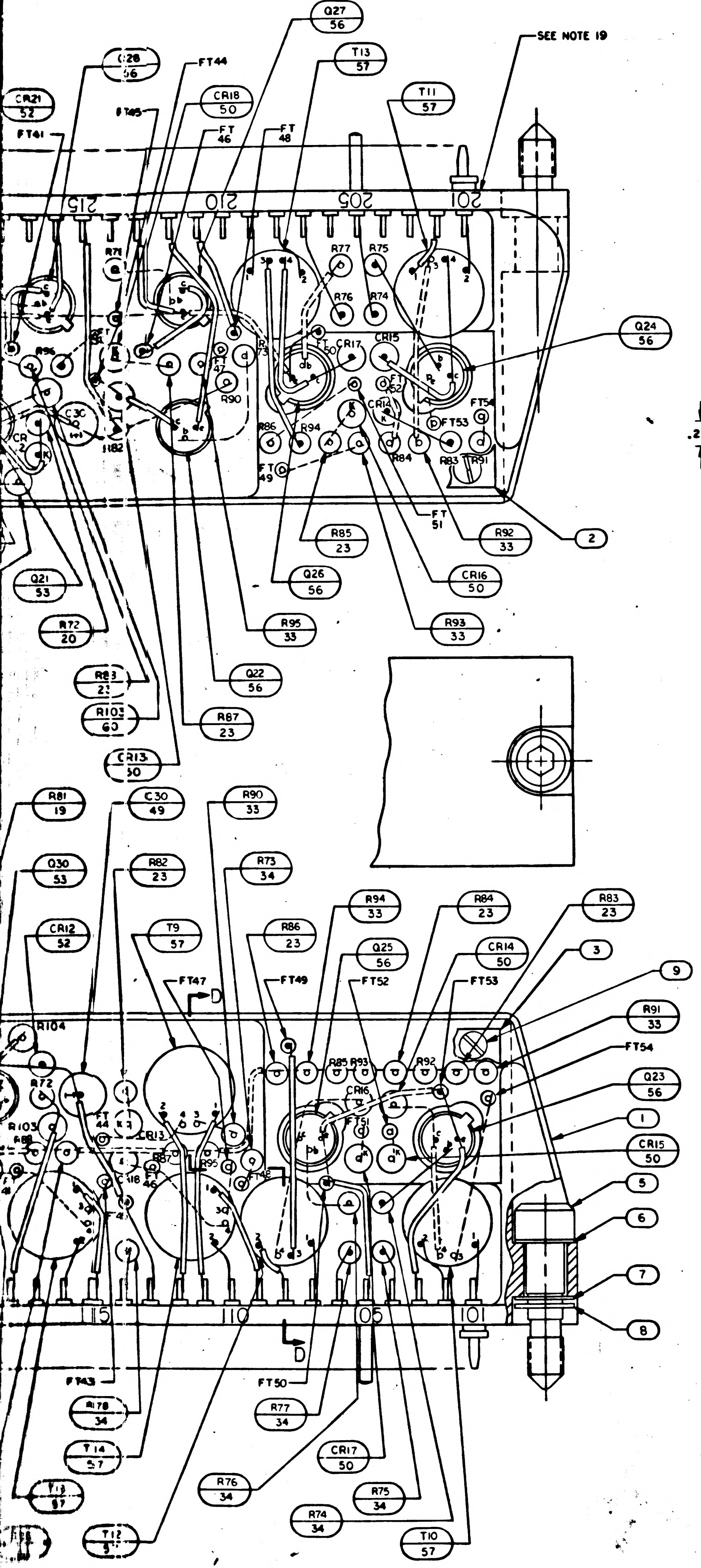
5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

JD:efo

		REVISIONS TDRR 20772				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23008			7 Oct 65	WR



SEE NOTE 19
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T13 57
T11 57
C28 56
FT44
CR18 50
FT45
CR21 52
FT41
FT 46
FT 48
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210
205
201
R77
R75
R76
R74
R96
R71
CR17
CR15
R90
C30
R86
R94
CR12
FT53
FT54
R84
R83
R91
FT 49
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R85 23
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FT 51
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R94 33
R84 23
R83 23
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FT52
FT53
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FT54
Q23 56
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7
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R104
R72
R103
R85
R93
R92
CR16
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110
105
101
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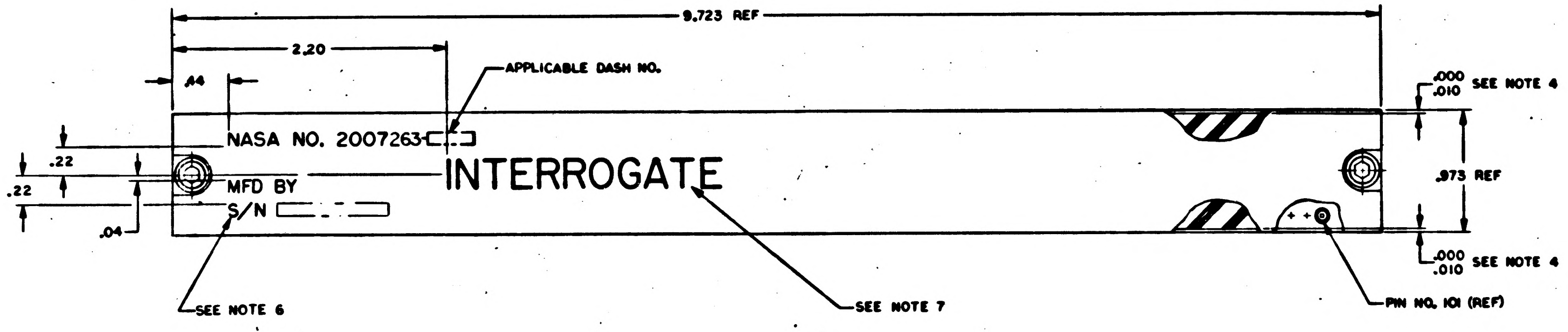
T12 57
T10 57



9.723 REF
2.20
.44
APPLICABLE DASH NO.
.000 .010 SEE NOTE 4
NASA NO. 2007263
INTERROGATE
MFD BY
S/N
.22
.22
.04
.973 REF
.000 .010 SEE NOTE 4
SEE NOTE 6
SEE NOTE 7
PIN NO. 101 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	2010080	SCHEMATIC	REF
2	1010604-16	RESISTOR	60
2	1006750-62	RESISTOR	59
4	1006755-133	CAPACITOR	58
12	1006762-2	TRANSFORMER	57
20	1010966-1	TRANSISTOR	56
3	1010652-1	TRANSISTOR	55
2	1010342	TRANSISTOR	54
5	1010343-3	TRANSISTOR	53
2	1010830-9	DIODE	52
2	1010372-12	DIODE	51
17	1010385	DIODE	50
2	1006755-79	CAPACITOR	49
2	1006755-21	CAPACITOR	48
2	1006755-33	CAPACITOR	47
8	1006755-69	CAPACITOR	46
1	1006755-10	CAPACITOR	45
3	1006777-10	CAPACITOR	44
3	1006777-23	CAPACITOR	43
6	1006777-24	CAPACITOR	42
2	1006777-39	CAPACITOR	41
2	1006777-31	CAPACITOR	40
1	1010604-34	RESISTOR	39
3	1010369-1	RESISTOR	38
3	1010369-152	RESISTOR	37
2	1010369-92	RESISTOR	36
2	1010369-105	RESISTOR	35
8	1006750-25	RESISTOR	34
8	1006750-16	RESISTOR	33
1	1010604-39	RESISTOR	32
1	1006750-58	RESISTOR	31
3	1006750-49	RESISTOR	30
3	1006750-72	RESISTOR	29
3	1006750-24	RESISTOR	28
3	1006750-8	RESISTOR	27
3	1006750-77	RESISTOR	26
6	1006750-39	RESISTOR	25
1	1006750-52	RESISTOR	24
16	1006750-32	RESISTOR	23
3	1006750-63	RESISTOR	22
3	1006750-44	RESISTOR	21
5	1006750-36	RESISTOR	20
15	1006750-56	RESISTOR	19
5	1006750-65	RESISTOR	18
2	1006750-5	RESISTOR	17
5	1008025-5	INSULATOR, BUSHING	16
25	1008025-1	INSULATOR, BUSHING	15
4	1010275	TRANSFORMER	14
AR	1006757-8	WIRE, ELECTRICAL	13
AR	1006757-1	WIRE, ELECTRICAL	12
AR	1006776-22	INSULATION SLEEVING	11
AR	1006776-21	INSULATION SLEEVING	10
4	1008161-4	SCREW, CAP, SLOTTED	9
2	MS16633-4015	RING RETAINING EXT, E	8
2	1004546-3	WASHER, FLAT	7
2	1004546-1	WASHER, FLAT	6
2	1004579-1	SCREW, JACKING	5
1	2008093-001	TERMINAL, THREADED	4
1	2008357	WIRING BOARD B	3
1	2008359	WIRING BOARD A	2
1	2007210-011	HEADER HOUSING ASSY	1
-011	LIST OF MATERIALS		

2007263

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Munson 26 Aug 65
CHECKED 26 Aug 65
APPROVED 27 Aug 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATE ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO. 80230
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DRAWING NO. 2007263
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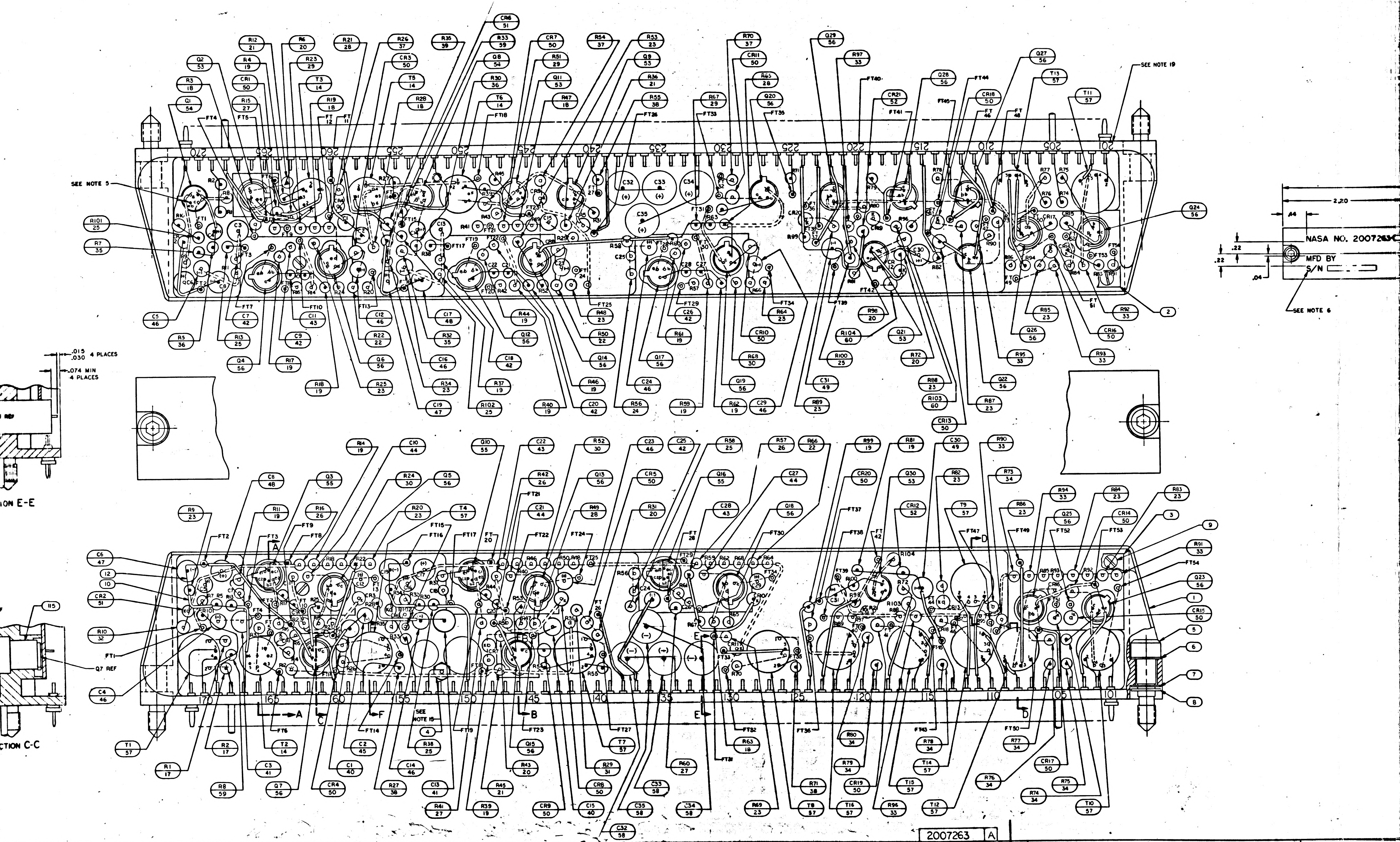
SHEET 1 OF 1

MASTER

2007263 A

508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Q9 53
CR11 50
R97 33
Q27 56
R3 18
CR1 50
T3 14
T5 14
R30 36
Q11 53
R36 21
R65 28
Q28 56
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R19 18
R28 18
T6 14
R47 18
R55 38
R67 29
Q20 56
CR21 52
CR18 50
T11 57
SEE NOTE 19
FT4
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FT 12
FT 11
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FT26
FT33
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C5 46
R5 36
C7 42
R13 25
Q4 56
C9 42
C11 43
R17 19
C12 46
R22 22
R18 19
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R37 19
C18 42
R102 25
R44 19
Q12 56
R40 19
R48 23
R50 22
Q14 56
C20 42
R46 19
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FT29
C26 42
R61 19
Q17 56
C24 46
R56 24
R59 19
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R64 23
CR10 50
R68 30
Q19 56
R62 19
C29 46
FT39
FT42
R98 20
R104 60
Q21 53
R100 25
R72 20
C31 49
R89 23
R88 23
R103 60
CR13 50
R85 23
Q26 56
R95 33
Q22 56
R87 23
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R20 23
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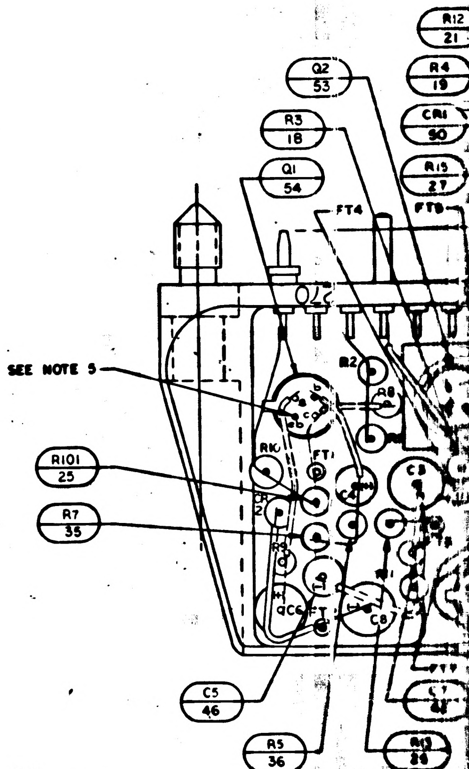
2007263 A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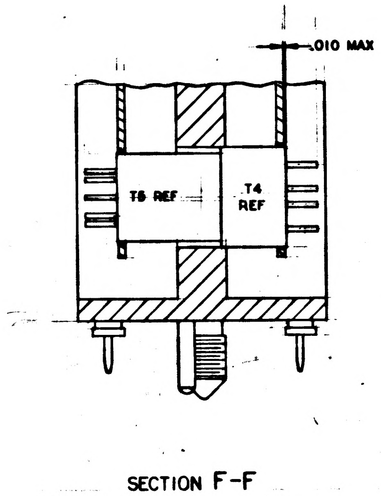
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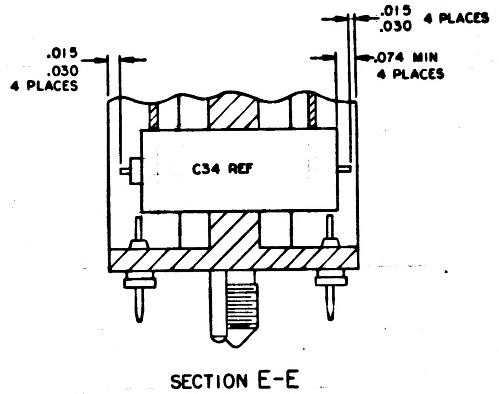
SECTION F-F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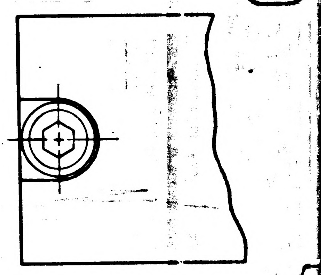
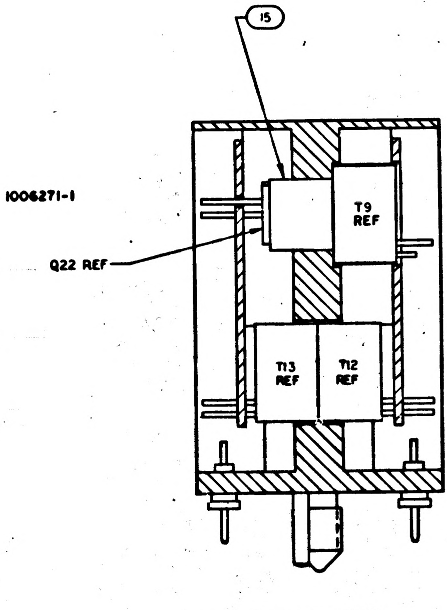


NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND1002005
3. STAKE FIND NO. 14 THRU FIND NO. 57 TO FIND NO. 1 PER ND1002009 METHOD J
4. ENCAPSULATE PER ND1002002. REMOVE ALL FLASHING
5. TRIM UNUSED LEADS OF FIND NUMBERS 14, 54 AND 55 .010/.030 FROM CASE
6. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
7. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
8. AR DENOTES AS REQUIRED
9. FT DENOTES FEED THRU
10. K DENOTES CATHODE SIDE OF DIODE
11. + DENOTES POSITIVE SIDE OF CAPACITOR
12. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
13. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
14. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
15. MOUNTING TORQUE FOR FIND NO. 4 TO BE 15-20 INCH OUNCES
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF RS. 2007263
17. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
18. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN BLADES AND INSULATORS TO BE FREE OF PAINT
19. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II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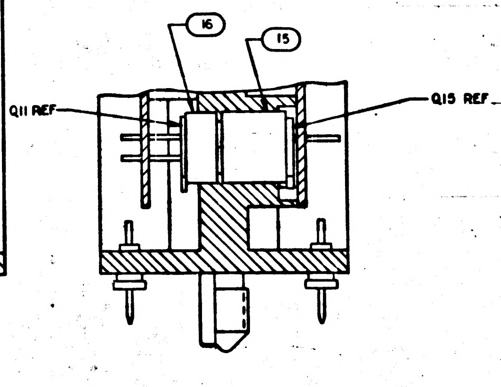
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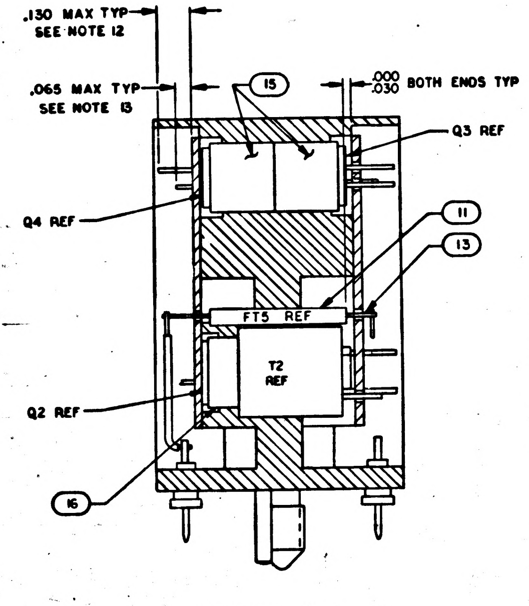
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FT5 REF
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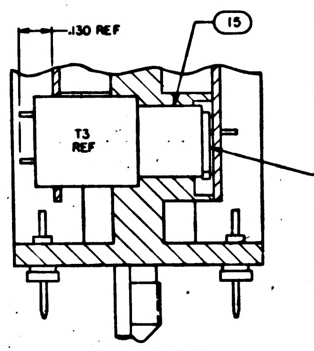
Q2 REF
16

SECTION A-A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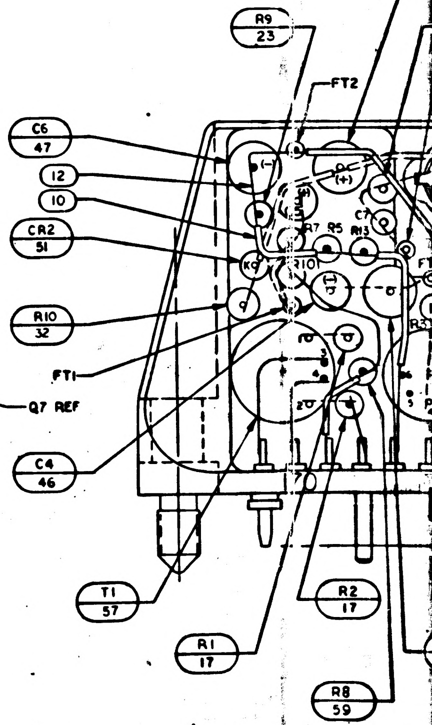
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R2
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R8
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C7
R7
R5
R13
R101

REVISIONS TDRR 20772

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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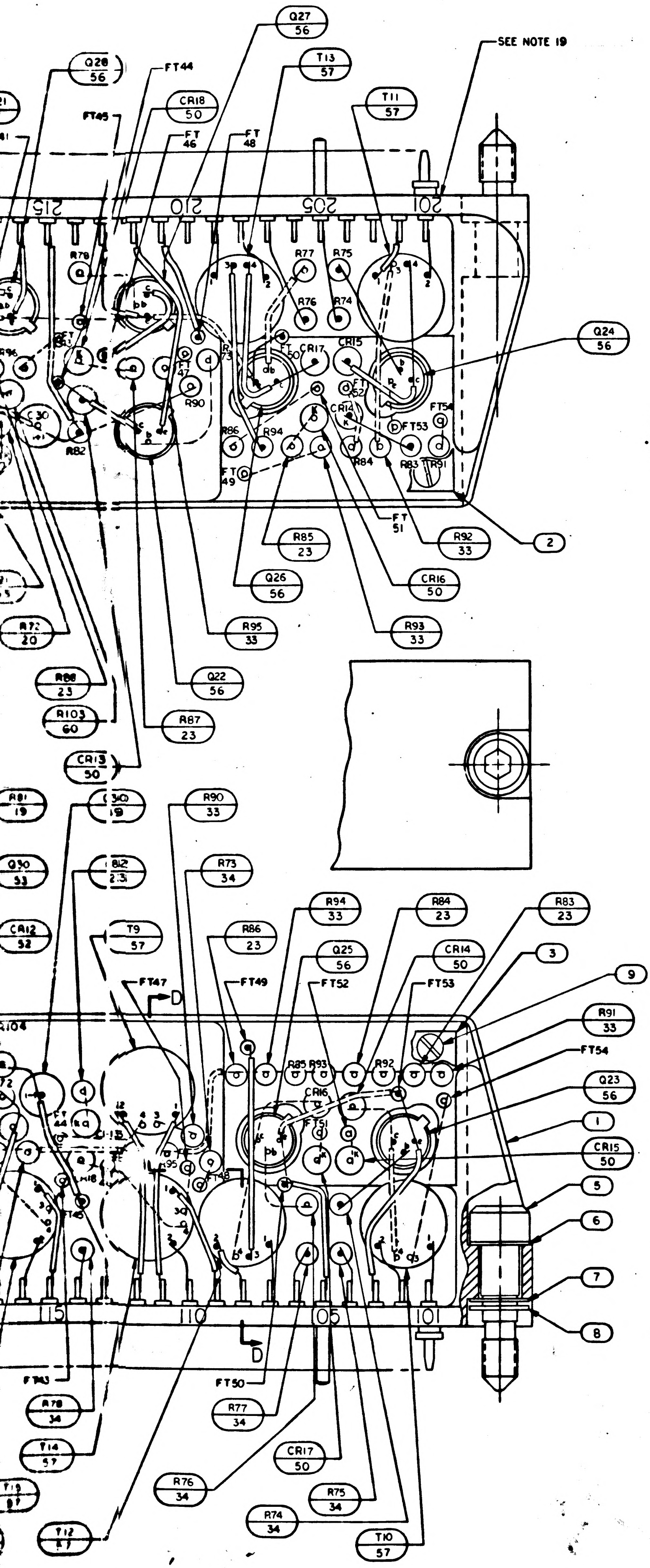
B		REVISED PER TDRR 23888			Nov 65	WK



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R76
R74
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R82
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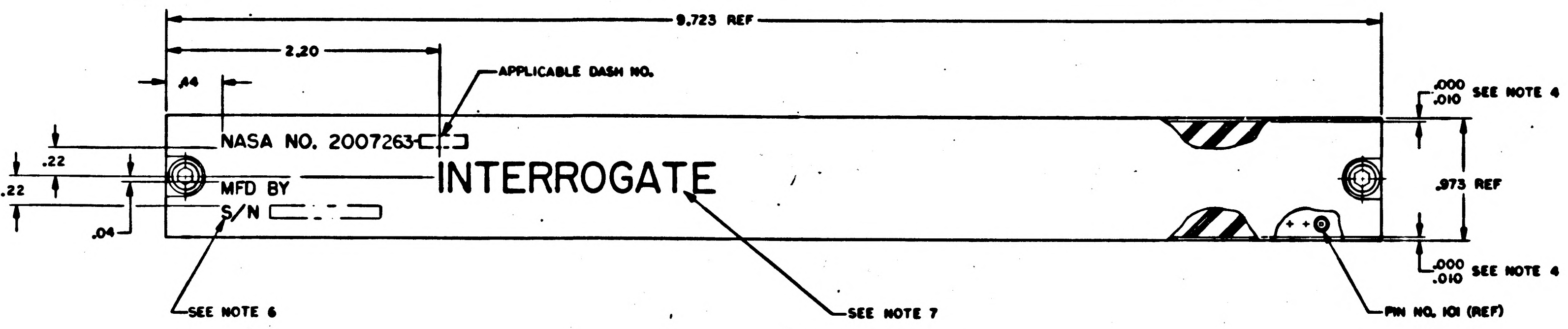

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MFD BY
S/N
INTERROGATE
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SEE NOTE 4
SEE NOTE 6
SEE NOTE 7
PIN NO. 101 (REF)

MARKING VIEW
SCALE 2/1

☒	2010080	SCHEMATIC	REF
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2	1006750-62	RESISTOR	59
4	1006755-133	CAPACITOR	58
12	1006762-2	TRANSFORMER	57
20	1010966-1	TRANSISTOR	56
3	1010652-1	TRANSISTOR	55
2	1010342	TRANSISTOR	54
5	1010343-3	TRANSISTOR	53
2	1010830-9	DIODE	52
2	1010372-12	DIODE	51
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2	1006755-21	CAPACITOR	48
2	1006755-33	CAPACITOR	47
8	1006755-69	CAPACITOR	46
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3	1006777-23	CAPACITOR	43
6	1006777-24	CAPACITOR	42
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2	1006777-31	CAPACITOR	40
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3	1010369-1	RESISTOR	38
3	1010369-152	RESISTOR	37
2	1010369-92	RESISTOR	36
2	1010369-105	RESISTOR	35
8	1006750-25	RESISTOR	34
8	1006750-16	RESISTOR	33
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3	1006750-77	RESISTOR	26
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4	1010275	TRANSFORMER	14
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AR	1006776-21	INSULATION SLEEVING	10
4	1008161-4	SCREW, CAP, SLOTTED	9
2	MS16633-4015	RING RETAINING EXT, E	8
2	1004546-3	WASHER, FLAT	7
2	1004546-1	WASHER, FLAT	6
2	1004579-1	SCREW, JACKING	5
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1	2008359	WIRING BOARD A	2
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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
-011	LIST OF MATERIALS		

B

2007263

MASTER

NEXT ASSY	USED ON
2007222	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Mangan 26 APR 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

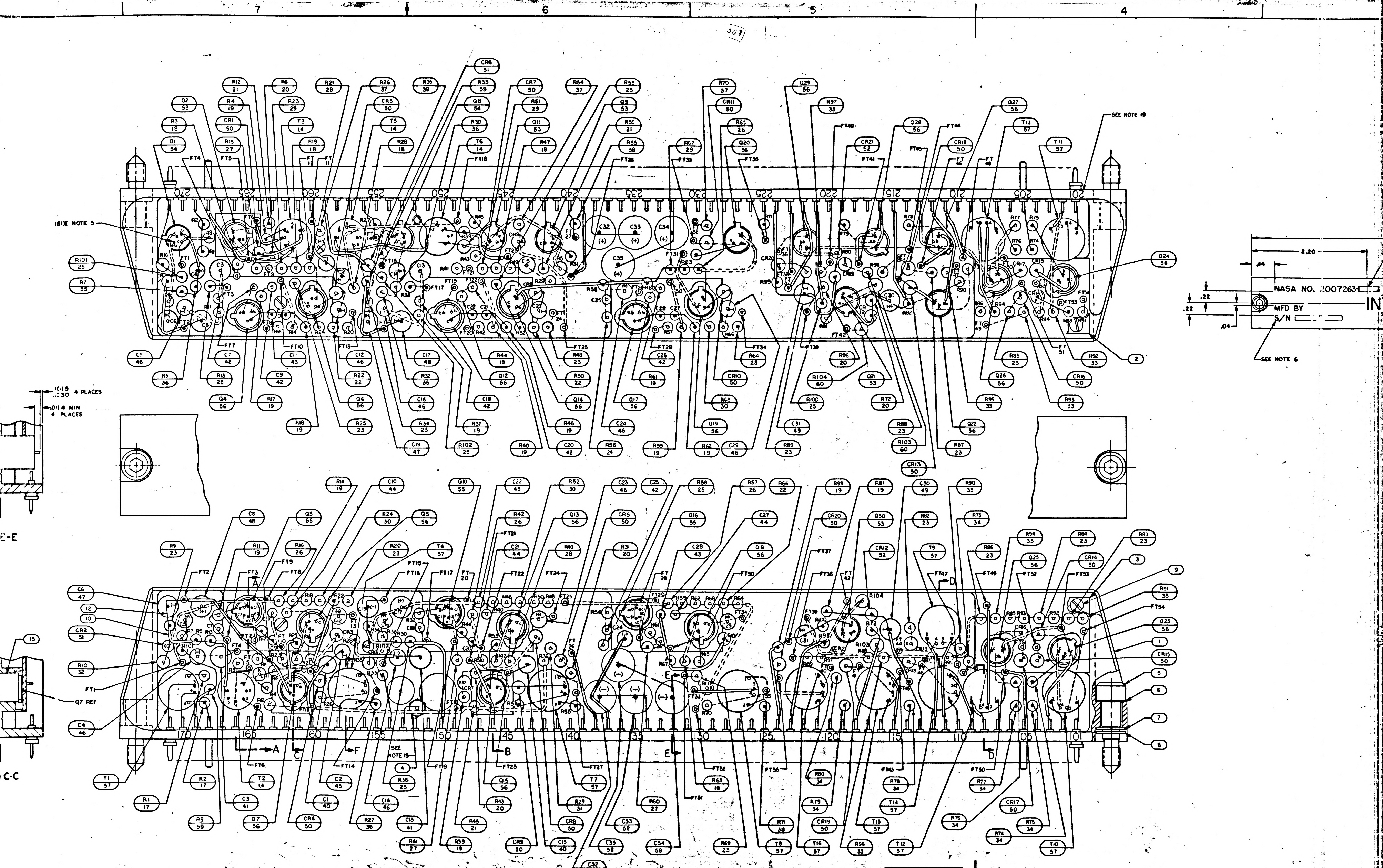
INTERROGATE
ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2007263
SCALE 4/1
SHEET 1 OF 1

3

2007263 B

508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C34 58
R69 23
T8 57
T16 57
R96 33
T12 57
T10 57
C32 58
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2007263 B

NOTES
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2. WELD PER ND1002005
3. STAKE FIND NO.14 THRU FIND NO.57 TO FIND NO.1 PER ND1002009 METHOD J
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9. FT DENOTES FEED THRU
10. K DENOTES CATHODE SIDE OF DIODE
11. + DENOTES POSITIVE SIDE OF CAPACITOR
12. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
13. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
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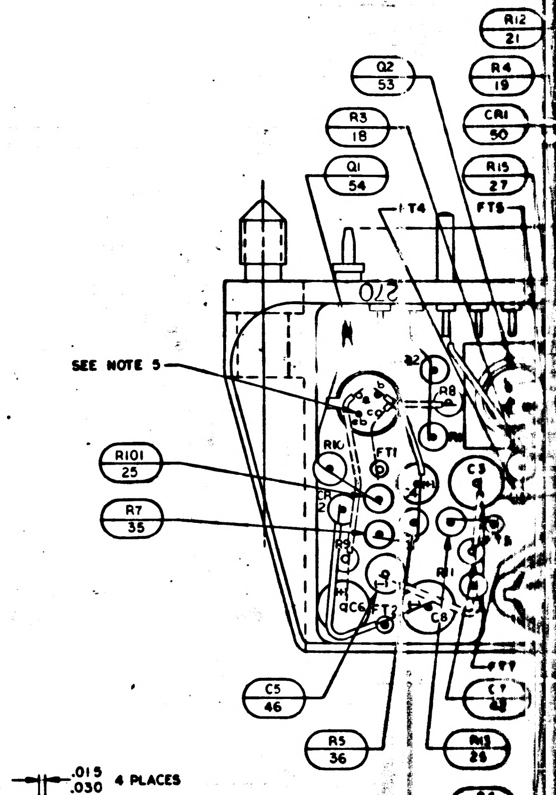
19. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II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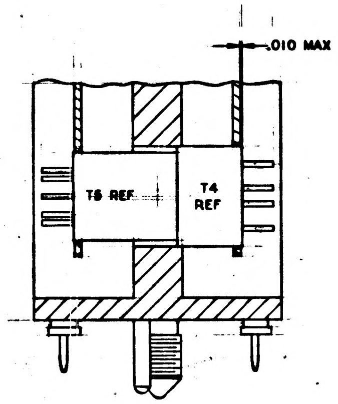
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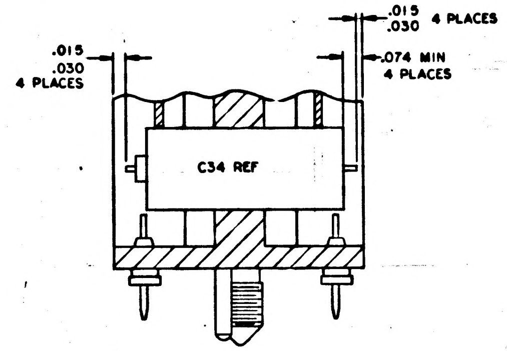
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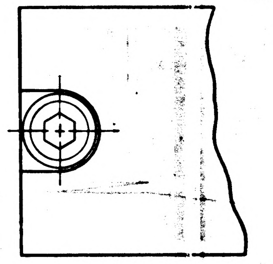

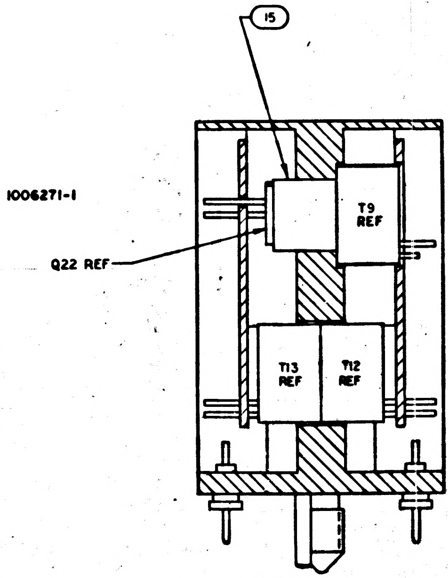
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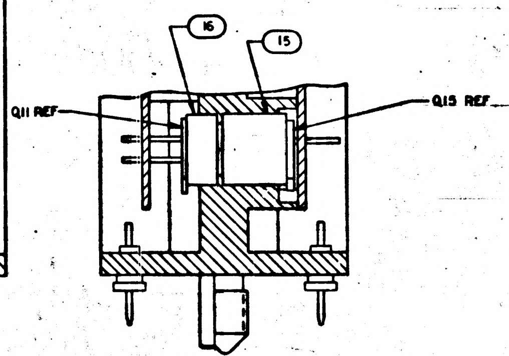
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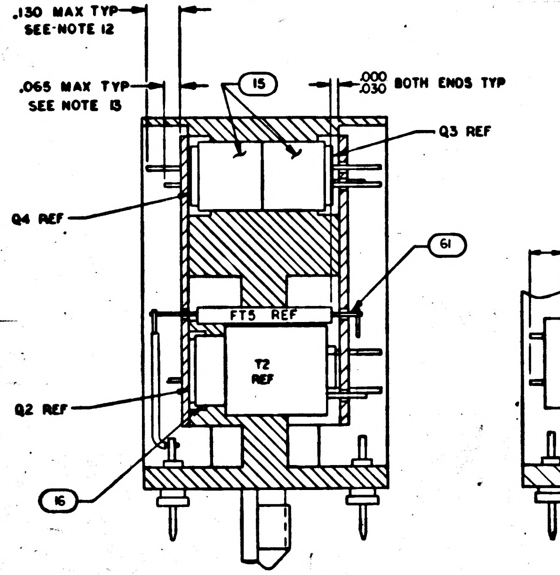
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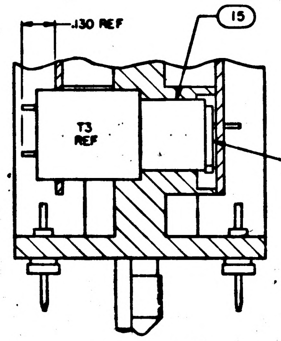
SECTION A-A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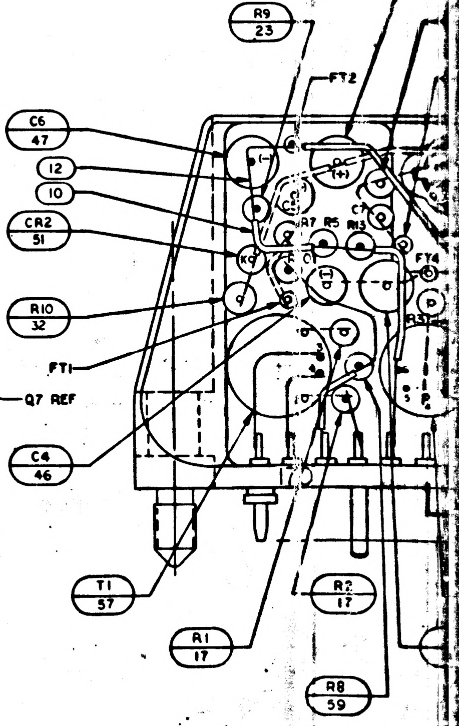
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R8 59

2007263 B

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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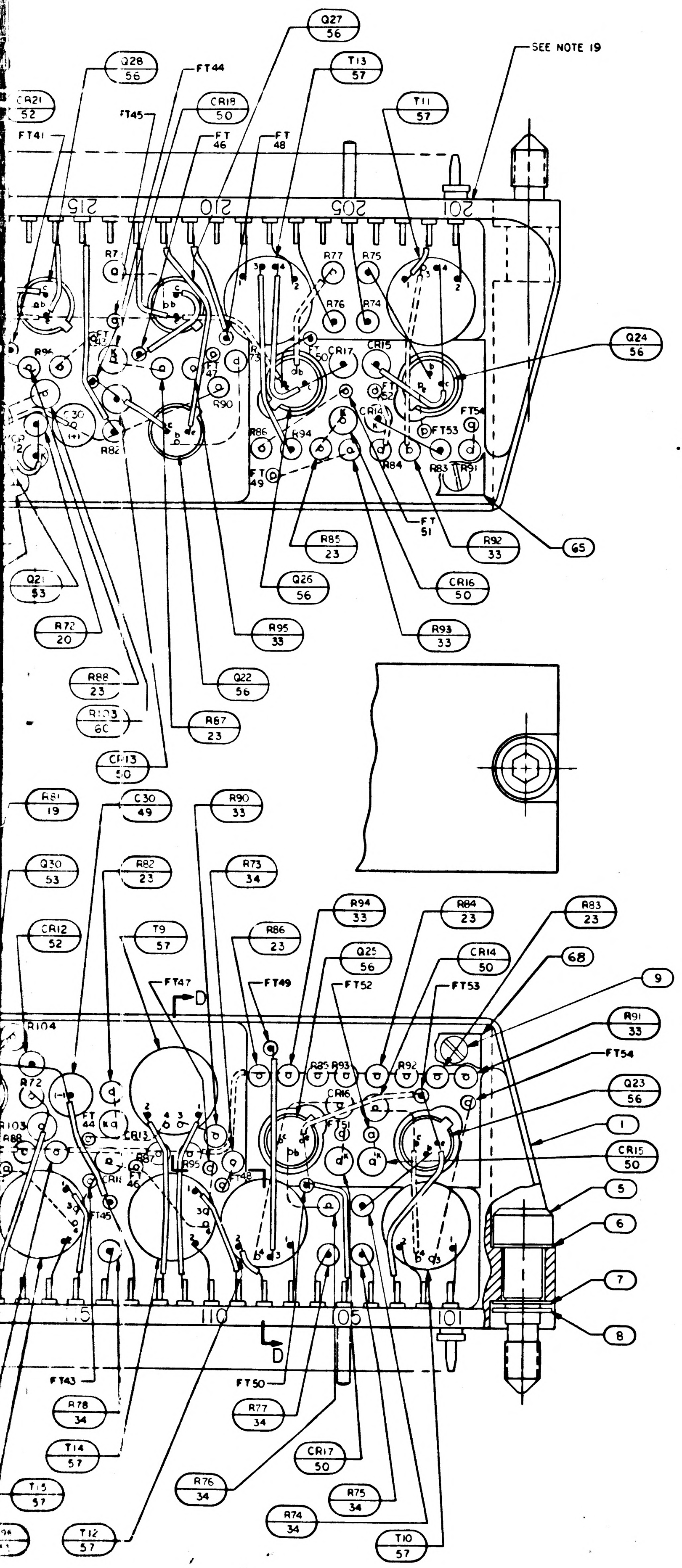
B		REVISED PER TDRR 23888			9 NOV 65	
C		REVISED PER TDRR 27818				



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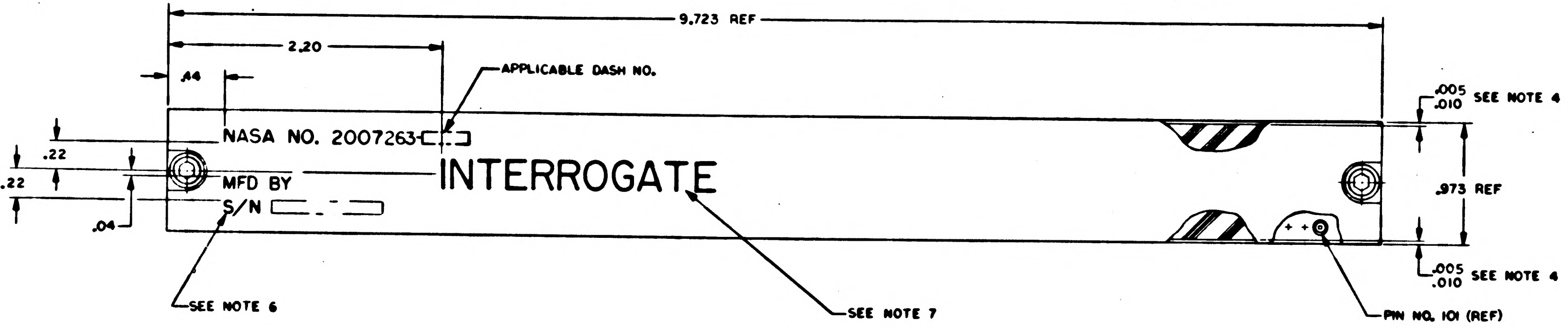

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.005
.010 SEE NOTE 4
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NASA NO. 2007263-
MFD BY
S/N
INTERROGATE
.973 REF
.005
.010 SEE NOTE 4
SEE NOTE 6
SEE NOTE 7
PIN NO. 101 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	2010080	SCHEMATIC	RE
1	2010689	WIRING BOARD F	[illegible]
1	2010687	WIRING BOARD E	[illegible]
1	2010685	WIRING BOARD D	[illegible]
1	2010683	WIRING BOARD C	[illegible]
1	2010681	WIRING BOARD B	64
1	2010679	WIRING BOARD A	[illegible]
1	1008025-6	INSULATOR, BUSHING	[illegible]
AR	1010848-2	WIRE, ELECTRICAL	61
2	1010604-16	RESISTOR	60
2	1[illegible]6750-62	RESISTOR	59
4	1006755-133	CAPACITOR	58
12	1006762-2	TRANSFORMER	57
20	1010[illegible]-1	TRANSISTOR	56
3	1010652-1	TRANSISTOR	55
2	1010342	TRANSISTOR	54
5	1010343-3	TRANSISTOR	53
2	1010830-9	DIODE	52
2	1010372-12	DIODE	51
17	1010385	DIODE	50
2	1006755-79	CAPACITOR	49
2	1006755-21	CAPACITOR	48
2	1006755-33	CAPACITOR	47
8	1006755 69	CAPACITOR	46
1	1006755-10	CAPACITOR	45
3	1006777-10	CAPACITOR	44
3	1006777-23	CAPACITOR	43
6	1006777-24	CAPACITOR	42
2	1006777-39	CAPACITOR	41
2	1006777-31	CAPACITOR	40
1	1010604-34	RESISTOR	39
3	1010369-1	RESISTOR	38
3	1010369-152	RESISTOR	37
2	1010369-92	RESISTOR	36
2	1010369-105	RESISTOR	35
8	1006750-25	RESISTOR	34
8	1006750-16	RESISTOR	33
1	1010604-39	RESISTOR	32
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3	1006750-49	RESISTOR	30
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3	1006750-24	RESISTOR	28
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15	1006750-56	RESISTOR	19
5	1006750-65	RESISTOR	18
2	1006750-5	RESISTOR	17
5	1008025-5	INSULATOR, BUSHING	16
24	1008025-1	INSULATOR, BUSHING	15
4	1010275	TRANSFORMER	14
			13
AR	1006757-1	WIRE, ELECTRICAL	12
			11
AR	1006776-21	INSULATION SLEEVING	10
12	1008161-4	SCREW, CAP, SLOTTED	9
2	MS16633-4015	RING RETAINING EXT, E	8
2	1004546-3	WASHER, FLAT	7
2	1004546-1	WASHER, FLAT	6
2	1004579-1	SCREW, JACKING	5
1	2008093-003	TERMINAL, THREADED	4
~~1~~	~~2008357~~	~~WIRING BOARD B~~	3
~~1~~	~~2008359~~	~~WIRING BOARD A~~	2
1	2007210-011	HEADER HOUSING ASSY	1

-011 LIST OF MATERIALS

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Mangan 26 MAY 65
CHECKED 7 Jul 65
APPROVED 8 Jul 65
APPROVED
APPROVED MIT 13/6/65
APPROVED MSC
DATE

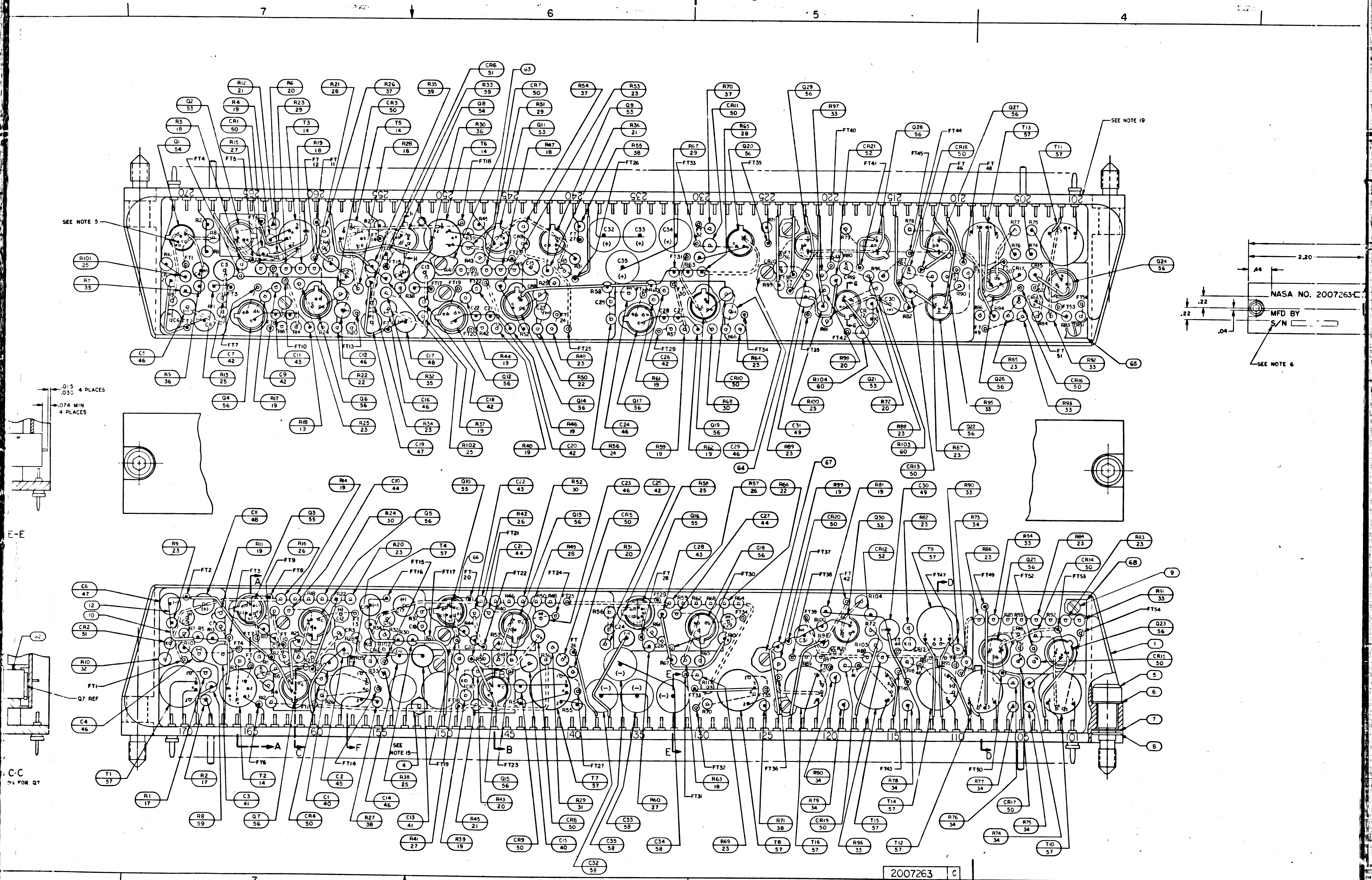
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATE
ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO. 80230 SIZE J DRAWING NO. 2007263
SCALE 4/1 SHEET 1 OF 1

2007263 C

3/2007263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SEE NOTE 19
SEE NOTE 5
SEE NOTE 6
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NASA NO. 2007263-C
MFD BY
S/N
2.20
.44
.22
.22
.04
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4 PLACES
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C-C
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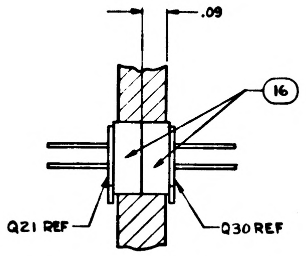
E
F

2007263 C

2/2007263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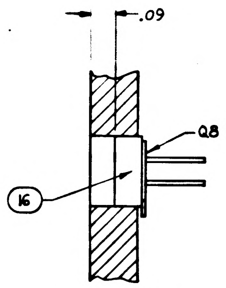
Q30 REF

SECTION G-G



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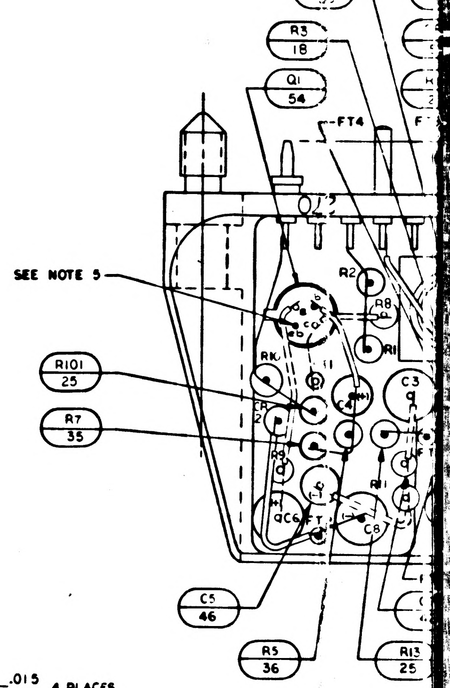
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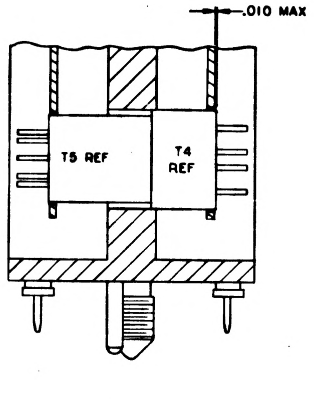
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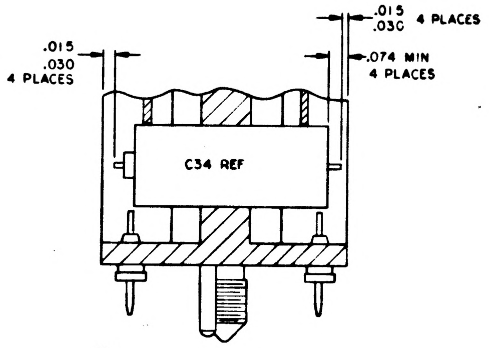
T4 REF

SECTION F-F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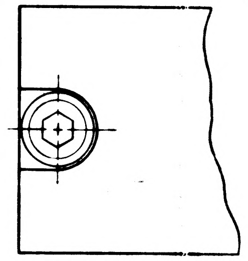
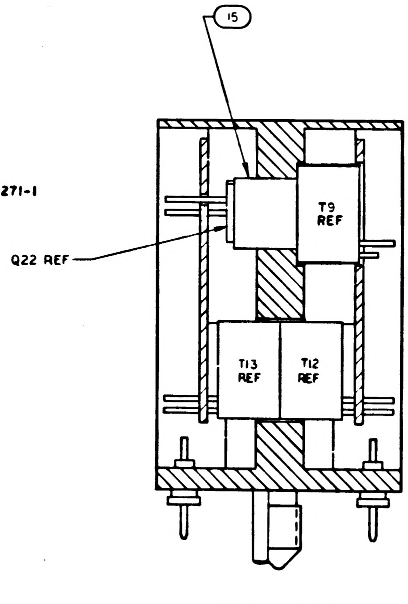
.030
4 PLACES
.015
.030
4 PLACES
.074 MIN
4 PLACES
C34 REF

SECTION E-E



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND1002005
3. STAKE FIND NO. 14 THRU FIND NO. 57 TO FIND NO. 1 PER ND1002009 METHOD J
4. ENCAPSULATE PER ND1002002. REMOVE ALL FLASHING
5. TRIM UNUSED LEADS OF FIND NUMBERS 14, 54 AND 55 .010/.030 FROM CASE
6. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
7. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
8. AR DENOTES AS REQUIRED
9. FT DENOTES FEED THRU
10. K DENOTES CATHODE SIDE OF DIODE
11. + DENOTES POSITIVE SIDE OF CAPACITOR
12. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
13. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
14. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
15. MOUNTING TORQUE FOR FIND NO. 4 TO BE 15-20 INCH OUNCES
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S. 2007263
17. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
18. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN BLADES AND INSULATORS TO BE FREE OF PAINT
19. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II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T9
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T13
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T12
REF

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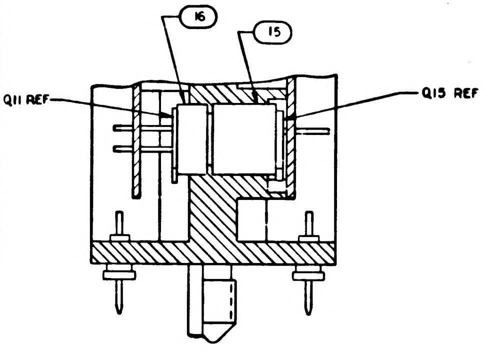
TYP INSTALLATION FOR Q1, Q9, Q20, Q22, Q27, Q28 AND Q29.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Q15 REF

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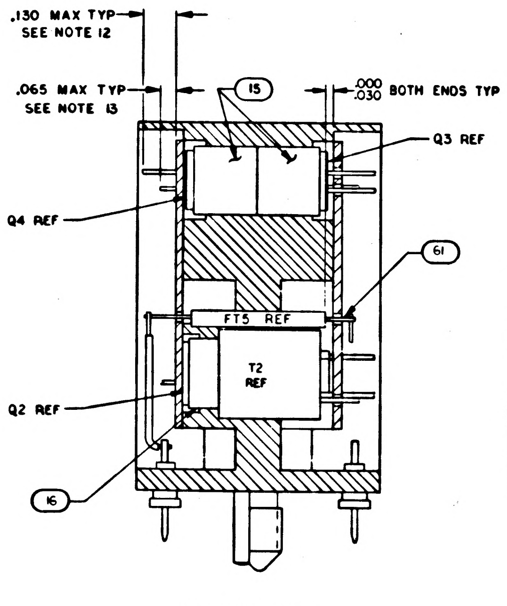
TYP INSTALLATION FOR Q11 AND Q15.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SEE NOTE 12
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SEE NOTE 13
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Q4 REF
61
FT5 REF
T2
REF
Q2 REF
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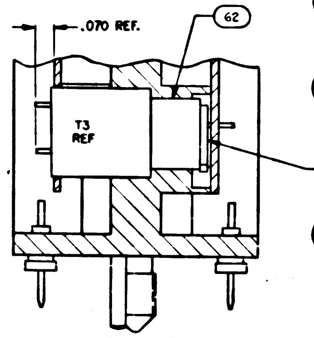
SECTION A-A
TYP INSTALLATION FOR Q3 THRU Q6, Q10, Q12, Q13, Q14, Q16 THRU Q19 AND Q23 THRU Q26.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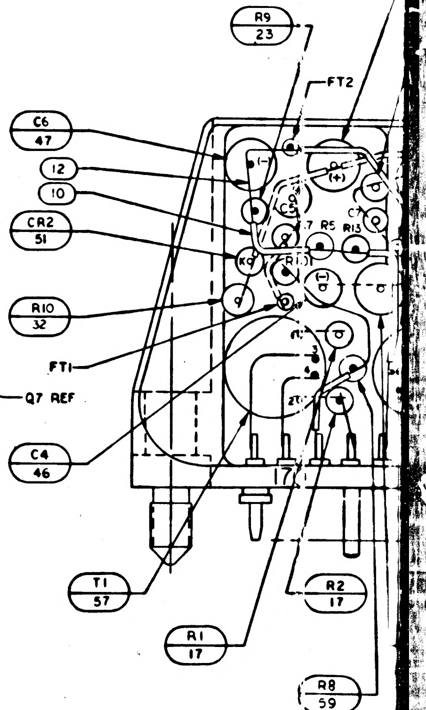
Q7 REF

SECTION C-C
TYP INSTALLATION FOR Q7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R2
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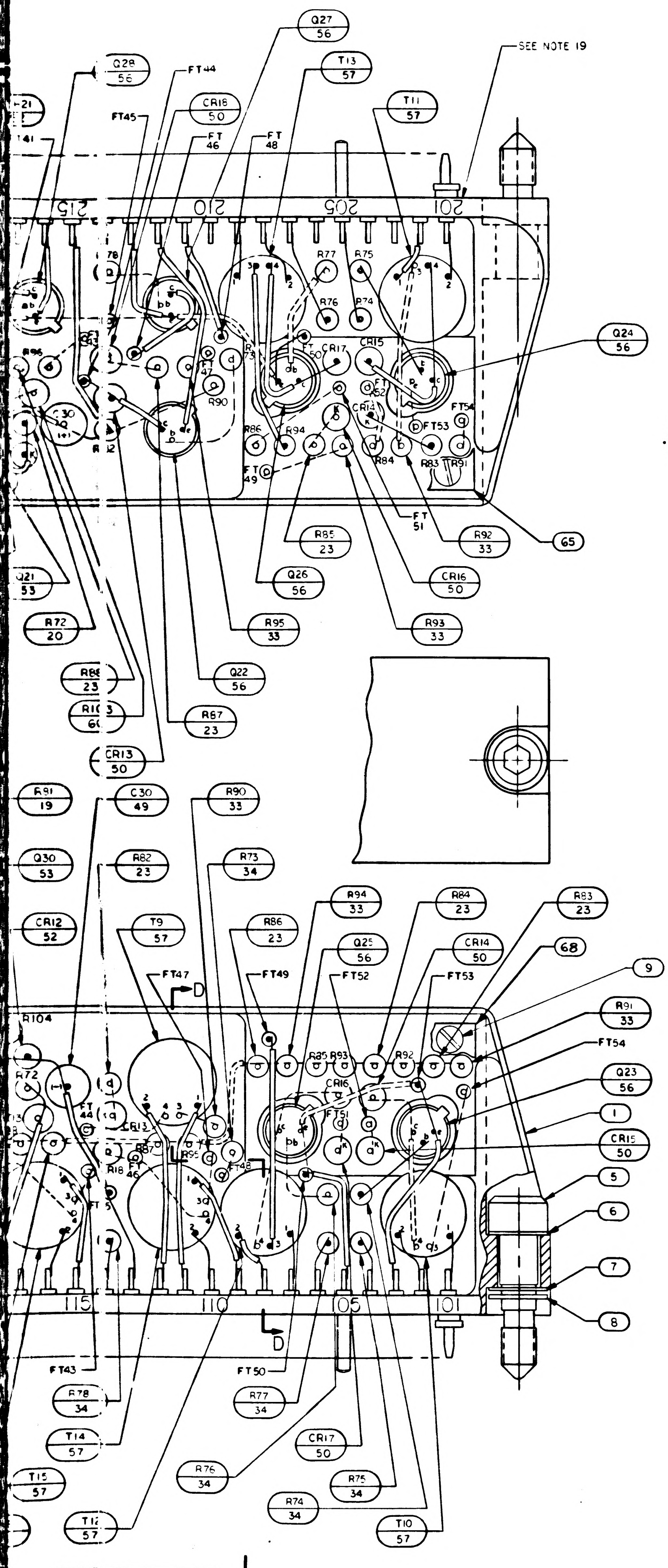
R8
59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C30
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FT 47
R73
FT 50
CR17
CR15
FT 52
CR14
FT53
FT54
R86
R94
FT 49
R84
R83
R91
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Q24 56
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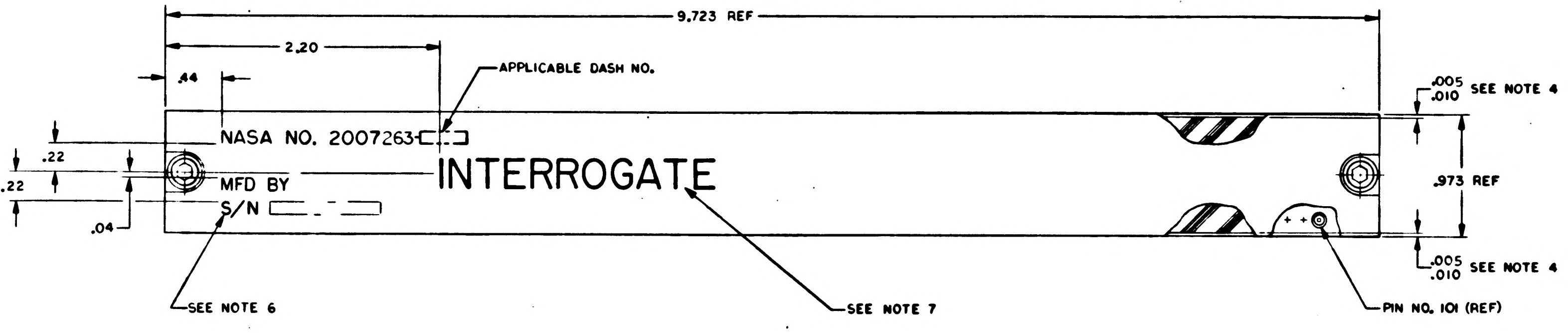
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.22
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.973 REF
.005
.010
SEE NOTE 4
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SEE NOTE 7
PIN NO. 101 (REF)

MARKING VIEW
SCALE 2/1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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C		REVISED PER TDRR 27818				
D		REVISED PER TDRR 28184	Jim P			

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3	1006777-23	CAPACITOR	43
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2	1004546-1	WASHER, FLAT	6
2	1004579-1	SCREW, JACKING	5
1	2008093-003	TERMINAL, THREADED	4
~~1~~	~~2008357~~	~~WIRING BOARD B~~	3
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DO NOT SCALE THIS DRAWING

MATERIAL
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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Manson 26 MAY 65
CHECKED 7 Jun 65
APPROVED 23 Jun 65
APPROVED
APPROVED MIT 13/4/65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

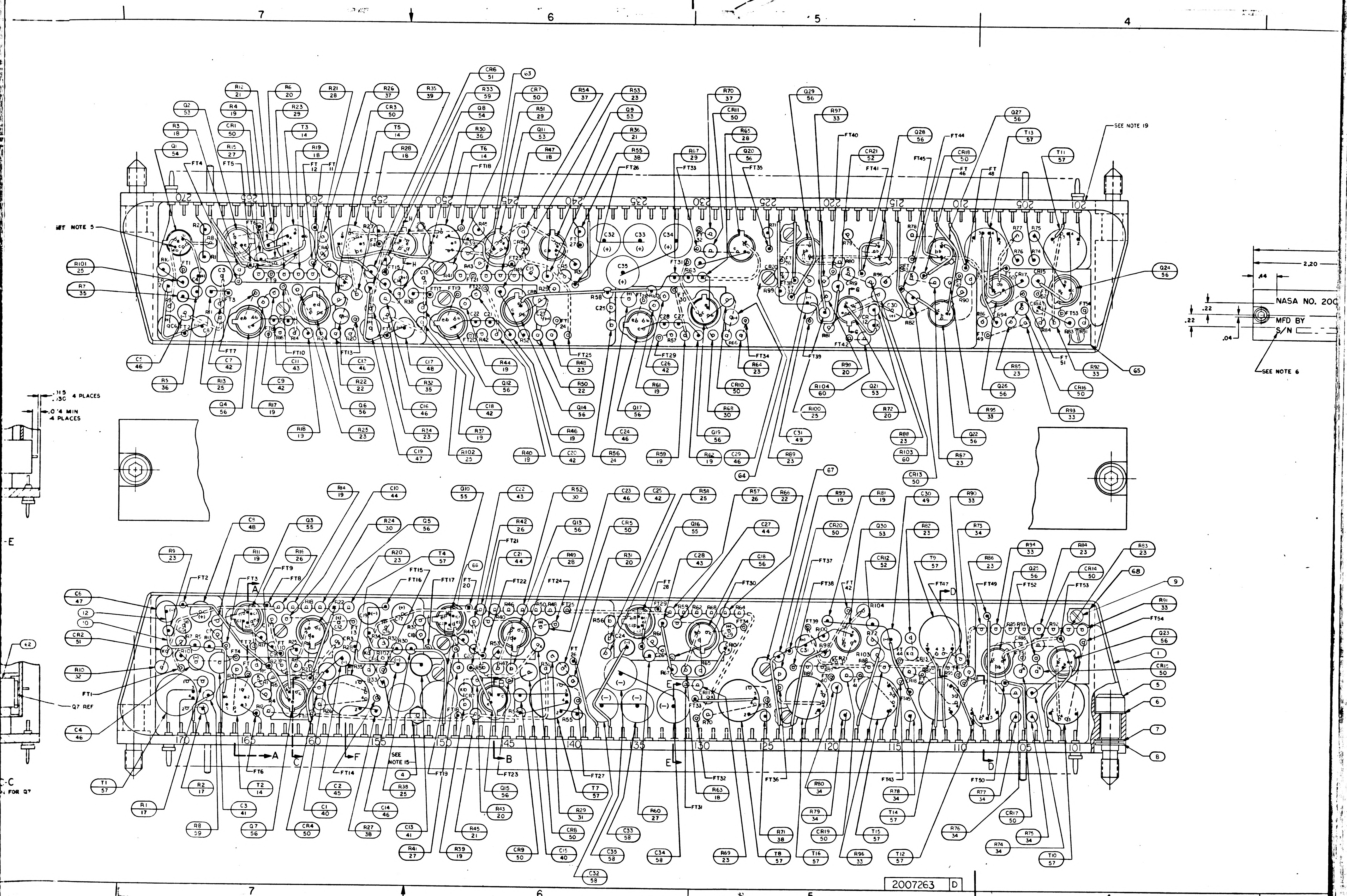
INTERROGATE
ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO 80230
SIZE J
DRAWING NO 2007263
SCALE 4/1
SHEET 1 OF 1

2007263 D

3H

3/2007263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SEE NOTE 19
SEE NOTE 6
SEE NOTE 15
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.04
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.014 MIN
4 PLACES
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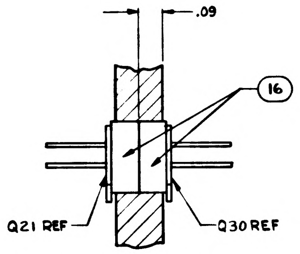
2007263 D

27200 07263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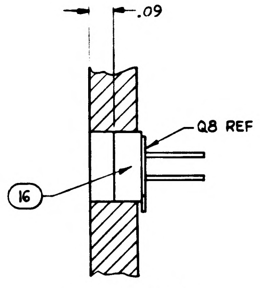
Q30 REF

SECTION G - G



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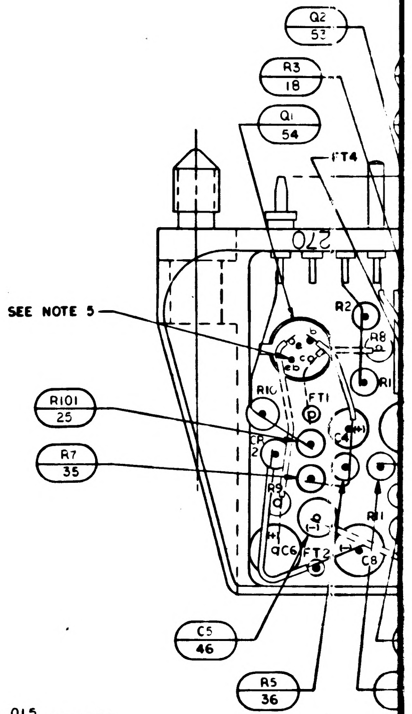
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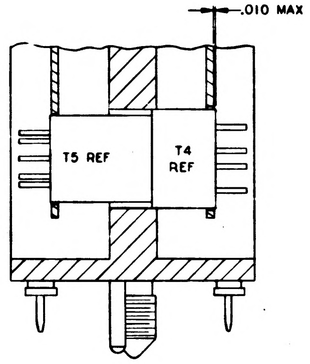
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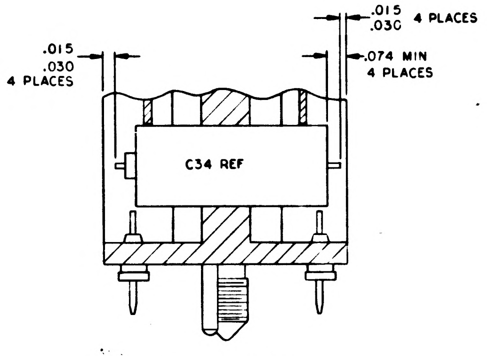
T5 REF
T4 REF

SECTION F-F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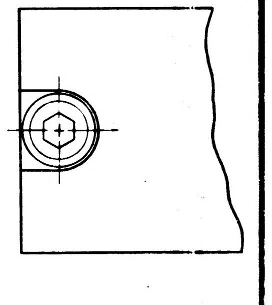
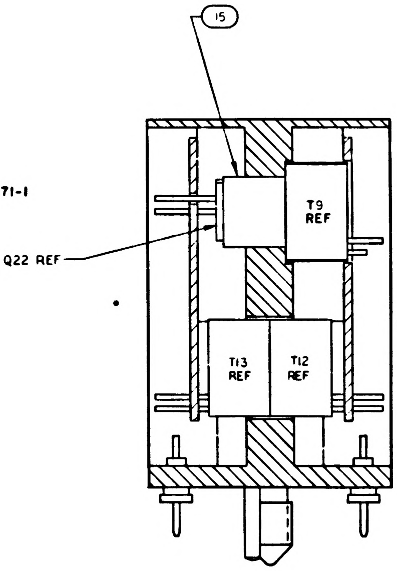
.030
4 PLACES
.015
.030 4 PLACES
.074 MIN
4 PLACES
C34 REF

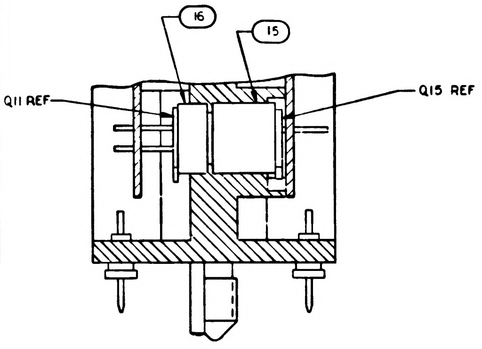
SECTION E-E



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL - D - 70327
2. WELD PER ND1002005
3. STAKE FIND NO. 14 THRU FIND NO. 57 TO FIND NO. 1 PER ND1002009 METHOD J
4. ENCAPSULATE PER ND1002002. REMOVE ALL FLASHING
5. TRIM UNUSED LEADS OF FIND NUMBERS 14, 54 AND 55 .010/.030 FROM CASE
6. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
7. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
8. AR DENOTES AS REQUIRED
9. FT DENOTES FEED THRU
10. K DENOTES CATHODE SIDE OF DIODE
11. + DENOTES POSITIVE SIDE OF CAPACITOR
12. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
13. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
14. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
15. MOUNTING TORQUE FOR FIND NO. 4 TO BE 15 - 20 INCH OUNCES
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF P.S. 2007263
17. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
18. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279, USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN BLADES AND INSULATORS TO BE FREE OF PAINT
19. MARK .060/.080 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II


15
Q22 REF
T9 REF
T13 REF
T12 REF

SECTION D-D
TYP INSTALLATION FOR Q1, Q9, Q20, Q22, Q27, Q28 AND Q29.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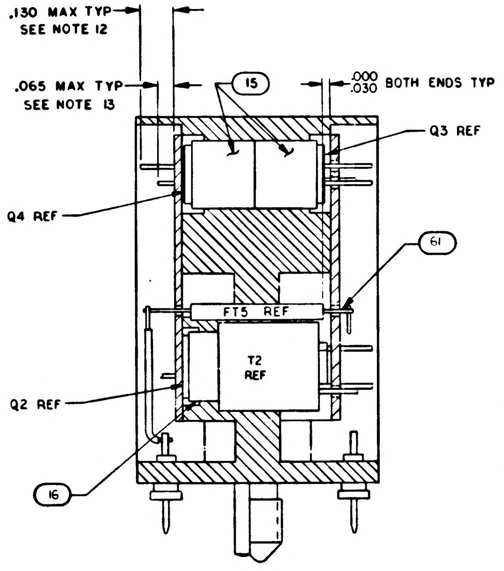
15
Q11 REF
Q15 REF

SECTION B-B
TYP INSTALLATION FOR Q11 AND Q15.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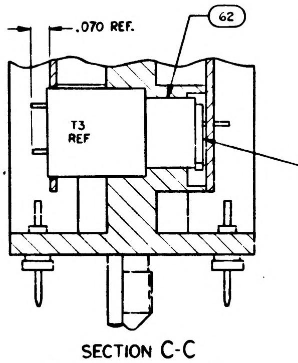
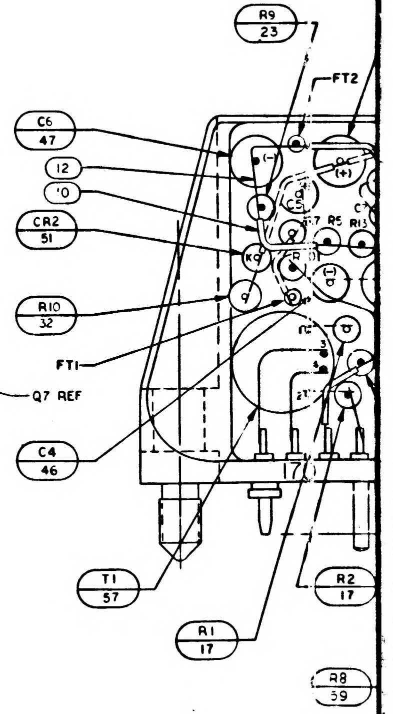
SEE NOTE 12
.065 MAX TYP
SEE NOTE 13
15
.000
.030 BOTH ENDS TYP
Q3 REF
Q4 REF
61
FT5 REF
T2 REF
Q2 REF
16

SECTION A-A
TYP INSTALLATION FOR Q3 THRU Q6, Q10, Q12, Q13, Q14, Q16 THRU Q19 AND Q23 THRU Q26.


.070 REF.
62
T3 REF
Q7 REF

SECTION C-C
TYP INSTALLATION FOR Q7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FT2
C6
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CR2
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R10
32
FT1
C4
46
17
T1
57
R2
17
R1
17
R8
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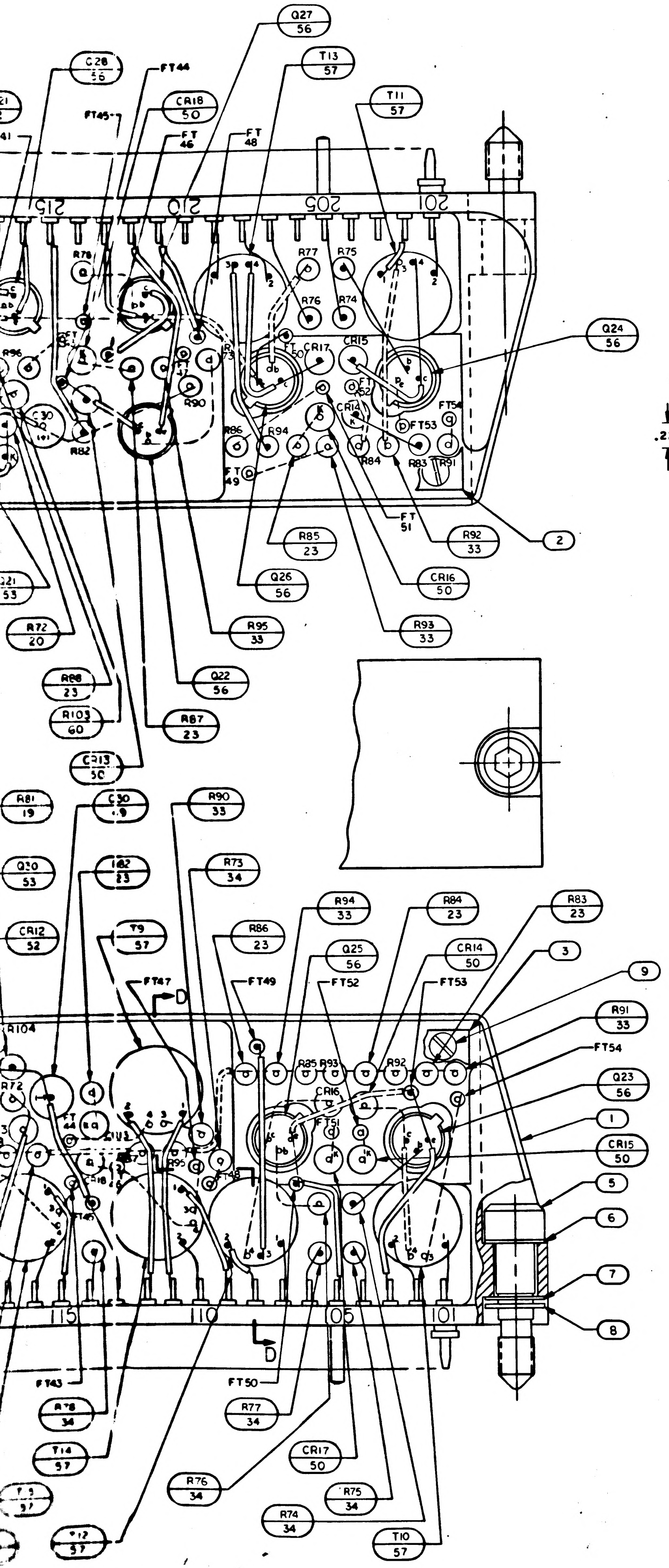
2007263 D

1/2007263

REVISIONS ~~CAR~~ 2077 2						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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R90
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C30
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R84
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FT
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CR12
52
T9
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CR14
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FT49
FT52
FT53
R91
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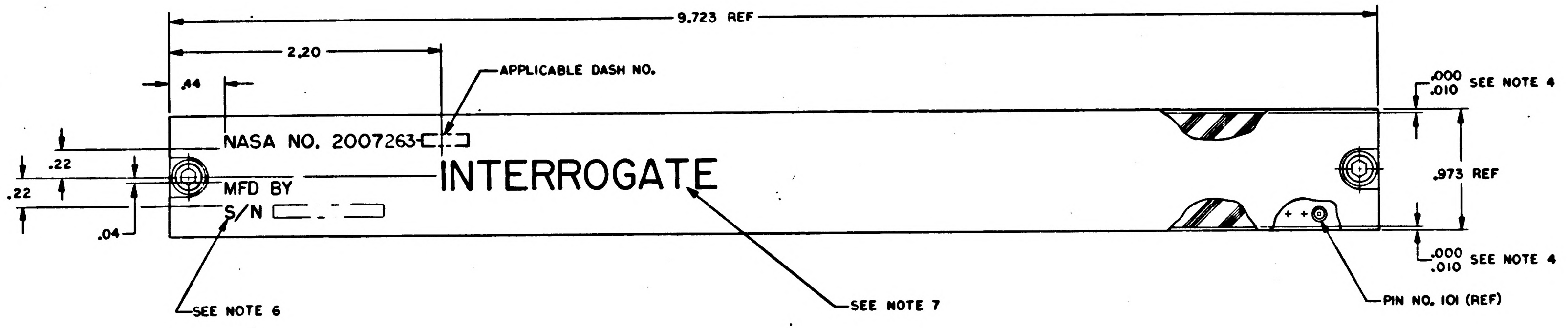

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SEE NOTE 4
.973 REF
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SEE NOTE 4
SEE NOTE 6
SEE NOTE 7
PIN NO. 101 (REF)

MARKING VIEW
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
⨯	2010080	SCHEMATIC	REF
2	1010604-16	RESISTOR	60
2	1006750-62	RESISTOR	59
4	1006755-133	CAPACITOR	58
12	1006762-2	TRANSFORMER	57
20	1010966-1	TRANSISTOR	56
3	1010652-1	TRANSISTOR	55
2	1010342	TRANSISTOR	54
5	1010343-3	TRANSISTOR	53
2	1010830-9	DIODE	52
2	1010372-12	DIODE	51
17	1010385	DIODE	50
2	1006755-79	CAPACITOR	49
2	1006755-21	CAPACITOR	48
2	1006755-33	CAPACITOR	47
8	1006755-69	CAPACITOR	46
1	1006755-10	CAPACITOR	45
3	1006777-10	CAPACITOR	44
3	1006777-23	CAPACITOR	43
6	1006777-24	CAPACITOR	42
2	1006777-39	CAPACITOR	41
2	1006777-31	CAPACITOR	40
1	1010604-34	RESISTOR	39
3	1010369-1	RESISTOR	38
3	1010369-152	RESISTOR	37
2	1010369-92	RESISTOR	36
2	1010369-105	RESISTOR	35
8	1006750-25	RESISTOR	34
8	1006750-16	RESISTOR	33
1	1010604-39	RESISTOR	32
1	1006750-58	RESISTOR	31
3	1006750-49	RESISTOR	30
3	1006750-72	RESISTOR	29
3	1006750-24	RESISTOR	28
3	1006750-8	RESISTOR	27
3	1006750-77	RESISTOR	26
6	1006750-39	RESISTOR	25
1	1006750-52	RESISTOR	24
16	1006750-32	RESISTOR	23
3	1006750-63	RESISTOR	22
3	1006750-44	RESISTOR	21
5	1006750-36	RESISTOR	20
15	1006750-56	RESISTOR	19
5	1006750-65	RESISTOR	18
2	1006750-5	RESISTOR	17
5	1008025-5	INSULATOR, BUSHING	16
25	1008025-1	INSULATOR, BUSHING	15
4	1010275	TRANSFORMER	14
AR	1006757-8	WIRE, ELECTRICAL	13
AR	1006757-1	WIRE, ELECTRICAL	12
AR	1006776-22	INSULATION SLEEVING	11
AR	1006776-21	INSULATION SLEEVING	10
4	1008161-4	SCREW, CAP, SLOTTED	9
2	MS16633-4015	RING RETAINING EXT, E	8
2	1004546-3	WASHER, FLAT	7
2	1004546-1	WASHER, FLAT	6
2	1004579-1	SCREW, JACKING	5
1	2008093-001	TERMINAL, THREADED	4
1	2008357	WIRING BOARD B	3
1	2008359	WIRING BOARD A	2
1	2007210-011	HEADER HOUSING ASSY	1
-011	LIST OF MATERIALS		

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

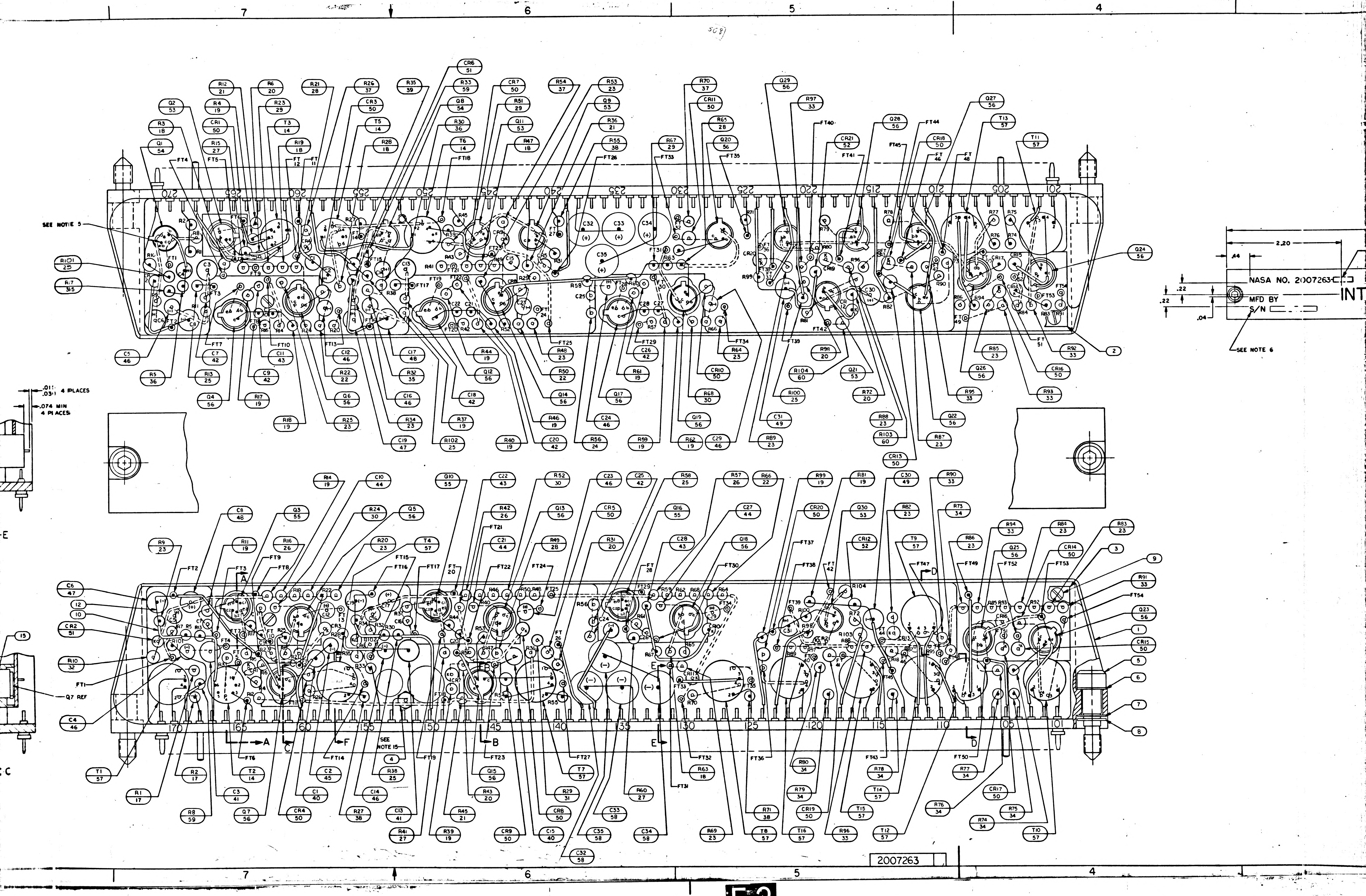
DRAWN	W. Manger	26 MAY 65
CHECKED	[illegible]	7 Jun 65
APPROVED	[illegible]	8 Jun 65
APPROVED	[illegible]	[illegible]
APPROVED MIT	[illegible]	13/4/65
APPROVED MSC	[illegible]	7-13-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATE
ASSEMBLY
CDU ELECTRONICS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2007263
SCALE 4/1	—	SHEET 1 OF 1

2007263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SEE NOTE 6
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CR7 50
R54 37
R53 23
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Q9 53
CR11 50
R97 33
R3 18
CR1 50
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T5 14
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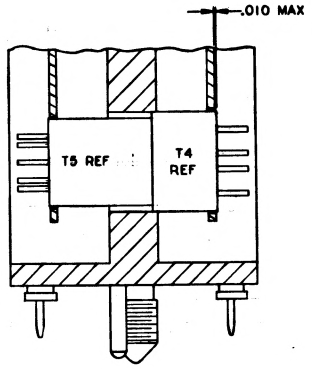
2007263

F-2

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WELD PER ND1002005
3. STAKE FIND NO. 14 THRU FIND NO. 57 TO FIND NO. 1 PER ND1002009 METHOD C OR D
4. ENCAPSULATE PER ND1002002. REMOVE ALL FLASHING
5. TRIM UNUSED LEADS OF FIND NUMBERS 14, 54 AND 55 .010/.030 FROM CASE
6. MARK .10/.08 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 AND SERIALIZE PER ND1002023 USING INK 1006271-1
7. MARK .26/.24 HIGH WHITE CHARACTERS PER ND1002019 AND ND1002122 TYPE II, CLASS 2 USING INK 1006271-1
8. AR DENOTES AS REQUIRED
9. FT DENOTES FEED THRU
10. K DENOTES CATHODE SIDE OF DIODE
11. + DENOTES POSITIVE SIDE OF CAPACITOR
12. BLACK DOT AND SINGLE SOLID LEADS INDICATE UPPER LEVEL WIRING
13. WHITE DOT AND SINGLE DOTTED LEADS INDICATE LOWER LEVEL WIRING
14. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
15. MOUNTING TORQUE FOR FIND NO. 4 TO BE 15-20 INCH OUNCES
16. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF R.S. 2007263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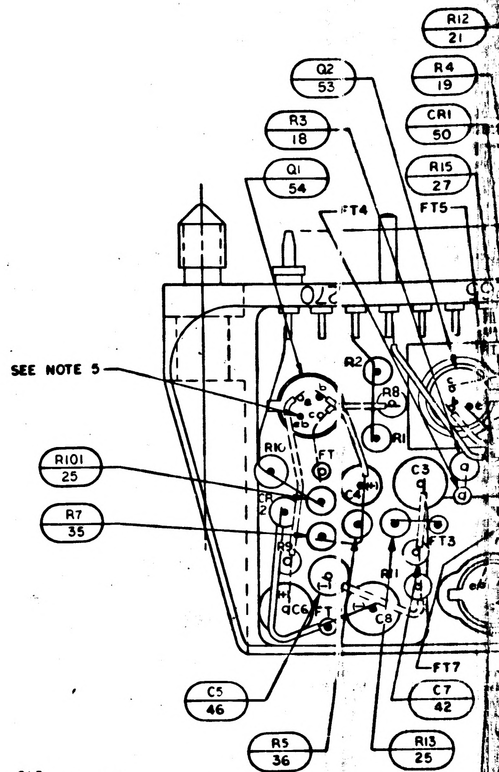
T5 REF
T4 REF

SECTION F-F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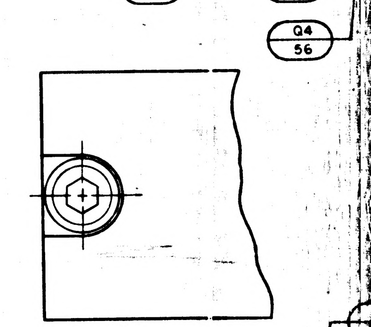
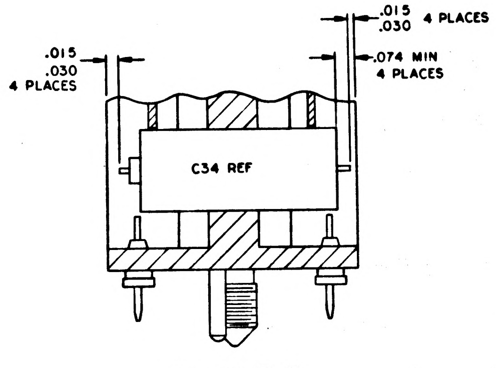
FT7
C7 42
R13 25

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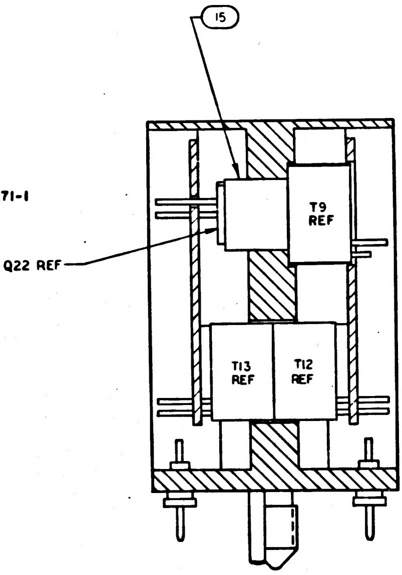
.015 .030 4 PLACES
.074 MIN 4 PLACES
C34 REF

SECTION E-E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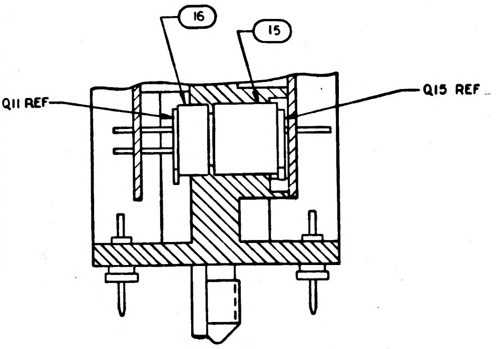
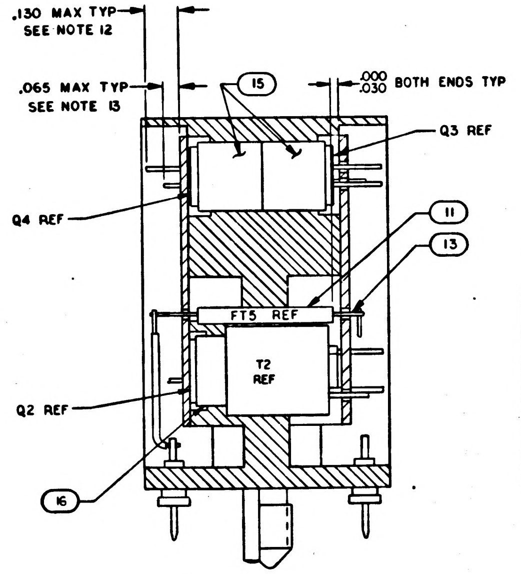
T9 REF
Q22 REF
T13 REF
T12 REF

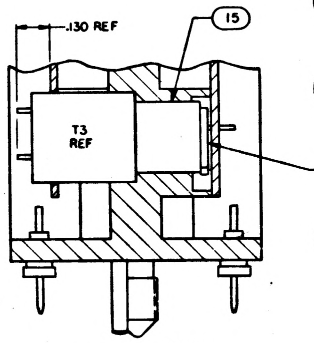
SECTION D-D


16
15
Q11 REF
Q15 REF

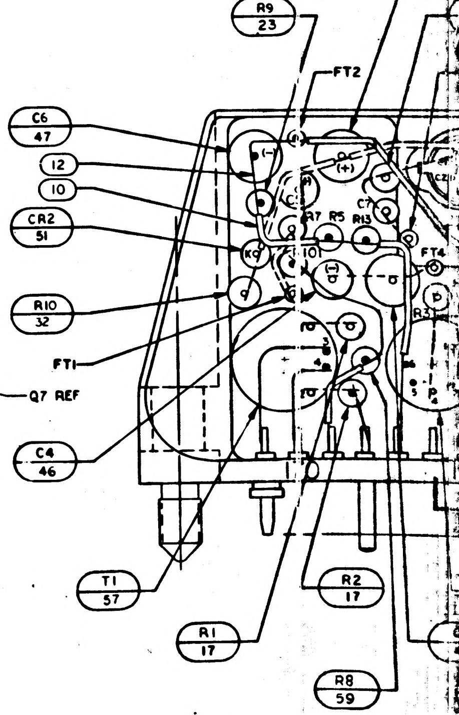
SECTION B-B


.130 MAX TYP SEE NOTE 12
.065 MAX TYP SEE NOTE 13
15
.000 .030 BOTH ENDS TYP
Q3 REF
Q4 REF
11
13
FT5 REF
T2 REF
Q2 REF
16

SECTION A-A


.130 REF
15
T3 REF
Q7 REF

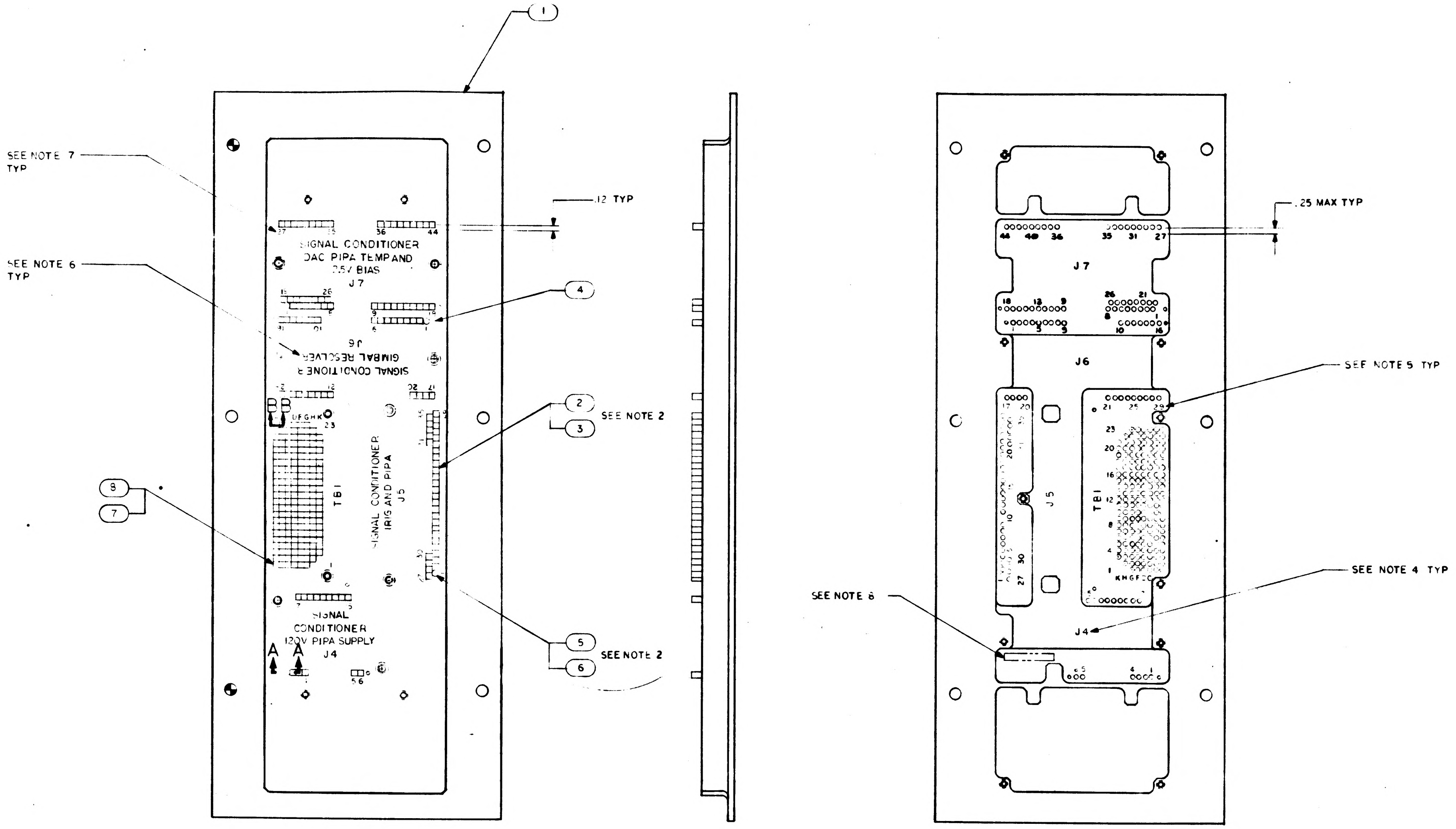
SECTION C-C

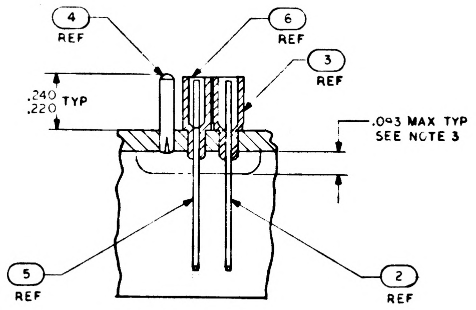

R9 23
FT2
C6 47
12
10
CR2 51
R10 32
FT1
C4 46
T1 57
R1 17
R2 17
R8 59

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29122

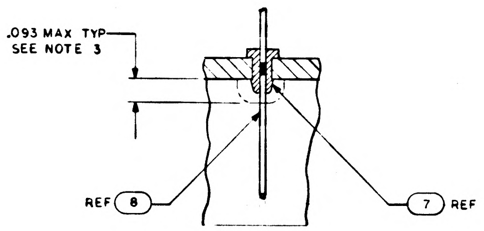
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC		7-66	


1
SEE NOTE 7 TYP
SEE NOTE 6 TYP
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5V BIAS
J7
J6
SIGNAL CONDITIONER GIMBAL RESOLVER
SIGNAL CONDITIONER IRIG AND PIPA
J5
TB1
SIGNAL CONDITIONER 120V PIPA SUPPLY
J4
A A
8
7
4
2
3
SEE NOTE 2
5
6
SEE NOTE 2
.12 TYP
.25 MAX TYP
SEE NOTE 5 TYP
SEE NOTE 4 TYP
SEE NOTE 8


4 REF
6 REF
3 REF
.240 .220 TYP
.093 MAX TYP SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO.2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO.2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III. SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
178	1010994-004		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSERT ASSY	1

-011 LIST OF MATERIALS

2007270	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 2 May 66
CHECKED 20 May 66
APPROVED V G Kaye 23 May 66
APPROVED 23 May 66
APPROVED MIT A. C. METZGER 5-24-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

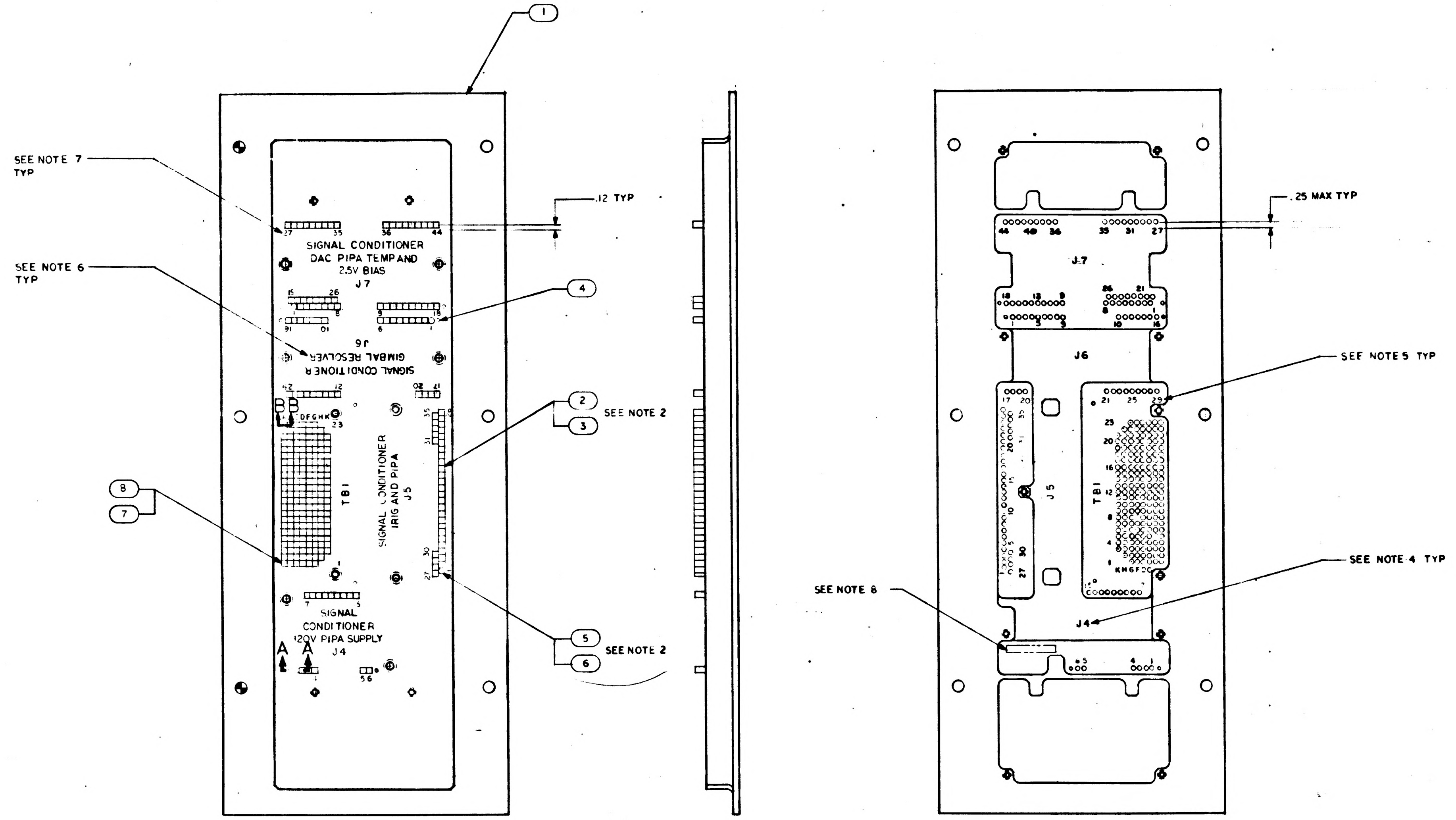
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230 SIZE E DRAWING NO. 2007268
SCALE 1/1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

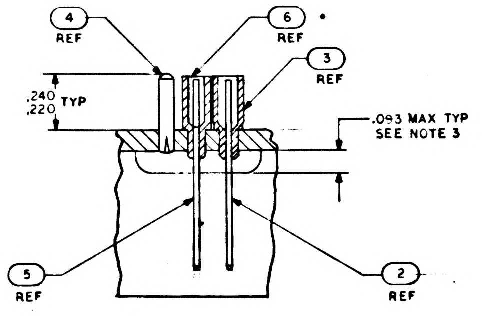
REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC		7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JAC	26 JUL 66	


1
SEE NOTE 7 TYP
.12 TYP
SEE NOTE 6 TYP
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5V BIAS
J7
4
SIGNAL CONDITIONER GIMBAL RESOLVER
J6
2
3
SEE NOTE 2
B B
8
7
TB1
SIGNAL CONDITIONER IRIG AND PIPA
J5
SIGNAL CONDITIONER 120V PIPA SUPPLY
J4
A A
5
6
SEE NOTE 2
.25 MAX TYP
J7
J6
SEE NOTES TYP
J5
TB1
SEE NOTE 4 TYP
SEE NOTE 8
J4

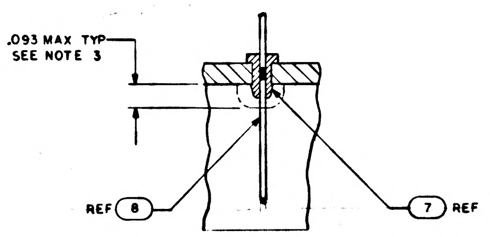
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III.
   SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019


4
REF
6
REF
3
REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
5
REF
2
REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP
SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1
-011	LIST OF MATERIALS			

NEXT ASSY	USED ON
2007270	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 2/May/66
CHECKED 20May66
APPROVED 23 Mar 66
APPROVED 23 Mar 66
APPROVED MIT A. C. METZGER 5-2-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

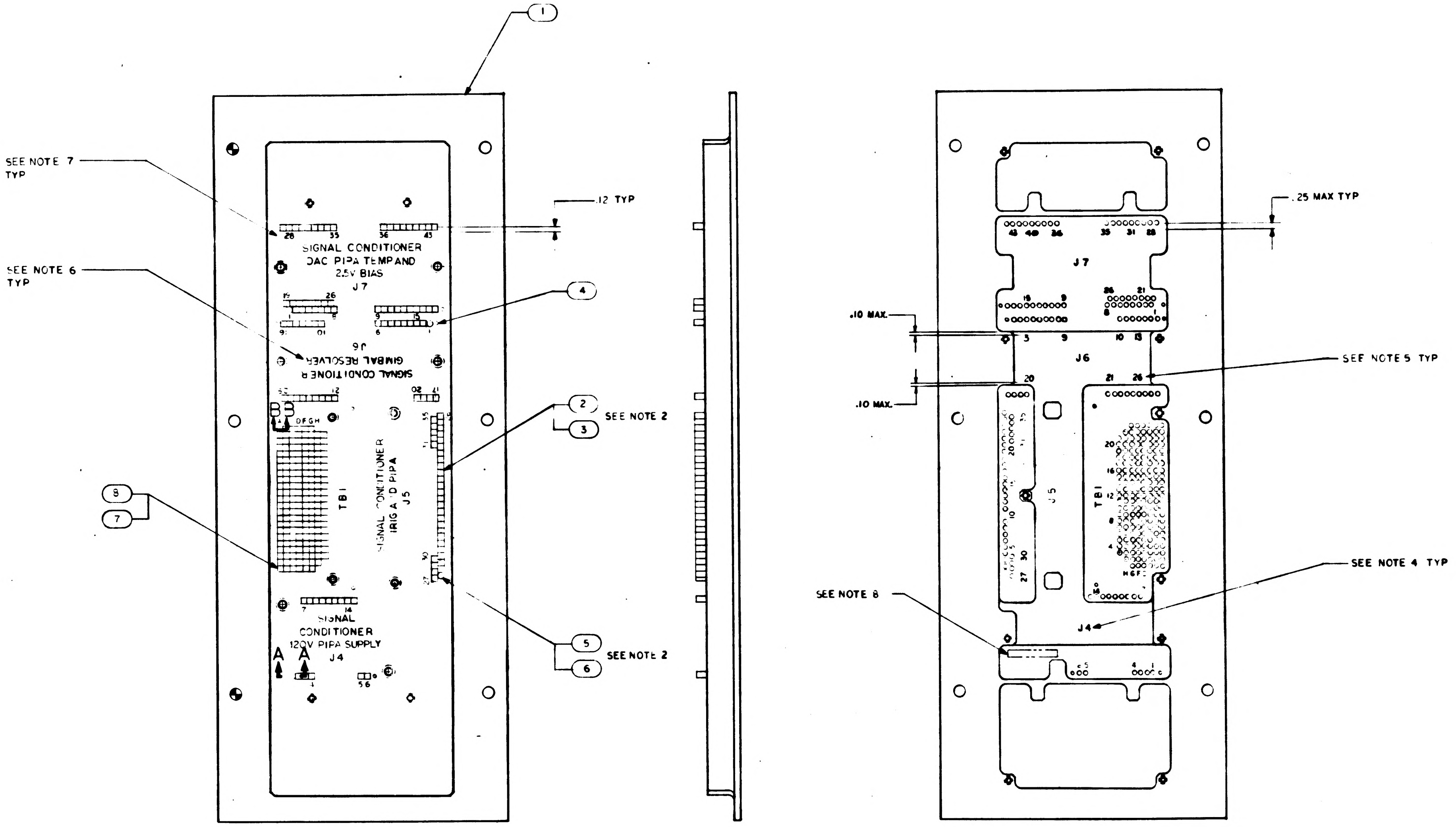
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007268
SCALE 1/1
SHEET 1 OF 1

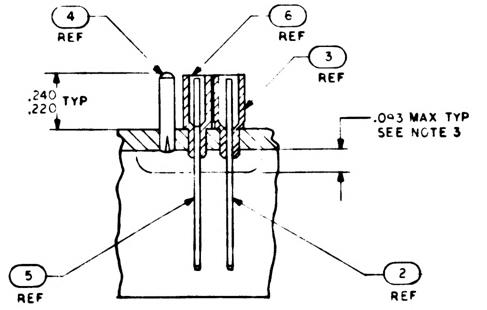
2007268

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 29122

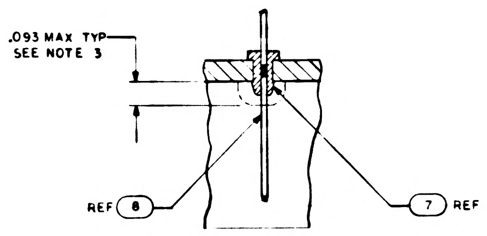
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC		7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JAC	26 JUL 66	
C		REVISED PER TDRR 30911	JJB	NS	2 SEP 66	


1
SEE NOTE 7 TYP
SEE NOTE 6 TYP
28 35 36 43
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J7
4
J6
SIGNAL CONDITIONER
GIMBAL RESOLVER
2
3
SEE NOTE 2
8
7
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J5
5
6
SEE NOTE 2
SIGNAL
CONDITIONER
120V PIPA SUPPLY
J4
A A
.12 TYP
.25 MAX TYP
J7
.10 MAX.
.10 MAX.
J6
SEE NOTE 5 TYP
J5
TB1
SEE NOTE 4 TYP
SEE NOTE 8
J4


4 REF
6 REF
3 REF
.240 .220 TYP
.093 MAX TYP
SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP
SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III.
   SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
178	1010994-005		TERMINAL WRAPOST	8
178	1010996-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
	2008135		HEADER INSEP ASSY	1

-011 LIST OF MATERIALS

2007270	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 2 May 66
CHECKED 20 May 66
APPROVED V G 23 Mar 66
APPROVED 23 Mar 66
APPROVED MIT N G Mulley 5-2-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230 | SIZE E | DRAWING NO. 2007268

SCALE 1/1 | SHEET 1 OF 1

2007268

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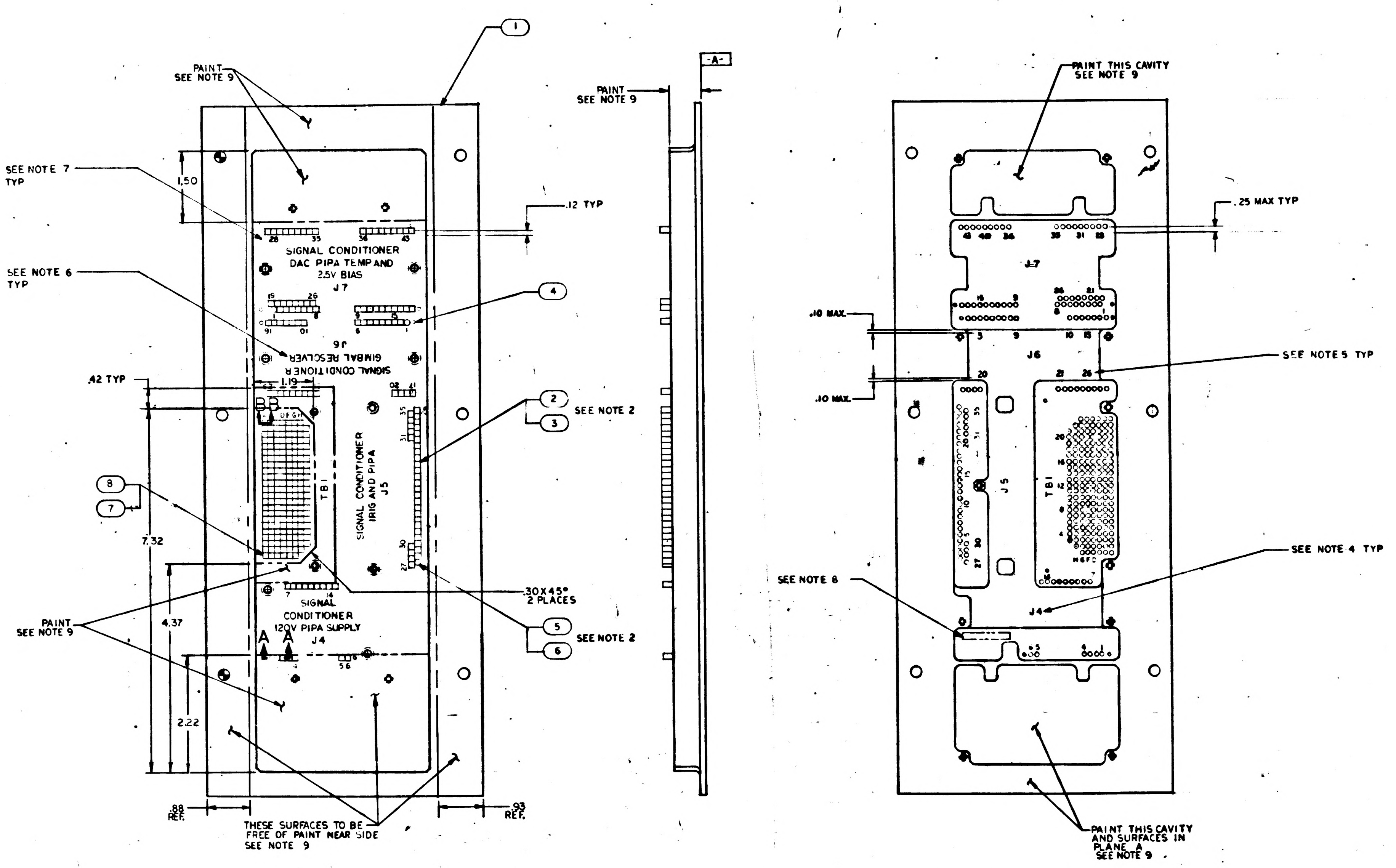
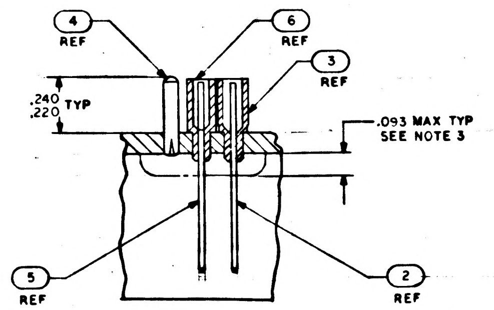
REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC		7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JAC	26 JUL 66	
C		REVISED PER TDRR 30911	WB	NS	12 SEP 66	
D		REVISED PER TDRR 31082	JSD	NS	20 SEP 66	


1
PAINT SEE NOTE 9
SEE NOTE 7 TYP
1.50
.12 TYP
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5V BIAS J7
SEE NOTE 6 TYP
4
J6 GIMBAL RESOLVER SIGNAL CONDITIONER
.42 TYP
1.19
2
3
SEE NOTE 2
8
7
7.32
TB1
SIGNAL CONDITIONER IRIG AND PIPA J5
.30X45° 2 PLACES
4.37
PAINT SEE NOTE 9
SIGNAL CONDITIONER 120V PIPA SUPPLY J4
A
5
6
SEE NOTE 2
2.22
.88 REF.
.93 REF.
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE SEE NOTE 9
-A-
PAINT SEE NOTE 9
PAINT THIS CAVITY SEE NOTE 9
.25 MAX TYP
J7
.10 MAX.
.10 MAX.
J6
SEE NOTE 5 TYP
J5
TB1
SEE NOTE 4 TYP
SEE NOTE 8
J4
PAINT THIS CAVITY AND SURFACES IN PLANE A SEE NOTE 9

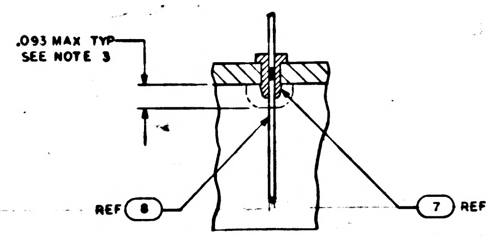
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III.
   SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019
9. PAINT EDGE SURFACES AND INDICATED AREAS PER ND 1002291, TYPE III, USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. PAINT TO OVERLAP VERTICAL SURFACES OF CAVITIES NOT PAINTED .10 TO .20 INCHES. DO NOT PAINT TAPPED HOLES AND INDICATED AREAS.


4 REF
6 REF
3 REF
.240
.220 TYP
.093 MAX TYP SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
178	1010994-005		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007270	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED 23 MAR 66
APPROVED 23 MAR 66
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

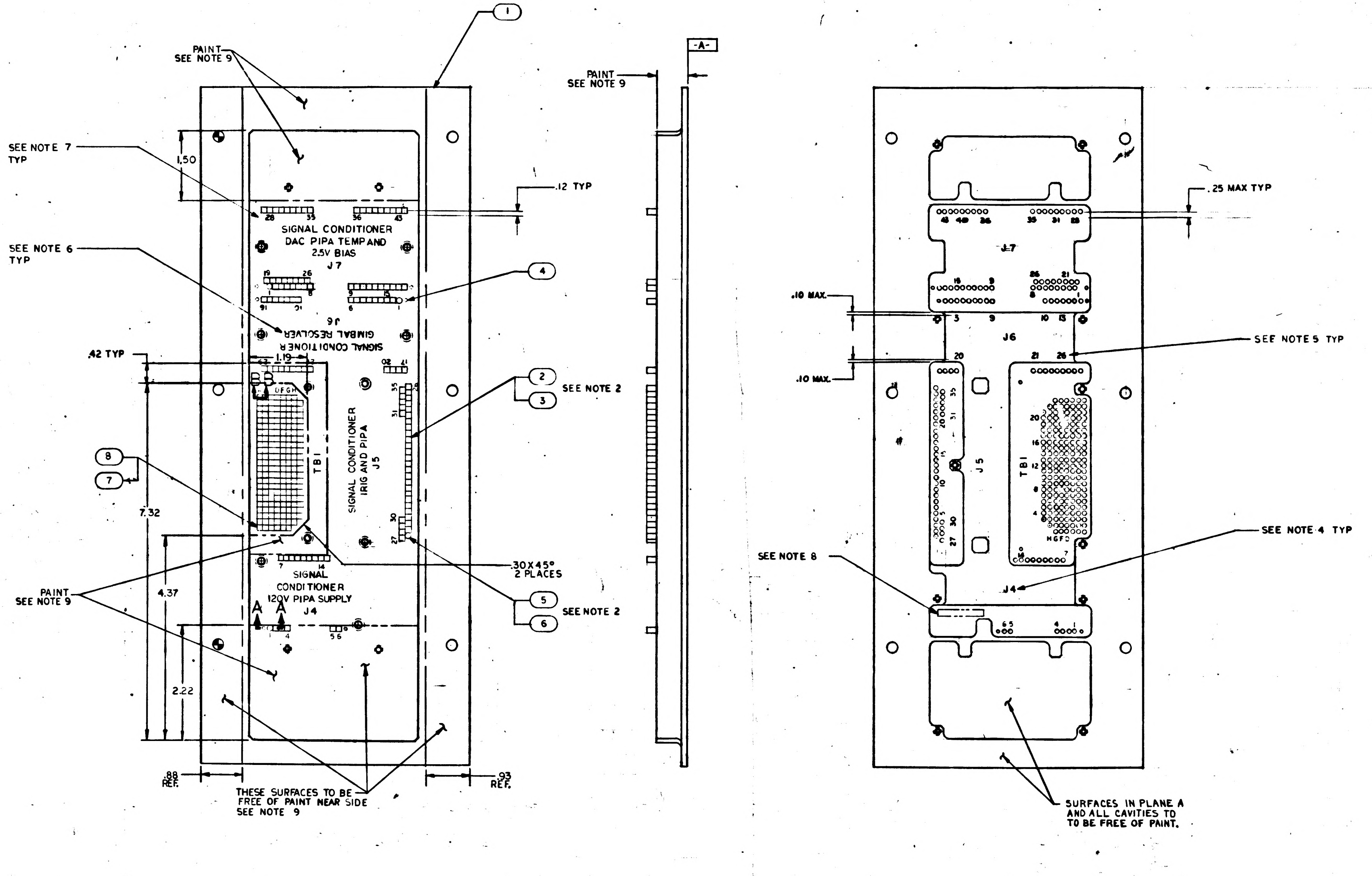
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007268
SCALE 1/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

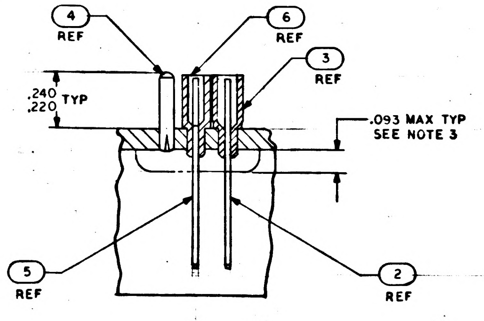
REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC	[illegible]	7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JAC	26 JUL 66	
C		REVISED PER TDRR 30911	WB	NS	12 SEP 66	
D		REVISED PER TDRR 31082	JSD	NS	20 SEP 66	
E		REVISED PER TDRR 32276	WA	[illegible]	12 [illegible]	



1
PAINT SEE NOTE 9
SEE NOTE 7 TYP
1.50
SEE NOTE 6 TYP
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5V BIAS J7
SIGNAL CONDITIONER GIMBAL RESOLVER J6
.12 TYP
4
.42 TYP
1.19
TB1
SIGNAL CONDITIONER IRIG AND PIPA J5
2
3
SEE NOTE 2
8
7
7.32
4.37
PAINT SEE NOTE 9
SIGNAL CONDITIONER 120V PIPA SUPPLY J4
A A
.30X45° 2 PLACES
5
6
SEE NOTE 2
2.22
.88 REF.
.93 REF.
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE SEE NOTE 9
PAINT SEE NOTE 9
-A-
.25 MAX TYP
J7
J6
.10 MAX.
.10 MAX.
SEE NOTE 5 TYP
J5
TB1
SEE NOTE 4 TYP
SEE NOTE 8
J4
SURFACES IN PLANE A AND ALL CAVITIES TO TO BE FREE OF PAINT.

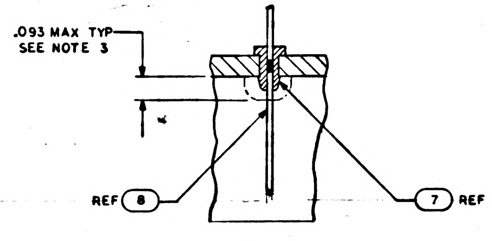
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III. SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019
9. PAINT EDGE SURFACES AND INDICATED AREAS PER ND 1002291, TYPE III USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. DO NOT PAINT TAPPED HOLES AND INDICATED AREAS.



4 REF
6 REF
3 REF
.240
.220 TYP
.093 MAX TYP SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1



.093 MAX TYP SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1
-011	LIST OF MATERIALS			

NEXT ASSY	USED ON
2007270	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Jon Bold	2 May 66
CHECKED	[illegible]	20 May 66
APPROVED	V. G. [illegible]	23 May 66
APPROVED	[illegible]	23 May 66
APPROVED MIT	M G Mucky A. C. METZGER	5-24-66
APPROVED MSC		DATE

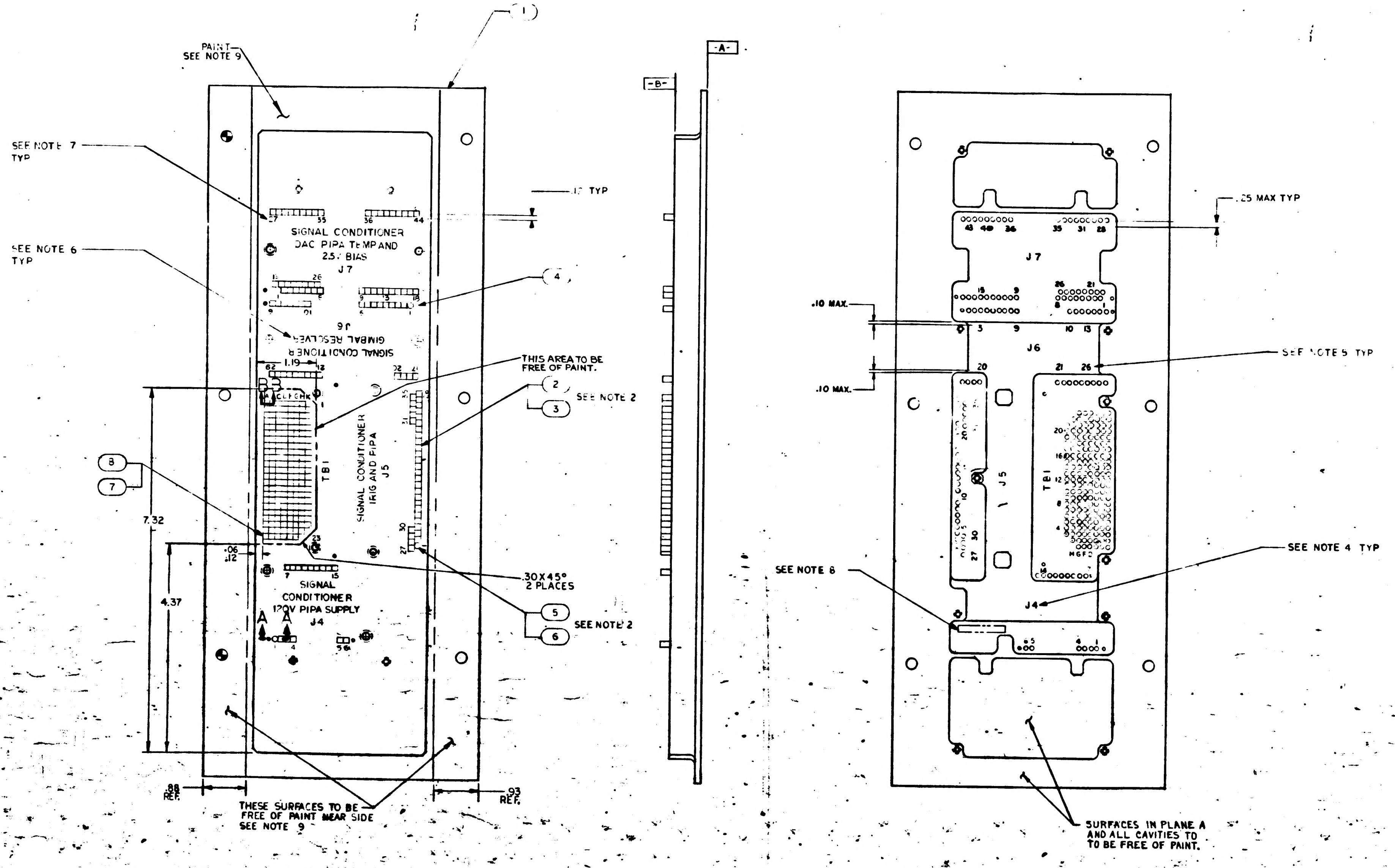
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

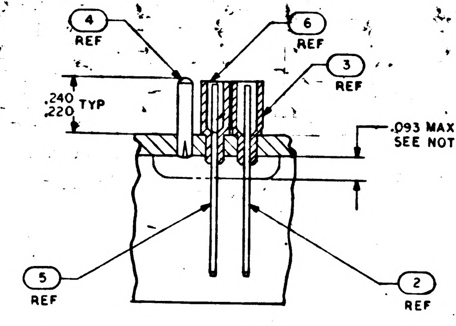
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007268
SCALE 1/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29122

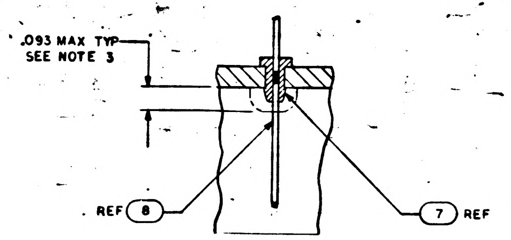
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC		7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JAC	26 JUL 66	
C		REVISED PER TDRR 30911	JJB	NS	12 SEP 66	
D		REVISED PER TDRR 31082	SD	NS	20 SEP 66	
E		REVISED PER TDRR 32276	WA		12 DEC 66	
F		REVISED PER TDRR 32415	EC		6 JAN 67	


PAINT SEE NOTE 9
1
SEE NOTE 7 TYP
SEE NOTE 6 TYP
SIGNAL CONDITIONER
DAC PIPA TEMP AND
25↑ BIAS
J7
J6
GIMBAL RESOLVER
SIGNAL CONDITIONER
1.19
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J5
THIS AREA TO BE FREE OF PAINT.
2
3
SEE NOTE 2
4
8
7
7.32
4.37
.06
.12
.30X45°
2 PLACES
5
6
SEE NOTE 2
SIGNAL CONDITIONER
120V PIPA SUPPLY
J4
A
.12 TYP
.88 REF.
.93 REF.
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE SEE NOTE 9
-A-
-B-
.25 MAX TYP
.10 MAX.
.10 MAX.
SEE NOTE 5 TYP
SEE NOTE 4 TYP
SEE NOTE 8
J4
SURFACES IN PLANE A AND ALL CAVITIES TO TO BE FREE OF PAINT.


4 REF
6 REF
3 REF
.240
.220 TYP
.093 MAX TYP SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019
9. PAINT EDGE SURFACES AND INDICATED AREAS PER ND 1002291, TYPE III USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. DO NOT PAINT ALL HOLES AND INDICATED AREAS. TOTAL PAINT FILM THICKNESS TO BE .002 INCH MAXIMUM IN VIEWING PLANE -B-.
10. SEAL FIND NO. 6 TO FIND NO. 1 PER ND 1002004 TYPE I IN PLANE -B-. SEALING COMPOUND TO EXTEND .030 INCH MAX. BEYOND EDGE OF FIND NO. 6 ON SURFACE OF FIND NO. 1. ROOM TEMPERATURE CURE PERMITTED PROVIDING SEALING COMPOUND IS NOT DISTURBED FOR A MINIMUN OF 8 HOURS.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007270	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 2/May/66
CHECKED 20 May 66
APPROVED V G 23 May 66
APPROVED 23 May 66
APPROVED MIT M G Murley 5-2-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230 SIZE E DRAWING NO. 2007268

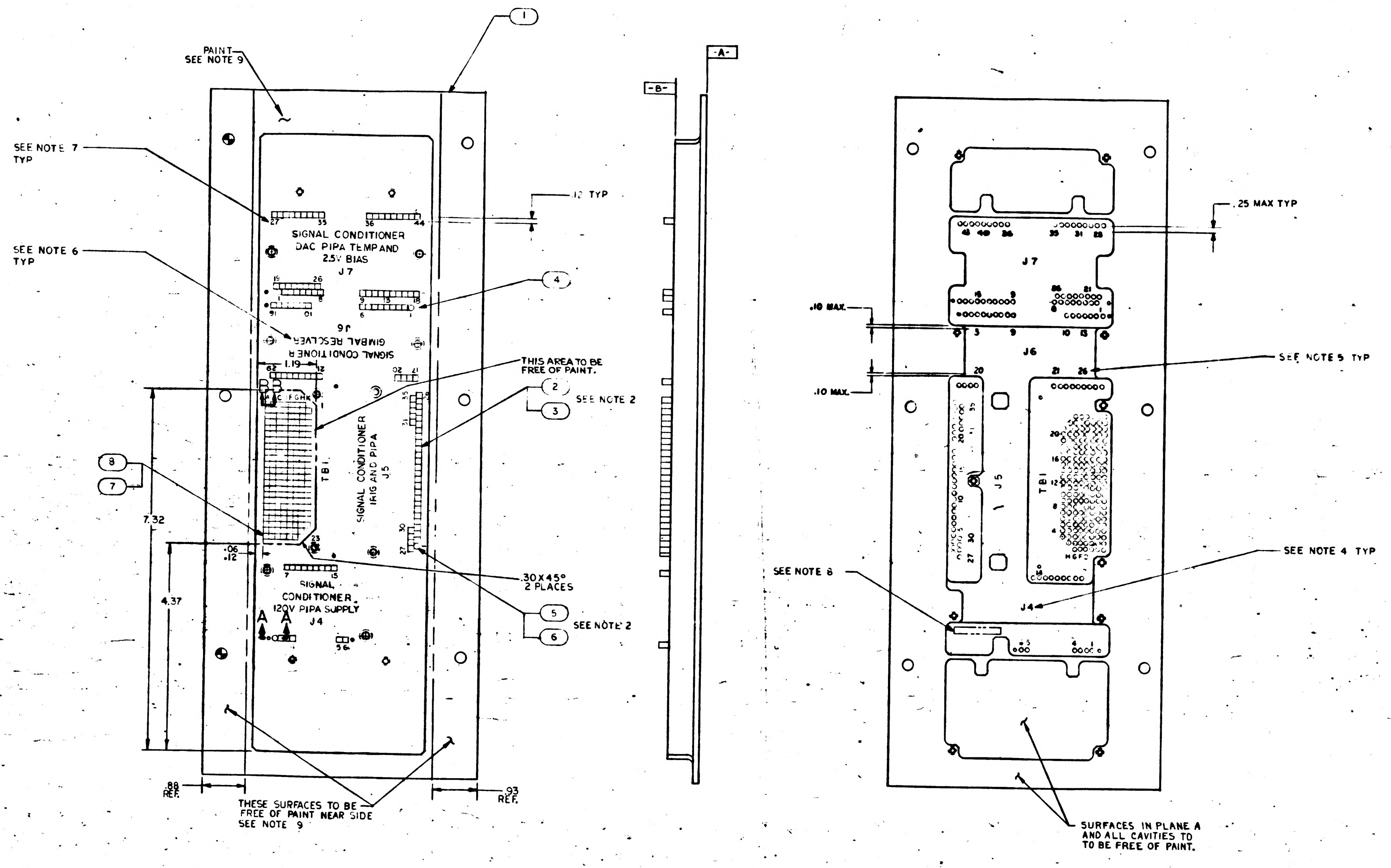
SCALE 1/1 SHEET 1 OF 1

2007268

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JPC		7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JPC	JUL 66	
C		REVISED PER TDRR 30911	UB	NS	12 SEP 66	
D		REVISED PER TDRR 31082	JSD	NS	20 SEP 66	
E		REVISED PER TDRR 32276	WA		12 DEC 66	
F		REVISED PER TDRR 32415	EC		6 JAN 67	
G		REVISED PER TDRR 32416	EC		9 JAN 67	


1
PAINT SEE NOTE 9
SEE NOTE 7 TYP
SEE NOTE 6 TYP
.12 TYP
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5V BIAS
J7
4
SIGNAL CONDITIONER GIMBAL RESOLVER
J6
1.19
THIS AREA TO BE FREE OF PAINT.
2
3
SEE NOTE 2
8
7
7.32
TB1
SIGNAL CONDITIONER IRIG AND PIPA
J5
.06
.12
.30X45° 2 PLACES
4.37
SIGNAL CONDITIONER 120V PIPA SUPPLY
J4
A
A
5
6
SEE NOTE 2
.88 REF.
.93 REF.
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE SEE NOTE 9
-B-
-A-
.25 MAX TYP
J7
.10 MAX.
J6
.10 MAX.
SEE NOTE 5 TYP
J5
TB1
SEE NOTE 4 TYP
SEE NOTE 8
J4
SURFACES IN PLANE A AND ALL CAVITIES TO TO BE FREE OF PAINT.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND 1002187 TYPE III. SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
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5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
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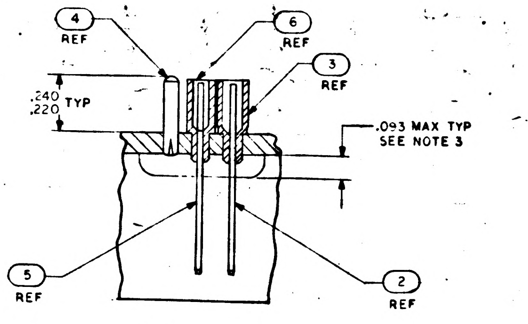
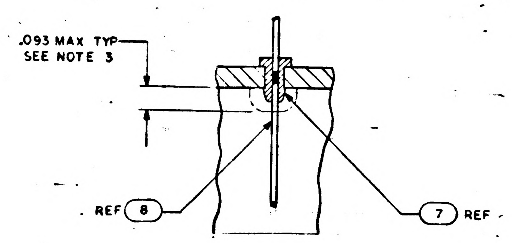
8. IDENTIFY WITH PART NO. PER ND1002019
9. PAINT EDGE SURFACES AND INDICATED AREAS PER ND 1002291, TYPE III USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. DO NOT PAINT ALL HOLES AND INDICATED AREAS. TOTAL PAINT FILM THICKNESS TO BE .002 INCH MAXIMUM IN VIEWING PLANE -B-.
10. SEAL FIND NOS. 3 AND 6 TO FIND NO. 1 PER ND1002004 TYPE I IN PLANE -B-. SEALING COMPOUND TO EXTEND .020 INCH MAX. BEYOND EDGE OF FIND NOS. 3 AND 6 ON SURFACE OF FIND NO. 1, AND EXTEND UP THE SIDE OF FIND NOS. 3 AND 6 $^{.050}_{.070}$ INCHES.
    SEALANT TO BE APPLIED TO PERIPHERY OF EACH GROUP OF FIND NO. 3 AT THE INTERFACE WITH FIND NO. 1 EXCEPT ON TB1. ROOM TEMPERATURE CURE PERMITTED PROVIDING SEALING COMPOUND IS NOT DISTURBED FOR A MINIMUM OF 8 HOURS.


4 REF
6 REF
3 REF
.240
.220 TYP
.093 MAX TYP SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005		TERMINAL WRAPOST	8
173	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1
-011	LIST OF MATERIALS			

NEXT ASSY	USED ON
2007270	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Jim Bell
CHECKED
APPROVED 23 March 66
APPROVED 23 Mar 66
APPROVED MIT
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

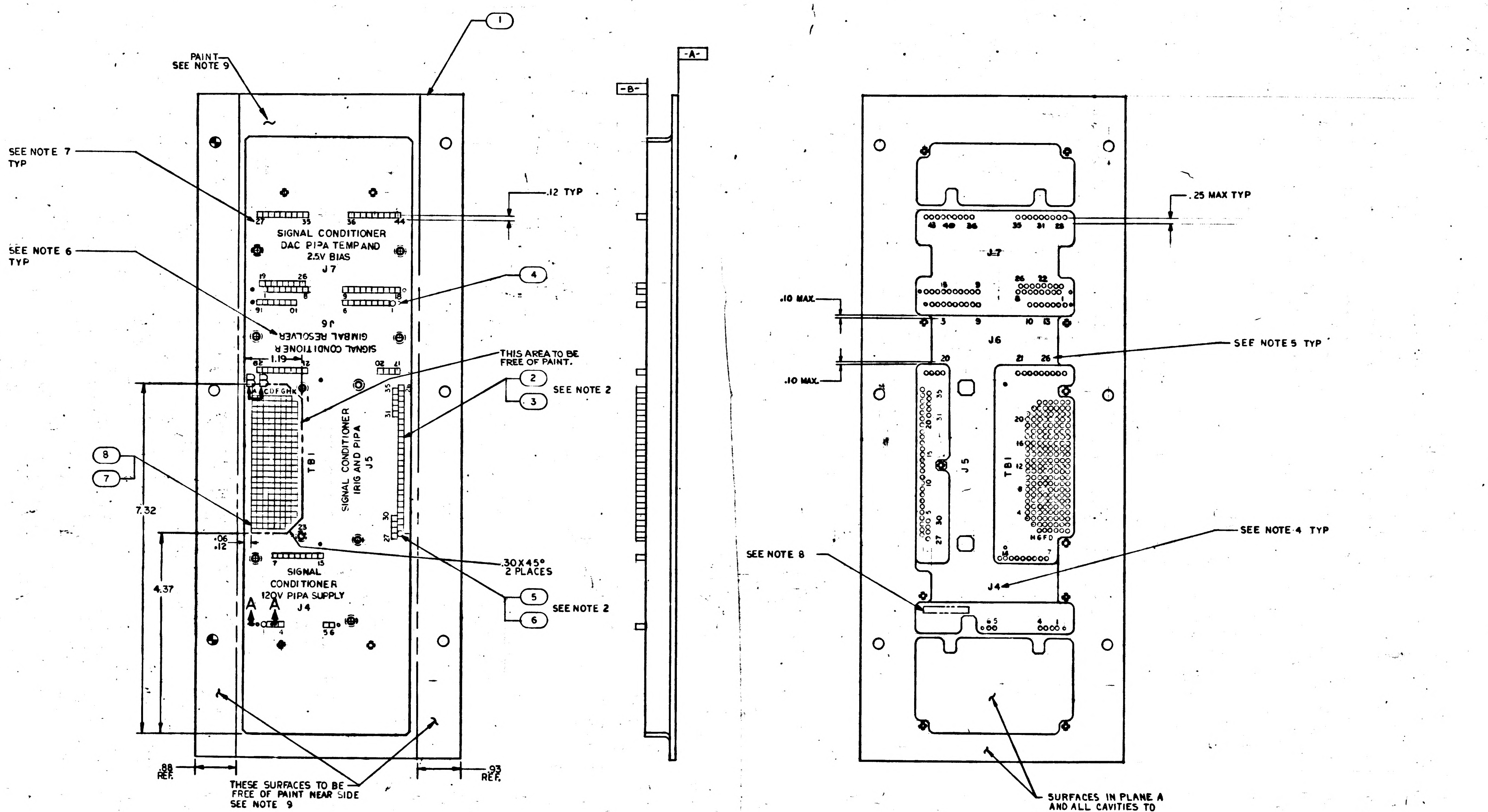
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007268
SCALE 1/1
SHEET 1 OF 1

2007268 G

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	F-4	REVISED PER TDRR 29767.	JAC		7 JULY 66	
B		REVISED PER TDRR 29953	GWM	JAC	26 JUL 66	
C		REVISED PER TDRR 30911	WB	NS	12 SEP 66	
D		REVISED PER TDRR 31082	JSD	NS	20 SEP 66	
E		REVISED PER TDRR 32270	WA		12 DEC 66	
F		REVISED PER TDRR 32415	EC	EB	6 JAN 67	
G		REVISED PER TDRR 32416	EC	EB	9 JAN 67	
H		REVISED PER TDRR 32644	REP	EB	29 JAN 67	


1
PAINT SEE NOTE 9
SEE NOTE 7 TYP
SEE NOTE 6 TYP
27 35 36 44
.12 TYP
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5V BIAS J7
19 26 1 8 9 18 16 10 6 1
4
J6
SIGNAL CONDITIONER GIMBAL RESOLVER
1.19
THIS AREA TO BE FREE OF PAINT.
2
3
SEE NOTE 2
TB1
SIGNAL CONDITIONER IRIG AND PIPA J5
35 31 30 27
8
7
7.32
4.37
.06 .12
23
.30X45° 2 PLACES
5
6
SEE NOTE 2
SIGNAL CONDITIONER 120V PIPA SUPPLY J4
7 15
A A
1 4 5 6
.88 REF.
.93 REF.
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE SEE NOTE 9
-B-
-A-
.25 MAX TYP
43 40 36 35 31 28
J7
18 9 26 22 8 1
.10 MAX.
.10 MAX.
3 9 10 13
J6
20 21 26
SEE NOTE 5 TYP
35 31 20 15 10 5 30 27
J5
TB1
20 16 12 8 4
H G F D
14 7
SEE NOTE 4 TYP
J4
SEE NOTE 8
6 5 4 1
SURFACES IN PLANE A AND ALL CAVITIES TO TO BE FREE OF PAINT.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
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4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
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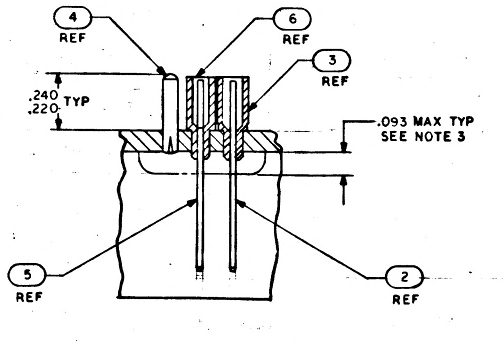
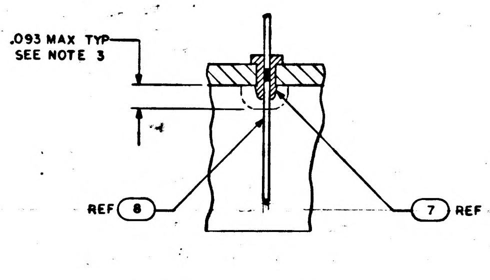
10. SEAL FIND NOS. 3 AND 6 TO FIND NO. 1 PER ND1002004 TYPE I IN PLANE $\boxed{\text{-B-}}$. SEALING COMPOUND TO EXTEND .020 INCH MAX. BEYOND EDGE OF FIND NOS. 3 AND 6 ON SURFACE OF FIND NO. 1, AND EXTEND UP THE SIDE OF FIND NOS. 3 AND 6 $^{.050}_{.070}$ INCHES. SEALANT TO BE APPLIED TO PERIPHERY OF EACH GROUP OF FIND NO. 3 AT THE INTERFACE WITH FIND NO. 1 EXCEPT ON TB1. ROOM TEMPERATURE CURE PERMITTED PROVIDING SEALING COMPOUND IS NOT DISTURBED FOR A MINIMUM OF 8 HOURS.


4 REF
6 REF
3 REF
.240 .220 TYP
.093 MAX TYP SEE NOTE 3
5 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


.093 MAX TYP SEE NOTE 3
REF 8
7 REF

PARTIAL SECTION B-B

SCALE 4/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1
-011	LIST OF MATERIALS			

NEXT ASSY	USED ON
2007270	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —   DECIMALS ±.02   ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Jon Bell 2 May 66
CHECKED 20 May 66
APPROVED V. G. 23 May 66
APPROVED 23 May 66
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

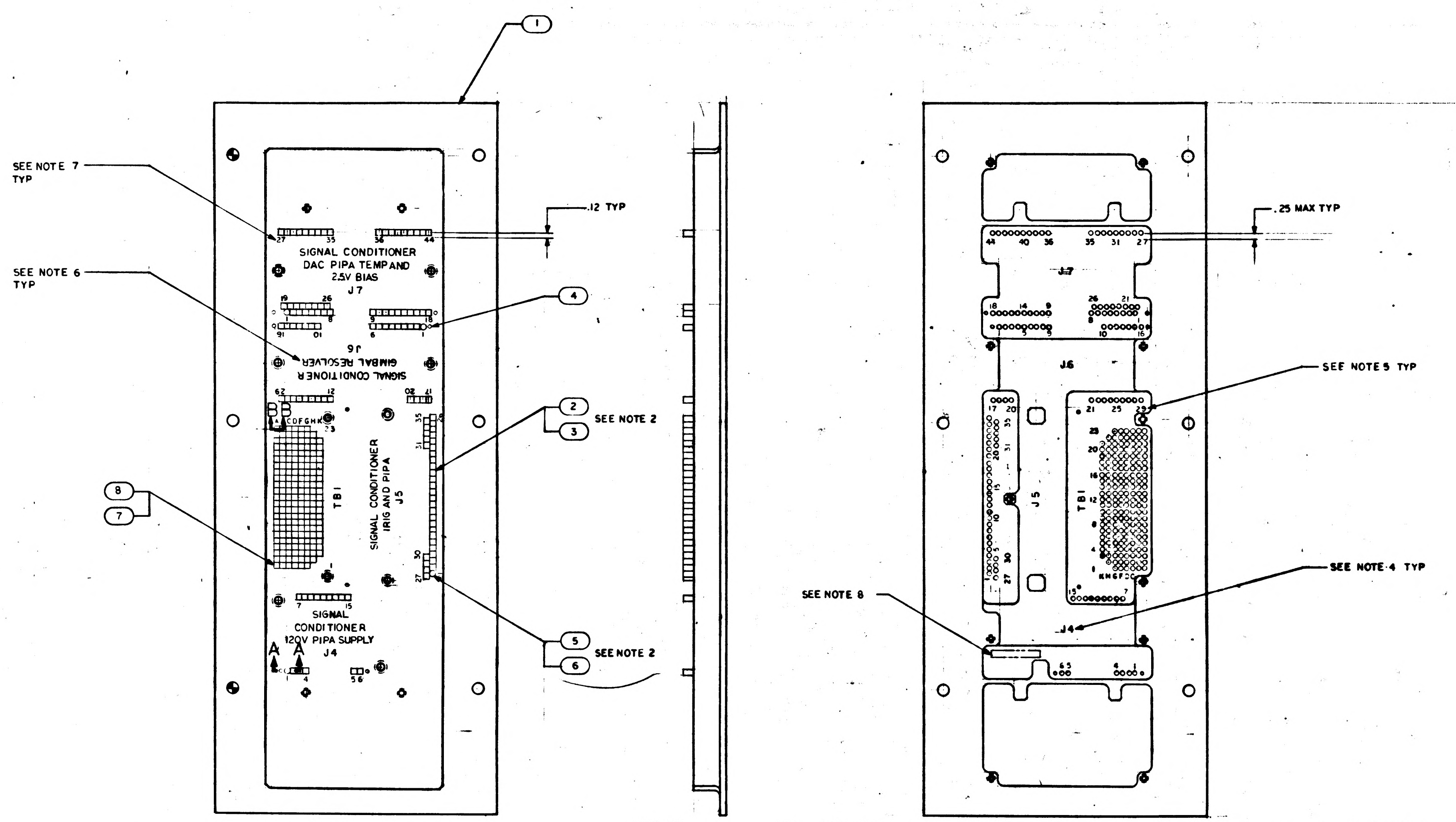
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007268
SCALE 1/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

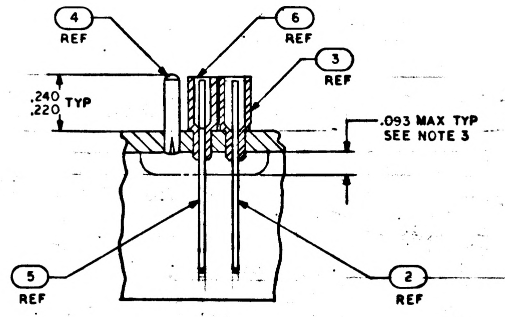
REVISIONS 29122						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



SEE NOTE 7 TYP
SEE NOTE 6 TYP
1
.12 TYP
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J7
4
SIGNAL CONDITIONER
GIMBAL RESOLVER
J6
2
3
SEE NOTE 2
8
7
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J5
SIGNAL
CONDITIONER
120V PIPA SUPPLY
J4
5
6
SEE NOTE 2
A
A
B
B
.25 MAX TYP
J7
J6
SEE NOTE 5 TYP
J5
TB1
SEE NOTE 4 TYP
SEE NOTE 8
J4

NOTES:

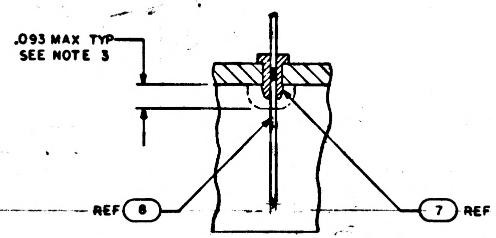
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,5,6,7 AND 8 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,5,6,7 AND 8 TO FIND NO. 1 PER ND1002187 TYPE III.
   SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019 CENTRALIZE AS SHOWN
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10. NO PROTECTIVE COATING REQUIRED, CENTRALIZE AS SHOWN
8. IDENTIFY WITH PART NO. PER ND1002019



4
REF
6
REF
3
REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
5
REF
2
REF

PARTIAL SECTION A-A

SCALE 4/1



.093 MAX TYP
SEE NOTE 3
REF
8
7
REF

PARTIAL SECTION B-B

SCALE 4/1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-004		TERMINAL WRAPOST	8
178	1010995-001		INSULATOR BUSHING	7
4	1008819-001		SLEEVE MINIATURE GROUNDING	6
4	1008818-008		CONTACT, WRAPOST-MINIATURE, FEMALE GROUND	5
8	1010620-7		PIN, GUIDE	4
119	1006774		INSULATOR, WRAPOST-FEMALE, MINIATURE	3
119	1006781-10		CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008435		HEADER INSEP ASSY	1
-011	LIST OF MATERIALS			

MASTER

NEXT ASSY	USED ON
2007270	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Jon Bell 5 May 66
CHECKED 20 May 66
APPROVED 23 May 66
APPROVED 23 May 66
APPROVED MIT M G Mueller 5-26-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007268
SCALE 1/1
SHEET 1 OF 1

2007268

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29/22

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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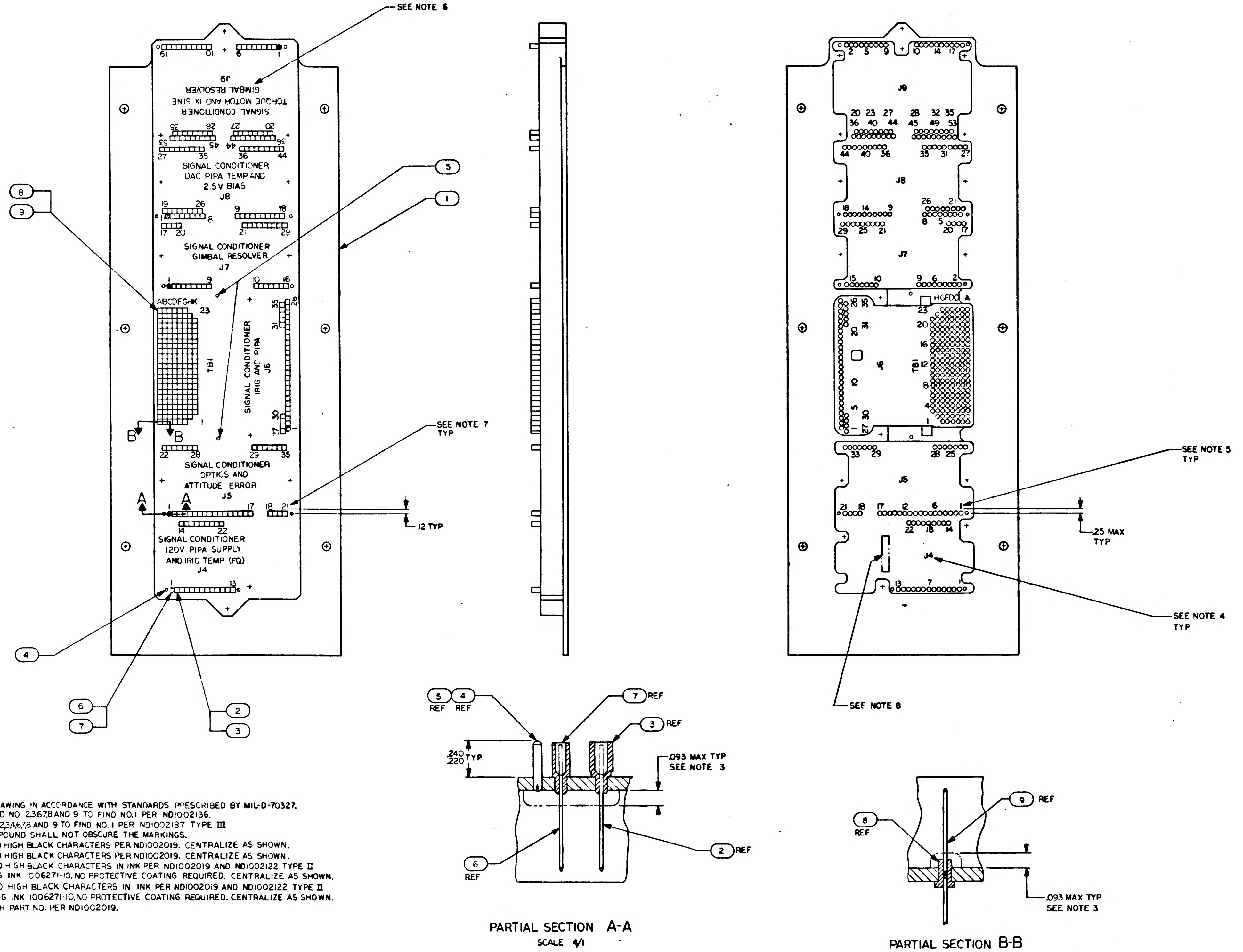

SEE NOTE 6
J9
GIMBAL RESOLVER
TORQUE MOTOR AND IX SINE
SIGNAL CONDITIONER
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
ABCDFGHK
23
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
B
B
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
A
A
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP (FQ)
J4
SEE NOTE 7
TYP
.12 TYP
SEE NOTE 5
TYP
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8
1
2
3
4
5
6
7
8
9
5 REF
4 REF
7 REF
3 REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
6 REF
2 REF
8 REF
9 REF
.093 MAX TYP
SEE NOTE 3

PARTIAL SECTION A-A
SCALE 4/1

PARTIAL SECTION B-B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III
   SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II
   CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
178	1010994-005	TERMINAL WRAPOST	9
178	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	
011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —   DECIMALS ±.02   ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	E. Miller	26 APR 66
CHECKED	L. [illegible]	20 May 66
APPROVED	V. A. [illegible]	23 May 66
APPROVED	[illegible]	23 May 66
APPROVED MIT	McMurdy	5-24-66
APPROVED MSC	A. C. METZGER	
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

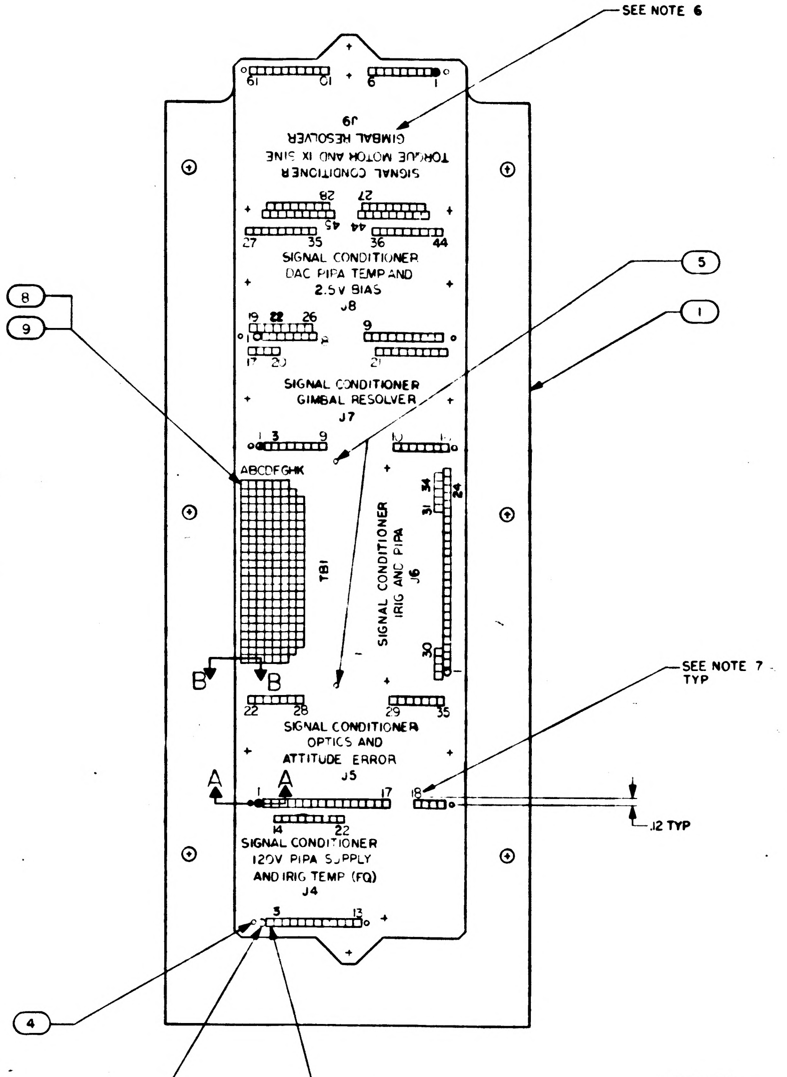
CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2007269

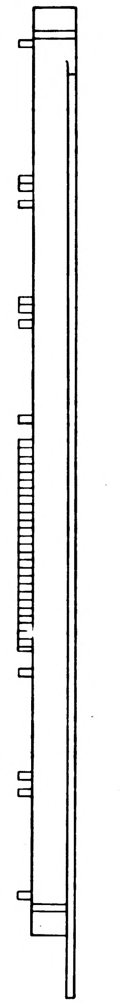
SCALE 1/1   SHEET 1 OF 1

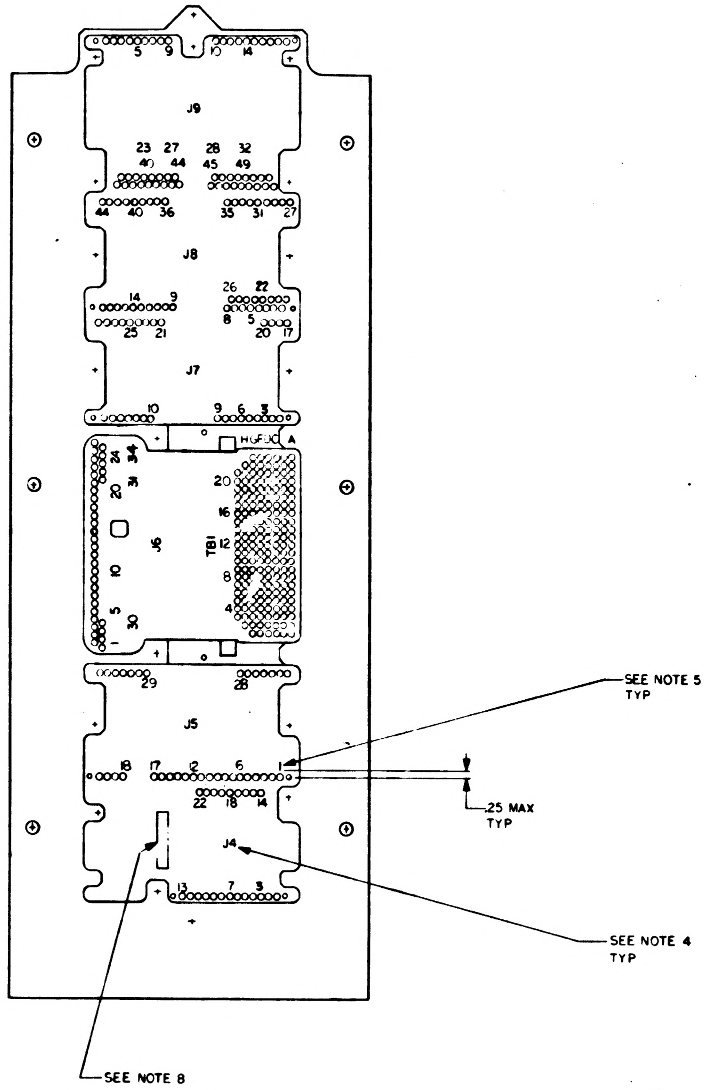
2007269 A

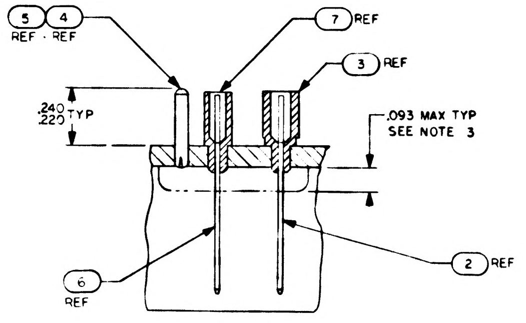
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 29954.	JAC		13 JULY 66	
B		REVISED PER TDRR 30903	N. W.	PLW	13 SEP 66	

REVISIONS 29122


SEE NOTE 6
SIGNAL CONDITIONER
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER
J9
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
ABCDEFGHK
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP (FQ)
J4
SEE NOTE 7
TYP
.12 TYP
A
A
B
B
8
9
5
1
4

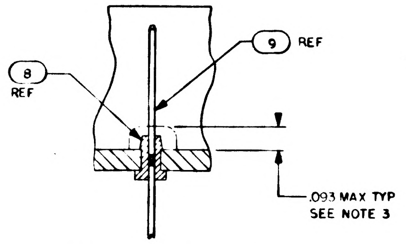



J9
J8
J7
TB1
J6
J5
J4
SEE NOTE 5
TYP
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8


5
4
REF · REF
7 REF
3 REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
6
REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


8
REF
9 REF
.093 MAX TYP
SEE NOTE 3

PARTIAL SECTION B-B

SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
173	1010994-005	TERMINAL WRAPOST	9
173	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	1

011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.02 ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN E. Miller 20 APR 66
CHECKED L. Hood
APPROVED 23 MAY 66
APPROVED
APPROVED MIT 5 JUN 66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

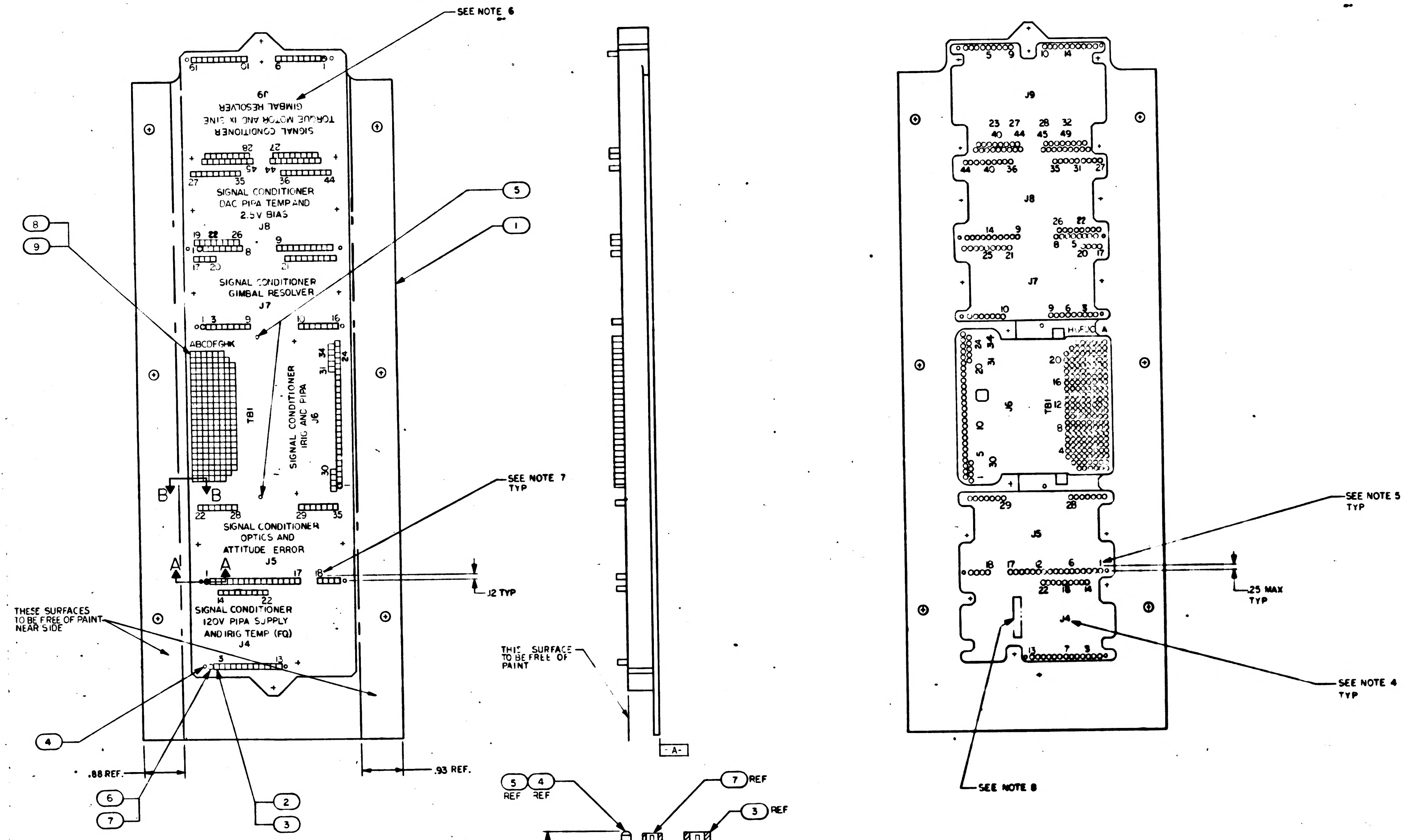
CODE IDENT NO 80230 SIZE E DRAWING NO. 2007269

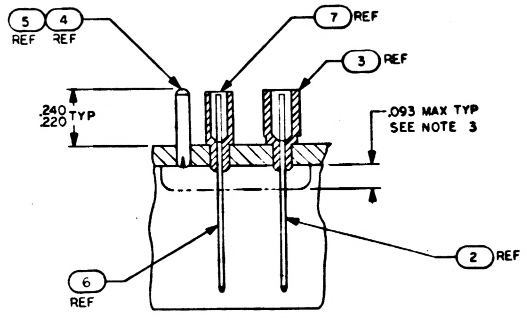
SCALE 1/1 SHEET 1 OF 1

2007269 B

REVISIONS 29122

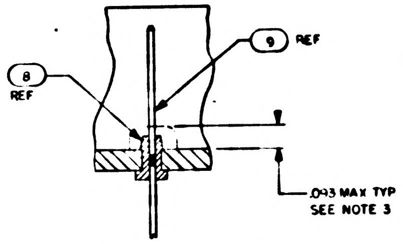
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 29954.	JAC		13 JULY 66		
B		REVISED PER TDRR 30903	W. W.	RLW	13 SEP 66		
C		REVISED PER TDRR 31057	JJB	RLW	21 SEP 66		


SEE NOTE 6
J9
GIMBAL RESOLVER
TORQUE MOTOR AND IX LINE
SIGNAL CONDITIONER
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
ABCDEFGHK
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP (FQ)
J4
SEE NOTE 7
TYP
.12 TYP
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE
THIS SURFACE TO BE FREE OF PAINT
-A-
.88 REF.
.93 REF.
B
A
1
2
3
4
5
6
7
8
9
J9
J8
J7
J6
J5
J4
TB1
SEE NOTE 5
TYP
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8


5 REF
4 REF
7 REF
3 REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
6 REF
2 REF

PARTIAL SECTION A-A

SCALE 4/1


8 REF
9 REF
.093 MAX TYP
SEE NOTE 3

PARTIAL SECTION B-B

SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS, PER ND 1002291, TYPE III, USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003, PRIOR TO THE INSTALLATION OF ANY FIND NUMBERS. IN VIEWING PLANE -A- OVERLAP PAINT ON ADJACENT VERTICAL SURFACES .10 TO .20 INCHES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
178	1010994-005	TERMINAL, WRAPOST	9
178	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	1

011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.02 ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN E. Miller 26 APR 66
CHECKED L. [illegible]
APPROVED U. A. Kopp[illegible]
APPROVED
APPROVED MIT McMurdy 5-24-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

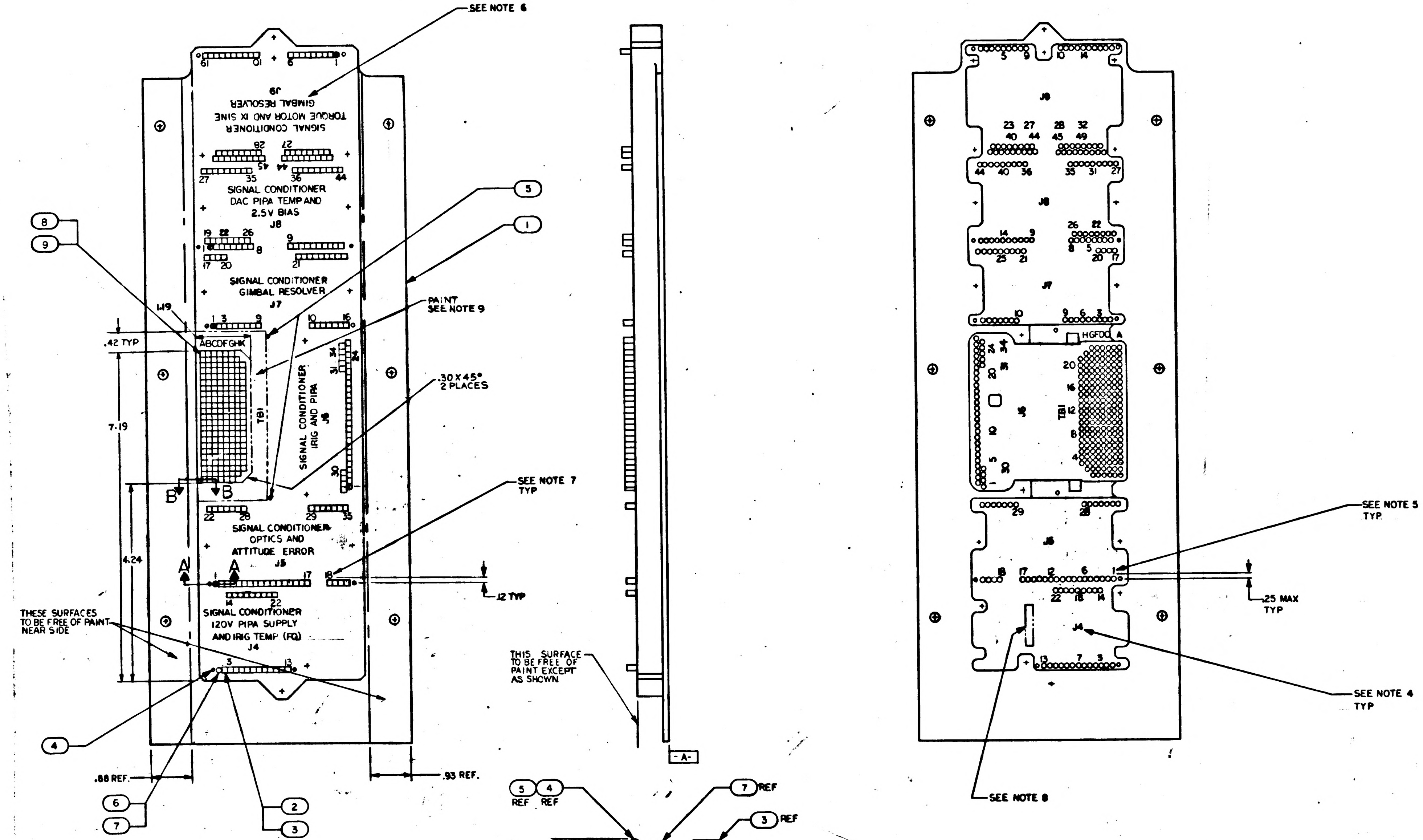
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2007269
SCALE 1/1
SHEET 1 OF 1

2007269 C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29122						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 29954.	JAC		13 JULY 66	
B		REVISED PER TDRR 30903.	N.W.	CLW	13 SEP 66	
C		REVISED PER TDRR 31057	JJB	CLW	21 SEP 66	
D		REVISED PER TDRR 31064	EC	JI	26 SEP 66	


SEE NOTE 6
J9
GIMBAL RESOLVER
TORQUE MOTOR AND IX SINE
SIGNAL CONDITIONER
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
PAINT
SEE NOTE 9
.30 X 45°
2 PLACES
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP (FQ)
J4
SEE NOTE 7
TYP
.12 TYP
THESE SURFACES
TO BE FREE OF PAINT
NEAR SIDE
1.19
.42 TYP
7.19
4.24
ABCDFGHK
.88 REF.
.93 REF.
B
A
THIS SURFACE
TO BE FREE OF
PAINT EXCEPT
AS SHOWN
-A-
SEE NOTE 5
TYP.
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8
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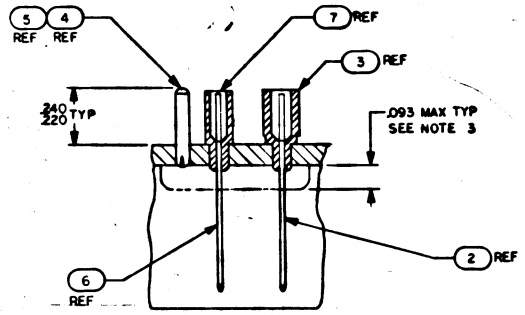
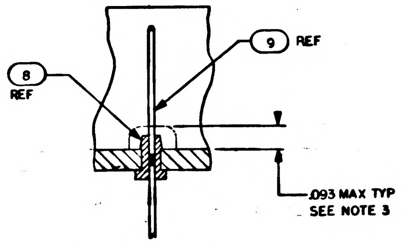
2
3
4
5
6
7
8
9


5 REF
4 REF
7 REF
3 REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
6 REF
2 REF

PARTIAL SECTION A-A
SCALE 4/1


9 REF
8 REF
.093 MAX TYP
SEE NOTE 3

PARTIAL SECTION B-B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS. PER ND 1002291, TYPE III, USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003, PRIOR TO THE INSTALLATION OF ANY FIND NUMBERS. IN VIEWING PLANE -A- OVERLAP PAINT ON ADJACENT VERTICAL SURFACES .10 TO .20 INCHES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005	TERMINAL, WRAPOST	9
178	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	1
011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.02 ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN E Miller 20 APR 66
CHECKED
APPROVED U. A. Kaj
APPROVED
APPROVED MIT 5-2-66
APPROVED MSC A. C. METZGER
DATE

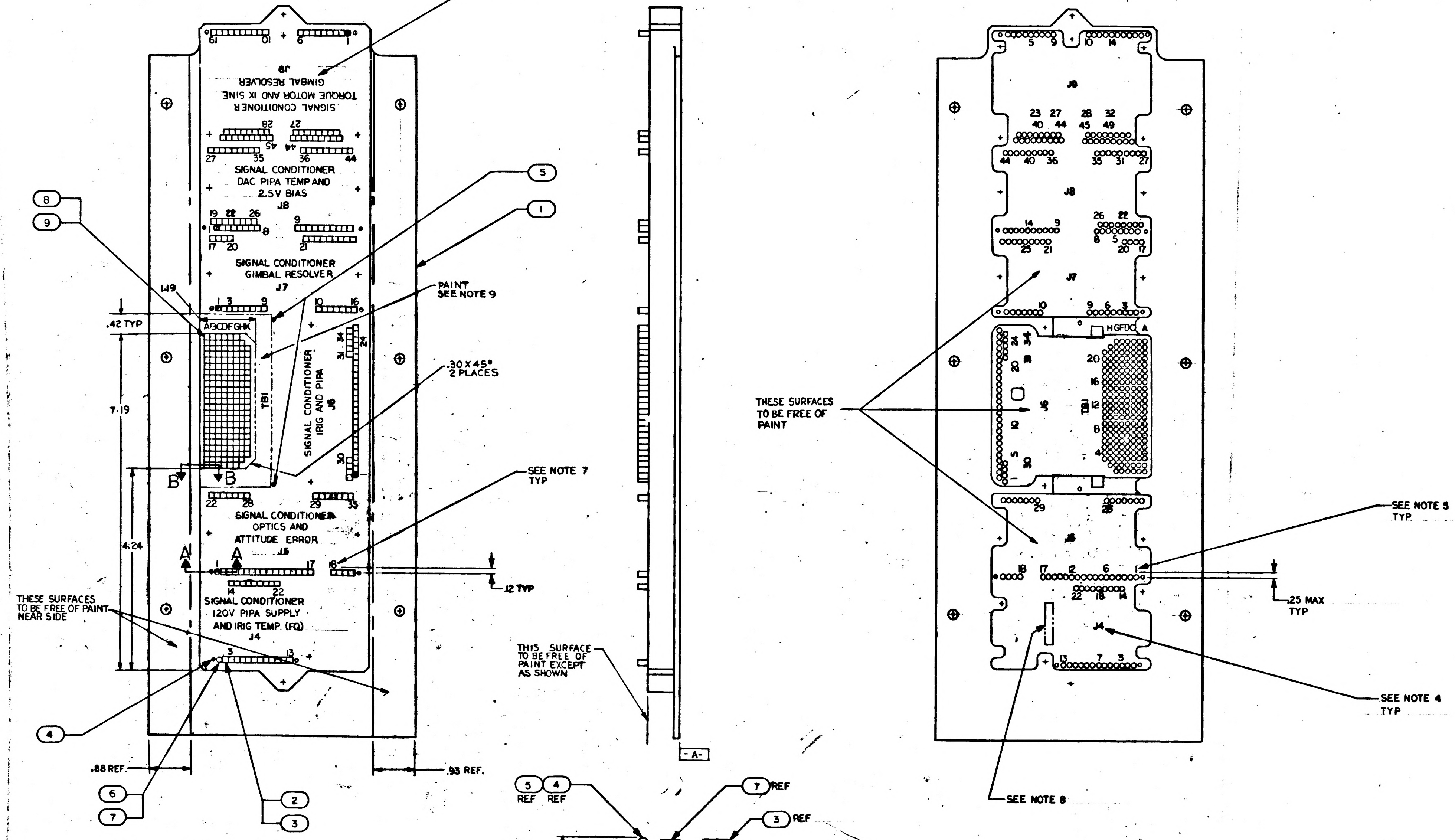
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

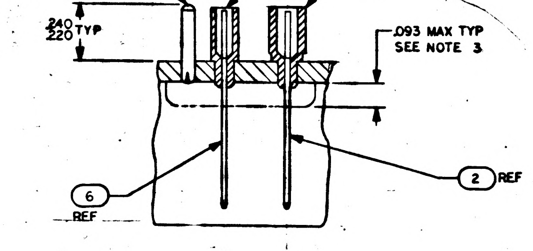
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007269
SCALE 1/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

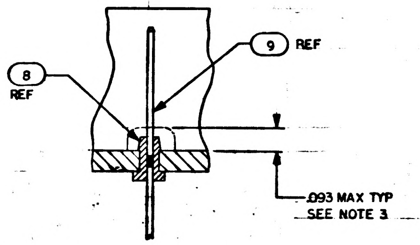
REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 29954.	JAC		13 JULY 66		
B		REVISED PER TDRR 30903.	W.	RLW	13 SEP 66		
C		REVISED PER TDRR 3105		RLW	21 SEP 66		
D		REVISED PER TDRR 31064		JI	29 SEP 66		
E		REVISED PER TDRR 32279.	V	RLW	12 DEC 66		


SEE NOTE 6
J9
SIGNAL CONDITIONER
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP. (FQ)
J4
ABCDEFGHK
1.19
.42 TYP
7.19
4.24
B
A
PAINT
SEE NOTE 9
.30 X 45°
2 PLACES
SEE NOTE 7
TYP
.12 TYP
THESE SURFACES
TO BE FREE OF PAINT
NEAR SIDE
.88 REF.
.93 REF.
1
2
3
4
5
6
7
8
9
THIS SURFACE
TO BE FREE OF
PAINT EXCEPT
AS SHOWN
-A-
THESE SURFACES
TO BE FREE OF
PAINT
HGFDC A
SEE NOTE 5
TYP
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8


5 REF
4 REF
7 REF
3 REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
6 REF
2 REF

PARTIAL SECTION A-A
SCALE 4/1


9 REF
8 REF
.093 MAX TYP
SEE NOTE 3

PARTIAL SECTION B-B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,6,7,8 AND 9 TO FIND NO.1 PER ND1002136.
3. SEAL FIND NO.2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS, PER ND 1002291, TYPE III, USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003, PRIOR TO THE INSTALLATION OF ANY FIND NUMBERS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005	TERMINAL WRAPOST	9
178	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	
011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E. Miller 20 APR 66
CHECKED
APPROVED
APPROVED
APPROVED MIT 5-24-66
APPROVED MSC A. C. METZGER
DATE

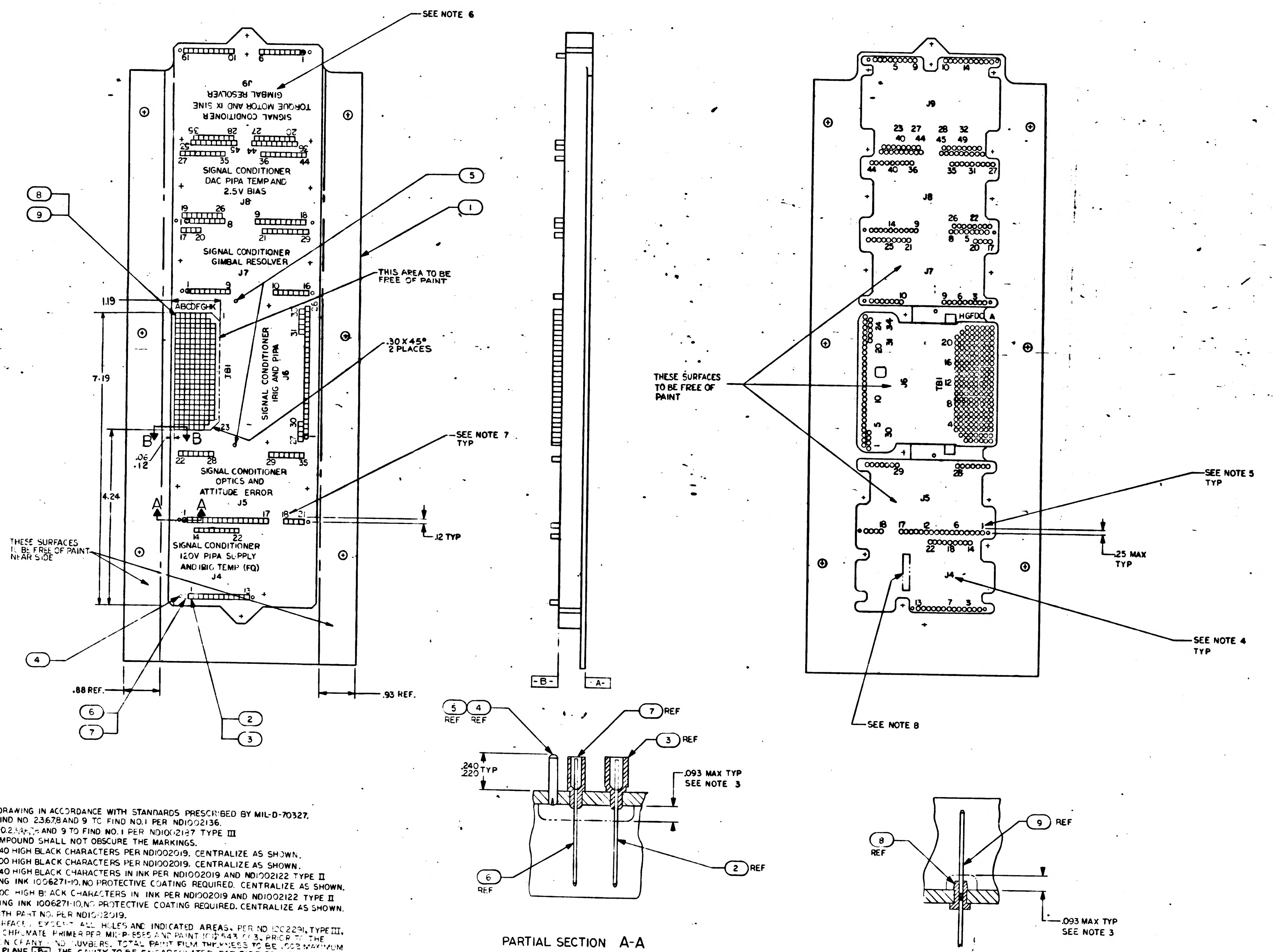
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007269
SCALE 1/1
SHEET 1 OF 1

REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 29954.	JAC		13 JULY 66	
B		REVISED PER TDRR 30903	W. W.	RLW	13 SEP 66	
C		REVISED PER TDRR 31057	JJB	RLW	21 SEP 66	
D		REVISED PER TDRR 31064	EC	JI	29 SEP 66	
E		REVISED PER TDRR 32279	HV	RLW	12 DEC 66	
F		REVISED PER TDRR 32404	EC		9 JAN 67	


SEE NOTE 6
J9
SIGNAL CONDITIONER
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
THIS AREA TO BE FREE OF PAINT
ABCDFGHK
TB1
SIGNAL CONDITIONER IRIG AND PIPA
J6
.30 X 45° 2 PLACES
1.19
7.19
B
.06 .12
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
SEE NOTE 7 TYP
A
4.24
.12 TYP
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP (FQ)
J4
THESE SURFACES TO BE FREE OF PAINT NEAR SIDE
.88 REF.
.93 REF.
-B-
-A-
THESE SURFACES TO BE FREE OF PAINT
HGFDC A
SEE NOTE 5 TYP
.25 MAX TYP
SEE NOTE 4 TYP
SEE NOTE 8
REF
.240 .220 TYP
.093 MAX TYP SEE NOTE 3
REF
.093 MAX TYP SEE NOTE 3

PARTIAL SECTION A-A
SCALE 4/1

PARTIAL SECTION B-B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002137 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. PAINT ALL SURFACES EXCEPT ALL HOLES AND INDICATED AREAS, PER ND 1002291, TYPE III, USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003, PRIOR TO THE INSTALLATION OF ANY FIND NUMBERS. TOTAL PAINT FILM THICKNESS TO BE .002 MAXIMUM IN VIEWING PLANE -B-. THE CAVITY TO BE ENCAPSULATED, FAR SIDE OF VIEWING PLANE -B-, TO BE FREE OF PAINT EXCEPT FOR OVERLAP.
10. SEAL FIND NO.7 TO FIND NO.1 PER ND 1002004 TYPE I IN PLANE -B-. SEALING COMPOUND TO EXTEND .030 INCH MAX. BEYOND EDGE OF FIND NO 7 ON SURFACE OF FIND NO. 1. ROOM TEMPERATURE CURE PERMITTED PROVIDING SEALING COMPOUND IS NOT DISTURBED FOR A MINIMUM OF 8 HOURS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
173	1010994-005	TERMINAL, WRAPOST	9
173	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	1

011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.02 ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN E. Miller 20 APR 66
CHECKED L. Hood 20 Apr 66
APPROVED 23 MAY 66
APPROVED
APPROVED MIT 5-24-66
APPROVED MSC
DATE

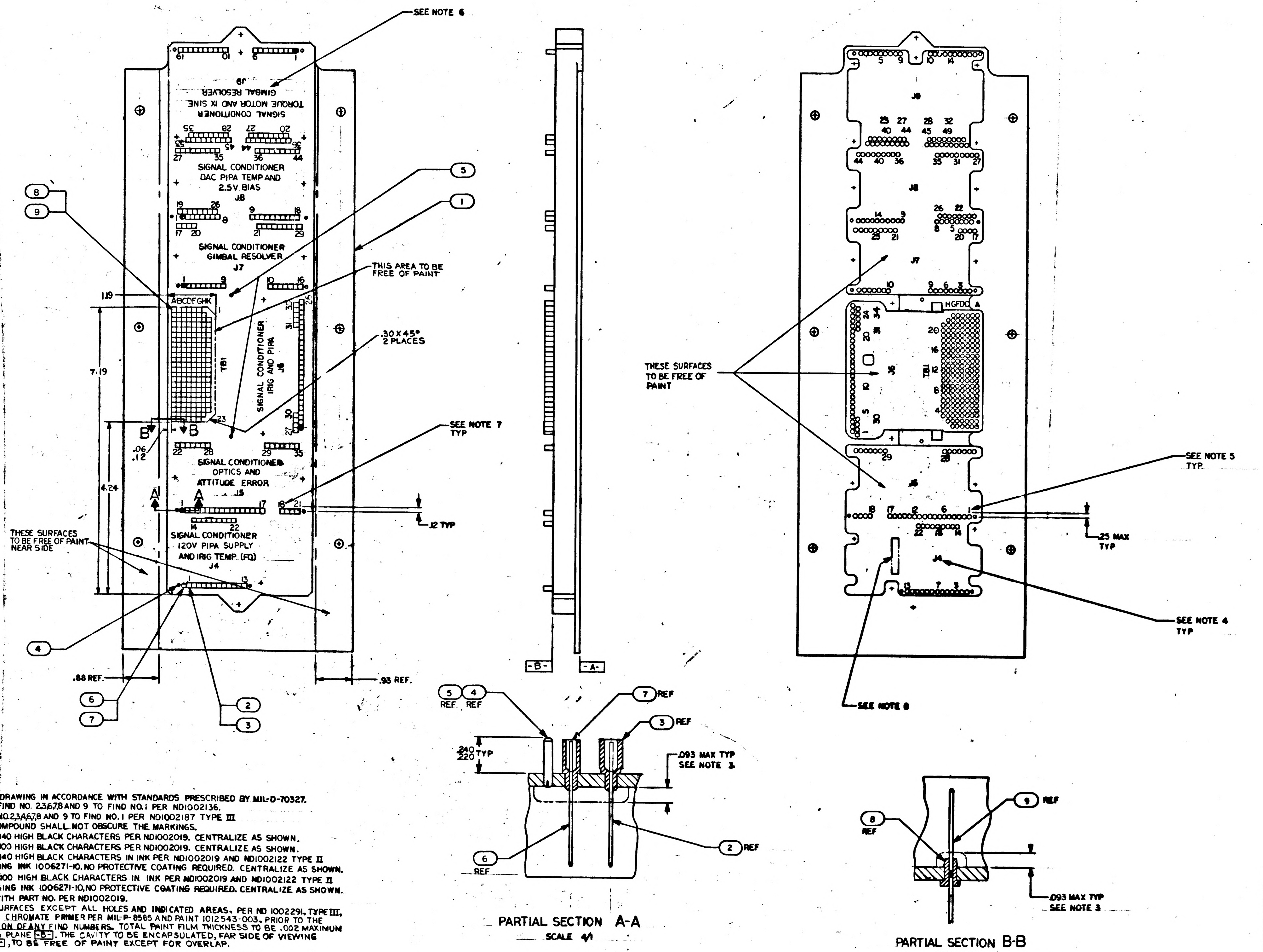
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230 SIZE E DRAWING NO. 2007269
SCALE 1/1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29122

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 29954.	JAC		13 JULY 66	
B		REVISED PER TDRR 30903.	N. W.	RLW	13 SEP 66	
C		REVISED PER TDRR 31057	JJB	RLW	21 SEP 66	
D		REVISED PER TDRR 31064	EC	JI	29 SEP 66	
E		REVISED PER TDRR 32279	HV	RLW	12 DEC 66	
F		REVISED PER TDRR 32404	EC	EB	9 JAN 67	
G		REVISED PER TDRR 32417	EC	EB	9 JAN 67	


SEE NOTE 6
SIGNAL CONDITIONER
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER
J9
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
THIS AREA TO BE
FREE OF PAINT
ABCDFGHK
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
.30 X 45°
2 PLACES
SEE NOTE 7
TYP
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
.12 TYP
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP. (FQ)
J4
THESE SURFACES
TO BE FREE OF PAINT
NEAR SIDE
1.19
7.19
4.24
.06
.12
B
A
.88 REF.
.93 REF.
-B-
-A-
THESE SURFACES
TO BE FREE OF
PAINT
HGFDC A
SEE NOTE 5
TYP
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8
REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
PARTIAL SECTION A-A
SCALE 4/1
PARTIAL SECTION B-B
SCALE 4/1
1
2
3
4
5
6
7
8
9

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. PAINT ALL SURFACES EXCEPT ALL HOLES AND INDICATED AREAS, PER ND 1002291, TYPE III, USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003, PRIOR TO THE INSTALLATION OF ANY FIND NUMBERS. TOTAL PAINT FILM THICKNESS TO BE .002 MAXIMUM IN VIEWING PLANE -B-. THE CAVITY TO BE ENCAPSULATED, FAR SIDE OF VIEWING PLANE -B-, TO BE FREE OF PAINT EXCEPT FOR OVERLAP.
10. SEAL FIND NOS. 3 AND 7 TO FIND NO. 1 PER ND1002004, TYPE I IN PLANE -B-. SEALING COMPOUND TO EXTEND .020 INCH MAX. BEYOND EDGE OF FIND NOS. 3 AND 7 ON SURFACE OF FIND NO. 1, AND EXTEND UP THE SIDE OF FIND NOS. 3 AND 7 $\frac{.050}{.070}$ INCHES. SEALANT TO BE APPLIED TO PERIPHERY OF EACH GROUP OF FIND NO. 3 AT THE INTERFACE WITH FIND NO. 1 EXCEPT ON TB1. ROOM TEMPERATURE CURE PERMITTED PROVIDING SEALING COMPOUND IS NOT DISTURBED FOR A MINIMUM OF 8 HOURS.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-005	TERMINAL WRAPOST	9
178	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	1
011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.02 ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E. Miller 20 APR 66
CHECKED L. [illegible]
APPROVED V. A. [illegible]
APPROVED [illegible] 28 [illegible] 66
APPROVED MIT [illegible] 5-24-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

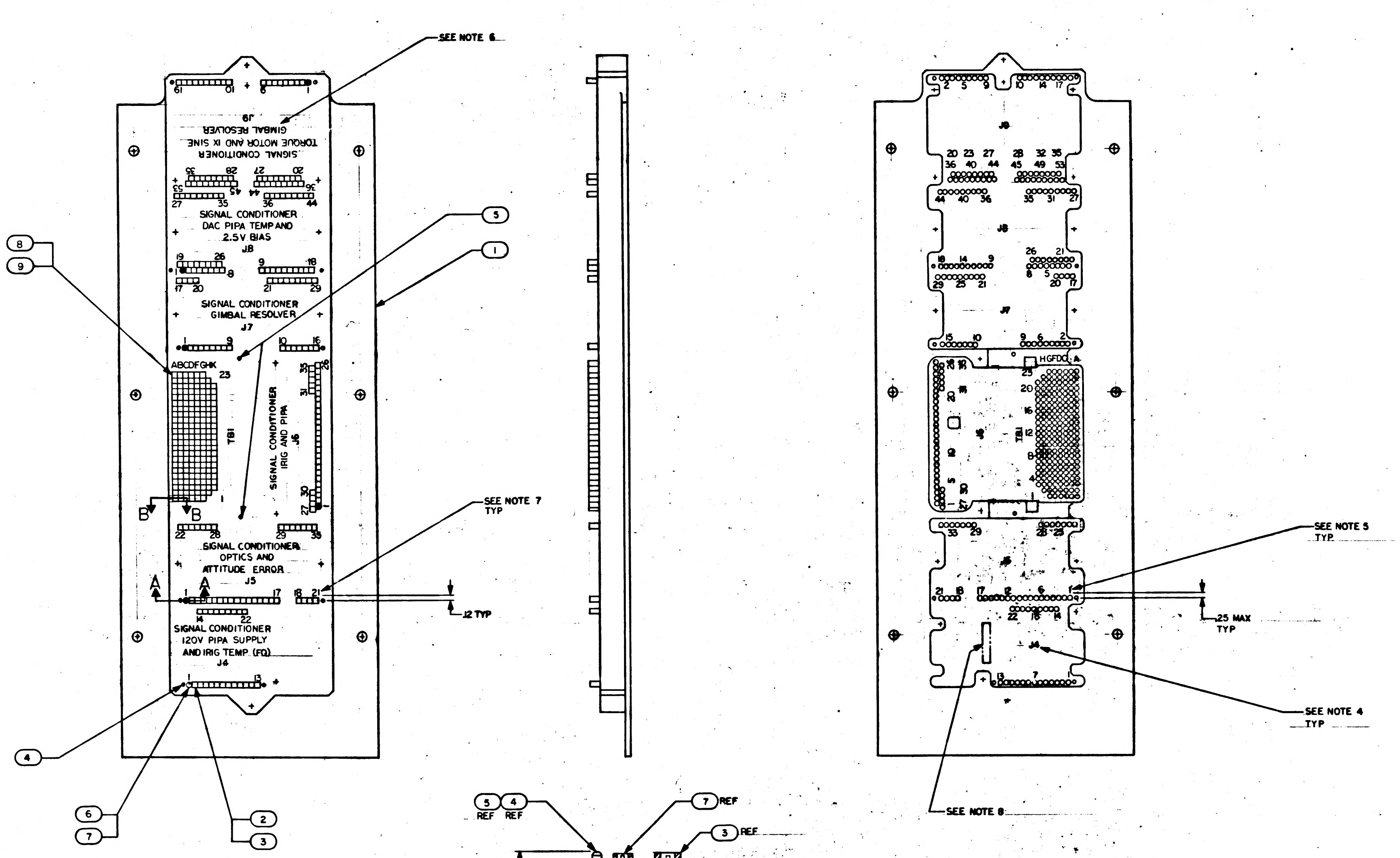
HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

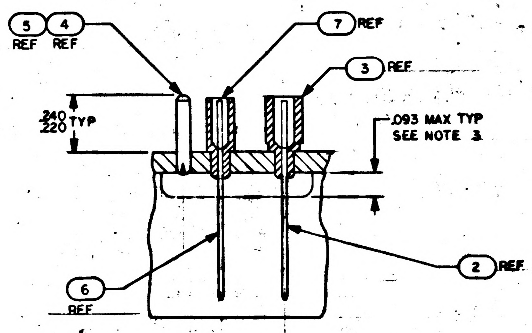
CODE IDENT NO. 80230 SIZE E DRAWING NO. 2007269
SCALE 1/1 SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

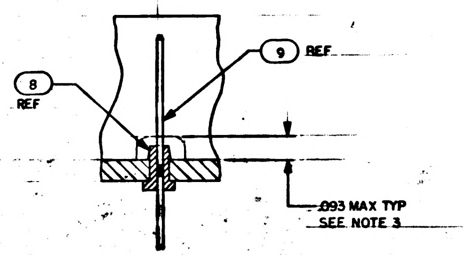
REVISIONS L9.22

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


SEE NOTE 6
SIGNAL CONDITIONER
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER
J9
SIGNAL CONDITIONER
DAC PIPA TEMP AND
2.5V BIAS
J8
SIGNAL CONDITIONER
GIMBAL RESOLVER
J7
ABCDFGHK
TB1
SIGNAL CONDITIONER
IRIG AND PIPA
J6
B B
SIGNAL CONDITIONER
OPTICS AND
ATTITUDE ERROR
J5
A A
SIGNAL CONDITIONER
120V PIPA SUPPLY
AND IRIG TEMP (FQ)
J4
SEE NOTE 7
TYP
.12 TYP
1
2
3
4
5
6
7
8
9
HGFDCBA
SEE NOTE 5
TYP
.25 MAX
TYP
SEE NOTE 4
TYP
SEE NOTE 8


5 REF
4 REF
7 REF
3 REF
.240
.220 TYP
.093 MAX TYP
SEE NOTE 3
2 REF
6 REF

PARTIAL SECTION A-A
SCALE 4/1


8 REF
9 REF
.093 MAX TYP
SEE NOTE 3

PARTIAL SECTION B-B
SCALE 4/1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE FIND NO. 2,3,6,7,8 AND 9 TO FIND NO. 1 PER ND1002136.
3. SEAL FIND NO. 2,3,4,6,7,8 AND 9 TO FIND NO. 1 PER ND1002187 TYPE III
SEALING COMPOUND SHALL NOT OBSCURE THE MARKINGS.
4. MARK .100/.140 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
5. MARK .060/.100 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
6. MARK .100/.140 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
7. MARK .060/.100 HIGH BLACK CHARACTERS IN INK PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-10, NO PROTECTIVE COATING REQUIRED. CENTRALIZE AS SHOWN.
8. IDENTIFY WITH PART NO. PER ND1002019.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
178	1010994-004	TERMINAL WRAPOST	9
178	1010995-001	INSULATOR, BUSHING	8
6	1008819-001	SLEEVE, MINIATURE GROUNDING	7
6	1008818-008	CONTACT, WRAPOST-MINIATURE FEMALE GROUND	6
2	1010620-4	PIN, GUIDE	5
12	1010620-7	PIN, GUIDE	4
212	1006774	INSULATOR, WRAPOST-FEMALE, MINIATURE	3
212	1006781-10	CONTACT, WRAPOST-FEMALE, MINIATURE	2
1	2008436	HEADER INSEP ASSY	1
011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007271	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.02 ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN E Mellen 25 APR 66
CHECKED
APPROVED
APPROVED
APPROVED MIT 5-24-66
APPROVED MSC A. G. METZGER
DATE

HEADER SUBASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007269
SCALE 1/1
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.

3. THIS IS AN INCOMPLETE DRAWING.

REVISIONS 27828					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		11 MAR 66	

SEE NOTE 2 (1010862 through 1010995-001)

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1				LEAD SET A-A, ELECTRICAL
			3			MS16555-25	PIN, GUIDE
			210			1010862	BUSHING, SLEEVE
			50			1010958-1	PLUG, PROTECTIVE
			146			1010770-2	CONTACT, CRIMP TYPE
			85			1010770-1	CONTACT, CRIMP TYPE
			1			1010937-108	CONNECTOR, RECEPTACLE
			1			1010937-102	CONNECTOR, RECEPTACLE
			1			1010937-001	CONNECTOR, RECEPTACLE
			8			1010620-7	PIN, GUIDE
			10			1008818-002	CONTACT, WRAPOST, FEMALE
			10			1008819-001	SLEEVE, GROUND, FEMALE
			200			1006781-3	CONTACT, WRAPOST, FEMALE
			200			1006774	INSULATOR, WRAPOST, FEMALE
			10			1010994-001	TERMINAL, WRAPOST
			10			1010995-001	INSULATOR, BUSHING
			1			2008435	HEADER, INSEP ASSY

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
-011	2007234-011	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL ———
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN A. J. Fl[illegible] DATE 7 MAR 66
CHECKED B. GRIEB 8 MAR 66
APPROVAL Geo Lundin
CONTRACT NAS9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL W Kupfer

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY,
SIGNAL CONDITIONER,
C/M OPERATIONAL

SIZE C
CODE IDENT NO. 80230
2007270
SCALE —
SHEET 1 OF 1

MIL-1052D D

APOLLO G&N Specification
PS2007270 REV A
Original Issue Date: 21 June 1966
Release Authority: TDRR 29724
Class A Release
CODE IDENT. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

HEADER ASSEMBLY OPERATIONAL SIGNAL CONDITIONER (C/M)

DRAWING NO. 2007270

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
8/11/66	A	30308	4, 5 [illegible]	EA	--

This specification consists of page 1 to 6 inclusive.

APPROVALS	C. METZGER NASA/MSC		6-2-66 MIT/IL		D. Jensen 14 JUNE 66 ACSP

4.3.2 Continuity and DC Resistance. Continuity and dc resistance shall be measured using a low voltage resistance measuring device in accordance with Method 303 of MIL-STD-202. Measurements shall be made from each individual pin to all other pins electrically connected, but duplicate tests of pins previously tested need not be made. All readings for pins electrically connected per Drawings 2014781 and 2014803 shall be less than 0.5 ohm. Any readings greater than 0.5 ohm for pins electrically connected as per Drawings 2014781 and 2014803 shall be recorded and shall be cause for rejection.

4.3.3 Grounding Pin Resistance. With a dc current of 3.0±2.5 amperes passed through the frame and the pin being tested, and the dc voltage measured across the pin and the frame as shown in Figure 1, the dc resistance between each individual pin listed in Table I and the frame shall be calculated and recorded. The resistance shall be calculated using the equation specified in 6.1 and the value shall be as specified in 3.1.2. To ensure good electrical connections, when measuring the voltage and current, the protective finish of the frame may be penetrated.

4.3.4 Insulation Resistance. The insulation resistance between each electrically connected network and all other networks shall be as specified in 3.1.3 when measured in accordance with Method 302 of MIL-STD-202. The megohmmeter used shall have an output voltage of 500±100 vdc limited to a short circuit current of 2.0 milliamperes or less. Any reading of less than 100 megohms shall be recorded and shall be cause for rejection. Spare pins shall be included as individual networks.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES

6.1 GROUND PIN RESISTANCE EQUATION. Grounding pin resistance shall be calculated using the following equation:

$$R = \frac{E}{I} \text{ milliohms}$$

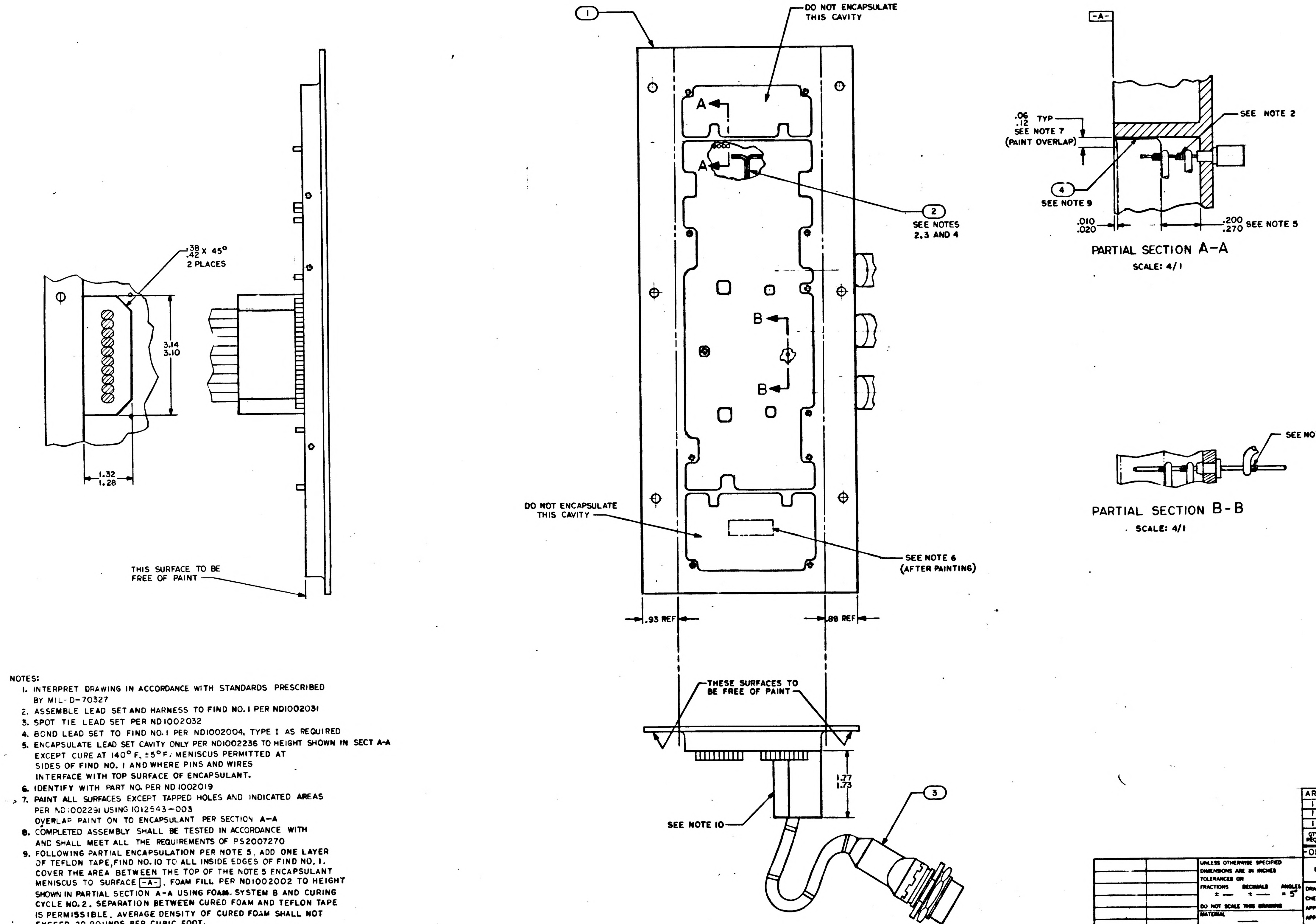
where: E is the millivoltmeter indication
I is the ammeter indication

ETP:lv

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29353		



.38
.42 X 45°
2 PLACES
3.14
3.10
1.32
1.28
THIS SURFACE TO BE FREE OF PAINT
1
DO NOT ENCAPSULATE THIS CAVITY
A
A
2
SEE NOTES 2,3 AND 4
B
B
DO NOT ENCAPSULATE THIS CAVITY
SEE NOTE 6 (AFTER PAINTING)
.93 REF
.88 REF
THESE SURFACES TO BE FREE OF PAINT
1.77
1.73
SEE NOTE 10
3
-A-
.06
.12 TYP
SEE NOTE 7 (PAINT OVERLAP)
SEE NOTE 2
4
SEE NOTE 9
.010
.020
.200
.270 SEE NOTE 5
SEE NOTE 2 AND 11

PARTIAL SECTION A-A

SCALE: 4/1

PARTIAL SECTION B-B

SCALE: 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET AND HARNESS TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND1002032
4. BOND LEAD SET TO FIND NO. 1 PER ND1002004, TYPE I AS REQUIRED
5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F, ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019
7. PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543—003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A—A
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
9. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 10 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
10. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN
11. SOLDER WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071

QTY RECD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Edw. Gross DATE 6 May 66
CHECKED 27 May 66
APPROVAL 31 MAY 66
APPROVAL 2 June 66
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

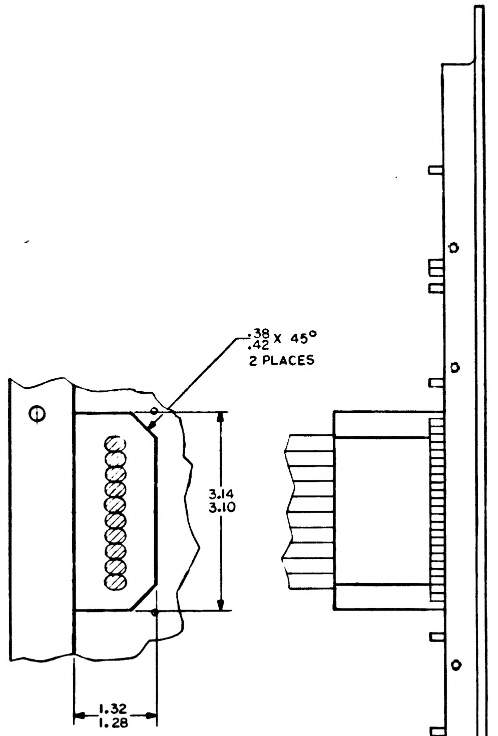
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

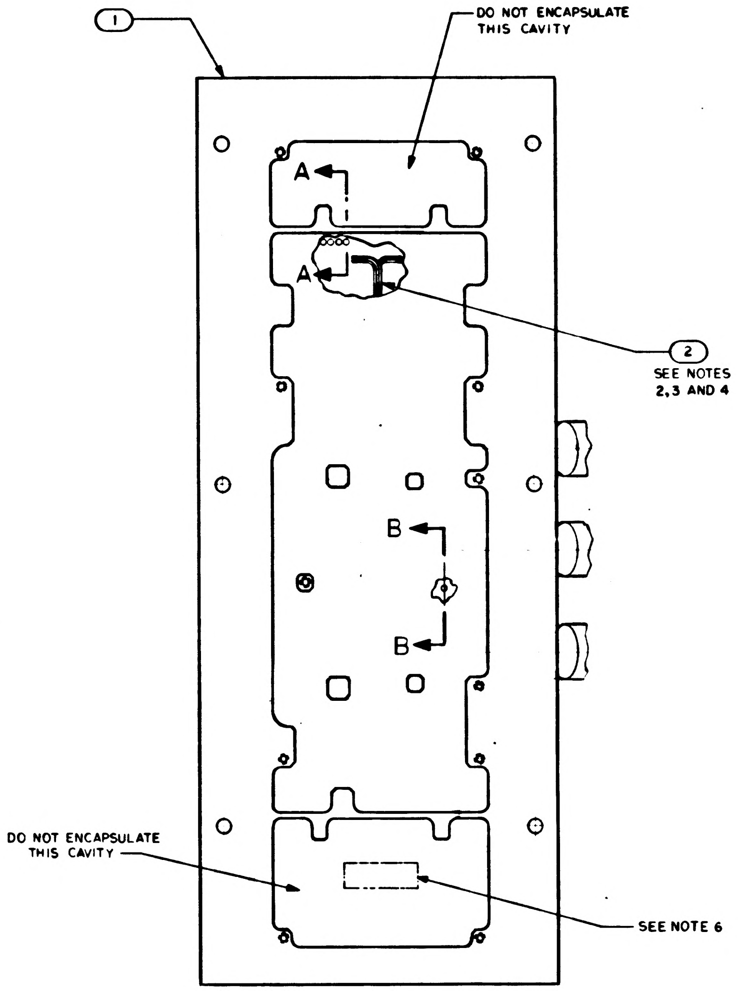
CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2007270
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

2007270 B

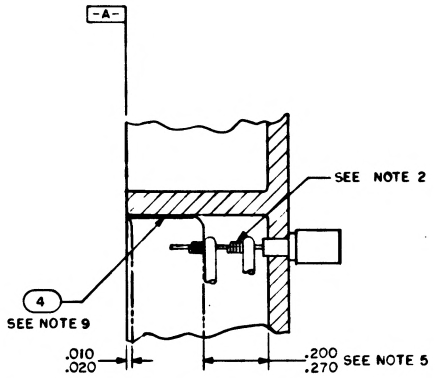
[illegible]

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29353		
C	REVISED PER TDRR 31081	20 SEP 66	JGS NS



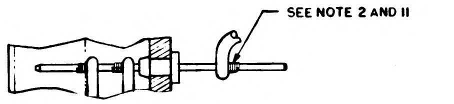


1
DO NOT ENCAPSULATE THIS CAVITY
A
A
2
SEE NOTES 2,3 AND 4
B
B
DO NOT ENCAPSULATE THIS CAVITY
SEE NOTE 6



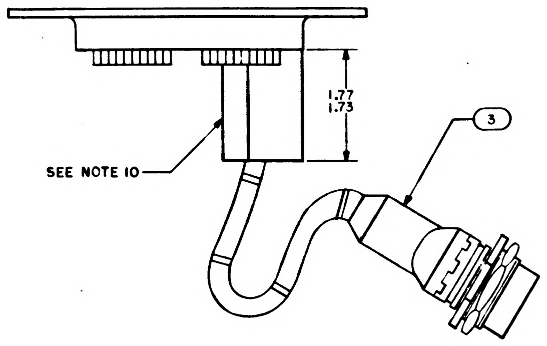
PARTIAL SECTION A–A

SCALE: 4/1



PARTIAL SECTION B-B

SCALE: 4/1



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET AND HARNESS TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND1002032
4. BOND LEAD SET TO FIND NO. 1 PER ND1002004, TYPE I AS REQUIRED
5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F. ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002221 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
9. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5. ADD ONE LAYER OF TEFLON TAPE, FIND NO. 10 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE $\boxed{-A-}$. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
10. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN
11. SOLDER WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	2007234
USED ON	
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Edw. Gross DATE 6 MAY 66
CHECKED L. Hood 27 May 66
APPROVAL D A Koppenne 31 MAY 66
APPROVAL 2 June 66
NASA APPROVAL ~~B.C. [illegible]~~
MIT APPROVAL McMurdy 6 3 66

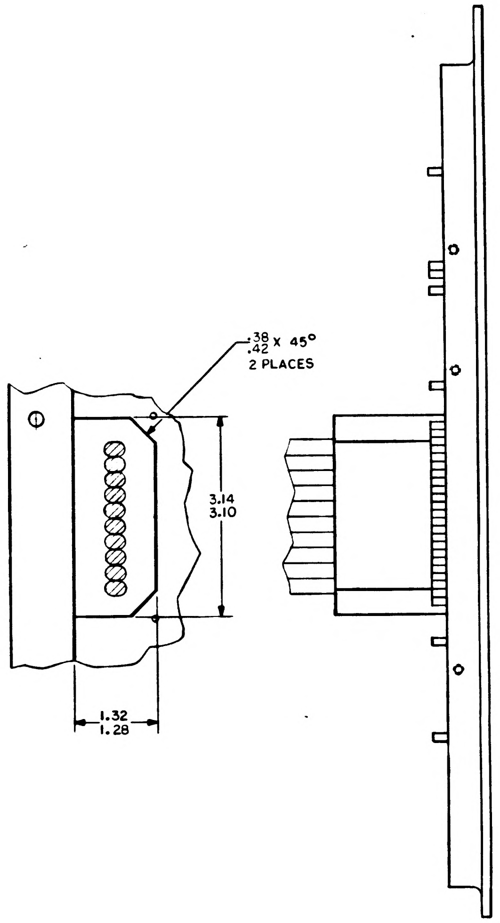
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

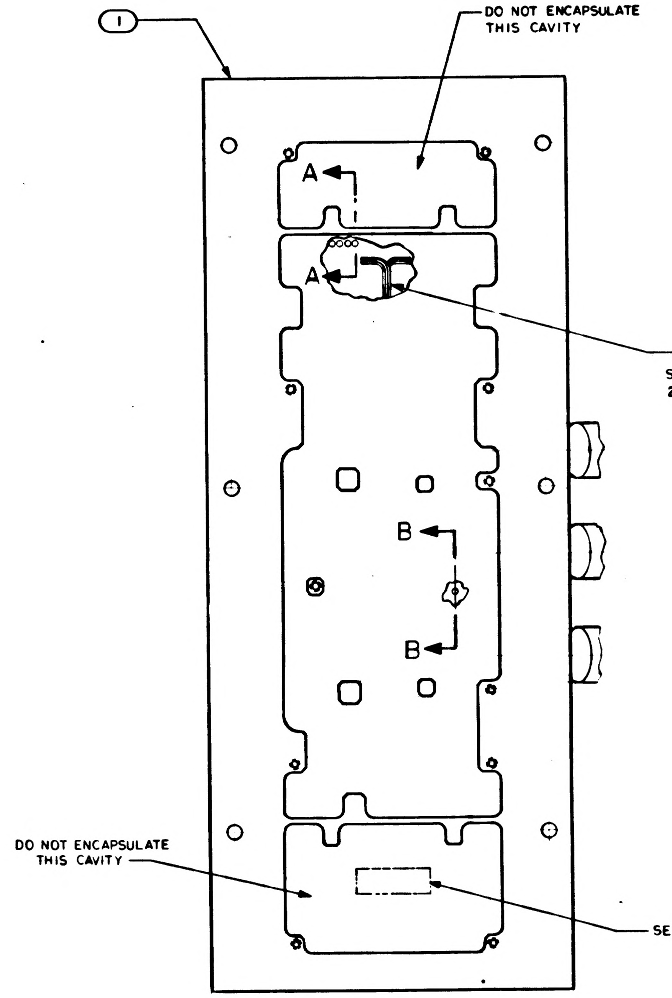
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

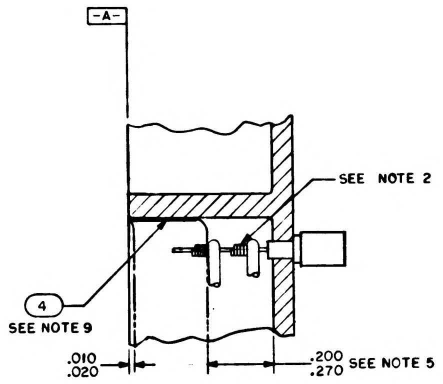
CODE IDENT NO 80230 | SIZE E | NASA DRAWING NO 2007270
SCALE 1/1 & NOTED | WT | SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29353		
C	REVISED PER TDRR 31081	20 SEP 66	JSD NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB SC

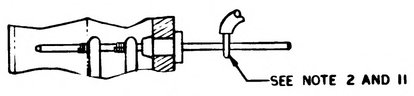






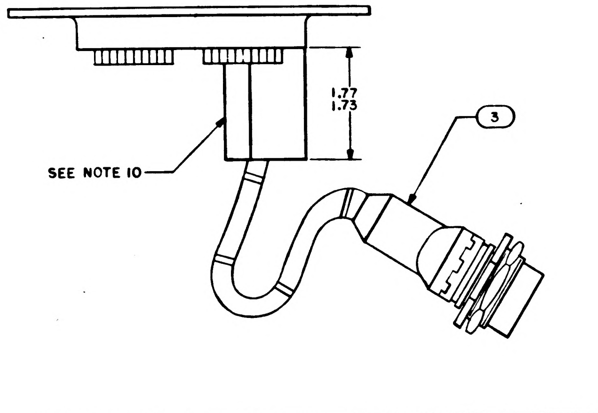
PARTIAL SECTION A–A

SCALE: 4/1



PARTIAL SECTION B-B

SCALE: 4/1



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET ~~AND HARNESS~~ TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND1002032
4. BOND LEAD SET TO FIND NO. 1 PER ND1002004, TYPE I AS REQUIRED
5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F, ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
9. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5. ADD ONE LAYER OF TEFLON TAPE, FIND NO. 10 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE $\boxed{-A-}$. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
10. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN
11. SOLDER WIRE ~~WRAPPED~~ TERMINATIONS OF HARNESS PER ND1002071

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
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1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

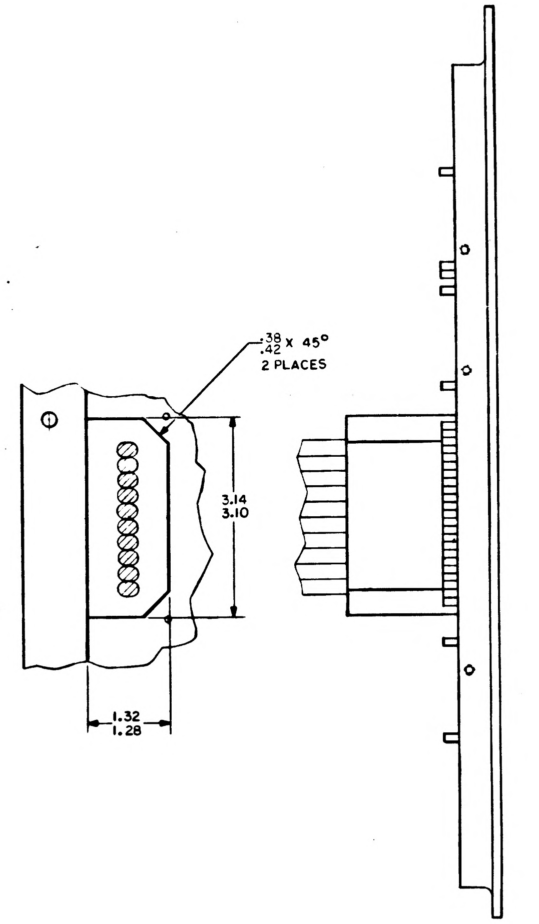
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Edw. Moss DATE 6MAY66
CHECKED L. Hood 27May66
APPROVAL D. W. Koppens 31MAY66
APPROVAL 2 June 66
NASA APPROVAL ~~B.C. MITTED~~
MIT APPROVAL 6-3-66

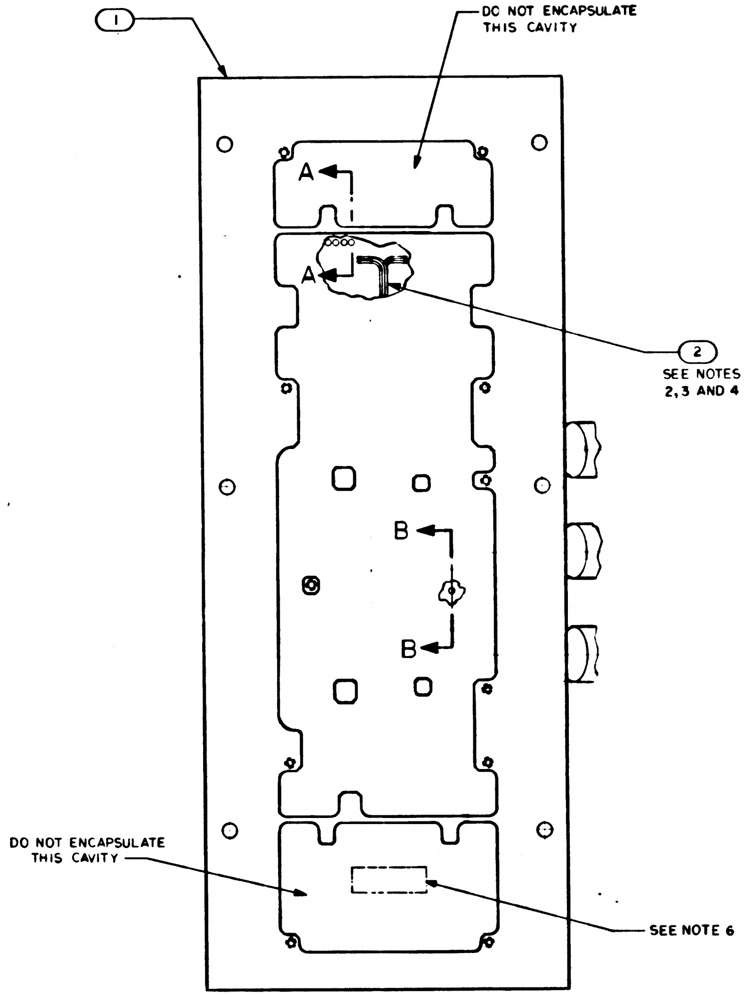
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

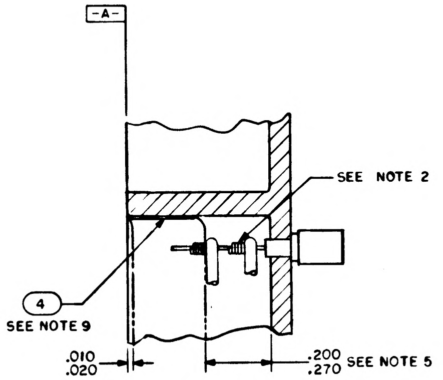
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230 SIZE E NASA DRAWING NO 2007270
SCALE 1/1 & NOTED WT SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29353		
C	REVISED PER TDRR 31081	20 SEP 66	SD NS
D	REVISED PER TDRR 3[illegible]97	25 OCT 66	JJB SC
E	REVISED PER TDRR [illegible]	[illegible] NOV 66	TD SC

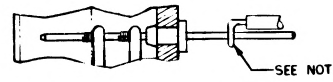



1
DO NOT ENCAPSULATE THIS CAVITY
A
A
2
SEE NOTES 2,3 AND 4
B
B
DO NOT ENCAPSULATE THIS CAVITY
SEE NOTE 6



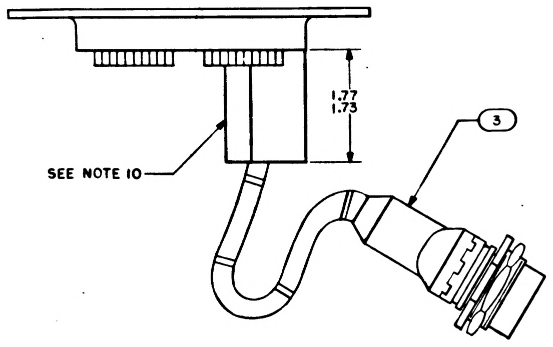
PARTIAL SECTION A-A

SCALE: 4/1



PARTIAL SECTION B-B

SCALE: 4/1



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET ~~AND HARNESS~~ TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND1002032
4. BOND LEAD SET TO FIND NO. 1 PER ND1002004, TYPE I AS REQUIRED
5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F, ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
9. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 10 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
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11. SOLDER WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071.

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Edw. Gross DATE 6 MAY 66
CHECKED L. Hood 27 MAY 66
APPROVAL D. G. Koppins 31 MAY 66
APPROVAL [illegible] 2 June 66
NASA APPROVAL ~~R. C. [illegible]~~
MIT APPROVAL McAlevey 6 3 66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2007270
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

OTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA
USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY
ATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOV-
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NISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS
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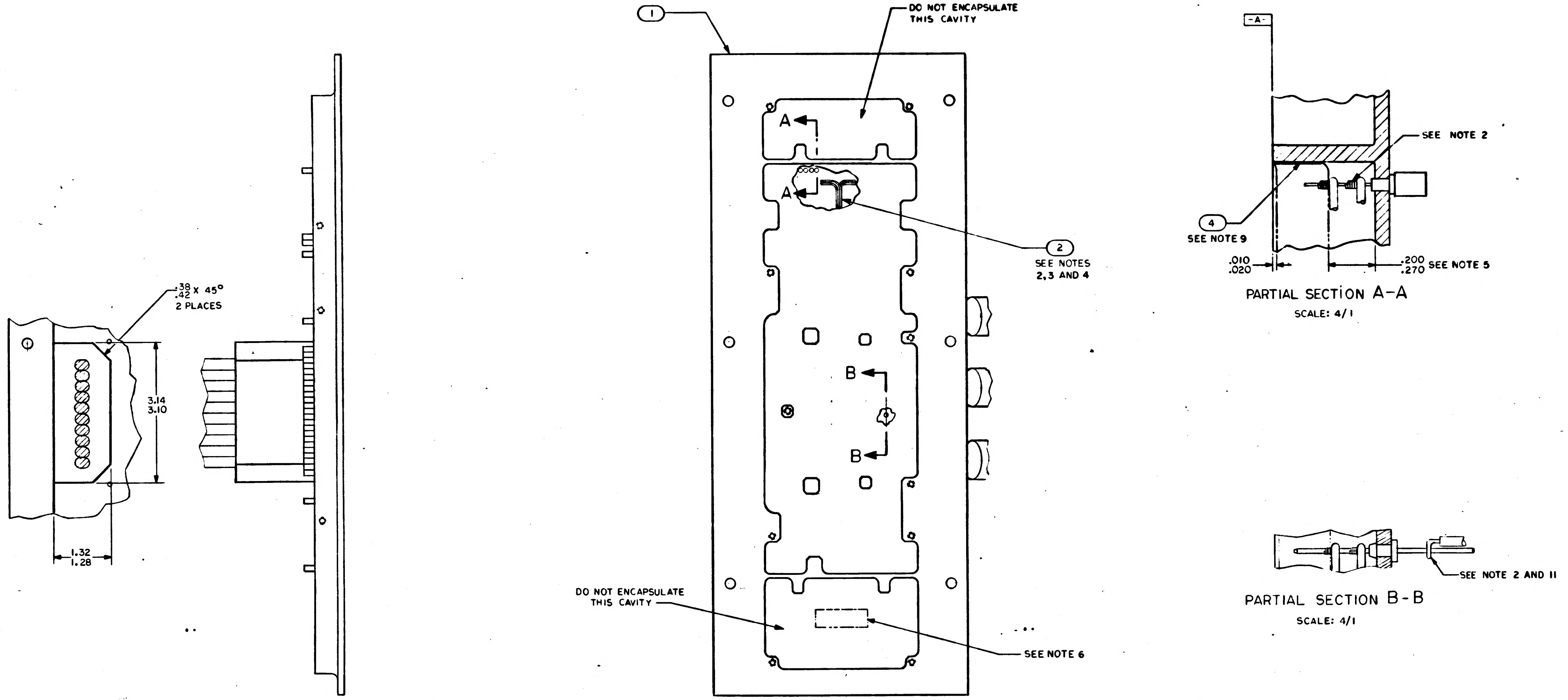
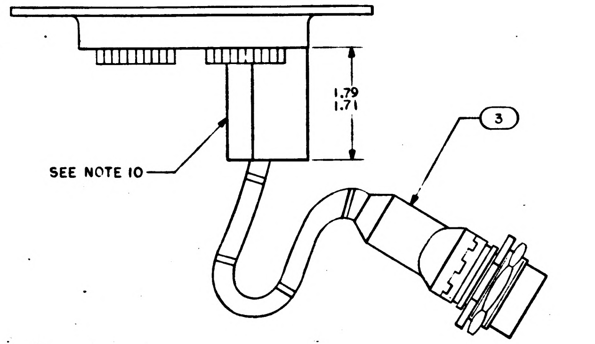
PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29353		
C	REVISED PER TDRR 31081	20 SEP 66	JSD NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB SC
E	REVISED PER TDRR 31806	7 NOV 66	T.O. SC
F	REVISED PER TDRR 32068	2 NOV 66	WA EB





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET ~~AND HARNESS~~ TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND1002032
4. BOND LEAD SET TO FIND NO. 1 PER ND1002004, TYPE I AS REQUIRED
5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F, ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002012
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING KH2543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
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11. SOLDER WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007234	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Edw. Gross DATE 6 MAY 66
CHECKED 27 May 66
APPROVAL 31 MAY 66
APPROVAL 2 June 66
NASA APPROVAL
MIT APPROVAL 6 3 66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2007270
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

2007270 F

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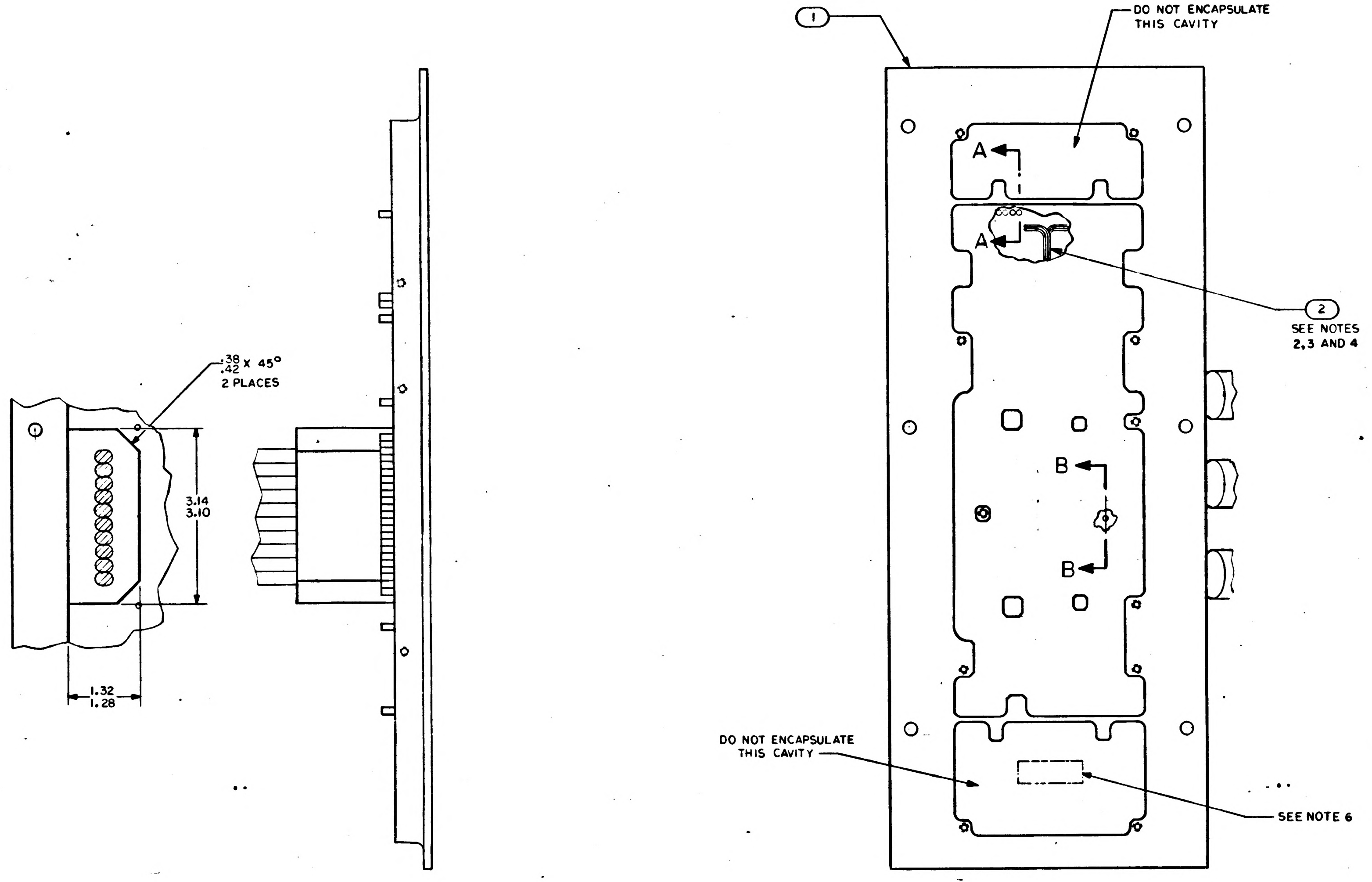
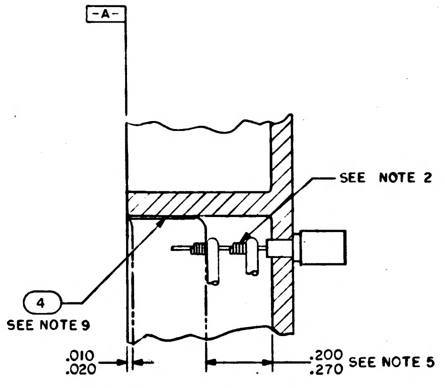
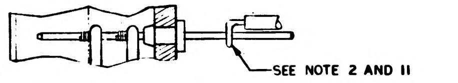
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29358		
C	REVISED PER TDRR 31081	30 SEP 66	JSD NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB SC
E	REVISED PER TDRR 31806	7 NOV 66	TQ SC
F	REVISED PER TDRR 32068	2 NOV 66	WA E.D.





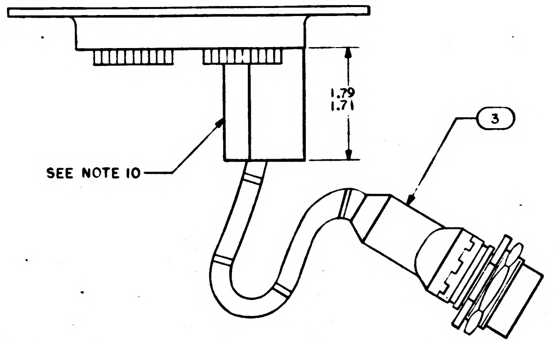
PARTIAL SECTION A-A

SCALE: 4/1



PARTIAL SECTION B-B

SCALE: 4/1



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6. IDENTIFY WITH PART NO. PER ND1002012

~~7. PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~

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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007234	
APPLICATION	

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HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Edw. Gross DATE 6 MAY 66
CHECKED L. Hood 27 May 66
APPROVAL D. G. Jones 31 MAY 66
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2007270

SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

2007270 F

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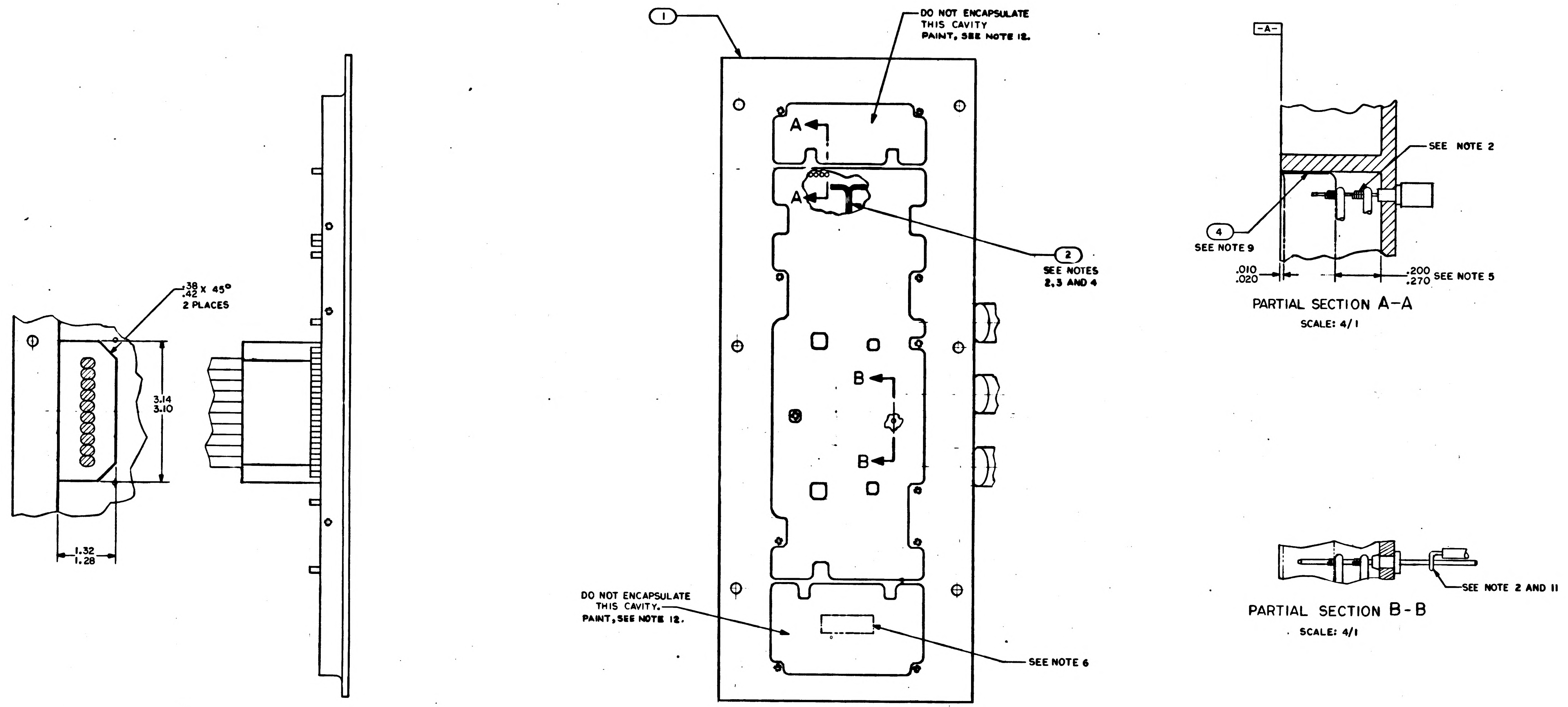
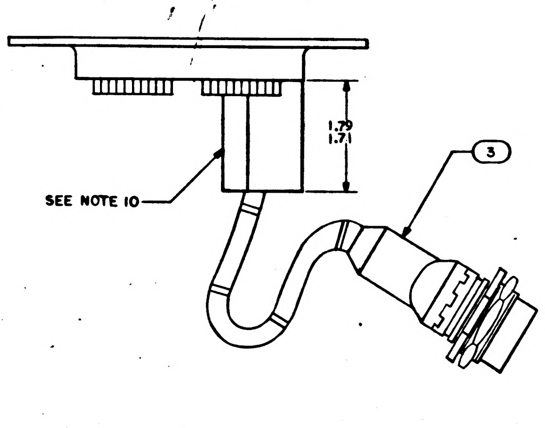
B	REPLACES WORD DWG REV A PER TDRR 29358		
C	REVISED PER TDRR 31081	30 SEP 66	JSD / NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB / SC
E	REVISED PER TDRR 31863	7 NOV 66	T.O. / SC
F	REVISED PER TDRR 32068	2 NOV 66	WA
G	REVISED PER TDRR 32275	12 DEC 66	ME



PARTIAL SECTION A-A
SCALE: 4/1

PARTIAL SECTION B-B
SCALE: 4/1



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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007234	
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DRAWN Edw. Moss DATE 6 MAY 66
CHECKED L. Hagel 27 May 66
APPROVAL D. A. Koppina 31 May 66
APPROVAL 2 June 66
NASA APPROVAL
MIT APPROVAL M. Mundy 6-3-66

MANNED SPACECRAFT CENTER
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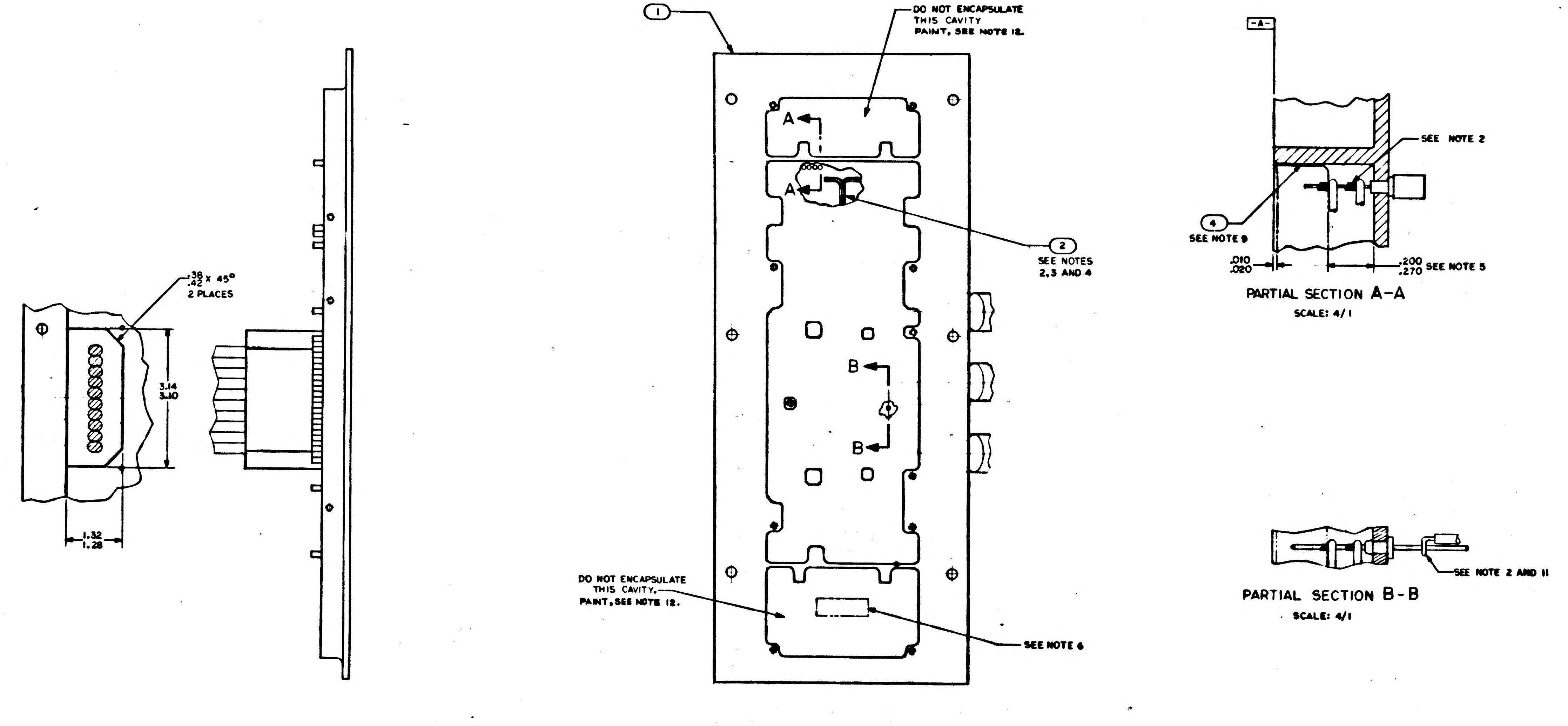
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2007270
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

REV	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 22355		
C	REVISED PER TDRR 31081	66	NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB SC
E	REVISED PER TDRR 31806	7 NOV 66	TD
F	REVISED PER TDRR 32068	2 NOV 66	WA
G	REVISED PER TDRR 32275	12 DEC 66	MF
H	REVISED PER TDRR 33C-3	3 MAR 67	RM



NOTES:

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5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F, ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
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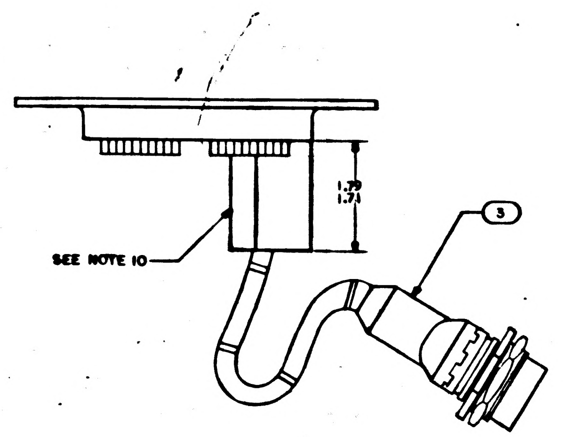

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1012555-002	LACING TAPE	5
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2014781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

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DRAWN
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APPROVAL
NASA APPROVAL
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CODE IDENT NO 80230
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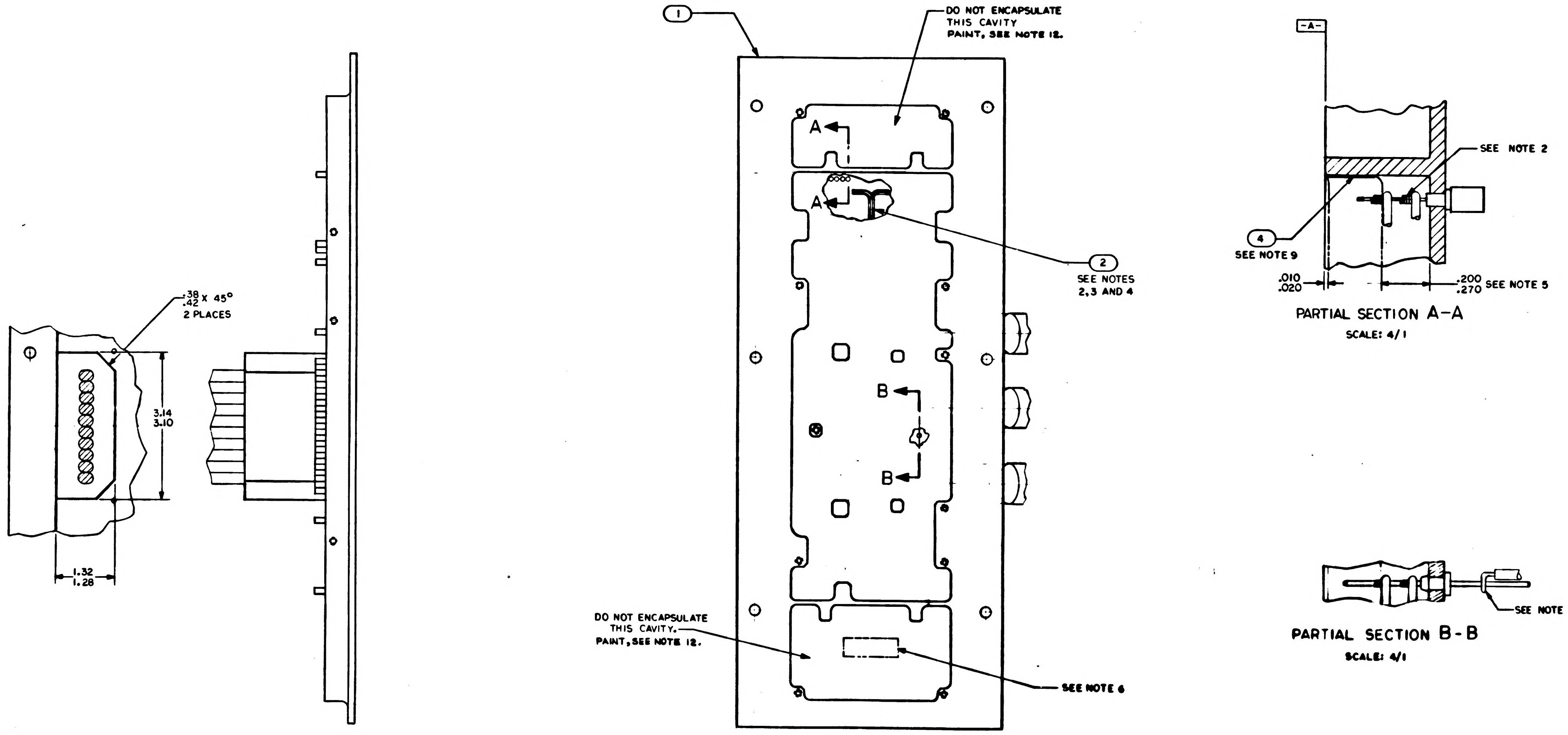
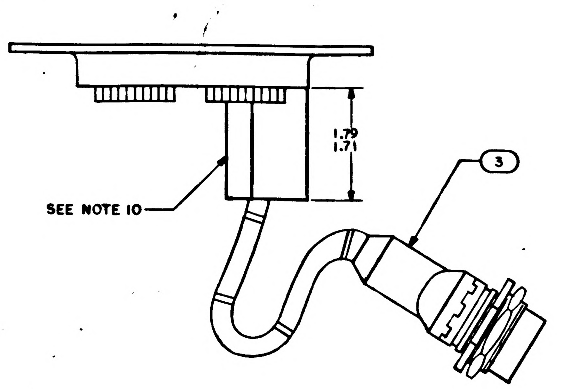
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 22353		
C	REVISED PER TDRR 31081	66	JSD NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB SC
E	REVISED PER TDRR 31806	7 NOV 66	T.O. SC
F	REVISED PER TDRR 32068	2 NOV 66	WA
G	REVISED PER TDRR 32275	12 DEC 66	
H	REVISED PER TDRR 33070	3 MAR 67	RM
J	REVISED PER TDRR 33869		ES





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11. SOLDER WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071.
12. PAINT THERMAL INTERFACE, PLANE -A- AND ALL EXPOSED SURFACES OF ENCAPSULANT PER ND1002291, TYPE I USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. CLEAN SURFACES TO BE PAINTED USING FREON, ISO-PROPYL ALCOHOL AND DISTILLED WATER. DO NOT PAINT ENCAPSULANT ON OR ADJACENT TO FIND NO. 3.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1012555-002	LACING TAPE	5
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014803	HARNESS	3
1	2C14781	LEAD SET	2
1	2007268-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007234	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Edw. [illegible] DATE
CHECKED
APPROVAL 31 May 66
APPROVAL 2 June 66
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

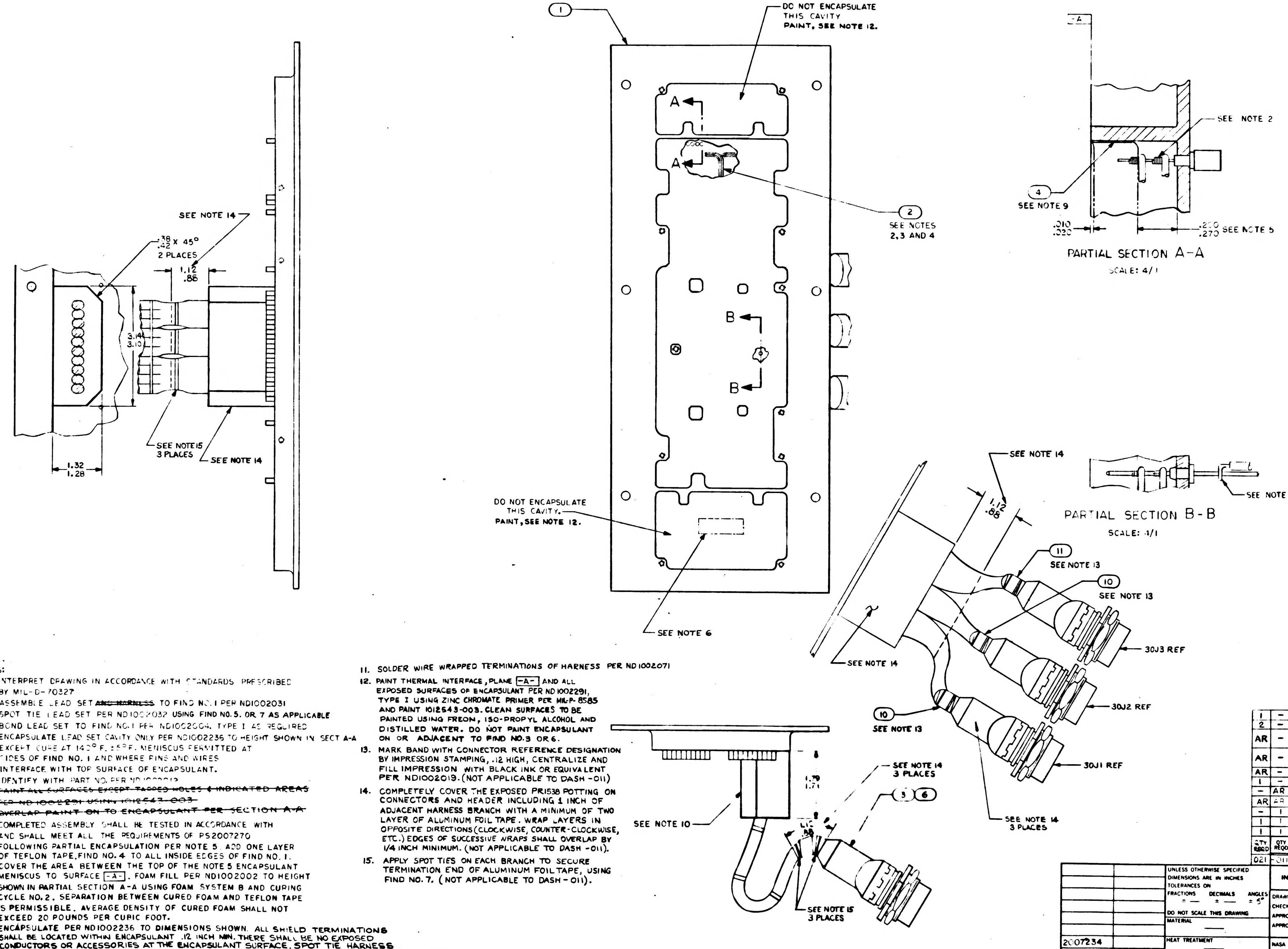
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2007270
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

2007270

NOTICE - [illegible]

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 29358		
C	REVISED PER TDRR 31081	SEPT 66	JJB NS
D	REVISED PER TDRR 31597	26 OCT 66	JJB SC
E	REVISED PER TDRR 31806	7 NOV 66	T.O. SC
F	REVISED PER TDRR 32068	2 NOV 66	WA
G	REVISED PER TDRR 32275	12 DEC 66	ME
H	REVISED PER TDRR 33070	3 MAR 67	RM
J	REVISED PER TDRR 33869	2 AUG 67	ES
K	REVISED PER TDRR 34543	21 SEPT 67	J.W.



①
DO NOT ENCAPSULATE THIS CAVITY PAINT, SEE NOTE 12.
A
A
②
SEE NOTES 2,3 AND 4
B
B
DO NOT ENCAPSULATE THIS CAVITY. PAINT, SEE NOTE 12.
SEE NOTE 6
SEE NOTE 14
.38/.42 X 45° 2 PLACES
1.12/.86
3.14/3.10
SEE NOTE 15 3 PLACES
SEE NOTE 14
1.32/1.28
-A-
SEE NOTE 2
④
SEE NOTE 9
.010/.020
.230/.270
SEE NOTE 5
PARTIAL SECTION A-A
SCALE: 4/1
SEE NOTE 2 AND 11
PARTIAL SECTION B-B
SCALE: 4/1
SEE NOTE 14
1.12/.86
⑪
SEE NOTE 13
⑩
SEE NOTE 13
30J3 REF
SEE NOTE 14
30J2 REF
⑩
SEE NOTE 13
30J1 REF
SEE NOTE 14 3 PLACES
SEE NOTE 10
1.79/1.71
SEE NOTE 14 3 PLACES
③ ⑥
SEE NOTE 15 3 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET ~~AND HARNESS~~ TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND1002032 USING FIND NO. 5. OR 7 AS APPLICABLE
4. BOND LEAD SET TO FIND NO. 1 PER ND1002004, TYPE I AS REQUIRED
5. ENCAPSULATE LEAD SET CAVITY ONLY PER ND1002236 TO HEIGHT SHOWN IN SECT A-A EXCEPT CURE AT 140° F. ±5° F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND[illegible]
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
9. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5. ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
10. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN. ALL SHIELD TERMINATIONS SHALL BE LOCATED WITHIN ENCAPSULANT .12 INCH MIN. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE ENCAPSULANT SURFACE. SPOT TIE HARNESS USING FIND No.5 OR 7 AS APPLICABLE PER ND1002032, AS NECESSARY, WITHIN THE ENCAPSULANT AREA MINISCUS PERMITTED ALONG WIRES OF FIND NO.3 OR 6
11. SOLDER WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071
12. PAINT THERMAL INTERFACE, PLANE -A- AND ALL EXPOSED SURFACES OF ENCAPSULANT PER ND1002291, TYPE I USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. CLEAN SURFACES TO BE PAINTED USING FREON, ISO-PROPYL ALCOHOL AND DISTILLED WATER. DO NOT PAINT ENCAPSULANT ON OR ADJACENT TO FIND NO.3 OR 6.
13. MARK BAND WITH CONNECTOR REFERENCE DESIGNATION BY IMPRESSION STAMPING, .12 HIGH, CENTRALIZE AND FILL IMPRESSION WITH BLACK INK OR EQUIVALENT PER ND1002019. (NOT APPLICABLE TO DASH -011)
14. COMPLETELY COVER THE EXPOSED PR1538 POTTING ON CONNECTORS AND HEADER INCLUDING 1 INCH OF ADJACENT HARNESS BRANCH WITH A MINIMUM OF TWO LAYER OF ALUMINUM FOIL TAPE. WRAP LAYERS IN OPPOSITE DIRECTIONS (CLOCKWISE, COUNTER-CLOCKWISE, ETC.) EDGES OF SUCCESSIVE WRAPS SHALL OVERLAP BY 1/4 INCH MINIMUM. (NOT APPLICABLE TO DASH -011).
15. APPLY SPOT TIES ON EACH BRANCH TO SECURE TERMINATION END OF ALUMINUM FOIL TAPE, USING FIND NO. 7. (NOT APPLICABLE TO DASH - 011).

1	-	1008940-002	BAND, MARKER	11
2	-	1008940-001	BAND, MARKER	10
AR	-	1008937-007	TAPE, PRESSURE SENSITIVE ADHESIVE ALUM. FOIL BACKED	9
AR	-	1008937-003	TAPE, PRESSURE SENSITIVE ADHESIVE ALUM. FOIL BACKED	8
AR	-	1008936-001	LACING TAPE	7
1	-	2021291	WIRING HARNESS "A"	6
-	AR	1012555-002	LACING TAPE	5
AR	AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
-	1	2014803	HARNESS	3
1	1	2014781	LEAD SET	2
1	1	2007268-011	HEADER SUBASSEMBLY	1
QTY REQD	QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
021	-011	LIST OF MATERIALS		

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

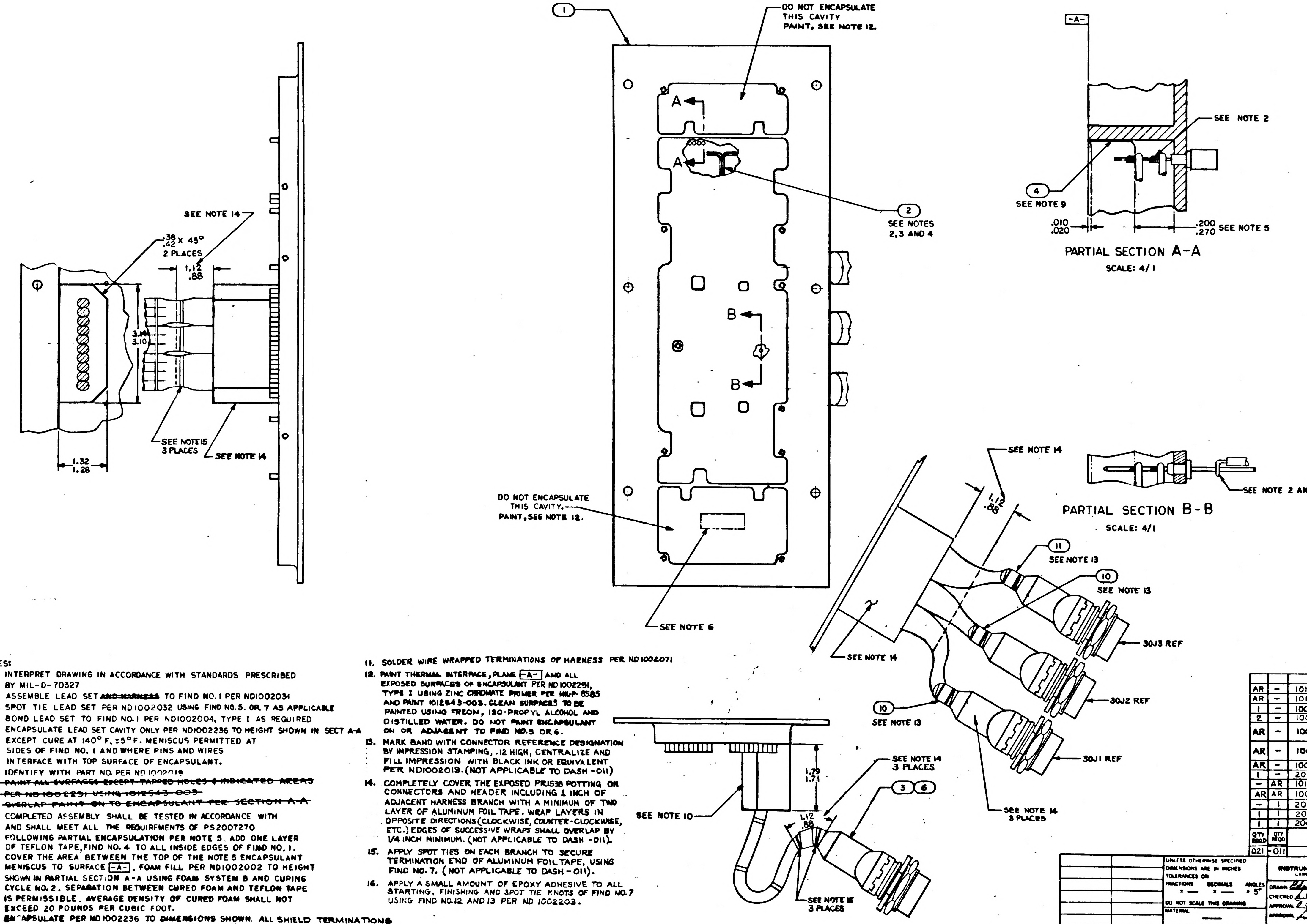
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Edw. [illegible] DATE [illegible]
CHECKED [illegible] 27 May [illegible]
APPROVAL [illegible] 31 May [illegible]
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO. 2007270
SCALE 1/1 & NOTED
WT
SHEET 1 OF 1

LTR	DESCRIPTION	DATE	APPROVAL
B	REPLACES WORD DWG REV A PER TDRR 22355		
C	REVISED PER TDRR 31081	SEP 66	JSD NS
D	REVISED PER TDRR 31597	25 OCT 66	JJB SC
E	REVISED PER TDRR 31800	7 NOV 66	T.O. SC
F	REVISED PER TDRR 32068	2 NOV 66	WA
G	REVISED PER TDRR 32275	12 DEC 66	MF
H	REVISED PER TDRR 33070	3 MAR 67	RR
J	REVISED PER TDRR 33869	2 AUG 67	ES
K	REVISED PER TDRR 34543	2 SEP 67	J.D.
L	REVISED PER TDRR 34683	3 SEP 67	JD



1
DO NOT ENCAPSULATE THIS CAVITY PAINT, SEE NOTE 12.
A
A
B
B
2
SEE NOTES 2,3 AND 4
DO NOT ENCAPSULATE THIS CAVITY. PAINT, SEE NOTE 12.
SEE NOTE 6
SEE NOTE 14
.38/.42 X 45° 2 PLACES
1.12/.88
3.14/3.10
SEE NOTE 15 3 PLACES
SEE NOTE 14
1.32/1.28
-A-
SEE NOTE 2
4
SEE NOTE 9
.010/.020
.200/.270 SEE NOTE 5
PARTIAL SECTION A-A
SCALE: 4/1
SEE NOTE 2 AND 11
PARTIAL SECTION B-B
SCALE: 4/1
SEE NOTE 14
1.12/.88
11
SEE NOTE 13
10
SEE NOTE 13
30J3 REF
30J2 REF
30J1 REF
10
SEE NOTE 13
SEE NOTE 14
SEE NOTE 14 3 PLACES
SEE NOTE 14 3 PLACES
3
6
1.79/1.71
1.12/.88
SEE NOTE 10
SEE NOTE 15 3 PLACES

NOTES:

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6. IDENTIFY WITH PART NO. PER ND1002019
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES & INDICATED AREAS PER ND1002291 USING 1012543-003 OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007270
9. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
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15. APPLY SPOT TIES ON EACH BRANCH TO SECURE TERMINATION END OF ALUMINUM FOIL TAPE, USING FIND NO. 7. (NOT APPLICABLE TO DASH -011).
16. APPLY A SMALL AMOUNT OF EPOXY ADHESIVE TO ALL STARTING, FINISHING AND SPOT TIE KNOTS OF FIND NO. 7 USING FIND NO. 12 AND 13 PER ND 1002203.

QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	–	1010750	CURING AGENT POLYAMIDE	13
AR	–	1010748	RESIN EPOXY	12
1	–	1008940-002	BAND, MARKER	11
2	–	1008940-001	BAND, MARKER	10
AR	–	1008937-007	TAPE, PRESSURE SENSITIVE ADHESIVE ALUM. FOIL BACKED	9
AR	–	1008937-003	TAPE, PRESSURE SENSITIVE ADHESIVE ALUM. FOIL BACKED	8
AR	–	1008936-001	LACING TAPE	7
1	–	2021291	WIRING HARNESS "A"	6
–	AR	1012555-002	LACING TAPE	5
AR	AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
–	1	2014803	HARNESS	3
1	1	2014781	LEAD SET	2
1	1	2007268-011	HEADER SUBASSEMBLY	1
021	-011	LIST OF MATERIALS		

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Edw. Gross DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO 80230 SIZE E NASA DRAWING NO 2007270
SCALE 1/1 AS NOTED WT SHEET 1 OF 1

APOLLO G&N Specification
PS2007270 REV —
Original Issue Date: 21 June 1966
Release Authority: TDRR 29724
Class A Release
CODE IDENT. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

HEADER ASSEMBLY OPERATIONAL SIGNAL CONDITIONER (C/M)

DRAWING NO. 2007270

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 6 inclusive.

APPROVALS	A. C. METZGER NASA/MSC		M G Murley 6-21-66 MIT/IL	16 June	D. Jensen 14 JUNE 66
					ACSP E.T.P D. Van Zeeland

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the Header Assembly Operational Signal Conditioner, hereafter called the assembly, Part Number 2007270-011.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND1002214	General Specification for Preservation, Packaging, Packing and Container Marking of APOLLO Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

DRAWINGS

APOLLO G&N

2007270	Header Assembly Operational Signal Conditioner
2014781	Lead Set AA, Electrical - C/M Operational
2014803	Wiring Harness A - C/M Operational

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 **Continuity and DC Resistance.** Continuity shall be as specified on Drawings 2014781 and 2014803. All pins electrically connected shall exhibit dc resistance of 0.5 ohms or less.

3.1.2 **Grounding Pin Resistance.** Each pin listed in Table I shall exhibit a dc resistance of 15 milliohms or less to the frame.

TABLE I

GROUNDING PINS

PINS
J4-1
J5-1
J6-1
J7-1

3.1.3 **Insulation Resistance.** The resistance between each network and all other networks shall be greater than or equal to 100 megohms.

3.2 PRODUCT CONFIGURATION

3.2.1 **Drawings.** The configuration of the assembly shall be in accordance with Drawing 2007270 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 PRODUCT PERFORMANCE AND CONFIGURATION REQUIREMENTS/QUALITY VERIFICATION CROSS REFERENCE INDEX

Test/Examination	Requirement	Method
Continuity and DC Resistance	3.1.1	4.3.3
Grounding Pin Resistance	3.1.2	4.3.4
Insulation Resistance	3.1.3	4.3.5
Drawing Compliance	3.2.1	4.3.1

4.2 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.2.1 Test Conditions

4.2.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. **Temperature:** 25° ±10°C
b. **Relative Humidity:** 90% max
c. **Barometric Pressure:** 28 to 32 inches of Hg

4.2.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.3 TESTS

4.3.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Drawing 2007270. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 Workmanship-Vibration. For spare units only, the assembly shall be vibrated with dummy modules which simulate the respective module weight. The proper connector pins shall be wired and monitored for continuity during the vibration test. The assembly shall be mounted on the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the simulated command module X, Y, and Z axes. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/15 sec. The magnitude of vibration shall be 3.5g rms limited to a 0.3 inch pp constant displacement from 10 cps to the crossover frequency. During vibration the continuity of the assembly shall be constantly monitored per Drawings 2014781 and 2014803. Any evidence of discontinuity shall be recorded and shall be cause for rejection. The monitoring circuitry shall have a response time of 10 μsec or less for any open circuit. Workmanship-vibration testing shall be performed on all units other than spares at the higher assembly level with operational modules installed.

4.3.3 Continuity and DC Resistance. Continuity and dc resistance shall be measured using a low voltage resistance measuring device in accordance with Method 303 of MIL-STD-202. Measurements shall be made from each individual pin to all other pins electrically connected, but duplicate tests of pins previously tested need not be made. All readings for pins electrically connected per Drawings 2014781 and 2014803 shall be less than 0.5 ohm. Any readings greater than 0.5 ohm for pins electrically connected as per Drawings 2014781 and 2014803 shall be recorded and shall be cause for rejection.

4.3.4 Grounding Pin Resistance. With a dc current of 3.0±2.5 amperes passed through the frame and the pin being tested, and the dc voltage measured across the pin and the frame as shown in Figure 1, the dc resistance between each individual pin listed in Table I and the frame shall be calculated and recorded. The resistance shall be calculated using the equation specified in 6.1 and the value shall be as specified in 3.1.2. To ensure good electrical connections, when measuring the voltage and current, the protective finish of the frame may be penetrated.

4.3.5 Insulation Resistance. The insulation resistance between each electrically connected network and all other networks shall be as specified in 3.1.3 when measured in accordance with Method 302 of MIL-STD-202. The megohmmeter used shall have an output voltage of 500±100 vdc limited to a short circuit current of 2.0 milliamperes or less. Any reading of less than 100 megohms shall be recorded and shall be cause for rejection. Spare pins shall be included as individual networks.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES

6.1 GROUND PIN RESISTANCE EQUATION. Grounding pin resistance shall be calculated using the following equation:

$$R = \frac{E}{I} \text{ milliohms}$$

where: E is the millivoltmeter indication
I is the ammeter indication

ETP:lv

REVISIONS 27828					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		11 MAR 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
3. THIS IS AN INCOMPLETE DRAWING.

SEE NOTE 2

SEE NOTE 2

			1				LEAD SET A-A, ELECTRICAL
			3			MS16555-25	PIN, GUIDE
			210			1010862	BUSHING, SLEEVE
			50			1010958-1	PLUG, PROTECTIVE
			146			1010770-2	CONTACT, CRIMP TYPE
			85			1010770-1	CONTACT, CRIMP TYPE
			1			1010937-108	CONNECTOR, RECEPTACLE
			1			1010937-102	CONNECTOR, RECEPTACLE
			1			1010937-001	CONNECTOR, RECEPTACLE
			12			1010620-7	PIN, GUIDE
			15			1008818-002	CONTACT, WRAPOST
			15			1008819-001	SLEEVE, GROUND
			300			1006781-3	CONTACT, WRAPOST
			300			1006774	INSULATOR, WRAPOST, FEMALE
			10			1010994-001	TERMINAL, WRAPOST
			10			1010995-001	INSULATOR, BUSHING
			1			2008436	HEADER, INSEPARABLE ASSEMBLY
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

-011	2007235-011	
APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± ___ 3 PLACE DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ———
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN DATE 8-MAR-66
CHECKED O. GRIEB 8 MAR 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY,
SIGNAL CONDITIONER
C/M FLIGHT QUALIFICATION

SIZE C | CODE IDENT NO. 80230 | 2007271
SCALE — | SHEET 1 OF 1

MIL-1052D D

APOLLO G&N Specification
PS2007271 REV A
Original Issue Date:
Release Authority: TDRR 29724
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

HEADER ASSEMBLY FLIGHT QUAL SIGNAL CONDITIONER (C/M)

DRAWING NO. 2007271

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
8/11/66	A	30308	4,5	EA	---

This specification consists of page 1 to 6 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	6-21 66 MIT/IL		D. Jensen 14 June 66 ACSP

[illegible] be constantly monitored per Drawings 2014779 and 2014802. Any evidence of discontinuity shall be recorded and shall be cause for rejection. The monitoring circuit shall have a response time of [illegible] usec or less for any open circuit. [illegible] vibration testing shall [illegible] at the higher [illegible] level [illegible]

4.3.2 Continuity and DC Resistance. Continuity and dc resistance shall be measured using a low voltage resistance measuring device in accordance with Method 303 of MIL-STD-202. Measurements shall be made from each individual pin to all other pins electrically connected, but duplicate tests of pins previously tested need not be made. All readings for pins electrically connected per Drawings 2014779 and 2014802 shall be less than 0.5 ohm. Any readings greater than 0.5 ohm for pins electrically connected as per Drawings 2014779 and 2014802 shall be recorded and shall be cause for rejection.

4.3.3 Grounding Pin Resistance. With a dc current of 3.0±2.5 amperes passed through the frame and the pin being tested, and the dc voltage measured across the pin and the frame as shown in Figure 1, the dc resistance between each individual pin listed in Table I and the frame shall be calculated and recorded. The resistance shall be calculated using the equation specified in 6.1 and the value shall be as specified in 3.1.2. To ensure good electrical connections, when measuring the voltage and current, the protective finish of the frame may be penetrated.

4.3.4 Insulation Resistance. The insulation resistance between each electrically connected network and all other networks shall be as specified in 3.1.3 when measured in accordance with Method 302 of MIL-STD-202. The megohmmeter used shall have an output voltage of 500±100 vdc limited to short circuit current of 2.0 milliamperes or less. Any reading of less than 100 megohms shall be recorded and shall be cause for rejection. Spare pins shall be included as individual networks.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES

6.1 GROUNDING PIN RESISTANCE EQUATION. Grounding pin resistance shall be calculated using the following equation:

$$R = \frac{E}{I} \text{ milliohms}$$

where: E is the millivoltmeter indication
I is the ammeter indication

ETP:lv

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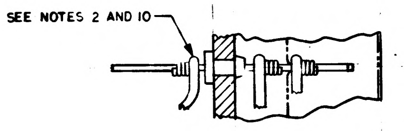
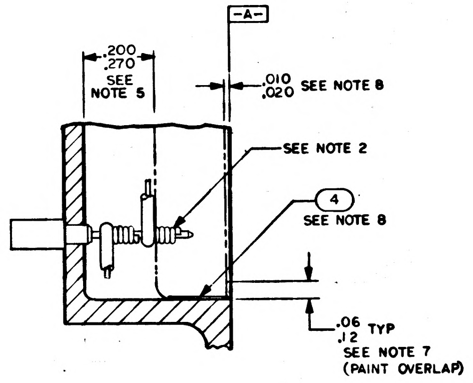
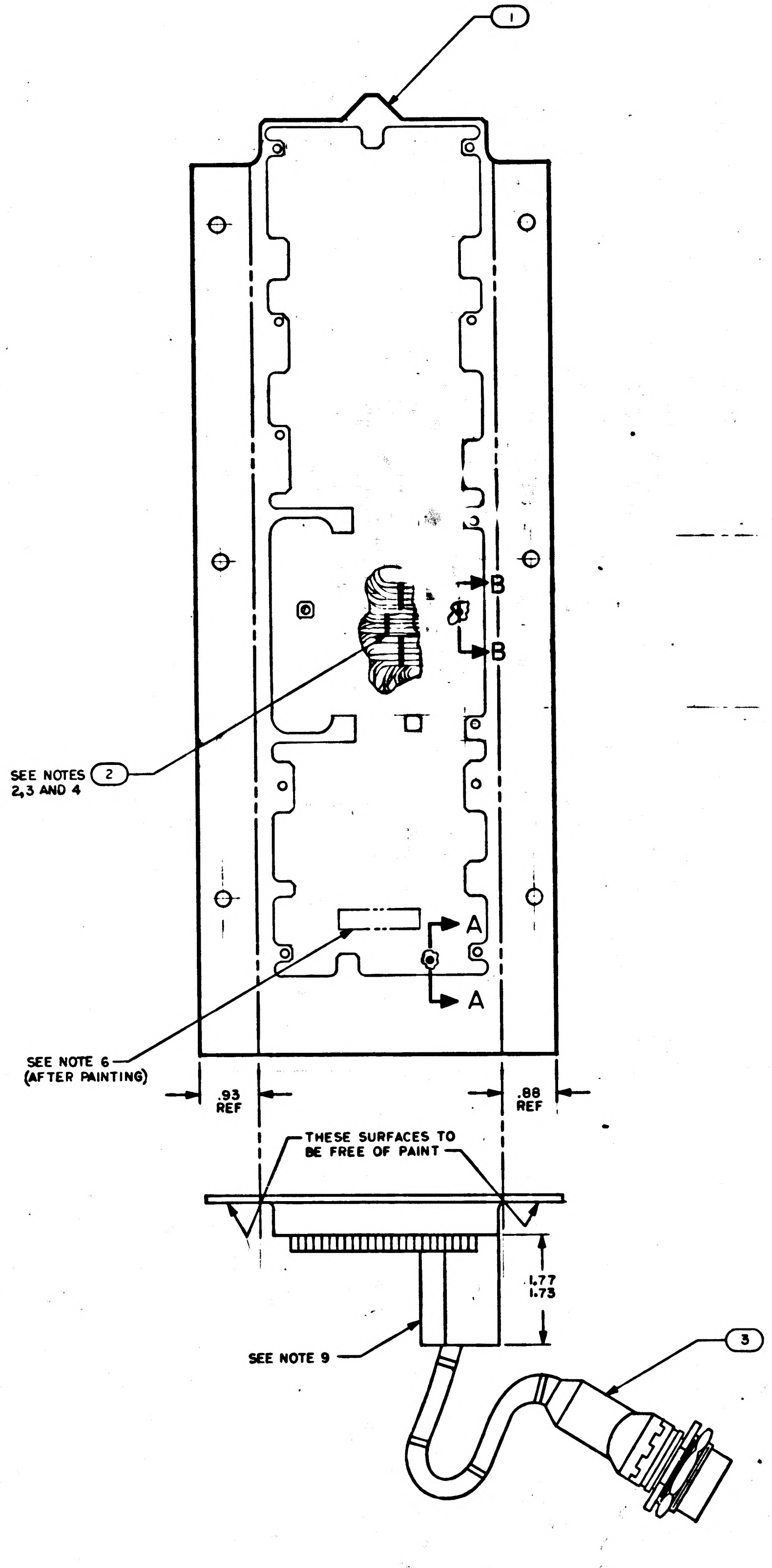
REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29352	KCH			

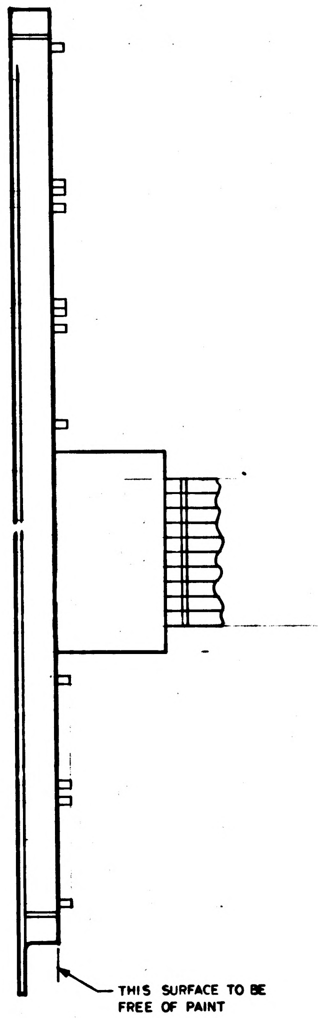


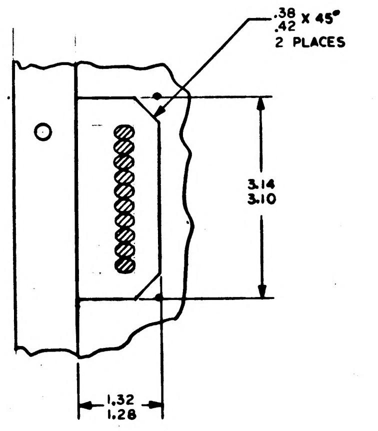
PARTIAL SECTION B-B
SCALE 4/1



PARTIAL SECTION A-A
SCALE 4/1







NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE LEAD SET AND HARNESS TO FIND NO. 1 PER ND1002031
3. SPOT TIE LEAD SET PER ND 1002032
4. BOND LEAD SET TO FIND NO. 1 PER ND 1002004, TYPE I AS REQUIRED
5. ENCAPSULATE PER ND1002236 TO HEIGHT SHOWN IN PARTIAL SECTION A-A, EXCEPT CURE AT 140°F ±5°F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT
6. IDENTIFY WITH PART NO. PER ND1002019
7. PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003.
OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A
8. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT
9. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN
10. SOLDER THE WIRE WRAPPED TERMINATIONS OF HARNESS PER ND1002071
11. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS2007271

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014802	WIRING HARNESS A	3
1	2014779	LEAD SET	2
1	2007269-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007235	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN		23 May 66
CHECKED		31 May 66
APPROVED		31 May 66
APPROVED		3 Jun 66
APPROVED MIT	M C Marky A. C. METZGER	6-3-66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2007271
SCALE 1/1		SHEET 1 OF 1

MASTER

2007271

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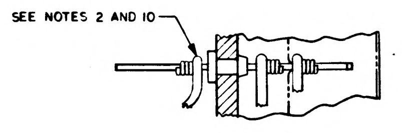
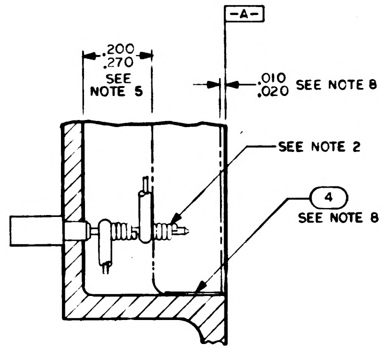
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29352	KCH			
C		REVISED PER TDRR 31058	JJB		9-20-66	



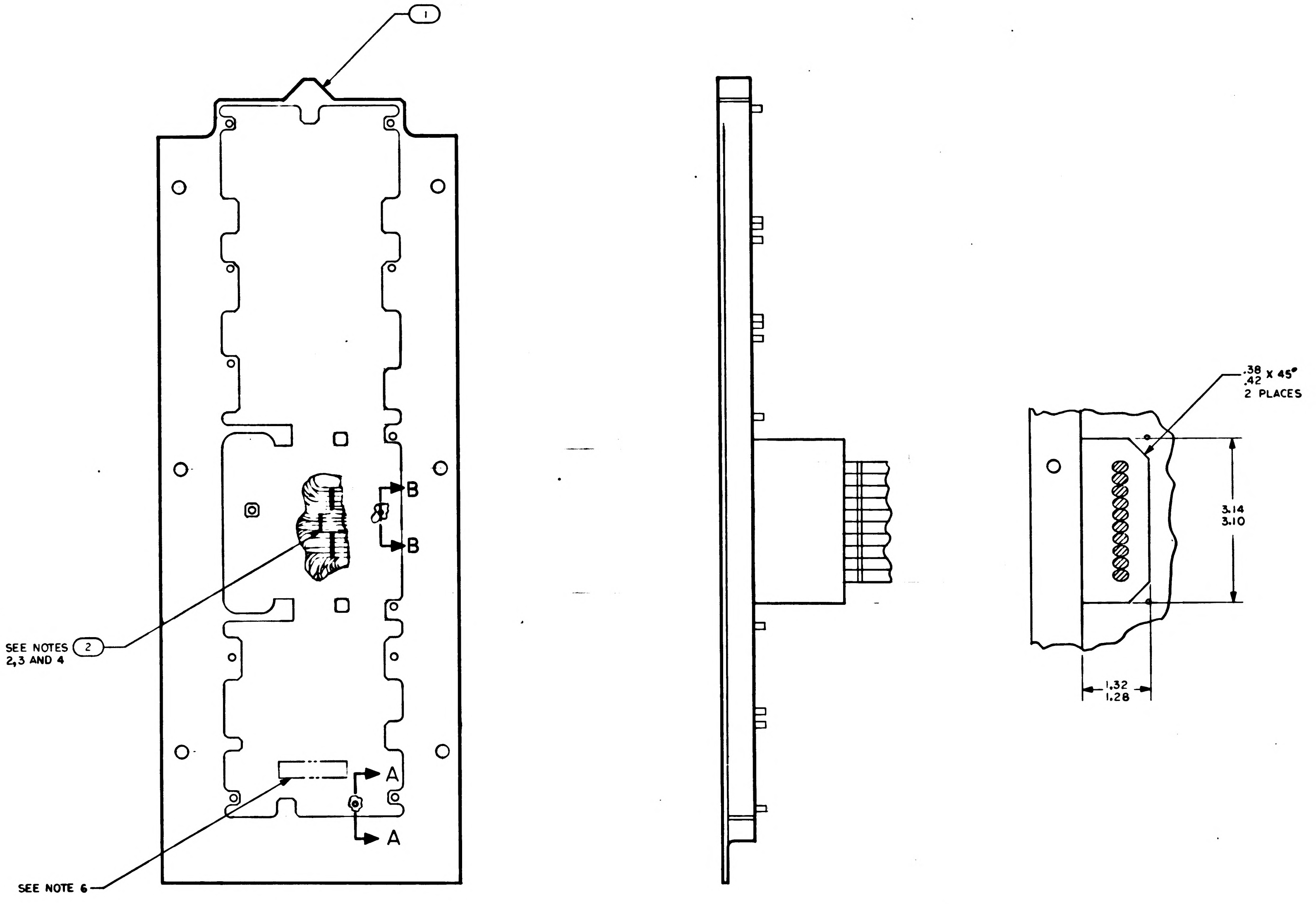
PARTIAL SECTION B–B

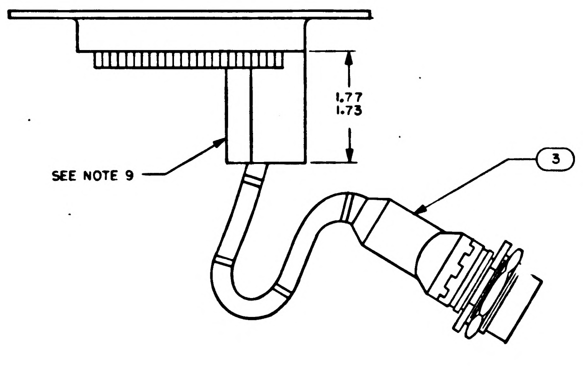
SCALE 4/1



PARTIAL SECTION A-A

SCALE 4/1





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6. IDENTIFY WITH PART NO. PER ND1002019
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003.~~ ~~OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
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AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014802	WIRING HARNESS A	3
1	2014779	LEAD SET	2
1	2007269-011	HEADER SUBASSEMBLY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
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CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 23 MAY 66
CHECKED 31 May 66
APPROVED 31 MAY 66
APPROVED 2 June 66
APPROVED MIT 6-3-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2007271
SCALE 1/1
SHEET 1 OF 1

2007271 C

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REVISIONS						
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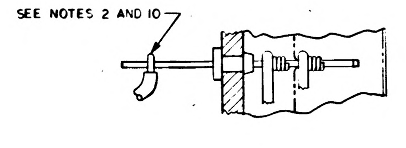
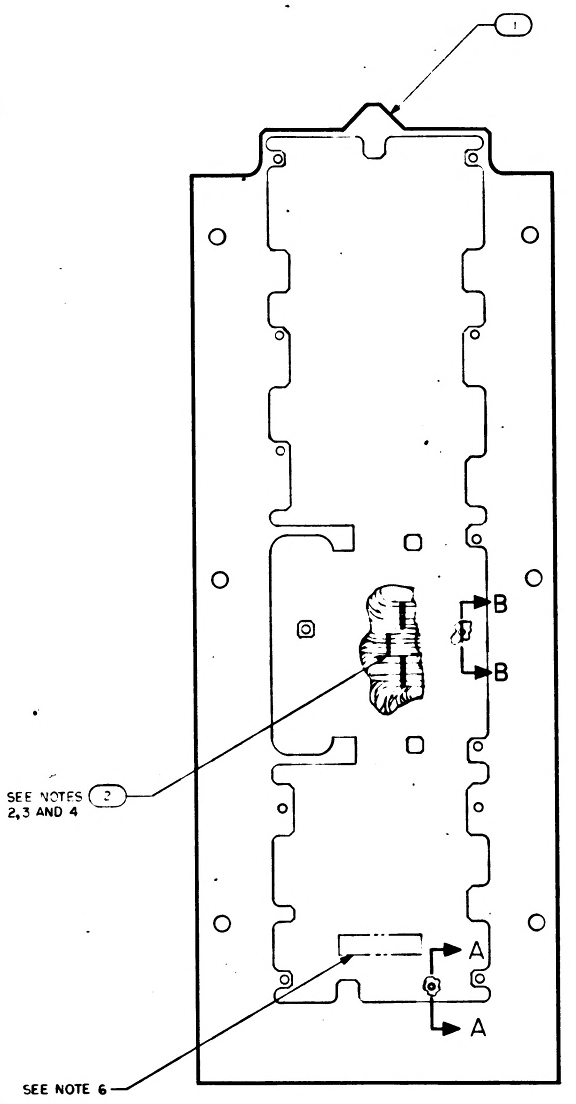
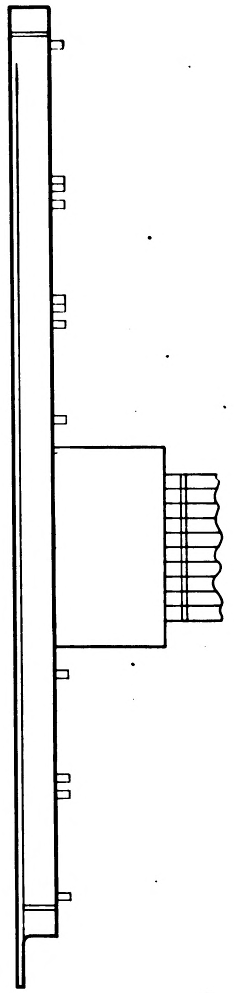
B		REPLACES WORD DWG REV A PER TDRR 29352	KEH			
C		REVISED PER TDRR 31058	JJB	NS	9-20-66	
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	

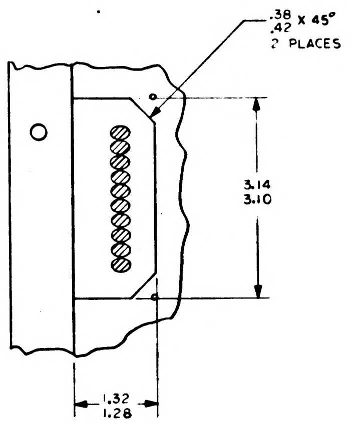


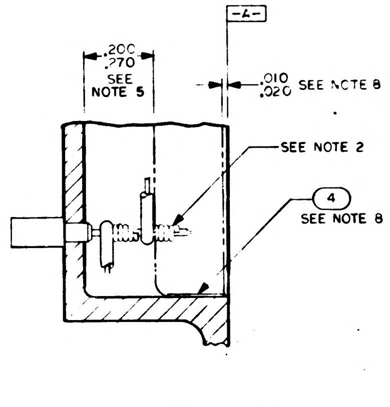
PARTIAL SECTION B–B

SCALE 4/1



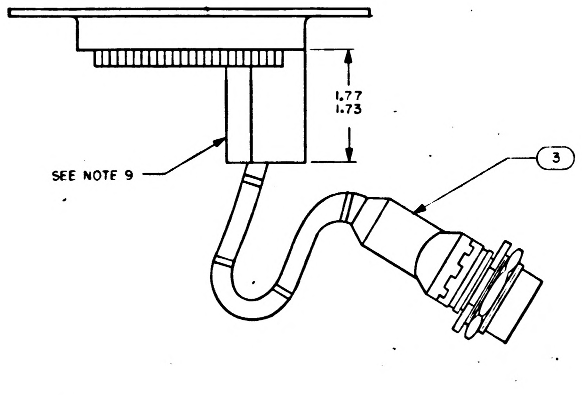






PARTIAL SECTION A-A

SCALE 4/1



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-011 LIST OF MATERIALS

2007235	
NEXT ASSY	USED ON
APPLICATION	

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DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN		23 MAY 66
CHECKED		31 May 66
APPROVED	U G Kaye	31 May 66
APPROVED		
APPROVED MIT		
APPROVED MSC		

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2007271
SCALE 1/1		SHEET 1 OF 1

2007271 D

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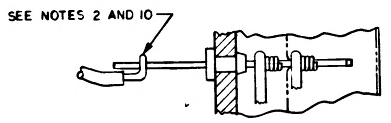
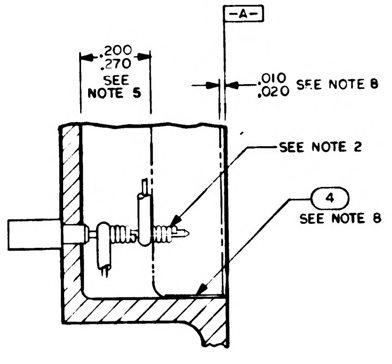
B		REPLACES WORD DWG REV PER TDRR 29352	KCH			
C		REVISED PER TDRR 31053	JJB	NS	9-20-66	
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	
E		① REVISED PER TDRR 3180–	JRK		8 NOV. 66	



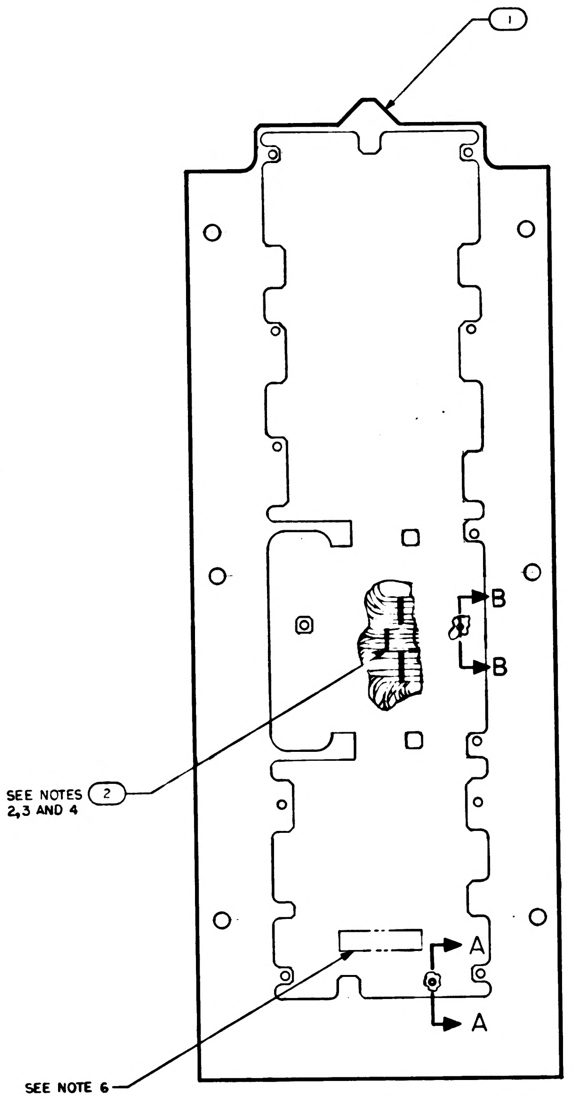
PARTIAL SECTION B–B

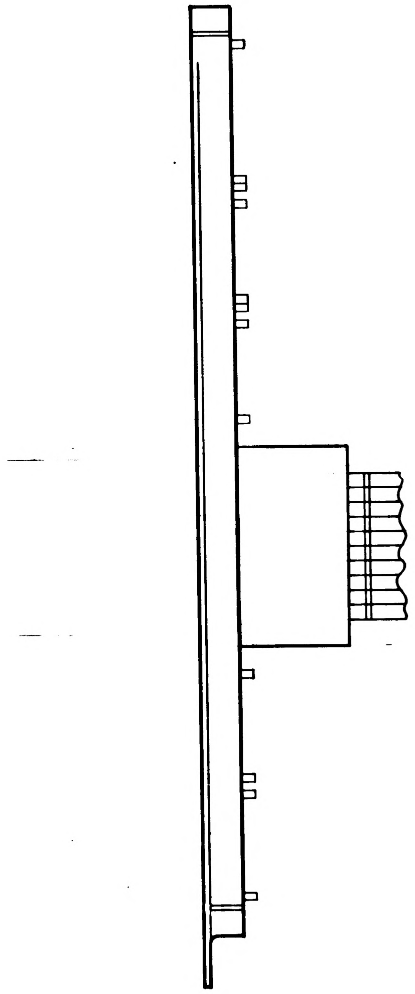
SCALE 4/1

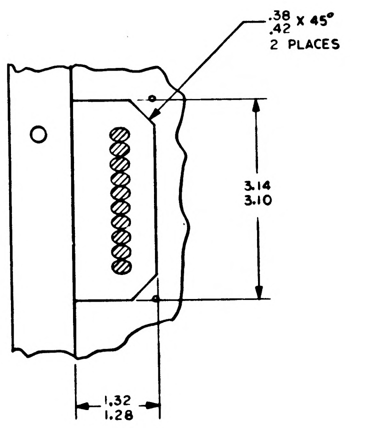


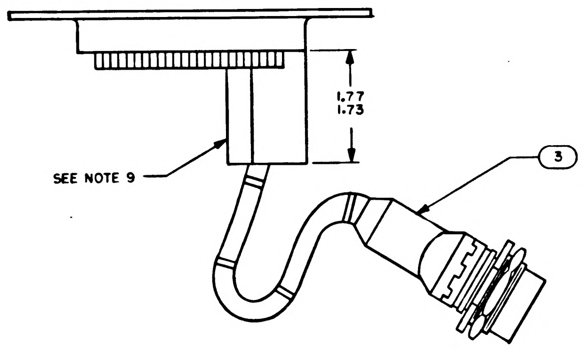
PARTIAL SECTION A-A

SCALE 4/1









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9. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN. ALL SHIELD TERMINATIONS SHALL BE LOCATED WITHIN ENCAPSULANT .12 INCH MINIMUM. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE ENCAPSULANT SURFACE. SPOT TIE HARNESS PER ND 1002032, AS NECESSARY, WITHIN THE ENCAPSULANT AREA.
10. SOLDER THE WIRE TERMINATIONS OF HARNESS PER ND 1002071.
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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN		23 MAY 66
CHECKED		31 May 66
APPROVED	V. G. Kap[illegible]	31 MAY 66
APPROVED		2 June 66
APPROVED MIT	A. C. METZGER	6-3-66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO	SIZE	DRAWING NO.
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SCALE 1/1		SHEET 1 OF 1

2007271 E

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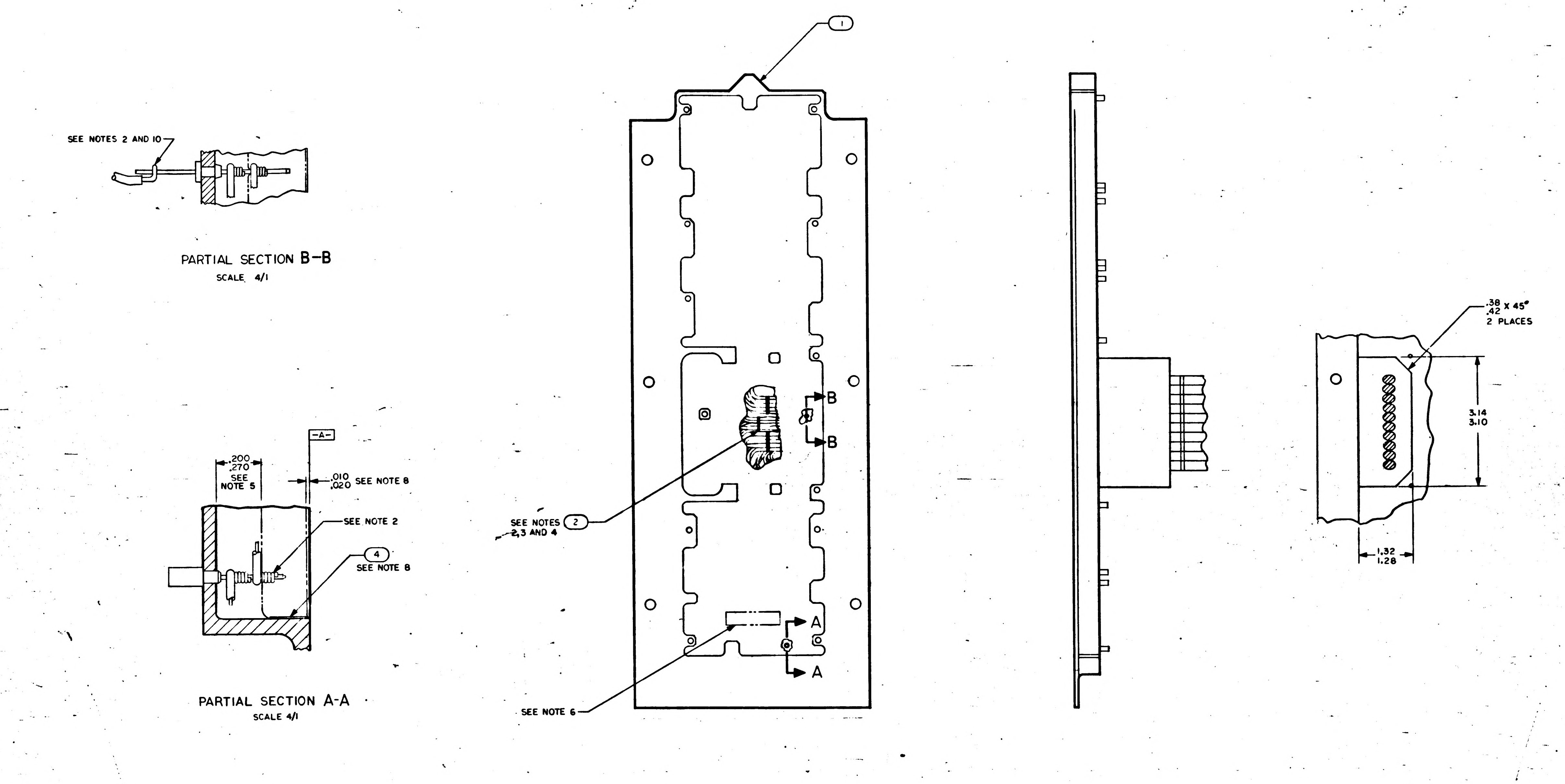
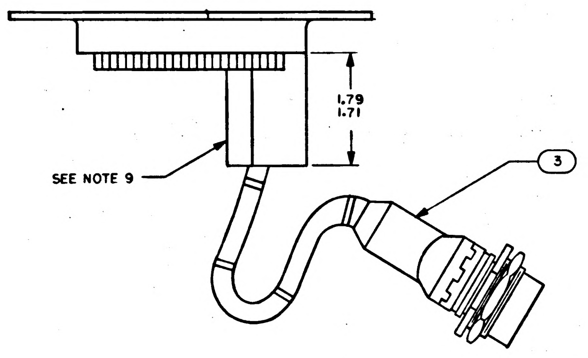
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	
E		① REVISED PER TDRR 31807	JRK		8 NOV 66	
F		REVISED PER TDRR 32067	JC		2 DEC 66	





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE LEAD SET TO FIND NO. 1 PER ND 1002031.
3. SPOT TIE LEAD SET PER ND 1002032.
4. BOND LEAD SET TO FIND NO.1 PER ND 1002004, TYPE I AS REQUIRED.
5. ENCAPSULATE PER ND1002236 TO HEIGHT SHOWN IN PARTIAL SECTION A-A, EXCEPT CURE AT 140°F ±5°F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019.
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003. OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
9. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN. ALL SHIELD TERMINATIONS SHALL BE LOCATED WITHIN ENCAPSULANT .12 INCH MINIMUM. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE ENCAPSULANT SURFACE. SPOT TIE HARNESS PER ND 1002032, AS NECESSARY, WITHIN THE ENCAPSULANT AREA. MENISCUS PERMITTED ALONG WIRES OF FIND NO. 3.
10. SOLDER THE WIRE TERMINATIONS OF HARNESS PER ND 1002071.
11. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007271.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014802	WIRING HARNESS A	3
1	2014779	LEAD SET	2
1	2007269-011	HEADER SUBASSEMBLY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 23 MAY 66
CHECKED 31 May 66
APPROVED 31 MAY 66
APPROVED
APPROVED MIT 6-3-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

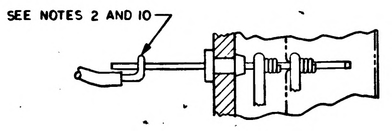
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2007271
SCALE 1/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

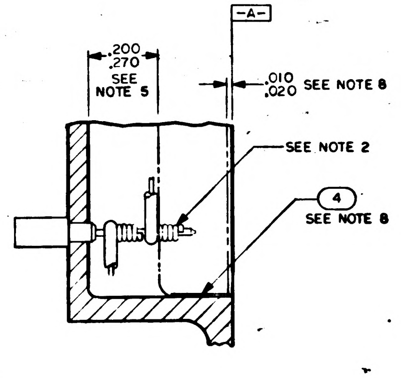
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29552	KEH			
C		REVISED PER TDRR 31058	JJB	NS	9-20-66	
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	
E		① REVISED PER TDRR 31807	JRK	PER	8 NOV 66	
F		REVISED PER TDRR 32067	JC		2 DEC 66	



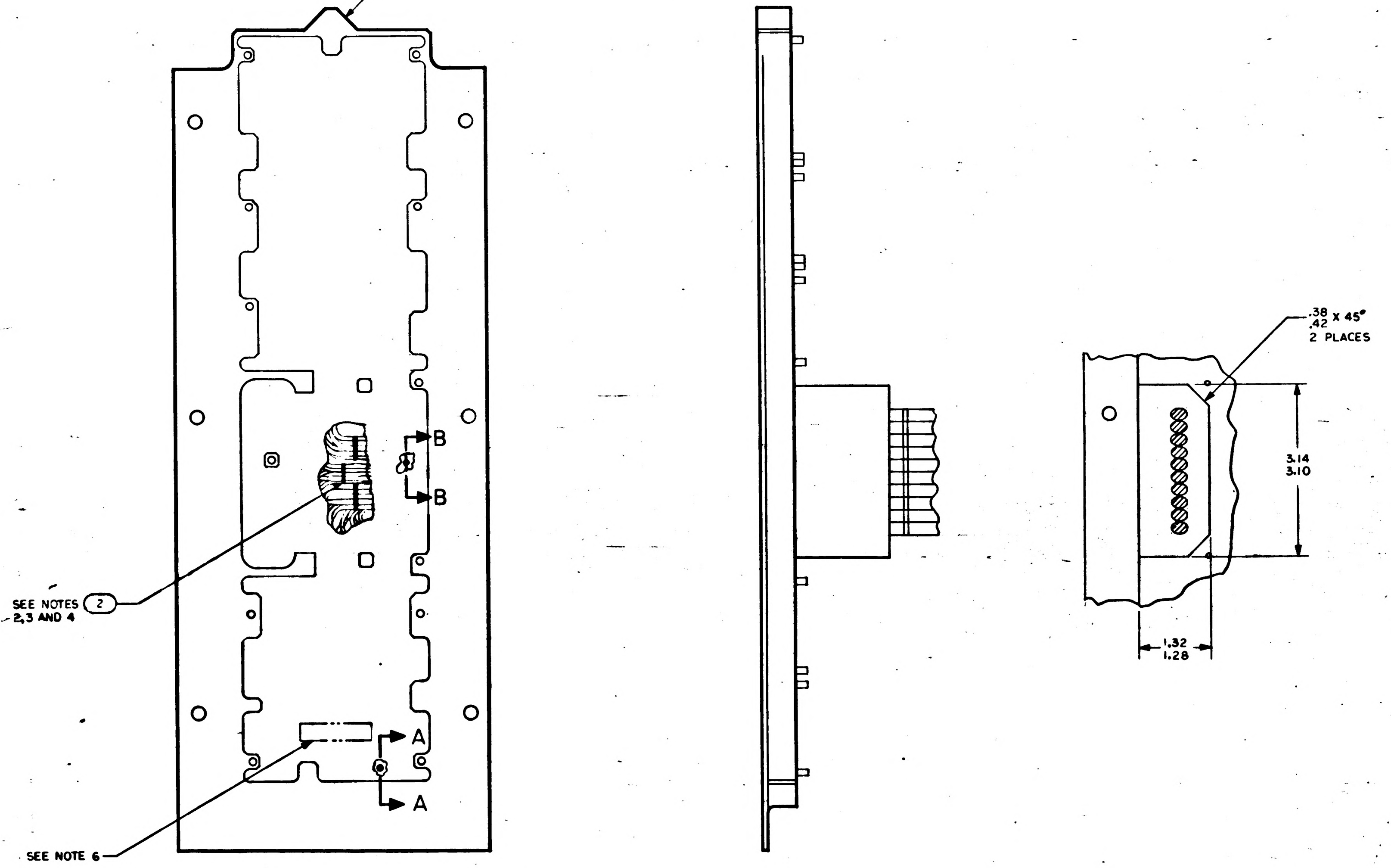
PARTIAL SECTION B–B

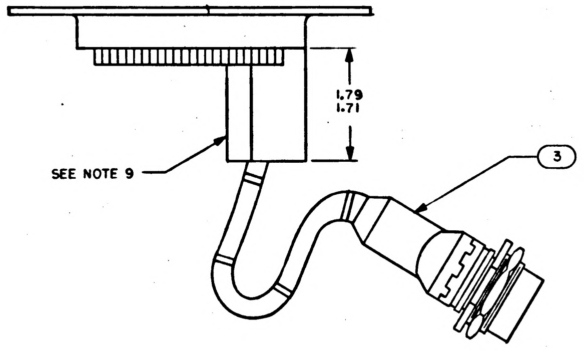
SCALE 4/1



PARTIAL SECTION A–A

SCALE 4/1





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE LEAD SET TO FIND NO. 1 PER ND 1002031.
3. SPOT TIE LEAD SET PER ND 1002032.
4. BOND LEAD SET TO FIND NO. 1 PER ND 1002004, TYPE I AS REQUIRED.
5. ENCAPSULATE PER ND1002236 TO HEIGHT SHOWN IN PARTIAL SECTION A–A, EXCEPT CURE AT 140°F ±5°F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019.
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003.~~ ~~OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A–A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
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10. SOLDER THE WIRE TERMINATIONS OF HARNESS PER ND 1002071.
11. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007271.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014802	WIRING HARNESS A	3
1	2014779	LEAD SET	2
1	2007269-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN		23 MAY 66
CHECKED		31 May 66
APPROVED	V. O.	31 MAY 66
APPROVED		2 Dec 66
APPROVED MIT	A. C. METZGER	6-3-66
APPROVED MSC		DATE

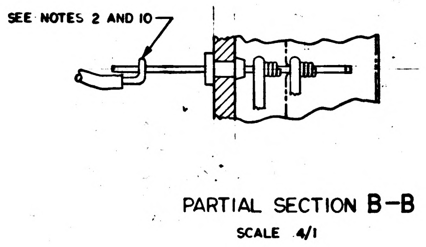
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

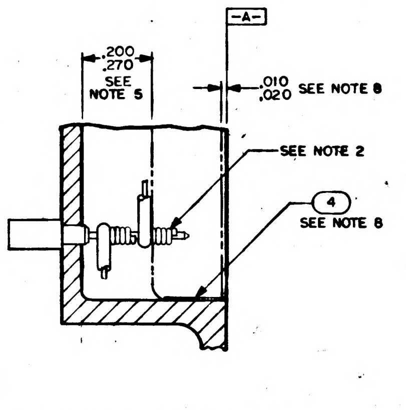
CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2007271

SCALE 1/1 SHEET 1 OF 1

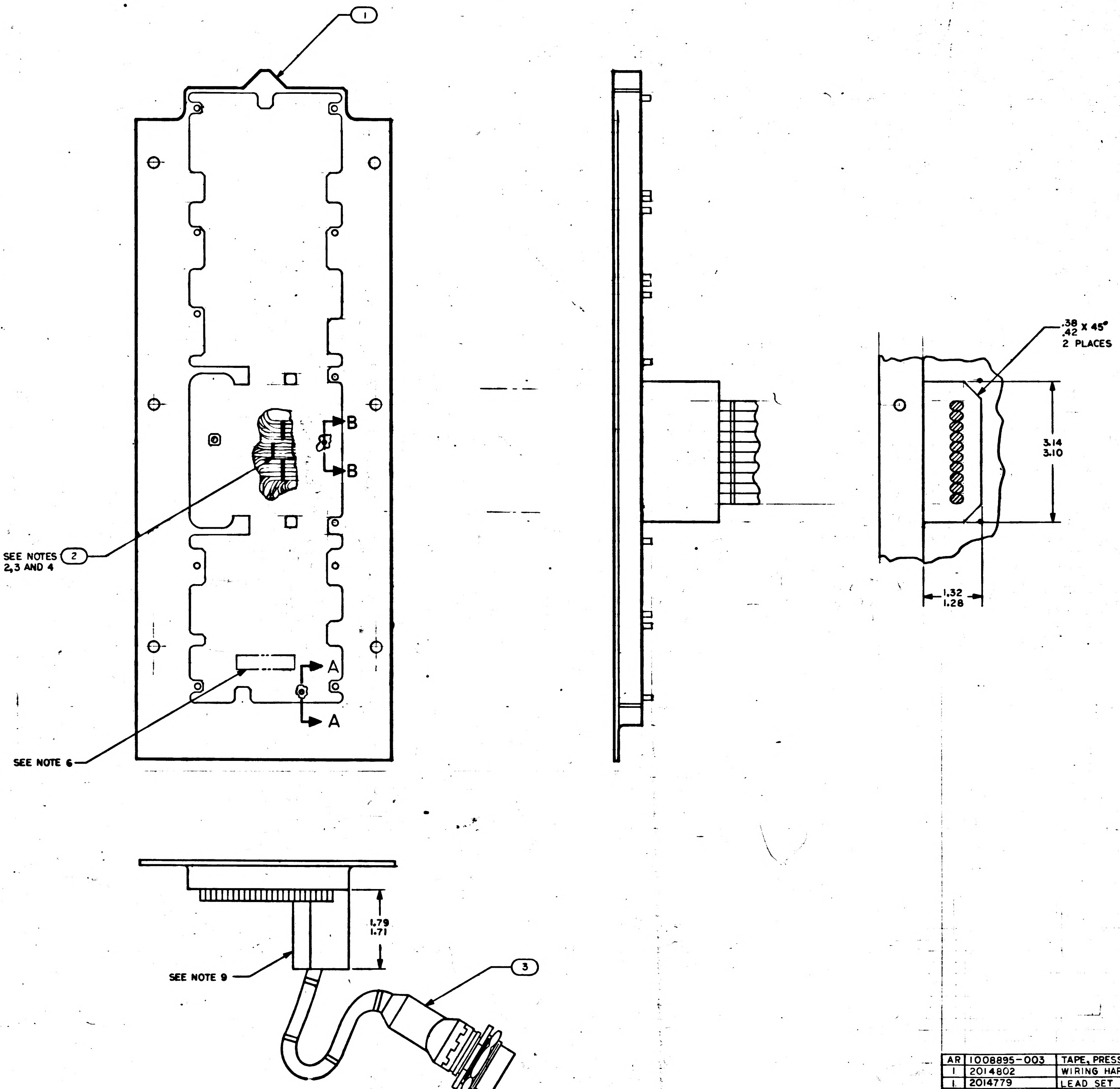
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29352	WCH			
C		REVISED PER TDRR 31058	JJB	NS	9 20 66	
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	
E		① REVISED PER TDRR 31807	JRK	PER	8 NOV 66	
F		REVISED PER TDRR 32067	JC		2 DEC 66	
G		REVISED PER TDRR 32280			14 DEC 66	



PARTIAL SECTION B-B
SCALE 4/1



PARTIAL SECTION A-A
SCALE 4/1



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE LEAD SET TO FIND NO. 1 PER ND 1002031.
3. SPOT TIE LEAD SET PER ND 1002032.
4. BOND LEAD SET TO FIND NO. 1 PER ND 1002004, TYPE I AS REQUIRED.
5. ENCAPSULATE PER ND1002236 TO HEIGHT SHOWN IN PARTIAL SECTION A-A, EXCEPT CURE AT 140°F ±5°F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019.
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003. OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
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10. SOLDER THE WIRE TERMINATIONS OF HARNESS PER ND 1002071.
11. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007271.
12. PAINT THERMAL INTERFACE, PLANE -A- AND ALL EXPOSED SURFACES OF ENCAPSULANT PER ND 1002291, TYPE I USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. CLEAN SURFACES TO BE PAINTED USING FREON, ISO-PROPYL ALCOHOL AND DISTILLED WATER. DO NOT PAINT ENCAPSULANT ON ADJACENT TO FIND NO. 3.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014802	WIRING HARNESS A	3
1	2014779	LEAD SET	2
1	2007269-011	HEADER SUBASSEMBLY	1
-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

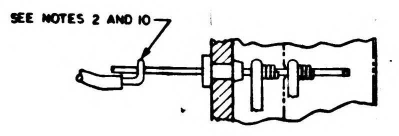
DRAWN 23 MAY 66
CHECKED 31 May 66
APPROVED 3 MAY 66
APPROVED 2 June 66
APPROVED MIT 6-3-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

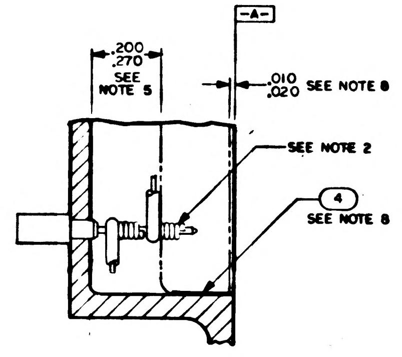
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2007271
SCALE 1/1
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV PER TDRR 29352				
C		REVISED PER TDRR 31058	JJB	NS	9-20-66	
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	
E		① REVISED PER TDRR 31807	IRK		8 NOV 66	
F		REVISED PER TDRR 32067	JC		2 DEC 66	
G		REVISED PER TDRR 32280			66	
H		REVISED PER TDRR 33069			3 MAR 67	



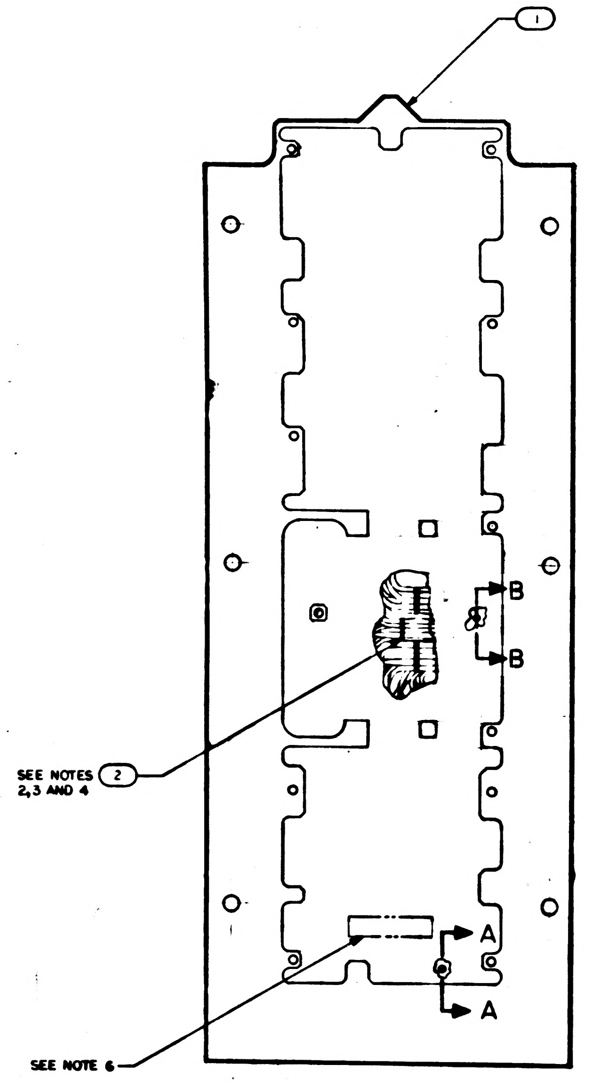
PARTIAL SECTION B-B

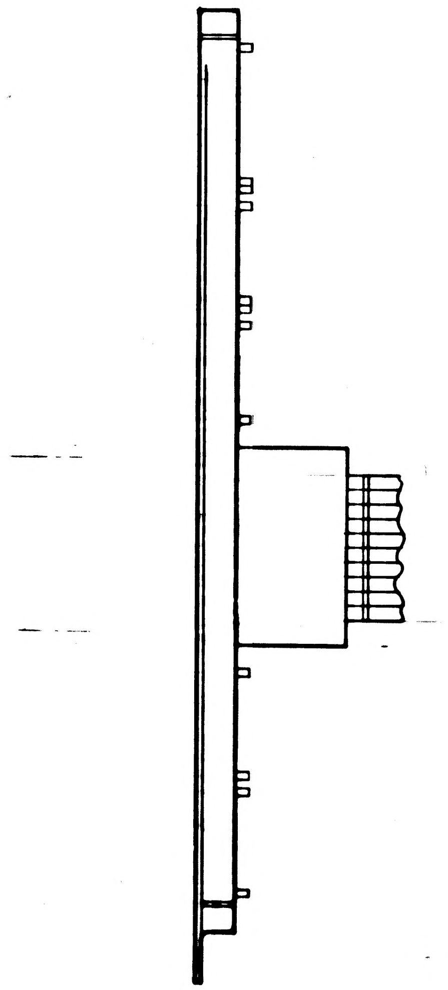
SCALE 4/1

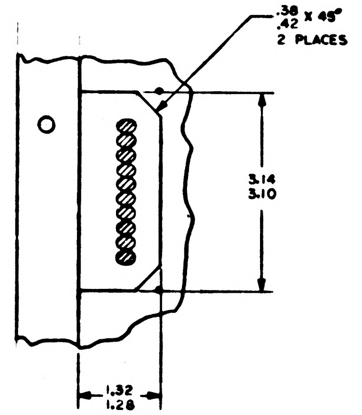


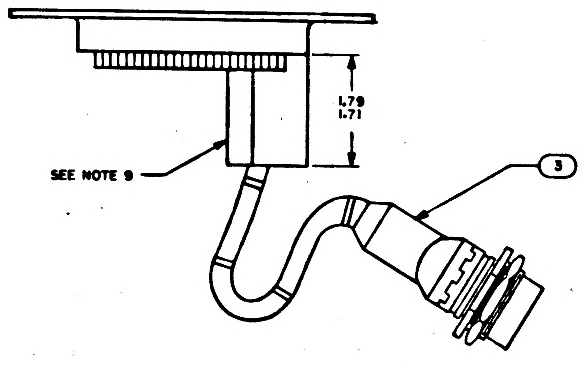
PARTIAL SECTION A-A

SCALE 4/1









NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE LEAD SET TO FIND NO. 1 PER ND 1002031.
3. SPOT TIE LEAD SET, PER ND 1002032 USING FIND NO 5.
4. BOND LEAD SET TO FIND NO.1 PER ND 1002004, TYPE I AS REQUIRED.
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6. IDENTIFY WITH PART NO. PER ND1002019.
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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1012555-002	LACING TAPE	
AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
1	2014802	WIRING HARNESS A	3
1	2014779	LEAD SET	2
1	2007269-011	HEADER SUBASSEMBLY	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2007235	

APPLICATION

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FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
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MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED 31 May 66
APPROVED
APPROVED 3 Dec 66
APPROVED MIT 6-3-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230
SIZE E
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SCALE 1/1
SHEET 1 OF 1

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REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29352	KEH			
C		REVISED PER TDRR 31058	JJB	NS	9 20 66	
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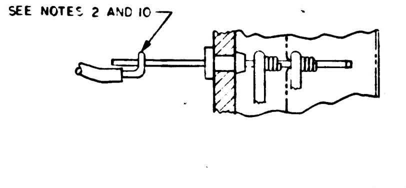
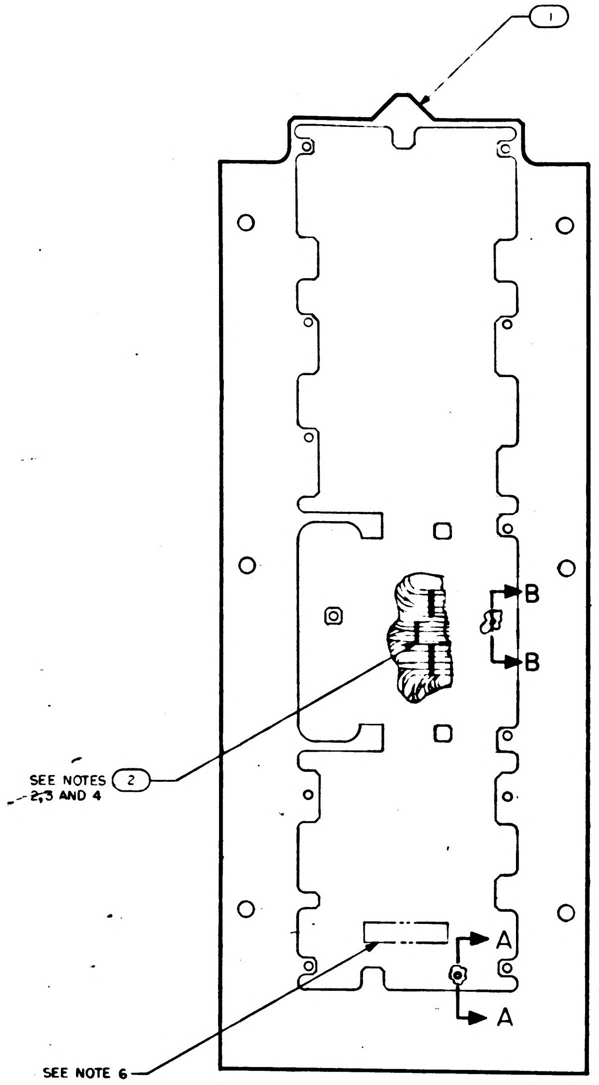
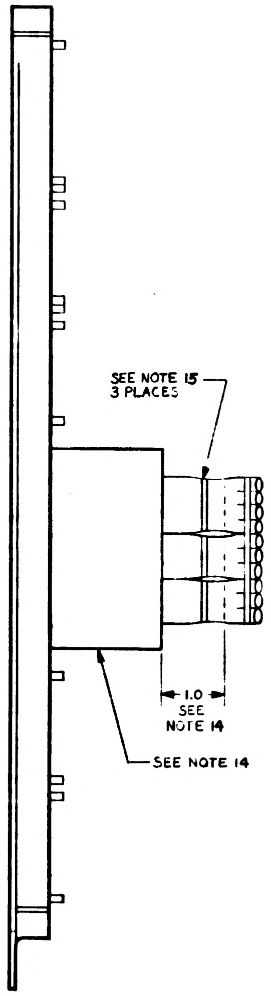
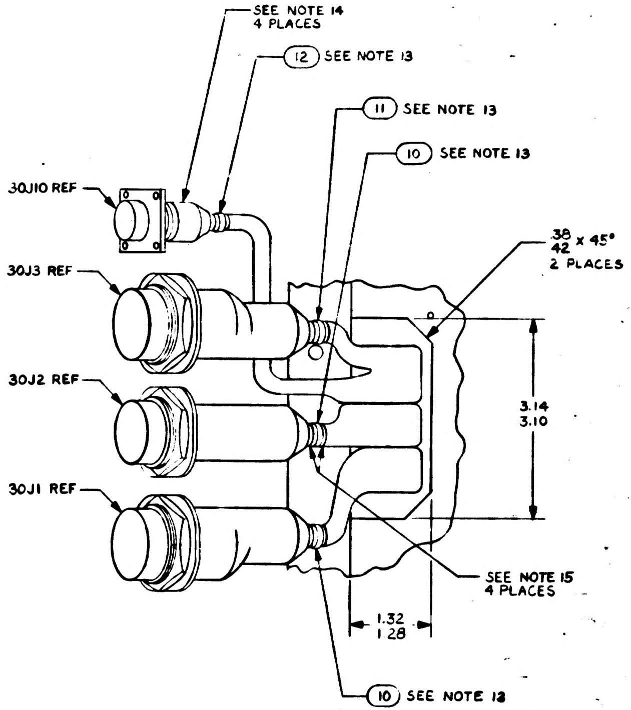
F		REVISED PER TDRR 32067	JC	EB	2 DEC 66	
G		REVISED PER TDRR 32280	LW		14 DEC 66	
H		REVISED PER TDRR 3069	NE	EB	3 MAR 67	
J		REVISED PER TDRR 34544	GD		21 SEP 67	

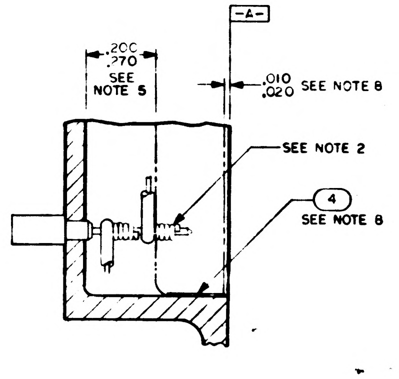


PARTIAL SECTION B-B
SCALE 4/1

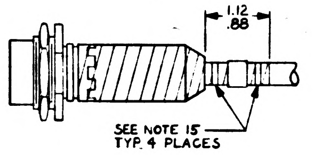


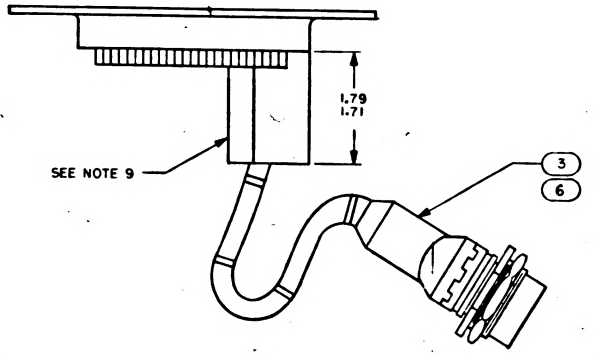






PARTIAL SECTION A-A
SCALE 4/1





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE LEAD SET TO FIND NO. 1 PER ND 1002031.
3. SPOT TIE LEAD SET, PER ND 1002032 USING FIND NO 5 OR 7 AS APPLICABLE.
4. BOND LEAD SET TO FIND NO.1 PER ND 1002004, TYPE I AS REQUIRED.
5. ENCAPSULATE PER ND1002236 TO HEIGHT SHOWN IN PARTIAL SECTION A-A, EXCEPT CURE AT 140°F ±5°F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019.
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003.~~ ~~OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
9. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN. ALL SHIELD TERMINATIONS SHALL BE LOCATED WITHIN ENCAPSULANT .12 INCH MINIMUM. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE ENCAPSULANT SURFACE. SPOT TIE HARNESS USING FIND NO. 5 OR 7 AS APPLICABLE, PER ND1002032 AS NECESSARY WITHIN THE ENCAPSULANT AREA. MENISCUS PERMITTED ALONG WIRES OF FIND № 3 OR 6.
10. SOLDER THE WIRE TERMINATIONS OF HARNESS PER ND 1002071.
11. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007271.
12. PAINT THERMAL INTERFACE, PLANE -A- AND ALL EXPOSED SURFACES OF ENCAPSULANT PER ND 1002291, TYPE I USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012548-003. CLEAN SURFACES TO BE PAINTED USING FREON, ISO-PROPYL ALCOHOL AND DISTILLED WATER. DO NOT PAINT ENCAPSULANT ON/OR ADJACENT TO FIND NO. 3. OR 6.
13. MARK BAND WITH CONNECTOR REFERENCE DESIGNATION BY IMPRESSION STAMPING, .12 HIGH, CENTRALIZE AND FILL IMPRESSION WITH BLACK INK OR EQUIVALENT, PER ND 1002019. NOT APPLICABLE TO DASH-011.
14. USING FIND NO. 8 AND 9, COMPLETELY COVER THE EXPOSED PR 1538 POTTING ON CONNECTORS AND HEADER INCLUDING 1 INCH OF ADJACENT HARNESS BRANCH WITH A MINIMUM OF TWO LAYERS OF ALUMINUM FOIL TAPE. WRAP LAYER IN OPPOSITE DIRECTIONS (CLOCKWISE, COUNTERCLOCKWISE, ETC.). EDGES OF SUCCESSIVE WRAPS SHALL OVERLAP BY 1/4 INCH MINIMUM. NOT APPLICABLE TO DASH-011.
15. APPLY SPOT TIES ON EACH BRANCH, TO SECURE TERMINATION END OF ALUMINUM FOIL TAPE USING FIND NO. 7. NOT APPLICABLE TO DASH-011.

QTY REQD -021	QTY REQD -011	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	–	1008940-004	BAND, MARKER	12
1	–	1008940-002	BAND, MARKER	11
2	–	1008940-001	BAND, MARKER	10
AR	–	1008937-007	TAPE, PRESSURE SENSITIVE, ALUM. FOIL BACKED	9
AR	–	1008937-003	TAPE, PRESSURE SENSITIVE, ALUM. FOIL BACKED	8
AR	–	1008936-001	LACING TAPE	7
1	–	2021289	WIRING HARNESS "A"	6
–	AR	1012555-002	LACING TAPE	5
AR	AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
–	1	2014802	WIRING HARNESS A	3
1	1	2014779	LEAD SET	2
1	1	2007269-011	HEADER SUBASSEMBLY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.

DRAWN
CHECKED 31 May 66
APPROVED H. O. Kargenian
APPROVED
APPROVED MIT 6-3-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

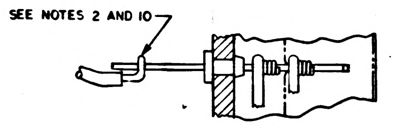
HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2007271
SCALE 1/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

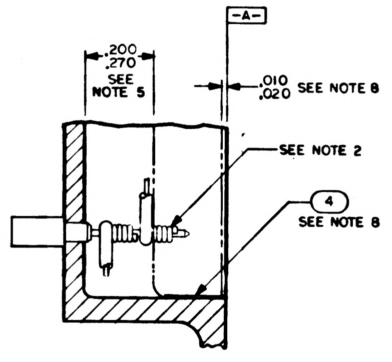
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29352				
C		REVISED PER TDRR 310·8	JJB	NS	9-20-66	
D		REVISED PER TDRR 31596	JC	SC	25 OCT 66	
E		① REVISED PER TDRR 31807	JRK		8 NOV 66	
F		REVISED PER TDRR 32067	JC		2 DEC 66	
G		REVISED PER TDRR 32280			14 DEC 66	
H		REVISED PER TDRR 33069	NE		3 MAR 67	
J		REVISED PER TDRR 34544	GD		21 SEP 67	
K		REVISED PER TDRR 3469-	TC		27 SEP	



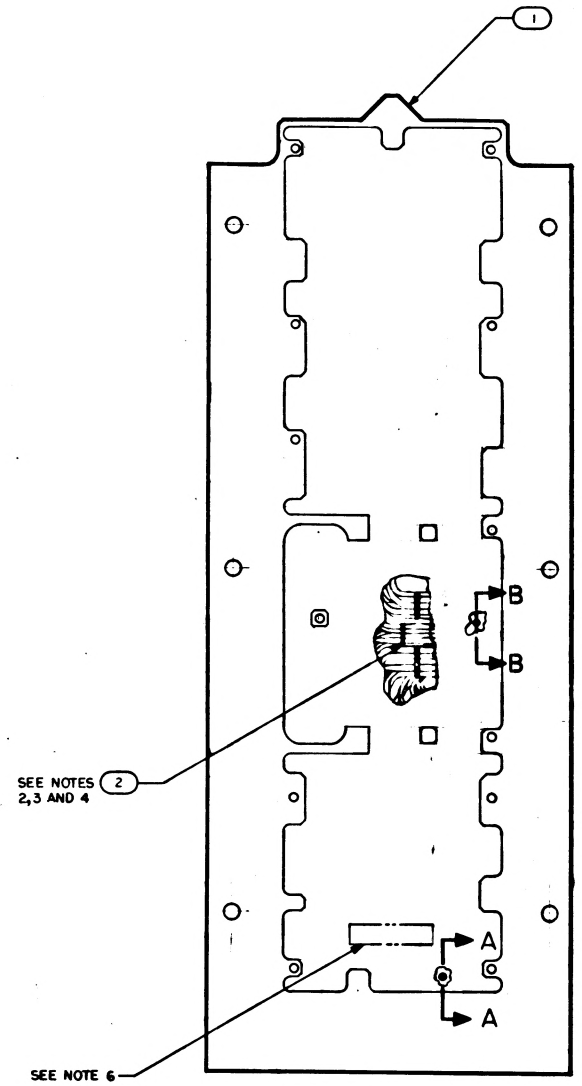
PARTIAL SECTION B-B

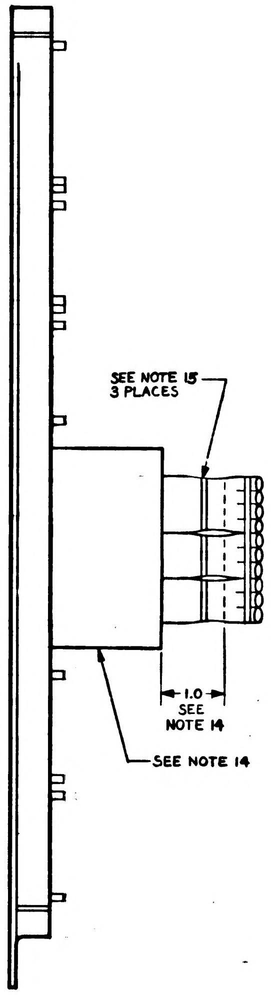
SCALE 4/1

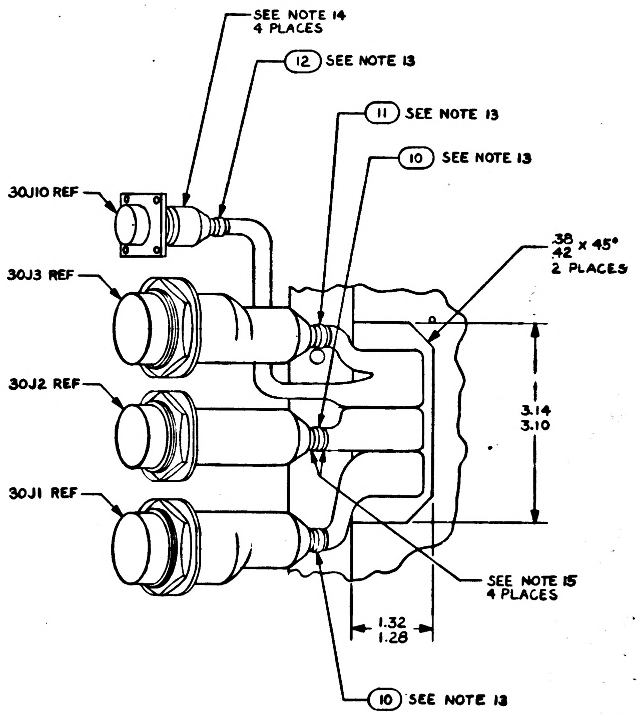


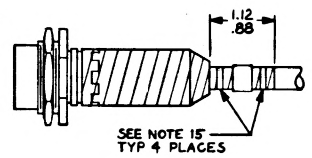
PARTIAL SECTION A-A

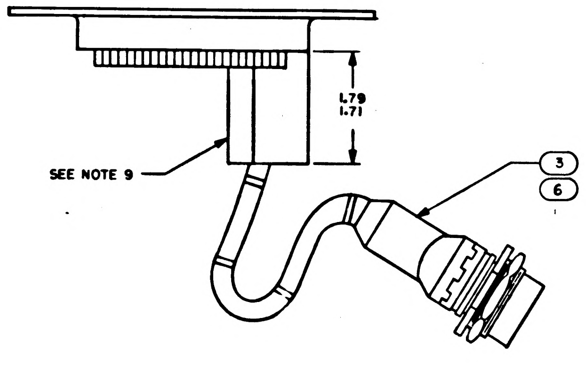
SCALE 4/1











NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ASSEMBLE LEAD SET TO FIND NO. 1 PER ND 1002031.
3. SPOT TIE LEAD SET, PER ND 1002032 USING FIND NO 5 OR 7 AS APPLICABLE..
4. BOND LEAD SET TO FIND NO.1 PER ND 1002004, TYPE I AS REQUIRED.
5. ENCAPSULATE PER ND1002236 TO HEIGHT SHOWN IN PARTIAL SECTION A-A, EXCEPT CURE AT 140°F ±5°F. MENISCUS PERMITTED AT SIDES OF FIND NO. 1 AND WHERE PINS AND WIRES INTERFACE WITH TOP SURFACE OF ENCAPSULANT.
6. IDENTIFY WITH PART NO. PER ND1002019.
7. ~~PAINT ALL SURFACES EXCEPT TAPPED HOLES AND INDICATED AREAS PER ND1002291 USING 1012543-003.~~ ~~OVERLAP PAINT ON TO ENCAPSULANT PER SECTION A-A~~
8. FOLLOWING PARTIAL ENCAPSULATION PER NOTE 5, ADD ONE LAYER OF TEFLON TAPE, FIND NO. 4 TO ALL INSIDE EDGES OF FIND NO. 1. COVER THE AREA BETWEEN THE TOP OF THE NOTE 5 ENCAPSULANT MENISCUS TO SURFACE -A-. FOAM FILL PER ND1002002 TO HEIGHT SHOWN IN PARTIAL SECTION A-A USING FOAM SYSTEM B AND CURING CYCLE NO. 2. SEPARATION BETWEEN CURED FOAM AND TEFLON TAPE IS PERMISSIBLE. AVERAGE DENSITY OF CURED FOAM SHALL NOT EXCEED 20 POUNDS PER CUBIC FOOT.
9. ENCAPSULATE PER ND1002236 TO DIMENSIONS SHOWN. ALL SHIELD TERMINATIONS SHALL BE LOCATED WITHIN ENCAPSULANT .12 INCH MINIMUM. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE ENCAPSULANT SURFACE. SPOT TIE HARNESS USING FIND NO. 5 OR 7 AS APPLICABLE, PER ND1002032 AS NECESSARY WITHIN THE ENCAPSULANT AREA. MENISCUS PERMITTED ALONG WIRES OF FIND № 3 OR 6.
10. SOLDER THE WIRE TERMINATIONS OF HARNESS PER ND 1002071.
11. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007271.
12. PAINT THERMAL INTERFACE, PLANE -A- AND ALL EXPOSED SURFACES OF ENCAPSULANT PER ND 1002291, TYPE I USING ZINC CHROMATE PRIMER PER MIL-P-8585 AND PAINT 1012543-003. CLEAN SURFACES TO BE PAINTED USING FREON, ISO-PROPYL ALCOHOL AND DISTILLED WATER. DO NOT PAINT ENCAPSULANT ON/OR ADJACENT TO FIND NO. 3. OR 6.
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14. USING FIND NO. 8 AND 9, COMPLETELY COVER THE EXPOSED PR 1538 POTTING ON CONNECTORS AND HEADER INCLUDING 1 INCH OF ADJACENT HARNESS BRANCH WITH A MINIMUM OF TWO LAYERS OF ALUMINUM FOIL TAPE. WRAP LAYER IN OPPOSITE DIRECTIONS (CLOCKWISE, COUNTERCLOCKWISE, ETC.). EDGES OF SUCCESSIVE WRAPS SHALL OVERLAP BY 1/4 INCH MINIMUM. NOT APPLICABLE TO DASH-011.
15. APPLY SPOT TIES ON EACH BRANCH, TO SECURE TERMINATION END OF ALUMINUM FOIL TAPE USING FIND NO. 7. NOT APPLICABLE TO DASH-011.
16. APPLY A SMALL AMOUNT OF EPOXY ADHESIVE TO ALL STARTING, FINISHING AND SPOT TIE KNOTS OF FIND NO. 7 USING FIND NO. 13 AND 14 PER ND 1002203.

QTY REQD	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	—	1010750	CURING AGENT POLYAMIDE	14
AR	—	1010748	RESIN EPOXY	13
1	—	1008940-004	BAND, MARKER	12
1	—	1008940-002	BAND, MARKER	11
2	—	1008940-001	BAND, MARKER	10
AR	—	1008937-007	TAPE, PRESSURE SENSITIVE, ALUM. FOIL BACKED	9
AR	—	1008937-003	TAPE, PRESSURE SENSITIVE, ALUM. FOIL BACKED	8
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1	—	2021289	WIRING HARNESS "A"	6
—	AR	1012555-002	LACING TAPE	5
AR	AR	1008895-003	TAPE, PRESSURE SENSITIVE, TEFLON	4
—	1	2014802	WIRING HARNESS A	3
1	1	2014779	LEAD SET	2
1	1	2007269-011	HEADER SUBASSEMBLY	1
-021	-011	LIST OF MATERIALS		

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 23 MAY 66
CHECKED 31 May 66
APPROVED U. O. [illegible] 31 May 66
APPROVED 2 Jun 66
APPROVED MIT M6 [illegible] 6-3-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER ASSEMBLY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2007271
SCALE 1/1
SHEET 1 OF 1

APOLLO G&N Specification
PS2007271 REV——
Original Issue Date:
Release Authority: TDRR 29724
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

HEADER ASSEMBLY FLIGHT QUAL SIGNAL CONDITIONER (C/M)

DRAWING NO. 2007271

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 6 inclusive.

APPROVALS	A. C. METZGER NASA/MSC		M G Wesley 6-21-66 MIT/IL	16 June	B. Jensen 14 June 66 ACSP

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the Header Assembly Flight Qual Signal Conditioner, hereafter called the assembly, Part Number 2007271-011.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND1002214	General Specification for Preservation, Packaging, Packing, and Container Marking of APOLLO Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment

STANDARDS

Military

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

DRAWINGS

APOLLO G&N

2007271	Header Assembly Flight Qual Signal Conditioner
2014779	Lead Set AA, Electrical - C/M Flight Qual
2014802	Wiring Harness A, C/M Flight Qual

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO, Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Continuity and DC Resistance. Continuity shall be as specified on Drawings 2014779 and 2014802. All pins electrically connected shall exhibit dc resistance of 0.5 ohms or less.

3.1.2 Grounding Pin Resistance. Each pin listed in Table I shall exhibit a dc resistance of 15 milliohms or less to the frame.

TABLE I

GROUNDING PINS

PINS	
J4-1	J7-1
J5-1	J8-1
J6-1	J9-1

3.1.3 Insulation Resistance. The resistance between each network and all other networks shall be greater than or equal to 100 megohms.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Drawing 2007271 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 PRODUCT PERFORMANCE AND CONFIGURATION REQUIREMENTS/QUALITY VERIFICATION CROSS REFERENCE INDEX

Test/Examination	Requirement	Method
Continuity and DC Resistance	3.1.1	4.3.3
Grounding Pin Resistance	3.1.2	4.3.4
Insulation Resistance	3.1.3	4.3.5
Drawing Compliance	3.2.1	4.3.1

4.2 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.2.1 Test Conditions

4.2.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C
b. Relative Humidity: 90% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.2.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.3 TESTS

4.3.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Drawing 2007271. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 Workmanship-Vibration. For spare units only, the assembly shall be vibrated with dummy modules which simulate the respective module weight. The proper connector pins shall be wired and monitored for continuity during the vibration test. The assembly shall be mounted on the vibration fixture in a manner similar to the way it will be mounted in service so that it will be vibrated along the simulated command module X, Y, and Z axes. The assembly shall be vibrated with simple harmonic motion swept from 10 to 2000 cps at a rate of one octave/ 15 sec. The magnitude of vibration shall be 3.5g rms limited to a 0.3 inch pp constant displacement from 10 cps to the crossover frequency. During vibration the continuity of the assembly shall be constantly monitored per Drawings 2014779 and 2014802. Any evidence of discontinuity shall be recorded and shall be cause for rejection. The monitoring circuitry shall have a response time of 10 μsec or less for any open circuit. Workmanship-vibration testing shall be performed on all units other than spares at the higher assembly level with operational modules installed.

4.3.3 Continuity and DC Resistance. Continuity and dc resistance shall be measured using a low voltage resistance measuring device in accordance with Method 303 of MIL-STD-202. Measurements shall be made from each individual pin to all other pins electrically connected, but duplicate tests of pins previously tested need not be made. All readings for pins electrically connected per Drawings 2014779 and 2014802 shall be less than 0.5 ohm. Any readings greater than 0.5 ohm for pins electrically connected as per Drawings 2014779 and 2014802 shall be recorded and shall be cause for rejection.

4.3.4 Grounding Pin Resistance. With a dc current of 3.0±2.5 amperes passed through the frame and the pin being tested, and the dc voltage measured across the pin and the frame as shown in Figure 1, the dc resistance between each individual pin listed in Table I and the frame shall be calculated and recorded. The resistance shall be calculated using the equation specified in 6.1 and the value shall be as specified in 3.1.2. To ensure good electrical connections, when measuring the voltage and current, the protective finish of the frame may be penetrated.

4.3.5 Insulation Resistance. The insulation resistance between each electrically connected network and all other networks shall be as specified in 3.1.3 when measured in accordance with Method 302 of MIL-STD-202. The megohmmeter used shall have an output voltage of 500±100 vdc limited to short circuit current of 2.0 milliamperes or less. Any reading of less than 100 megohms shall be recorded and shall be cause for rejection. Spare pins shall be included as individual networks.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES

6.1 GROUNDING PIN RESISTANCE EQUATION. Grounding pin resistance shall be calculated using the following equation:

$$R = \frac{E}{I} \text{ milliohms}$$

where: E is the millivoltmeter indication
I is the ammeter indication

ETP:lv

APPLICATION		REVISIONS 27779			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
2007090-031 2007090-011	2007222-011	A	REVISED PER TDRR 24962	5 JAN 66	J. PAT

REV																								
SHEET																								
REV STATUS	REV				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
OF SHEETS	SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO
CONTRACT

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
DATE 27 SEP 65
CHECKED 27 SEP 65
APPROVAL Dale Jensen 27 Sep 65
APPROVAL M. D. Birnbaum 28 Sep 65

LEAD SET AA, ELECTRICAL-
CDU ELECTRONICS TRAY X C/M

NASA APPROVAL
MIT APPROVAL

CODE IDENT NO.	SIZE		REV
80230	A	2007333	A

CONTRACT NAS 9-497
SCALE NONE
SHEET 1 OF 16

LEAD SET AA ▼ 2007333 A

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOTE ONE IS NOT APPLICABLE
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	VENDOR ITEM SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 2 OF 16

MIL 2084 9-65

LEAD SET AA ▼ 2007333 A

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
3	1	1	1010807- 5	WIRE, 24AWG, WHITE
3	2	1	1010807- 19	WIRE, 24AWG, RED
3	3	1	1010807- 20	WIRE, 24AWG, BLUE
3	4	1	1010807- 21	WIRE, 24AWG, YELLOW

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 3 OF 16

MIL 2084 9-65

LEAD SET AA ▼ 2007333 A

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA	1	3		X2-236 X2-136					.81 .81	NO NO			
AA	2	3		X2-136 X1-234					.81 .81	NO NO			
AA	3	3		X1-234 X1-233					.81 .81	NO NO			
AA	4	3		X1-233 X1-122					.81 .81	NO NO			
AA	5	3		X1-122 X1-121					.81 .81	NO NO			
AA	6	3		X1-121 X2-112					.81 .81	NO NO			
AA	7	3		X2-112 X2-212					.81 .81	NO NO			
AA	8	3		X2-212 X4-209					.81 .81	NO NO			
AA	9	3		X4-209 X2-160					.81 .81	NO NO			
AA	10	3		X2-160 X2-260					.81 .81	NO NO			
AA	11	3		X2-260 X3-160					.81 .81	NO NO			
AA	12	3		X3-160 X3-167					.81 .81	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 4 OF 16

MIL 2084 9-65

LEAD SET AA ▼ 2007333 A

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA	13	3		X3-167 X1-263					.81 .81	NO NO			
AA	14	3		X1-152 X4-204					.81 .81	NO NO			
AA	15	3		X1-152 X4-204					.81 .81	NO NO			
AA	16	3		X1-161 X4-205					.81 .81	NO NO			
AA	17	3		X1-161 X4-205					.81 .81	NO NO			
AA	18	3		X3-216 X4-210					.81 .81	NO NO			
AA	19	3		X4-210 X3-224					.81 .81	NO NO			
AA	20	3		X53-236 X4-217					.81 .81	NO NO			
AA	21	3		X53-236 X4-217					.81 .81	NO NO			
AA	22	3		X53-436 X4-218					.81 .81	NO NO			
AA	23	3		X53-436 X4-218					.81 .81	NO NO			
AA	24	3		X53-238 X4-219					.81 .81	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 5 OF 16

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 25	3		X53-238 X4-219					.81 .81	NO NO			
AA 26	3		X53-119 X4-220					.81 .81	NO NO			
AA 27	3		X53-119 X4-220					.81 .81	NO NO			
AA 28	3		X4-211 X51-141					.81 .81	NO NO			
AA 29	3		X51-141 X4-212					.81 .81	NO NO			
AA 30	3		X4-212 X51-341					.81 .81	NO NO			
AA 31	3		X51-341 X4-213					.81 .81	NO NO			
AA 32	3		X4-213 X51-242					.81 .81	NO NO			
AA 33	3		X51-242 X4-214					.81 .81	NO NO			
AA 34	3		X4-214 X51-143					.81 .81	NO NO			
AA 35	3		X51-143 X4-215					.81 .81	NO NO			
AA 36	3		X4-215 X51-343					.81 .81	NO NO			

SIZE A	CODE IDENT NO. 80230	2007333
SCALE-NONE	REV LTR A	SHEET 6 OF 16

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 37	3		X51-343 X4-216					.81 .81	NO NO			
AA 38	3		X4-216 X51-244					.81 .81	NO NO			
AA 39			DELETED									
AA 40	3		X4-206 X6-112					.81 .81	NO NO			
AA 41	3		X6-112 X6-212					.81 .81	NO NO			
AA 42	3		X6-212 X8-112					.81 .81	NO NO			
AA 43	3		X8-112 X8-212					.81 .81	NO NO			
AA 44	3		X8-212 X12-112					.81 .81	NO NO			
AA 45	3		X12-112 X12-212					.81 .81	NO NO			
AA 46	3		X12-212 X14-112					.81 .81	NO NO			
AA 47	3		X14-112 X14-212					.81 .81	NO NO			
AA 48	3		X14-212 X14-236					.81 .81	NO NO			

SIZE A	CODE IDENT NO. 80230	2007333
SCALE-NONE	REV LTR A	SHEET 7 OF 16

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 49	3		X14-236 X14-136					.81 .81	NO NO			
AA 50	3		X14-136 X14-134					.81 .81	NO NO			
AA 51	3		X14-134 X8-236					.81 .81	NO NO			
AA 52	3		X8-236 X8-136					.81 .81	NO NO			
AA 53	3		X8-136 X8-134					.81 .81	NO NO			
AA 54	3		X8-134 X4-206					.81 .81	NO NO			
AA 55	3		X4-208 X6-136					.81 .81	NO NO			
AA 56	3		X6-136 X6-236					.81 .81	NO NO			
AA 57	3		X6-236 X5-245					.81 .81	NO NO			
AA 58	3		X5-245 X5-166					.81 .81	NO NO			
AA 59	3		X5-166 X6-160					.81 .81	NO NO			
AA 60	3		X6-160 X6-260					.81 .81	NO NO			

SIZE A	CODE IDENT NO. 80230	2007333
SCALE-NONE	REV LTR A	SHEET 8 OF 16

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 61	3		X6-260 X8-160					.81 .81	NO NO			
AA 62	3		X8-160 X8-260					.81 .81	NO NO			
AA 63	3		X8-260 X4-208					.81 .81	NO NO			
AA 64	3		X4-207 X12-136					.81 .81	NO NO			
AA 65	3		X12-136 X12-236					.81 .81	NO NO			
AA 66	3		X12-236 X11-245					.81 .81	NO NO			
AA 67	3		X11-245 X11-166					.81 .81	NO NO			
AA 68	3		X11-166 X12-160					.81 .81	NO NO			
AA 69	3		X12-160 X12-260					.81 .81	NO NO			
AA 70	3		X12-260 X14-160					.81 .81	NO NO			
AA 71	3		X14-160 X14-260					.81 .81	NO NO			
AA 72	3		X14-260 X4-207					.81 .81	NO NO			

SIZE A	CODE IDENT NO. 80230	2007333
SCALE-NONE	REV LTR A	SHEET 9 OF 16

MIL 2084 9-65

LEAD SET AA 2007333 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 73	2		X1-140 X4-107					.81 .81	NO NO			
AA 74	2		X1-140 X4-107					.81 .81	NO NO			
AA 75	2		X1-247 X4-108					.81 .81	NO NO			
AA 76	2		X1-247 X4-108					.81 .81	NO NO			
AA 77			DELETED									
AA 78	2		X2-124 X2-224					.81 .81	NO NO			
AA 79	2		X2-224 X4-106					.81 .81	NO NO			
AA 80	2		X4-105 X2-248					.81 .81	NO NO			
AA 81	2		X2-248 X2-148					.81 .81	NO NO			
AA 82	2		X2-148 X3-260					.81 .81	NO NO			
AA 83	2		X4-109 X51-340					.81 .81	NO NO			
AA 84	2		X51-340 X4-110					.81 .81	NO NO			

SIZE A
CODE IDENT NO. 80230
2007333
SCALE-NONE REV LTR A
SHEET 10 OF 16

MIL 2084 9-65

LEAD SET AA 2007333 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 85	2		X4-110 X51-241					.81 .81	NO NO			
AA 86	2		X51-241 X4-111					.81 .81	NO NO			
AA 87	2		X4-111 X51-142					.81 .81	NO NO			
AA 88	2		X51-142 X4-112					.81 .81	NO NO			
AA 89	2		X4-112 X51-342					.81 .81	NO NO			
AA 90	2		X51-342 X4-113					.81 .81	NO NO			
AA 91	2		X4-113 X51-243					.81 .81	NO NO			
AA 92	2		X51-243 X4-114					.81 .81	NO NO			
AA 93	2		X4-114 X51-144					.81 .81	NO NO			
AA 94	2		X4-101 X14-224					.81 .81	NO NO			
AA 95	2		X14-224 X14-124					.81 .81	NO NO			
AA 96	2		X14-124 X12-224					.81 .81	NO NO			

SIZE A
CODE IDENT NO. 80230
2007333
SCALE-NONE REV LTR A
SHEET 11 OF 16

MIL 2084 9-65

LEAD SET AA 2007333 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 97	2		X12-224 X12-124					.81 .81	NO NO			
AA 98	2		X12-124 X4-102					.81 .81	NO NO			
AA 99	2		X4-102 X6-124					.81 .81	NO NO			
AA 100	2		X6-124 X6-224					.81 .81	NO NO			
AA 101	2		X6-224 X8-124					.81 .81	NO NO			
AA 102	2		X8-124 X8-224					.81 .81	NO NO			
AA 103	2		X8-224 X4-101					.81 .81	NO NO			
AA 104	2		X4-103 X14-248					.81 .81	NO NO			
AA 105	2		X14-248 X14-148					.81 .81	NO NO			
AA 106	2		X14-148 X12-248					.81 .81	NO NO			
AA 107	2		X12-248 X12-148					.81 .81	NO NO			
AA 108	2		X12-148 X4-104					.81 .81	NO NO			

SIZE A
CODE IDENT NO. 80230
2007333
SCALE-NONE REV LTR A
SHEET 12 OF 16

MIL 2084 9-65

LEAD SET AA 2007333 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 109	2		X4-104 X6-148					.81 .81	NO NO			
AA 110	2		X6-148 X6-248					.81 .81	NO NO			
AA 111	2		X6-248 X8-148					.81 .81	NO NO			
AA 112	2		X8-148 X8-248					.81 .81	NO NO			
AA 113	2		X8-248 X4-103					.81 .81	NO NO			
AA 114	4		X11-144 X15-209					.81 .81	NO NO			
AA 115	4		X15-209 X15-126					.81 .81	NO NO			
AA 116	4		X15-126 X15-233					.81 .81	NO NO			
AA 117	4		X15-233 X15-243					.81 .81	NO NO			
AA 118	4		X15-264 X15-260					.81 .81	NO NO			
AA 119	4		X15-260 X15-250					.81 .81	NO NO			
AA 120	4		X15-250 X15-208					.81 .81	NO NO			

SIZE A
CODE IDENT NO. 80230
2007333
SCALE-NONE REV LTR A
SHEET 13 OF 16

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 121	4		X15-208 X15-244					.81 .81	NO NO			
AA 122	4		X15-244 X16-210					.81 .81	NO NO			
AA 123	4		X16-210 X16-250					.81 .81	NO NO			
AA 124	4		X16-250 X16-163					.81 .81	NO NO			
AA 125	4		X15-171 X16-140					.81 .81	NO NO			
AA 126	4		X5-144 X9-209					.81 .81	NO NO			
AA 127	4		X9-209 X9-126					.81 .81	NO NO			
AA 128	4		X9-126 X9-233					.81 .81	NO NO			
AA 129	4		X9-233 X9-243					.81 .81	NO NO			
AA 130	4		X9-264 X9-260					.81 .81	NO NO			
AA 131	4		X9-260 X9-250					.81 .81	NO NO			
AA 132	4		X9-250 X9-208					.81 .81	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 14 OF 16

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 133	4		X9-208 X9-244					.81 .81	NO NO			
AA 134	4		X9-244 X10-210					.81 .81	NO NO			
AA 135	4		X10-210 X10-250					.81 .81	NO NO			
AA 136	4		X10-250 X10-163					.81 .81	NO NO			
AA 137	4		X9-171 X10-140					.81 .81	NO NO			
AA 138	1		X53-136 X4-131					.81 .81	NO NO			
AA 139	1		X53-336 X4-231					.81 .81	NO NO			
AA 140	3		X3-134 X3-132					.81 .81	NO NO			
AA 141	3		X3-132 X3-224					.81 .81	NO NO			
AA 142	3		X3-216 X3-213					.81 .81	NO NO			
AA 143	3		X3-213 X3-113					.81 .81	NO NO			
AA 144	3		X3-113 X3-105					.81 .81	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 15 OF 16

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 145	3		X3-105 X3-103					.81 .81	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2007333
SCALE-NONE	REV LTR A	SHEET 16 OF 16

APPLICATION	
NEXT ASSY	USED ON
2007090-031 2007090-011	2007222-011

REVISIONS 22929			
SYM	DESCRIPTION	DATE	APPROVAL

REV															
SHEET															
REV STATUS REV	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
OF SHEETS SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Jon Wisk DATE 27 SEP 65
CHECKED 27 SEP 65
APPROVAL Dale Jensen 27 Sep 65
APPROVAL R. D. Birnbaum 28 Sep 65
NASA APPROVAL NOT REQUIRED PER LETTER
MIT APPROVAL MIT/AP7-65-612
CONTRACT NAS 9-497

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HOUSTON, TEXAS

LEAD SET AA, ELECTRICAL - CDU ELECTRONICS TRAY X C/M

CODE IDENT NO. 80230
SIZE A
2007333
REV +
SCALE NONE
SHEET 1 OF 15

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOTE ONE IS NOT APPLICABLE
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SEE NOTE NUMBER	ITEM	QTY	LIST OF MATERIALS PART NO.	DESCRIPTION
3	1	1	1010807- 5	WIRE, 24AWG, WHITE
3	2	1	1010807- 19	WIRE, 24AWG, RED
3	3	1	1010807- 20	WIRE, 24AWG, BLUE
3	4	1	1010807- 21	WIRE, 24AWG, YELLOW

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 1	3		X2-236 X2-136					.81 .81	NO NO			
AA 2	3		X2-136 X1-234					.81 .81	NO NO			
AA 3	3		X1-234 X1-233					.81 .81	NO NO			
AA 4	3		X1-233 X1-122					.81 .81	NO NO			
AA 5	3		X1-122 X1-121					.81 .81	NO NO			
AA 6	3		X1-121 X2-112					.81 .81	NO NO			
AA 7	3		X2-112 X2-212					.81 .81	NO NO			
AA 8	3		X2-212 X4-209					.81 .81	NO NO			
AA 9	3		X4-209 X2-160					.81 .81	NO NO			
AA 10	3		X2-160 X2-260					.81 .81	NO NO			
AA 11	3		X2-260 X3-160					.81 .81	NO NO			
AA 12	3		X3-160 X3-167					.81 .81	NO NO			

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 13	3		X3-167					.81	NO			
			X1-263					.81	NO			
AA 14	3		X1-152					.81	NO			
			X4-204					.81	NO			
AA 15	3		X1-152					.81	NO			
			X4-204					.81	NO			
AA 16	3		X1-161					.81	NO			
			X4-205					.81	NO			
AA 17	3		X1-161					.81	NO			
			X4-205					.81	NO			
AA 18	3		X3-117					.81	NO			
			X4-210					.81	NO			
AA 19	3		X4-210					.81	NO			
			X3-224					.81	NO			
AA 20	3		X53-236					.81	NO			
			X4-217					.81	NO			
AA 21	3		X53-236					.81	NO			
			X4-217					.81	NO			
AA 22	3		X53-436					.81	NO			
			X4-218					.81	NO			
AA 23	3		X53-436					.81	NO			
			X4-218					.81	NO			
AA 24	3		X53-238					.81	NO			
			X4-219					.81	NO			

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SIZ
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2007333

SCALE-NONE
REV LTR

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONB, FIG	ACCESSORY ITEMS	REMARKS
AA 25	3		X53-238					.81	NO			
			X4-219					.81	NO			
AA 26	3		X53-119					.81	NO			
			X4-220					.81	NO			
AA 27	3		X53-119					.81	NO			
			X4-220					.81	NO			
AA 28	3		X4-211					.81	NO			
			X51-141					.81	NO			
AA 29	3		X51-141					.81	NO			
			X4-212					.81	NO			
AA 30	3		X4-212					.81	NO			
			X51-341					.81	NO			
AA 31	3		X51-341					.81	NO			
			X4-213					.81	NO			
AA 32	3		X4-213					.81	NO			
			X51-242					.81	NO			
AA 33	3		X51-242					.81	NO			
			X4-214					.81	NO			
AA 34	3		X4-214					.81	NO			
			X51-143					.81	NO			
AA 35	3		X51-143					.81	NO			
			X4-215					.81	NO			
AA 36	3		X4-215					.81	NO			
			X51-343					.81	NO			

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SIZE
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2007333

SCALE-NONE
REV LTR

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 37	3		X51-343					.81	NO			
			X4-216					.81	NO			
AA 38	3		X4-216					.81	NO			
			X51-244					.81	NO			
AA 39	3		X51-244					.81	NO			
			X53-649					.81	NO			
AA 40	3		X4-206					.81	NO			
			X6-112					.81	NO			
AA 41	3		X6-112					.81	NO			
			X6-212					.81	NO			
AA 42	3		X6-212					.81	NO			
			X8-112					.81	NO			
AA 43	3		X8-112					.81	NO			
			X8-212					.81	NO			
AA 44	3		X8-212					.81	NO			
			X12-112					.81	NO			
AA 45	3		X12-112					.81	NO			
			X12-212					.81	NO			
AA 46	3		X12-212					.81	NO			
			X14-112					.81	NO			
AA 47	3		X14-112					.81	NO			
			X14-212					.81	NO			
AA 48	3		X14-212					.81	NO			
			X14-236					.81	NO			

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SIZE
A

2007333

SCALE-NONE
REV LTR

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONB, FIG	ACCESSORY ITEMS	REMARKS
AA 49	3		X14-236					.81	NO			
			X14-136					.81	NO			
AA 50	3		X14-136					.81	NO			
			X14-134					.81	NO			
AA 51	3		X14-134					.81	NO			
			X8-236					.81	NO			
AA 52	3		X8-236					.81	NO			
			X8-136					.81	NO			
AA 53	3		X8-136					.81	NO			
			X8-134					.81	NO			
AA 54	3		X8-134					.81	NO			
			X4-206					.81	NO			
AA 55	3		X4-208					.81	NO			
			X6-136					.81	NO			
AA 56	3		X6-136					.81	NO			
			X6-236					.81	NO			
AA 57	3		X6-236					.81	NO			
			X5-245					.81	NO			
AA 58	3		X5-245					.81	NO			
			X5-166					.81	NO			
AA 59	3		X5-166					.81	NO			
			X6-160					.81	NO			
AA 60	3		X6-160					.81	NO			
			X6-260					.81	NO			

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SIZE
A

2007333

SCALE-NONE
REV LTR

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 61	3		X6-260 X8-160					.81 .81	NO NO			
AA 62	3		X8-160 X8-260					.81 .81	NO NO			
AA 63	3		X8-260 X4-208					.81 .81	NO NO			
AA 64	3		X4-207 X12-136					.81 .81	NO NO			
AA 65	3		X12-136 X12-236					.81 .81	NO NO			
AA 66	3		X12-236 X11-245					.81 .81	NO NO			
AA 67	3		X11-245 X11-166					.81 .81	NO NO			
AA 68	3		X11-166 X12-160					.81 .81	NO NO			
AA 69	3		X12-160 X12-260					.81 .81	NO NO			
AA 70	3		X12-260 X14-160					.81 .81	NO NO			
AA 71	3		X14-160 X14-260					.81 .81	NO NO			
AA 72	3		X14-260 X4-207					.81 .81	NO NO			

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SCALE - NONE	REV LTR	SHEET 9 OF 15

MIL 2064 4-63

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 73	2		X1-140 X4-107					.81 .81	NO NO			
AA 74	2		X1-140 X4-107					.81 .81	NO NO			
AA 75	2		X1-247 X4-108					.81 .81	NO NO			
AA 76	2		X1-247 X4-108					.81 .81	NO NO			
AA 77	2		X3-120 X2-124					.81 .81	NO NO			
AA 78	2		X2-124 X2-224					.81 .81	NO NO			
AA 79	2		X2-224 X4-106					.81 .81	NO NO			
AA 80	2		X4-105 X2-248					.81 .81	NO NO			
AA 81	2		X2-248 X2-148					.81 .81	NO NO			
AA 82	2		X2-148 X3-260					.81 .81	NO NO			
AA 83	2		X4-109 X51-340					.81 .81	NO NO			
AA 84	2		X51-340 X4-110					.81 .81	NO NO			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2007333
SCALE - NONE	REV LTR	SHEET 10 OF 15

MIL 2064 4-63

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 85	2		X4-110 X51-241					.81 .81	NO NO			
AA 86	2		X51-241 X4-111					.81 .81	NO NO			
AA 87	2		X4-111 X51-142					.81 .81	NO NO			
AA 88	2		X51-142 X4-112					.81 .81	NO NO			
AA 89	2		X4-112 X51-342					.81 .81	NO NO			
AA 90	2		X51-342 X4-113					.81 .81	NO NO			
AA 91	2		X4-113 X51-243					.81 .81	NO NO			
AA 92	2		X51-243 X4-114					.81 .81	NO NO			
AA 93	2		X4-114 X51-144					.81 .81	NO NO			
AA 94	2		X4-101 X14-224					.81 .81	NO NO			
AA 95	2		X14-224 X14-124					.81 .81	NO NO			
AA 96	2		X14-124 X12-224					.81 .81	NO NO			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2007333
SCALE - NONE	REV LTR	SHEET 11 OF 15

MIL 2064 4-63

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 97	2		X12-224 X12-124					.81 .81	NO NO			
AA 98	2		X12-124 X4-102					.81 .81	NO NO			
AA 99	2		X4-102 X6-124					.81 .81	NO NO			
AA 100	2		X6-124 X6-224					.81 .81	NO NO			
AA 101	2		X6-224 X8-124					.81 .81	NO NO			
AA 102	2		X8-124 X8-224					.81 .81	NO NO			
AA 103	2		X8-224 X4-101					.81 .81	NO NO			
AA 104	2		X4-103 X14-248					.81 .81	NO NO			
AA 105	2		X14-248 X14-148					.81 .81	NO NO			
AA 106	2		X14-148 X12-248					.81 .81	NO NO			
AA 107	2		X12-248 X12-148					.81 .81	NO NO			
AA 108	2		X12-148 X4-104					.81 .81	NO NO			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2007333
SCALE - NONE	REV LTR	SHEET 12 OF 15

MIL 2064 4-63

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 109	2		X4-104 X6-148					.81 .81	NO NO			
AA 110	2		X6-148 X6-248					.81 .81	NO NO			
AA 111	2		X6-248 X8-148					.81 .81	NO NO			
AA 112	2		X8-148 X8-248					.81 .81	NO NO			
AA 113	2		X8-248 X4-103					.81 .81	NO NO			
AA 114	4		X11-144 X15-209					.81 .81	NO NO			
AA 115	4		X15-209 X15-126					.81 .81	NO NO			
AA 116	4		X15-126 X15-233					.81 .81	NO NO			
AA 117	4		X15-233 X15-243					.81 .81	NO NO			
AA 118	4		X15-264 X15-260					.81 .81	NO NO			
AA 119	4		X15-260 X15-250					.81 .81	NO NO			
AA 120	4		X15-250 X15-208					.81 .81	NO NO			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2007333
SCALE-NONE
REV LTR
SHEET 13 OF 15

MIL 2064 4-63

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 121	4		X15-208 X15-244					.81 .81	NO NO			
AA 122	4		X15-244 X16-210					.81 .81	NO NO			
AA 123	4		X16-210 X16-250					.81 .81	NO NO			
AA 124	4		X16-250 X16-163					.81 .81	NO NO			
AA 125	4		X15-171 X16-140					.81 .81	NO NO			
AA 126	4		X5-144 X9-209					.81 .81	NO NO			
AA 127	4		X9-209 X9-126					.81 .81	NO NO			
AA 128	4		X9-126 X9-233					.81 .81	NO NO			
AA 129	4		X9-233 X9-243					.81 .81	NO NO			
AA 130	4		X9-264 X9-260					.81 .81	NO NO			
AA 131	4		X9-260 X9-250					.81 .81	NO NO			
AA 132	4		X9-250 X9-208					.81 .81	NO NO			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2007333
SCALE-NONE
REV LTR
SHEET 14 OF 15

MIL 2064 4-63

LEAD SET AA 2007333

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 133	4		X9-208 X9-244					.81 .81	NO NO			
AA 134	4		X9-244 X10-210					.81 .81	NO NO			
AA 135	4		X10-210 X10-250					.81 .81	NO NO			
AA 136	4		X10-250 X10-163					.81 .81	NO NO			
AA 137	4		X9-171 X10-140					.81 .81	NO NO			
AA 138	1		X53-136 X4-131					.81 .81	NO NO			
AA 139	1		X53-336 X4-231					.81 .81	NO NO			

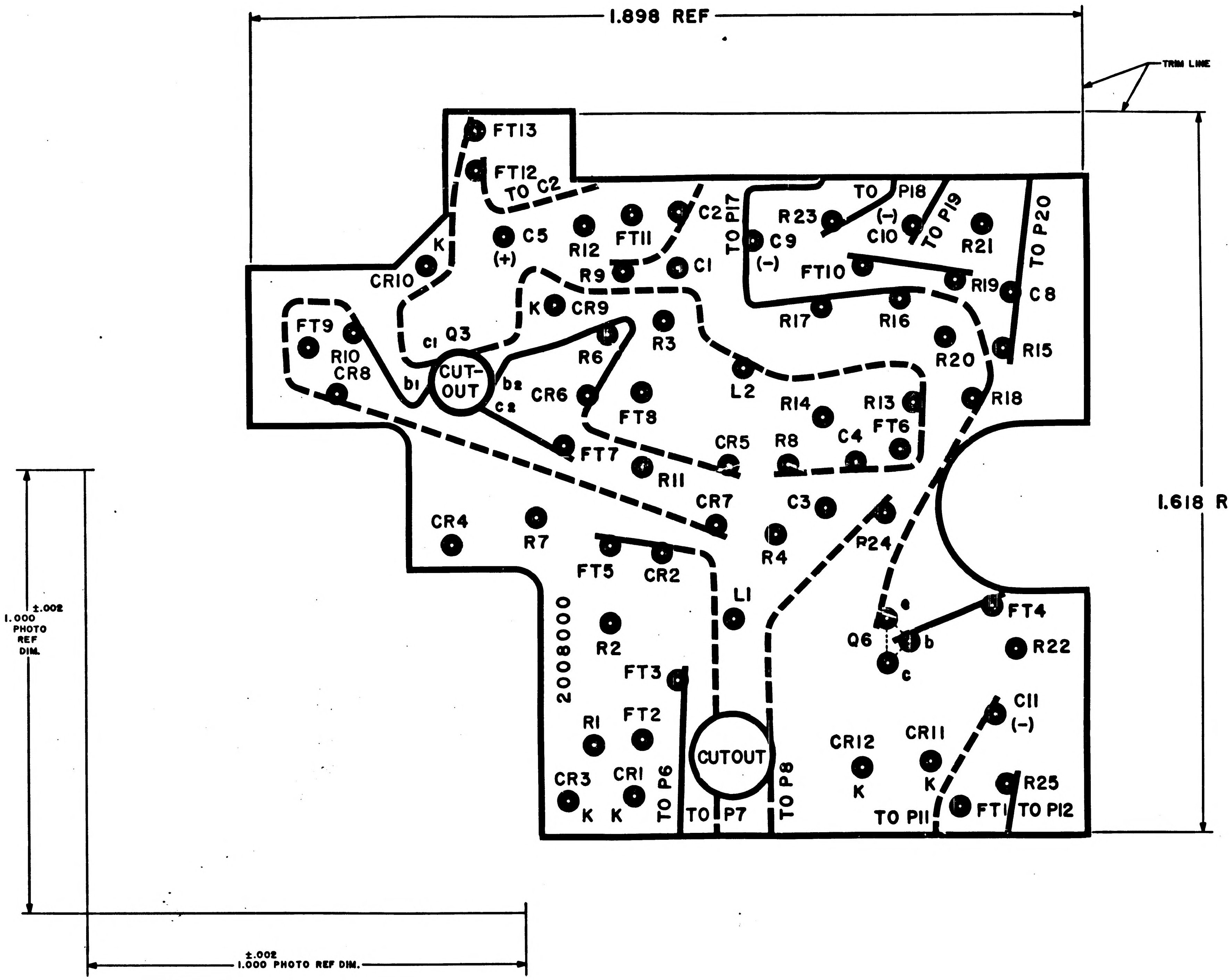
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2007333
SCALE-NONE
REV LTR
SHEET 15 OF 15

MIL 2064 4-63

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14797

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17618		ℓℓ	22 MAR 65	WK


1.898 REF
TRIM LINE
1.618 REF
1.000 ±.002 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.
FT13
FT12
TO C2
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C2
TO P17
C9
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C10
TO P19
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CR10
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FT3
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(−)
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CR11
CUTOUT
CR3
CR1
K
K
TO P6
TO P7
TO P8
K
K
TO P11
R25
FT1
TO P12

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ◉ .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007103	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.G. [illegible]
CHECKED [illegible]
APPROVED [illegible] 11 DEC 64
APPROVED [illegible]
APPROVED MIT W Ryffer
APPROVED MSC W.J. Rhine
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

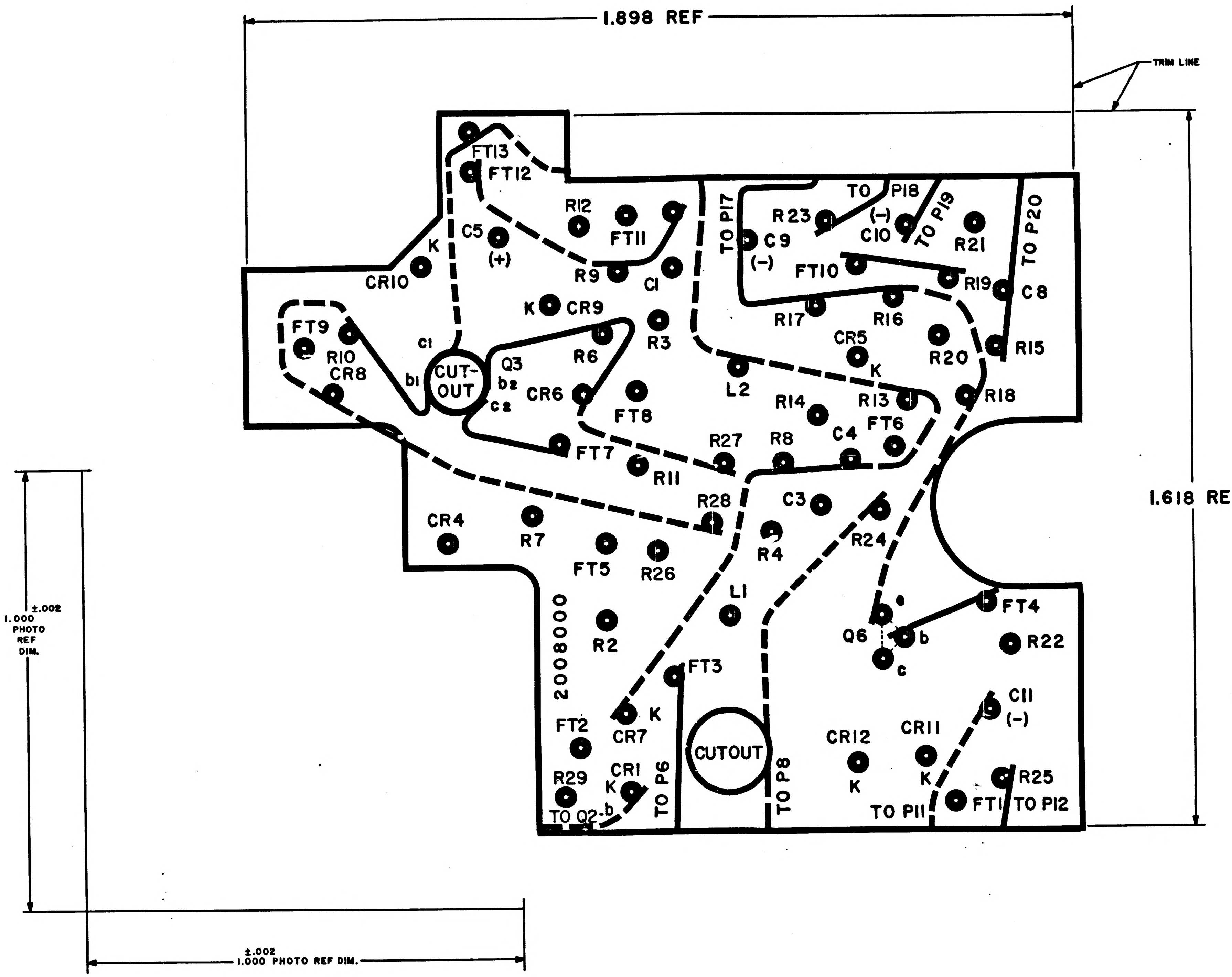
INSULATOR TOP
PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008000
SCALE 10/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14797

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17618			22 MAR 65	
B		REVISED PER TDRR 19223			29 ... 65	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1.618 REF
±.002
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FT13
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CR7
FT2
CUTOUT
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C11
(-)
R29
CR1
K
b
TO Q2
TO P6
TO P8
K
K
TO P11
R25
FT1
TO P12

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007103	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.B. [illegible] 17 NOV 64
CHECKED A. Lindstrom 18 Nov 64
APPROVED [illegible] 11 DEC 64
APPROVED [illegible]
APPROVED MIT W. Kupfer 15 Dec 64
APPROVED MSC W.J. Rhine 12-15-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

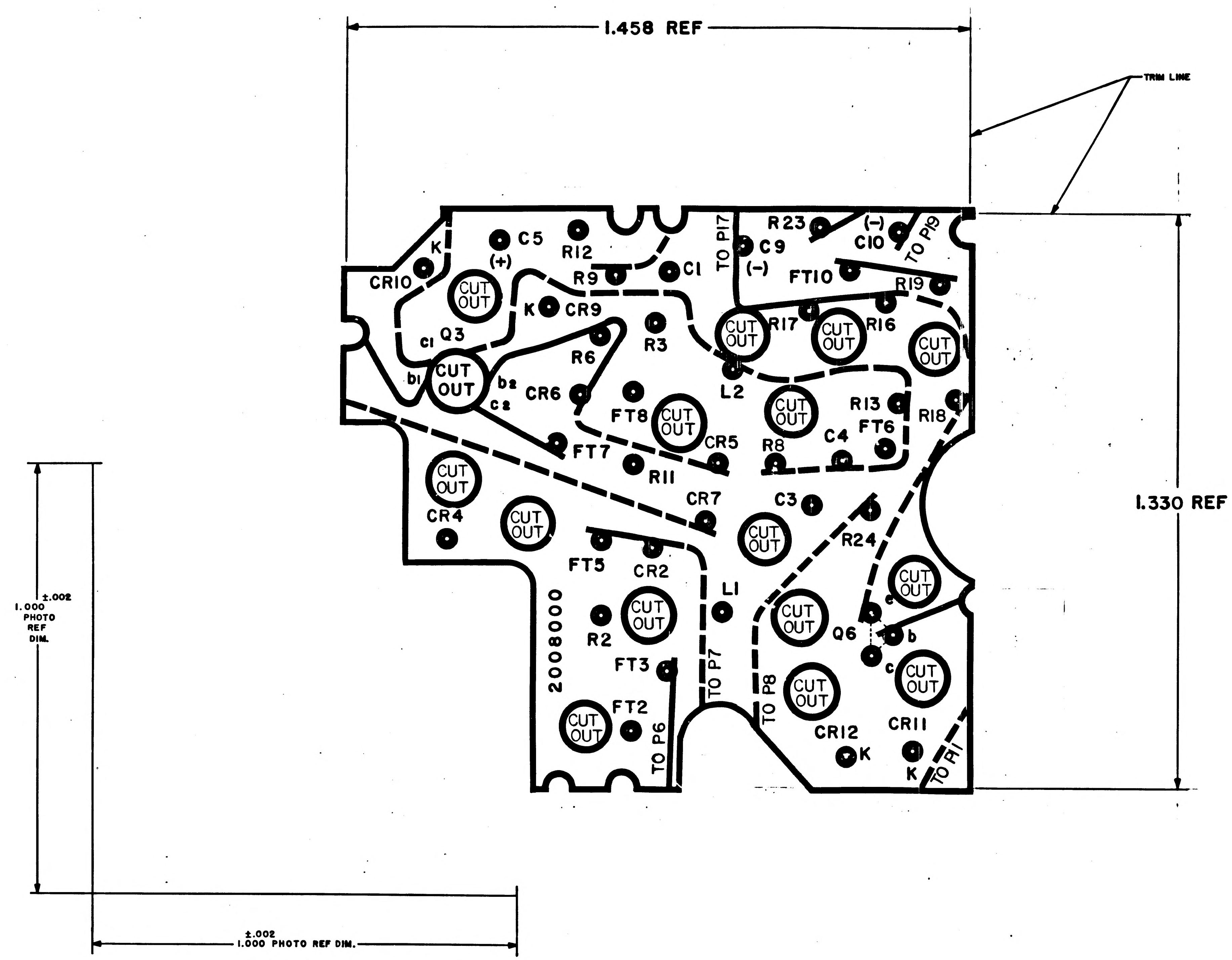
INSULATOR TOP
PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008000
SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14797

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17618			22MAR65	
B		REVISED PER TDRR 19283				
C		REVISED PER TDRR 21462			24AUG65	



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TRIM LINE
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1.000 PHOTO REF DIM.
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TO P17
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C10
TO P19
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CUT OUT
K
CR9
R17
R16
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R3
b1
b2
c2
R6
CR6
L2
FT8
R13
FT6
R18
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CR5
R8
C4
R11
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CR7
C3
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2008000
R2
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TO P7
TO P8
FT2
TO P6
CR12
CR11
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TO R1

NOTES:

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6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007103	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.B. [illegible]
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP
PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

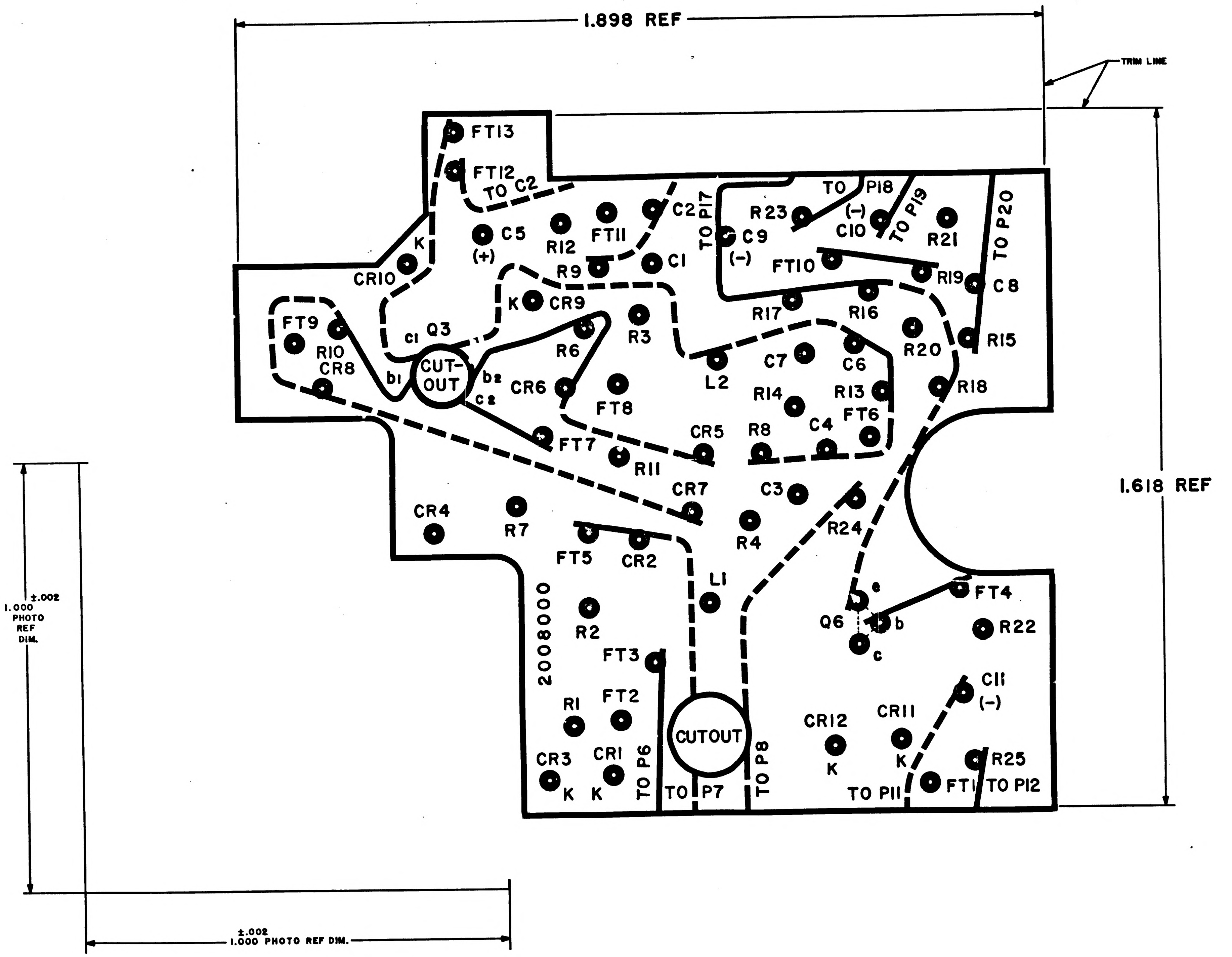
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008000

SCALE 10/1
SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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TO P19
R21
TO P20
C9
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K
CR10
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FT10
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CR8
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b2
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C6
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FT6
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CR5
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R25
TO P12

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
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4. MAKE MASTER POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007103	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.G. [illegible] 17 NOV 64
CHECKED [illegible]
APPROVED [illegible] 11 DEC 64
APPROVED [illegible]
APPROVED MIT [illegible] 15 [illegible] 64
APPROVED MSC [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

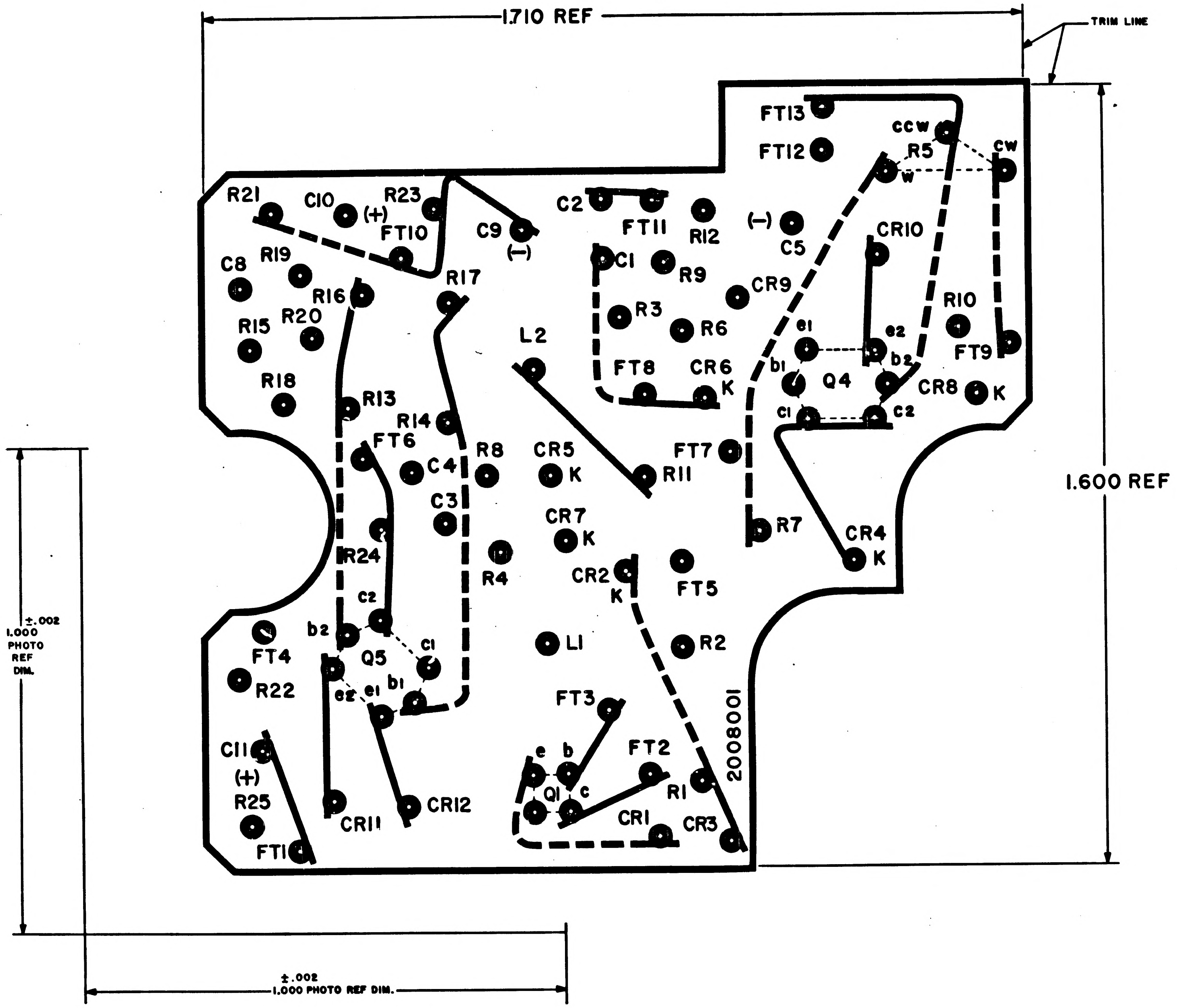
INSULATOR TOP PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008000
SCALE 10/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14793

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17618		[illegible]	[illegible]	[illegible]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1.600 REF
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C5
R21
C10
(+)
R23
FT10
C9
(−)
C1
R9
CR9
CR10
C8
R19
R16
R17
R3
R6
R10
R15
R20
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1.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007103	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN C.G. [illegible] [illegible]
CHECKED A. Lindstrom [illegible]
APPROVED [illegible] [illegible]
APPROVED [illegible] [illegible]
APPROVED MIT [illegible] [illegible]
APPROVED MSC [illegible] [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

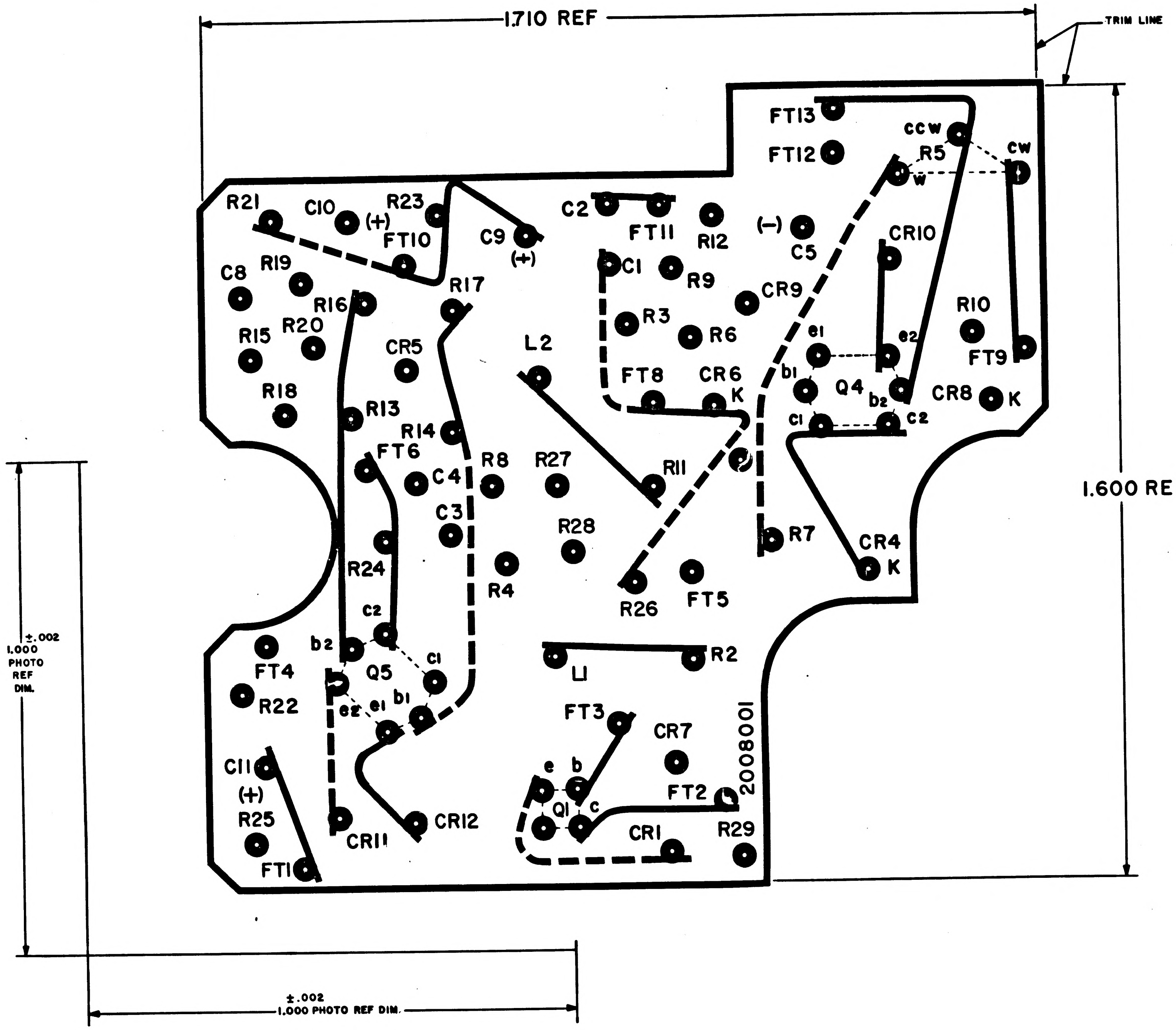
CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008001

SCALE 10/1 — SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14797

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17618		RL	2 MAR 65	wK
B		REVISED PER TDRR 19283	RMR		24 May 65	wic



1.710 REF
TRIM LINE
1.600 REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
FT13
FT12
CCW
R5
CW
W
R21
C10
(+)
R23
FT10
C9
(+)
C2
FT11
R12
(-)
C5
CR10
C8
R19
R16
R17
C1
R9
CR9
R3
R6
R10
R15
R20
CR5
L2
e1
e2
FT9
R18
FT8
CR6
K
b1
Q4
b2
CR8
K
R13
R14
c1
c2
FT6
C4
R8
R27
R11
C3
R28
R7
CR4
K
R24
R4
R26
FT5
c2
b2
Q5
c1
L1
R2
FT4
e2
e1
b1
R22
FT3
CR7
2008001
C11
(+)
e
b
FT2
Q1
c
R25
CR11
CR12
CR1
R29
FT1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007103	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R. B. [illegible]
CHECKED A. Lindstrom 18 Nov 64
APPROVED [illegible] 11 DEC 64
APPROVED [illegible]
APPROVED MIT [illegible] 15 Dec 64
APPROVED MSC [illegible] 12-15-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

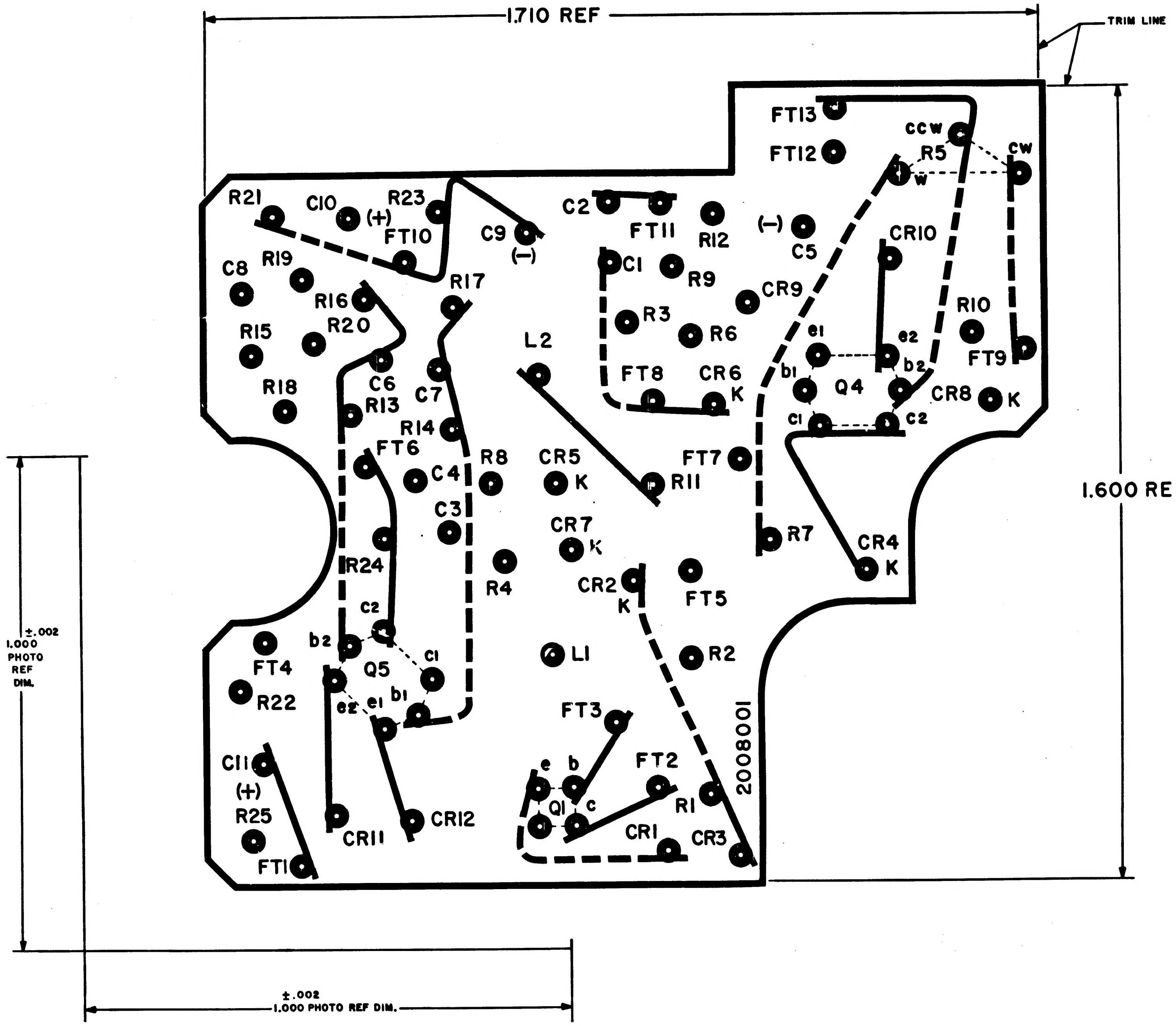
INSULATOR BOTTOM
PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008001
SCALE 10/1
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14797

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



1.710 REF
TRIM LINE
1.600 REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
2008001
FT13
FT12
CCW
R5
W
CW
R21
C10
(+)
R23
FT10
C9
(−)
C2
FT11
R12
(−)
C5
CR10
C8
R19
R16
R17
C1
R9
CR9
R20
R3
R6
e1
e2
R10
R15
C6
C7
L2
FT8
CR6
K
b1
Q4
b2
FT9
R18
R13
c1
c2
CR8
K
R14
FT6
C4
R8
CR5
K
FT7
R11
C3
CR7
K
R7
CR4
K
R24
R4
CR2
K
FT5
c2
b2
Q5
c1
L1
R2
FT4
e1
b1
R22
e2
FT3
C11
(+)
e
b
FT2
Q1
c
R1
R25
CR11
CR12
CR1
CR3
FT1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045 / .055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007103	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R. B. [illegible]
CHECKED A. Lindstrom 18 Nov 64
APPROVED [illegible] 11 DEC 64
APPROVED [illegible]
APPROVED MIT W Kaffer [illegible]
APPROVED MSC W J [illegible] 12-15-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

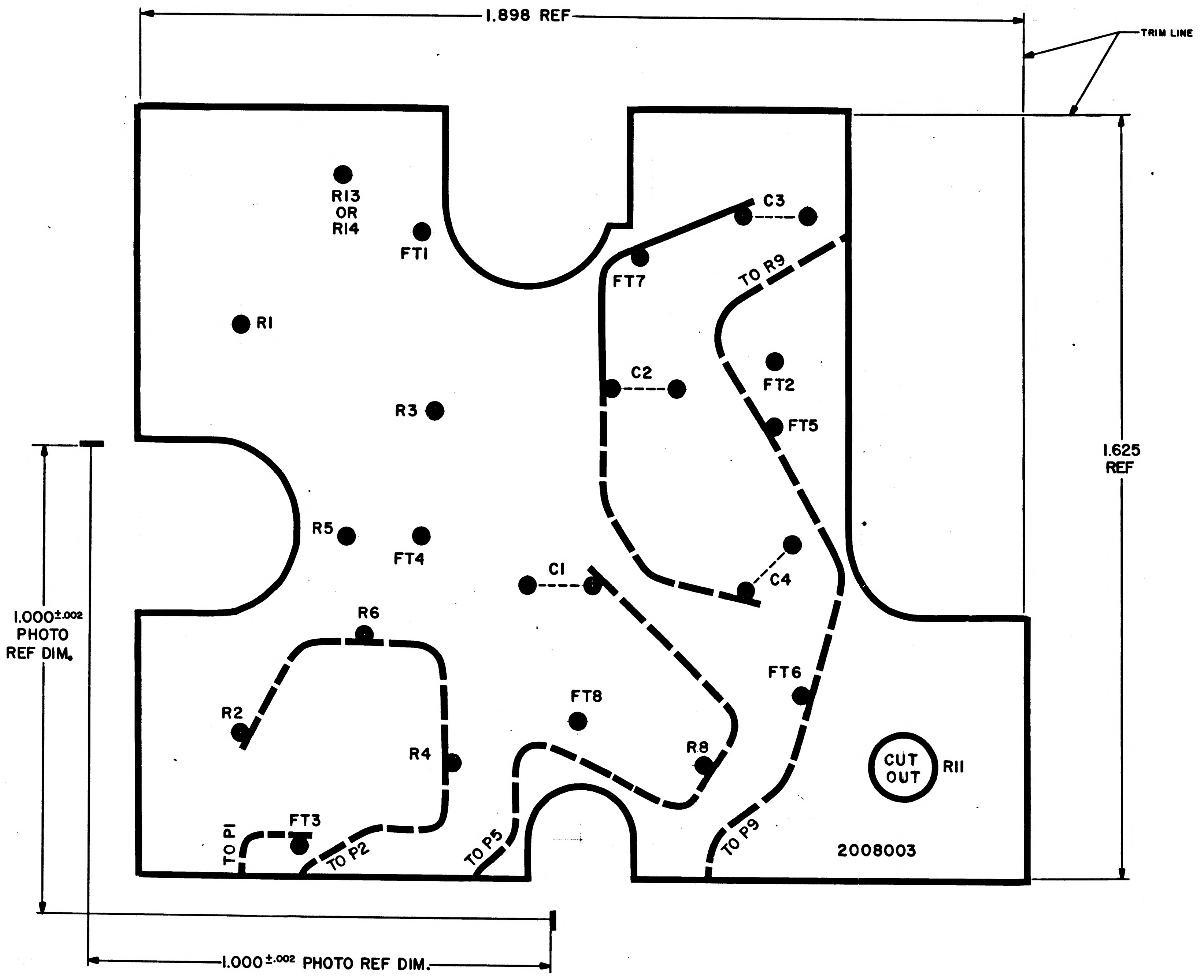
INSULATOR BOTTOM
PHOTOGRAPHIC MASTER
BINARY CURRENT SWITCH

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008001
SCALE 10/1
SHEET 1 OF 1

2008001

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
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6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007105	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 3/DEC/64
CHECKED
APPROVAL J. BLYSHAK
APPROVAL 12/23/64
NASA APPROVAL 1-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP
PHOTOGRAPHIC MASTER
PIPA CALIBRATION

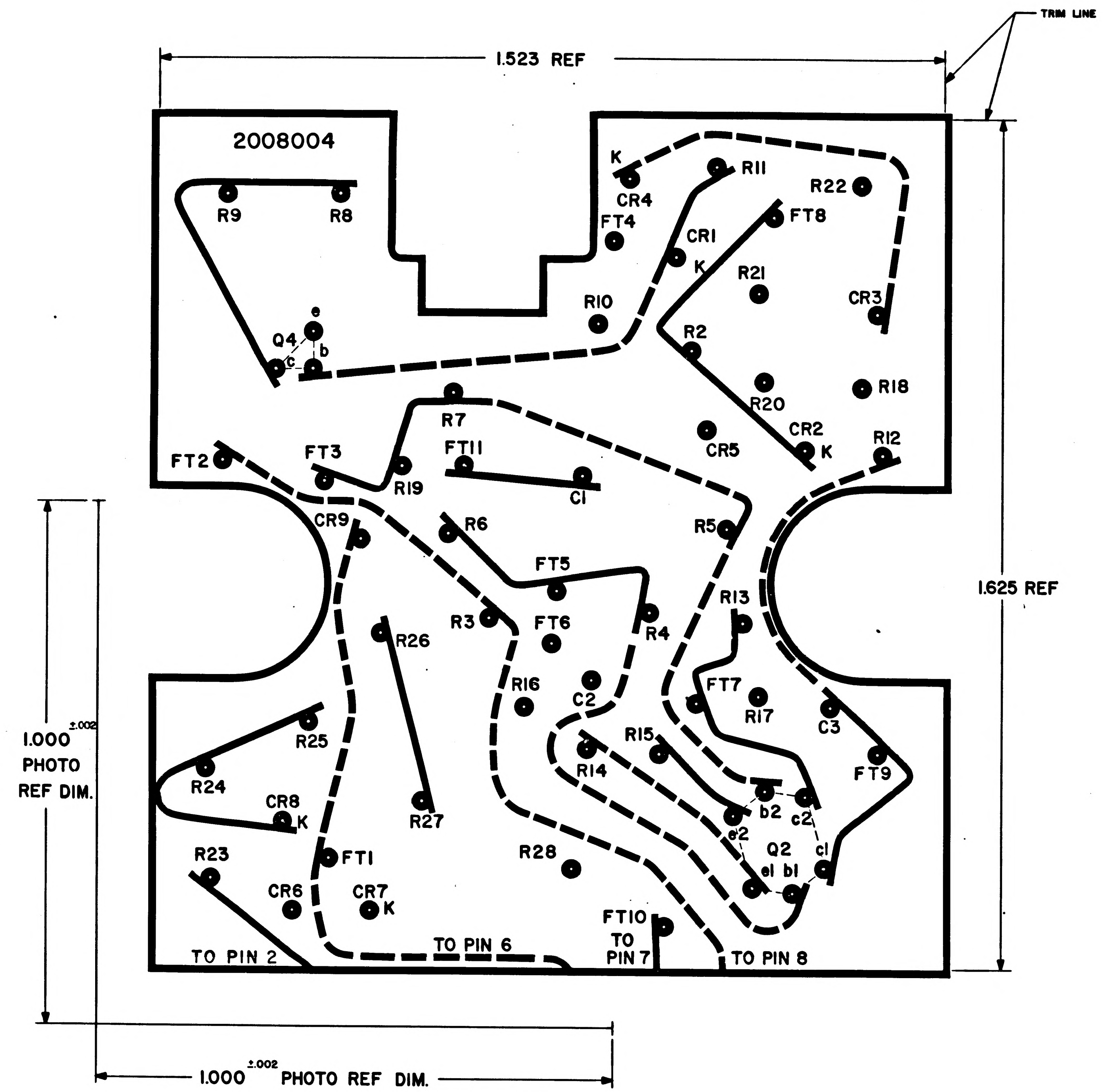
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008003
SCALE 10/1
WT —
SHEET 1 OF 1

2008003

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008004

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


TRIM LINE
1.523 REF
2008004
K
CR4
R11
R22
FT8
FT4
CR1
K
R9
R8
R21
R10
CR3
e
Q4
b
c
R2
R18
R20
R7
CR2
K
CR5
R12
FT2
FT3
FT11
R19
C1
CR9
R6
R5
1.625 REF
FT5
R3
R13
FT6
R4
R26
R16
C2
FT7
R17
C3
R25
R15
R14
FT9
R24
CR8
K
b2
c2
R27
e2
Q2
c1
e1 b1
R23
FT1
R28
CR6
CR7
K
FT10
TO PIN 2
TO PIN 6
TO PIN 7
TO PIN 8
1.000 ±.002 PHOTO REF DIM.
1.000 ±.002 PHOTO REF DIM.

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007101	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. Romey DATE 9-30-64
CHECKED [illegible]
APPROVAL J M BUYSHAN 4/DEC/64
APPROVAL D.B. Test 12/4/64
NASA APPROVAL W J [illegible] 12 Dec 64
MIT APPROVAL W Kupfer [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

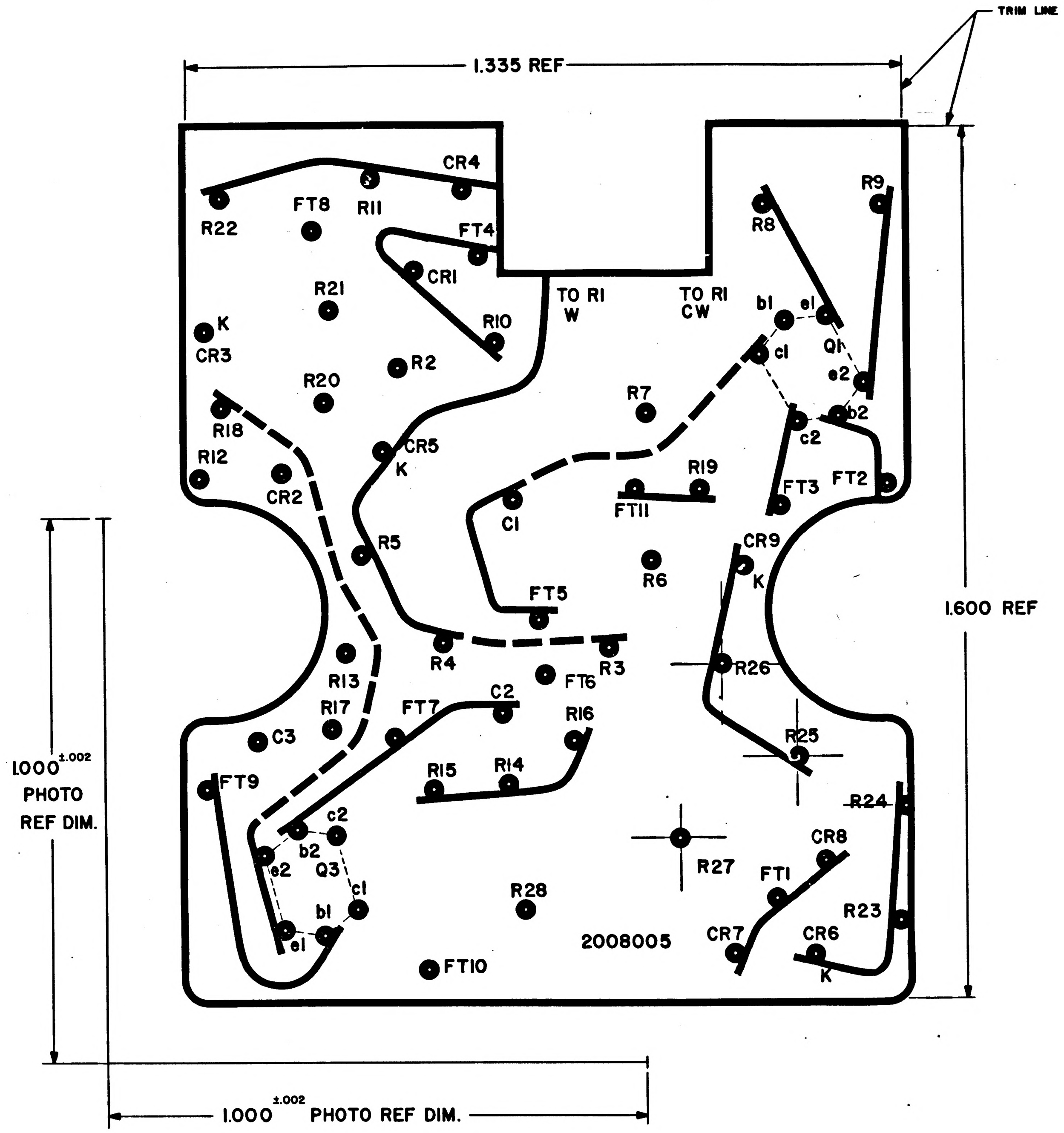
INSULATOR TOP
PHOTOGRAPHIC MASTER
DC AMPLIFIER AND PVR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008004
SCALE 10/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008005

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL


TRIM LINE
1.335 REF
1.600 REF
1.000 ±.002 PHOTO REF DIM.
1.000 ±.002 PHOTO REF DIM.
CR4
R22
FT8
R11
FT4
CR1
R10
R21
K
CR3
R2
R20
R18
R12
CR2
CR5
K
R5
TO R1 W
TO R1 CW
R7
R19
FT11
C1
FT5
R6
R8
R9
b1
e1
c1
Q1
e2
b2
c2
FT3
FT2
CR9
K
R26
R25
R24
R4
R3
FT6
R13
R17
C3
FT7
C2
R16
FT9
R15
R14
c2
b2
e2
Q3
c1
b1
e1
R28
R27
2008005
FT10
CR7
FT1
CR8
CR6
K
R23

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007101	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

M.I.T.
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. No. CONTRACT
DRAWN DATE
CHECKED
APPROVAL L.M. BLYTHAK 4/DEC/64
APPROVAL 12/4/64
NASA APPROVAL W.J. Rhine 12-8-64
MIT APPROVAL

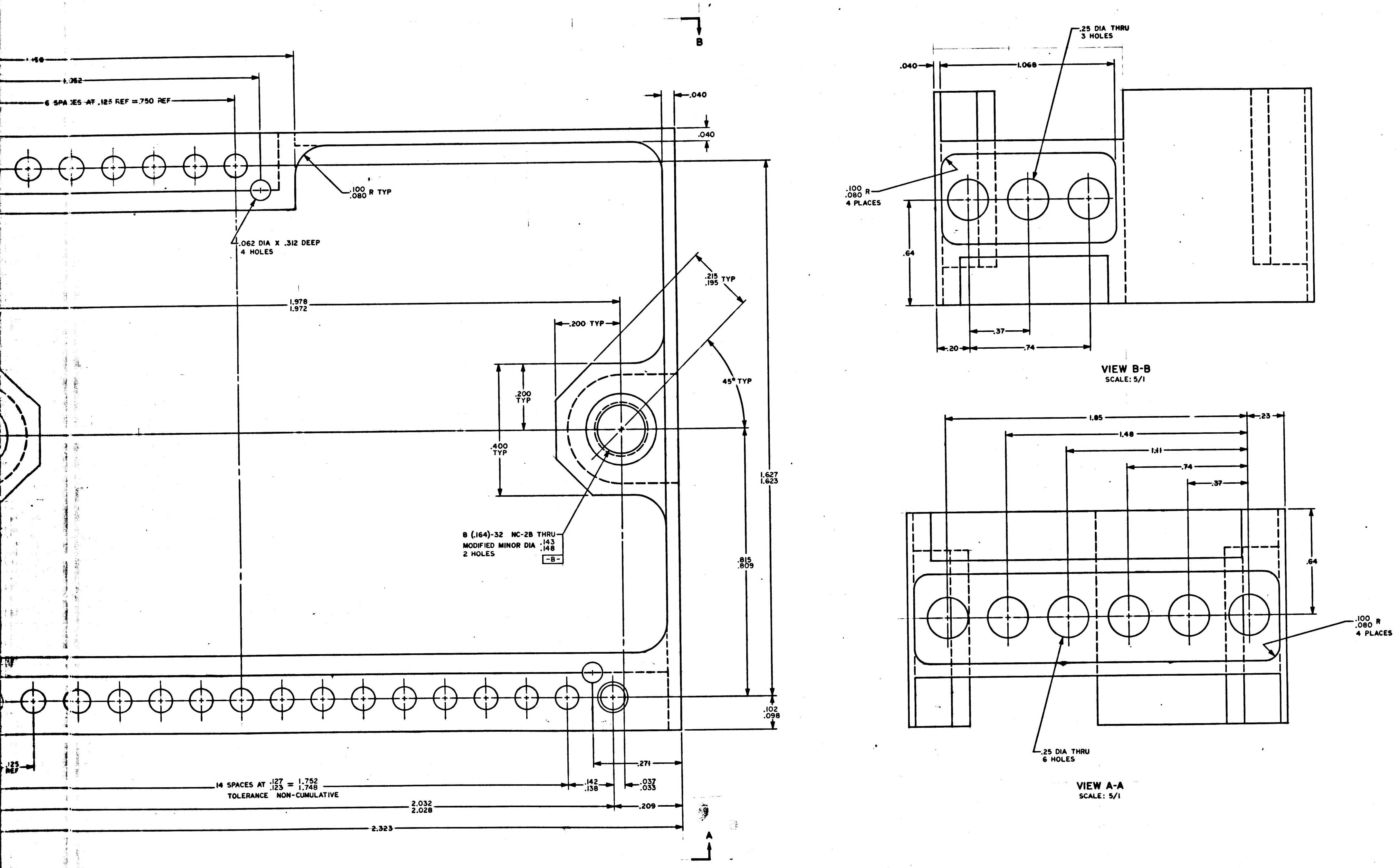
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM PHOTOGRAPHIC MASTER
DC AMPLIFIER AND PVR

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 2008005
SCALE 10/1
WT
SHEET 1 OF 1

REVISIONS 13245			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18794	17MAR65	WR

2008006 A



B
.150
.062
6 SPACES AT .125 REF = .750 REF
.040
.040
.100
.080 R TYP
.062 DIA X .312 DEEP
4 HOLES
.215
.195 TYP
1.978
1.972
.200 TYP
45° TYP
.200 TYP
.400 TYP
1.627
1.623
8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
-B-
.815
.809
.102
.098
.125 REF
.271
14 SPACES AT .127 .123 = 1.752 1.748
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
2.032
2.028
.209
2.323
A
.25 DIA THRU
3 HOLES
.040
1.068
.100
.080 R
4 PLACES
.64
.37
.20
.74
VIEW B-B
SCALE: 5/1
1.85
.23
1.48
1.11
.74
.37
.64
.100
.080 R
4 PLACES
.25 DIA THRU
6 HOLES
VIEW A-A
SCALE: 5/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT —

FINAL FINISH SEE NOTE 6

NEXT ASSY	USED ON
2007104	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Ken Healy DATE 1 DEC 64
CHECKED
APPROVAL
APPROVAL 1/4/65
NASA APPROVAL 1-5-65
MIT APPROVAL 5 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

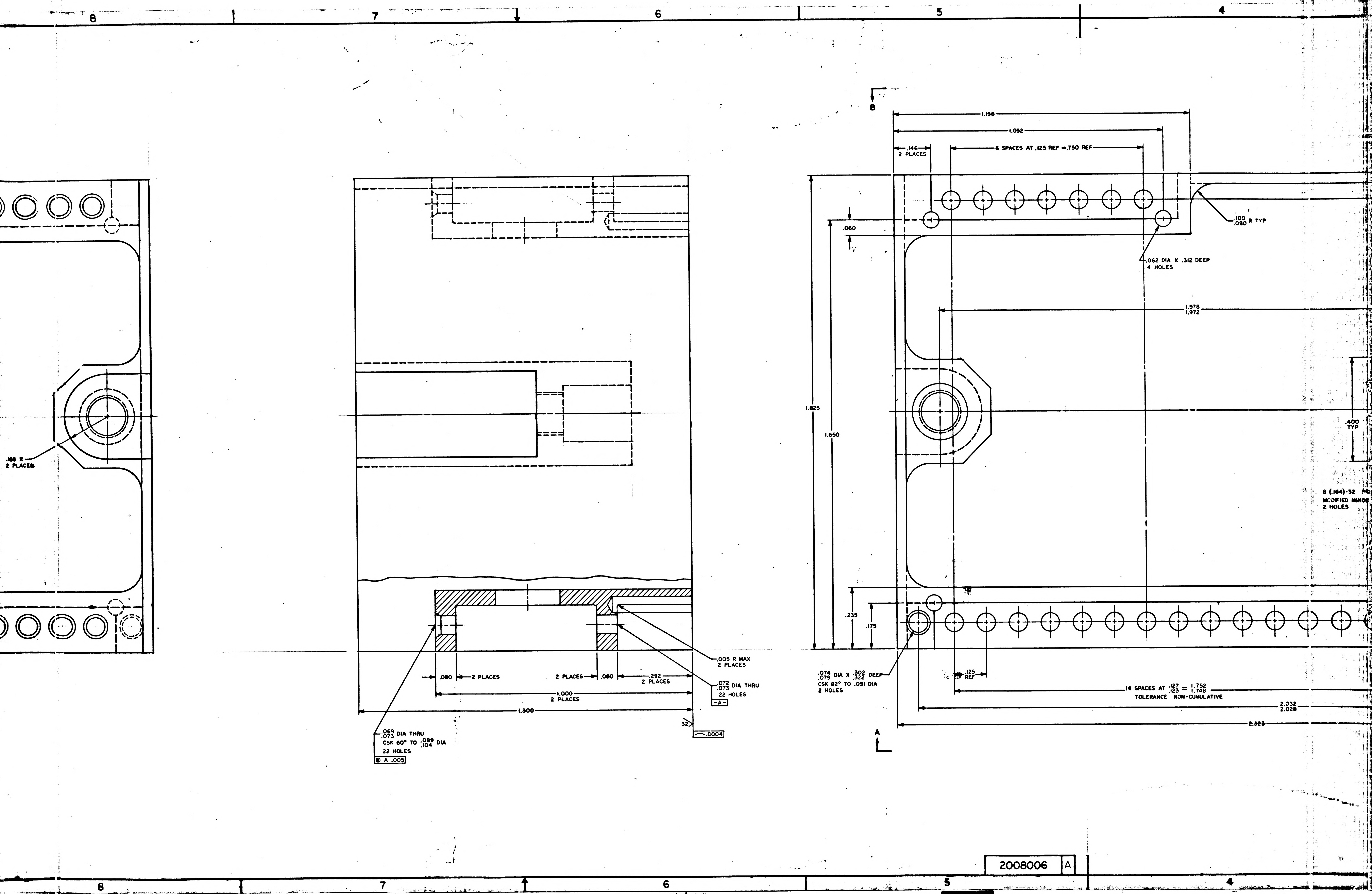
FRAME,
AC DIFFERENTIAL AMPLIFIER AND INTERROGATOR

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO 2008006
SCALE 10/1
WT —
SH 1 OF 1

2008006 A

MASTER

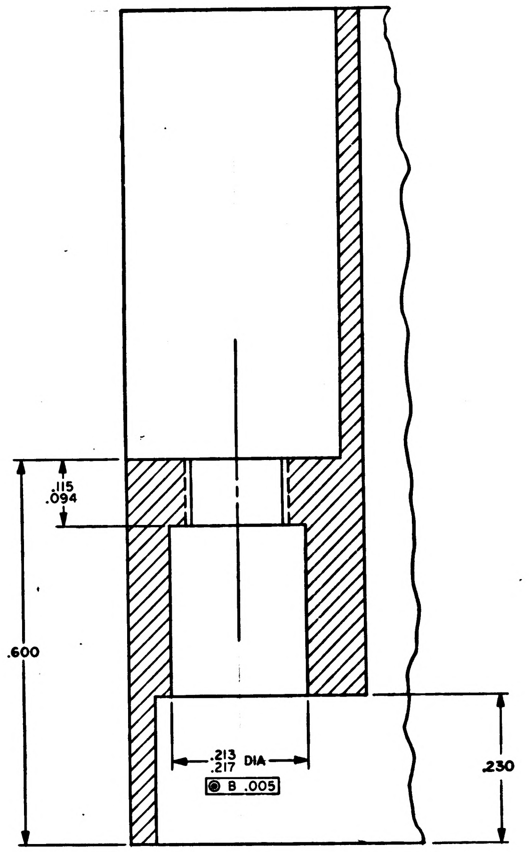
F3


8
7
6
5
4
B
.165 R
2 PLACES
1.158
1.052
.146
2 PLACES
6 SPACES AT .125 REF =.750 REF
.060
.100
.080 R TYP
.062 DIA X .312 DEEP
4 HOLES
1.978
1.972
1.825
1.650
.400
TYP
8 (.164)-32
MODIFIED MINOR
2 HOLES
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125
REF
14 SPACES AT .127
.123 = 1.752
1.748
TOLERANCE NON-CUMULATIVE
2.032
2.028
2.323
A
.005 R MAX
2 PLACES
.080
2 PLACES
2 PLACES
.080
.292
2 PLACES
.072
.073 DIA THRU
22 HOLES
-A-
1.000
2 PLACES
1.300
32
.0004
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
22 HOLES
◉ A .005
8
7
6
5
4

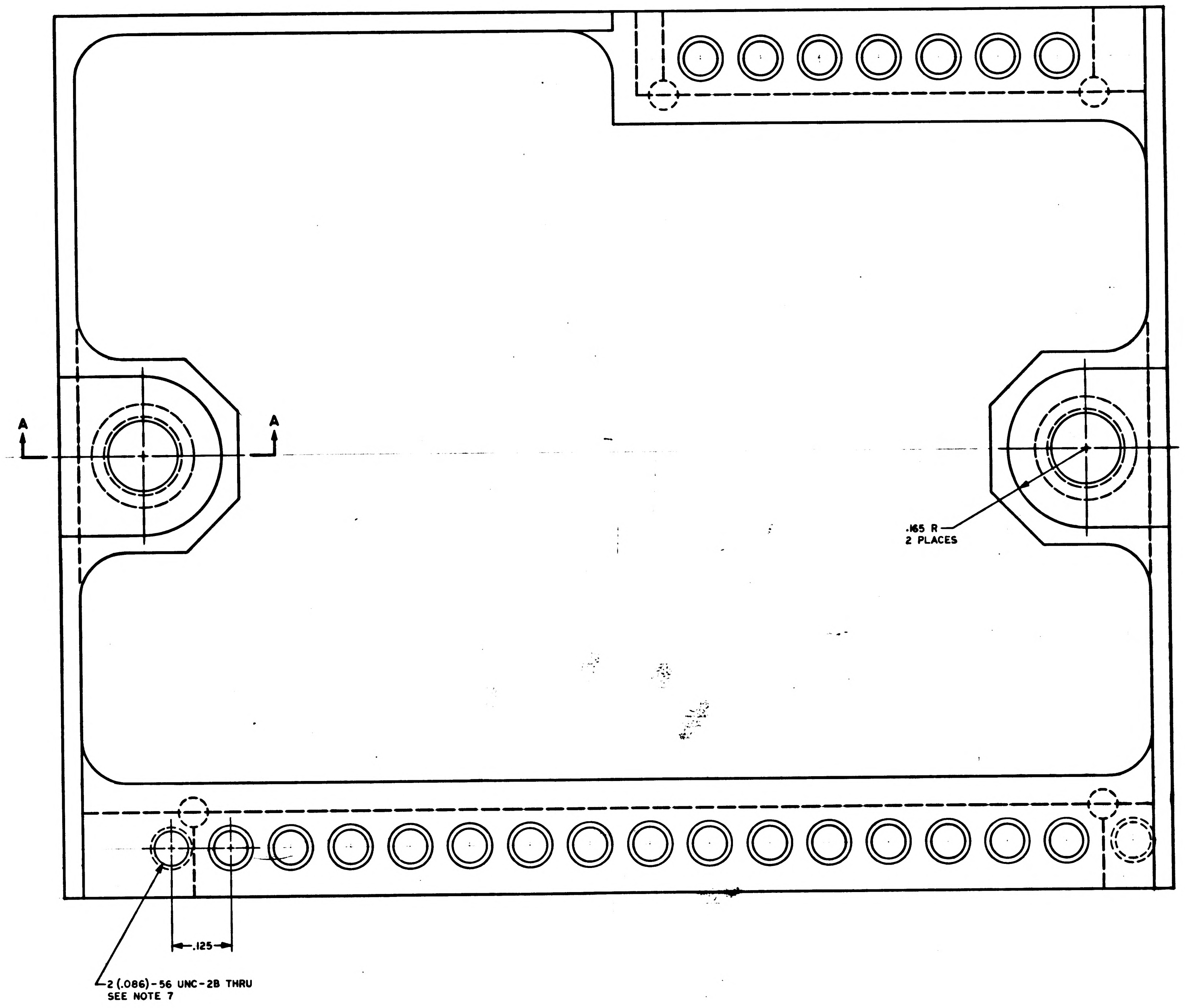
2008006 A

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



PARTIAL SECTION A-A

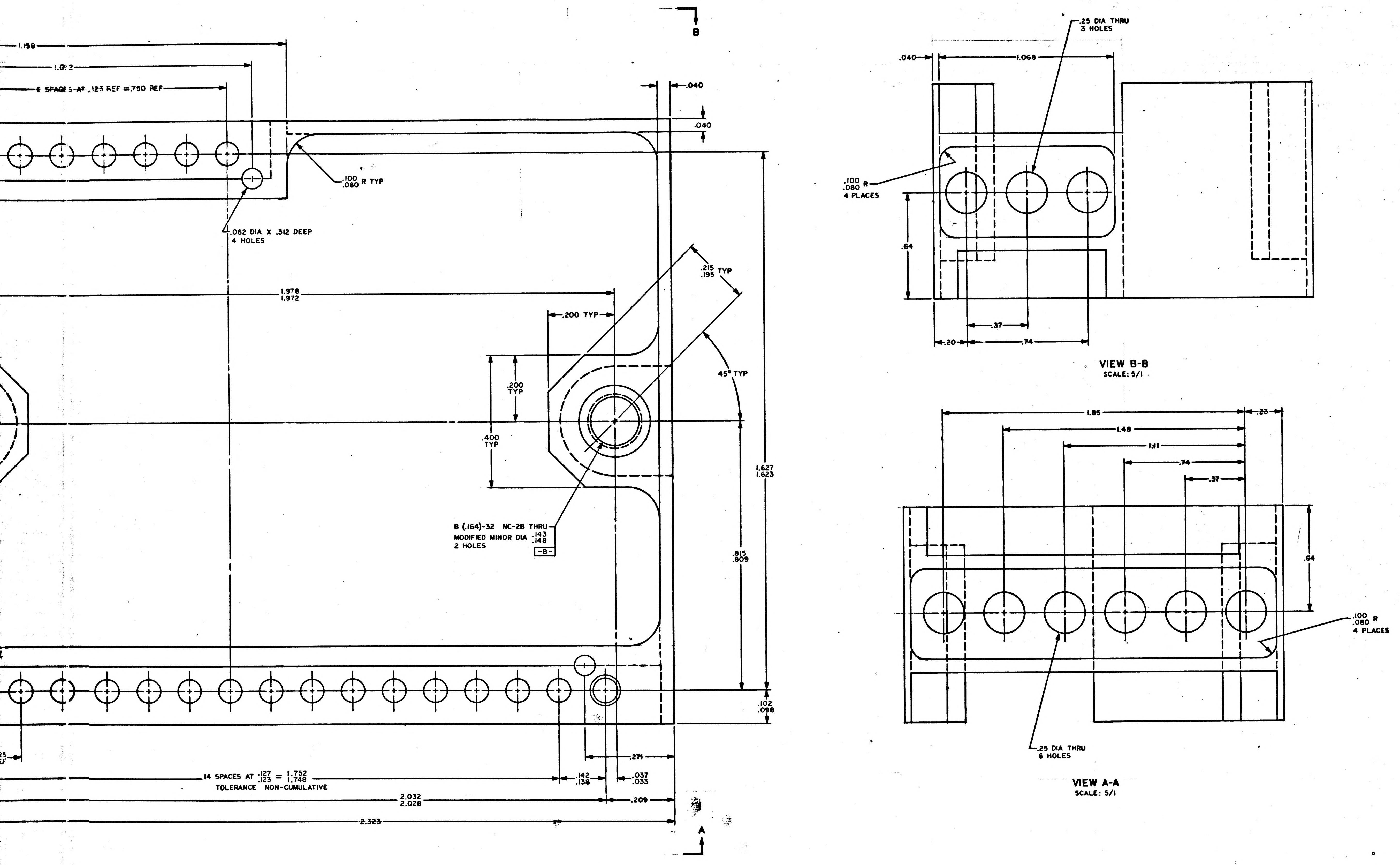


NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015
5. UNLESS OTHERWISE SPECIFIED, 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE, COAT PER ND1002040
8. IDENTIFY PER ND1002019

2008006

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS


B
1.158
1.012
6 SPACES AT .125 REF = .750 REF
.040
.040
.100 .080 R TYP
.062 DIA X .312 DEEP
4 HOLES
1.978 1.972
.215 .195 TYP
.200 TYP
45° TYP
.200 TYP
.400 TYP
1.627 1.623
8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
-B-
.815 .809
.102 .098
.271
14 SPACES AT .127 .123 = 1.752 1.748
TOLERANCE NON-CUMULATIVE
.142 .138
.037 .033
2.032 2.028
.209
2.323
A
.25 DIA THRU
3 HOLES
.040
1.068
.100 .080 R
4 PLACES
.64
.37
.20
.74
VIEW B-B
SCALE: 5/1
1.85
.23
1.48
1.11
.74
.37
.64
.100 .080 R
4 PLACES
.25 DIA THRU
6 HOLES
VIEW A-A
SCALE: 5/1
4
3
2
1
D
C
B
A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007104	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT

DRAWN Ken Healy DATE 1 Dec 64
CHECKED
APPROVAL
APPROVAL 1/4/65
NASA APPROVAL 1-5-65
MIT APPROVAL 5 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME,
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

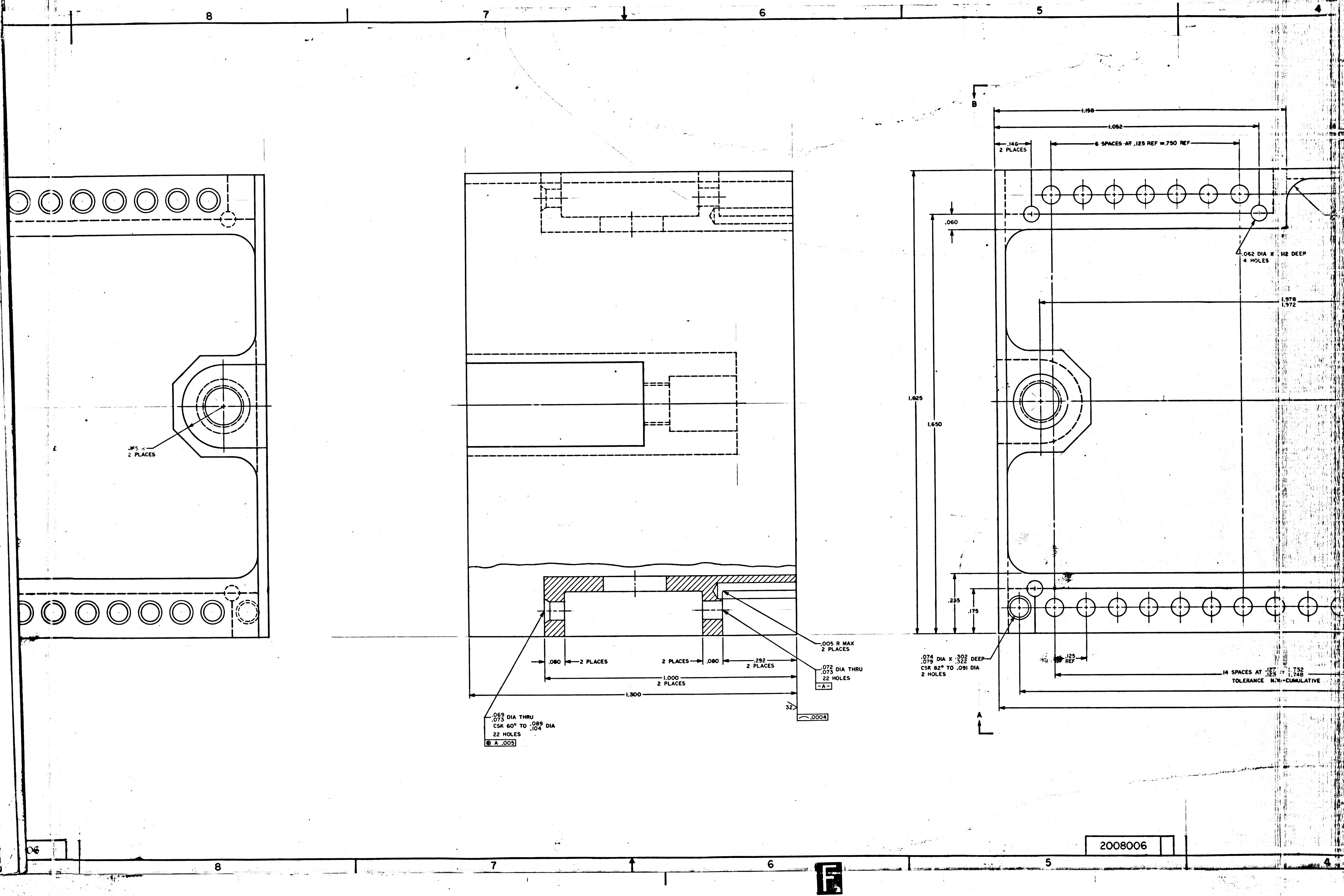
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008006
SCALE 10/1
WT —
SHEET 1 OF 1

2008006

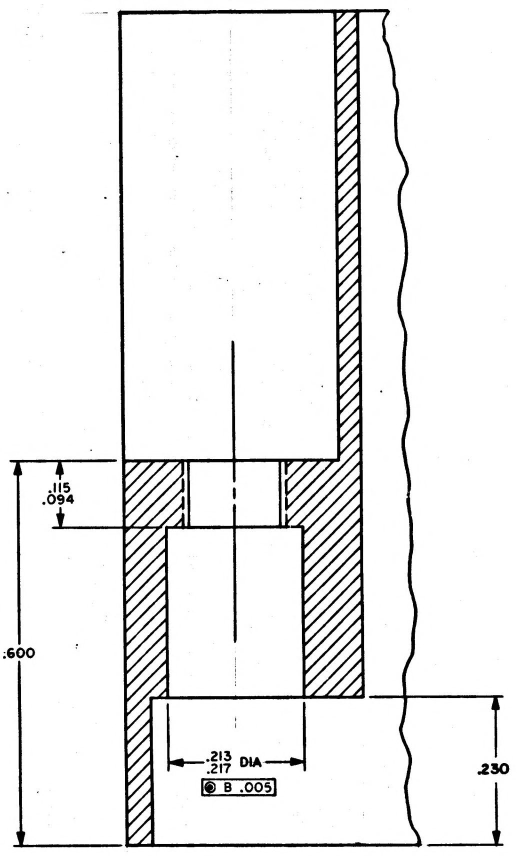
MASTER

2008006

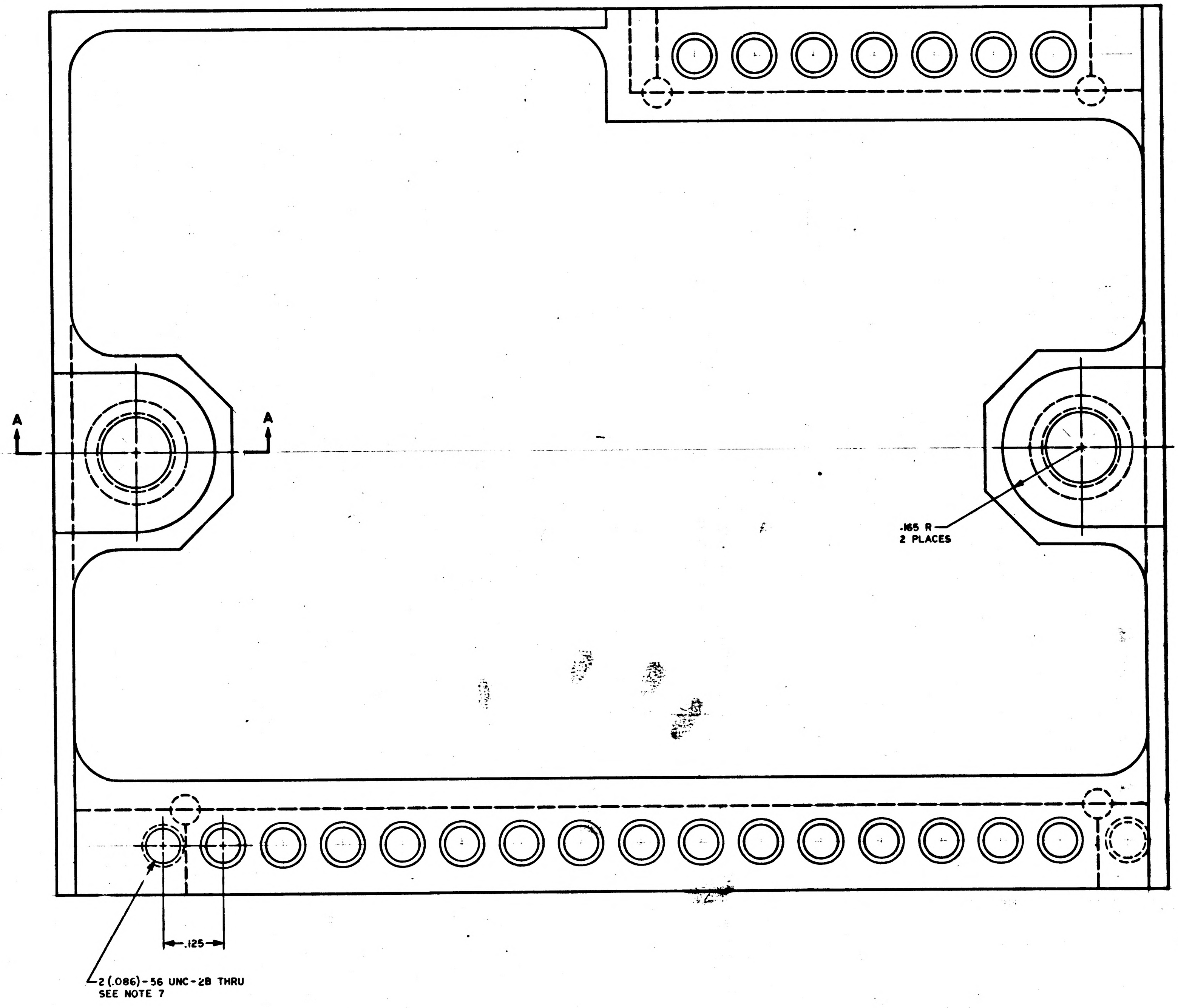
F-3


8
7
6
5
4
B
1.158
1.062
.146
2 PLACES
6 SPACES AT .125 REF = .750 REF
.060
.062 DIA X .312 DEEP
4 HOLES
1.978
1.972
1.825
1.650
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125
REF
14 SPACES AT .127
.123 = 1.752
1.748
TOLERANCE NON-CUMULATIVE
A
.185 R
2 PLACES
.005 R MAX
2 PLACES
.080
2 PLACES
2 PLACES
.080
.292
2 PLACES
.072
.073 DIA THRU
22 HOLES
-A-
1.000
2 PLACES
1.300
32
.0004
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
22 HOLES
A .005
06
2008006
8
7
6
5
4
F

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



PARTIAL SECTION A-A

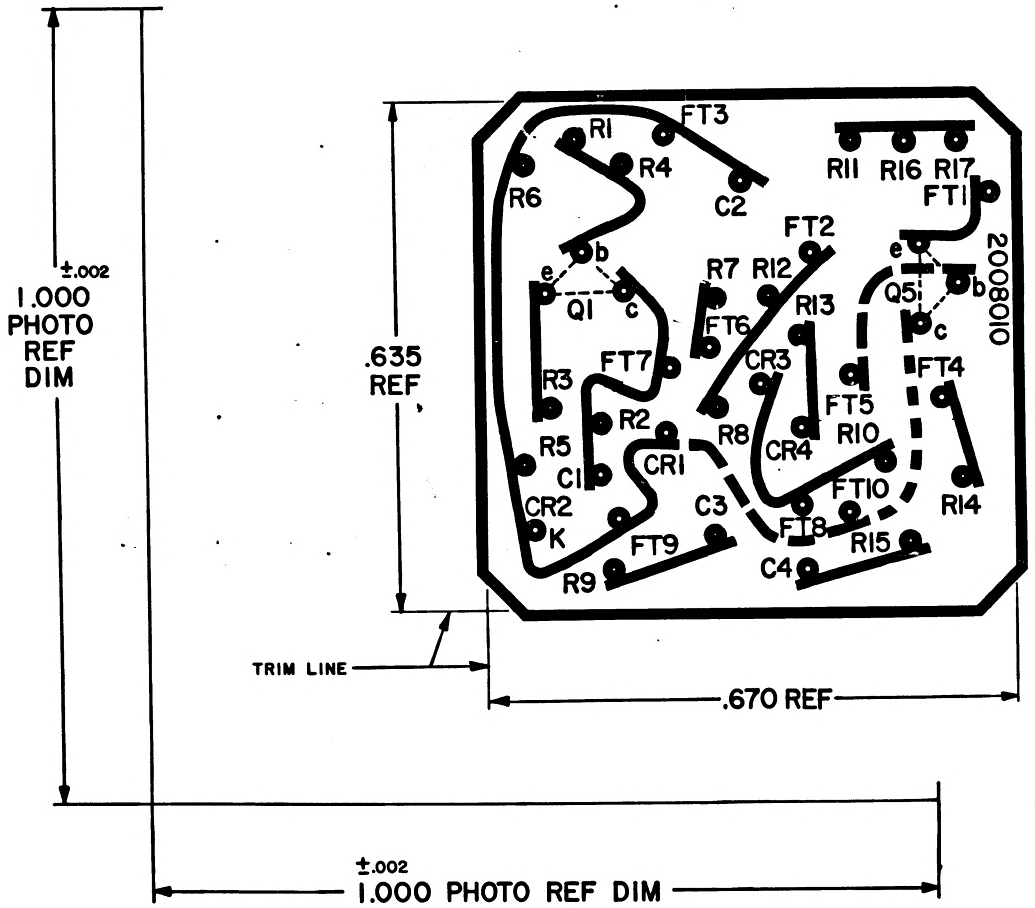


NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015
5. UNLESS OTHERWISE SPECIFIED, 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. THREAD TO BE FREE OF ANODIZE
8. IDENTIFY PER ND1002019

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14330

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18089	30 APRIL 65	EJM CAP



R1
R4
FT3
C2
R6
R11
R16
R17
FT1
FT2
2008010
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b
c
Q1
R7
R12
FT6
R13
e
Q5
b
c
FT4
R3
FT7
CR3
FT5
R10
R2
R8
CR4
R5
C1
CR1
FT10
R14
CR2
K
C3
FT8
R15
FT9
C4
R9
±.002
1.000
PHOTO
REF
DIM
.635
REF
TRIM LINE
.670 REF
±.002
1.000 PHOTO REF DIM

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Walsh DATE 8 Oct 64
CHECKED A. Lindstrom 6 Nov '64
APPROVAL
APPROVAL D. B. Test 11/16/64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

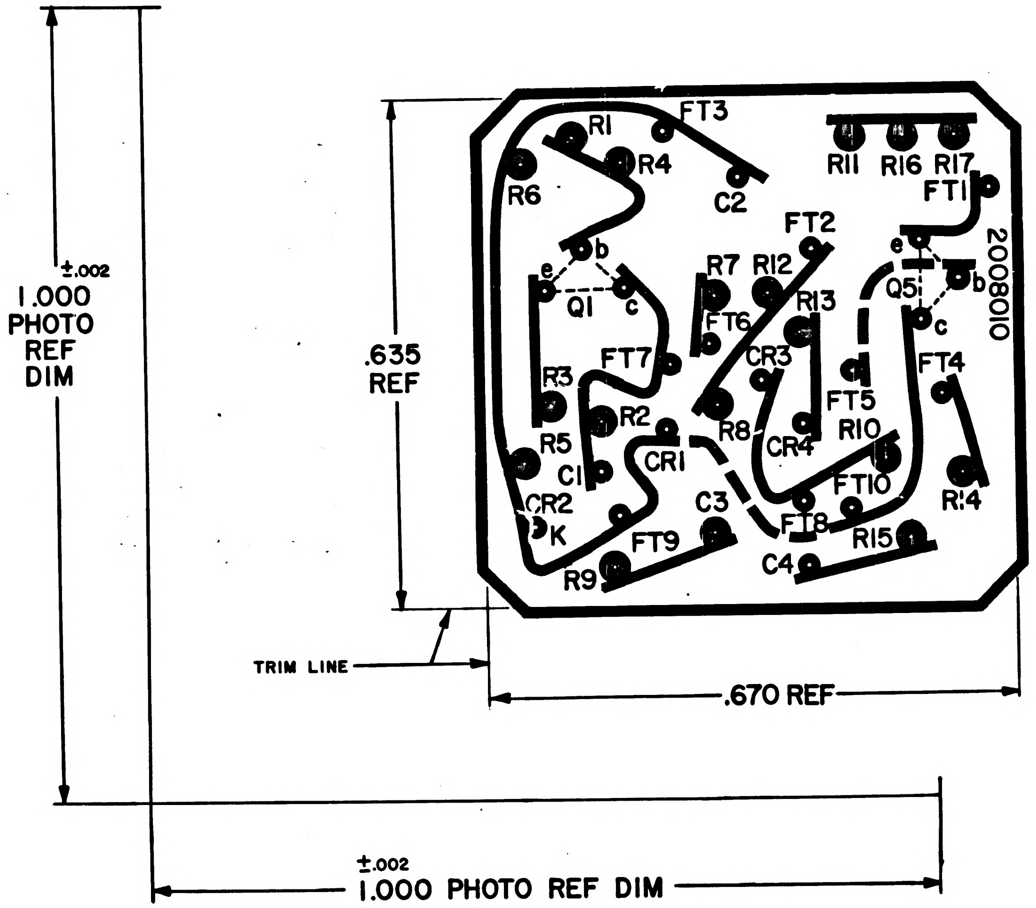
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
OPERATIONAL AMPLIFIER ELECTRONICS
CDU
(TOP)

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008008
SCALE 10/1
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /4330			
SYM	DESCRIPTION	DATE	APPROVAL


R1
FT3
R4
R6
C2
R11
R16
R17
FT1
2008010
FT2
e
b
Q1
c
R7
R12
R13
FT6
e
Q5
b
c
R3
FT7
CR3
FT4
R2
R8
FT5
R10
R5
CR4
C1
CR1
FT10
CR2
C3
R14
K
FT9
FT8
R15
R9
C4
±.002
1.000
PHOTO
REF
DIM
.635
REF
TRIM LINE
.670 REF
±.002
1.000 PHOTO REF DIM

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±— DECIMALS ±— ANGLES ±—
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Walsh DATE 8 Oct 64
CHECKED A. Lindstrom 6 Nov '64
APPROVAL
APPROVAL D. G. Test 11/16/64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

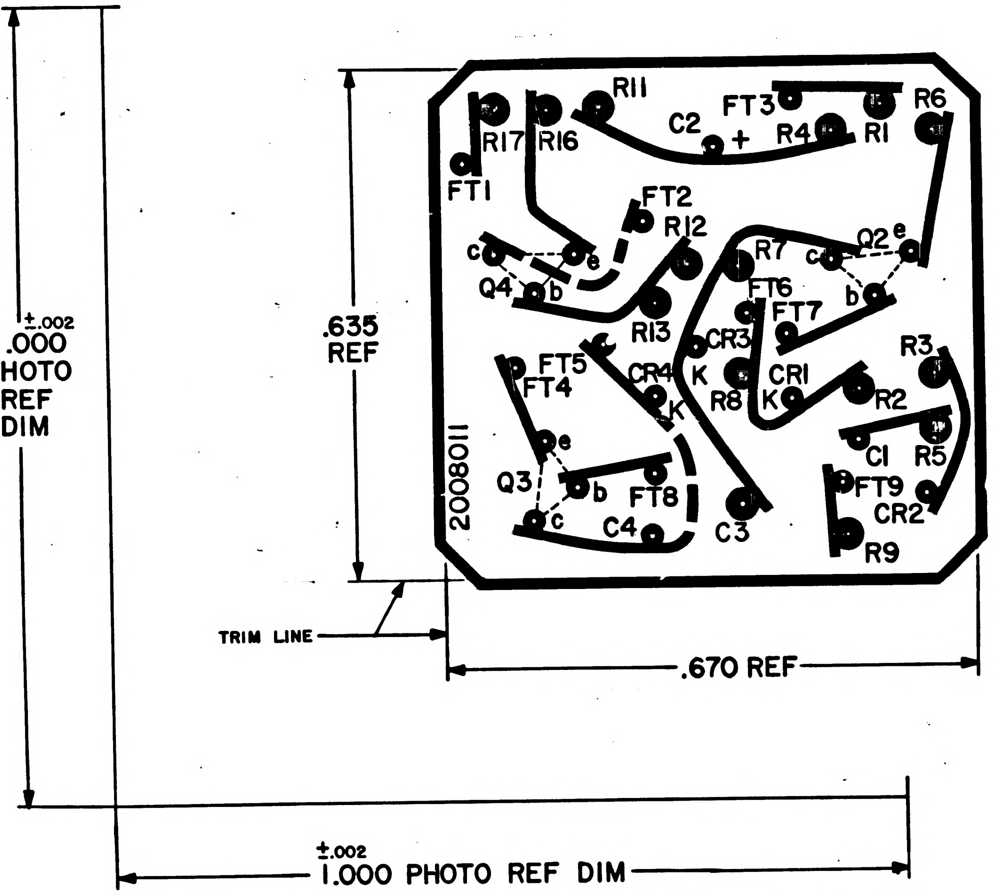
PHOTOGRAPHIC MASTER
OPERATIONAL AMPLIFIER ELECTRONICS
CDU
(TOP)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008008
SCALE 10/1
WT —
SHEET 1 OF 1

INCHES
0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /4330			
SYM	DESCRIPTION	DATE	APPROVAL


R11
FT3
R6
C2
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R4
R1
R17
R16
FT1
FT2
R12
R7
Q2
c
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c
e
Q4
b
b
FT6
FT7
R13
CR3
R3
FT5
CR4
K
CR1
FT4
K
R8
K
R2
e
C1
R5
Q3
b
FT8
FT9
c
C4
C3
CR2
R9
2008011
.635 REF
±.002 1.000 PHOTO REF DIM
TRIM LINE
.670 REF
±.002 1.000 PHOTO REF DIM

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .010 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN J.F. Walsh DATE 19 Oct 64
CHECKED A. Lindstrom 9 Nov 64
APPROVAL
APPROVAL D. R. Test 11/16/64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

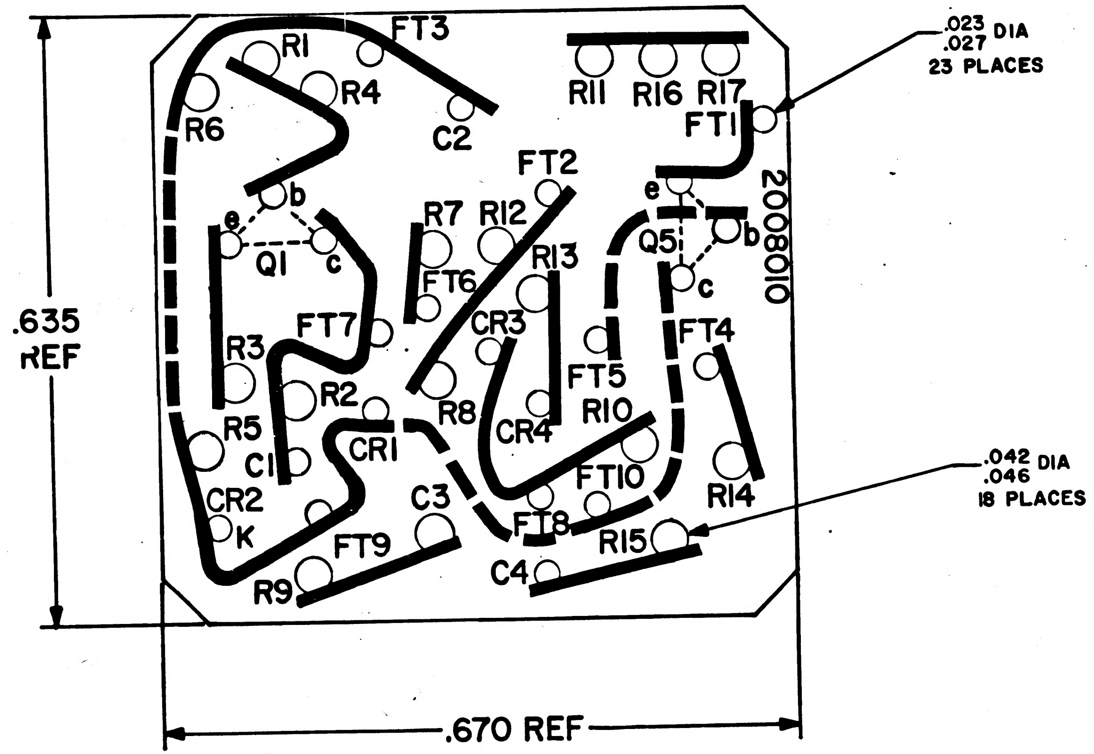
PHOTOGRAPHIC MASTER
OPERATIONAL AMPLIFIER ELECTRONICS
C D U
(BOTTOM)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008009
SCALE 10/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14330

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15240	6JAN66	LK RPK WK



FT3
R1
R4
R6
C2
R11 R16 R17
FT1
FT2
2008010
e
b
Q1
c
R7 R12
R13
e
Q5
b
c
FT6
R3
FT7
CR3
FT4
R2
FT5
R10
R5
R8
CR4
C1
CR1
FT10
R14
CR2
C3
K
FT8
R15
FT9
C4
R9
.635 REF
.670 REF
.023
.027 DIA
23 PLACES
.042
.046 DIA
18 PLACES

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .015 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:
DWG NO. 2008008 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN J.F. Welch DATE 8 Oct 64
CHECKED A. Lindstrom 9 Nov '64
APPROVAL
APPROVAL D. R. Test 11/16/64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL W Kupfer 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD TOP
OPERATIONAL AMPLIFIER ELECTRONICS
CDU

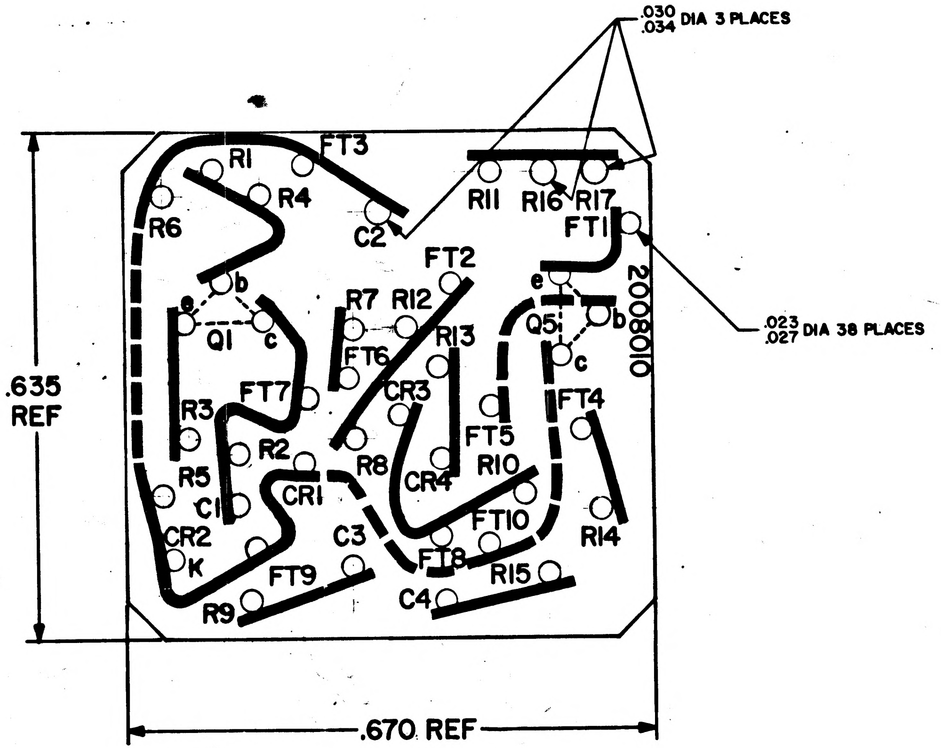
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008010
SCALE 10/1
WT —
SHEET 1 OF 1

2008010 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14330

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15240	6 Jan 65	LK EPK WK
B	REVISED PER TDRR 18089	16 Apr 65	EJM CAP WK



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .015 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:
DWG NO. 2008008 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN J.F. Wells DATE 8 Oct 64
CHECKED A. Lindstrom 9 Nov 64
APPROVAL
APPROVAL D. A. Test 11/16/64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL 17 Nov 64

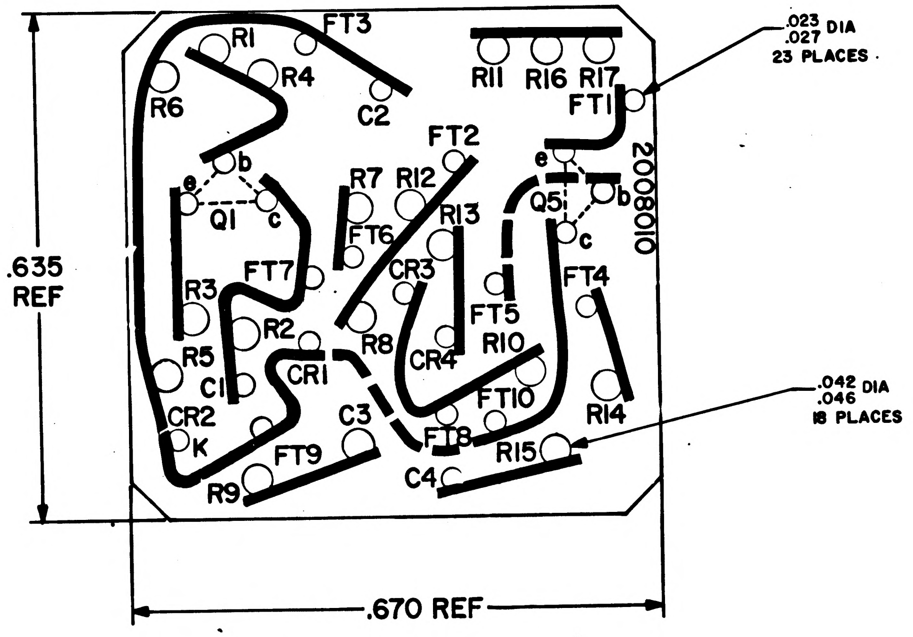
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD TOP
OPERATIONAL AMPLIFIER ELECTRONICS
CDU

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008010
SCALE 10/1
WT
SHEET 1 OF 1

REVISIONS 14330			
SYM	DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO



R1
FT3
R6
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C2
R11 R16 R17
FT1
FT2
2008010
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Q1
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R7 R12
FT6
R13
e
Q5
b
c
R3
FT7
CR3
FT4
FT5
R10
R2
R8
CR4
R5
C1
CR1
FT10
CR2
C3
R14
K
FT9
FT8
R15
R9
C4
.635 REF
.670 REF
.023 .027 DIA 23 PLACES
.042 .046 DIA 18 PLACES

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL .015 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:
DWG NO. 2008008 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN J.F. Welch DATE 8 Oct 64
CHECKED A. Lindstrom 9 Nov 64
APPROVAL
APPROVAL D. A. Fast 11/16/64
NASA APPROVAL W. J. Rhine 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

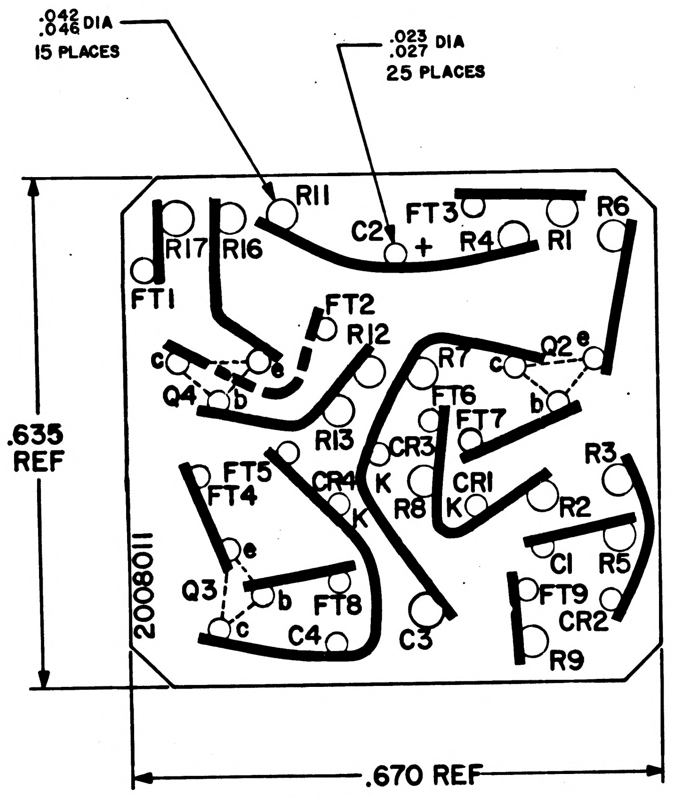
WIRING BOARD TOP
OPERATIONAL AMPLIFIER ELECTRONICS
CDU

CODE IDENT NO. — SIZE D NASA DRAWING NO. 2008010
SCALE 10/1 WT SHEET 1 OF 1

INCHES 0 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14330			
SYM	DESCRIPTION	DATE	APPROVAL



.042 .046 DIA
15 PLACES
.023 .027 DIA
25 PLACES
R11
C2
FT3
+
R4
R1
R6
R17
R16
FT1
FT2
R12
R7
c
Q2
e
b
c
e
Q4
b
FT6
FT7
R13
CR3
K
CR1
R3
FT5
FT4
CR4
K
R8
K
R2
e
C1
R5
Q3
b
FT8
FT9
CR2
c
C4
C3
R9
2008011
.635 REF
.670 REF

REF DWG:
DWG NO. 2008009 FOR PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .015 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN J.F. Welch DATE 13 Oct 64
CHECKED A. Lindstrom 7 Nov 64
APPROVAL
APPROVAL D. R. Test 11/16/64
NASA APPROVAL W. J. Rhine 11-17-64
MIT APPROVAL W. Kupfer 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD BOTTOM
OPERATIONAL AMPLIFIER ELECTRONICS
CDU

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008011

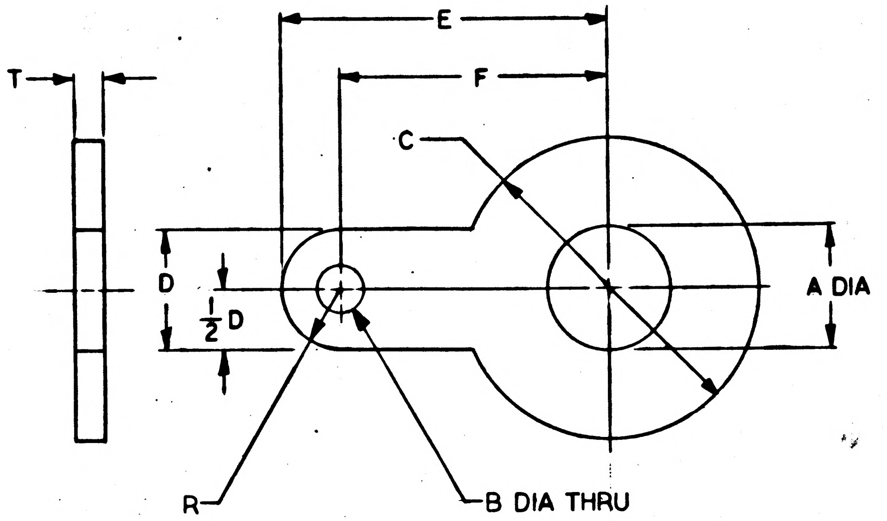
SCALE 10/1 WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008013 A

REVISIONS 13087

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 23598 a.a.	5Nov65	EPK WR



PART NO.	A	B	C	D	E	F	T
2008013-1	.257	.093	.625	.25	.69	.56	.03
2008013-2	.323	.125	.625	.25	.69	.56	.03
2008013-3	.196	.093	.438	.16	.62	.50	.03
2008013-4	.196	.093	.562	.16	.62	.50	.06
2008013-5	.196	.093	.575	.16	.62	.50	.03

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: COPPER, QQ-C-576 SOFT-ANNEALED
3. FINISH: GOLD PLATE PER MIL-G-45204 TYPE II 200 µ INCHES MIN
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN L. Krahn DATE 3 DEC 63
CHECKED [illegible] 31 Jan 64
APPROVAL
APPROVAL [illegible]
NASA APPROVAL W. J. [illegible] 9-29-64
MIT APPROVAL [illegible] 29 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

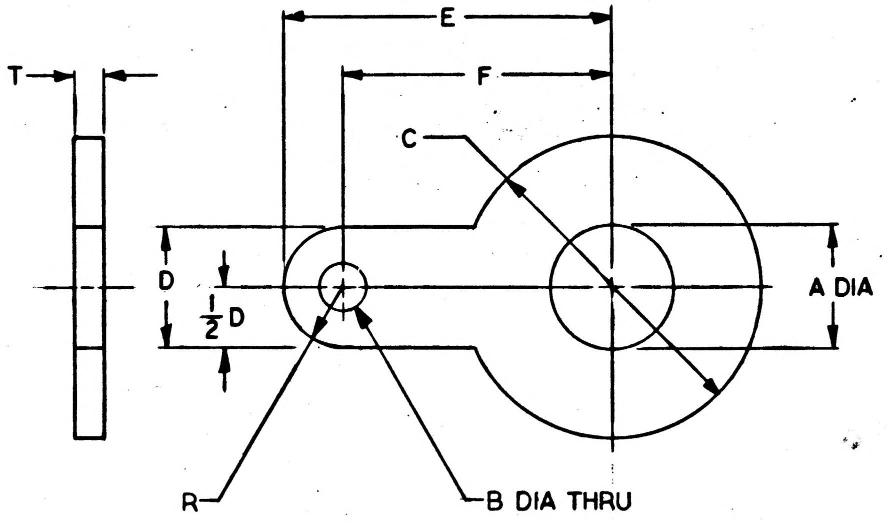
TERMINAL-LUG
SOLDER-FLAT

CODE IDENT NO.
SIZE C
NASA DRAWING NO. 2008013
SCALE NONE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008013

REVISIONS 13087			
SYM	DESCRIPTION	DATE	APPROVAL



PART NO	A	B	C	D	E	F	T
2008013-1	.257	.093	.625	.25	.69	.56	.03
2008013-2	.323	.125	.625	.25	.69	.56	.03
2008013-3	.196	.093	.438	.16	.62	.50	.03
2008013-4	.196	.093	.562	.16	.62	.50	.06

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: COPPER, QQ-C-576 SOFT-ANNEALED
3. FINISH: GOLD PLATE PER MIL-G-45204 TYPE II 200μ INCHES MIN
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX±.005 XX±.02 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
———

FINAL FINISH
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN L. Krahn DATE 3 DEC 63
CHECKED L.P. Kingsbury 31 Jan 64
APPROVAL
APPROVAL D. R. Scott 9/29/64
NASA APPROVAL W. J. Rhine 9-29-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL-LUG
SOLDER-FLAT

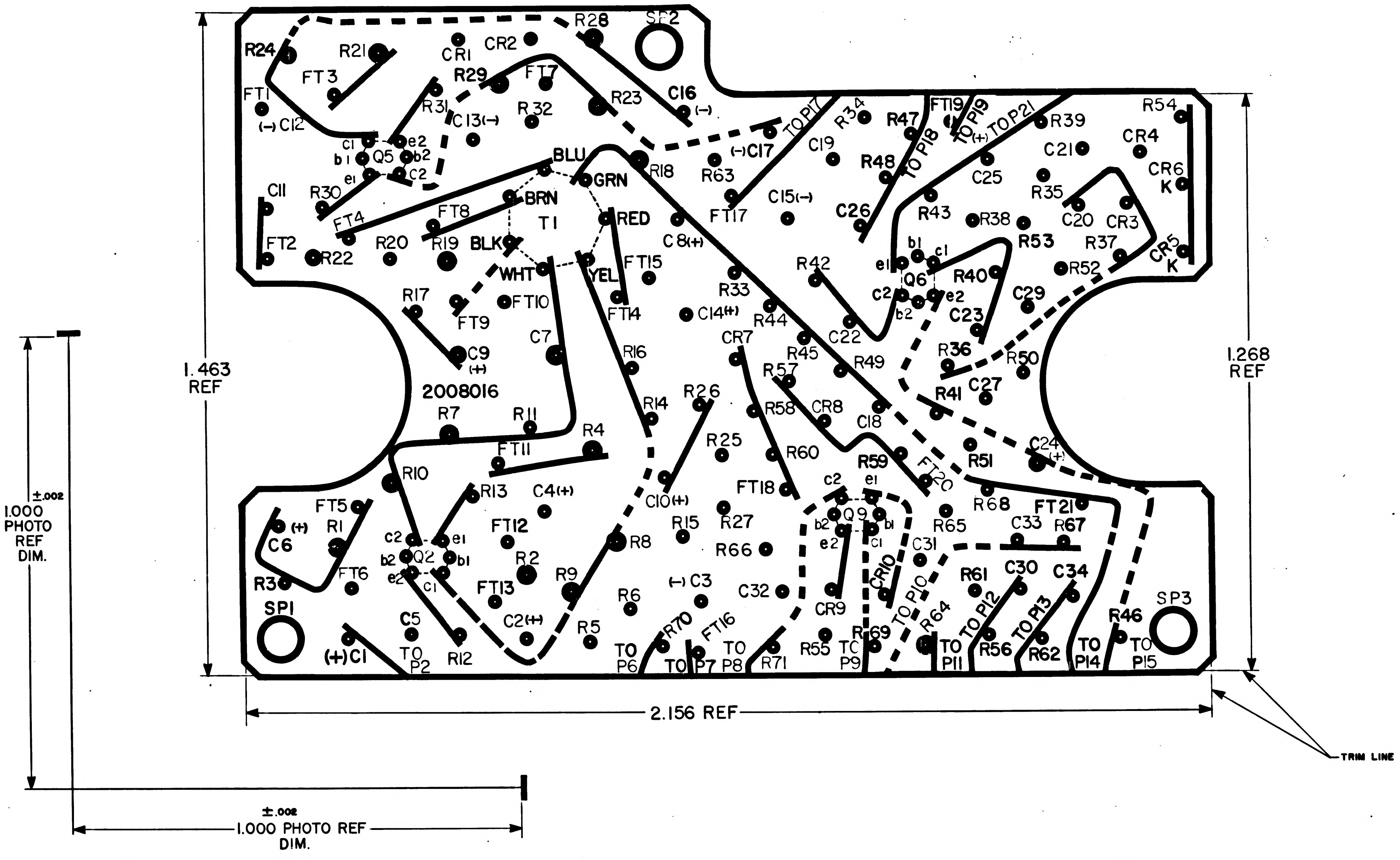
CODE IDENT NO.	SIZE	NASA DRAWING NO.	
	C	2008013	
SCALE NONE	WT		SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER, OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18527	TAW	RE	22 APR 65	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CR2
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SP2
FT3
R29
FT7
FT1
R31
C13(-)
R32
R23
C16 (-)
(-)C12
c1
e2
b1
Q5
b2
e1
c2
BLU
R18
R63
(-)C17
TO P17
R34
C19
R47
FT19
TO P18
TO P19
(+) TO P21
R39
R54
CR4
C21
R48
C25
CR6 K
C11
R30
BRN
GRN
C15(-)
R35
FT4
FT8
T1
RED
FT17
C26
R43
R38
C20
CR3
FT2
R22
R20
R19
BLK
C8(+)
R53
R37
CR5 K
WHT
YEL
FT15
R42
b1
c1
e1
Q6
e2
c2
b2
R40
R52
R17
FT10
R33
C23
C29
FT9
FT14
C14(+)
R44
C22
C7
CR7
R45
C9 (+)
R16
R57
R49
R36
R50
2008016
R26
R41
C27
R7
R11
R14
R58
CR8
C18
R4
FT11
R25
R60
C24 (+)
R10
R59
e1
FT20
R51
R13
C4(+)
C10(+)
FT18
c2
R68
FT21
FT5
R1
(+)
C6
c2
e1
b2
Q2
b1
e2
c1
FT12
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R15
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b2
Q9
b1
e2
c1
R65
C33
R67
C31
R3
FT6
R66
CR10
R61
C30
C34
FT13
R9
R6
(-) C3
C32
CR9
TO P10
R64
TO P12
TO P13
SP1
C5
C2(+)
R5
R70
FT16
R69
R46
SP3
(+)C1
TO P2
R12
TO P6
TO P7
TO P8
R71
R55
TO P9
TO P11
R56
R62
TO P14
TO P15
1.463 REF
1.268 REF
2.156 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.
TRIM LINE

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	J. Hall	NOV 20-64
CHECKED		
APPROVED		
APPROVED	D. A. Fost	1/6/65
APPROVED MIT	W Kopler	
APPROVED MSC	W. J. Rhine	1-5-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

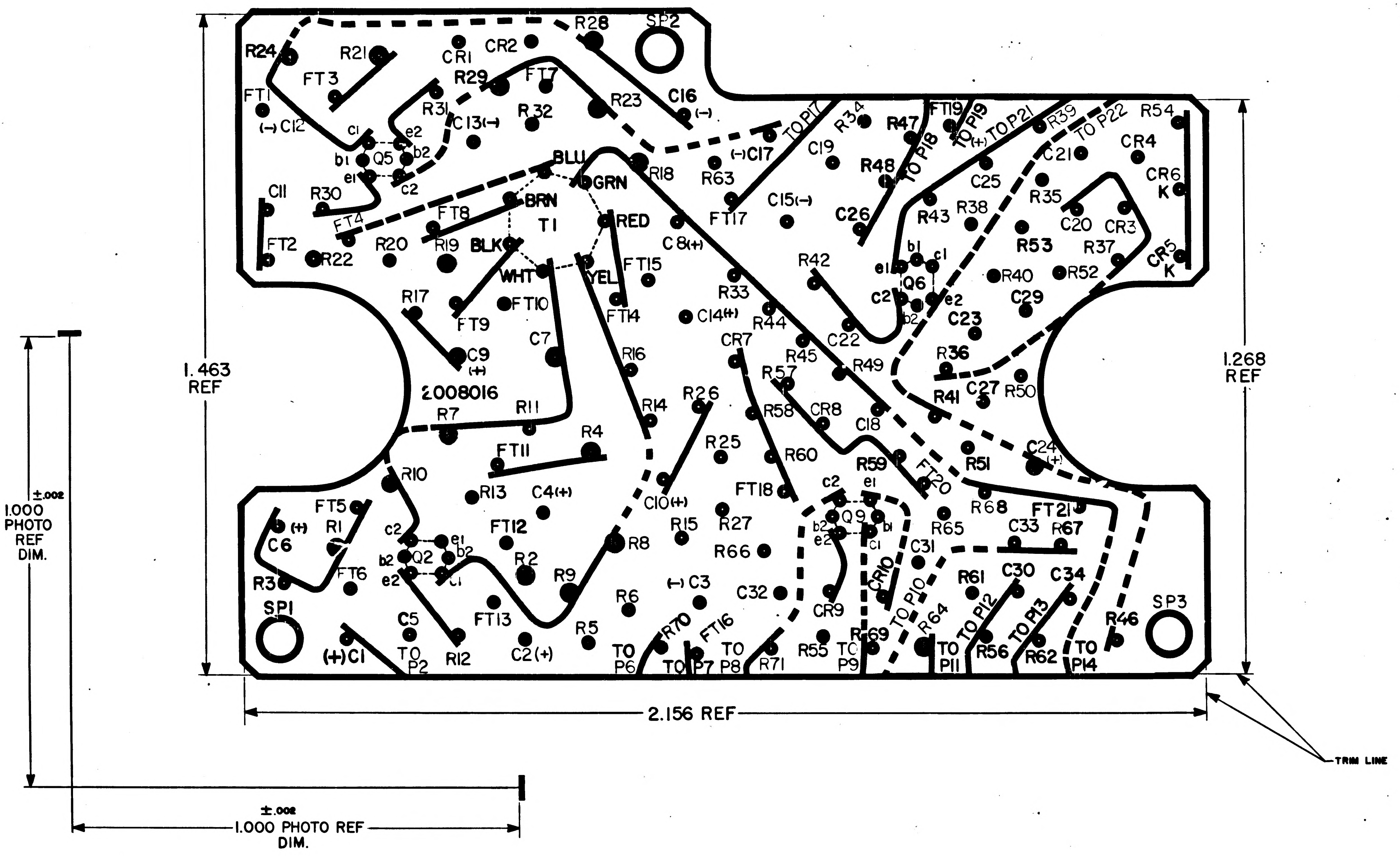
PHOTOGRAPHIC MASTER
WIRING BOARD (TOP)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

SIZE E
DRAWING NO 2008014
SCALE 10/1
SHEET 1 OF 1

…TICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA
… USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY
…LATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERN-
…T THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER;
… THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR
… ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS
… TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER
…ENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY-
… ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY
…ENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15255

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18527			22 APR 65	
B		REVISED PER TDRR 18794			12 MAY 65	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R21
CR1
CR2
R28
SP2
FT1
FT3
R29
FT7
R23
C16 (-)
(-) C12
R31
C13 (-)
R32
c1
e2
b1
Q5
b2
e1
c2
BLU
GRN
R18
(-) C17
TO P17
R34
R47
FT19
TO P19
(+) TO P21
R39
TO P22
R54
R63
C19
R48
TO P18
C21
CR4
C11
R30
FT4
FT8
BRN
T1
RED
FT17
C15 (-)
C25
CR6
K
FT2
R22
R20
R19
BLK
C8 (+)
C26
R43
R38
R35
C20
CR3
WHT
YEL
FT15
R42
b1
c1
R53
R37
CR5
K
R17
FT10
R33
e1
Q6
R40
R52
FT9
FT14
C14 (+)
c2
e2
C29
C7
R44
b2
C22
C23
C9 (+)
R16
CR7
R45
R36
2008016
R49
R57
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R50
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R11
R14
R26
R41
R4
R58
CR8
C18
FT11
R25
R60
R59
R51
C24 (+)
R10
FT20
R13
C4 (+)
C10 (+)
FT18
c2
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FT5
R27
Q9
R68
FT21
C6 (+)
R1
c2
e1
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b1
R65
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FT12
R8
R66
C31
R3
FT6
e2
c1
R2
R9
(-) C3
R61
C30
C34
SP1
C5
FT13
R6
C32
CR9
CR10
TO P10
R64
TO P12
TO P13
SP3
R46
(+) C1
TO P2
R12
C2 (+)
R5
TO P6
R70
TO P7
FT16
TO P8
R71
R55
TO P9
R69
TO P11
R56
R62
TO P14
1.463 REF
1.268 REF
2.156 REF
TRIM LINE
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED 1/4/65
APPROVED MIT
APPROVED MSC 5-5-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD (TOP)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

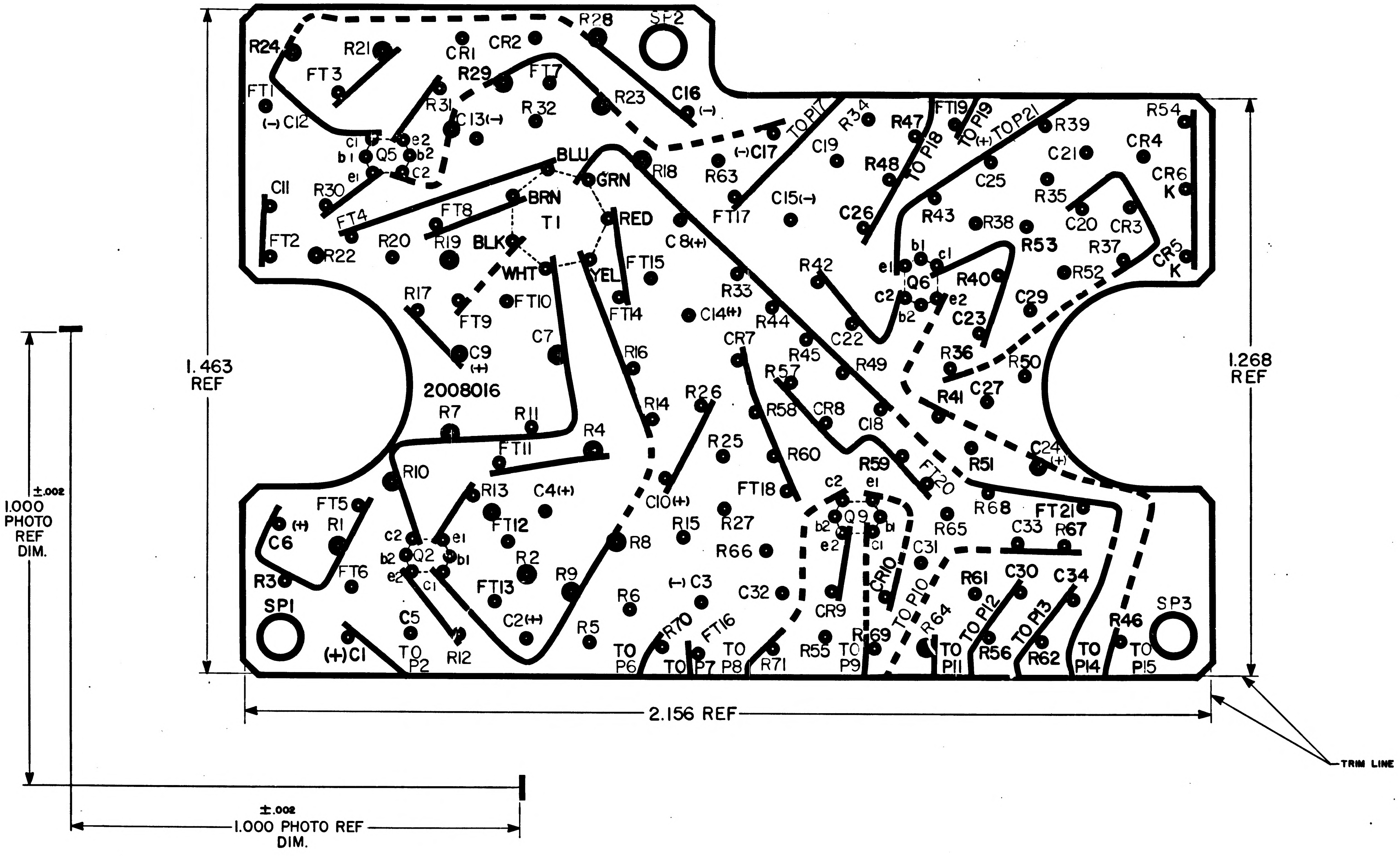
CODE IDENT NO. 80230 SIZE E DRAWING NO. 2008014
SCALE 10/1 SHEET 1 OF 1

2008014 B

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1525

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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R21
FT3
CR1
CR2
R28
SP2
FT1
R29
FT7
R23
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(–) C12
R31
C13 (–)
R32
TO P17
R34
R47
FT19
TO P19
(+) TO P21
R39
R54
c1 b1 Q5 e1 e2 b2 c2
BLU
GRN
R18
(–) C17
C19
R63
TO P18
R48
C25
C21
CR4
CR6 K
C11
R30
BRN
T1
FT17
C15 (–)
C26
R43
R38
R35
C20
CR3
FT4
FT8
RED
FT2
R22
R20
R19
BLK
C8 (+)
R42
b1 c1 e1 Q6 c2 b2 e2
R53
R37
CR5 K
WHT
YEL
FT15
R40
R52
R17
FT10
FT9
FT14
R33
C14 (+)
R44
C23
C29
C7
C9 (+)
R16
CR7
C22
R45
R36
R50
2008016
R57
R49
R41
C27
R7
R11
R14
R26
R58
CR8
C18
R4
R25
R60
R59
C24 (+)
FT11
R51
FT20
R10
R13
C4 (+)
C10 (+)
FT18
c2 e1 Q9 b2 b1 e2 c1
R68
FT21
FT5
R1
C6 (+)
c2 e1 b2 Q2 b1 e2 c1
FT12
R15
R27
R65
C33
R67
R2
R8
R66
C31
FT6
R3
FT13
R9
(–) C3
C32
CR10
R61
C30
C34
SP1
C5
C2 (+)
R6
CR9
R64
TO P12
TO P13
R46
SP3
TO P10
R5
R70
FT16
(+) C1
TO P2
R12
TO P6
TO P7
TO P8
R71
R55
TO P9
R69
TO P11
R56
R62
TO P14
TO P15
1.463 REF
1.268 REF
2.156 REF
TRIM LINE
±.002 1.000 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J. Bell'Amo NOV 20-64
CHECKED L. Kempalany 1-6-65
APPROVED
APPROVED D.R. Test 1/8/65
APPROVED MIT W Kupler 1-5-65
APPROVED MSC W G Rhine 1-5-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

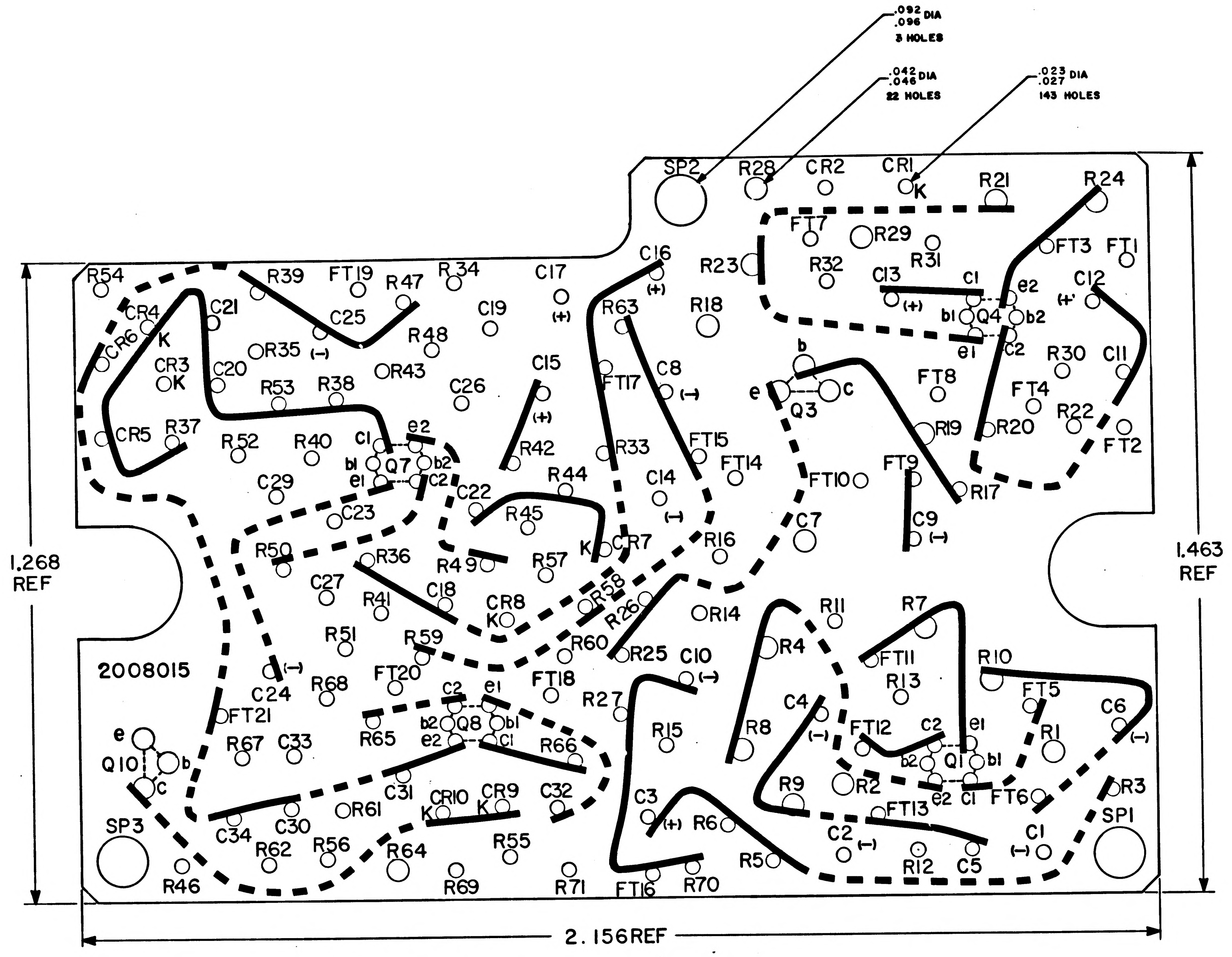
PHOTOGRAPHIC MASTER
WIRING BOARD (TOP)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

SIZE E
DRAWING NO. 2008014
SCALE 10/1
SHEET 1 OF 1

2008014

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS				
SYM	ZONE	DESCRIPTION	DR	APPROVED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.096 DIA
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.042
.046 DIA
22 HOLES
.023
.027 DIA
143 HOLES
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CR2
CR1
K
R21
R24
FT7
R29
R23
R32
R31
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e2
b1
Q4
b2
e1
C2
FT3
FT1
C12
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C16
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R63
R18
R54
CR4
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FT19
R34
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C21
C25
(–)
R48
C19
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(–)
R68
FT20
C2
e1
FT18
R13
FT5
FT21
b2
Q8
b1
e2
C1
R27
C4
(–)
FT12
C2
e1
C6
(–)
e
Q10
b
c
R67
C33
R65
R66
R15
R8
R1
b2
Q1
b1
R9
R2
e2
C1
FT6
R3
C31
CR10
K
CR9
K
C32
C3
(+)
R6
FT13
SP1
SP3
C34
C30
R61
C1
(–)
R62
R56
R64
R55
C2
(–)
R12
C5
R46
R69
R71
FT16
R70
R5
2.156REF

REF DRAWING:
DWG 2008017 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007104	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED 1/4/65
APPROVED MIT W. Kupfer
APPROVED MSC 1-5-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (BOTTOM)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO. ——
SIZE E
DRAWING NO. 2008015
SCALE 10/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 5245

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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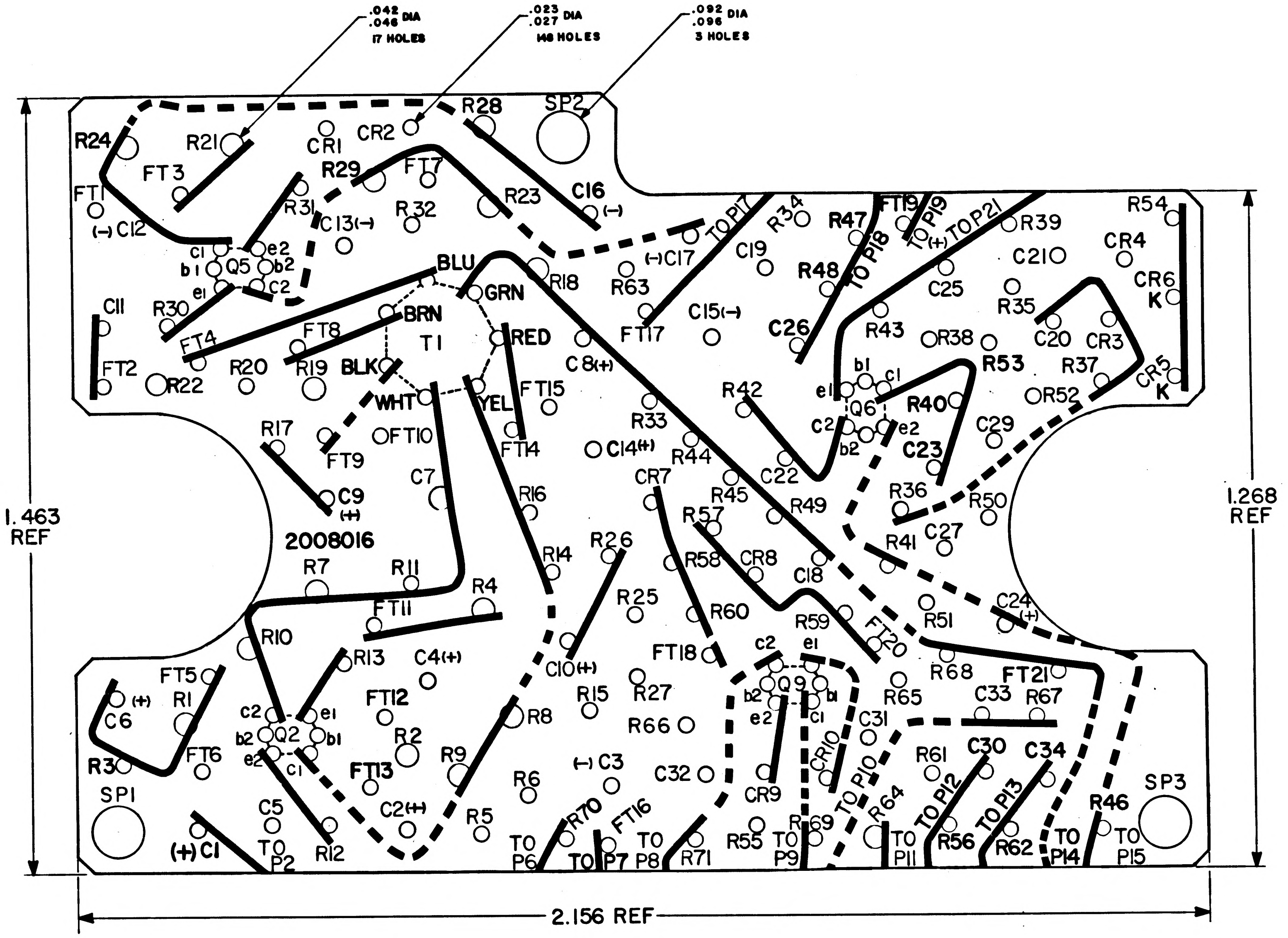
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.046
17 HOLES
.023 DIA
.027
148 HOLES
.092 DIA
.096
3 HOLES
R24
R21
CR1
CR2
R28
SP2
FT3
R29
FT7
R23
C16
(−)
FT1
(−) C12
R31
C13(−)
R32
(−)C17
TO P17
R34
R47
FT19
TO P19
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R39
R54
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Q5
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e2
b2
c2
BLU
GRN
R18
R63
C19
R48
TO P18
C21
CR4
C25
CR6
K
C11
R30
BRN
T1
RED
FT17
C15(−)
C26
R43
R38
R35
C20
CR3
FT4
FT8
C8(+)
R53
R37
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R52
CR5
K
WHT
YEL
R33
c2
b2
e2
C29
R17
FT10
FT14
C14(+)
R44
C22
C23
FT9
C7
CR7
R45
R36
C9
(+)
R16
R49
R50
2008016
R57
C27
R7
R11
R14
R26
R58
CR8
C18
R41
R4
R25
FT11
R60
C24
(+)
R10
R59
FT20
R51
R13
C4(+)
C10(+)
FT18
c2
e1
R68
FT21
FT5
(+)
R1
c2
e1
R15
R27
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e2
c1
C31
e2
c1
R2
R8
R3
FT6
FT13
R9
(−) C3
C32
CR10
TO P10
R61
C30
C34
SP1
C5
C2(+)
R6
CR9
R64
TO P12
TO P13
R46
SP3
R5
R70
FT16
R69
(+) C1
TO P2
R12
TO P6
TO P7
TO P8
R71
R55
TO P9
TO P11
R56
R62
TO P14
TO P15
1.463 REF
1.268 REF
2.156 REF

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL—P—18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DRAWING:
DWG NO. 2008014 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007104	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ——— ± ——— ± ———
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN NOV20-64
CHECKED 6 Jan 65
APPROVED
APPROVED D. B. Tost 1/4/65
APPROVED MIT 6 Jan 65
APPROVED MSC 1-5-66
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (TOP)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO. ———
SIZE E
DRAWING NO. 2008016
SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15245

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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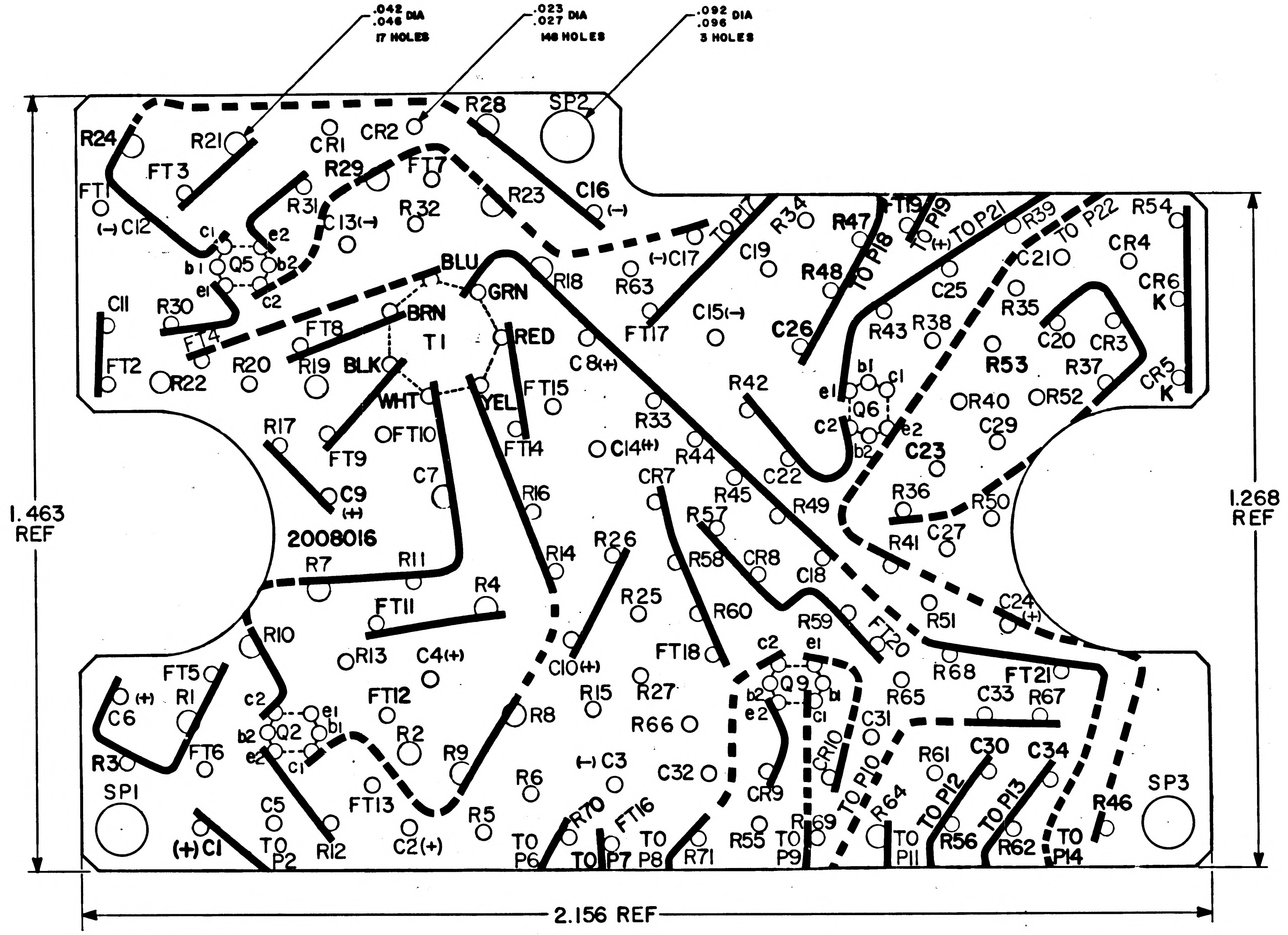
B		REVISED PER TDRR18794	RDM	RL		



.042 DIA
.046
17 HOLES
.023 DIA
.027
148 HOLES
.092 DIA
.096
3 HOLES
R24
R21
CR1
CR2
R28
SP2
FT1
FT3
R29
FT7
R23
C16 (–)
(–) C12
R31
C13 (–)
R32
TO P17
R34
R47
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TO P21
R39
TO P22
R54
c1
e2
b1
Q5
b2
e1
c2
BLU
(–) C17
C19
TO P18
(+)
C21
CR4
C11
R30
GRN
R18
R63
R48
C25
CR6
K
FT4
BRN
C15 (–)
C26
R43
R38
R35
FT8
T1
RED
FT17
b1
c1
C20
CR3
FT2
R22
R20
R19
BLK
C8 (+)
R42
e1
Q6
R53
R37
WHT
YEL
FT15
c2
e2
OR40
OR52
CR5
K
R17
OFT10
R33
b2
C29
FT9
FT14
C14 (+)
R44
C23
C7
C22
C9 (+)
CR7
R45
R36
R50
R16
R57
R49
2008016
C27
R41
R7
R11
R14
R26
R58
CR8
C18
R4
R25
C24 (+)
FT11
R60
R59
R51
R10
c2
e1
FT20
C10 (+)
FT18
R68
FT21
R13
C4 (+)
Q9
b1
R65
C33
R67
FT5
R15
b2
(+)
R1
c2
e1
FT12
R27
e2
C6
b2
Q2
b1
R8
R66
c1
C31
e2
c1
R2
R10
C30
C34
R3
FT6
R9
(–) C3
C32
TO P10
R61
R6
CR9
R64
TO P12
TO P13
SP1
C5
FT13
R5
R70
FT16
R46
SP3
(+) C1
TO P2
R12
C2 (+)
TO P6
TO P7
TO P8
R71
R55
TO P9
R69
TO P11
R56
R62
TO P14
1.463 REF
1.268 REF
2.156 REF

NOTES:
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REF DRAWING:
DWG NO. 2008014 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007104	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED 1/4/65
APPROVED MIT
APPROVED MSC 1-5-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (TOP)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008016
SCALE 10/1
SHEET 1 OF 1

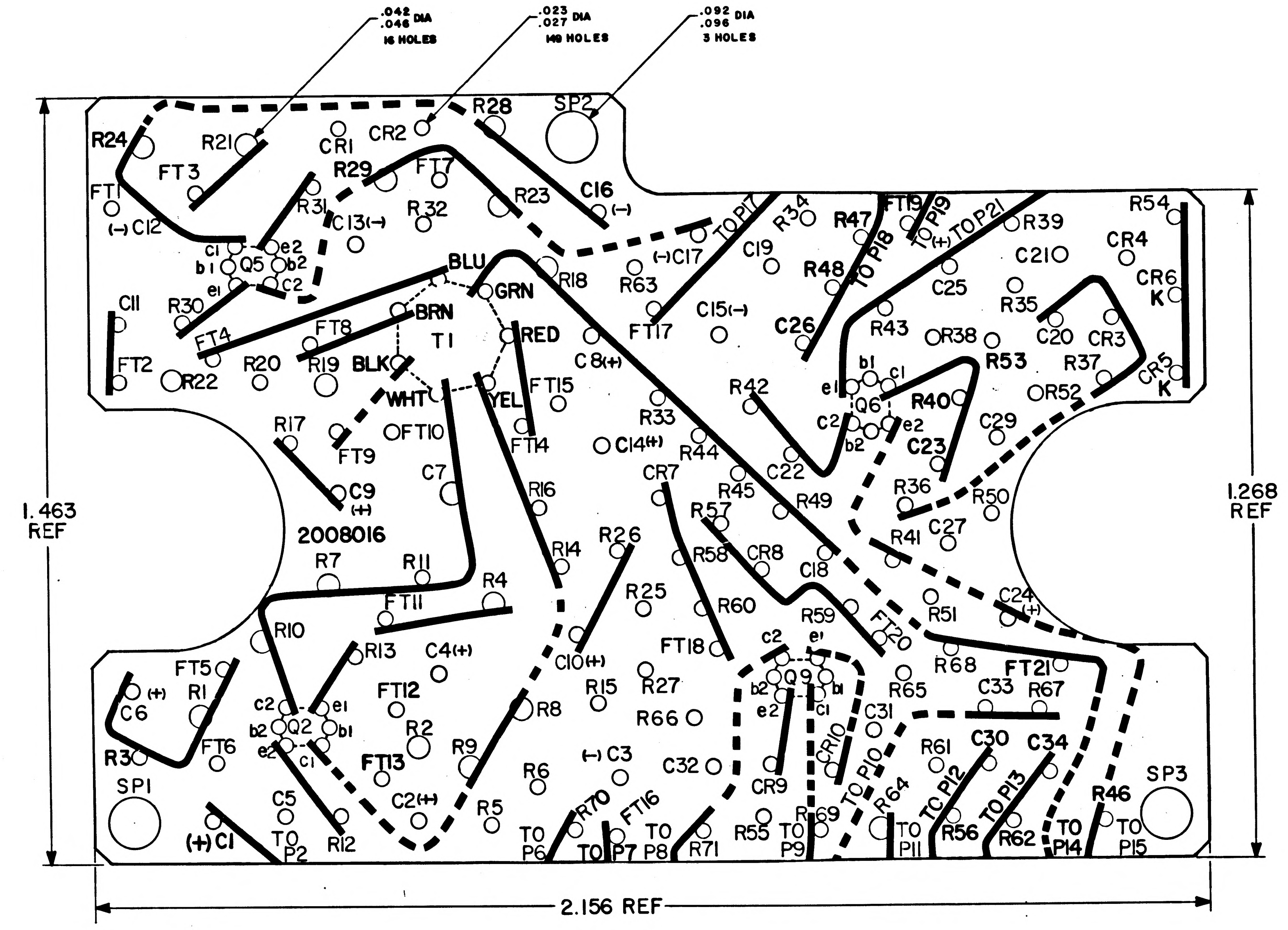
2008016 B

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15245

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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16 HOLES
.023
.027 DIA
149 HOLES
.092
.096 DIA
3 HOLES
R24
R21
CR1
CR2
R28
SP2
FT3
R29
FT7
R23
C16
(−)
FT1
R31
C13(−)
R32
TO P17
R34
R47
FT19
TO P19
(+) TO P21
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R54
(−) C12
c1
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Q5
e2
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c2
e1
BLU
GRN
R18
R63
(−) C17
C19
R48
TO P18
C25
C21
CR4
C11
R30
BRN
RED
FT17
C15(−)
C26
R43
R38
R35
C20
CR3
CR6
K
FT4
FT8
T1
C8(+)
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R37
FT2
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R20
R19
BLK
WHT
YEL
FT15
R42
b1
c1
e1
Q6
c2
b2
e2
R40
C23
R52
CR5
K
R17
FT10
FT9
R33
C14(+)
R44
C22
C29
C7
FT14
CR7
R45
R49
R36
R50
C9
(+)
R16
R57
C27
2008016
R14
R26
R58
CR8
R41
R7
R11
R4
C18
FT11
R25
R60
C24
(+)
R10
R51
R59
FT20
R13
C4(+)
C10(+)
FT18
c2
e1
R68
FT21
FT5
Q9
b2
e2
b1
c1
R27
C33
R67
C6
(+)
R1
c2
e1
FT12
R15
R65
C31
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Q2
b1
R8
R66
e2
c1
R2
FT6
R10
R61
C30
C34
R3
FT13
R9
(−) C3
C32
SP3
R6
CR9
TO P10
R64
TO P12
TO P13
SP1
C5
C2(+)
R46
R5
R70
FT16
R69
(+) C1
TO P2
R12
TO P6
TO P7
TO P8
R71
R55
TO P9
TO P11
R56
R62
TO P14
TO P15
1.463 REF
1.268 REF
2.156 REF

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL–P–18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DRAWING:
DWG NO. 2008014 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007104	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN		NOV 20-64
CHECKED		
APPROVED		
APPROVED	D. B. Teat	1/4/65
APPROVED MIT	W. Kupfer	
APPROVED MSC		1-5-65
		DATE

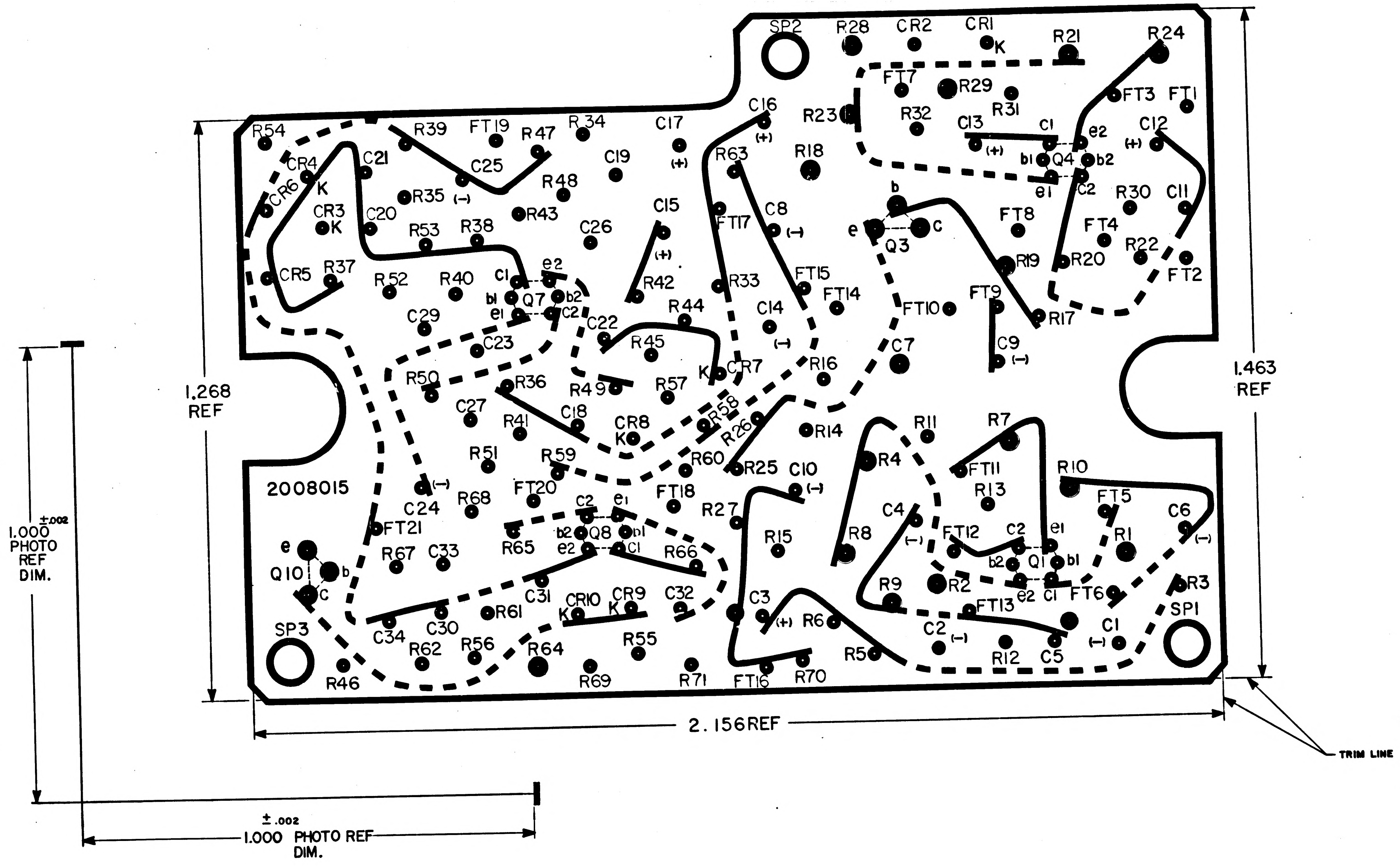
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (TOP)
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO.	SIZE	DRAWING NO.
——	E	2008016
SCALE 10/1	——	SHEET 1 OF 1

REVISIONS 5245						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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CR1
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R21
R24
FT7
R29
FT3
FT1
R23
R32
R31
C13
C1
e2
C12
(+)
b1
Q4
b2
(+)
e1
C2
R30
C11
R54
R39
FT19
R47
R34
C17
C16
(+)
R63
R18
(+)
CR4
C21
C25
C19
b
e
Q3
c
FT8
FT4
CR6
K
R35
(–)
R48
C15
FT17
C8
(–)
R22
CR3
K
C20
R53
R38
R43
C26
(+)
R19
R20
FT2
CR5
R37
R52
R40
C1
e2
R42
R33
FT15
FT14
FT10
FT9
R17
b1
Q7
b2
e1
C2
C29
C23
C22
R44
C14
(–)
C9
(–)
R45
K
CR7
R16
C7
1.268 REF
1.463 REF
R50
R36
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R57
R58
C27
R41
C18
CR8
K
R26
R14
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R7
R51
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R60
R25
C10
(–)
R4
FT11
R10
2008015
C24
(–)
R68
FT20
FT18
R13
FT5
C2
e1
R27
C4
C6
(–)
FT21
b2
Q8
b1
e2
c1
R15
R8
(–)
FT12
C2
e1
R1
e
R67
C33
R65
R66
b2
Q1
b1
Q10
b
c
C31
CR10
K
CR9
K
C32
C3
(+)
R6
R9
R2
FT13
e2
c1
FT6
R3
SP3
C34
C30
R61
C2
(–)
C1
(–)
SP1
R62
R56
R64
R55
R5
R12
C5
R46
R69
R71
FT16
R70
2.156 REF
TRIM LINE
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSION SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL
———

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.

DRAWN	S. Dell'Amore	
CHECKED	R.L. Kangaskey	[illegible]
APPROVED		
APPROVED	D.R. Test	1/4/65
APPROVED MIT	W. Koppe	1/[illegible]65
APPROVED MSC	W.G. Rhine	1-5-65
	DATE	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

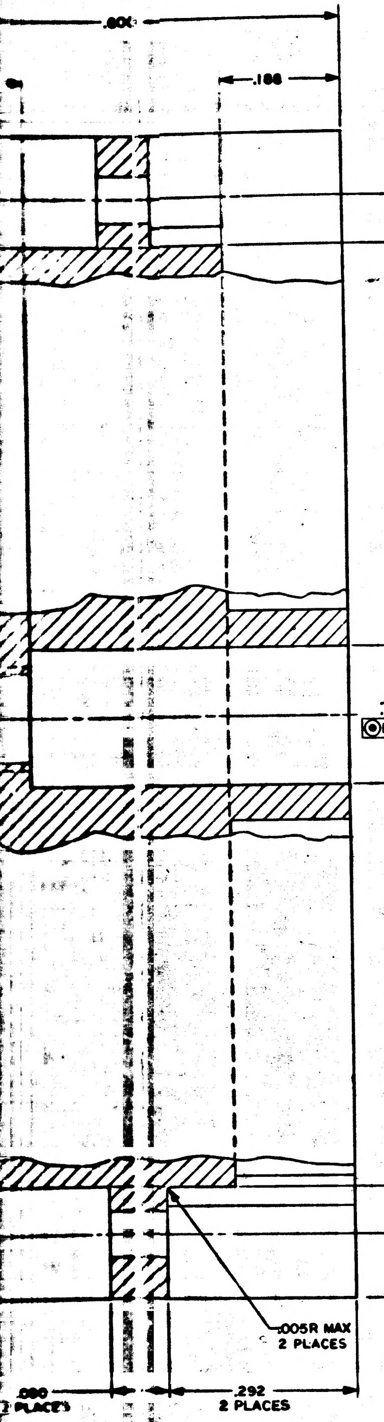
PHOTOGRAPHIC MASTE
WIRING BOARD (BOTTOM)
AC DIFFERENTIAL AMPLIFIE
AND INTERROGATOR

CODE IDENT NO.	SIZE	DRAWING NO.
———	E	2008017
SCALE 10/1	———	SHEET 1 OF 1

2008017

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TORR 17618		WR

REVISIONS 19777



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.005R MAX
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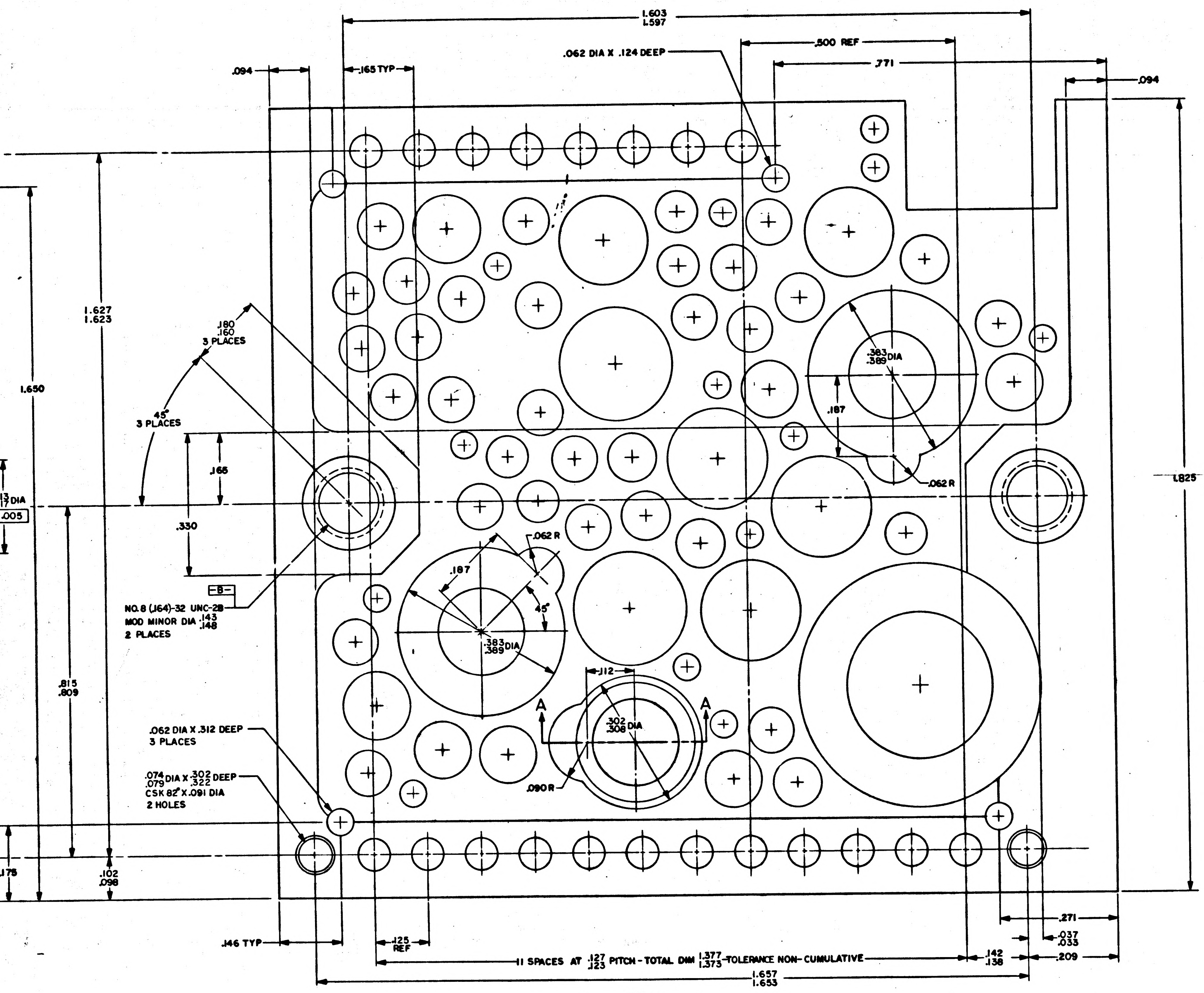
2 PLACES
.292
2 PLACES



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.771
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.094
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1.623
1.650
.180
.160
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45°
3 PLACES
.165
.330
-B-
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MOD MINOR DIA .143 .148
2 PLACES
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.389 DIA
.187
.062 R
.187
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45°
.383
.389 DIA
.112
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A
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.308 DIA
.090 R
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.815
.809
.062 DIA X .312 DEEP
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CSK 82° X .091 DIA
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.102
.098
.146 TYP
.125
REF
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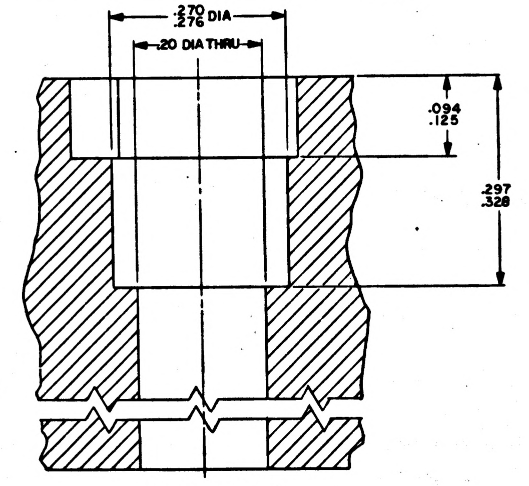
1.653



.270
.276 DIA
.20 DIA THRU
.094
.125
.297
.328

SECTION A-A

MASTER

2007103	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS XX ±.02 XXX ±.005 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
—
FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 12-15-69
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
BINARY CURRENT SWITCH

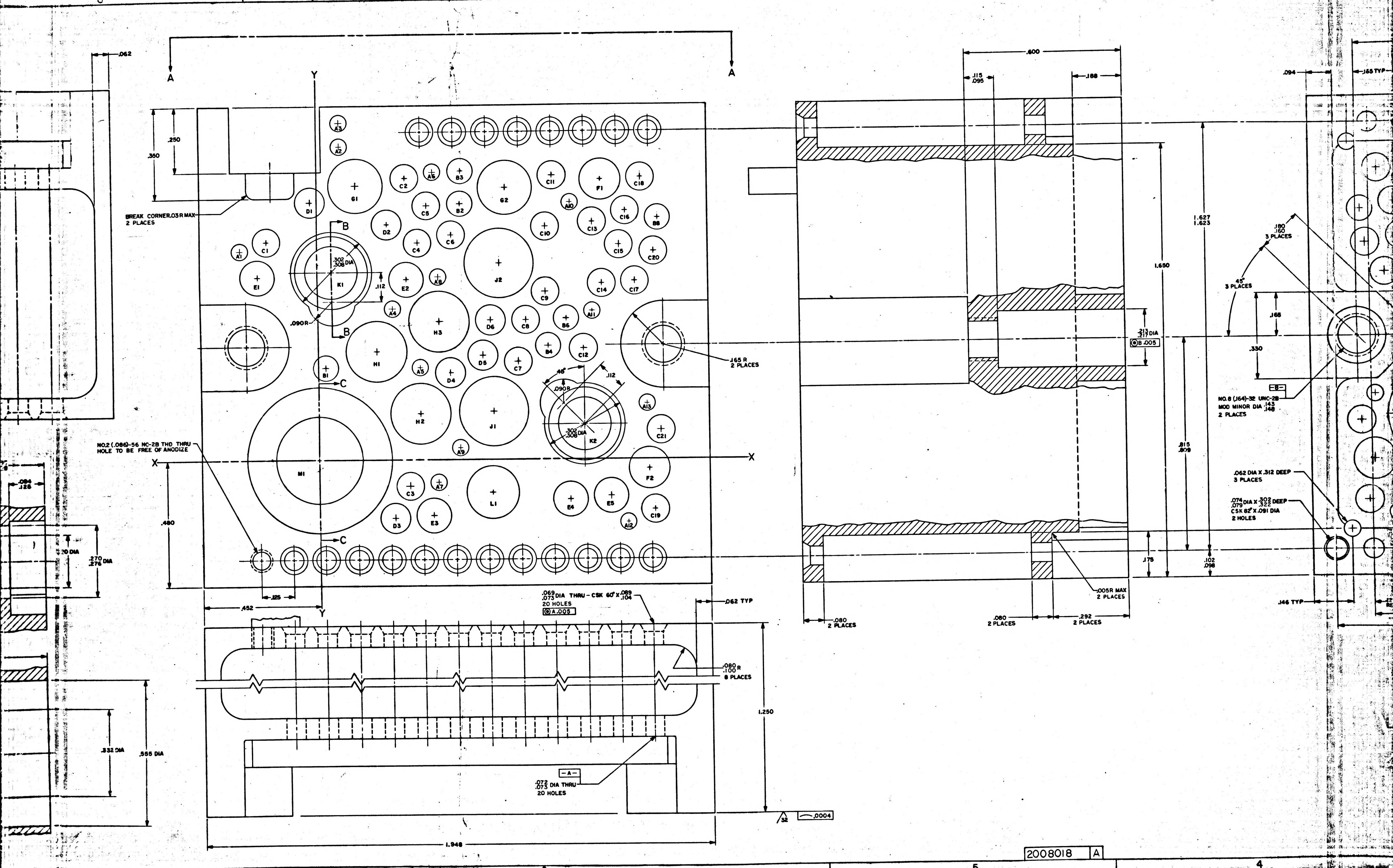
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008018
SCALE 10/1
WT —
SHEET 1 OF 1

2008018 A

2008018 A

F3

(34)

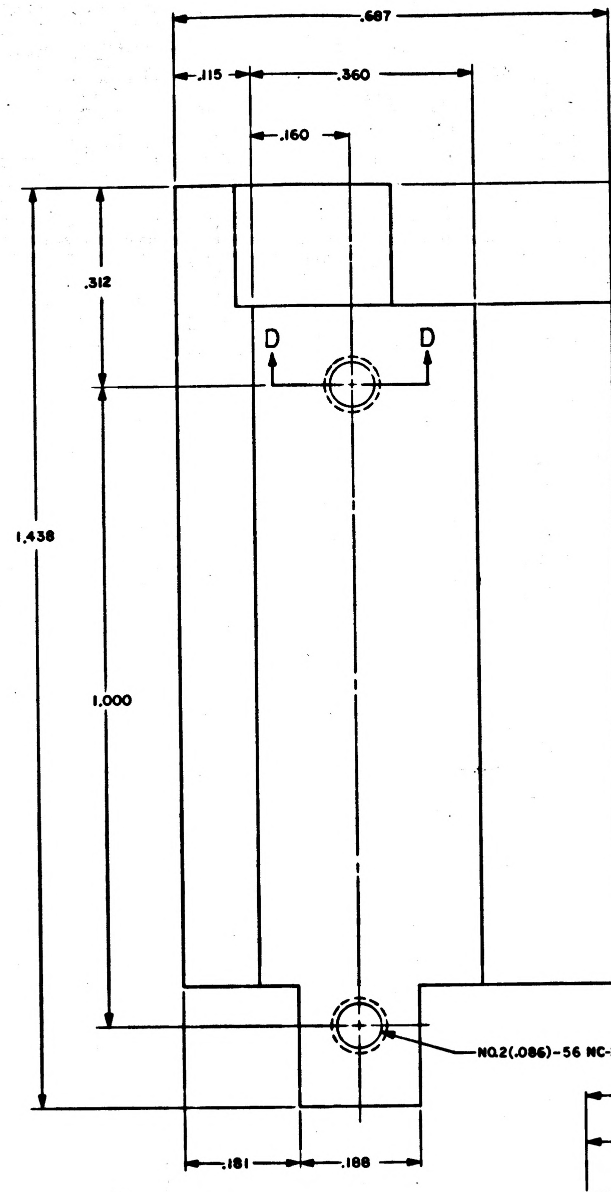

8
7
6
5
4
A
A
Y
Y
X
X
B
B
C
C
.062
.250
.350
BREAK CORNER .03 R MAX
2 PLACES
.302
.308 DIA
.112
.090R
.165 R
2 PLACES
45°
.090R
.112
.302
.308 DIA
NO.2 (.086)-56 NC-2B THD THRU
HOLE TO BE FREE OF ANODIZE
.480
.125
.452
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
B1
B2
B3
B4
B6
B8
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
D1
D2
D3
D4
D5
D6
E1
E2
E3
E4
E5
F1
F2
G1
G2
H1
H2
H3
J1
J2
K1
K2
L1
M1
.069
.073 DIA THRU - CSK 60° X .089
.104
20 HOLES
◎ A .005
.062 TYP
.080
.100 R
8 PLACES
1.250
-A-
.072
.073 DIA THRU
20 HOLES
32
⌒ .0004
1.948
.600
.115
.095
.188
1.650
1.627
1.623
.213
.217 DIA
◎ B .005
.815
.809
.175
.102
.098
.005R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.094
.165 TYP
.180
.160
3 PLACES
45°
3 PLACES
.165
.330
-B-
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
.062 DIA X .312 DEEP
3 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146 TYP
.094
.128
.20 DIA
.270
.276 DIA
.332 DIA
.555 DIA

2008018 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.297	.795	.058 .062	13
A2	.088	1.193		
A3	.088	1.283		
A4	.285	.575		
A5	.390	.350		
A6	.444	1.092		
A7	.457	-.086		
A8	.462	.695		
A9	.541	.045		
A10	.968	.975		
A11	1.050	.562		
A12	1.181	-.240		
A13	1.258	.210		
B1	.028	.350	.092 .096	6
B2	.548	.971		
B3	.550	1.096		
B4	.880	.430		
B6	.950	.585		
B8	1.305	.915		
C1	-.195	.830	.101 .105	21
C2	.337	1.070		
C3	.347	-.100		
C4	.385	.823		
C5	.420	.965		
C6	.514	.852		
C7	.765	.370		
C8	.795	.528		
C9	.872	.636		
C10	.873	.882		
C11	.900	1.078		
C12	1.015	.420		
C13	1.053	.900		
C14	1.080	.667		
C15	1.155	.813		
C16	1.180	.942		
C17	1.215	.675		
C18	1.240	1.070		
C19	1.285	-.192		
C20	1.287	.788		
C21	1.310	.110		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D1	-.025	.980	.108 .112	6
D2	.267	.894		
D3	.288	-.222		
D4	.305	.330		
D5	.630	.395		
D6	.660	.530		
E1	-.230	.695	.128 .132	5
E2	.340	.685		
E3	.436	-.212		
E4	.960	-.152		
E5	1.115	-.140		
F1	1.085	1.062	.153 .157	2
F2	1.264	-.036		
G1	.150	1.043	.202 .206	2
G2	.720	1.032		
H1	.223	.412	.227 .231	3
H2	.390	.175		
H3	.463	.525		
J1	.670	.182	.255 .262	2
J2	.696	.744		
K1	.055	.714	SEE SECTION B-B	2
K2	1.017	.132		
L1	.663	-.125	SEE SECTION A-A	1
M1	.000	.000	SEE SECTION C-C	1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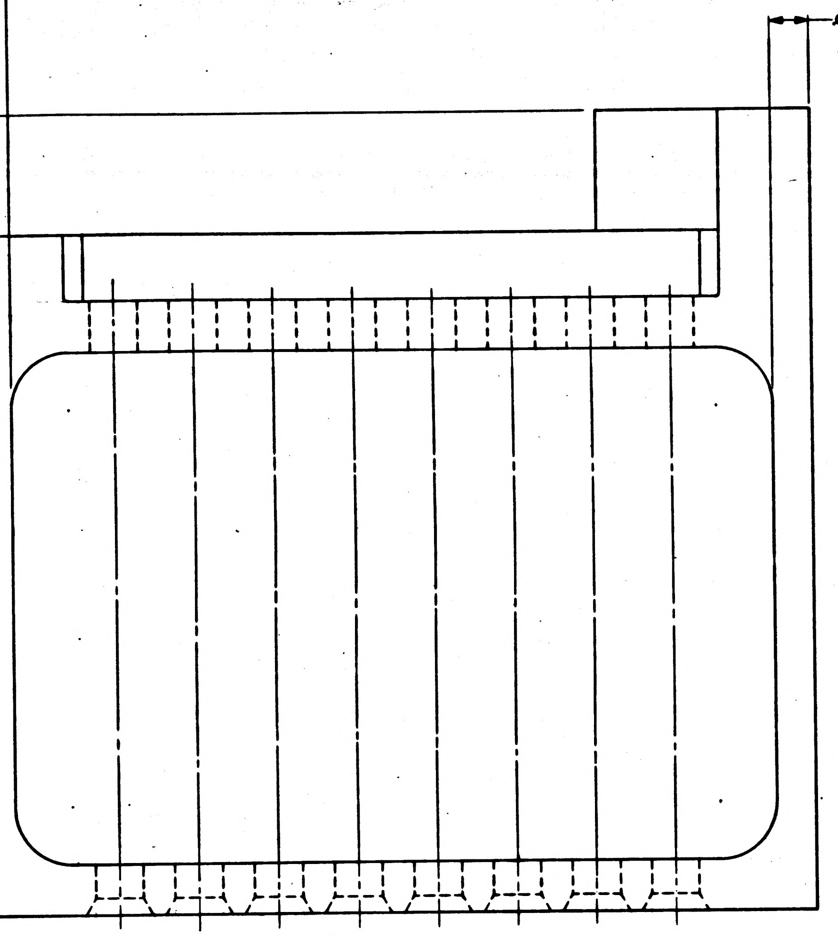
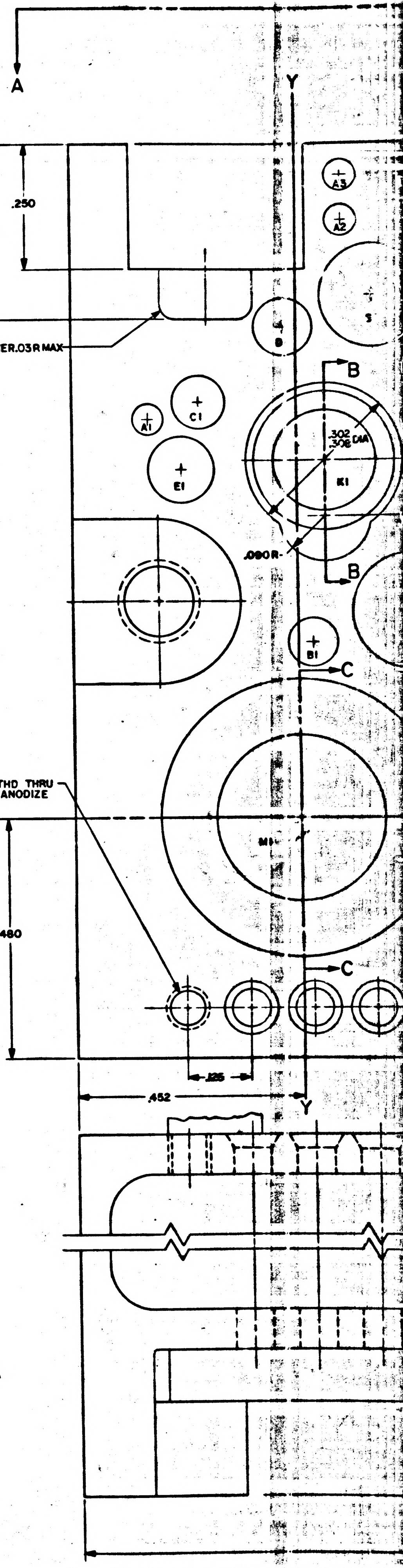
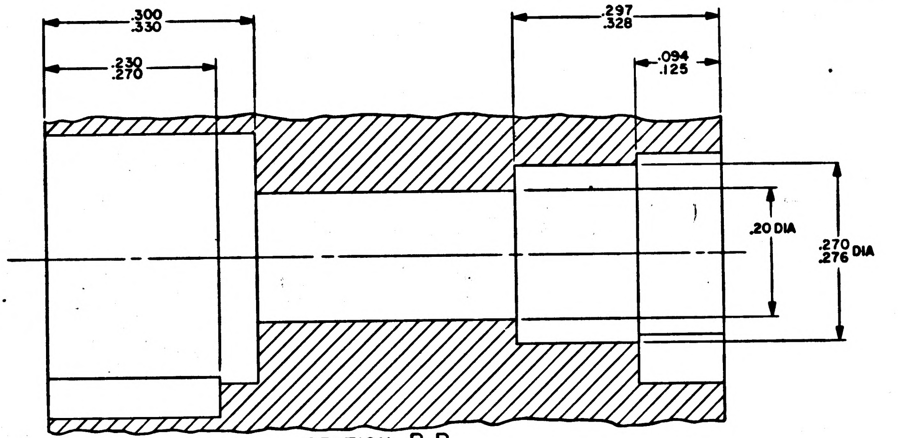
.115
.360
.160
.312
D
D
1.438
1.000
.181
.188
NO.2(.086)-56 NC-2B THD THRU

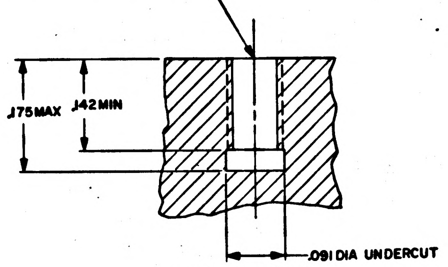


VIEW A-A

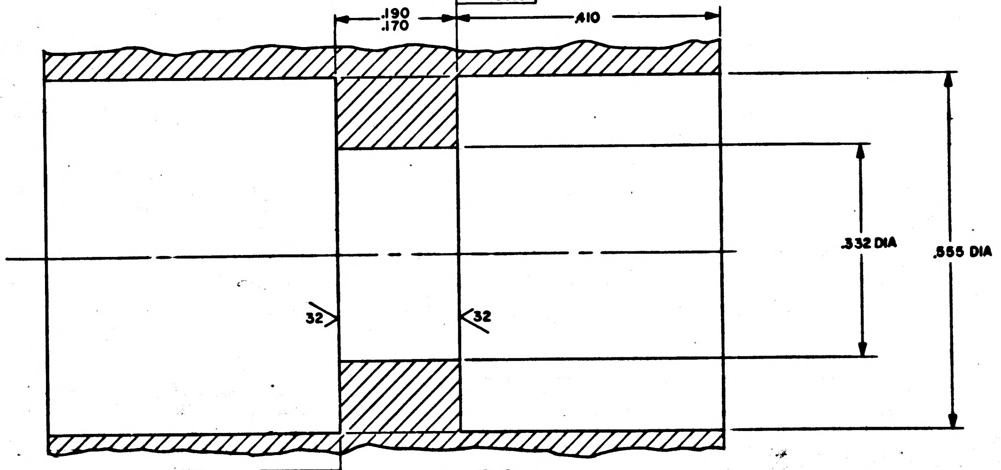

.062
A
.250
.350
BREAK CORNER .03R MAX 2 PLACES
A3
A2
B
B
C1
A1
E1
.302 .306 DIA
K1
.090R
B1
C
C
M1
NO.2 (.086)-56 NC-2B THD THRU HOLE TO BE FREE OF ANODIZE
X
.480
.125
.452
Y
Y


.300 .330
.230 .270
.297 .328
.094 .125
.20 DIA
.270 .276 DIA
.0010

SECTION B-B
TYP 2 K HOLES


NO.2(.086)-56 NC-2B THD
.175 MAX
.142 MIN
.091 DIA UNDERCUT

SECTION D-D


.190 .170
.410
.332 DIA
.555 DIA
32
32
.0010

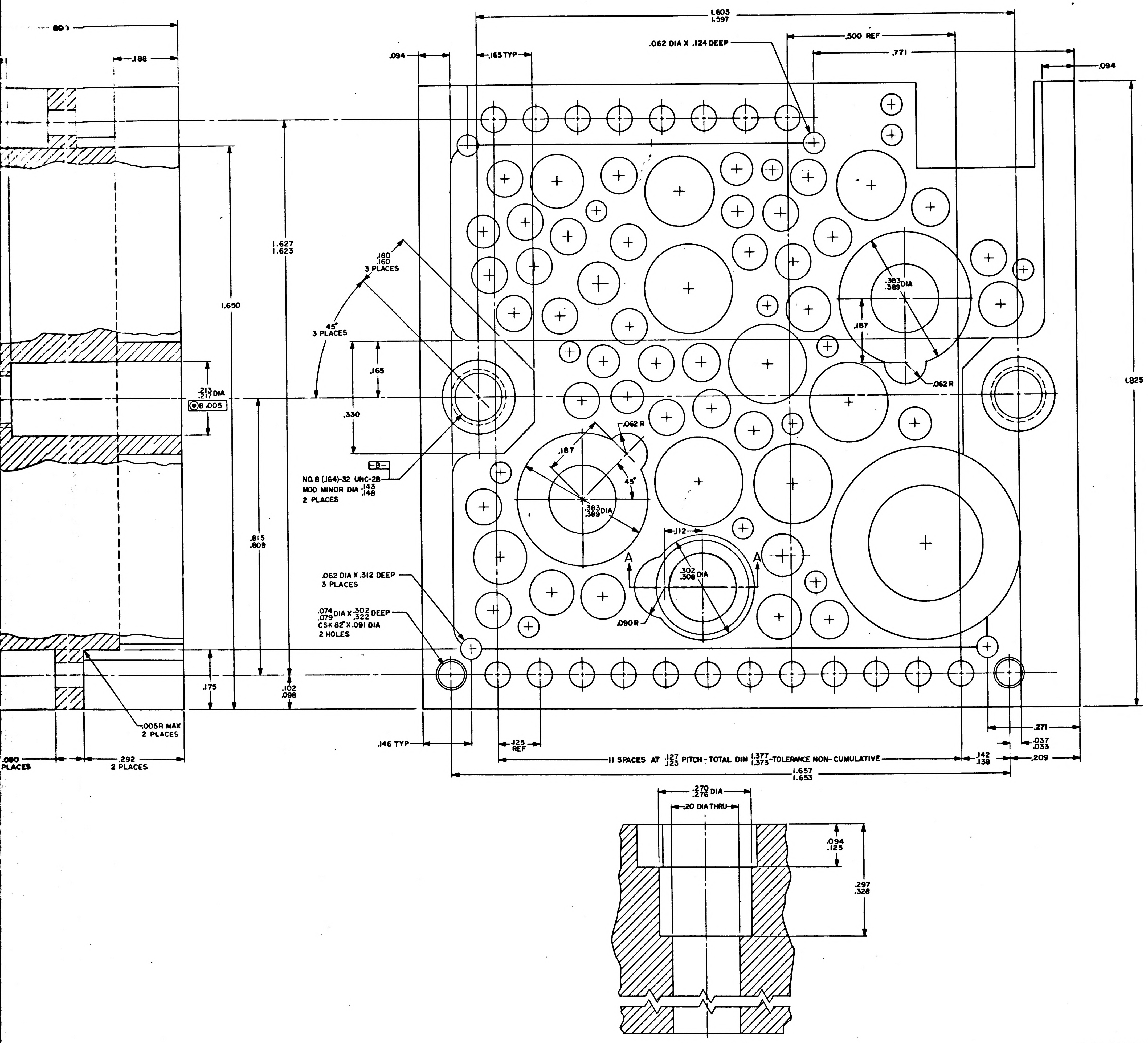
SECTION C-C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. UNLESS OTHERWISE SPECIFIED $\overset{125}{\checkmark}$ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019

2008018 A

REVISIONS 19399			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17618		WR
B	REVISED PER TDRR 19283	24 May '65	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1.597
.062 DIA X .124 DEEP
.500 REF
.771
.094
.165 TYP
.094
.188
.180
.160
3 PLACES
45°
3 PLACES
.165
.330
1.627
1.623
1.650
.213
.217 DIA
B .005
.383
.389 DIA
.187
.062 R
1.825
-B-
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
.062 R
.187
45°
.383
.389 DIA
.112
A
A
.302
.306 DIA
.090 R
.815
.809
.062 DIA X .312 DEEP
3 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.175
.102
.098
.005R MAX
2 PLACES
.080
PLACES
.292
2 PLACES
.146 TYP
.125
REF
11 SPACES AT .127
.123 PITCH - TOTAL DIM 1.377
1.373 -TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
.209
1.657
1.653
.270
.276 DIA
.20 DIA THRU
.094
.125
.297
.328

SECTION A-A

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS XX ± .02 XXX ± .005 ANGLES ±½°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
—
FINAL FINISH
SEE NOTE 6

2007103
NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED 11 Dec 64
APPROVAL 11 Dec 64
APPROVAL
NASA APPROVAL 12-15-64
MIT APPROVAL 15 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

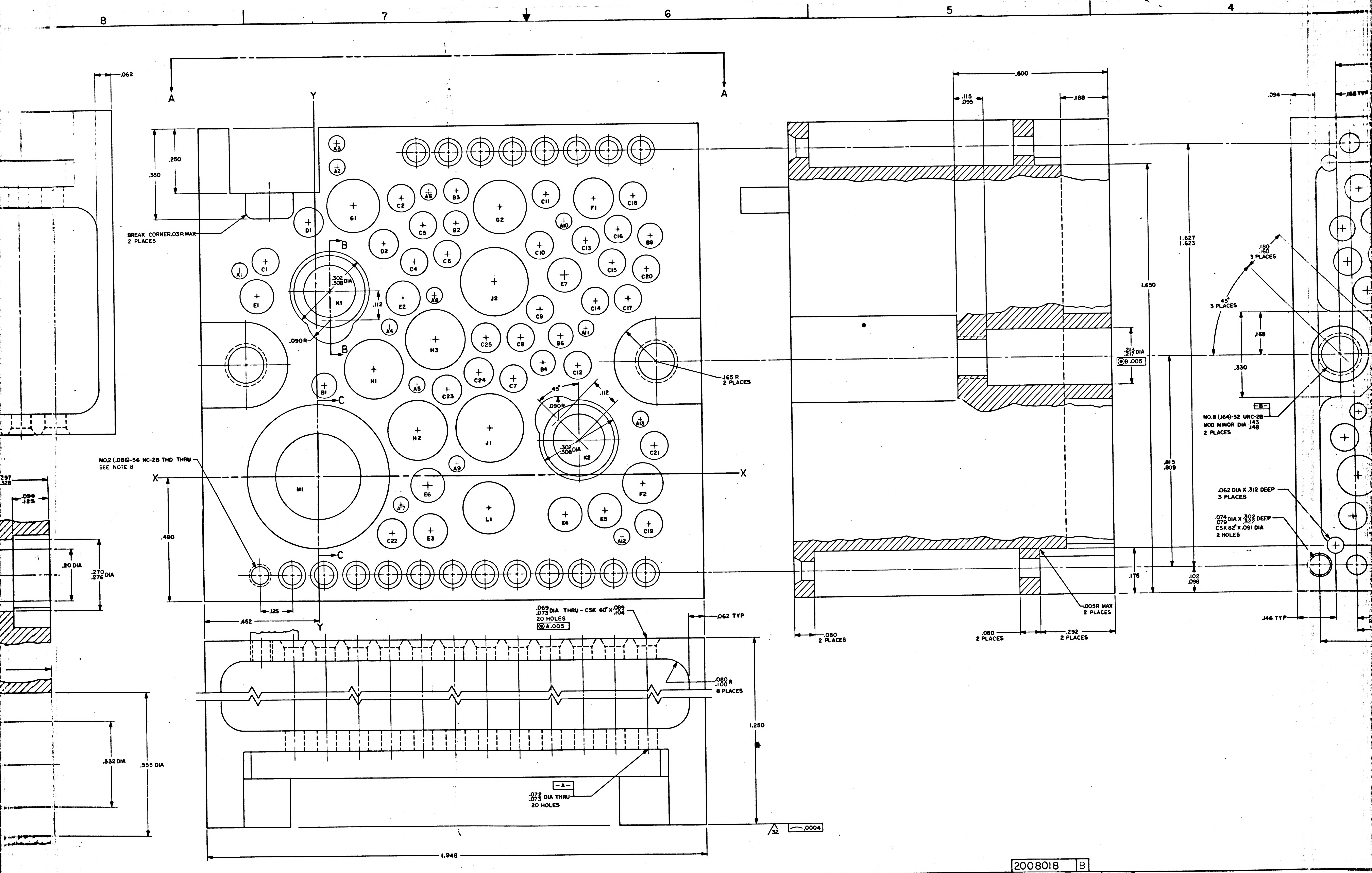
HEATSINK
BINARY CURRENT SWITCH

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008018
SCALE 10/1
WT —
SHEET 1 OF 1

2008018 B

34

F-3


8
7
6
5
4
A
A
Y
Y
X
X
B
B
C
C
.062
.250
.350
BREAK CORNER .03 R MAX
2 PLACES
.302
.308 DIA
.112
.090 R
.165 R
2 PLACES
45°
.090 R
.112
.302
.308 DIA
NO.2 (.086)-56 NC-2B THD THRU
SEE NOTE 8
.480
.125
.452
.069
.073 DIA THRU - CSK 60° X .089
.104
20 HOLES
⊙ A .005
.062 TYP
.080 R
.100
8 PLACES
1.250
-A-
.072
.073 DIA THRU
20 HOLES
32
⌒ .0004
1.948
A1 A2 A3 A4 A5 A6 A8 A9 A10 A11 A12 A13 A17
B1 B2 B3 B4 B6 B8
C1 C2 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25
D1 D2
E1 E2 E3 E4 E5 E6 E7
F1 F2
G1 G2
H1 H2 H3
J1 J2
K1 K2
L1
M1
.600
.115
.095
.188
1.650
1.627
1.623
.213
.217 DIA
⊙ B .005
.815
.809
.175
.102
.098
.005R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.094
.165 TYP
.180
.160
3 PLACES
45°
3 PLACES
.168
.330
-B-
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
.062 DIA X .312 DEEP
3 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146 TYP
.297
.328
.094
.125
.20 DIA
.270
.276 DIA
.332 DIA
.555 DIA

2008018 B

F2

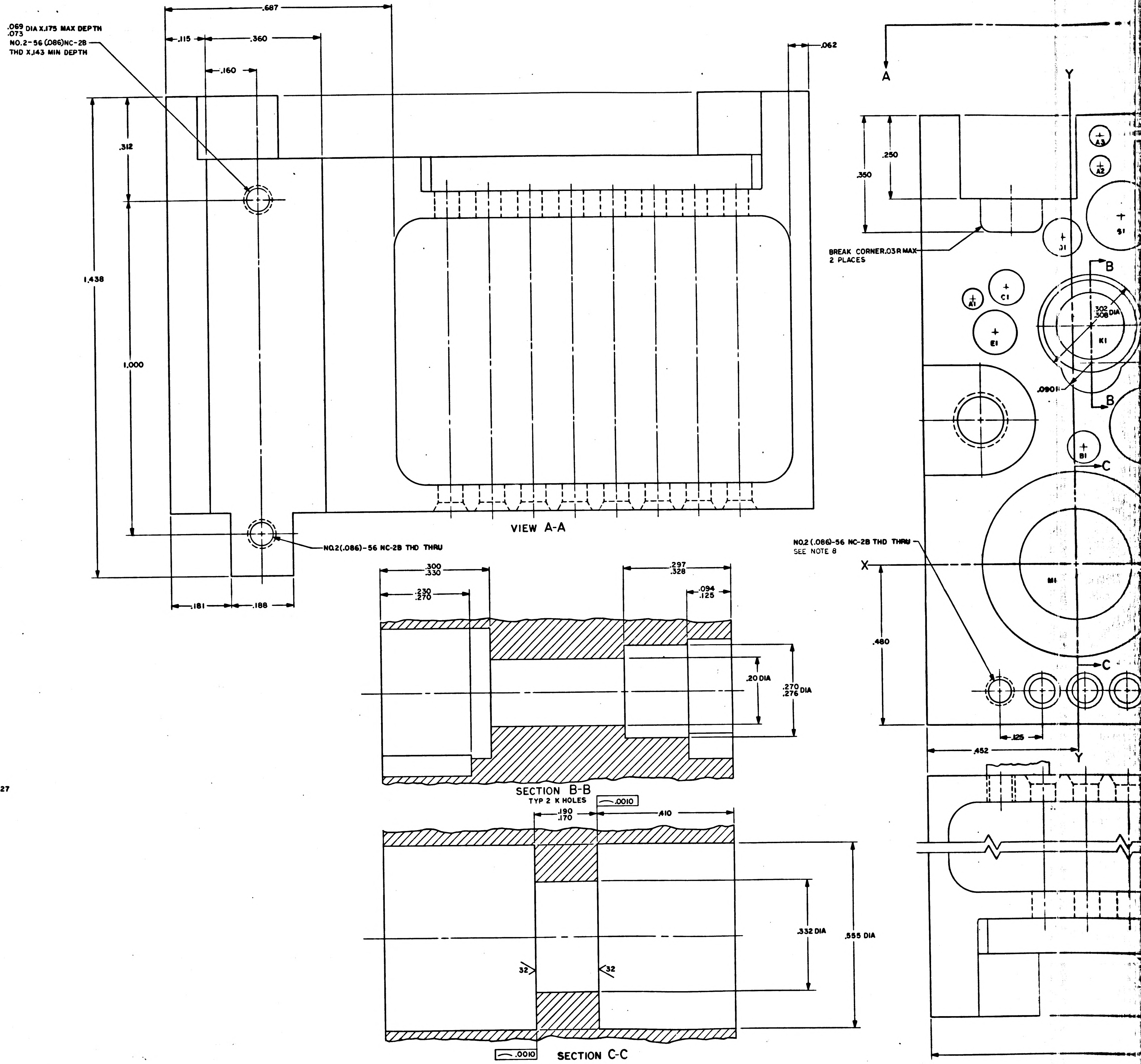
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	−.297	.795	.058 .062	13
A2	.088	1.193		
A3	.088	1.283		
A4	.285	.575		
A5	.390	.350		
A6	.444	1.092		
A7	.322	−.112		
A8	.462	.695		
A9	.541	.045		
A10	.968	.975		
A11	1.050	.562		
A12	1.181	−.240		
A13	1.258	.210		
B1	.028	.350	.092 .096	6
B2	.548	.971		
B3	.550	1.096		
B4	.880	.430		
B6	.950	.535		
B8	1.305	.915		
C1	−.195	.830	.101 .105	24
C2	.337	1.070		
C4	.385	.823		
C5	.420	.965		
C6	.514	.852		
C7	.765	.370		
C8	.795	.528		
C9	.872	.636		
C10	.873	.882		
C11	.900	1.078		
C12	1.015	.420		
C13	1.053	.900		
C14	1.080	.667		
C15	1.155	.813		
C16	1.180	.942		
C17	1.215	.675		
C18	1.240	1.070		
C19	1.285	−.192		
C20	1.287	.788		
C21	1.310	.110		
C22	.288	−.222		
C23	.505	.330		
C24	.630	.395		
C25	.660	.530		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D1	−.025	.980	.108 .112	2
D2	.267	.894		
E1	−.230	.695	.128 .132	7
E2	.340	.685		
E3	.436	−.212		
E4	.960	−.152		
E5	1.115	−.140		
E6	.427	−.036		
E7	.968	.768		
F1	1.085	1.062	.153 .157	2
F2	1.264	−.036		
G1	.150	1.043	.202 .206	2
G2	.720	1.032		
H1	.223	.412	.227 .231	3
H2	.390	.175		
H3	.463	.525		
J1	.670	.182	.255 .262	2
J2	.696	.744		
K1	.055	.714	SEE SECTION B-B	2
K2	1.017	.132		
L1	.663	−.125	SEE SECTION A-A	1
M1	.000	.000	SEE SECTION C-C	1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. UNLESS OTHERWISE SPECIFIED $\overset{125}{\surd}$ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040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NO.2-56 (.086)NC-2B
THD X.143 MIN DEPTH
.687
.115
.360
.160
.062
.312
1.438
1.000
.181
.188
NO.2(.086)-56 NC-2B THD THRU
.300
.330
.230
.270
.297
.328
.094
.125
.20 DIA
.270
.276 DIA
.0010
.190
.170
.410
32
32
.332 DIA
.555 DIA
.0010
A
Y
.250
.350
BREAK CORNER.03R MAX
2 PLACES
A3
A2
D1
G1
B
A1
C1
E1
.302
.308 DIA
K1
.090R
B
B1
C
NO.2 (.086)-56 NC-2B THD THRU
SEE NOTE 8
X
M1
.480
C
.125
.452
Y

VIEW A-A

SECTION B-B
TYP 2 K HOLES

SECTION C-C

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 19399			
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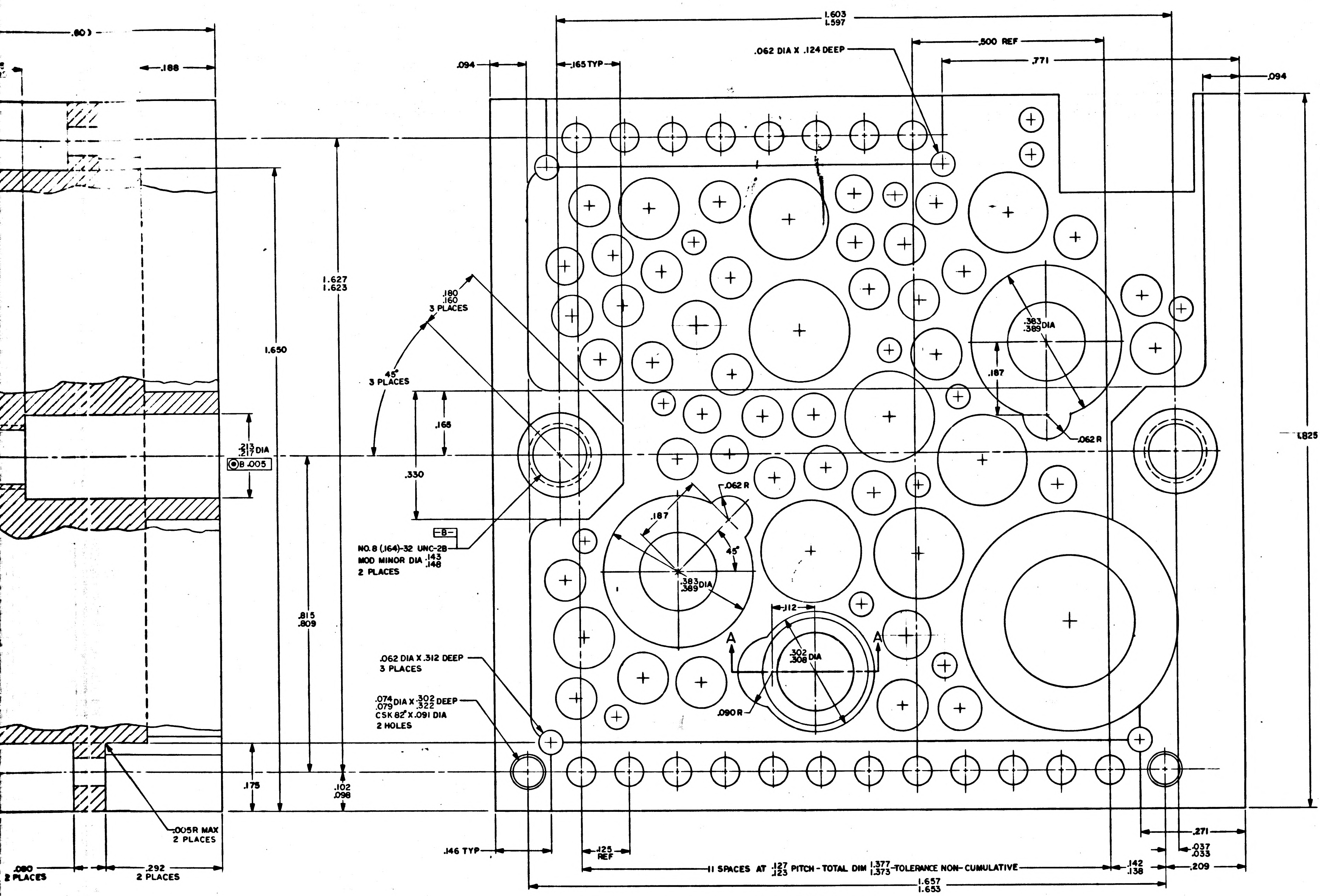
B	REVISED PER TDRR 19283		WR
C	REVISED PER TDRR 21487		WR



.80
.188
.094
.165 TYP
1.603
1.597
.062 DIA X .124 DEEP
.500 REF
.771
.094
1.627
1.623
1.650
.180
.160
3 PLACES
45°
3 PLACES
.383
.389 DIA
.187
.165
.330
.062 R
1.825
.213
.217 DIA
B .005
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
-B-
.187
.062 R
45°
.383
.389 DIA
.815
.809
.112
A
A
.302
.308 DIA
.062 DIA X .312 DEEP
3 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.090 R
.175
.102
.098
.005R MAX
2 PLACES
.080
2 PLACES
.292
2 PLACES
.146 TYP
.125
REF
11 SPACES AT .127
.123 PITCH - TOTAL DIM 1.377
1.373 - TOLERANCE NON-CUMULATIVE
.142
.138
1.657
1.653
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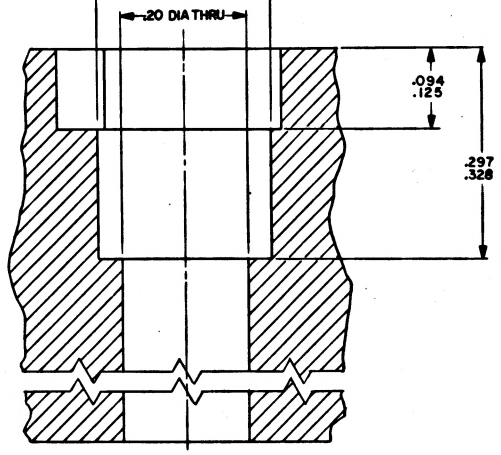
.209



.270
.276 DIA
.20 DIA THRU
.094
.125
.297
.328

SECTION A-A

2007103	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS XX±.02 XXX±.005 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE
CHECKED 11 Dec 66
APPROVAL 11 Dec 66
APPROVAL

NASA APPROVAL 12-15-67

MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

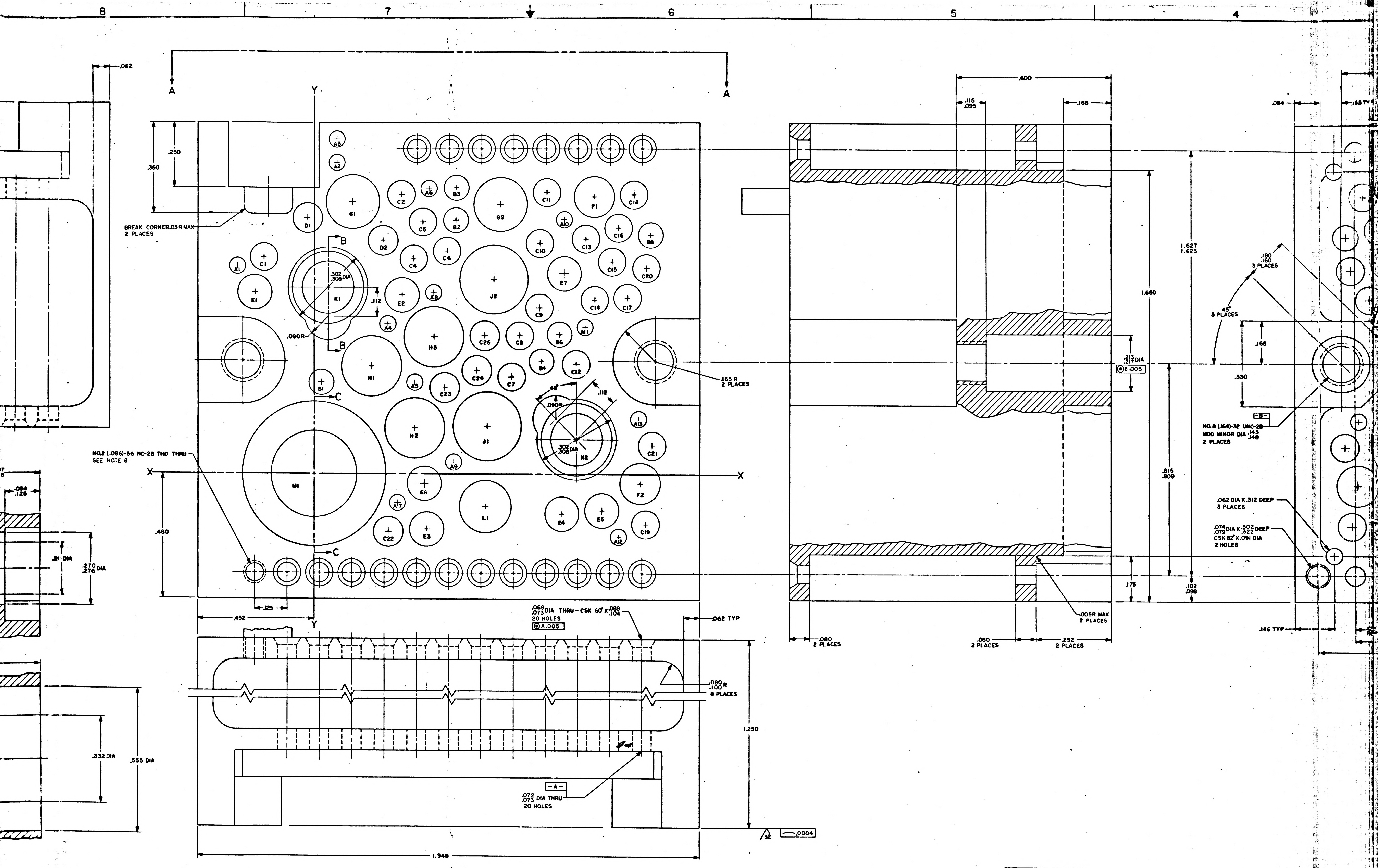
HEATSINK
BINARY CURRENT SWITCH

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008018

SCALE 10/1 WT — SHEET 1 OF 1

2008018 C

34

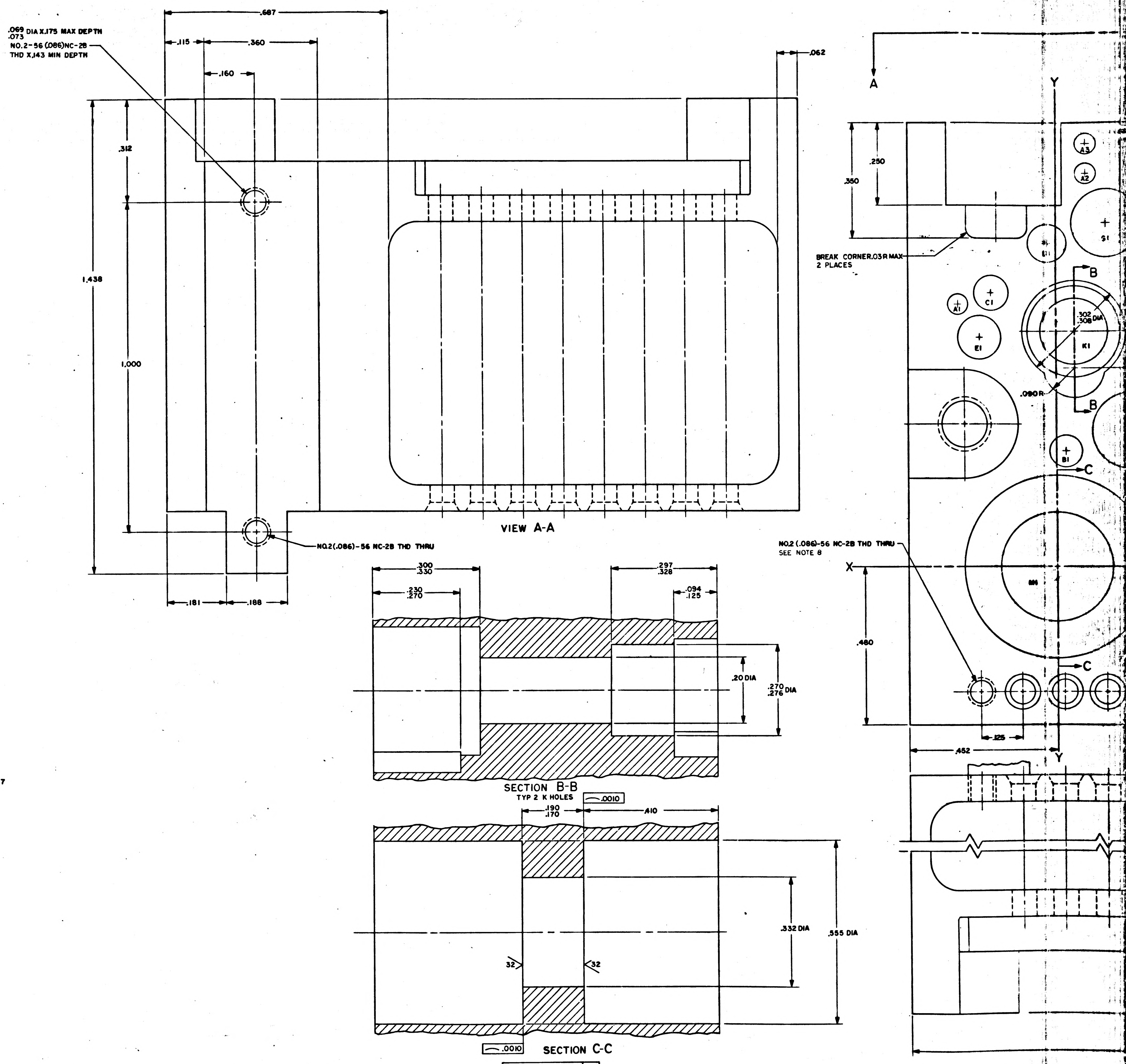

8
7
6
5
4
A
A
Y
Y
X
X
B
B
C
C
.062
.250
.350
BREAK CORNER.03 R MAX
2 PLACES
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
B1
B2
B3
B4
B6
B8
C1
C2
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
D1
D2
E1
E2
E3
E4
E5
E6
E7
F1
F2
G1
G2
H1
H2
H3
J1
J2
K1
K2
L1
M1
.302 .308 DIA
.112
.090R
46°
.112
.090R
.302 .308 DIA
.165 R
2 PLACES
NO.2 (.086)-56 NC-2B THD THRU
SEE NOTE 8
.480
.125
.452
1.948
.069 .073 DIA THRU - CSK 60° X .089 .104
20 HOLES
◎ A .005
.062 TYP
.080 .100 R
8 PLACES
1.250
–A–
.072 .073 DIA THRU
20 HOLES
32
⌒ .0004
.094 .125
.20 DIA
.270 .276 DIA
.332 DIA
.555 DIA
.600
.115 .095
.188
1.627 1.623
1.650
.213 .217 DIA
◎ B .005
.815 .809
.175
.102 .098
.005R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.094
.180 .160
3 PLACES
45°
3 PLACES
.168
.330
–B–
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.062 DIA X .312 DEEP
3 PLACES
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146 TYP

2008018 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.297	.795	.058 .062	13
A2	.066	1.193		
A3	.088	1.283		
A4	.285	.575		
A5	.390	.350		
A6	.444	1.092		
A7	.322	-.112		
A8	.462	.695		
A9	.541	.045		
A10	.968	.975		
A11	1.050	.562		
A12	1.181	-.240		
A13	1.258	.210		
B1	.028	.350	.092 .096	6
B2	.548	.971		
B3	.550	1.096		
B4	.880	.430		
B6	.950	.535		
B8	1.305	.915		
C1	-.195	.830	.101 .105	24
C2	.337	1.070		
C4	.385	.823		
C5	.420	.965		
C6	.514	.852		
C7	.765	.370		
C8	.795	.528		
C9	.872	.636		
C10	.873	.882		
C11	.900	1.078		
C12	1.015	.420		
C13	1.053	.900		
C14	1.080	.667		
C15	1.155	.813		
C16	1.180	.942		
C17	1.215	.675		
C18	1.240	1.070		
C19	1.285	-.192		
C20	1.287	.788		
C21	1.310	.110		
C22	.288	-.222		
C23	.505	.330		
C24	.630	.395		
C25	.660	.530		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D1	-.025	.980	.108 .112	2
D2	.267	.894		
E1	-.230	.695	.128 .132	7
E2	.340	.685		
E3	.436	-.212		
E4	.960	-.152		
E5	1.115	-.140		
E6	.427	-.036		
E7	.968	.768		
F1	1.085	1.062	.153 .157	2
F2	1.264	-.036		
G1	.150	1.043	.202 .206	2
G2	.720	1.032		
H1	.223	.412	.227 .231	3
H2	.390	.175		
H3	.463	.525		
J1	.670	.182	.255 .262	2
J2	.696	.744		
K1	.055	.714	SEE SECTION B-B	2
K2	1.017	.132		
L1	.663	-.125	SEE SECTION A-A	1
M1	.000	.000	SEE SECTION C-C	1


.069
.073 DIA X.175 MAX DEPTH
NO.2-56 (.086)NC-2B
THD X.143 MIN DEPTH
.687
.115
.360
.160
.062
.312
1.438
1.000
.181
.188
NO.2(.086)-56 NC-2B THD THRU
VIEW A-A
A
Y
.250
.350
BREAK CORNER.03R MAX
2 PLACES
A1
A2
A3
C1
E1
S1
B
.302
.308 DIA
K1
.090R
B1
C
M1
NO.2 (.086)-56 NC-2B THD THRU
SEE NOTE 8
X
.480
.125
.452
.300
.330
.230
.270
.297
.328
.094
.125
.20 DIA
.270
.276 DIA
SECTION B-B
TYP 2 K HOLES
.0010
.190
.170
.410
.332 DIA
.555 DIA
32
32
.0010
SECTION C-C

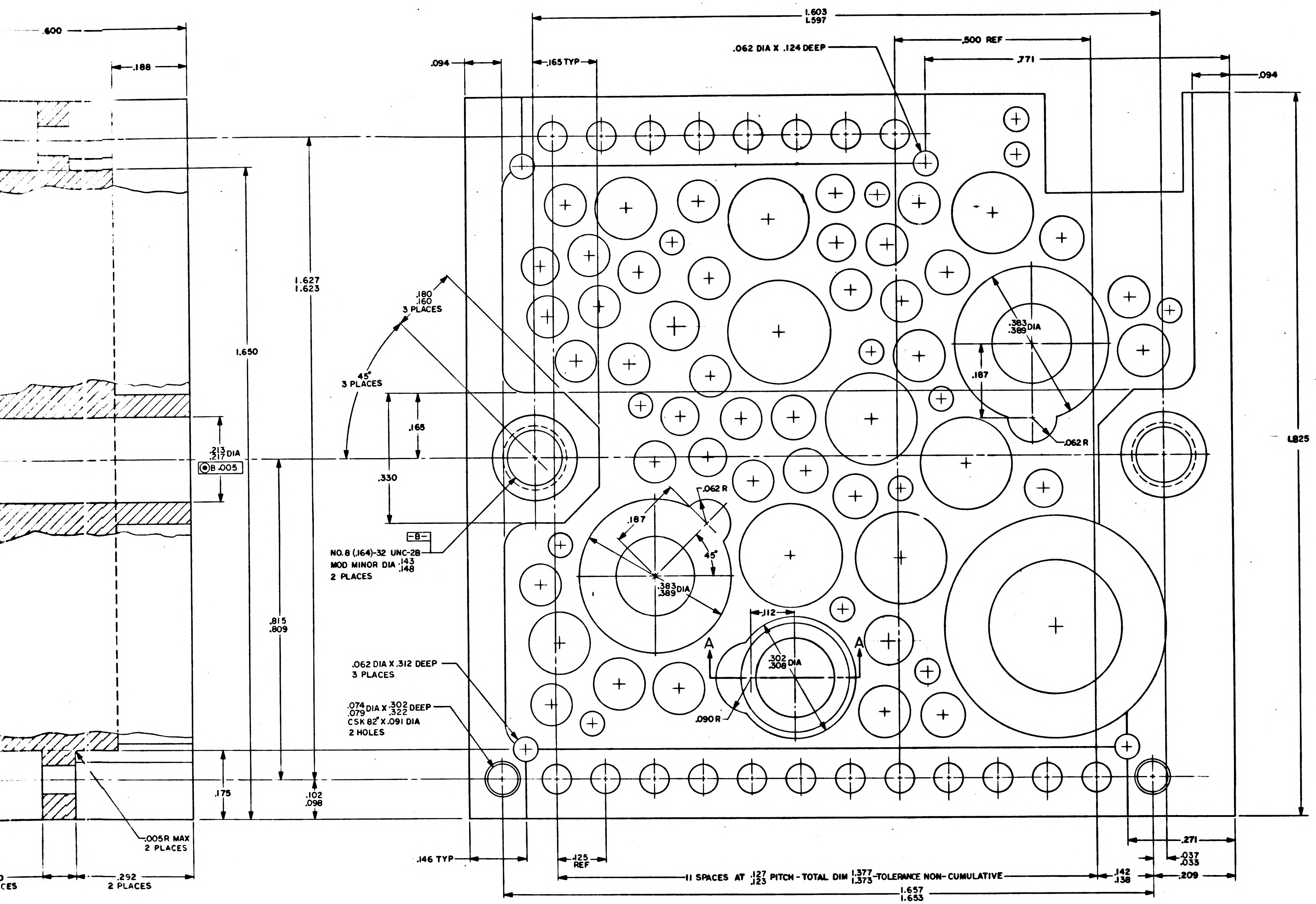
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. UNLESS OTHERWISE SPECIFIED $\sqrt{}^{125}$ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM MOUNTING SURFACE

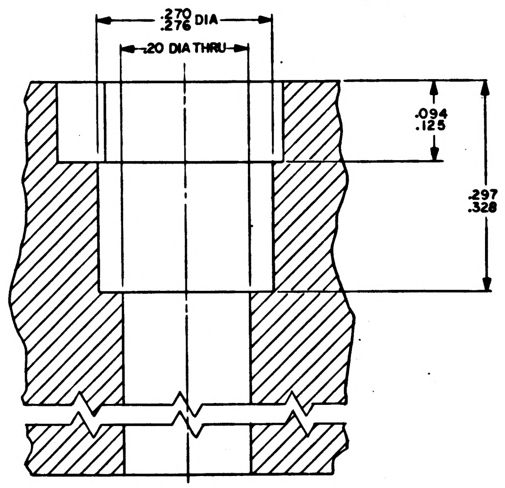
2008018 C

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17618		WK
B	REVISED PER TDRR 19283		WK
C	REVISED PER TDRR 21487		WK
D	REVISED PER TDRR 24714		WK

REVISIONS 19399



.600
.188
.094
.165 TYP
1.603
1.597
.062 DIA X .124 DEEP
.500 REF
.771
.094
1.627
1.623
1.650
.180
.160
3 PLACES
45°
3 PLACES
.165
.330
.213
.217 DIA
B .005
.383
.389 DIA
.187
.062 R
1.825
-B-
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.187
.062 R
45°
.383
.389 DIA
.815
.809
.112
A
A
.302
.306 DIA
.090 R
.062 DIA X .312 DEEP
3 PLACES
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.175
.102
.098
.005R MAX
2 PLACES
.292
2 PLACES
.146 TYP
.125
REF
11 SPACES AT .127 .123 PITCH - TOTAL DIM 1.377 1.373 - TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
.209
1.657
1.653



.270
.276 DIA
.20 DIA THRU
.094
.125
.297
.328

SECTION A-A

MASTER

2007103	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS XX ±.02 XXX ±.005 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
—
FINAL FINISH
SEE NOTE 6

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 12-15-69
MIT APPROVAL

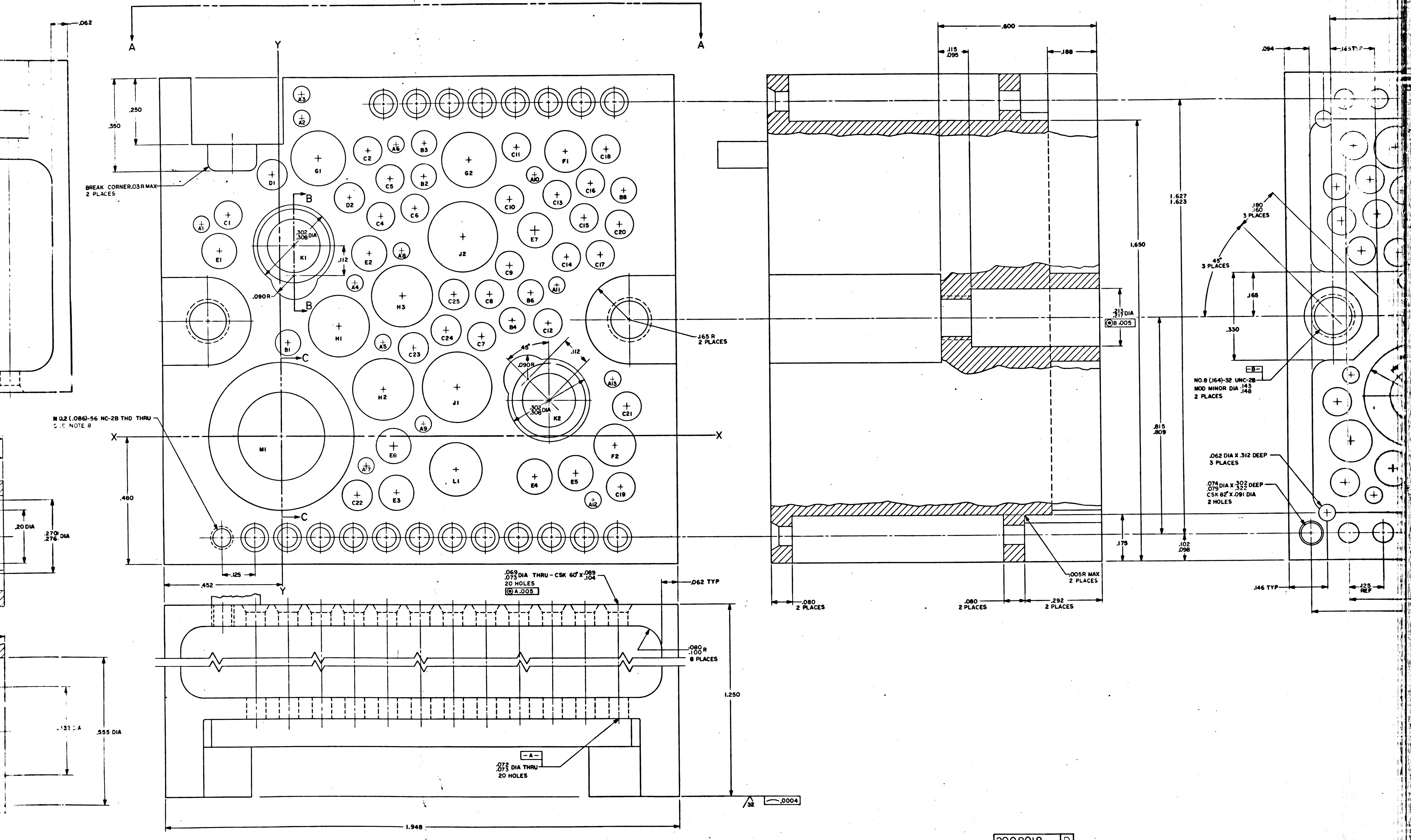
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
BINARY CURRENT SWITCH

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO 2008018
SCALE 10/1
WT —
SHEET 1 OF 1

2008018 D

F-3


.062
A
A
Y
.250
.350
BREAK CORNER .03 R MAX
2 PLACES
B
B
.302 .308 DIA
K1
.112
.090R
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
B1 B2 B3 B4 B6 B8
C1 C2 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25
D1 D2
E1 E2 E3 E4 E5 E6 E7
F1 F2
G1 G2
H1 H2 H3
J1 J2
K2
L1
M1
45°
.090R
.112
.302 .308 DIA
.165 R
2 PLACES
C
C
X
X
NO.2 (.086)-56 NC-2B THD THRU
SEE NOTE 8
.480
.125
.452
Y
.069 .073 DIA THRU - CSK 60° X .089 .104
20 HOLES
◉ A .005
.062 TYP
.080 .100 R
8 PLACES
1.250
-A-
.072 .073 DIA THRU
20 HOLES
32
⌒ .0004
1.948
.20 DIA
.270 .276 DIA
.555 DIA
.600
.115 .095
.188
1.627 1.623
1.650
.213 .217 DIA
◉ B .005
.815 .809
.175
.102 .098
.005R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.094
.165 TYP
.180 .160
3 PLACES
45°
3 PLACES
.165
.330
-B-
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.062 DIA X .312 DEEP
3 PLACES
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146 TYP
.125 REF

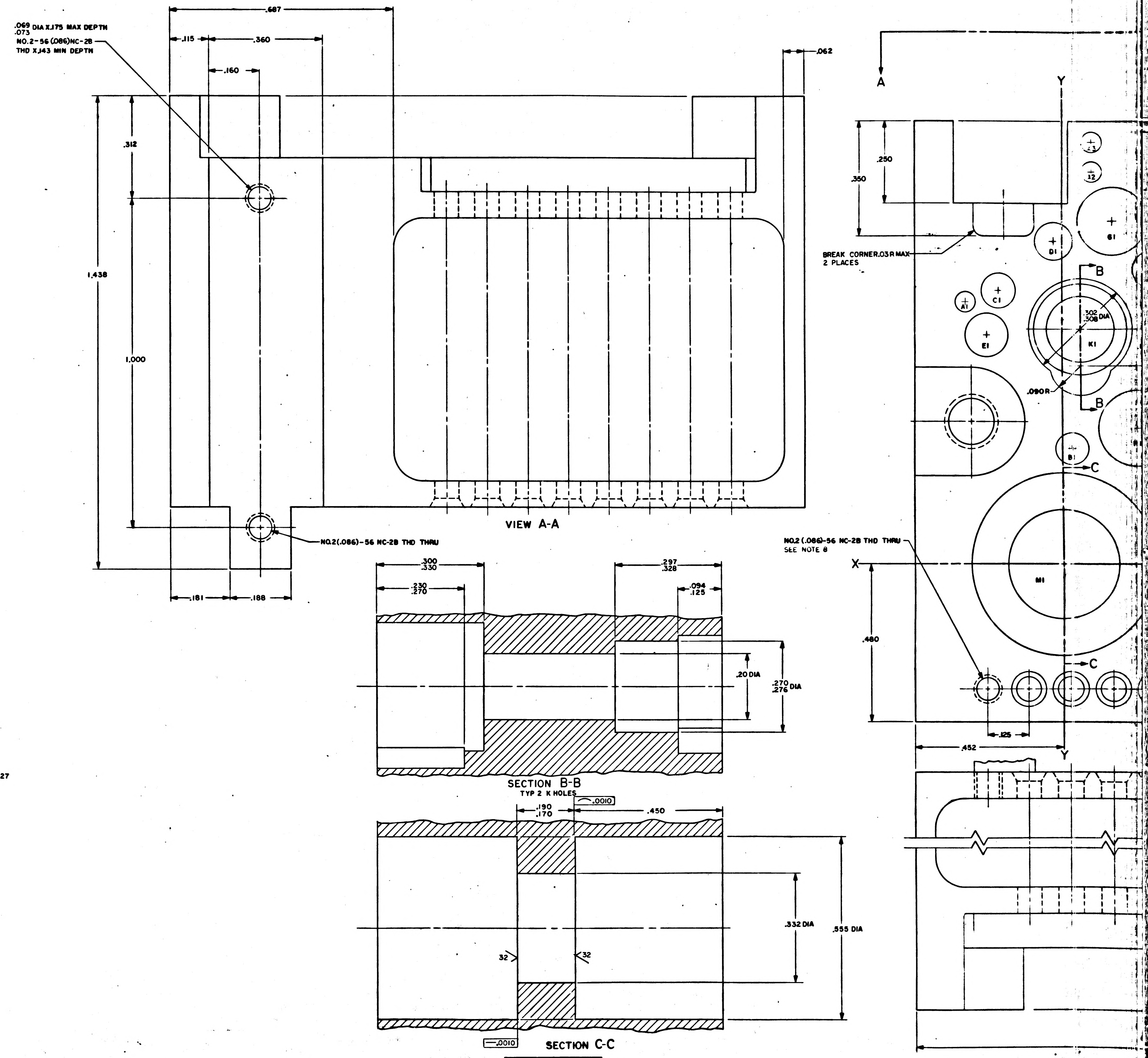
2008018 D

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.297	.795	.058 .062	13
A2	.088	1.193		
A3	.088	1.283		
A4	.285	.575		
A5	.390	.350		
A6	.444	1.092		
A7	.322	-.112		
A8	.462	.695		
A9	.541	.045		
A10	.968	.975		
A11	1.050	.562		
A12	1.181	-.240		
A13	1.258	.210		
B1	.028	.350	.092 .096	6
B2	.548	.971		
B3	.550	1.096		
B4	.880	.430		
B6	.950	.535		
B8	1.305	.915		
C1	-.195	.830	.101 .105	24
C2	.337	1.070		
C4	.385	.823		
C5	.420	.965		
C6	.514	.852		
C7	.765	.370		
C8	.795	.528		
C9	.872	.636		
C10	.873	.882		
C11	.900	1.078		
C12	1.015	.420		
C13	1.053	.900		
C14	1.080	.667		
C15	1.155	.813		
C16	1.180	.942		
C17	1.215	.675		
C18	1.240	1.070		
C19	1.285	-.192		
C20	1.287	.788		
C21	1.310	.110		
C22	.288	-.222		
C23	.505	.330		
C24	.630	.395		
C25	.660	.530		

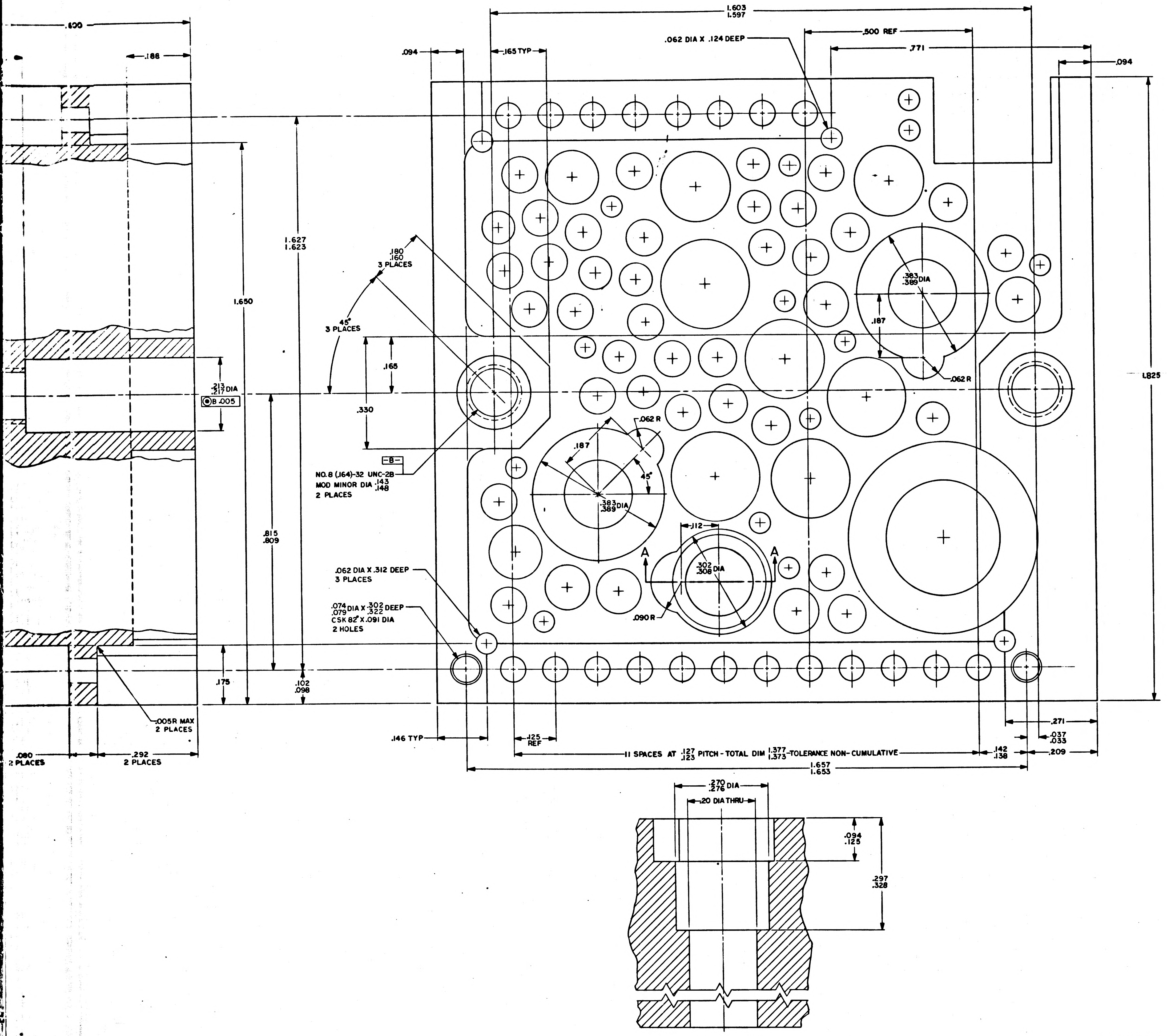
HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D1	-.025	.980	.108 .112	2
D2	.267	.894		
E1	-.230	.695	.128 .132	7
E2	.340	.685		
E3	.436	-.212		
E4	.960	-.152		
E5	1.115	-.140		
E6	.427	-.036		
E7	.968	.768		
F1	1.085	1.062	.153 .157	2
F2	1.264	-.036		
G1	.150	1.043	.202 .206	2
G2	.720	1.032		
H1	.223	.412	.227 .231	3
H2	.390	.175		
H3	.463	.525		
J1	.670	.182	.255 .262	2
J2	.696	.744		
K1	.055	.714	SEE SECTION B-B	2
K2	1.017	.132		
L1	.663	-.125	SEE SECTION A-A	1
M1	.000	.000	SEE SECTION C-C	1


.069
.073 DIA X.175 MAX DEPTH
NO.2-56 (.086)NC-2B
THD X.143 MIN DEPTH
.687
.115
.360
.160
.062
.312
1.438
1.000
.181
.188
NO.2(.086)-56 NC-2B THD THRU
VIEW A-A
A
Y
.250
.350
BREAK CORNER.03 R MAX
2 PLACES
D1
G1
A1
C1
E1
K1
.302
.306 DIA
.090R
B
B1
C
M1
NO.2 (.086)-56 NC-2B THD THRU
SEE NOTE 8
X
.480
.125
.452
.300
.330
.230
.270
.297
.328
.094
.125
.20 DIA
.270
.276 DIA
SECTION B-B
TYP 2 K HOLES
.0010
.190
.170
.450
.332 DIA
.555 DIA
32
32
.0010
SECTION C-C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. UNLESS OTHERWISE SPECIFIED $\overset{125}{\surd}$ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM MOUNTING SURFACE

2008018 D


.400
.188
1.650
1.627
1.623
.213
.217 DIA
B .005
.175
.102
.098
.005R MAX
2 PLACES
.080
2 PLACES
.292
2 PLACES
.180
.160
3 PLACES
45°
3 PLACES
.165
.330
.815
.809
-B-
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.062 DIA X .312 DEEP
3 PLACES
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
1.603
1.597
.094
.165 TYP
.062 DIA X .124 DEEP
.500 REF
.771
.094
.383
.389 DIA
.187
.062 R
.187
.062 R
45°
.383
.389 DIA
.112
A
A
.302
.308 DIA
.090 R
1.825
.146 TYP
.125
REF
11 SPACES AT .127 .123 PITCH - TOTAL DIM 1.377 1.373 - TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
.209
1.657
1.653
.270
.276 DIA
.20 DIA THRU
.094
.125
.297
.328
SECTION A-A

REVISIONS

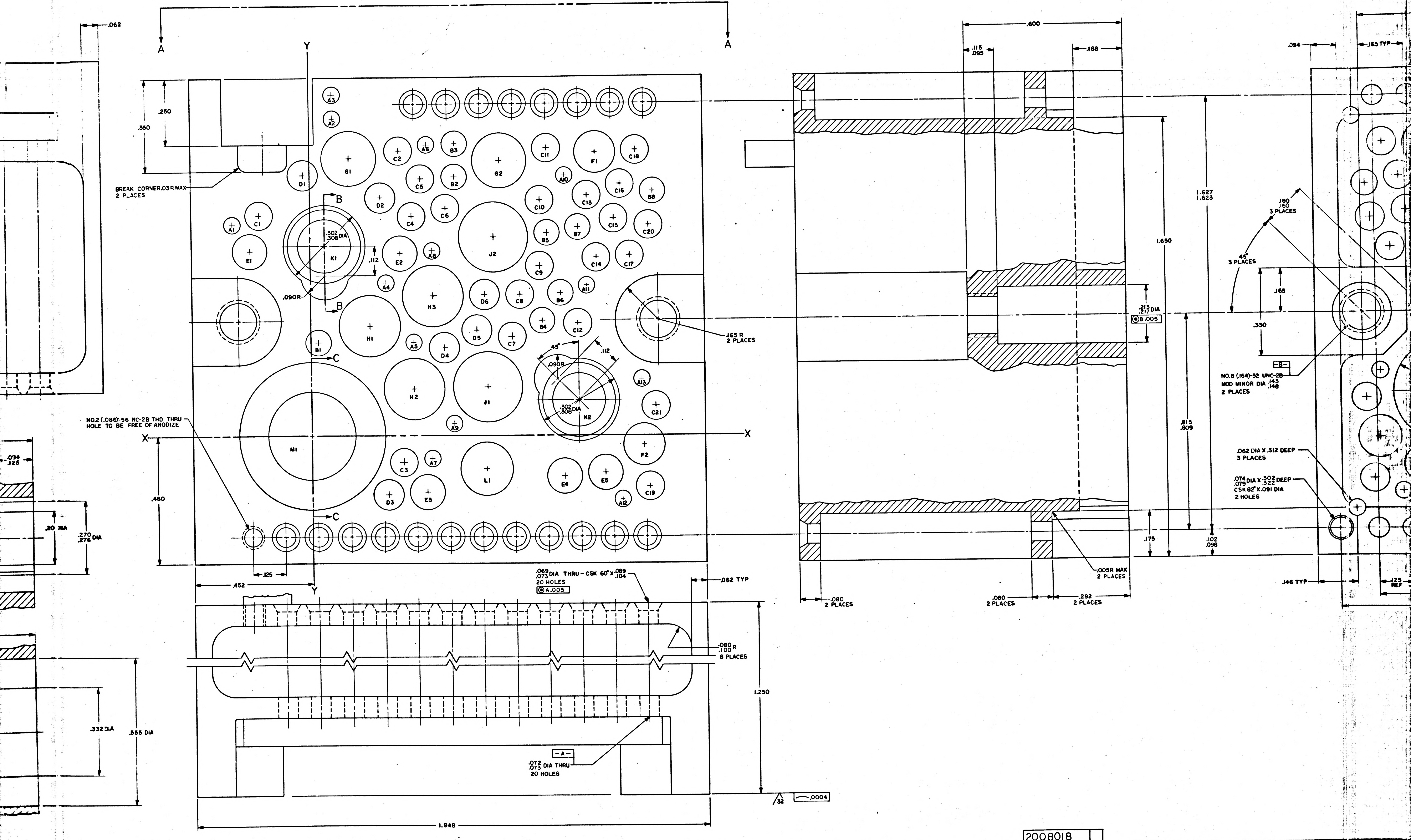
SYM	DESCRIPTION	DATE	APPROVAL

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS — DECIMALS XX ±.02 XXX ±.005 ANGLES ±1/2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
		MATERIAL SEE NOTE 2	DRAWN DATE CHECKED 11 Dec 64 APPROVAL 11 DEC 64 APPROVAL	HEATSINK BINARY CURRENT SWITCH
2007103		HEAT TREATMENT —	NASA APPROVAL 12-15-64	CODE IDENT NO. — SIZE J NASA DRAWING NO. 2008018
NEXT ASSY	USED ON	FINAL FINISH SEE NOTE 6	MIT APPROVAL 15 Dec 64	SCALE 10/1 WT — SHEET 1 OF 1
APPLICATION				

2008018

MASTER

(34)


A
A
Y
X
X
Y
B
B
C
C
.062
.250
.350
BREAK CORNER .03 R MAX
2 PLACES
.302
.308 DIA
.112
.090 R
45°
.090 R
.112
.302
.308 DIA
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
B1 B2 B3 B4 B5 B6 B7 B8
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21
D1 D2 D3 D4 D5 D6
E1 E2 E3 E4 E5
F1 F2
G1 G2
H1 H2 H3
J1 J2
K1 K2
L1
M1
.165 R
2 PLACES
NO.2 (.086)-56 NC-2B THD THRU
HOLE TO BE FREE OF ANODIZE
.480
.125
.452
.069
.073 DIA THRU - CSK 60° X .089
.104
20 HOLES
◎ A .005
.062 TYP
.080
.100 R
8 PLACES
1.250
-A-
.072
.073 DIA THRU
20 HOLES
32
.0004
1.948
.094
.125
.20 DIA
.270
.276 DIA
.332 DIA
.555 DIA
.600
.115
.095
.188
1.650
1.627
1.623
.213
.217 DIA
◎ B .005
.815
.809
.175
.102
.098
.005 R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.094
.165 TYP
.180
.160
3 PLACES
45°
3 PLACES
.165
.330
-B-
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
.062 DIA X .312 DEEP
3 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146 TYP
.125
REF

2008018

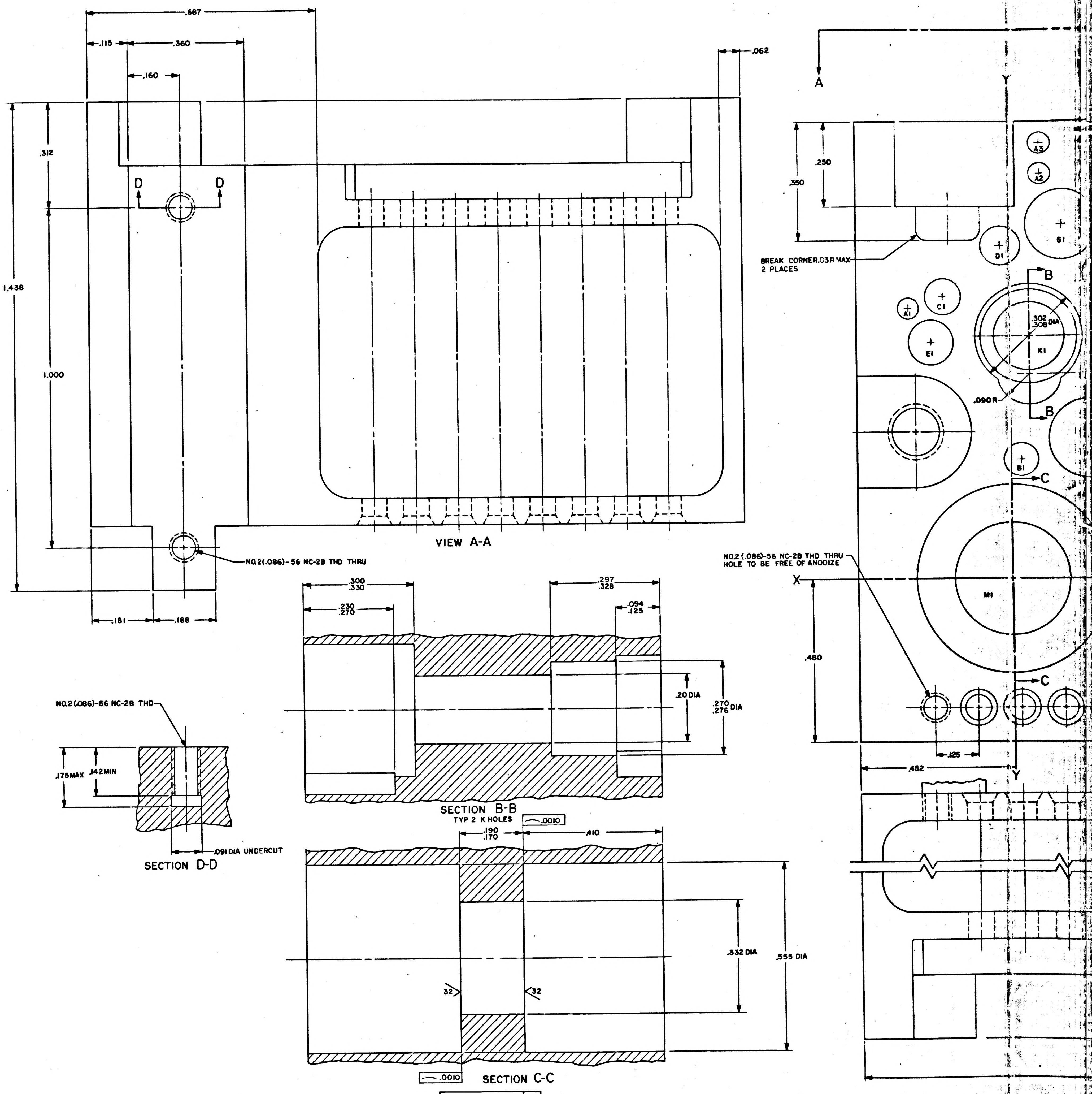
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.297	.795	.058 .062	13
A2	.088	1.193		
A3	.088	1.283		
A4	.285	.575		
A5	.390	.350		
A6	.444	1.092		
A7	.457	-.086		
A8	.462	.695		
A9	.541	.045		
A10	.968	.975		
A11	1.050	.562		
A12	1.181	-.240		
A13	1.258	.210		
B1	.028	.350	.092 .096	8
B2	.548	.971		
B3	.550	1.096		
B4	.880	.430		
B5	.900	.760		
B6	.950	.535		
B7	1.018	.780		
B8	1.305	.915		
C1	-.195	.830	.101 .105	21
C2	.337	1.070		
C3	.347	-.100		
C4	.385	.823		
C5	.420	.965		
C6	.514	.852		
C7	.765	.370		
C8	.795	.528		
C9	.872	.636		
C10	.873	.882		
C11	.900	1.078		
C12	1.015	.420		
C13	1.053	.900		
C14	1.080	.667		
C15	1.155	.813		
C16	1.180	.942		
C17	1.215	.675		
C18	1.240	1.070		
C19	1.285	-.192		
C20	1.287	.788		
C21	1.310	.110		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D1	-.025	.980	.108 .112	6
D2	.267	.894		
D3	.288	-.222		
D4	.505	.330		
D5	.630	.395		
D6	.660	.530		
E1	-.230	.695	.128 .132	5
E2	.340	.685		
E3	.436	-.212		
E4	.960	-.152		
E5	1.115	-.140		
F1	1.085	1.062	.153 .157	2
F2	1.264	-.036		
G1	.150	1.043	.202 .206	2
G2	.720	1.032		
H1	.223	.412	.227 .231	3
H2	.390	.175		
H3	.463	.525		
J1	.670	.182	.255 .262	2
J2	.696	.744		
K1	.055	.714	SEE SECTION B-B	2
K2	1.017	.132		
L1	.663	-.125	SEE SECTION A-A	1
M1	.000	.000	SEE SECTION C-C	1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. UNLESS OTHERWISE SPECIFIED $\overset{125}{\surd}$ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019

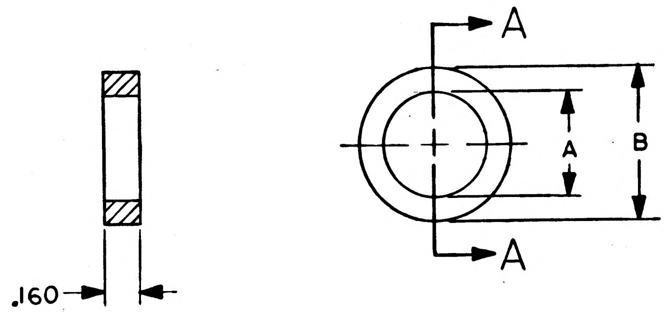

.687
.115
.360
.160
.062
.312
1.438
1.000
D
D
.181
.188
NO.2(.086)-56 NC-2B THD THRU
VIEW A-A
A
Y
.250
.350
A3
A2
A1
B1
C1
D1
E1
G1
K1
M1
BREAK CORNER.03R MAX 2 PLACES
B
B
.302
.308 DIA
.090R
C
C
NO.2(.086)-56 NC-2B THD THRU HOLE TO BE FREE OF ANODIZE
X
.480
.125
.452
Y
.300
.330
.230
.270
.297
.328
.094
.125
.20 DIA
.270
.276 DIA
SECTION B-B
TYP 2 K HOLES
.0010
.190
.170
.410
32
32
.332 DIA
.555 DIA
.0010
SECTION C-C
NO.2(.086)-56 NC-2B THD
.175MAX
.142MIN
.091DIA UNDERCUT
SECTION D-D

2008018

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008020

REVISIONS 15481			
SYM	DESCRIPTION	DATE	APPROVAL



SECTION A-A

PART NO.	A DIM.	B DIM.
2008020-1	.203	.312
2008020-2	.265	.375

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: CERAMIC PER MIL-I-10 GRADE L624
3. 125√ ALL OVER
4. BREAK SHARP EDGES .010 R MAX
5. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT

DRAWN R.D. Gleza DATE 8APR64
CHECKED R.P. Kingsbury 9Apr64
APPROVAL
APPROVAL D.R. Test 1/12/65
NASA APPROVAL W J Rhine 1-13-65
MIT APPROVAL W Kupfer 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

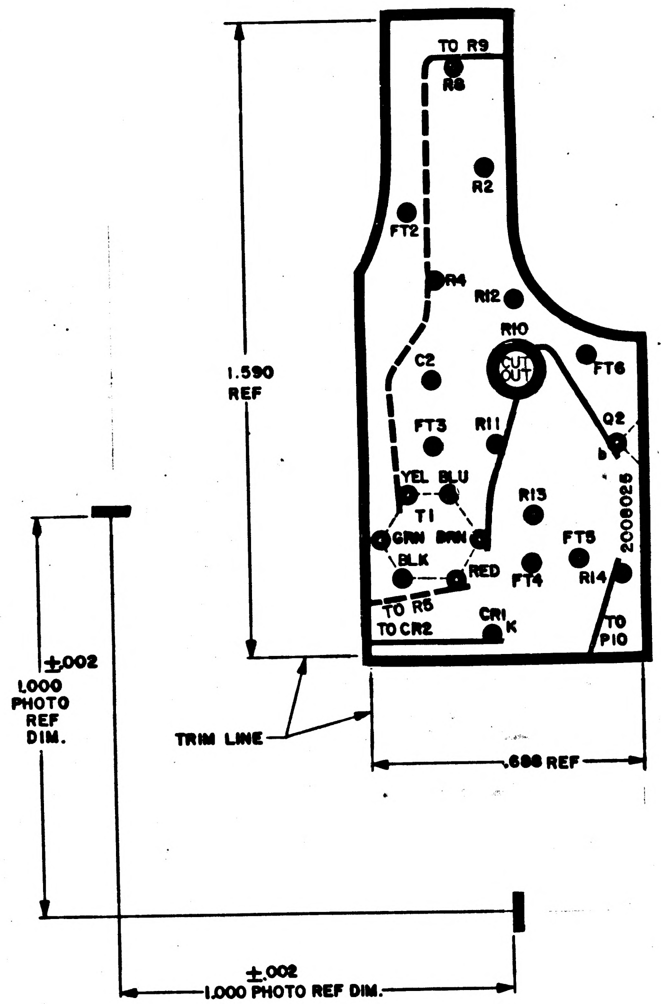
BUSHING, INSULATOR

CODE IDENT NO. —
SIZE C
NASA DRAWING NO. 2008020
SCALE —
WT —
SHEET 1 OF 1

2008020

REVISIONS 17009			
SYM	DESCRIPTION	DATE	APPROV

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE I B CLASS 2 STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
4. CUT TO WITHIN .010 OF TRIM LINE
5. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
6. ● .040/.050 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007111	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH —

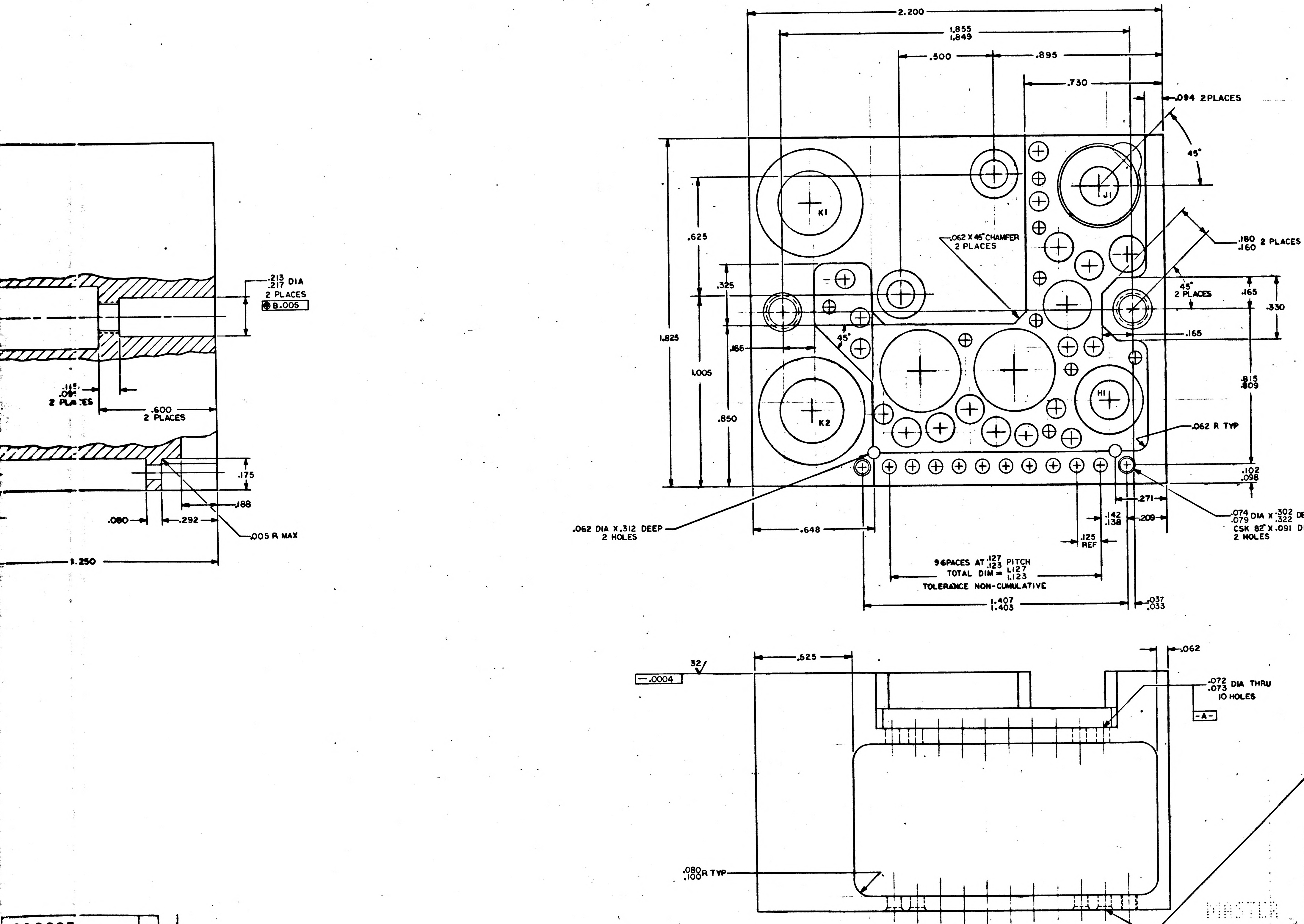
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. T. Baxx DATE 23 Feb 65
CHECKED R. Lindstrom 23 Feb 65
APPROVAL E. J. Sidlak 25 Feb 65
APPROVAL S. R. Test 2/24/65
NASA APPROVAL W. J. Rhine 3-2-65
MIT APPROVAL W. Kupfer 2 Mar 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP
PHOTOGRAPHIC MASTER
800CPS 5% AMPLIFIER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008025
SCALE 5/1
WT —
SHEET 1 OF 1

REVISIONS		17649	
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 21476		WK



2.200
1.855
1.849
.500
.895
.730
.094 2 PLACES
45°
.180
.160 2 PLACES
45°
2 PLACES
.165
.330
.165
.062 X 45° CHAMFER
2 PLACES
K1
J1
K2
H1
.625
.325
1.825
.165
1.005
.850
45°
.815
.809
.062 R TYP
.102
.098
.271
.142
.138
.209
.125
REF
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
2 HOLES
.648
9 SPACES AT .127
.123 PITCH
TOTAL DIM = 1.127
1.123
TOLERANCE NON-CUMULATIVE
1.407
1.403
.037
.033
.213
.217 DIA
2 PLACES
B .005
.115
.095
2 PLACES
.600
2 PLACES
.175
.188
.080
.292
.005 R MAX
1.250
.525
.062
32
— .0004
.072
.073 DIA THRU
10 HOLES
-A-
.080
.100 R TYP

.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
10 HOLES
A .005

MASTER

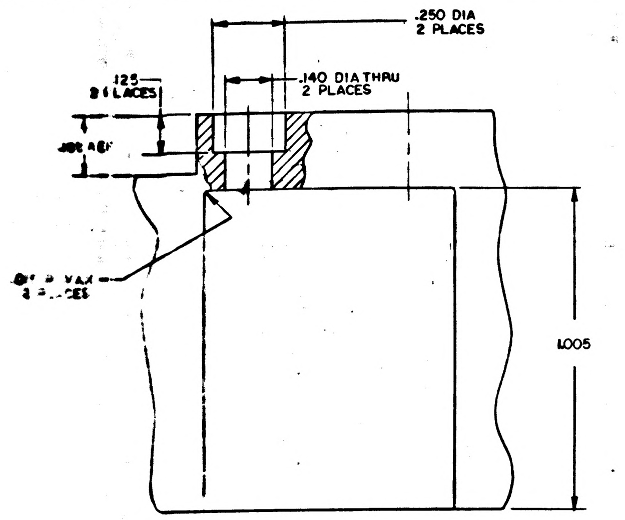
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

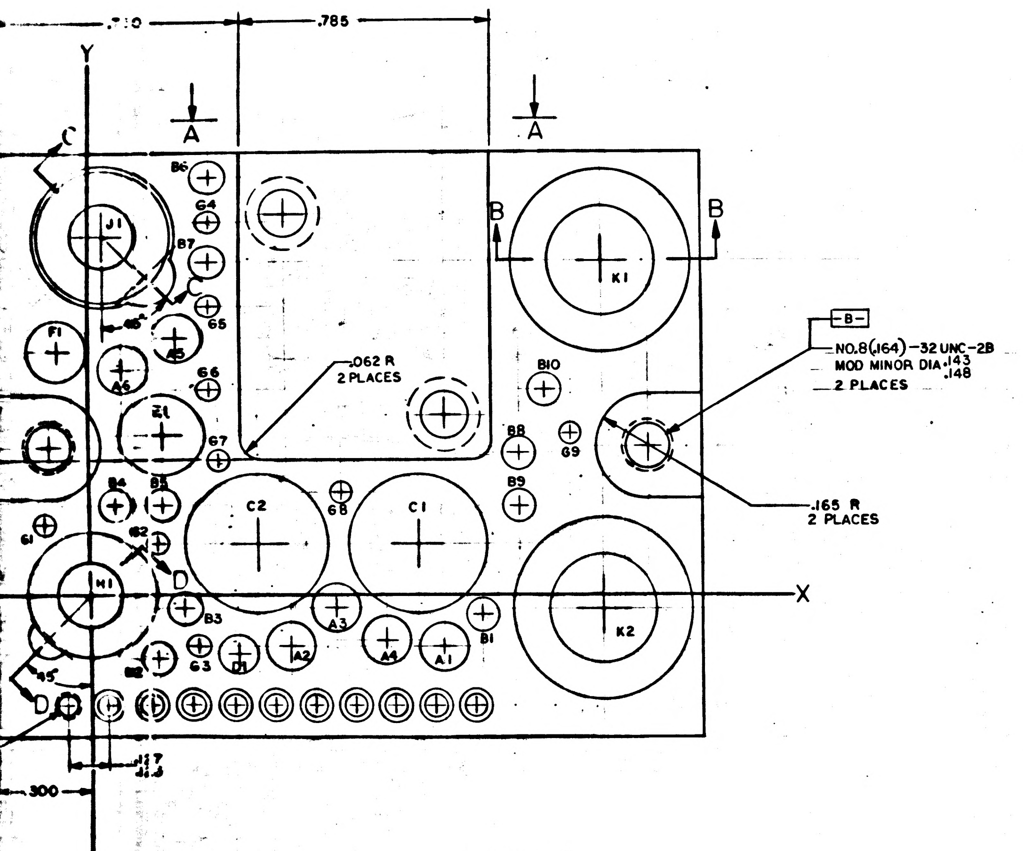
2007108		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1/2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS DRAWN B.F. Wald DATE 5 Mar 65 CHECKED APPROVAL 15 Mar 65 APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS HEATSINK 3200 CPS 1% AMPLIFIER
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL	CODE IDENT NO. — SIZE J NASA DRAWING NO. 2008031
APPLICATION		HEAT TREATMENT — FINAL FINISH SEE NOTE 6	MIT APPROVAL W Kupfer 18 Mar 65	SCALE 5/1 WT — SHEET 1 OF 1

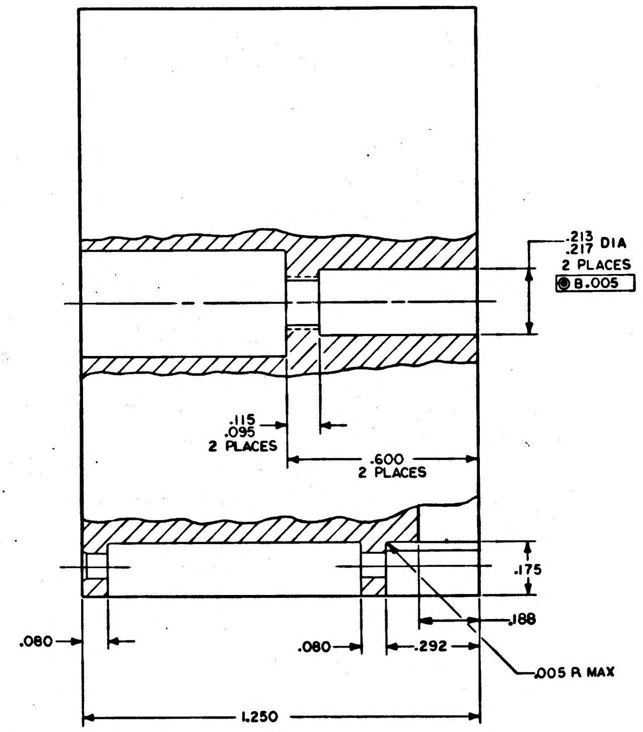
2008031 A

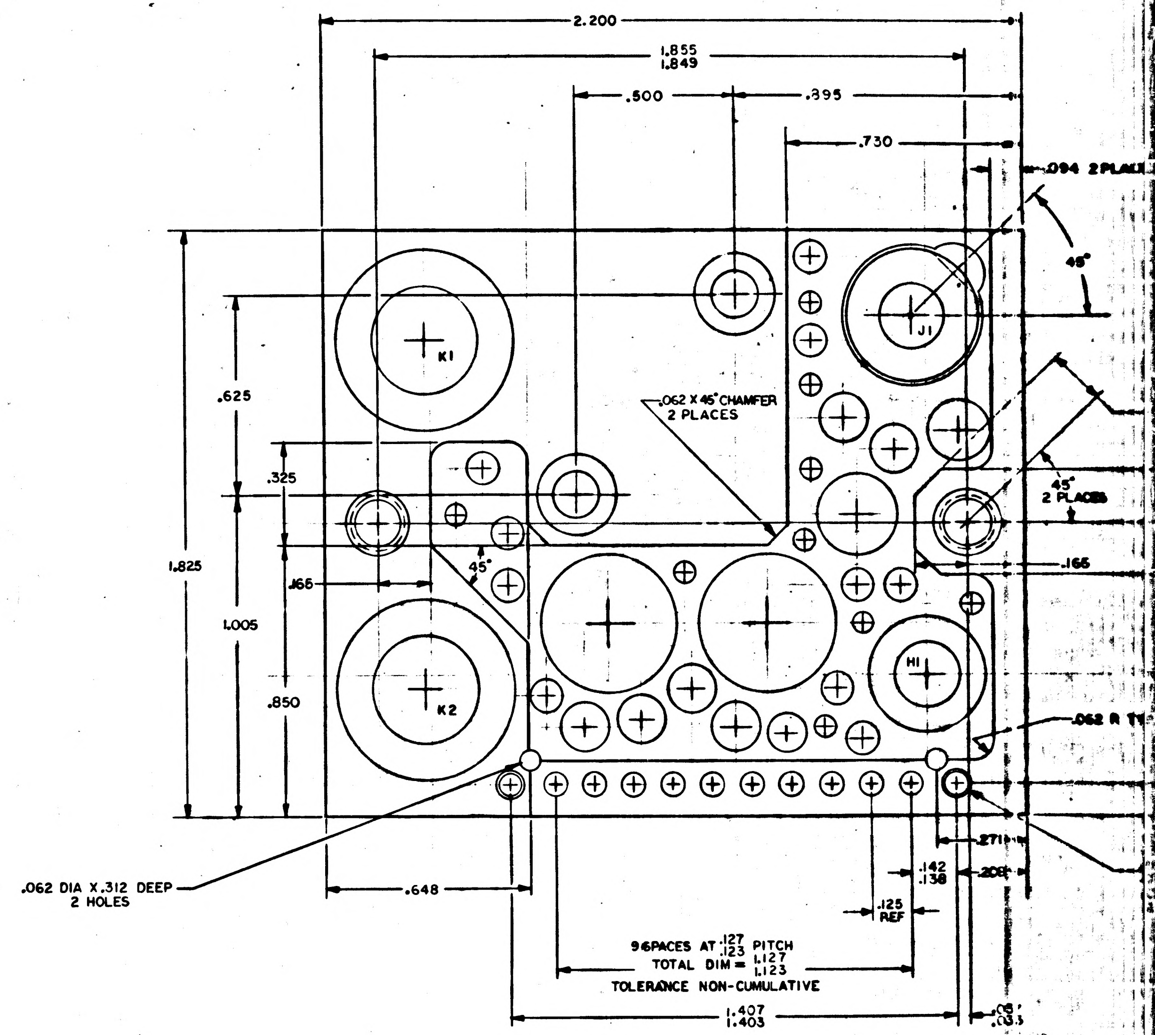
200803 A

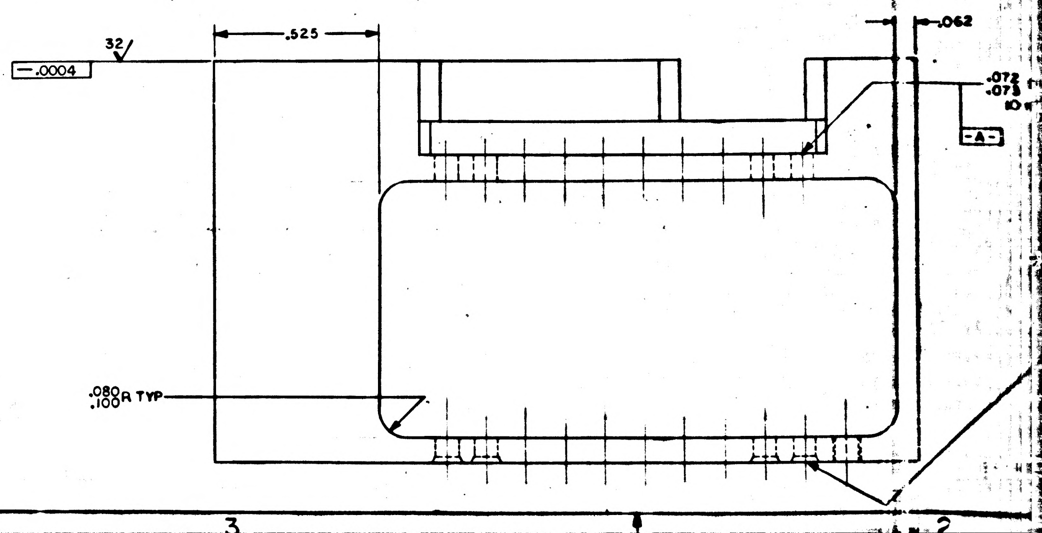

.250 DIA
2 PLACES
.140 DIA THRU
2 PLACES
.125
2 PLACES
1.005

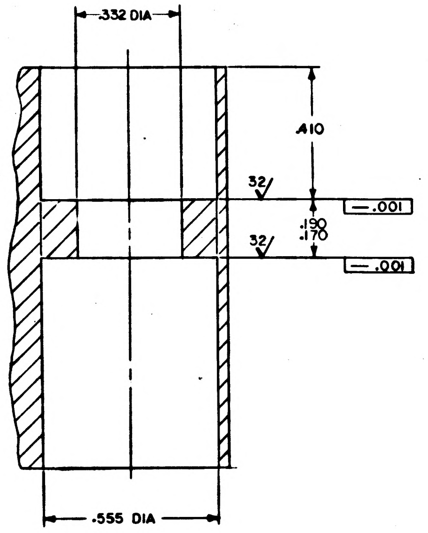
VIEW A-A


.785
Y
A
A
C
B
B
J1
K1
F1
E1
C2
C1
H1
K2
X
D
Y
.062 R
2 PLACES
-B-
NO.8(.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
.165 R
2 PLACES
45°
.300


.213
.217 DIA
2 PLACES
B .005
.115
.095
2 PLACES
.600
2 PLACES
.175
.188
.080
.080
.292
.005 R MAX
1.250


2.200
1.855
1.849
.500
.395
.730
.094 2 PLACES
45°
K1
J1
.625
.062 X 45° CHAMFER
2 PLACES
.325
45°
2 PLACES
1.825
.165
1.005
.165
.850
K2
H1
.062 R TYP
.062 DIA X .312 DEEP
2 HOLES
.648
.142
.138
.125
REF
96 SPACES AT .127
.123 PITCH
TOTAL DIM = 1.127
1.123
TOLERANCE NON-CUMULATIVE
1.407
1.403


.525
32
.0004
.062
-A-
.080
.100 R TYP


.332 DIA
.410
32
.001
.190
.170
32
.001
.555 DIA

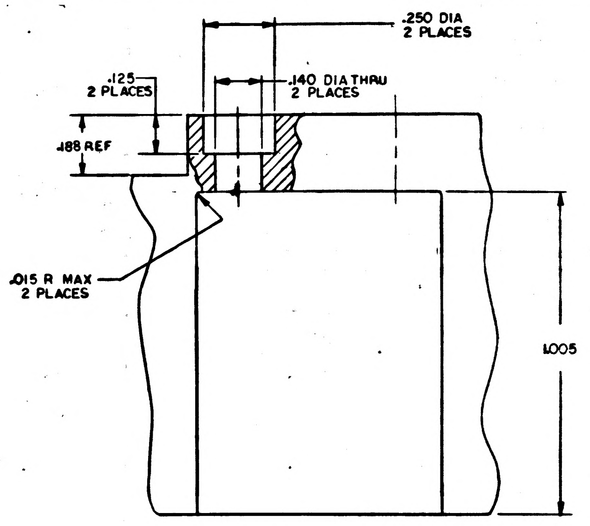
PARTIAL SECTION B-B
2 PLACES

2008031 A

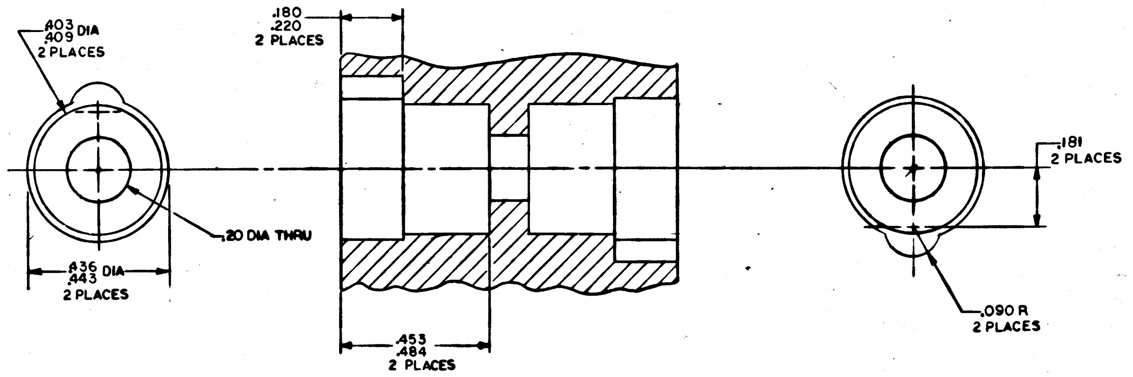
E-2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

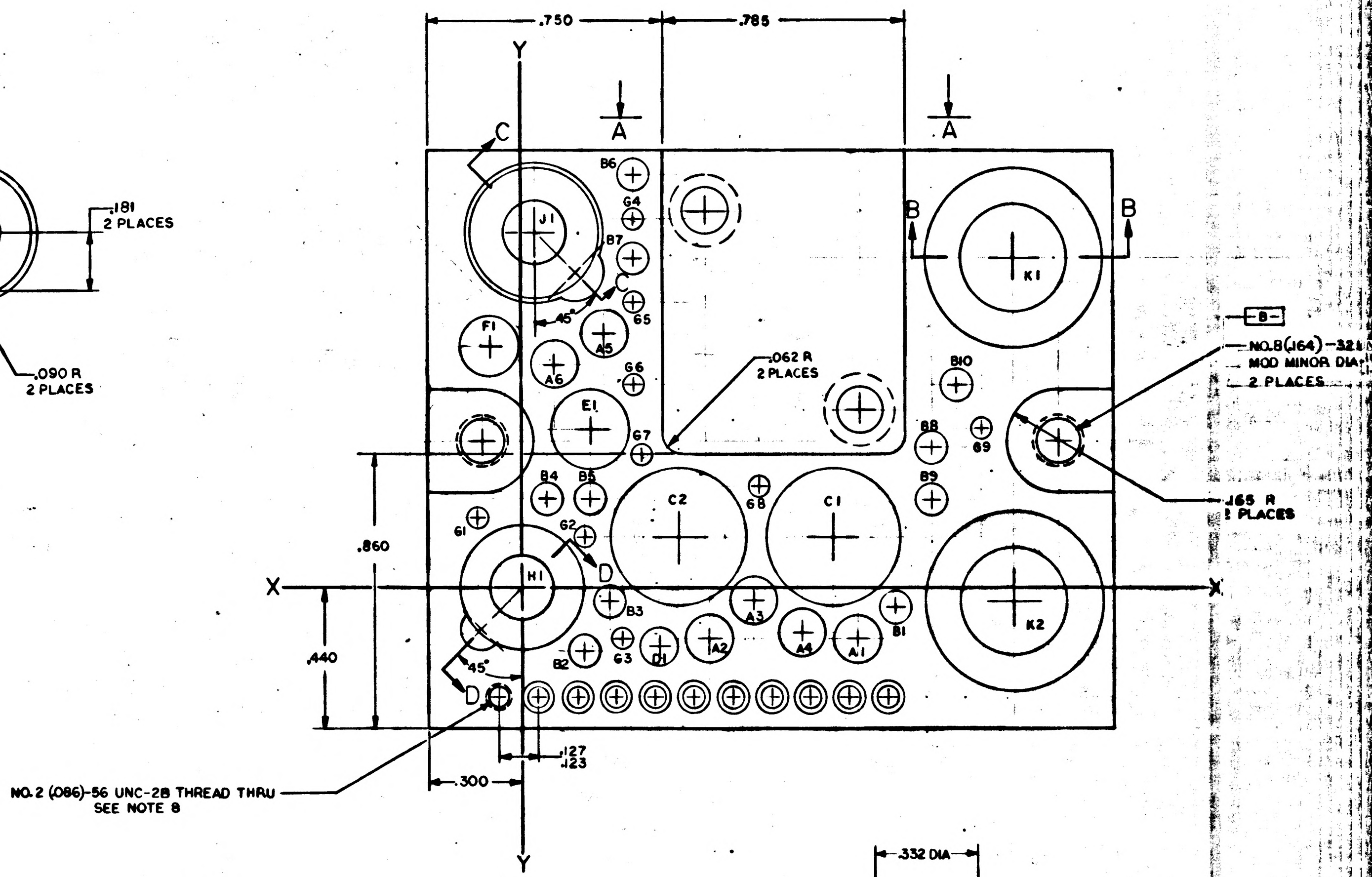
HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	1.080	-.160	.146 .150	6
A2	.600	-.160		
A3	.740	-.040		
A4	.900	-.140		
A5	.260	.800		
A6	.100	.700		
B1	1.200	-.060	.100 .104	10
B2	.200	-.200		
B3	.280	-.040		
B4	.080	.280		
B5	.220	.280		
B6	.360	1.300		
B7	.360	1.040		
B8	1.320	.440		
B9	1.320	.280		
B10	1.400	.640		
C1	1.000	.160	.420 .427	2
C2	.500	.160		
D1	.440	-.180	.112 .116	1
E1	.220	.500	.245 .249	1
F1	-.100	.760	.192 .196	1
G1	-.140	.220	.058 .062	9
G2	.200	.160		
G3	.320	-.160		
G4	.360	1.160		
G5	.360	.900		
G6	.360	.640		
G7	.380	.420		
G8	.760	.320		
G9	1.480	.500		
			SEE SECTION D-D	1
H1	.000	.000		
			SEE SECTION C-C	1
J1	.040	1.120		
			SEE SECTION B-B	2
K1	1.580	1.040		
K2	1.580	-.040		

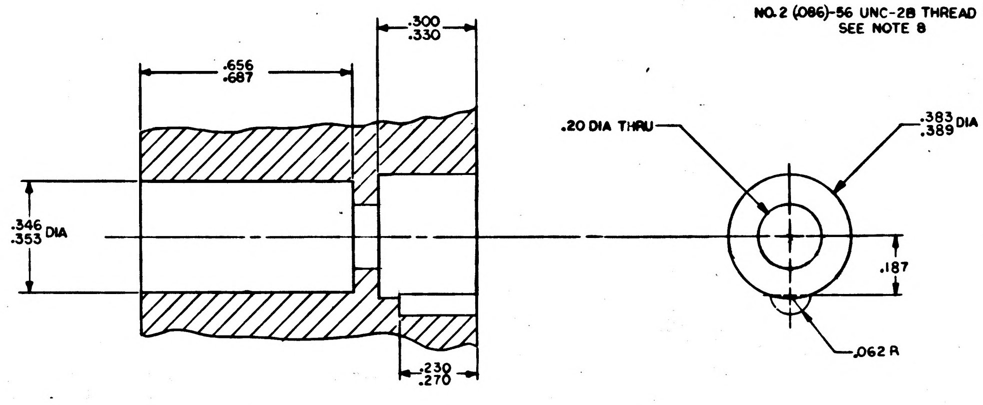

.250 DIA
2 PLACES
.125
2 PLACES
.140 DIA THRU
2 PLACES
.188 REF
.015 R MAX
2 PLACES
1.005

VIEW A-A


.403 DIA
.409
2 PLACES
.20 DIA THRU
.436 DIA
.443
2 PLACES
.180
.220
2 PLACES
.453
.484
2 PLACES
.181
2 PLACES
.090 R
2 PLACES

PARTIAL SECTION C-C
ROTATED 45° CW

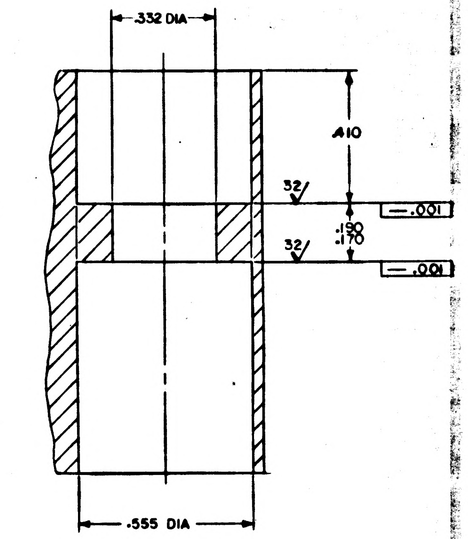

.750
.785
Y
A
A
C
B
B
B6
G4
J1
B7
C
G5
45°
F1
A5
A6
G6
.062 R
2 PLACES
E1
B10
-B-
NO.8(.164)-32
MOD MINOR DIA
2 PLACES
G7
B8
G9
B4
B5
B9
.165 R
2 PLACES
C2
G8
C1
G1
G2
.860
D
X
H1
B3
A3
K2
X
.440
A2
A4
A1
B1
B2
G3
D1
45°
D
.127
.123
.300
Y
NO.2 (.086)-56 UNC-2B THREAD THRU
SEE NOTE 8


.656
.687
.300
.330
.346
.353 DIA
.230
.270
.20 DIA THRU
.383
.389 DIA
.187
.062 R

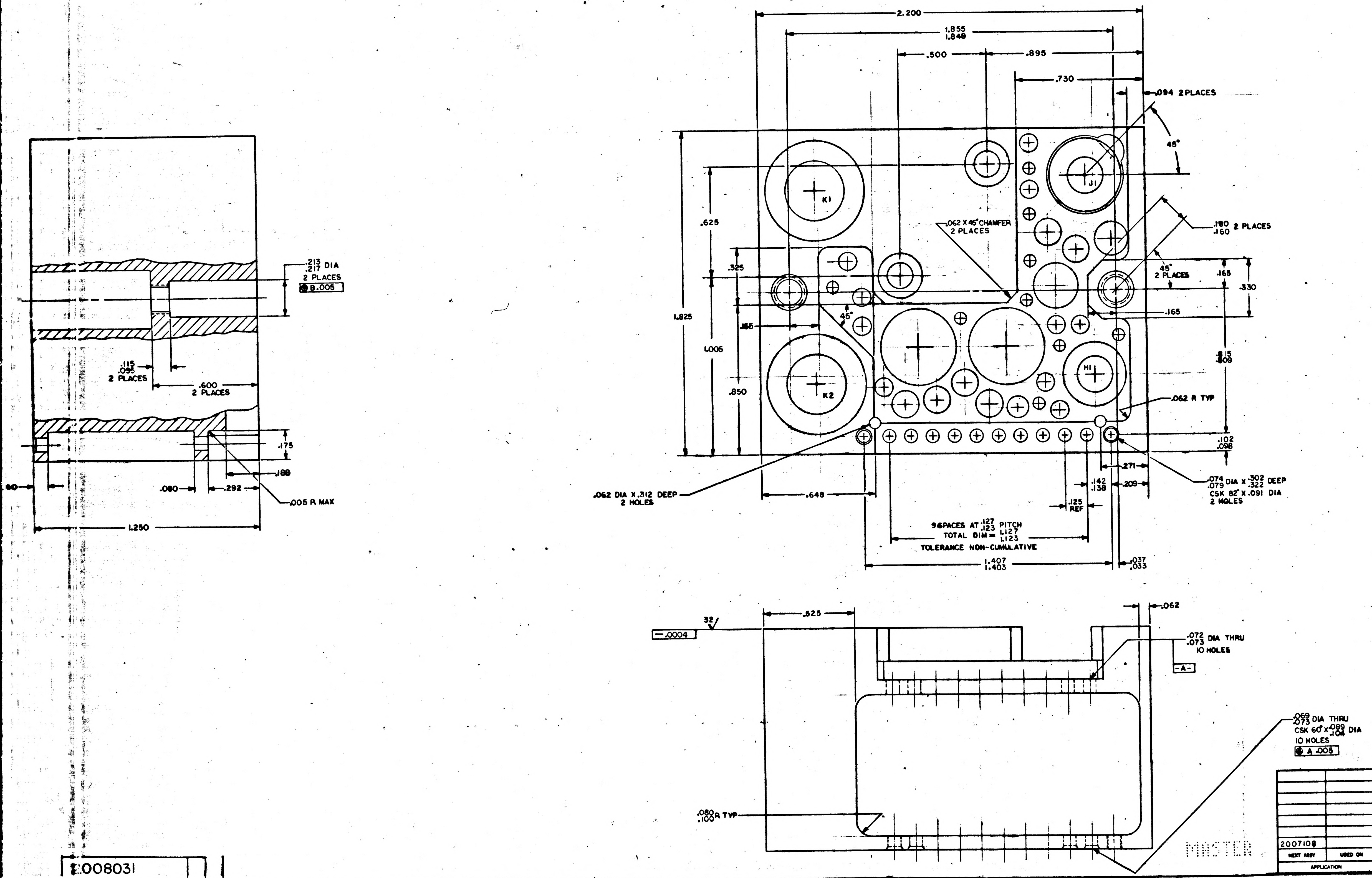
PARTIAL SECTION D-D
ROTATED 45° CCW

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5, PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. APPLY A COATING OF ADHESIVE PER ND1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE


.332 DIA
.410
32
.190
.170
32
.001
.001
.555 DIA

PARTIAL SECTION B-B
2 PLACES



2.200
1.855
1.849
.500
.895
.730
.094 2 PLACES
45°
.180
.160 2 PLACES
.062 X 45° CHAMFER
2 PLACES
45°
2 PLACES
.165
.330
.165
K1
J1
K2
H1
.625
.325
1.825
.165
1.005
.850
45°
.815
.809
.062 R TYP
.102
.098
.271
.209
.142
.138
.125
REF
.648
.062 DIA X .312 DEEP
2 HOLES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
96 PACES AT .127
.123 PITCH
TOTAL DIM = 1.127
1.123
TOLERANCE NON-CUMULATIVE
1.407
1.403
.037
.033
.213
.217 DIA
2 PLACES
B .005
.115
.095
2 PLACES
.600
2 PLACES
.175
.188
.080
.292
.005 R MAX
1.250
.525
.062
32
.0004
.072
.073 DIA THRU
10 HOLES
A
.080
.100 R TYP
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
10 HOLES
A .005

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007108	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 5 MAR 65
CHECKED 11 Mar 65
APPROVAL 15 Mar 65
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 18 Mar 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

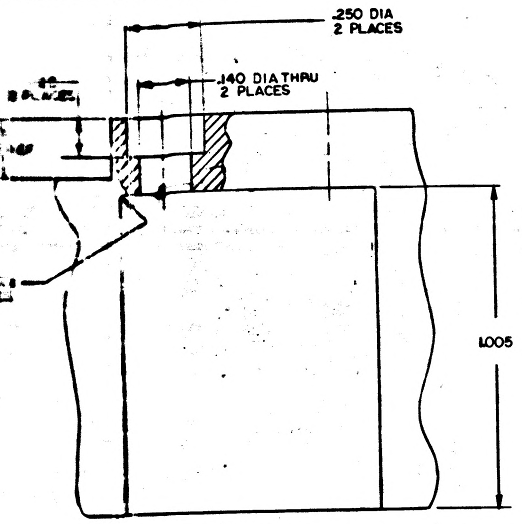
HEATSINK
3200 CPS
1% AMPLIFIER

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008031
SCALE 5/1
WT —
SHEET 1 OF 1

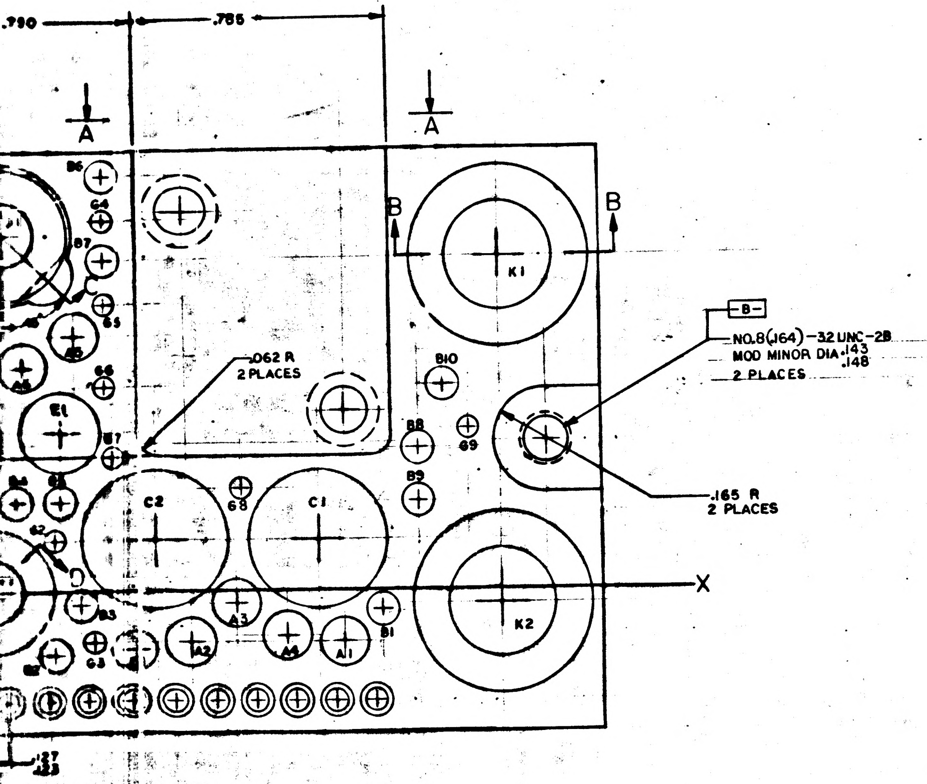
MASTER

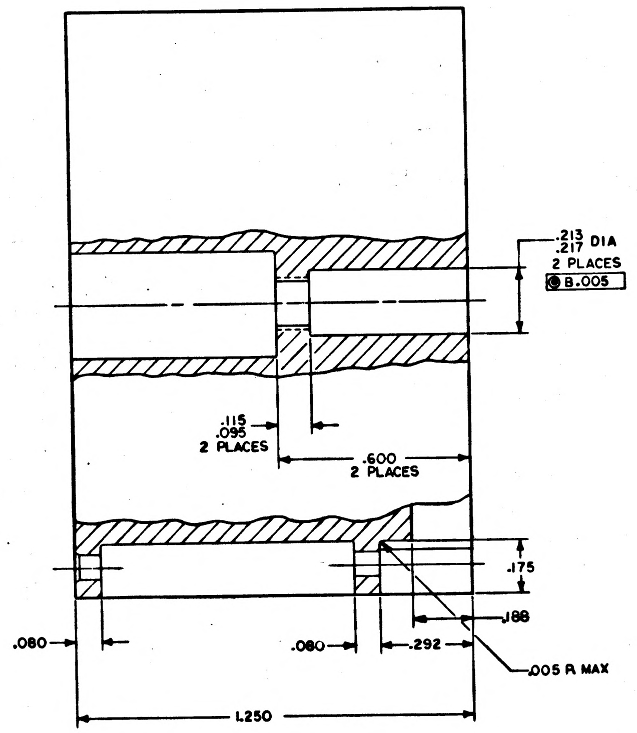
2008031

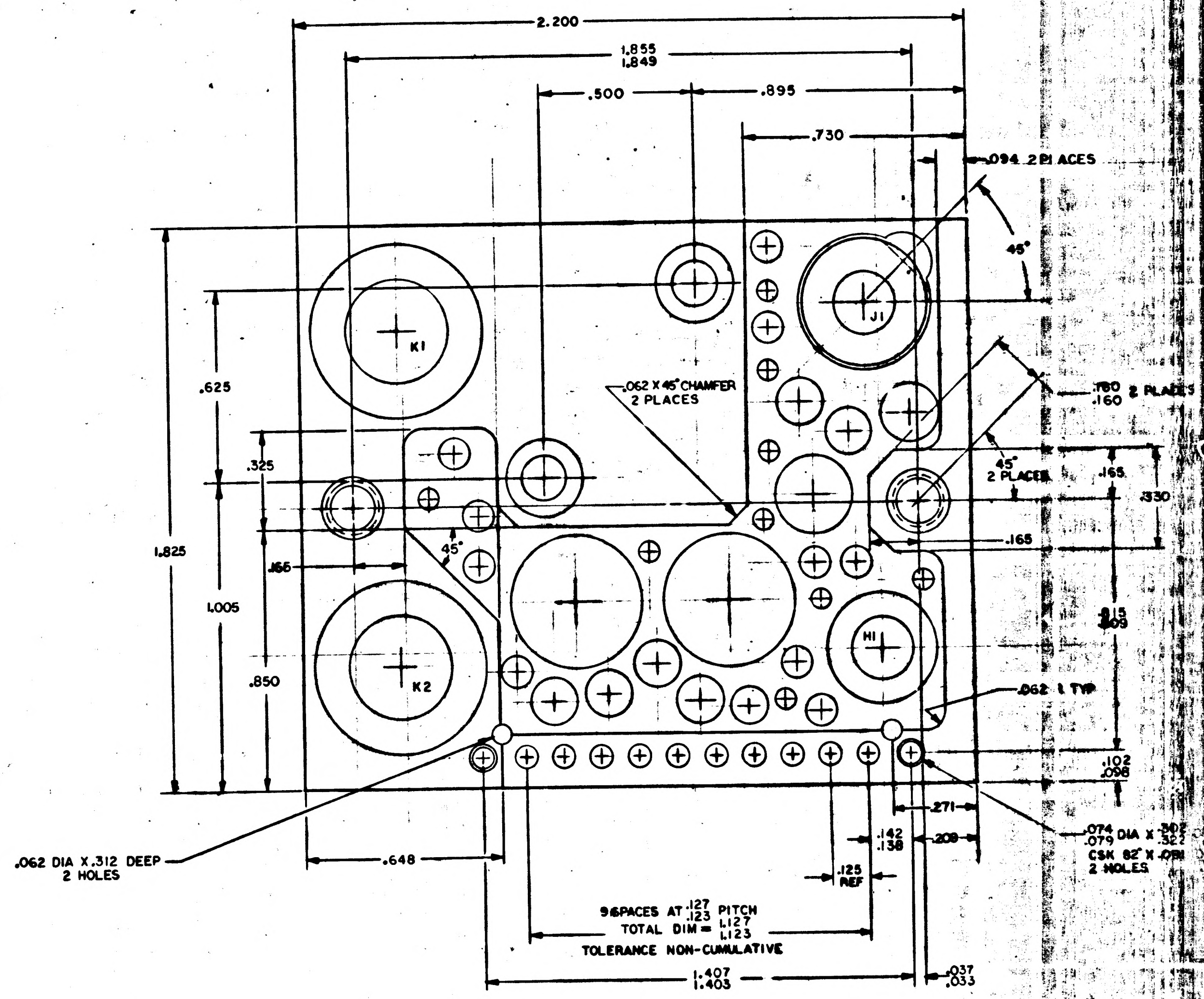
2008031

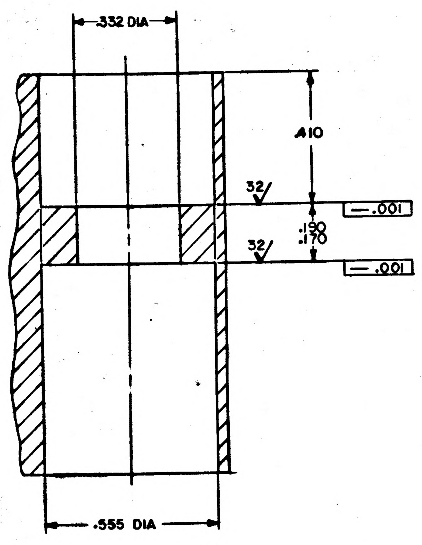

.250 DIA
2 PLACES
.140 DIA THRU
2 PLACES
1.005

VIEW A-A

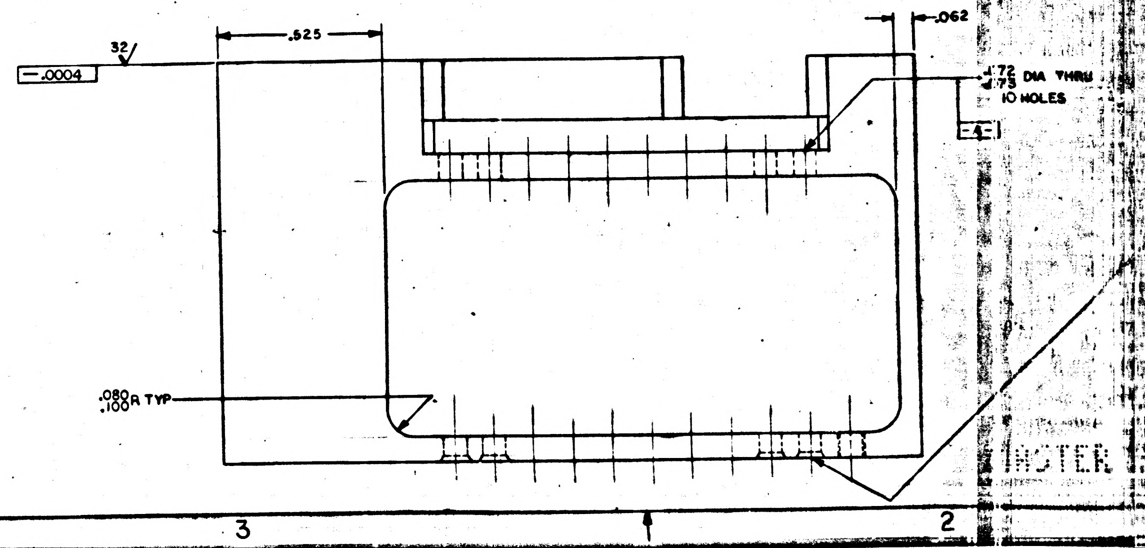

.790
.785
A
A
B
B
K1
K2
C1
C2
E1
A1
A2
A3
A4
B1
B3
B6
B7
B8
B9
B10
G3
G4
G5
G6
G8
G9
X
.062 R
2 PLACES
-B-
NO.8(.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.165 R
2 PLACES
.127 .123


.213 .217 DIA
2 PLACES
B .005
.115 .095
2 PLACES
.600
2 PLACES
.175
.188
.080
.080
.292
.005 R MAX
1.250

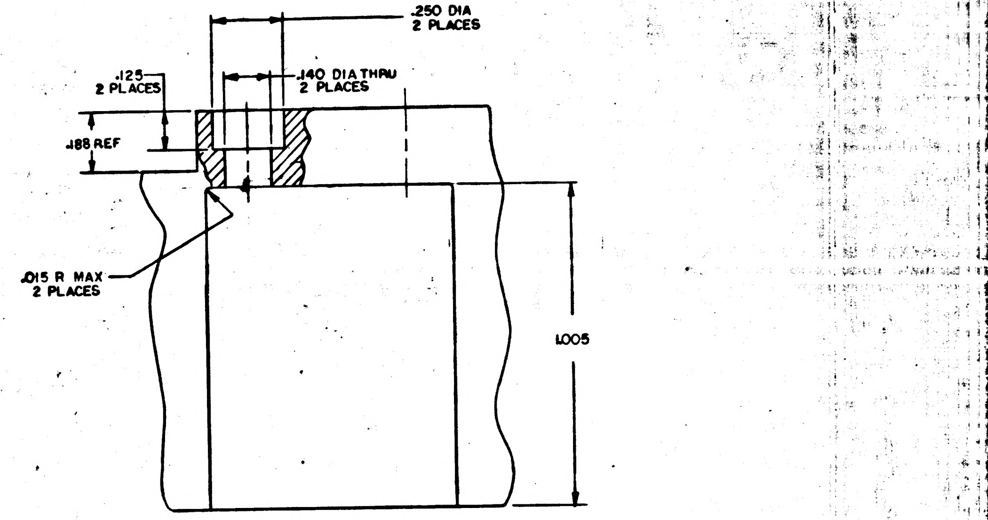

2.200
1.855 1.849
.500
.895
.730
.094 2 PLACES
45°
.160 .160 2 PLACES
45° 2 PLACES
.165
.330
.165
.815 .809
.062 R TYP
.102 .098
.271
.209
.074 .079 DIA X .302 .322
CSK 82° X .091
2 HOLES
.142 .138
.125 REF
9 SPACES AT .127 .123 PITCH
TOTAL DIM = 1.127 1.123
TOLERANCE NON-CUMULATIVE
1.407 1.403
.037 .033
.648
.062 DIA X .312 DEEP
2 HOLES
.062 X 45° CHAMFER
2 PLACES
45°
.625
.325
1.825
.165
1.005
.850
K1
K2
J1
H1


.332 DIA
.410
32
.190 .170
32
— .001
— .001
.555 DIA

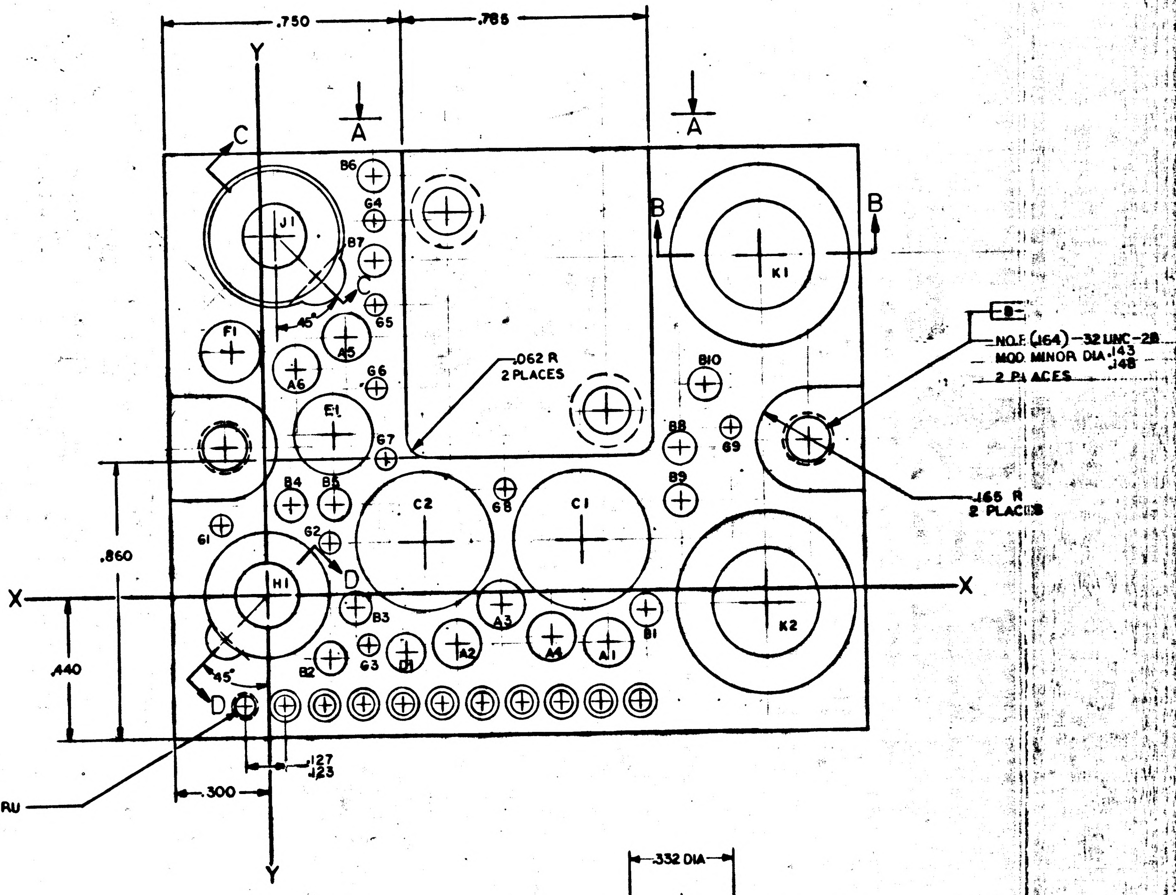
PARTIAL SECTION B-B
2 PLACES

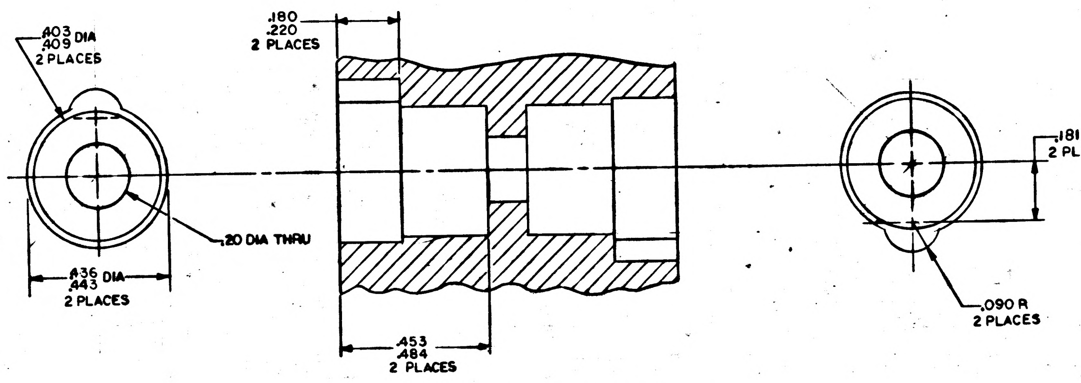

.525
32
— .0004
.062
.172 .173 DIA THRU
10 HOLES
.080 .100 R TYP

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	1.080	-.160	.146 .150	6
A2	.600	-.160		
A3	.740	-.040		
A4	.900	-.140		
A5	.260	.800		
A6	.100	.700		
B1	1.200	-.060	.100 .104	10
B2	.200	-.200		
B3	.280	-.040		
B4	.080	.280		
B5	.220	.280		
B6	.360	1.300		
B7	.360	1.040		
B8	1.320	.440		
B9	1.320	.280		
B10	1.400	.640		
C1	1.000	.160	.420 .427	2
C2	.500	.160		
D1	.440	-.180	.112 .116	1
E1	.220	.500	.245 .249	1
F1	-.100	.760	.192 .196	1
G1	-.140	.220	.058 .062	9
G2	.200	.160		
G3	.320	-.160		
G4	.360	1.160		
G5	.360	.900		
G6	.360	.640		
G7	.380	.420		
G8	.760	.320		
G9	1.480	.500		
H1	.000	.000	SEE SECTION D-D	1
J1	.040	1.120	SEE SECTION C-C	1
K1	1.580	1.040	SEE SECTION B-B	2
K2	1.580	-.040		

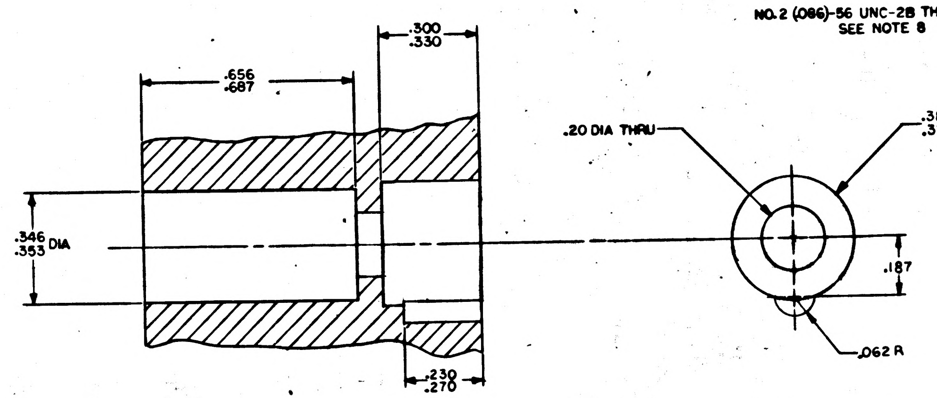

.250 DIA
2 PLACES
.125
2 PLACES
.140 DIA THRU
2 PLACES
.188 REF
.015 R MAX
2 PLACES
1.005

VIEW A-A

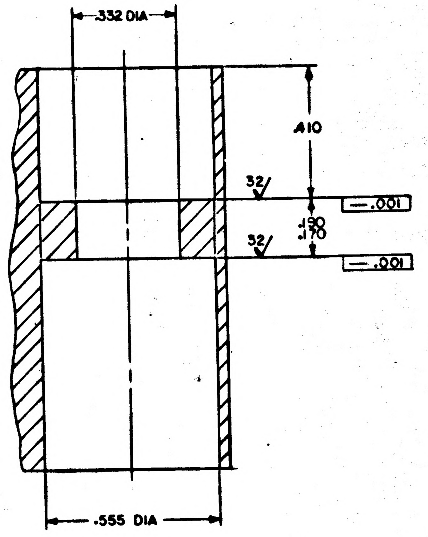

.750
.765
Y
C
A
A
B
B
B6
G4
B7
J1
45°
G5
A5
F1
A6
G6
.062 R
2 PLACES
B10
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
B8
B9
E1
G7
.165 R
2 PLACES
K1
B4
B5
G8
C2
C1
.860
G1
G2
H1
D
X
X
B3
A3
A4
A1
B1
K2
.440
45°
B2
G3
D1
A2
D
.127
.123
.300
NO.2 (.086)-56 UNC-2B THREAD THRU
SEE NOTE 8
Y


.403 DIA
.409
2 PLACES
.180
.220
2 PLACES
.20 DIA THRU
.436 DIA
.443
2 PLACES
.453
.484
2 PLACES
.181
2 PLACES
.090 R
2 PLACES

PARTIAL SECTION C-C
ROTATED 45° CW


.300
.330
.656
.687
.346
.353 DIA
.230
.270
.20 DIA THRU
.383 DIA
.389
.187
.062 R

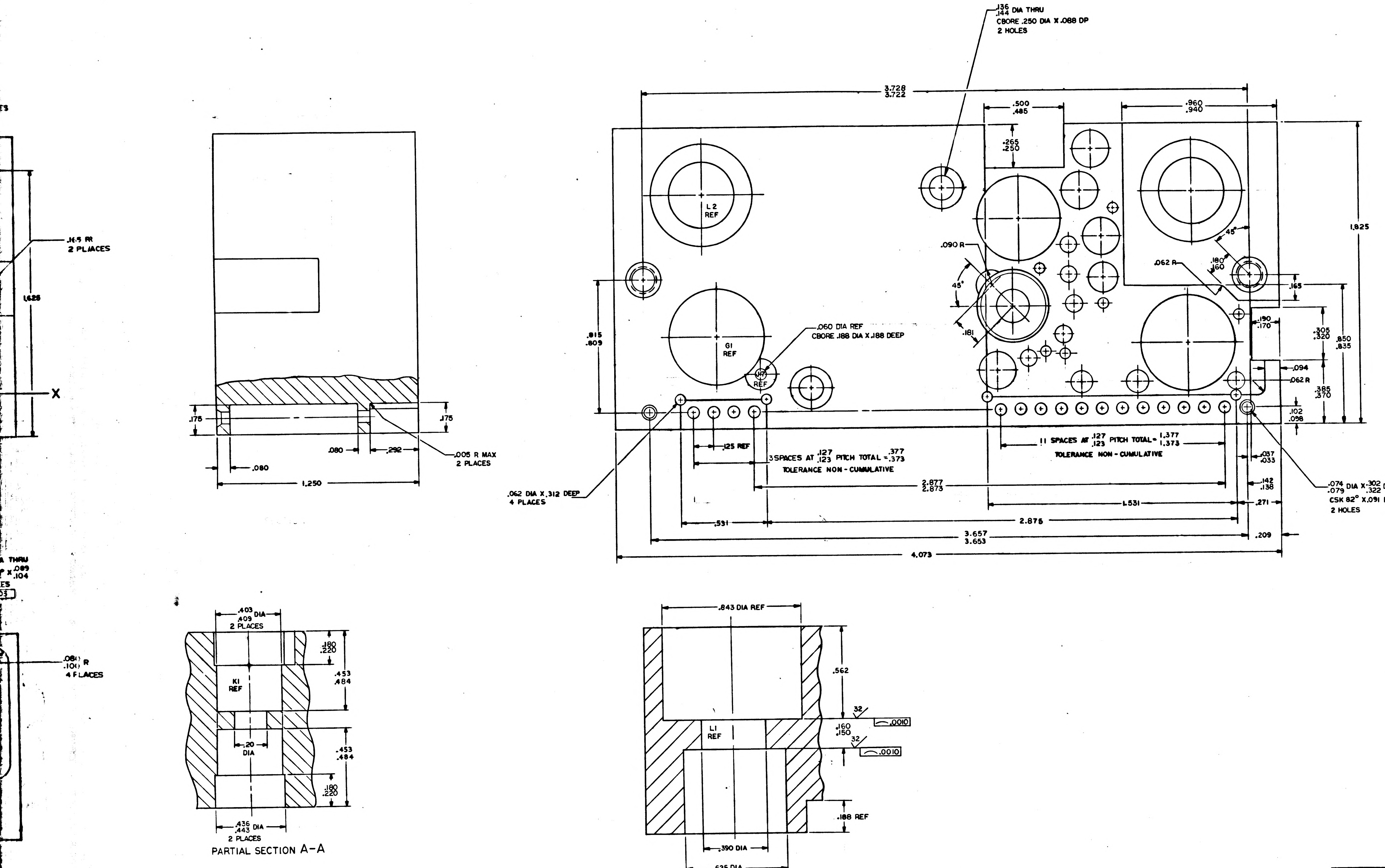
PARTIAL SECTION D-D
ROTATED 45° CCW


.332 DIA
.410
32
.190
.170
32
.001
.001
.555 DIA

PARTIAL SECTION B-B
2 PLACES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5, PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

REVISIONS 17049			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17985		



.136 .144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728 3.722
.500 .485
.960 .940
.265 .250
L2 REF
G1 REF
K1 REF
L1 REF
1.825
45°
.090 R
.062 R
.180 .160
.165
.190 .170
.305 .320
.850 .835
.094
.062 R
.385 .370
.102 .098
.181
.815 .809
.060 DIA REF
CBORE .188 DIA X .188 DEEP
.165 RR
2 PLACES
1.625
X
.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250
.125 REF
3 SPACES AT .127 .123 PITCH TOTAL = .377 .373
TOLERANCE NON-CUMULATIVE
11 SPACES AT .127 .123 PITCH TOTAL = 1.377 1.373
TOLERANCE NON-CUMULATIVE
.037 .033
.142 .138
.271
2.877 2.873
1.531
.062 DIA X .312 DEEP
4 PLACES
.531
2.876
3.657 3.653
.209
4.073
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.403 .409 DIA
2 PLACES
.180 .220
.453 .484
.20 DIA
.453 .484
.180 .220
.436 .443 DIA
2 PLACES
.080 .100 R
4 PLACES
DIA THRU
.089 .104
DIA THRU
.843 DIA REF
.562
32
.160 .150
.0010
32
.0010
.188 REF
.390 DIA
.625 DIA

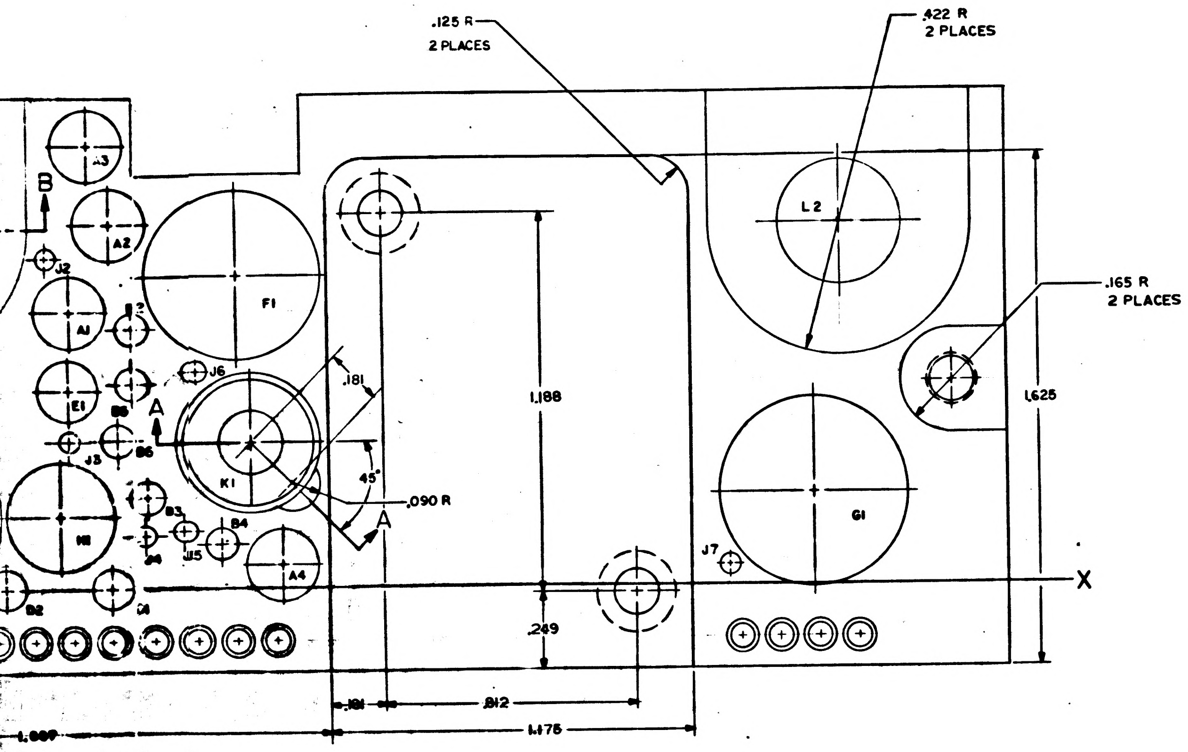
PARTIAL SECTION A–A

PARTIAL SECTION B-B
2 PLACES

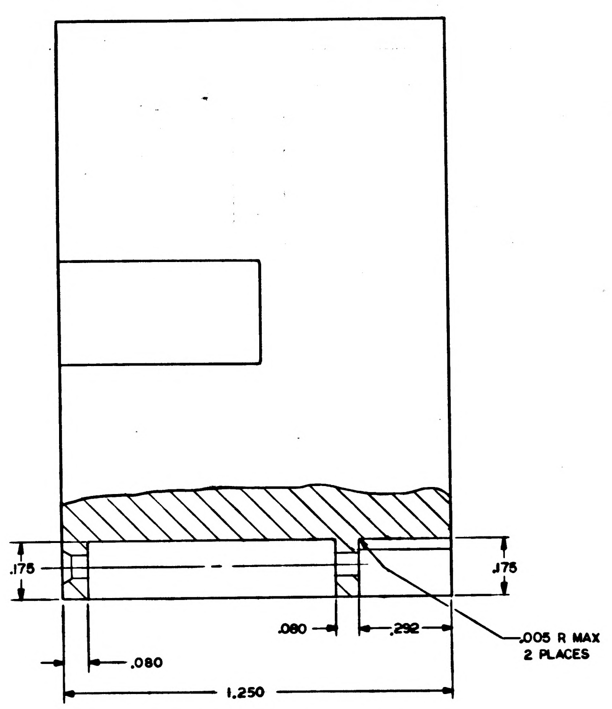
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007111		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS XXX± .005 XX± .02 ANGLES ± 1/2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DRAWN J. Camby DATE 12 Jan 65 CHECKED A. Lindstrom 2-3-65 APPROVAL E. Fdsolak 2/18/65 APPROVAL A. R. Test 2/24/65	MANNED SPACECRAFT CENTER HOUSTON, TEXAS HEATSINK 800 CPS 5% AMPLIFIER
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL W J Rhine 3-2-65	CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2008084
APPLICATION		HEAT TREATMENT ——— FINAL FINISH SEE NOTE 6	MIT APPROVAL W King for 2 Mar 65	SCALE 5/1 WT ——— SHEET 1 OF 1

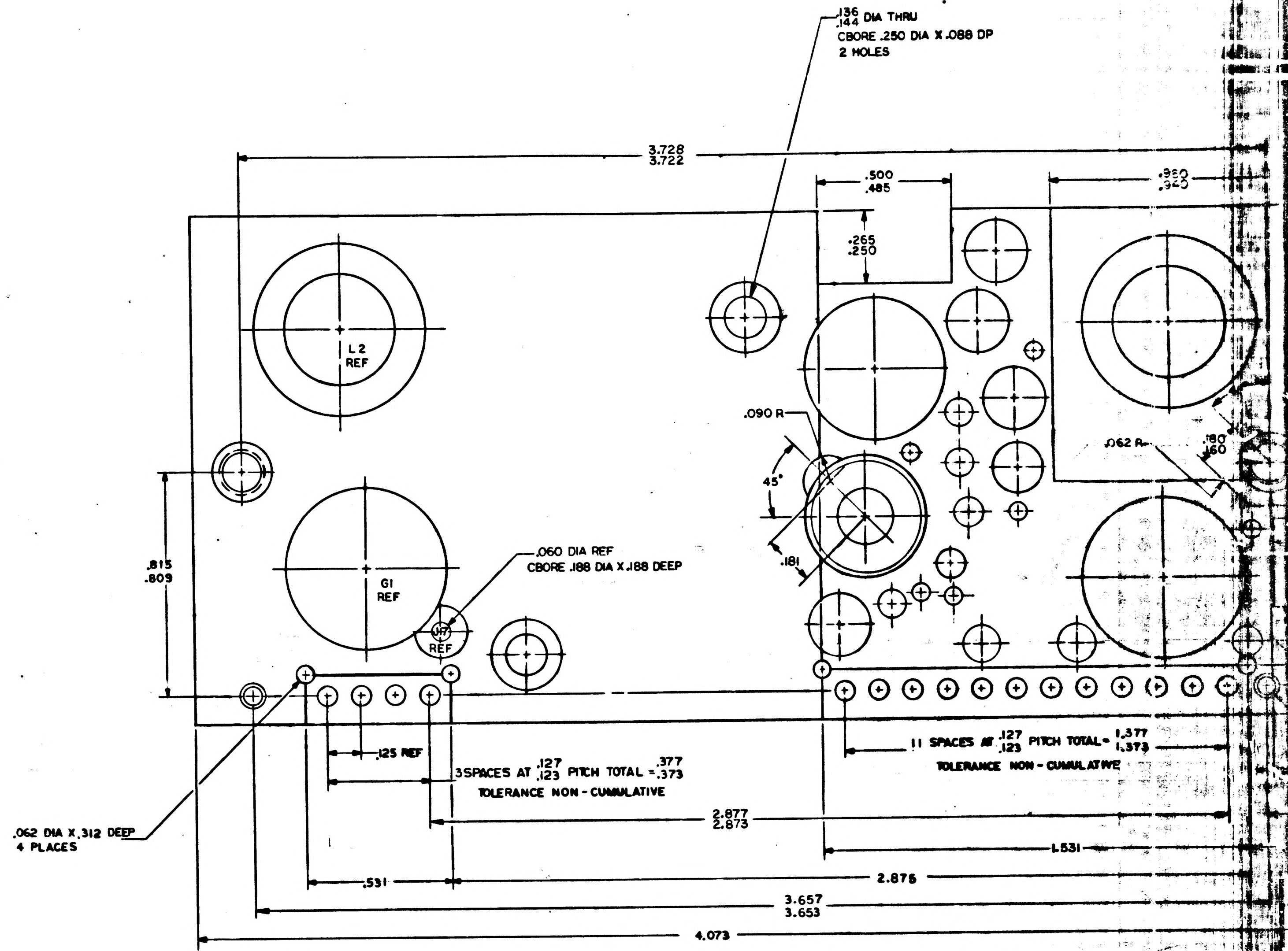
MASTER



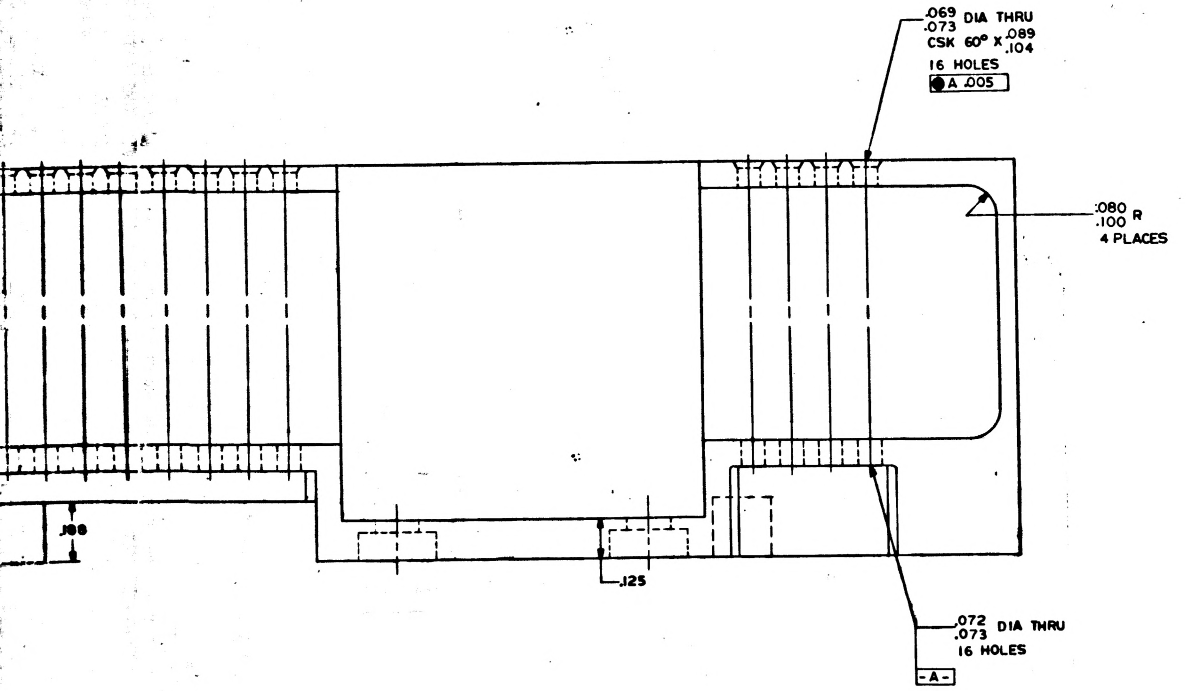
.125 R
2 PLACES
.422 R
2 PLACES
.165 R
2 PLACES
B
J3
A2
J2
F1
A1
B2
J6
E1
B5
A
J5
B6
K1
.181
45°
.090 R
A
H1
B3
B4
J4
J15
A4
J7
L2
G1
1.188
1.625
.249
X
B8
J1
.181
.812
1.175
1.007



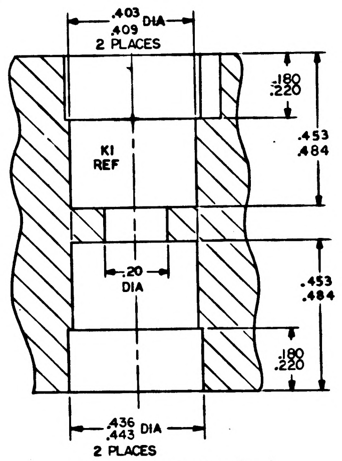
.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250



.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.485
.950
.945
.265
.250
L2
REF
.090 R
45°
.181
.062 R
.180
.160
.815
.809
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
H1
REF
.125 REF
3 SPACES AT .127 / .123 PITCH TOTAL = .377 / .373
TOLERANCE NON - CUMMULATIVE
11 SPACES AT .127 / .123 PITCH TOTAL = 1.377 / 1.373
TOLERANCE NON - CUMULATIVE
2.877
2.873
1.531
.531
2.875
3.657
3.653
4.073
.062 DIA X .312 DEEP
4 PLACES

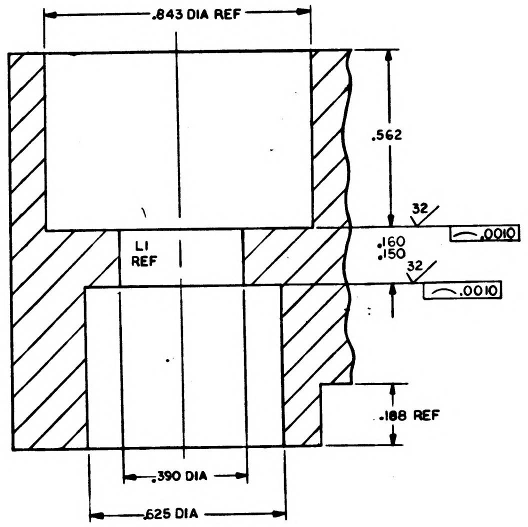


.069
.073 DIA THRU
CSK 60° X .089 / .104
16 HOLES
◉ A .005
.080
.100 R
4 PLACES
.188
.125
.072
.073 DIA THRU
16 HOLES
-A-



.403
.409 DIA
2 PLACES
.180
.220
.453
.484
K1
REF
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES

PARTIAL SECTION A-A



.843 DIA REF
.562
32
.0010
L1
REF
.160
.150
32
.0010
.188 REF
.390 DIA
.625 DIA

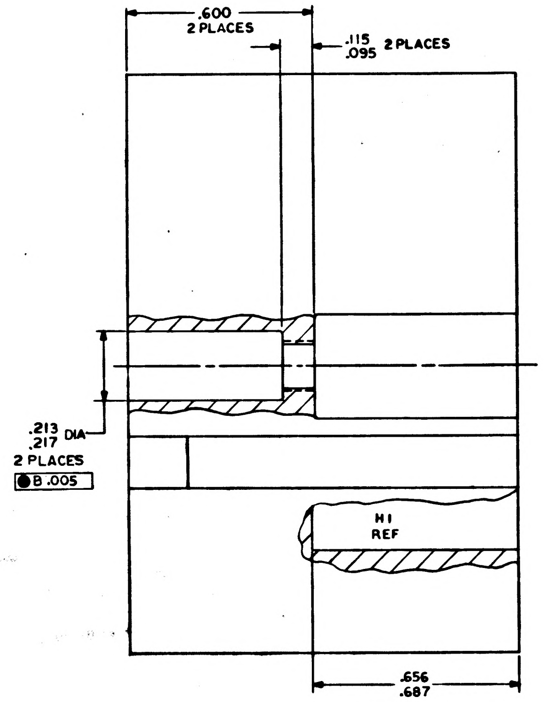
PARTIAL SECTION B-B
2 PLACES

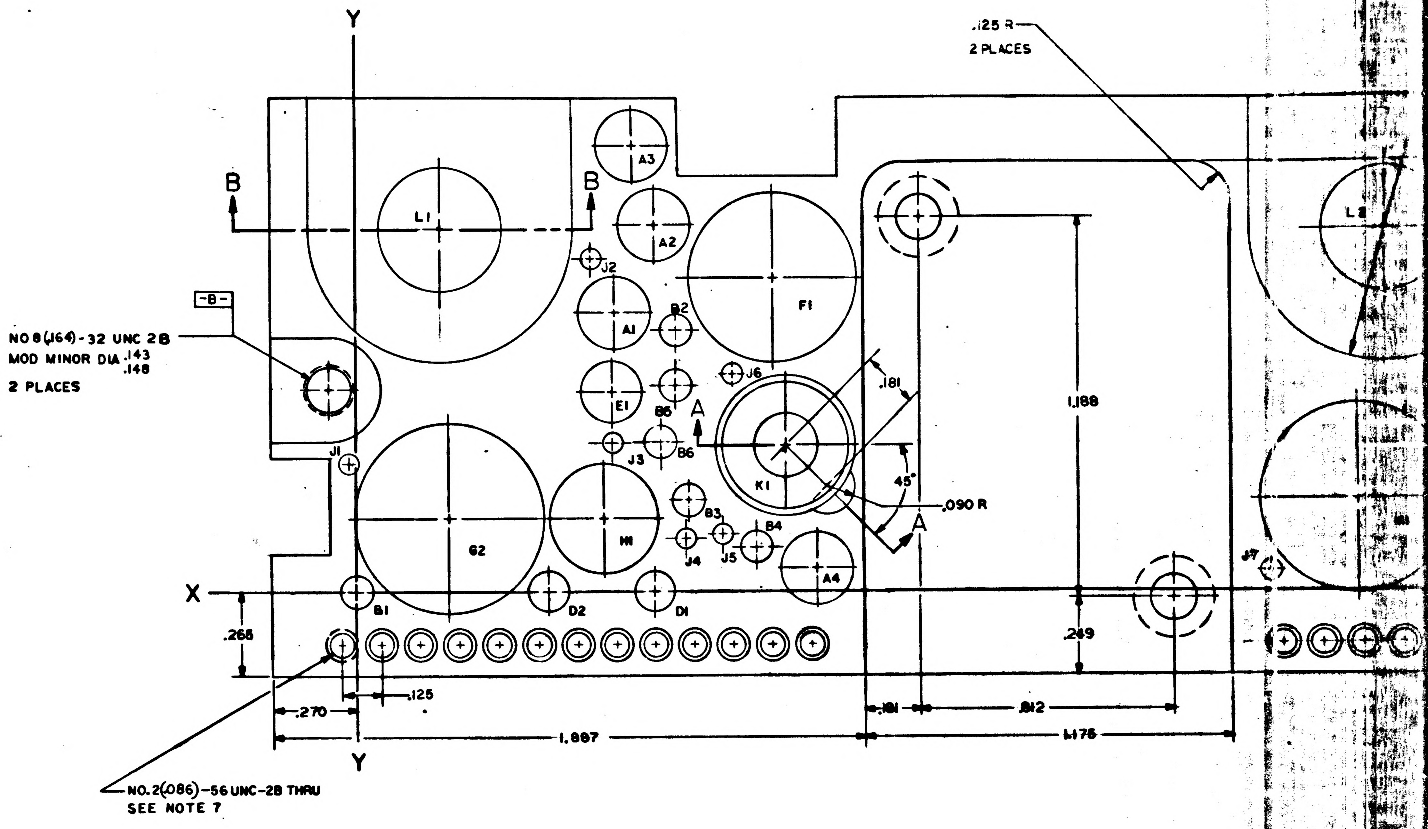
MASTER

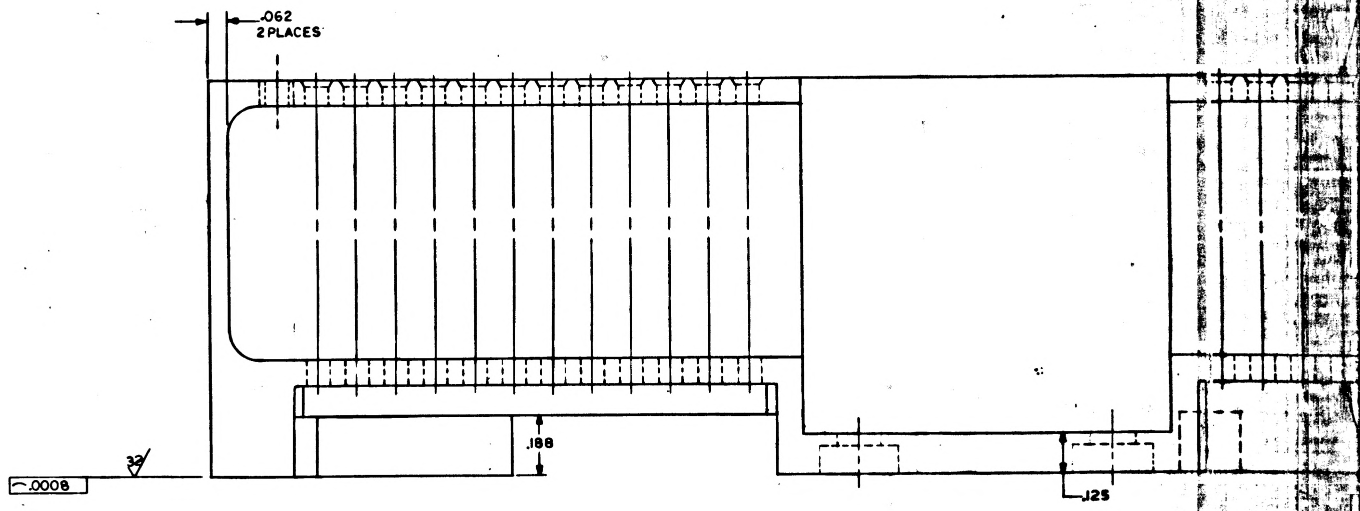
2007 1
NEXT ASSY
USED ON
APPLICATION

F,2

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.410		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.810	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.145	SEE SECTION B-B	2
L2	3.270	1.145		


.600
2 PLACES
.115
.095 2 PLACES
.213 DIA
.217
2 PLACES
B .005
H1
REF
.656
.687


Y
B
B
A3
A2
L1
J2
F1
A1
B2
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
J6
E1
B5
A
.181
J1
J3
B6
K1
45°
.090 R
A
G2
H1
B3
J4
J5
B4
A4
X
B1
D2
D1
.265
.270
.125
1.887
Y
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7
.125 R
2 PLACES
L2
1.188
J7
.249
.181
.812
1.175

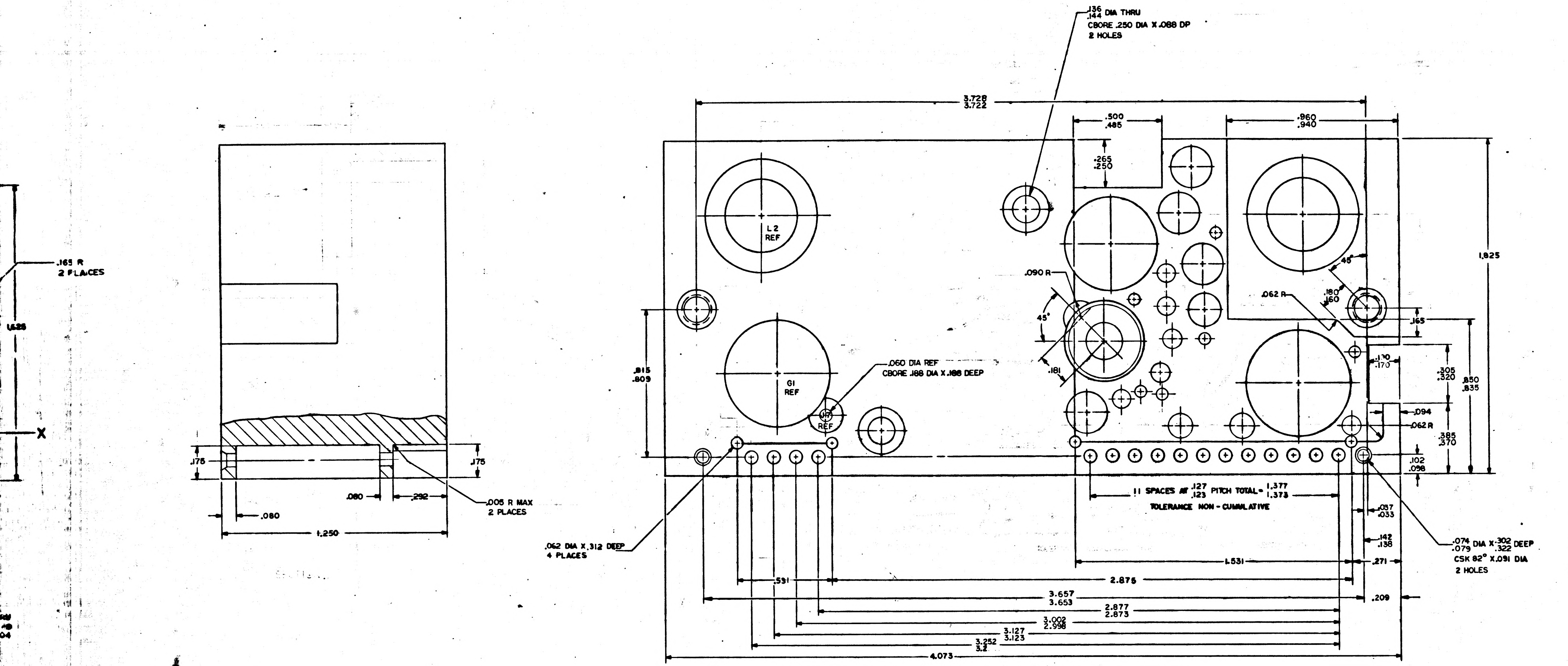

.062
2 PLACES
.188
.0008
32
.125

NOTES:

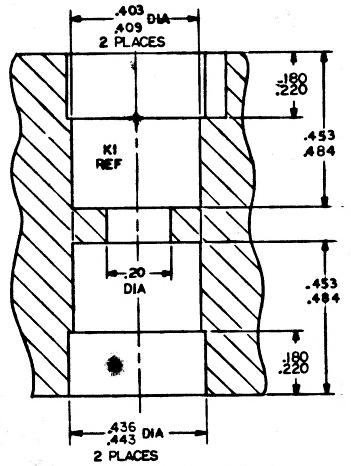
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125 ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

REVISIONS 17089

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17985		
B	REVISED PER TDRR 18846	5 May 65	

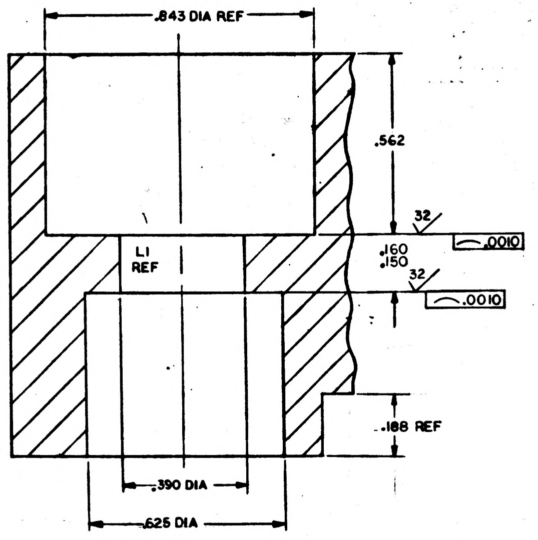


.136 .144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728 3.722
.500 .485
.960 .940
.265 .250
1.825
L2 REF
G1 REF
.090 R
45°
.062 R
.180 .160
45°
.165
.815 .809
.060 DIA REF
CBORE .188 DIA X .188 DEEP
.181
.130 .170
.305 .320
.850 .835
.094
.062 R
.385 .370
.102 .098
11 SPACES AT .127 .123 PITCH TOTAL = 1.377 1.373
TOLERANCE NON - CUMULATIVE
.037 .033
.142 .138
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 PLACES
1.531
.271
.531
2.875
3.657 3.653
.209
2.877 2.873
3.002 2.998
3.127 3.123
3.252 3.2
4.073
.165 R
2 PLACES
1.625
X
.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250
.080 .100
4 PLACES



.403 .409 DIA
2 PLACES
.180 .220
.453 .484
K1 REF
.20 DIA
.453 .484
.180 .220
.436 .443 DIA
2 PLACES

PARTIAL SECTION A-A



.843 DIA REF
.562
32
.0010
.160 .150
32
.0010
L1 REF
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION B-B
2 PLACES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT —

FINAL FINISH SEE NOTE 6

NEXT ASSY	USED ON
2007111	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVAL
APPROVAL

NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 5% AMPLIFIER

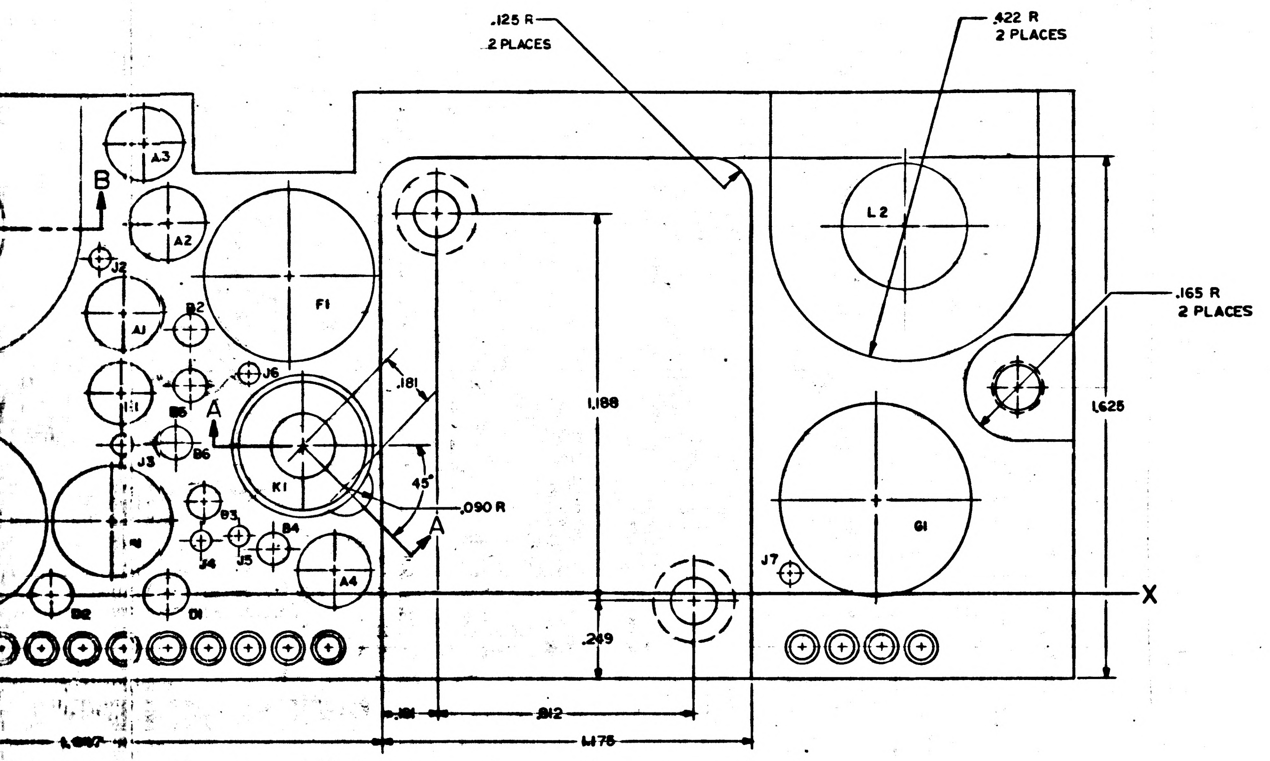
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008084
SCALE 5/1
WT —
SHEET 1 OF 1

2008084 B

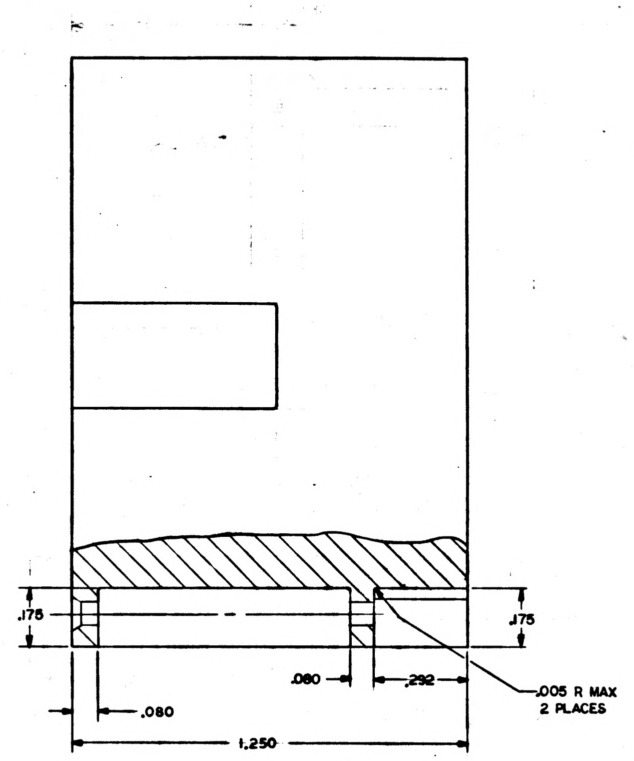
2008084 E

A 3H

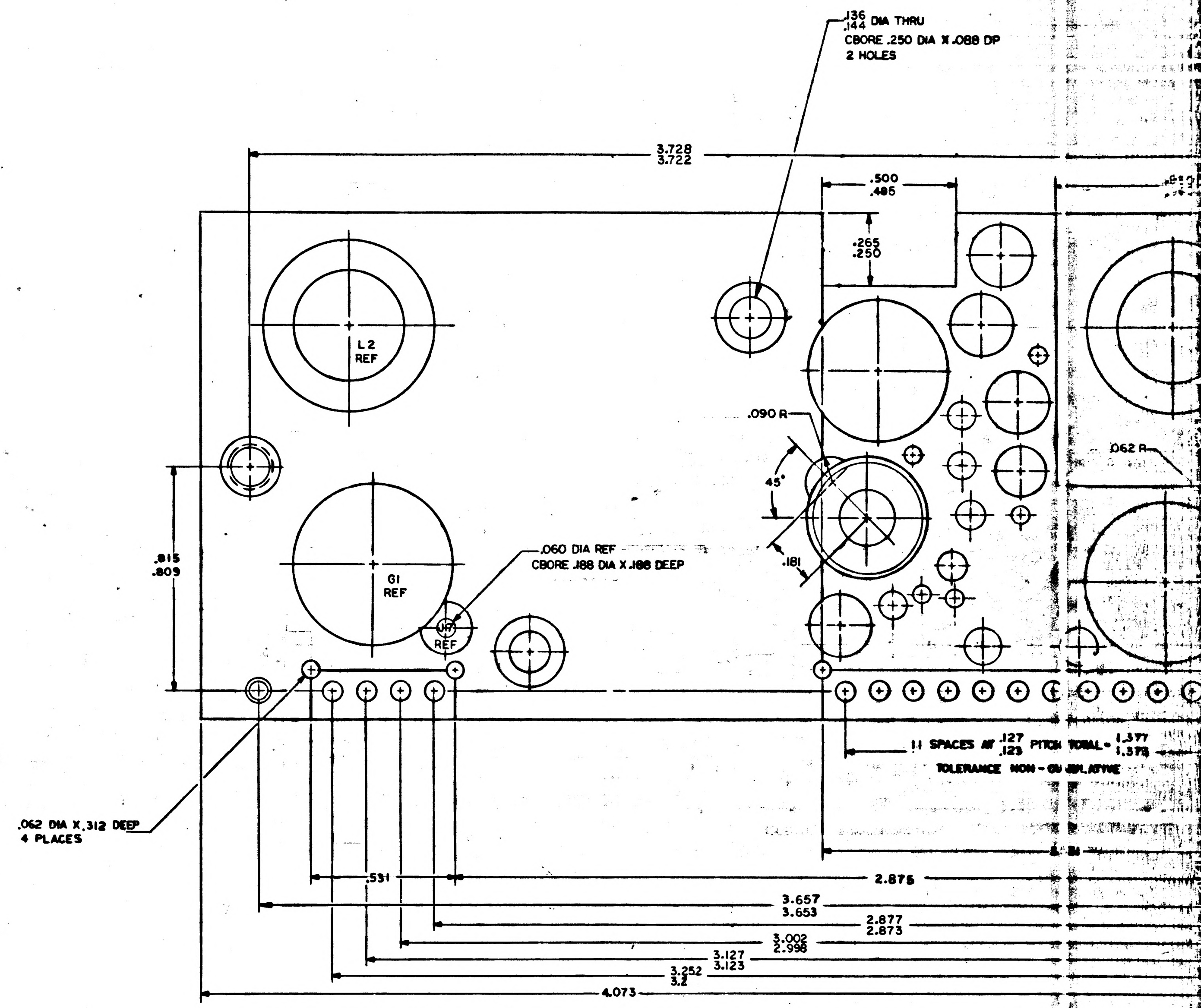
F-3



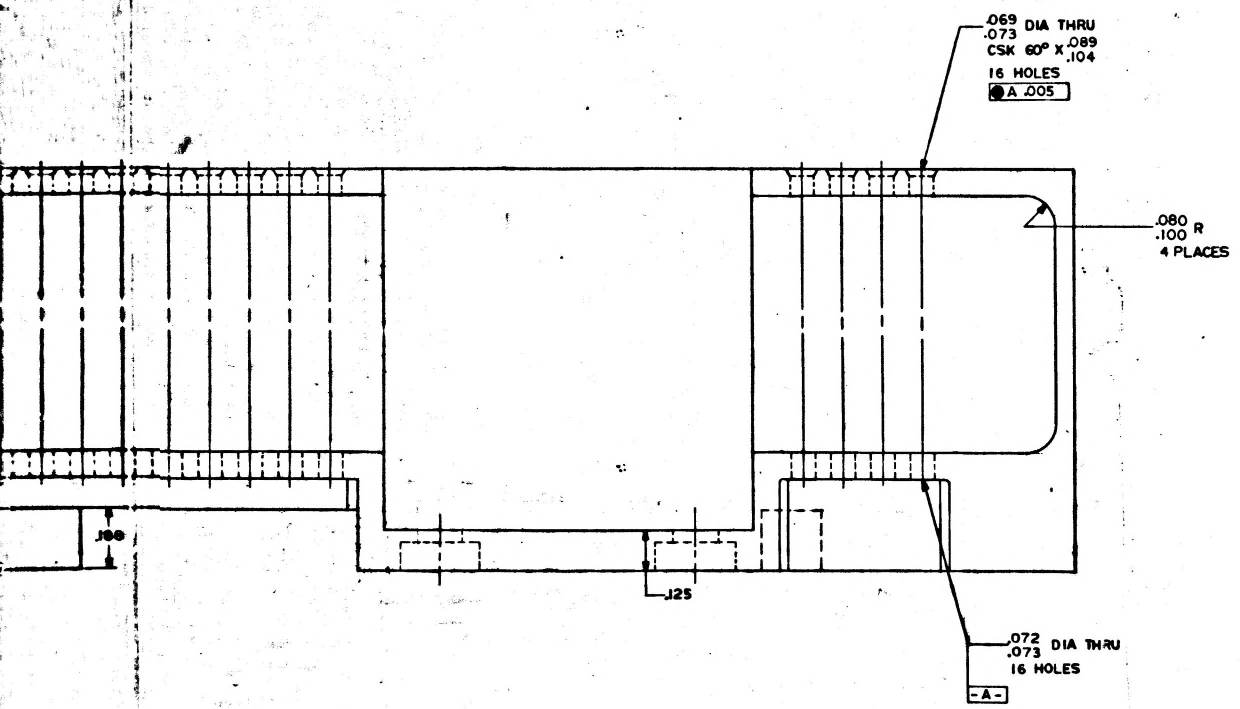
.125 R
2 PLACES
.422 R
2 PLACES
.165 R
2 PLACES
B
A3
A2
F1
J2
B2
A1
J6
.181
45°
.090 R
A
K1
L2
G1
J7
B5
B6
J3
B3
B4
J4
J5
A4
D1
1.188
1.625
.249
X
.181
.812
1.175



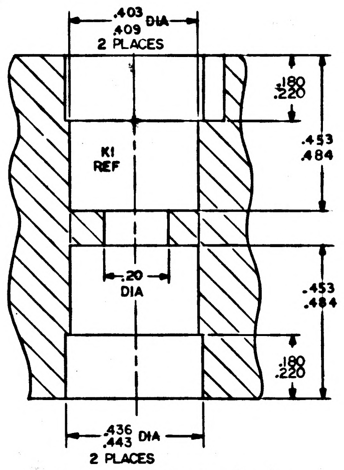
.175
.175
.080
.292
.080
1.250
.005 R MAX
2 PLACES



.136 DIA THRU
.144
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.485
.265
.250
L2
REF
G1
REF
.090 R
45°
.181
.062 R
.815
.809
.060 DIA REF
CBORE .188 DIA X .188 DEEP
J7
REF
11 SPACES AT .127 .123 PITCH TOTAL = 1.377 1.373
TOLERANCE NON-CUMULATIVE
.062 DIA X .312 DEEP
4 PLACES
.531
2.875
3.657
3.653
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.2
4.073

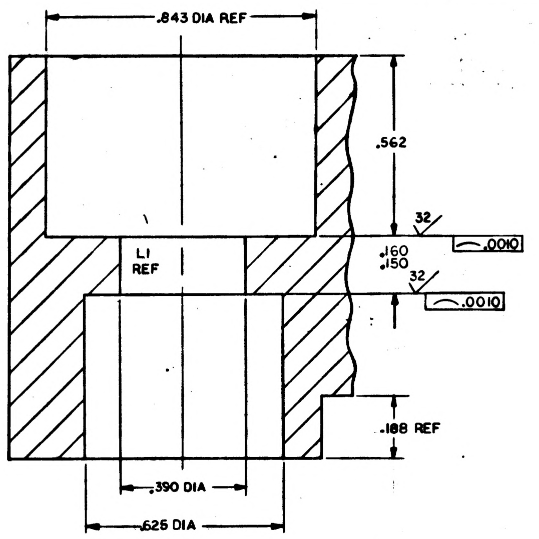


.069 DIA THRU
.073
CSK 60° X .089
.104
16 HOLES
A .005
.080 R
.100
4 PLACES
.188
.125
.072 DIA THRU
.073
16 HOLES
-A-



.403 DIA
.409
2 PLACES
.180
.220
K1
REF
.453
.484
.20
DIA
.453
.484
.180
.220
.436 DIA
.443
2 PLACES

PARTIAL SECTION A–A



.843 DIA REF
.562
32
.0010
L1
REF
.160
.150
32
.0010
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION B-B
2 PLACES

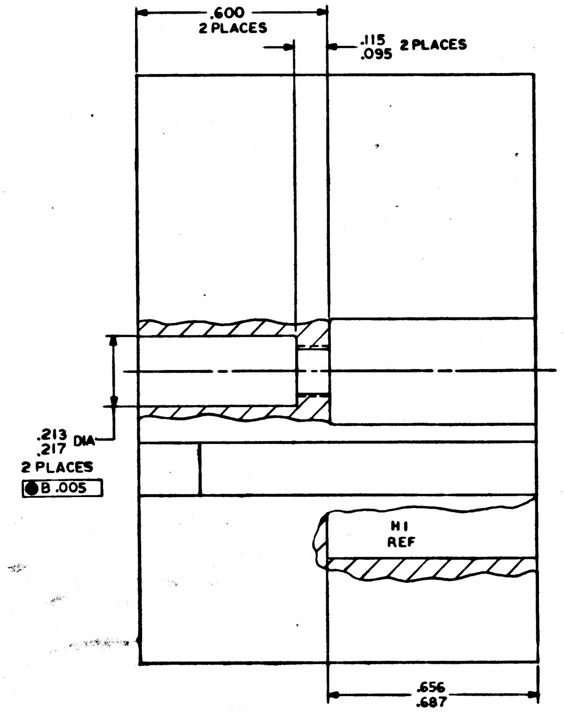
MASTER

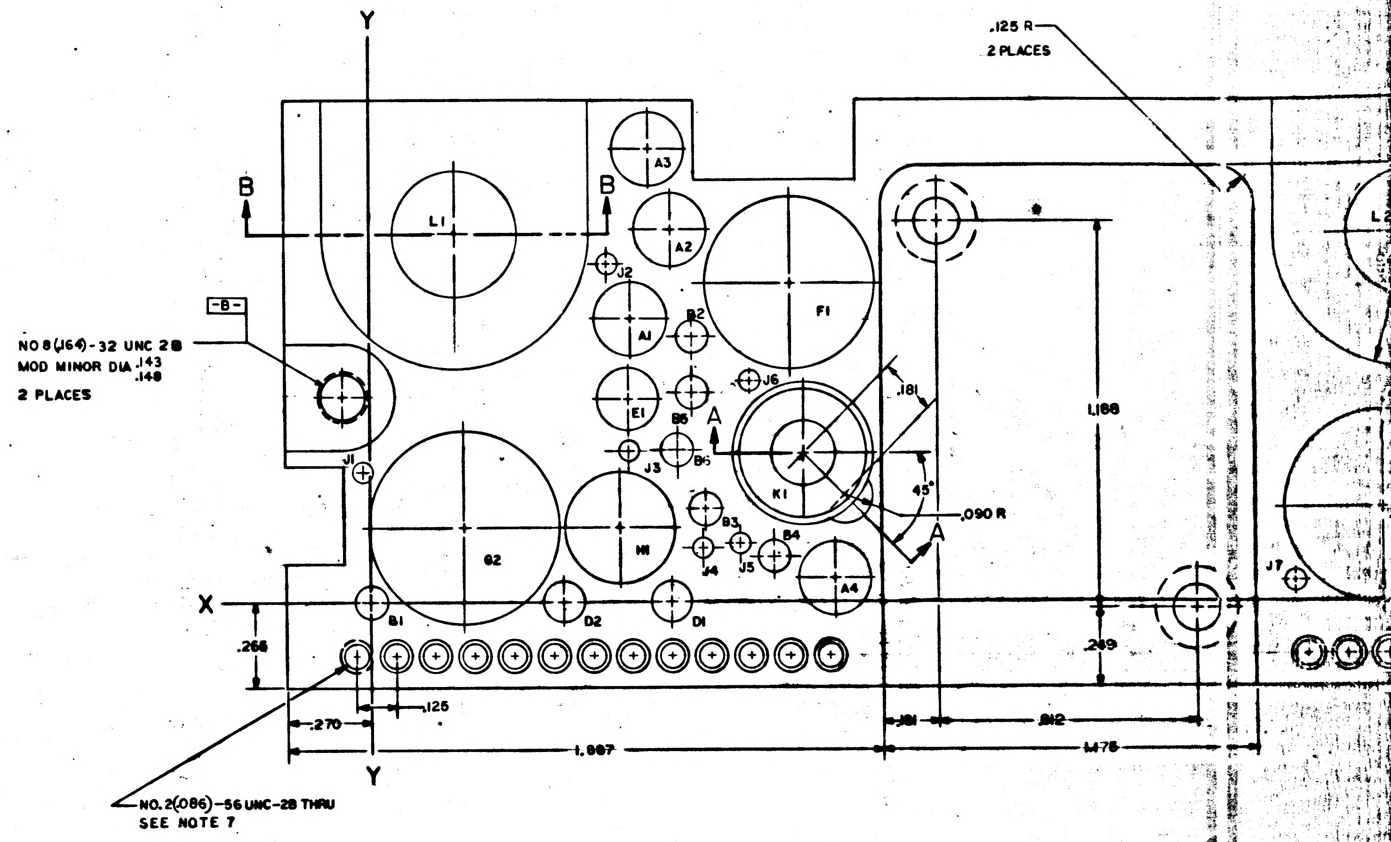
2007111
NEXT ASSY
APPLICATION

NOTICE – W[illegible] GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR [illegible] OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

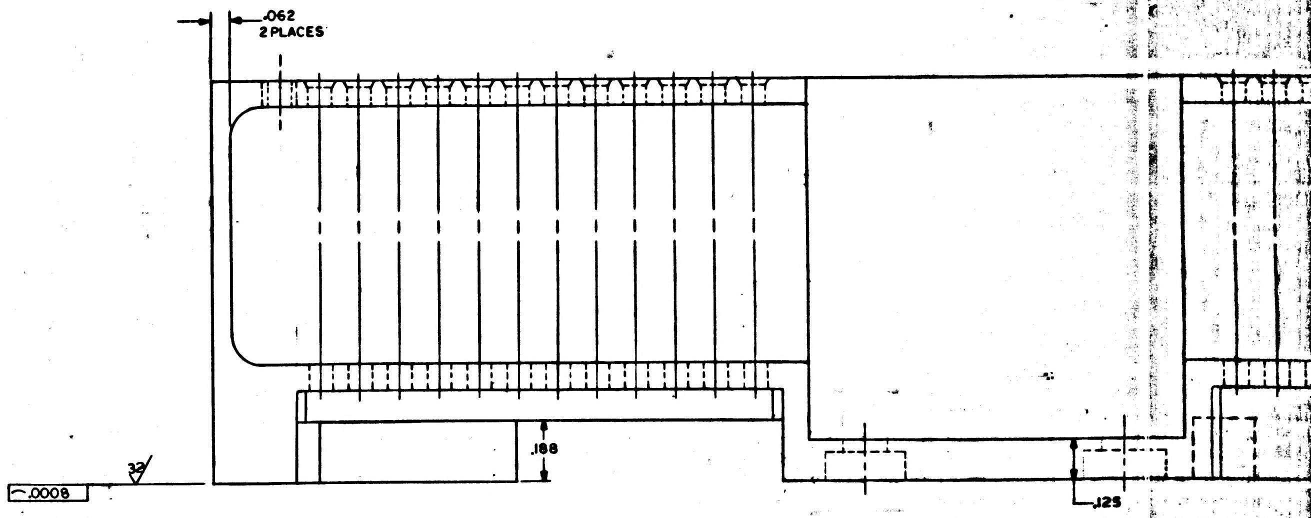
D

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.410		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.910	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.145	SEE SECTION B-B	2
L2	3.270	1.145		


.600
2 PLACES
.115
.095
2 PLACES
.213
.217
DIA
2 PLACES
B .005
H1
REF
.656
.687


Y
.125 R
2 PLACES
B
B
L1
A3
A2
F1
L2
J2
A1
B2
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
J6
E1
B5
A
.181
1.188
J1
J3
B6
K1
45°
.090 R
G2
H1
B3
B4
J4
J5
A4
A
J7
X
B1
D2
D1
.268
.249
.125
.270
.181
.812
1.887
1.475
Y
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7

C


.062
2 PLACES
.188
32
.0008
.125

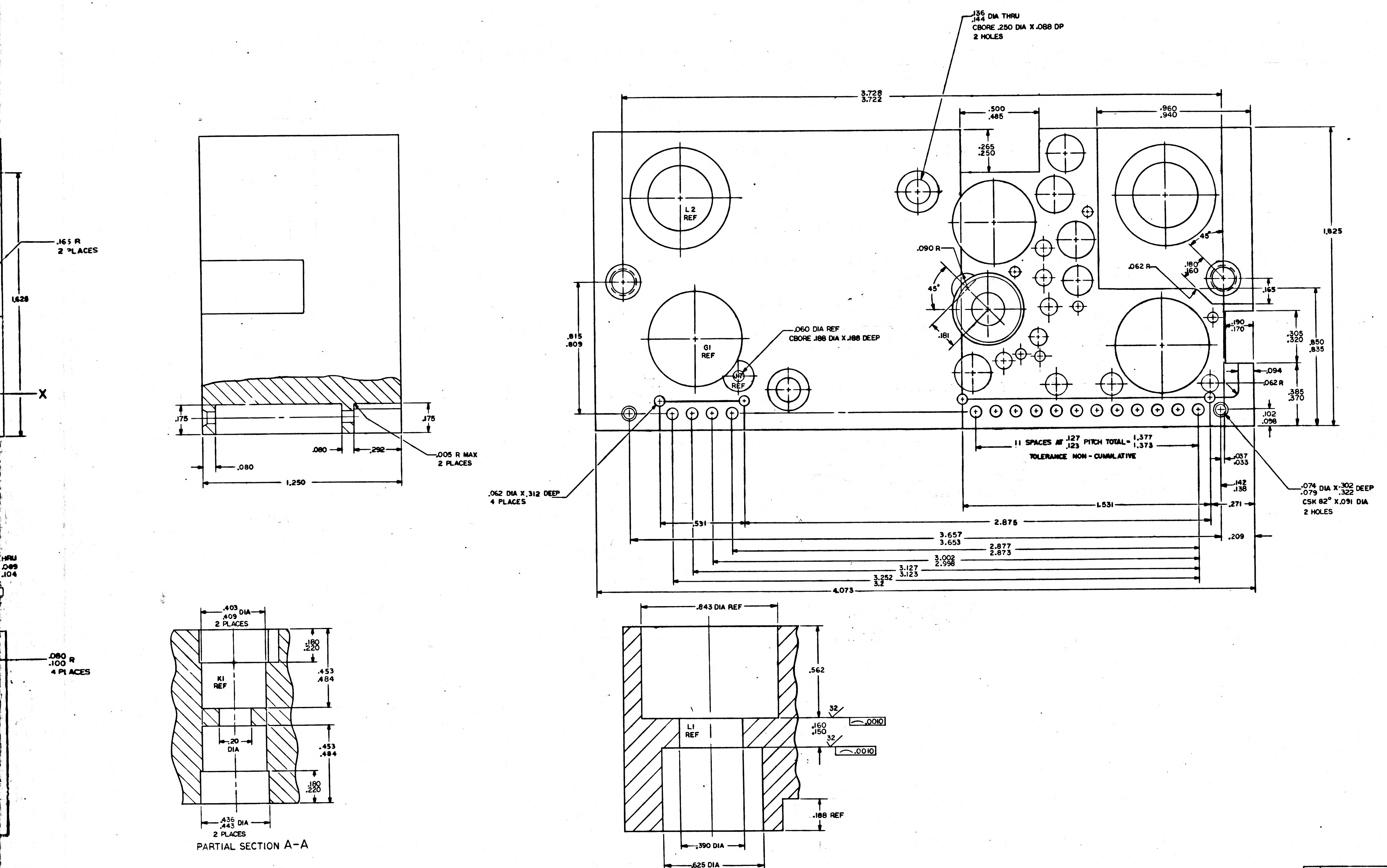
B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND 100204C
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

34 A

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 17009			
A	REVISED PER TDRR 17985	5 Jan 65	WK
B	REVISED PER TDRR 18846	5 Mar 65	WK
C	REVISED PER TDRR 19811	7 Jun 65	


.165 R
2 PLACES
1.628
X
THRU
.089
.104
.080
.100 R
4 PLACES
.175
.175
.080
.080
.292
.005 R MAX
2 PLACES
1.250
.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.485
.960
.940
.265
.250
L2
REF
G1
REF
K1
REF
.815
.809
.060 DIA REF
CBORE .188 DIA X .188 DEEP
.090 R
45°
.181
.062 R
45°
.180
.160
.165
1.825
.190
.170
.305
.320
.850
.835
.094
.062 R
.385
.370
.102
.098
11 SPACES AT .127 .123 PITCH TOTAL = 1.377 1.373
TOLERANCE NON - CUMULATIVE
.037
.033
.142
.138
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 PLACES
1.531
.271
.531
2.875
3.657
3.653
.209
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.2
4.073
.403
.409 DIA
2 PLACES
.180
.220
.453
.484
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES
.843 DIA REF
.562
32
.0010
.160
.150
32
.0010
L1
REF
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION A-A

PARTIAL SECTION B-B
2 PLACES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007111	
NEXT ASSY	USED ON
APPLICATION	

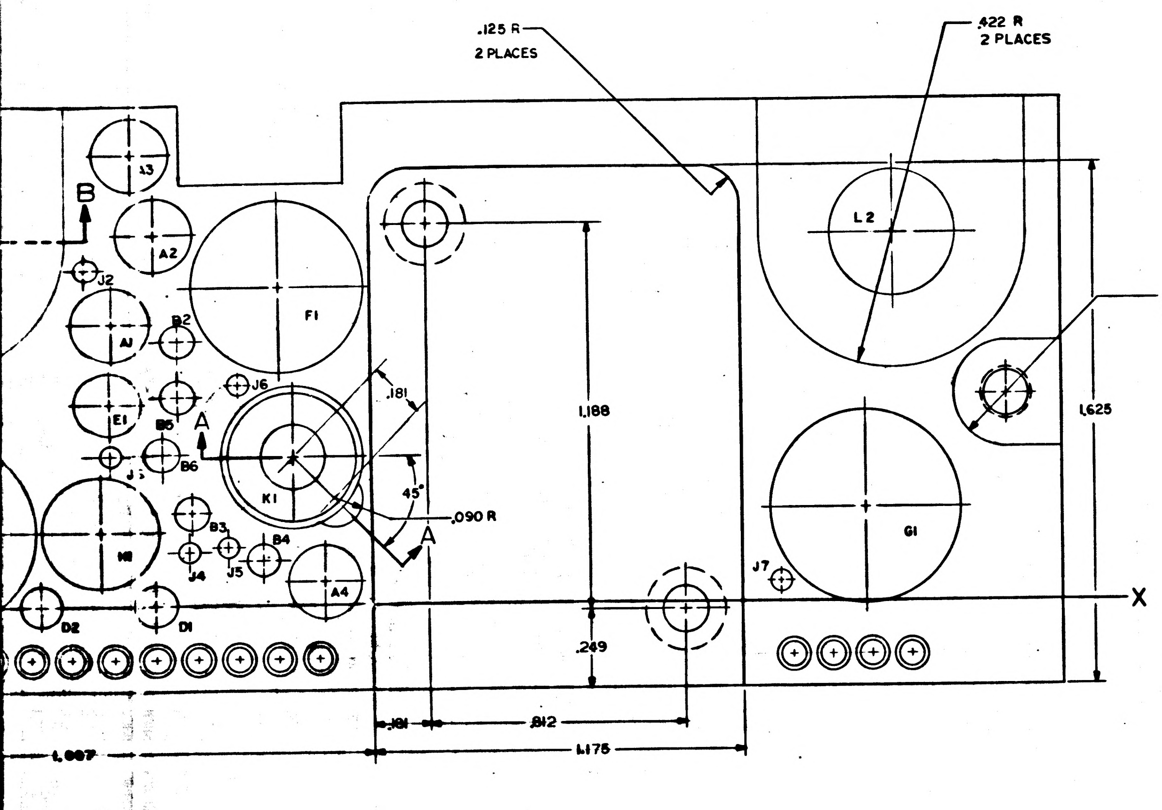
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN J. Caughey DATE 12 Jan 65
CHECKED A. Lindstrom 25 Jan 65
APPROVAL 25 Jan 65
APPROVAL 2/24/65
NASA APPROVAL 3-2-65
MIT APPROVAL WK 2/65

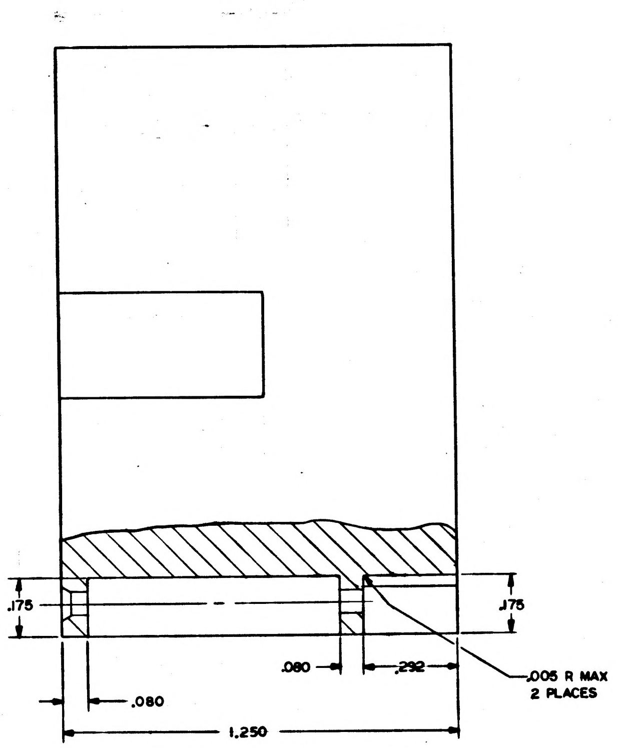
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 5% AMPLIFIER

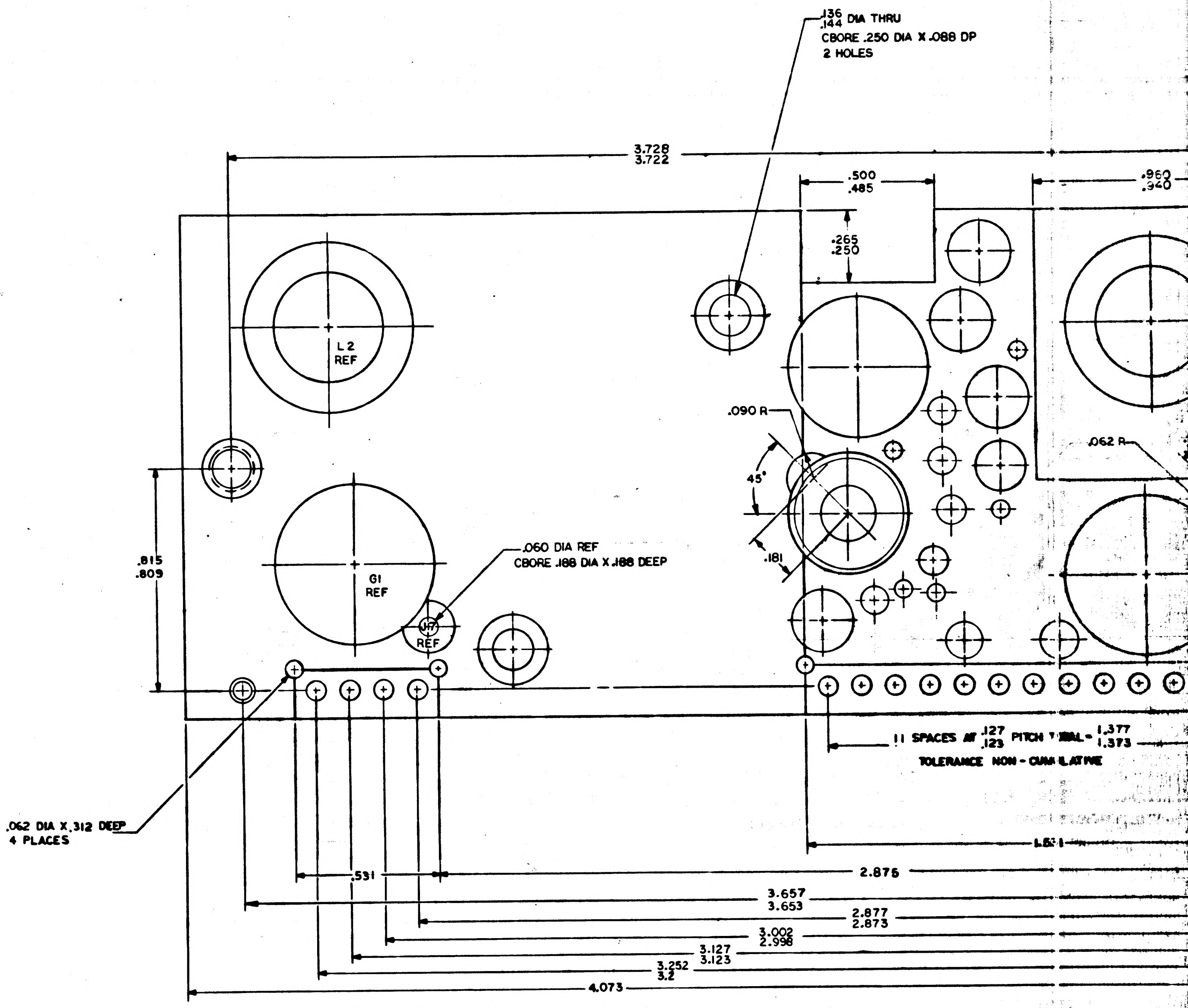
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008084
SCALE 5/1
WT —
SHEET 1 OF 1



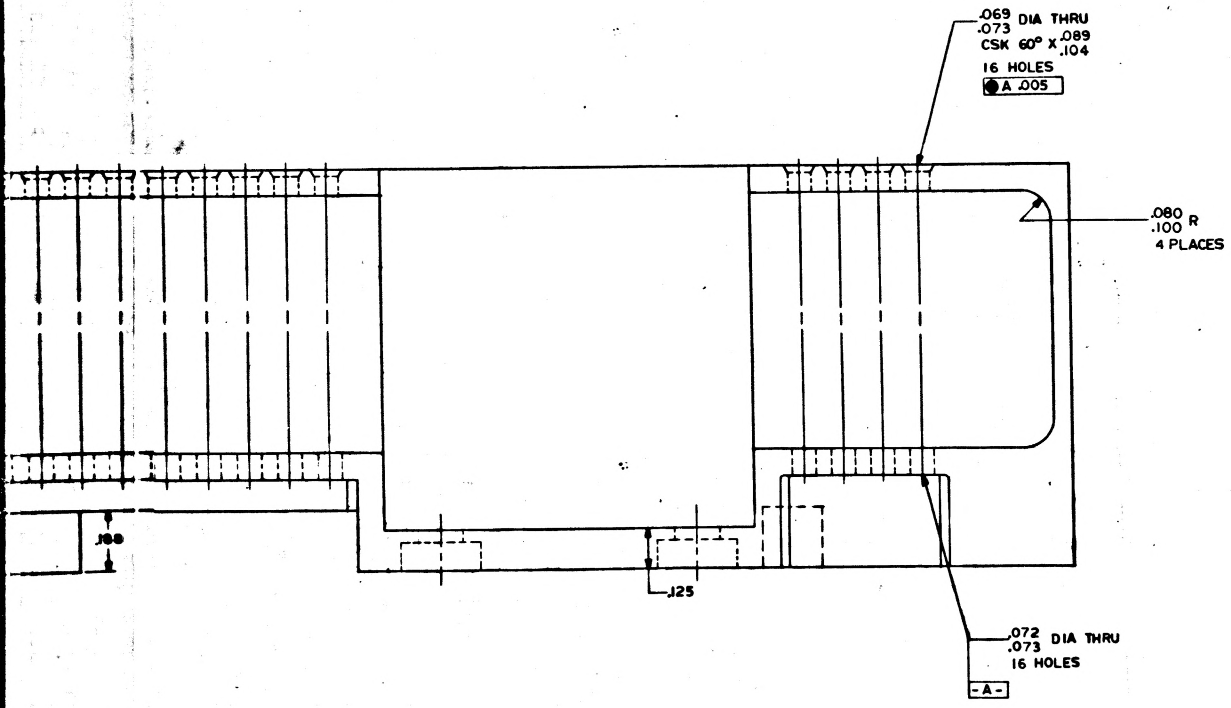
.125 R
2 PLACES
.422 R
2 PLACES
.165 R
2 PLACES
B
A
J3
A2
J2
F1
A1
B2
J6
E1
B5
B6
K1
H1
B3
B4
J4
J5
A4
D2
D1
L2
G1
J7
.181
45°
.090 R
1.188
1.625
.249
X
.181
.812
1.175
1.687



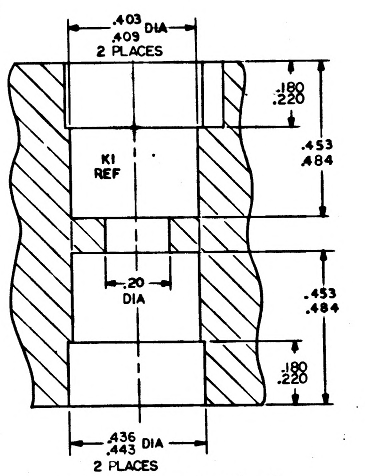
.175
.175
.080
.292
.080
1.250
.005 R MAX
2 PLACES



.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.485
.960
.940
.265
.250
L2
REF
.090 R
45°
.062 R
.181
.815
.809
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
J7
REF
11 SPACES AT .127/.123 PITCH TOTAL= 1.377/1.373
TOLERANCE NON-CUMULATIVE
.062 DIA X .312 DEEP
4 PLACES
.531
2.876
3.657
3.653
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.2
4.073

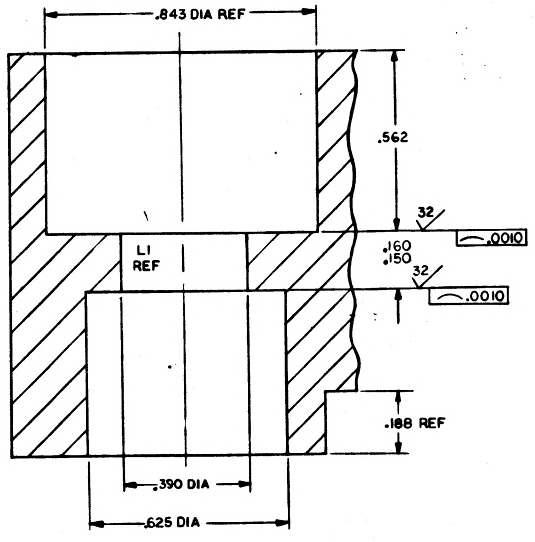


.069
.073 DIA THRU
CSK 60° X .089/.104
16 HOLES
A .005
.080
.100 R
4 PLACES
.188
.125
.072
.073 DIA THRU
16 HOLES
-A-



.403
.409 DIA
2 PLACES
.180
.220
.453
.484
K1
REF
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES

PARTIAL SECTION A-A



.843 DIA REF
.562
32
.0010
.160
.150
32
.0010
L1
REF
.188 REF
.390 DIA
.625 DIA

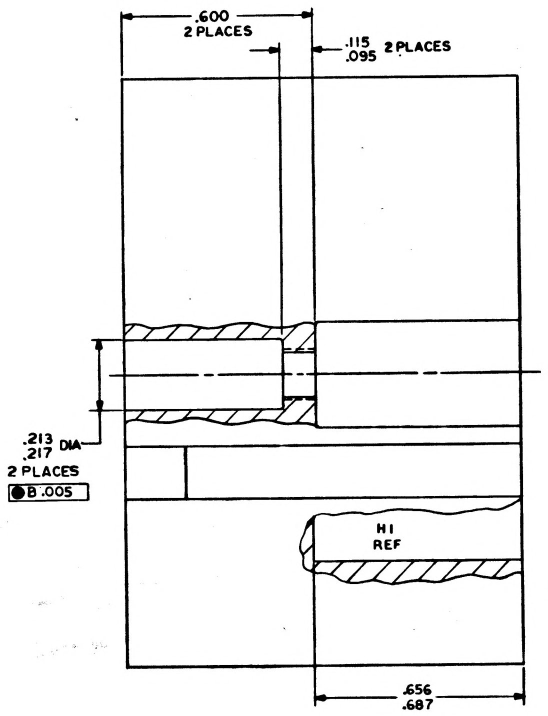
PARTIAL SECTION B-B
2 PLACES

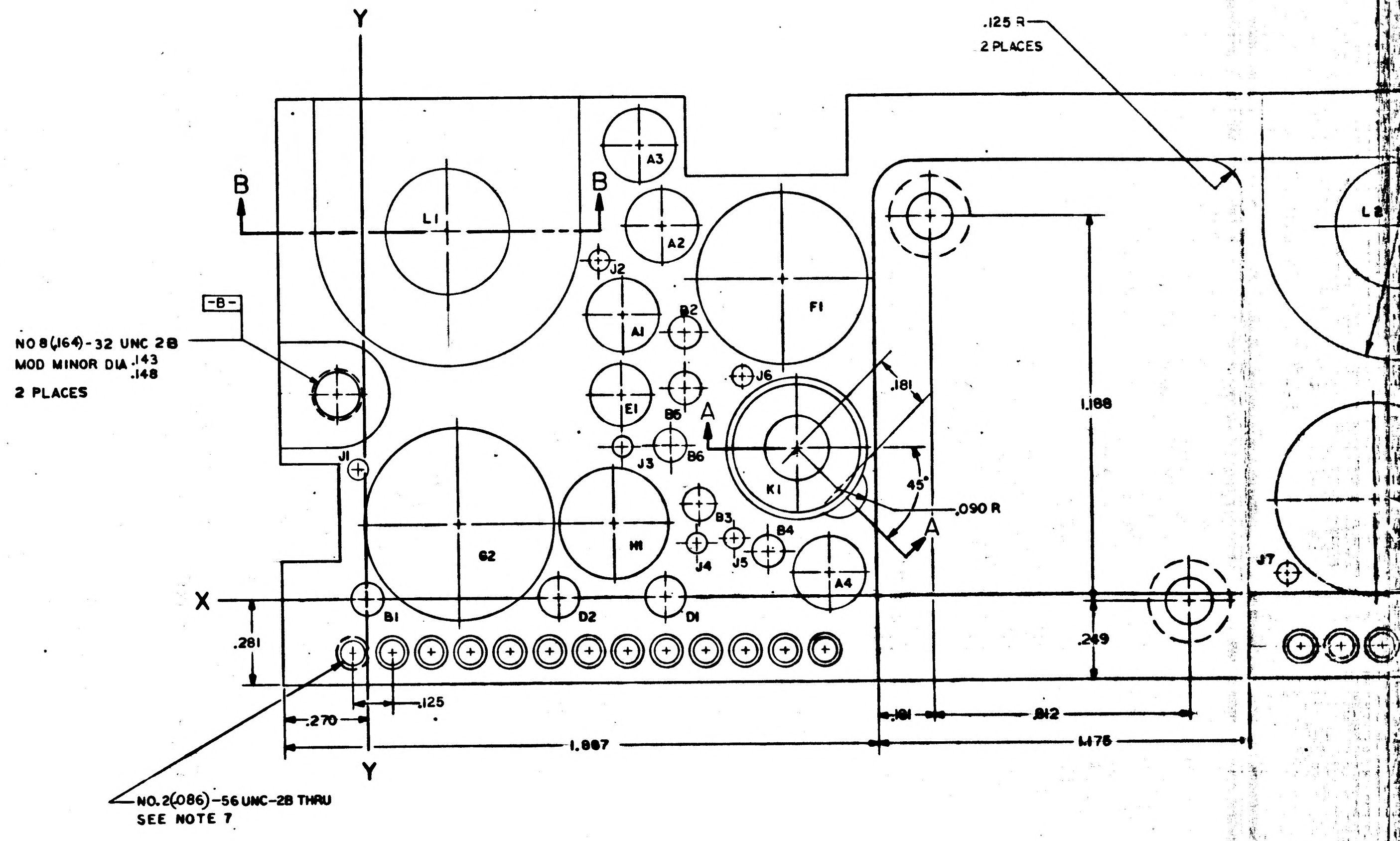
MASTER

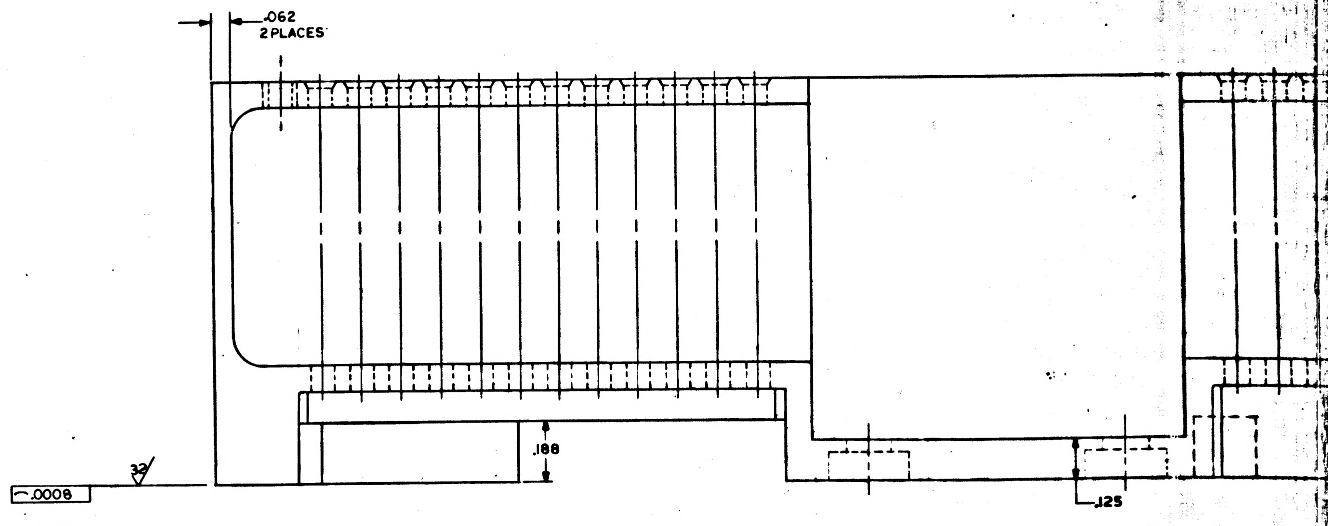
2007111

2008084 C

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.406		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.810	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.129	SEE SECTION B-B	2
L2	3.270	1.129		


.600
2 PLACES
.115
.095
2 PLACES
.213
.217
DIA
2 PLACES
B .005
H1
REF
.656
.687


Y
B
B
L1
A3
A2
J2
A1
B2
F1
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
E1
B5
A
J6
.181
.125 R
2 PLACES
J1
J3
B6
K1
45°
.090 R
A
G2
H1
B3
B4
J4
J5
A4
X
B1
D2
D1
J7
.281
.125
.270
1.887
.181
.812
1.476
1.188
.249
Y
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7

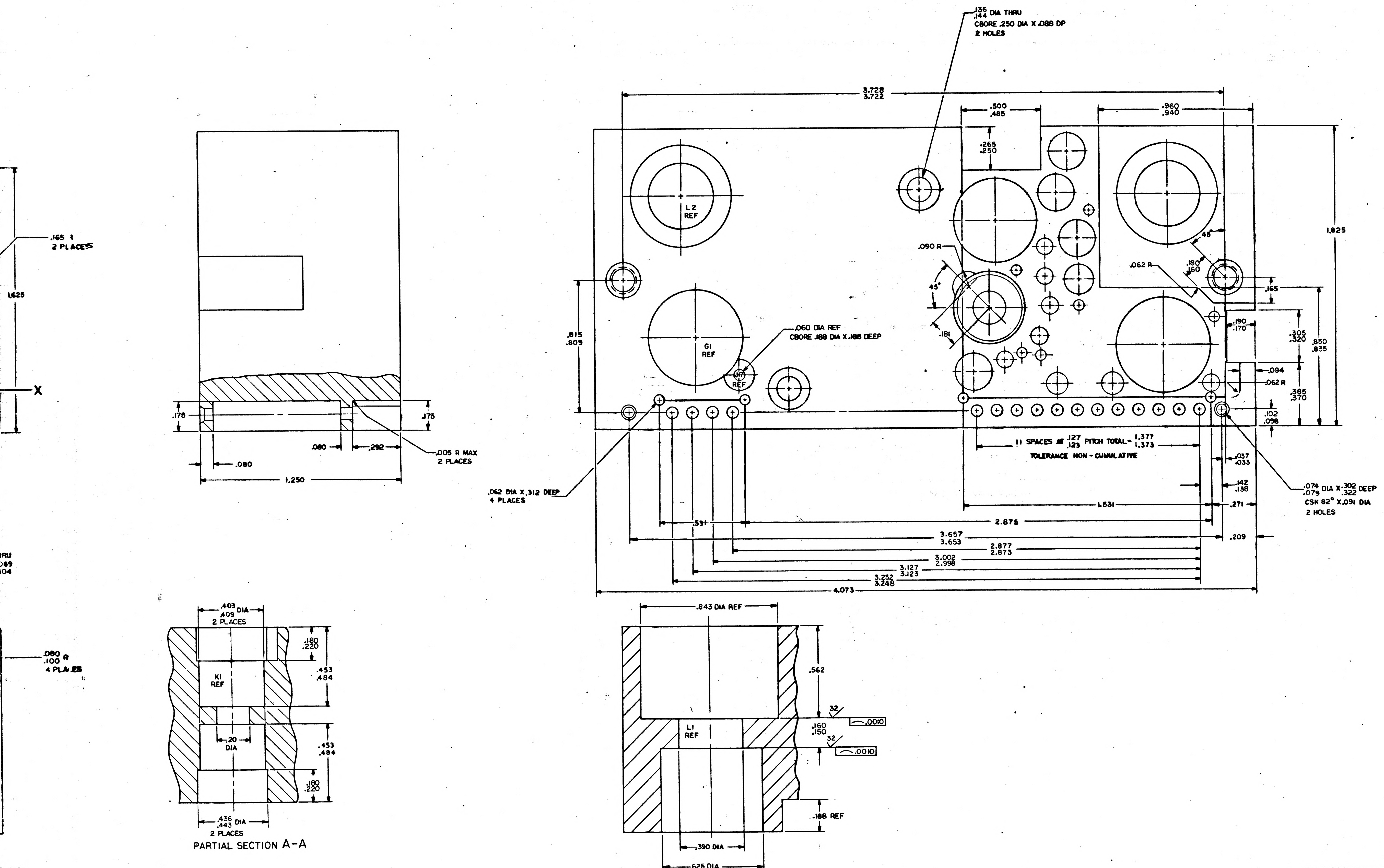

.062
2 PLACES
.188
.0008
32
.125

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

3H

REVISIONS 17049

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17985	5 Apr 65	WK
B	REVISED PER TDRR 18846	5 May 65	WK
C	REVISED PER TDRR 19811	4 Jun 65	MGM
D	REVISED PER TDRR 20412	2 Jul 65	WK


.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.485
.265
.250
.960
.940
1.825
L2
REF
.165 R
2 PLACES
1.625
X
.090 R
45°
.181
.062 R
.180
.160
45°
.165
.190
.170
.305
.320
.850
.835
.094
.062 R
.385
.370
.102
.098
.815
.809
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
J17
REF
.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250
11 SPACES AT .127
.123 PITCH TOTAL = 1.377
1.373
TOLERANCE NON - CUMULATIVE
.037
.033
.142
.138
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 PLACES
1.531
.271
.531
2.875
3.657
3.653
.209
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.248
4.073
.403
.409 DIA
2 PLACES
.180
.220
K1
REF
.453
.484
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES
PARTIAL SECTION A-A
.080
.100 R
4 PLACES
.843 DIA REF
.562
L1
REF
32
.0010
.160
.150
32
.0010
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION B-B
2 PLACES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 6

NEXT ASSY	USED ON
2007111	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN J. Crowley DATE 10 Jan 65
CHECKED A. Lindstrom 23 Jan 65
APPROVAL E. Lewis 25 Jan 65
APPROVAL 2/24/65
NASA APPROVAL W. J. Rhine 3-2-65
MIT APPROVAL

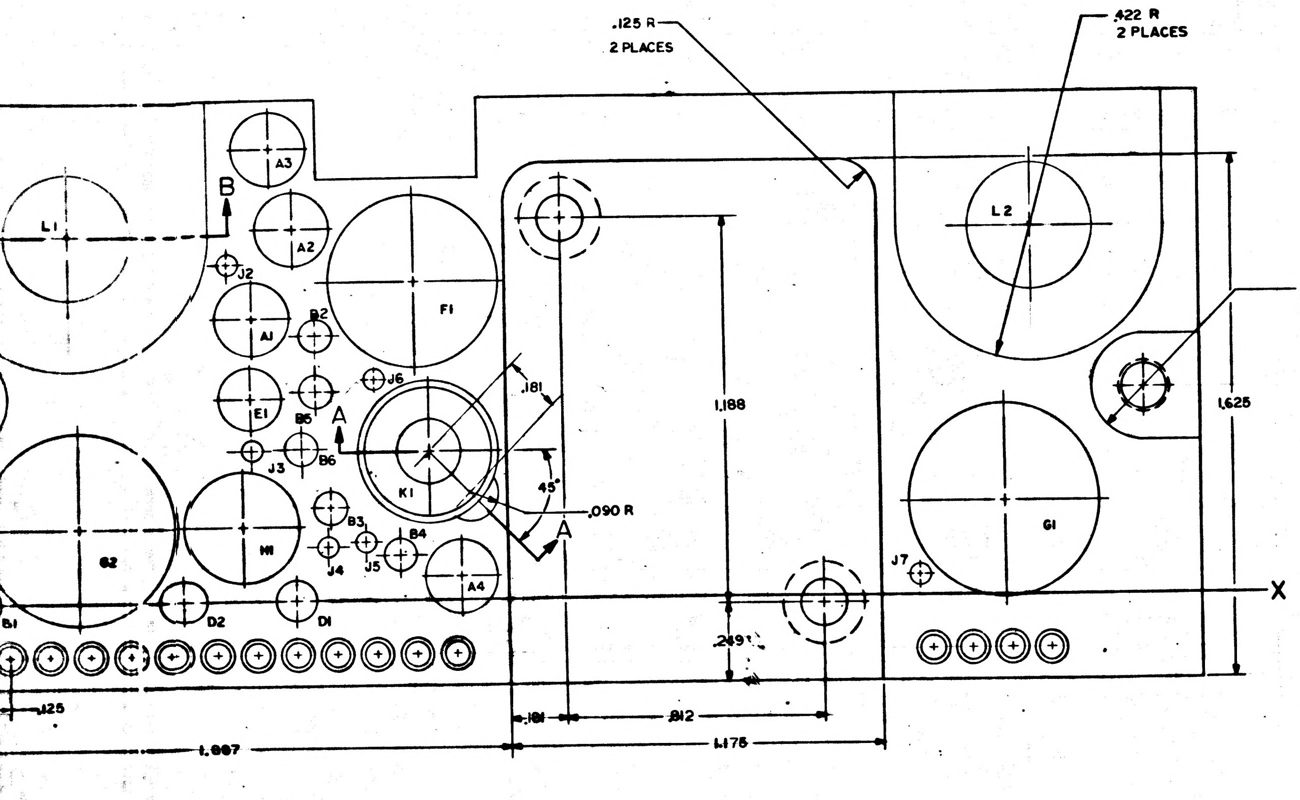
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 5% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008084
SCALE 5/1
WT ——
SHEET 1 OF 1

2008084 D

3H


.125 R
2 PLACES
.422 R
2 PLACES
.165 R
2 PLACES
B
A3
L1
A2
J2
F1
L2
B2
AJ
J6
.181
1.188
1.625
E1
B5
A
B6
J3
45°
K1
.090 R
G1
J7
B3
B4
A
G2
H1
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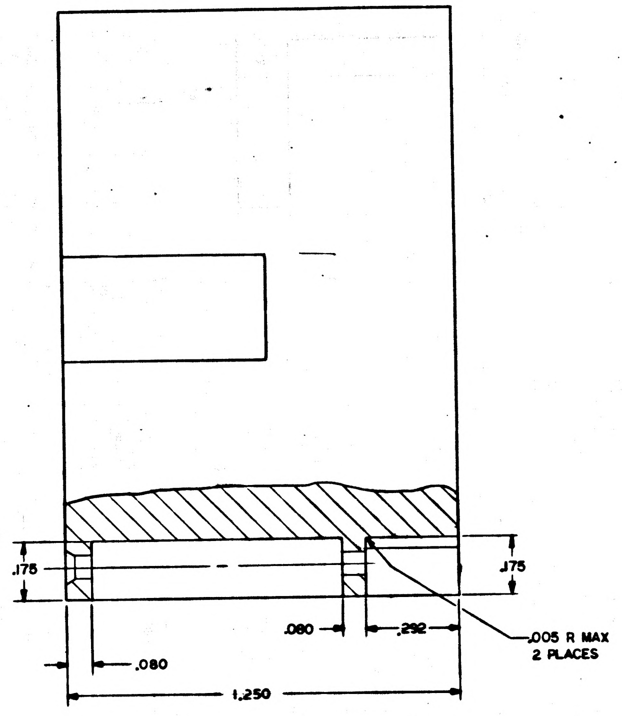
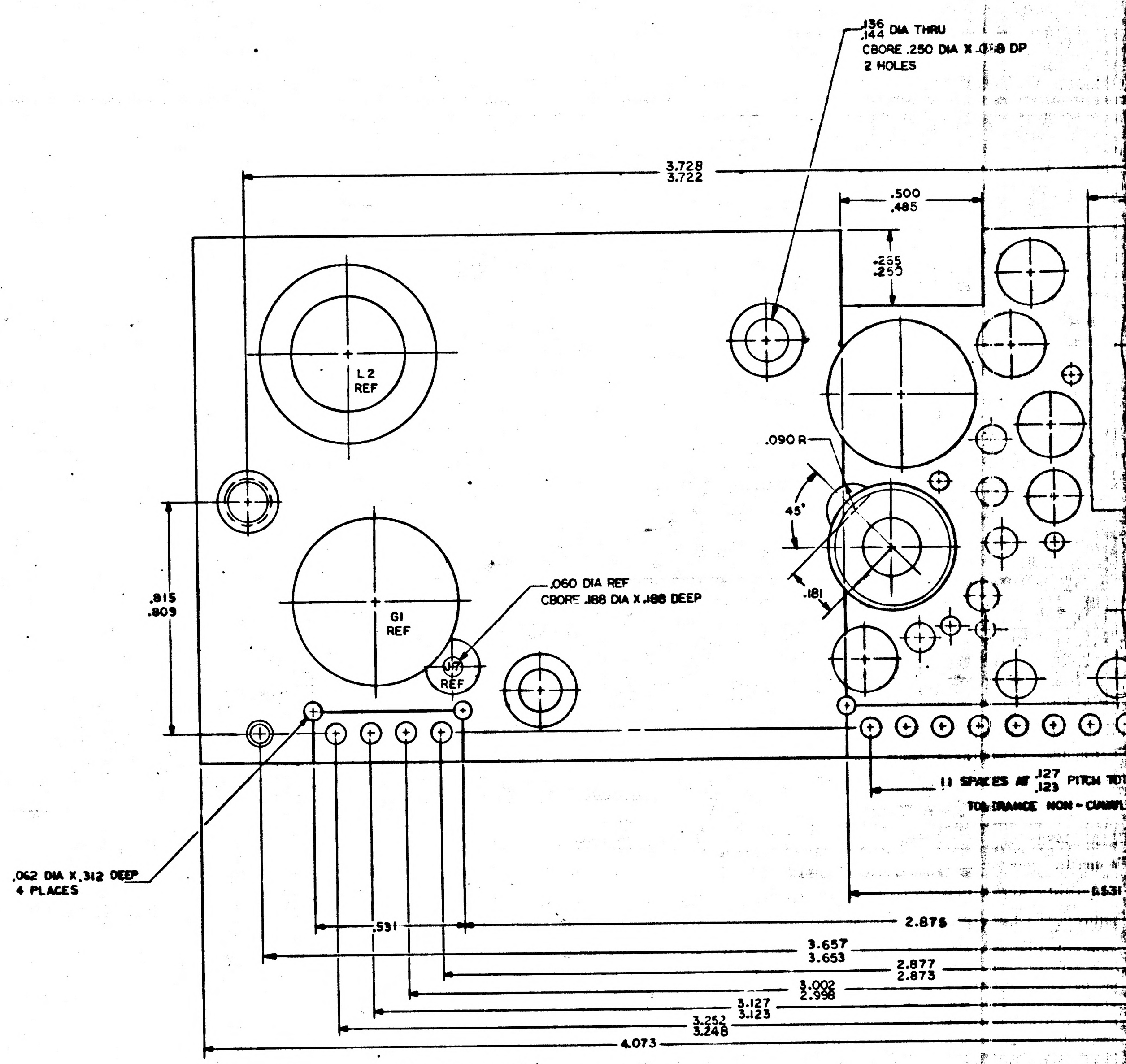
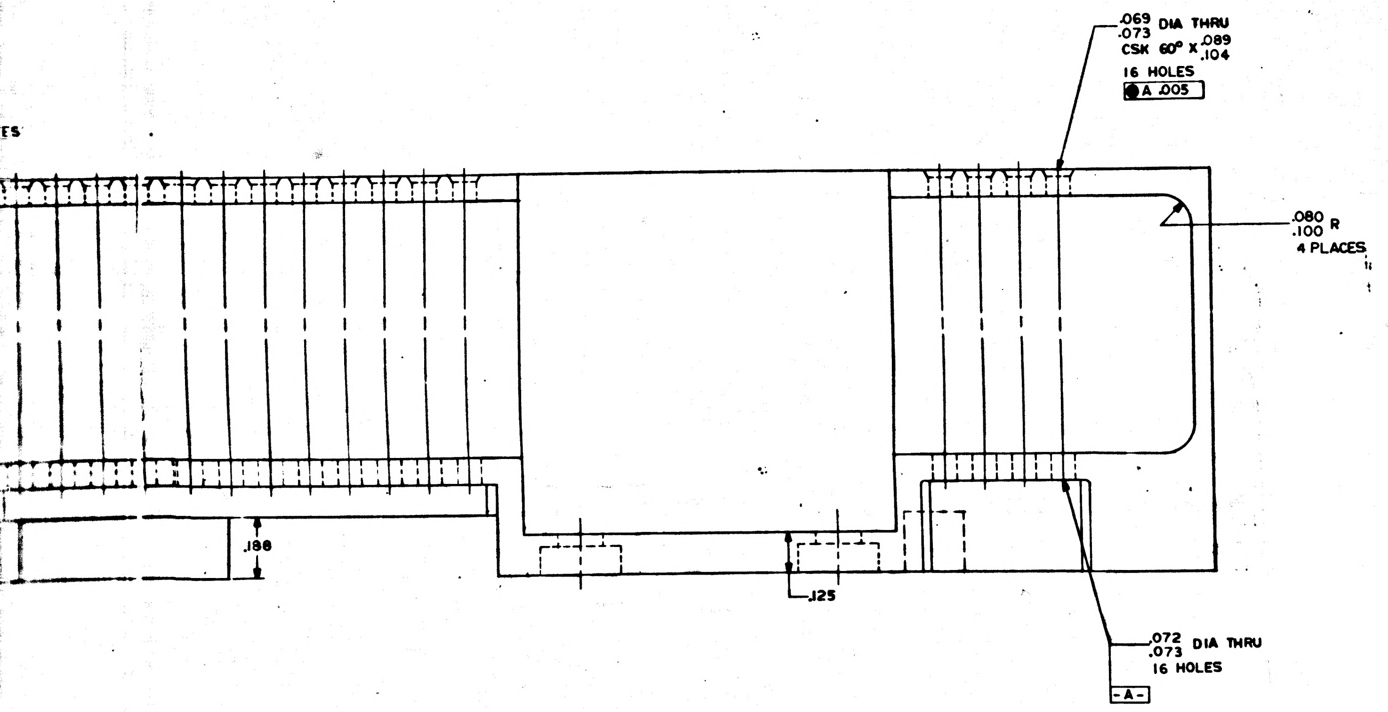
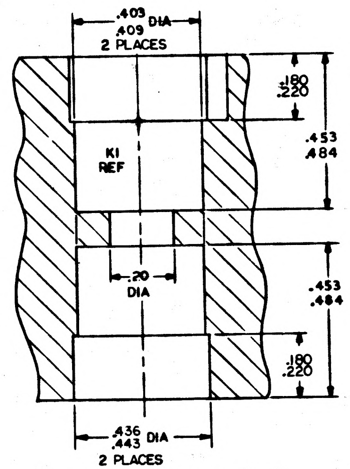
.181
.812
1.176
1.887

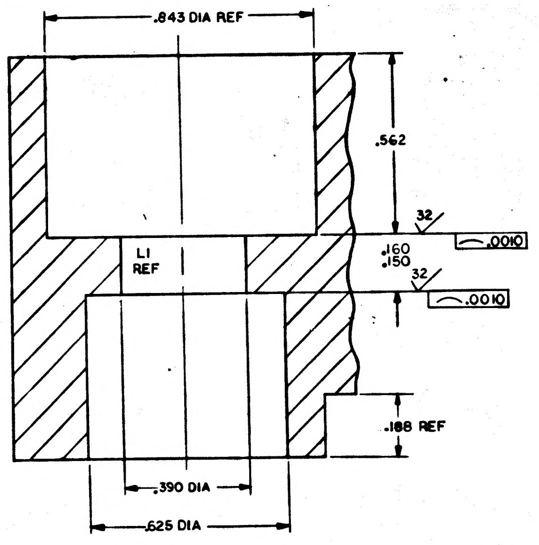

.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250


.136
.144 DIA THRU
CBORE .250 DIA X .018 DP
2 HOLES
3.728
3.722
.500
.485
.265
.250
L2
REF
.090 R
45°
.181
.815
.809
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
H7
REF
11 SPACES AT .127
.123 PITCH TOT
TOLERANCE NON-CUMUL
.062 DIA X .312 DEEP
4 PLACES
.531
1.531
2.875
3.657
3.653
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.248
4.073


.069
.073 DIA THRU
CSK 60° X .089
.104
16 HOLES
A .005
.080
.100 R
4 PLACES
.188
.125
.072
.073 DIA THRU
16 HOLES
-A-


.403
.409 DIA
2 PLACES
.180
.220
.453
.484
K1
REF
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES

PARTIAL SECTION A-A

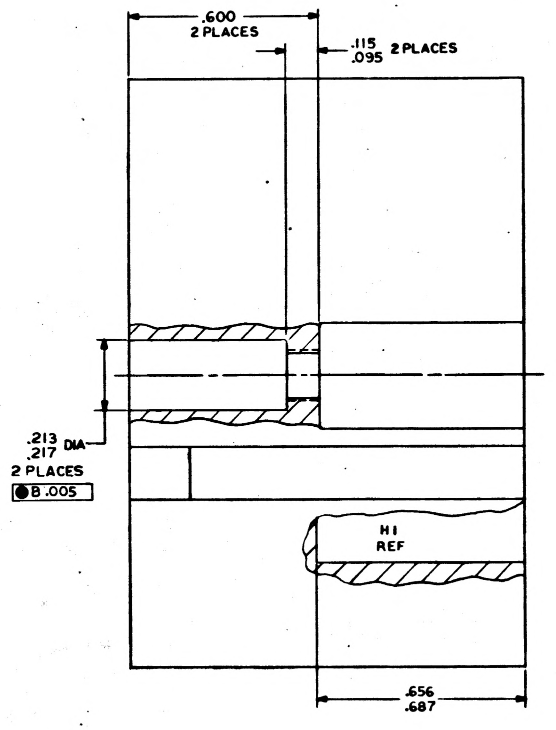

.843 DIA REF
.562
32
.0010
L1
REF
.160
.150
32
.0010
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION B-B
2 PLACES

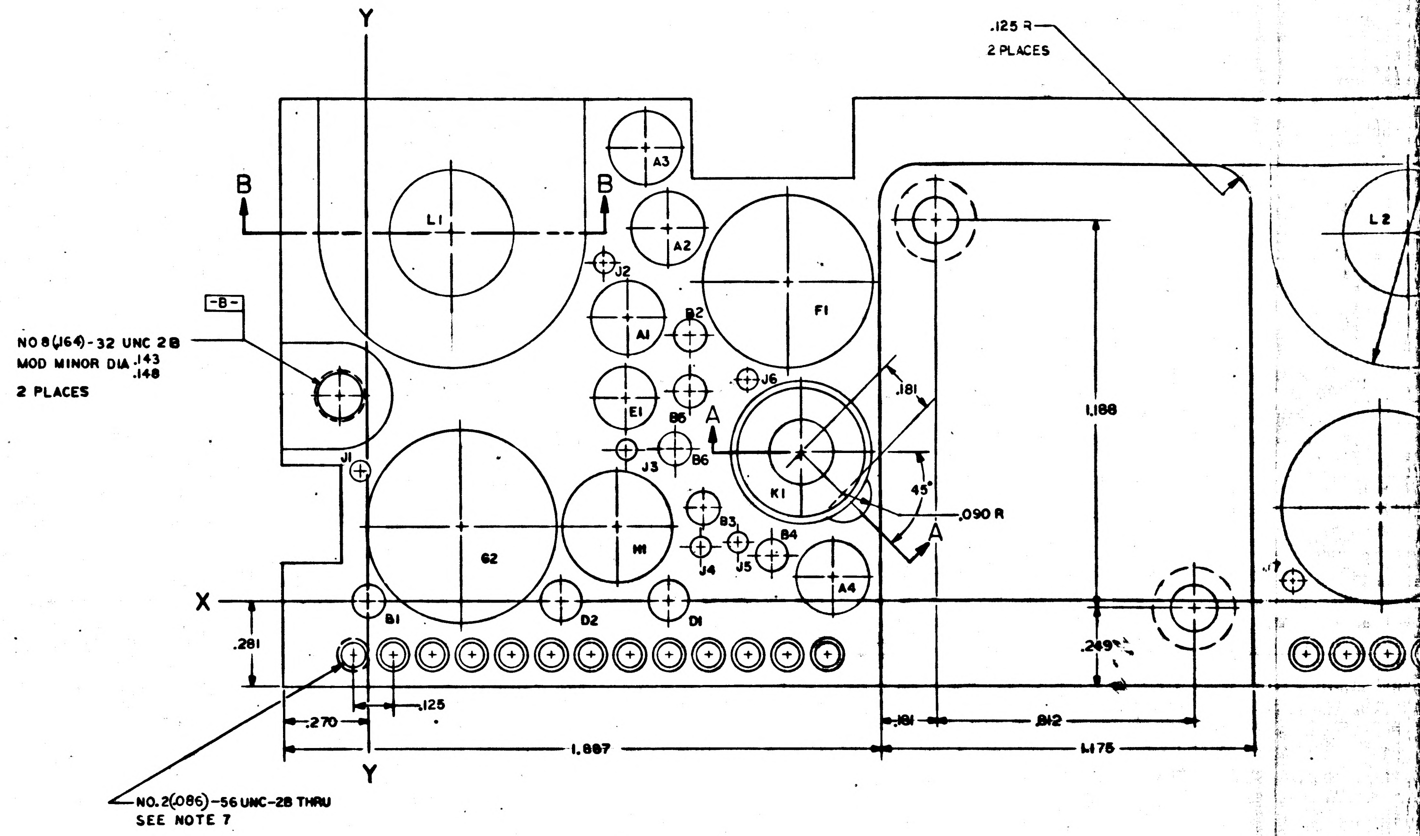
MASTER

F2

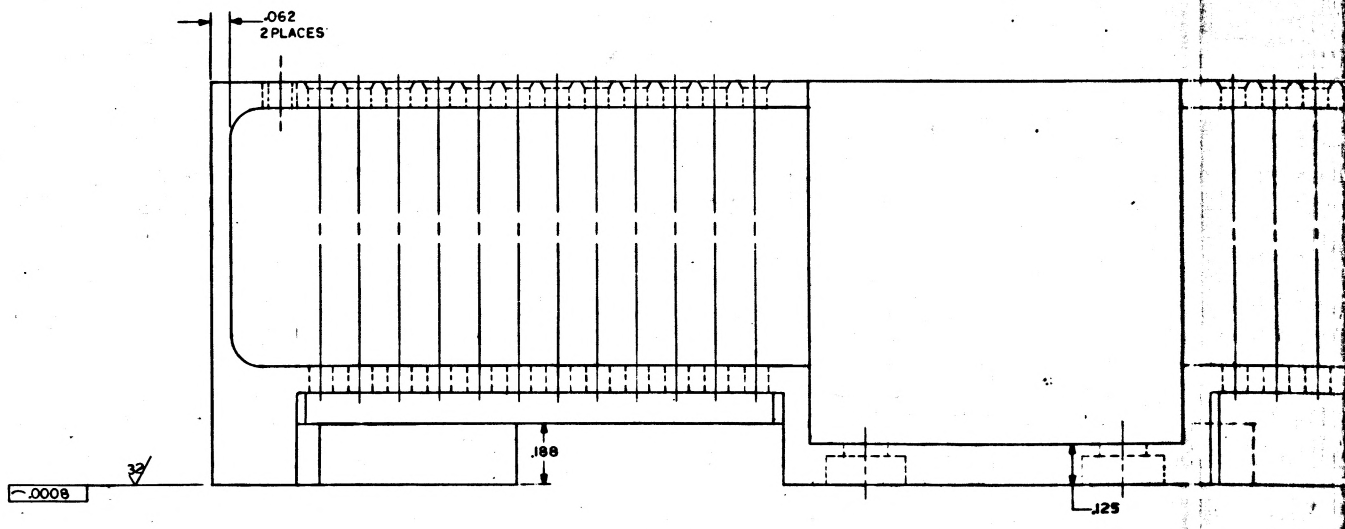
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.406		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.810	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.129	SEE SECTION B-B	2
L2	3.270	1.129		



.600
2 PLACES
.115
.095 2 PLACES
.213
.217 DIA
2 PLACES
B .005
H1
REF
.656
.687



Y
.125 R
2 PLACES
B
B
L1
A3
A2
L2
F1
J2
A1
B2
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
J6
.181
E1
B5
A
J1
J3
B6
K1
45°
.090 R
1.188
G2
H1
B3
B4
J4
J5
A4
A
X
.281
B1
D2
D1
.249
J7
.270
.125
.181
.812
1.887
1.175
Y
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7



.062
2 PLACES
.188
.0008
32
.125

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

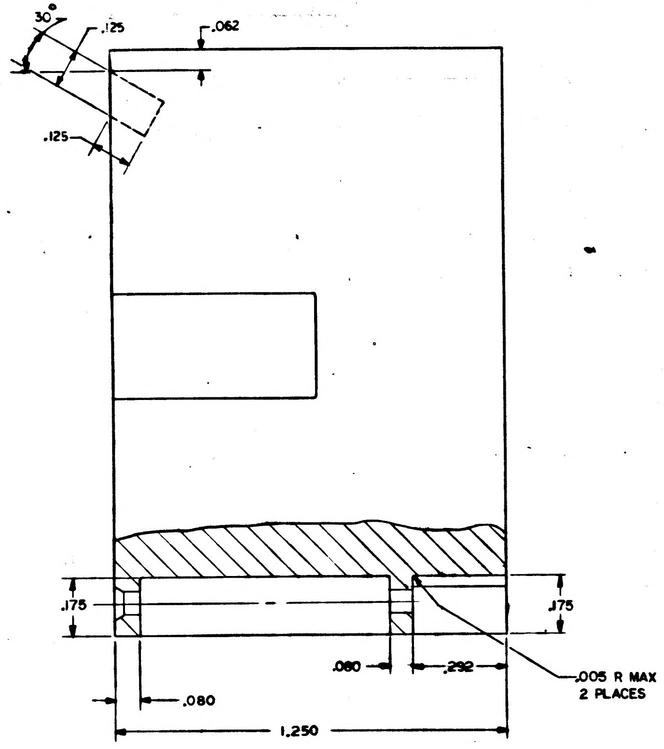
34

2008084	D

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17985		
B	REVISED PER TDRR 18846	5 MAY 65	WK
C	REVISED PER TDRR 19811	4 JUN 65	
D	REVISED PER TDRR 20412		WK
E	REVISED PER TDRR 23037	1 Sept 65	

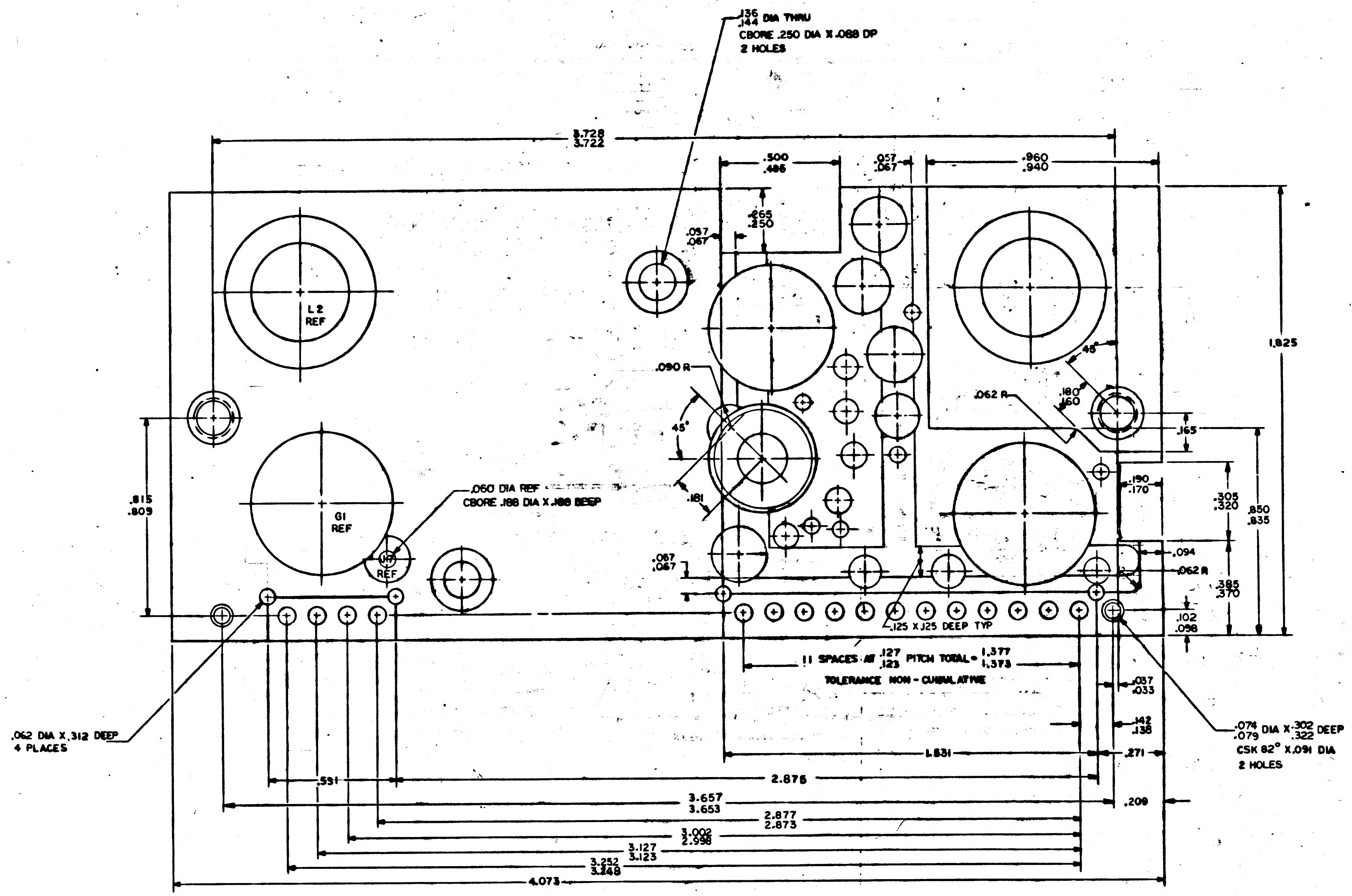
REVISIONS 17089

.165 R
2 PLACES



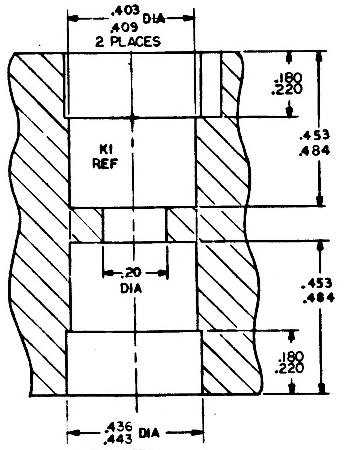
30°
.125
.062
.125
.175
.175
.080
.292
.080
1.250
.005 R MAX
2 PLACES

X



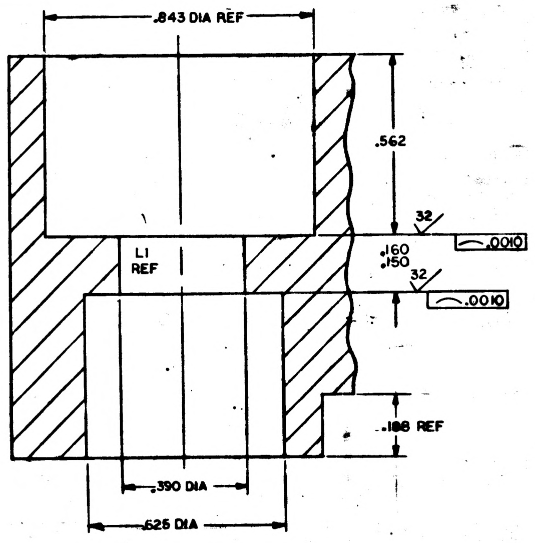
.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.496
.057
.067
.960
.940
.265
.250
.057
.067
L2
REF
1.825
45°
.180
.160
.062 R
.090 R
45°
.165
.815
.809
.060 DIA REF
CBORE .188 DIA X .188 DEEP
G1
REF
K1
REF
.181
.190
.170
.305
.320
.850
.835
.094
.062 R
.067
.057
.385
.370
.102
.098
.125 X .125 DEEP TYP
11 SPACES AT .127 .123 PITCH TOTAL = 1.377 1.373
TOLERANCE NON-CUMULATIVE
.037
.033
.142
.138
.062 DIA X .312 DEEP
4 PLACES
.074 DIA X .302 .322 DEEP
.079
CSK 82° X .091 DIA
2 HOLES
1.531
.271
.531
2.875
.209
3.657
3.653
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.248
4.073

.080
.100 R
4 PLACES



.403
.409 DIA
2 PLACES
.180
.220
K1
REF
.453
.484
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES

PARTIAL SECTION A-A



.843 DIA REF
.562
32
.0010
.160
.150
32
.0010
L1
REF
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION B-B
2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 6

2007111
NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN J. Cunningham DATE
CHECKED
APPROVAL 25 Feb 65
APPROVAL 2/24/65
NASA APPROVAL 3-2-65
MIT APPROVAL WK

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

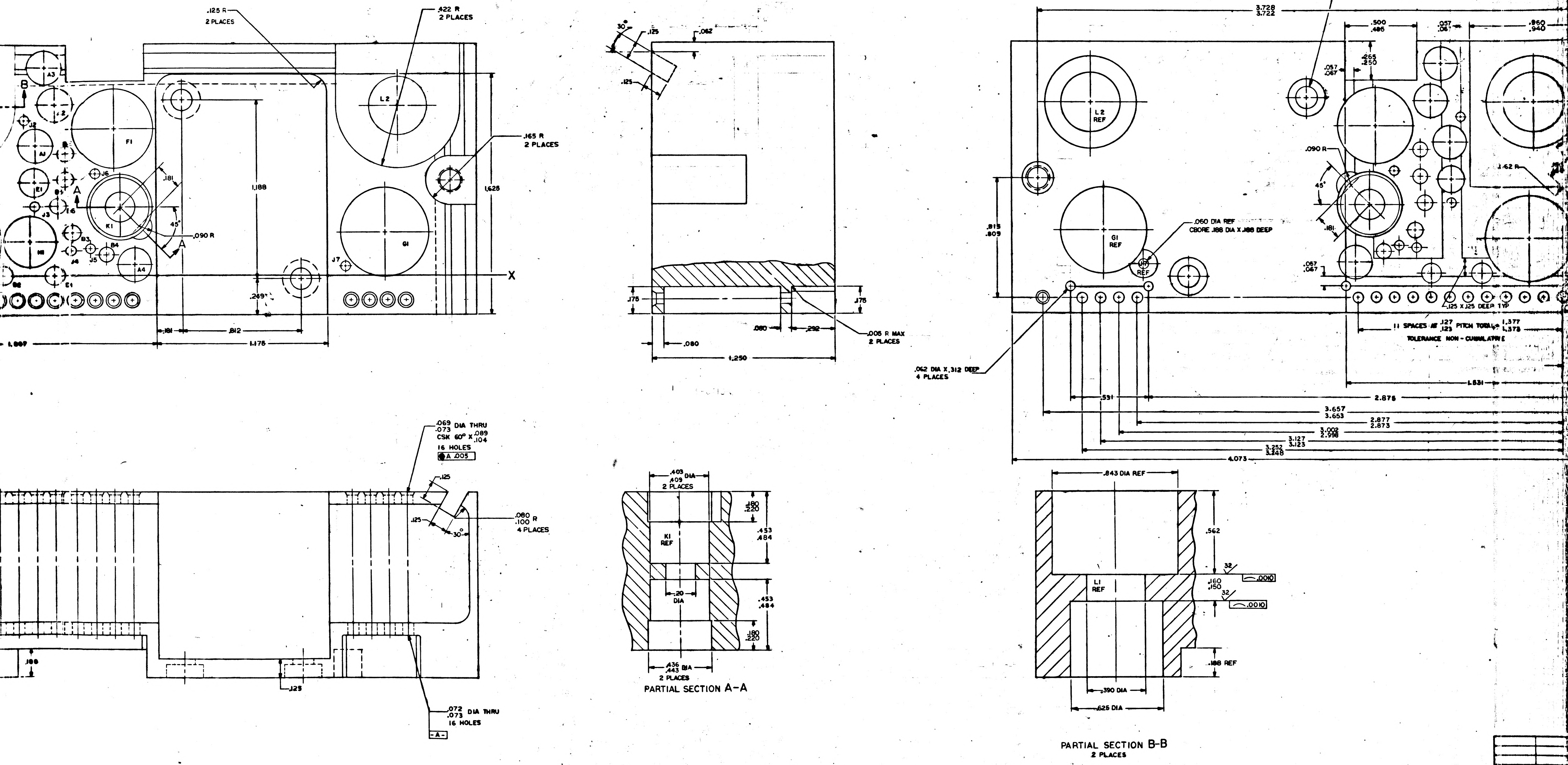
HEATSINK
800 CPS 5% AMPLIFIER

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO. 2008084
SCALE 5/1
WT
SHEET 1 OF 1

MASTER

2008084 E

3.4



.125 R
2 PLACES
.422 R
2 PLACES
.165 R
2 PLACES
1.188
1.628
.181
45°
.090 R
.249
.181
.812
1.175
1.067
X
A
B
L2
F1
K1
G1
J7
.062
.125
30°
.175
.080
.292
.005 R MAX
2 PLACES
1.250
.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.486
.057
.067
.265
.250
.960
.940
L2
REF
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
.813
.809
.162 R
.125 X .125 DEEP TYP
11 SPACES AT .127 .123 PITCH TOTAL 1.377 1.373
TOLERANCE NON-CUMULATIVE
.062 DIA X .312 DEEP
4 PLACES
1.531
.531
2.875
3.657
3.653
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.248
4.073
.069
.073 DIA THRU
CSK 60° X .089 .104
16 HOLES
A .005
.125
.080
.100 R
4 PLACES
.188
.125
.072
.073 DIA THRU
16 HOLES
-A-
.403
.409 DIA
2 PLACES
.180
.220
.453
.484
K1
REF
.20
DIA
.436
.443 DIA
2 PLACES
.843 DIA REF
.562
.160
.150
32
.0010
L1
REF
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION A-A

PARTIAL SECTION B-B
2 PLACES

MASTER

D

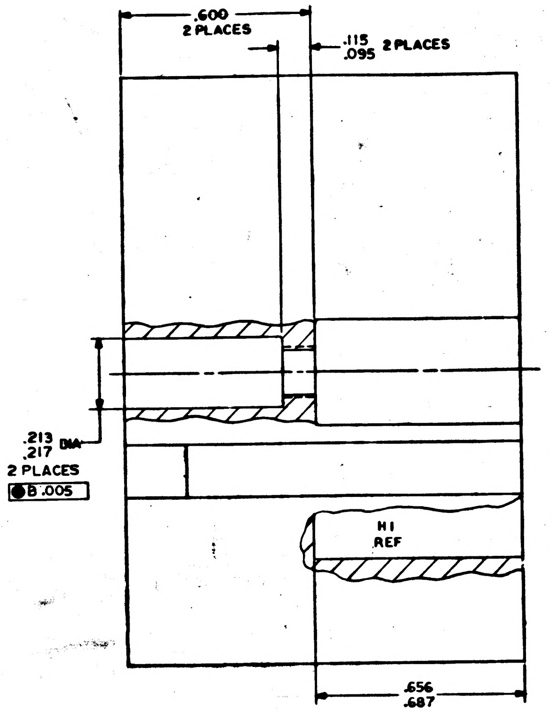
C

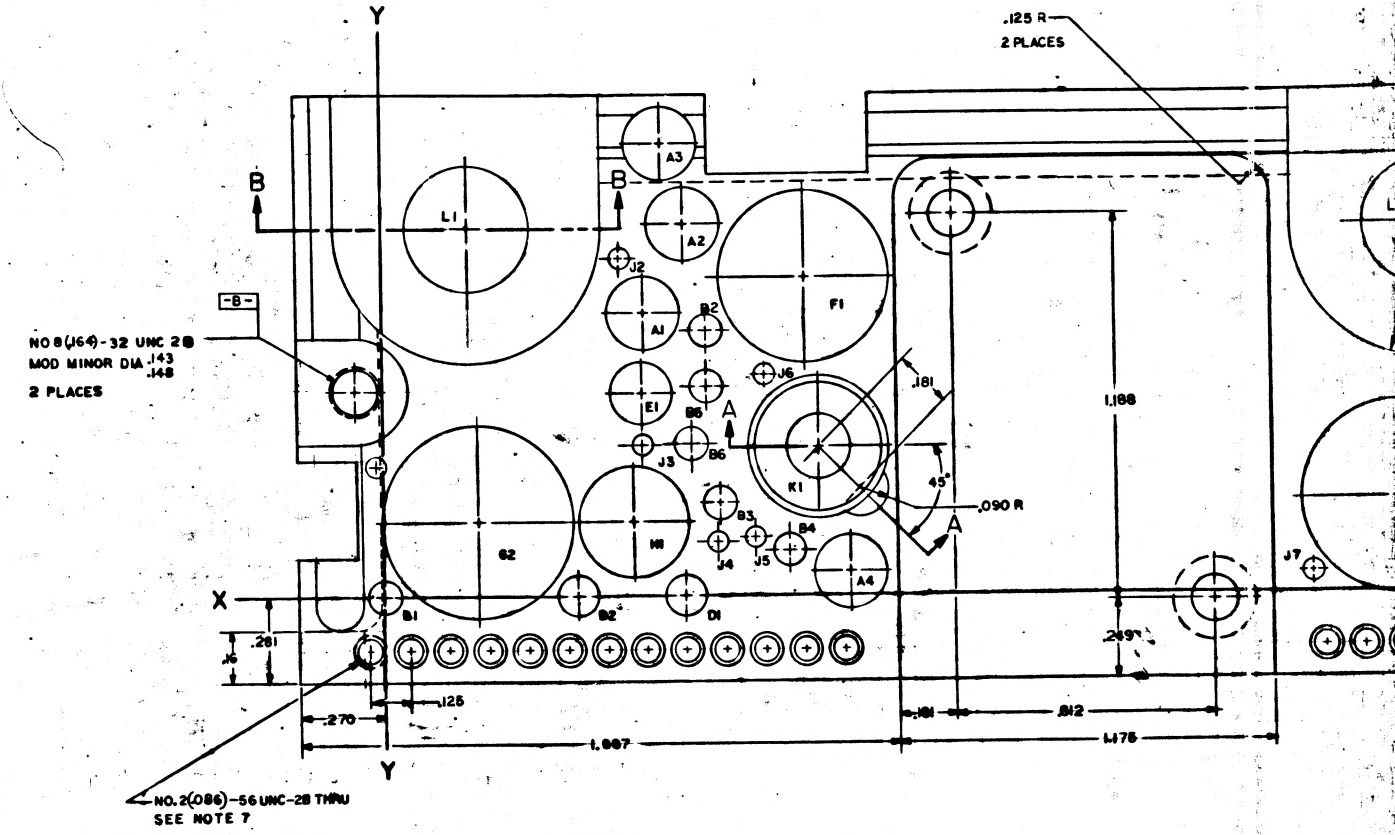
B

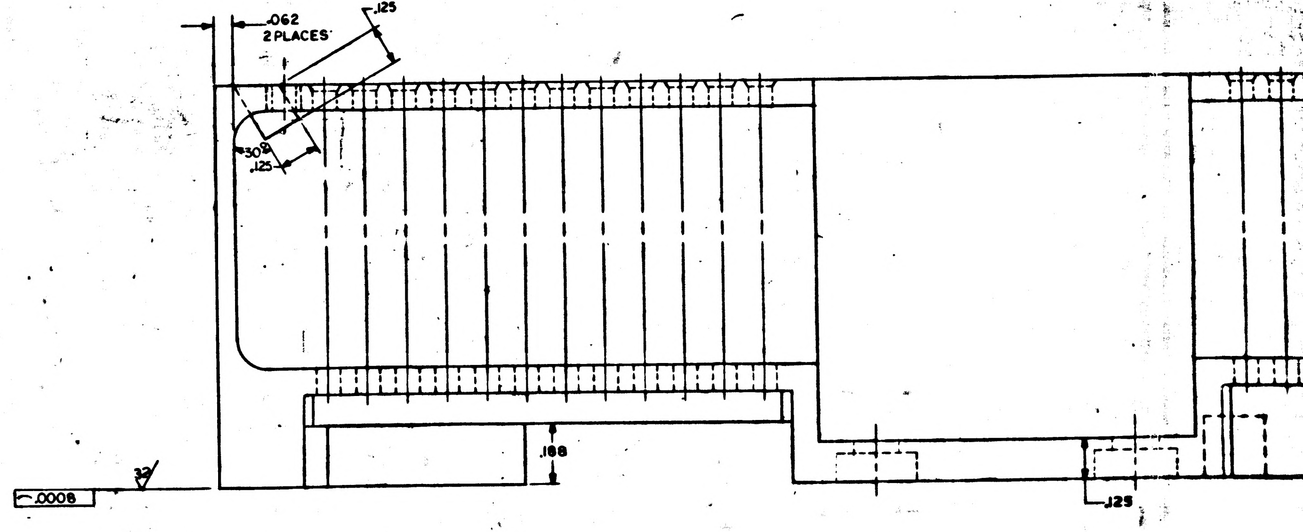
A

3⁴

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.406		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.810	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.129	SEE SECTION B-B	2
L2	3.270	1.129		


.600
2 PLACES
.115
.095 2 PLACES
.213
.217 DIA
2 PLACES
B .005
H1
REF
.656
.687

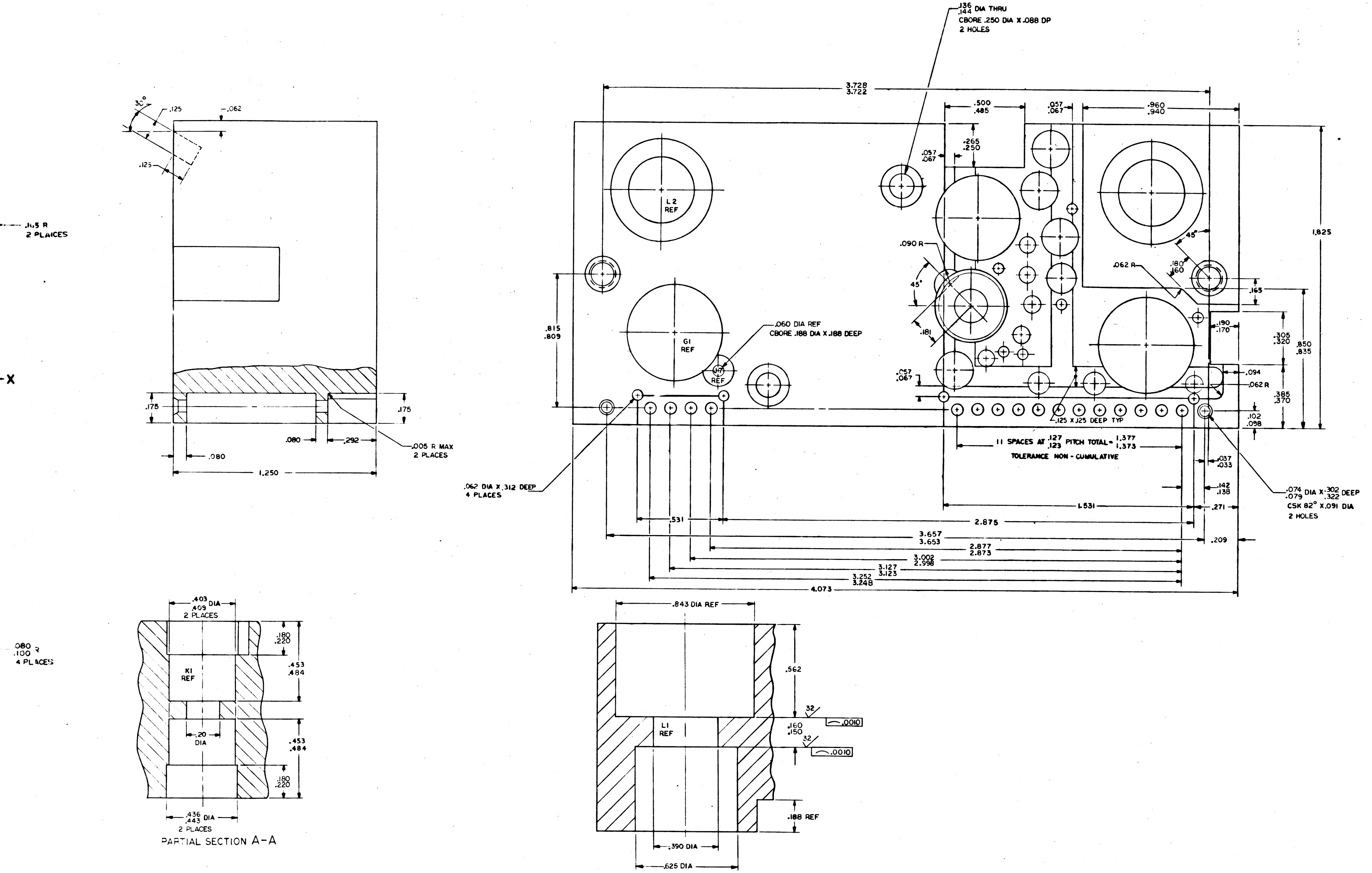

Y
.125 R
2 PLACES
B
B
L1
A3
A2
J2
F1
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
A1
B2
J6
.181
E1
B5
A
B6
J3
K1
45°
.090 R
1.188
G2
H1
B3
B4
J4
J5
A4
A
J7
X
B1
B2
D1
.281
.16
.249
.125
.270
.181
.812
1.887
1.175
Y
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7


.062
2 PLACES
.125
30°
.125
.188
32
.0008
.125

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
9. APPLY ADHESIVE PER ND1002187 TYPE II TO THE COMPONENT HOLE SURFACE WHICH IS .188 FROM THE MOUNTING AND .31 MIN WIDTH PERIMETER OF ADHESIVE TO THE COMPONENT HOLE SURFACE WHICH IS 1.25 FROM THE MOUNTING SURFACE

REVISIONS 17009			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17985	5 Apr 65	WK
B	REVISED PER TDRR 18846	5 MAY 65	WK
C	REVISED PER TDRR 19811	4 JUN 65	MGM
D	REVISED PER TDRR 20412	July 65	WK
E	REVISED PER TDRR 23037	13 OCT 65	WK
F	REVISED PER TDRR 27141	23 MAR 66	LK


30°
.125
.062
.125
.1.5 R
2 PLAICES
X
.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250
3.728
3.722
.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
.500
.485
.057
.067
.960
.940
.265
.250
.057
.067
L2
REF
1.825
.090 R
45°
45°
.062 R
.180
.160
.165
.815
.809
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
L17
REF
.181
.190
.170
.305
.320
.850
.835
.057
.067
.094
.062 R
.385
.370
.102
.098
.125 X .125 DEEP TYP
11 SPACES AT .127/.123 PITCH TOTAL = 1.377/1.373
TOLERANCE NON-CUMULATIVE
.037
.033
.062 DIA X .312 DEEP
4 PLACES
.142
.138
.074/.079 DIA X .302/.322 DEEP
CSK 82° X .091 DIA
2 HOLES
1.531
.271
.531
2.875
3.657
3.653
.209
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.248
4.073
.080/.100 R
4 PLACES
.403/.409 DIA
2 PLACES
.180
.220
K1
REF
.453
.484
.20
DIA
.453
.484
.180
.220
.436/.443 DIA
2 PLACES
.843 DIA REF
.562
32
.0010
.160
.150
32
.0010
L1
REF
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION A-A

PARTIAL SECTION B-B
2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

2007111		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS XXX ± .005 XX ± .02 ANGLES ± ½° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	DRAWN J. Cony DATE 10 Jan 65 CHECKED 23 Feb 65 APPROVAL APPROVAL 2/24/65	HEATSINK 800 CPS 5% AMPLIFIER	
APPLICATION		HEAT TREATMENT ———	NASA APPROVAL 03-3-66	CODE IDENT NO 80230	SIZE J
		FINAL FINISH SEE NOTE 6	MIT APPROVAL	SCALE 5/1	WT ——— SHEET 1 OF 1

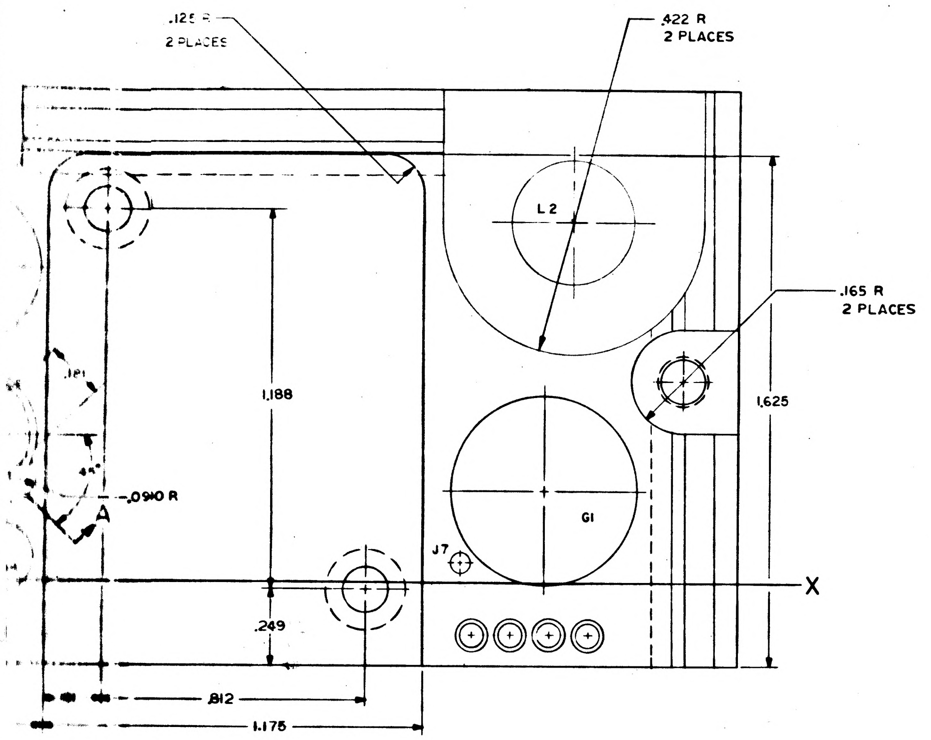
NASA DRAWING NO 2008084

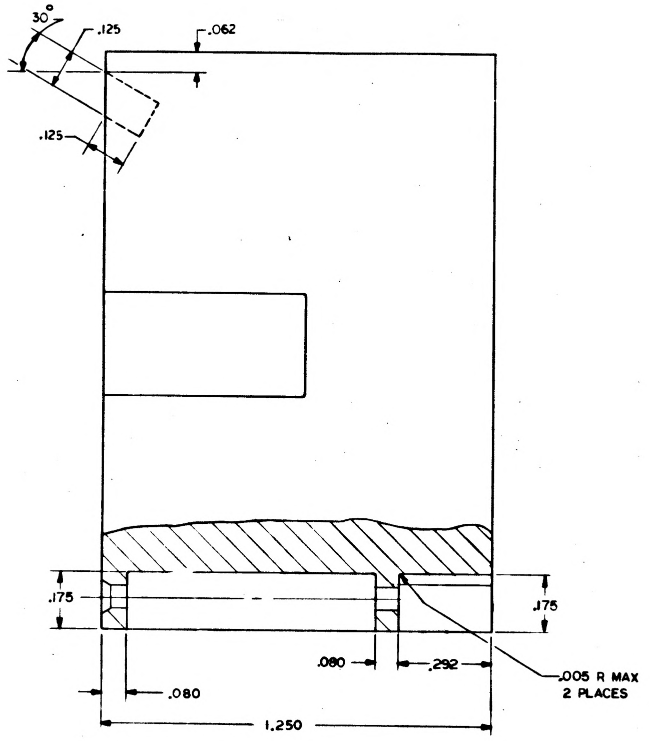
A 3A

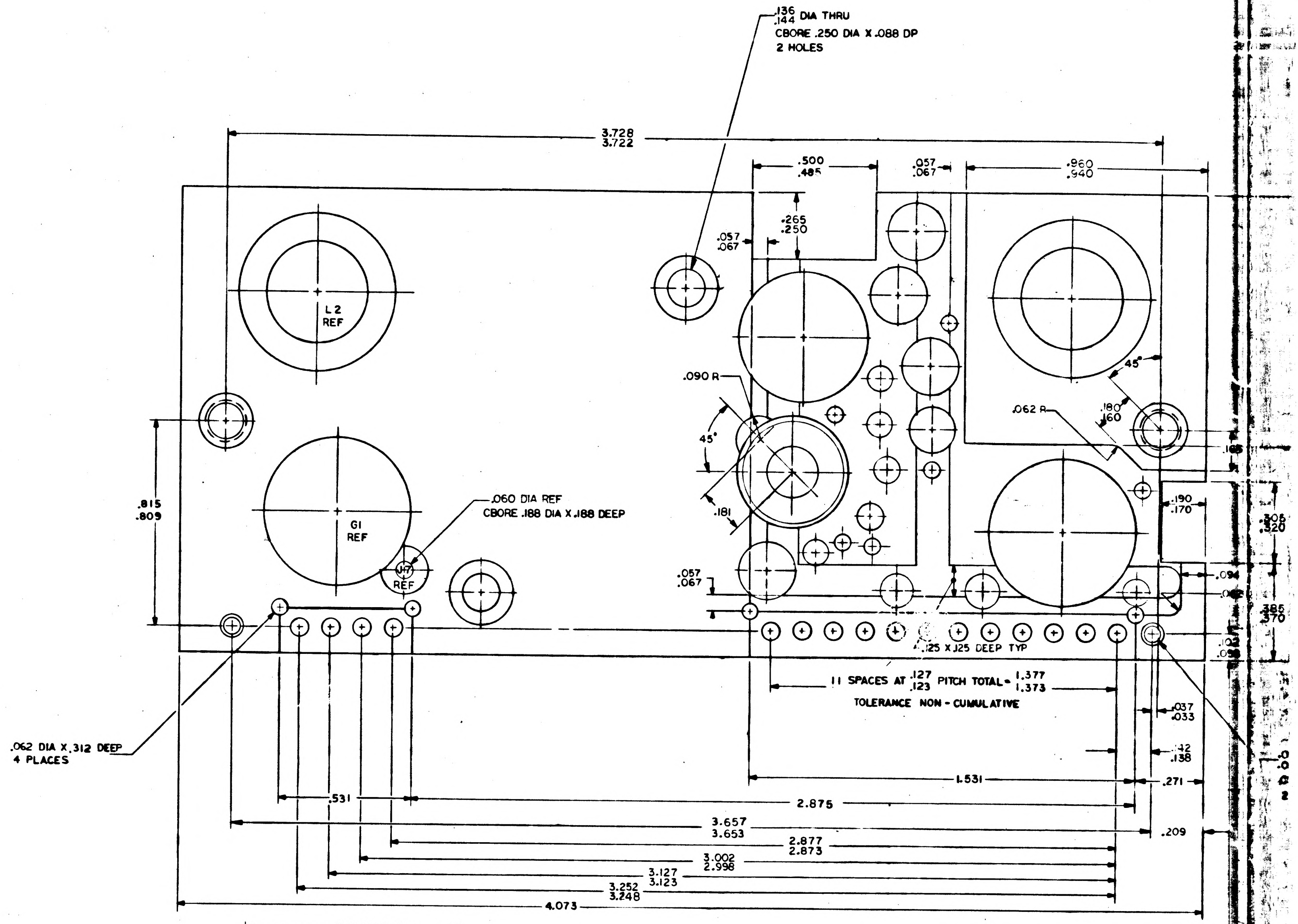
2008084 F

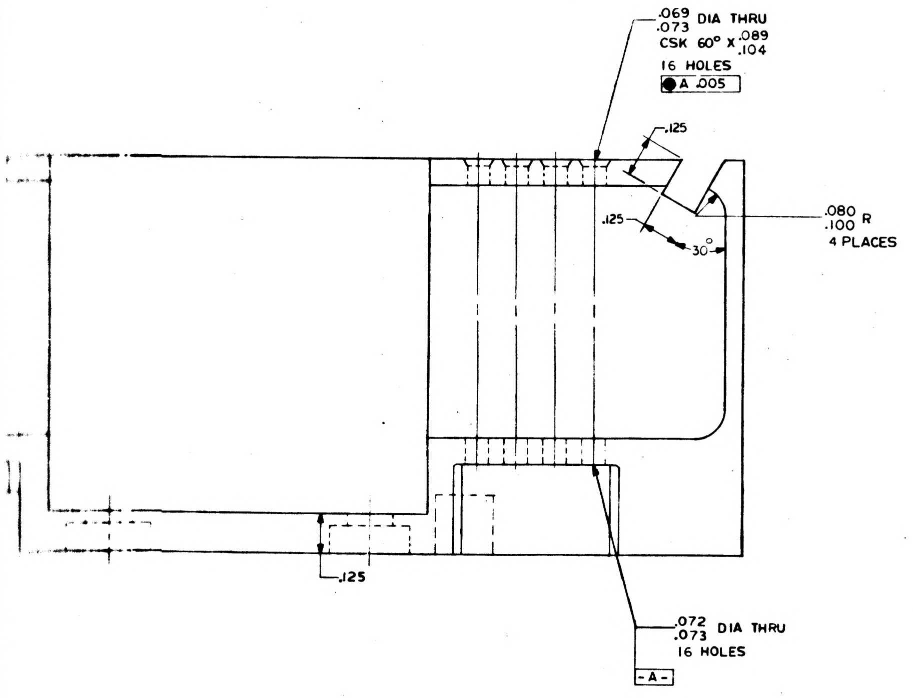
2008084 F

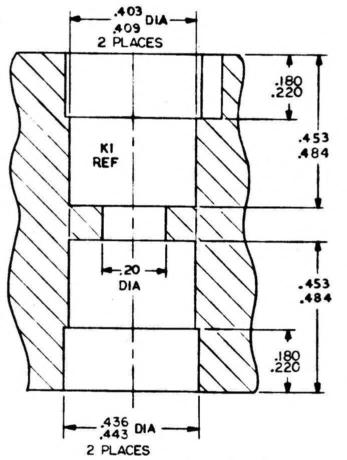
3/2008084


.125 R
2 PLACES
.422 R
2 PLACES
L2
.165 R
2 PLACES
1.188
1.625
.0910 R
A
G1
J7
X
.249
.812
1.175

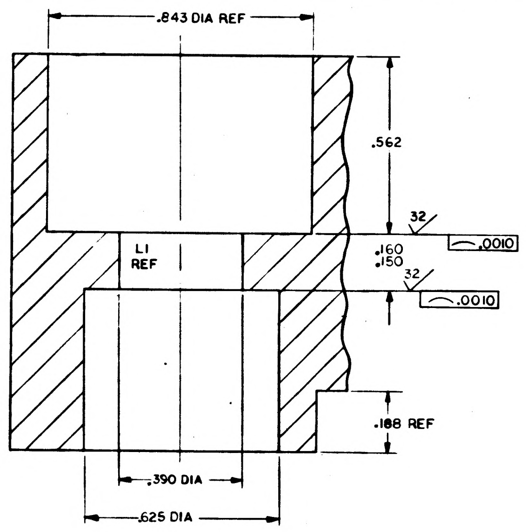

30°
.125
.062
.125
.175
.175
.080
.292
.080
1.250
.005 R MAX
2 PLACES


.136
.144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728
3.722
.500
.485
.057
.067
.860
.940
.265
.250
.057
.067
L2
REF
.090 R
45
45°
.062 R
.180
.160
.815
.809
G1
REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
J7
REF
.181
.057
.067
.190
.170
.125 X .125 DEEP TYP
11 SPACES AT .127
.123 PITCH TOTAL = 1.377
1.373
TOLERANCE NON-CUMULATIVE
.062 DIA X .312 DEEP
4 PLACES
.037
.033
.142
.138
1.531
.271
.531
2.875
3.657
3.653
.209
2.877
2.873
3.002
2.998
3.127
3.123
3.252
3.248
4.073


.069
.073 DIA THRU
CSK 60° X .089
.104
16 HOLES
● A .005
.125
.125
30°
.080
.100 R
4 PLACES
.125
.072
.073 DIA THRU
16 HOLES
-A-


.403
.409 DIA
2 PLACES
.180
.220
K1
REF
.453
.484
.20
DIA
.453
.484
.180
.220
.436
.443 DIA
2 PLACES

PARTIAL SECTION A-A


.843 DIA REF
.562
32
.0010
L1
REF
.160
.150
32
.0010
.188 REF
.390 DIA
.625 DIA

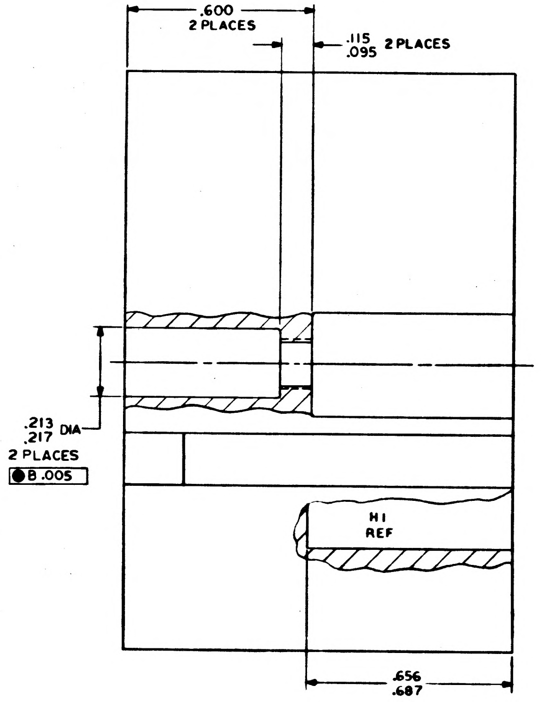
PARTIAL SECTION B-B
2 PLACES

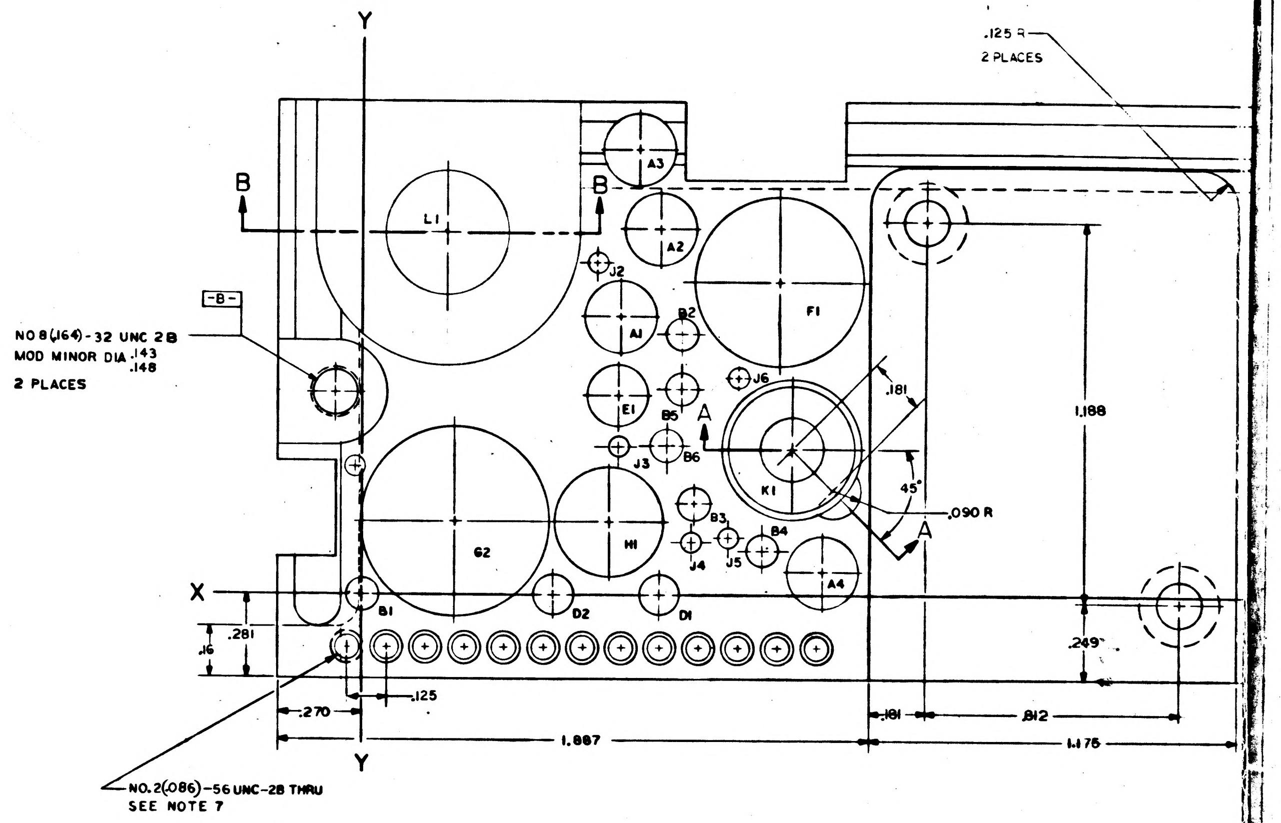
	UNLESS OTHERWISE SPE DIMENSIONS ARE IN INC TOLERANCES ON FRACTIONS DECIMALS ± XXX ±.005 DO NOT SCALE THIS DRA
	MATERIAL SEE NOTE
2007111	HEAT TREATMENT
NEXT ASSY USED ON APPLICATION	FINAL FINISH SEE NOTE

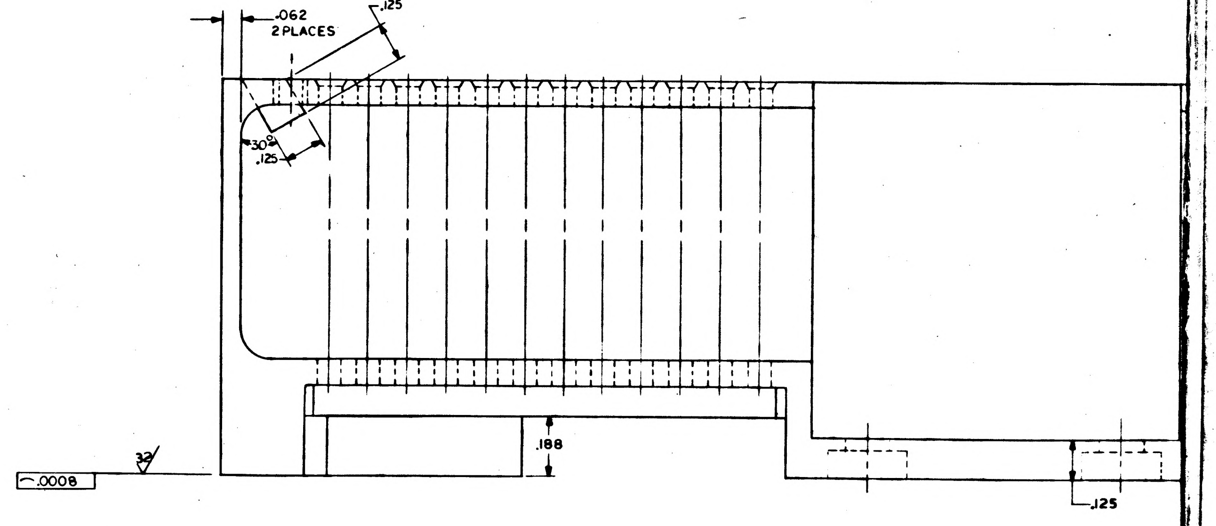
2008084 F

2/2008084

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.406		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.810	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.129	SEE SECTION B-B	2
L2	3.270	1.129		


.600
2 PLACES
.115
.095 2 PLACES
.213
.217 DIA
2 PLACES
B .005
H1
REF
.656
.687


Y
.125 R
2 PLACES
B
B
L1
A3
A2
J2
F1
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
B2
AJ
J6
E1
B5
A
.181
K1
45°
.090 R
A
J3
B6
G2
H1
B3
B4
J4
J5
A4
1.188
X
B1
D2
D1
.281
.16
.249
.125
.270
.181
.812
1.887
1.176
Y
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7


.062
2 PLACES
.125
30°
.125
.188
32
.0008
.125

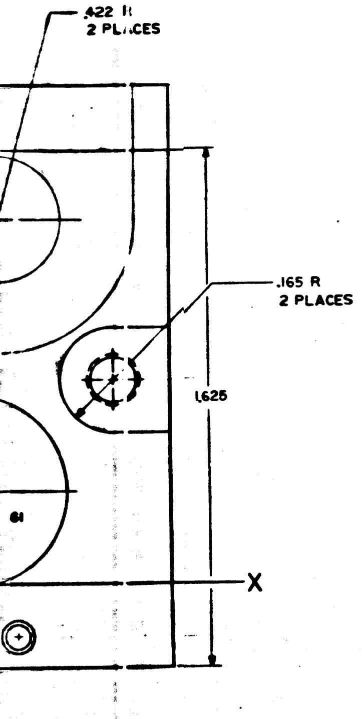
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. FINISH: APPLY CHEMICAL FILM PER MIL-C-5541, GRADE C, CLASS 2.
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
9. APPLY ADHESIVE PER ND1002187 TYPE II TO THE COMPONENT HOLE SURFACE WHICH IS .188 FROM THE MOUNTING AND .31 MIN WIDTH PERIMETER OF ADHESIVE TO THE COMPONENT HOLE SURFACE WHICH IS 1.25 FROM THE MOUNTING SURFACE

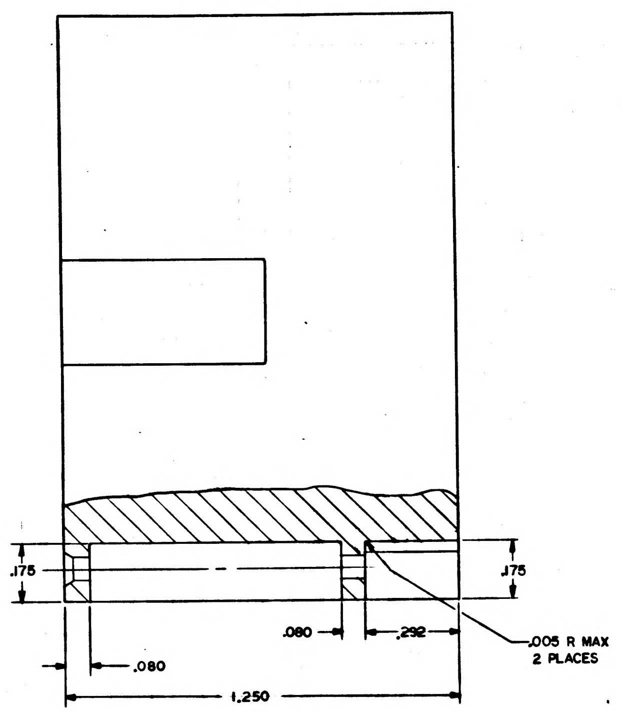
3H

| 2008084 | F |

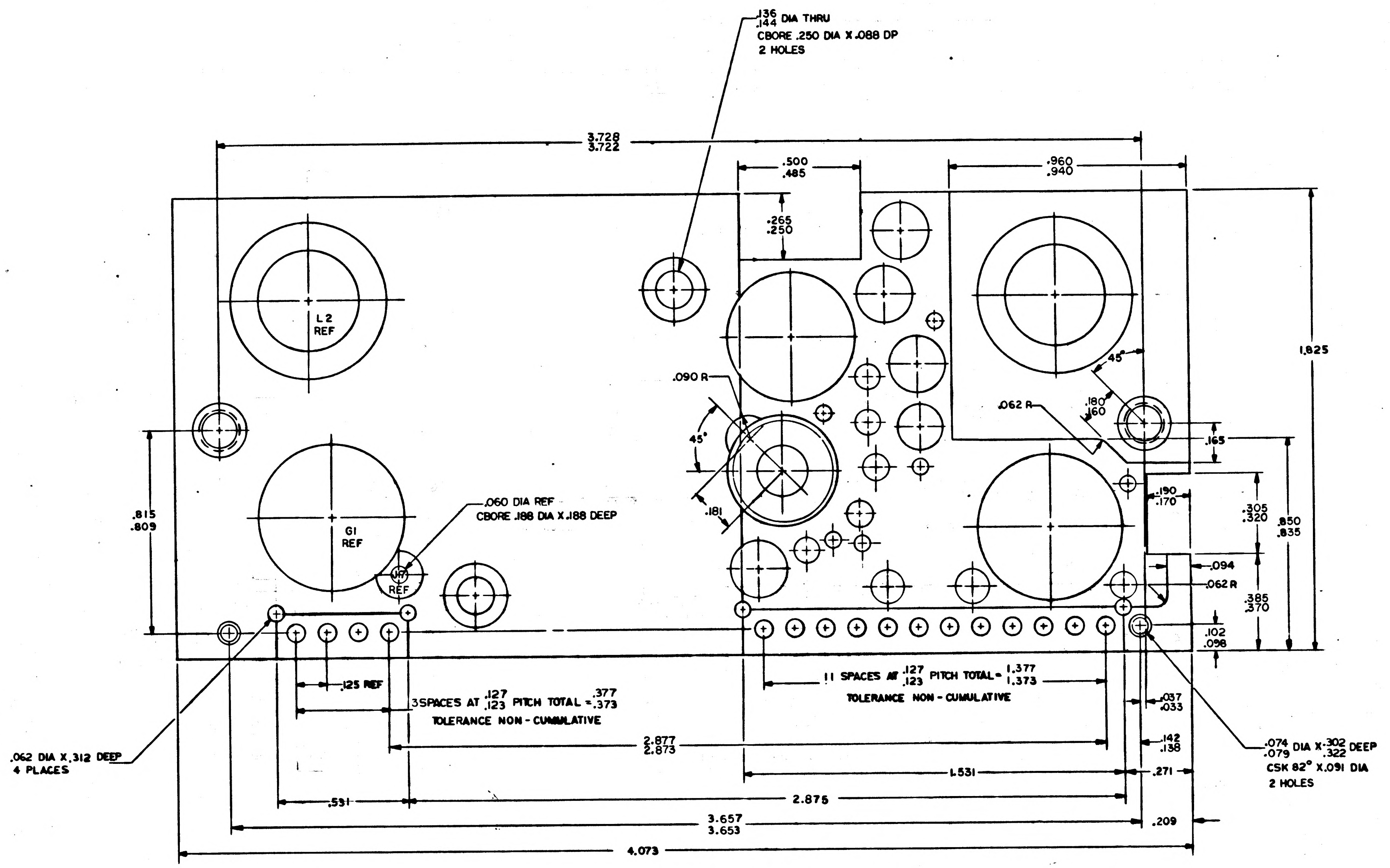
SYM	REVISIONS DESCRIPTION	DATE	APPROVAL



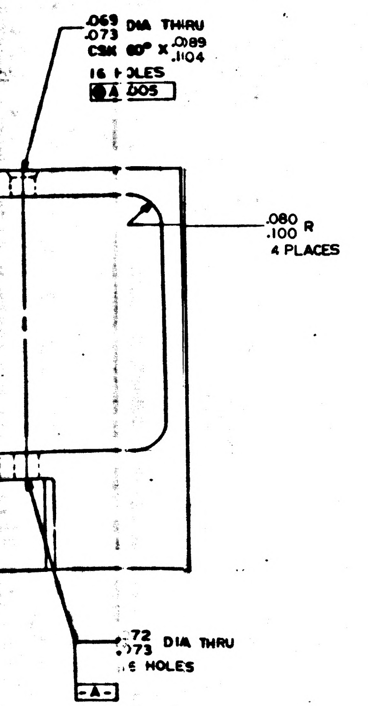
.422 R
2 PLACES
.165 R
2 PLACES
1.625
G1
X



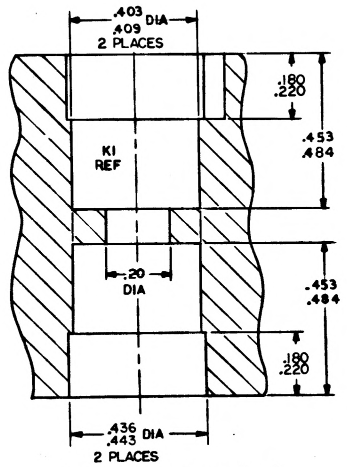
.175
.175
.080
.292
.080
.005 R MAX
2 PLACES
1.250



.136 .144 DIA THRU
CBORE .250 DIA X .088 DP
2 HOLES
3.728 3.722
.500 .485
.960 .940
.265 .250
L2 REF
1.825
45°
.090 R
.062 R
.180 .160
45°
.165
.815 .809
G1 REF
.060 DIA REF
CBORE .188 DIA X .188 DEEP
J17 REF
.181
.190 .170
.305 .320
.850 .835
.094
.062 R
.385 .370
.102 .098
.125 REF
3 SPACES AT .127 .123 PITCH TOTAL = .377 .373
TOLERANCE NON-CUMULATIVE
11 SPACES AT .127 .123 PITCH TOTAL = 1.377 1.373
TOLERANCE NON-CUMULATIVE
.037 .033
.142 .138
.062 DIA X .312 DEEP
4 PLACES
2.877 2.873
1.531
.271
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.531
2.875
3.657 3.653
.209
4.073

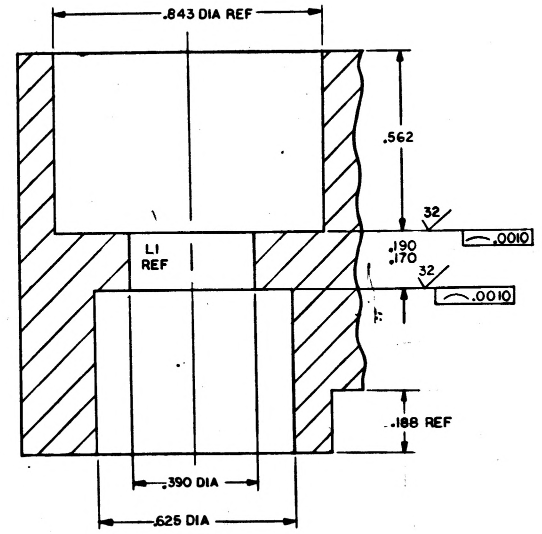


.069 .073 DIA THRU
CSK 60° X .0189 .1104
16 HOLES
A .005
.080 .100 R
4 PLACES
.072 .073 DIA THRU
16 HOLES
-A-



.403 .409 DIA
2 PLACES
.180 .220
.453 .484
K1 REF
.20 DIA
.453 .484
.180 .220
.436 .443 DIA
2 PLACES

PARTIAL SECTION A-A



.843 DIA REF
.562
32
.0010
.190 .170
32
.0010
L1 REF
.188 REF
.390 DIA
.625 DIA

PARTIAL SECTION B-B
2 PLACES

E3

MASTER

2008084

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIG NO

LIST OF MATERIALS

2007111
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 6

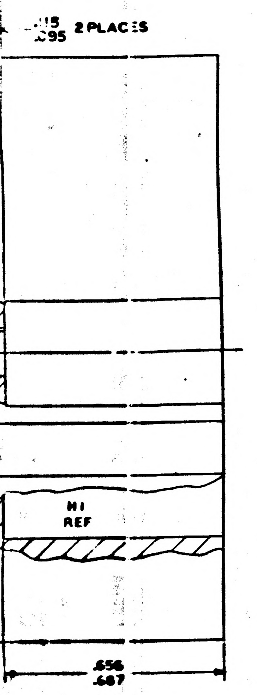
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN J. Crowley DATE 10 Jan 65
CHECKED A. Lindstrom 23 Feb 65
APPROVAL E. Sisiak 25 Feb 65
APPROVAL A. D. Test 2/24/65
NASA APPROVAL W. J. Rhine 03-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

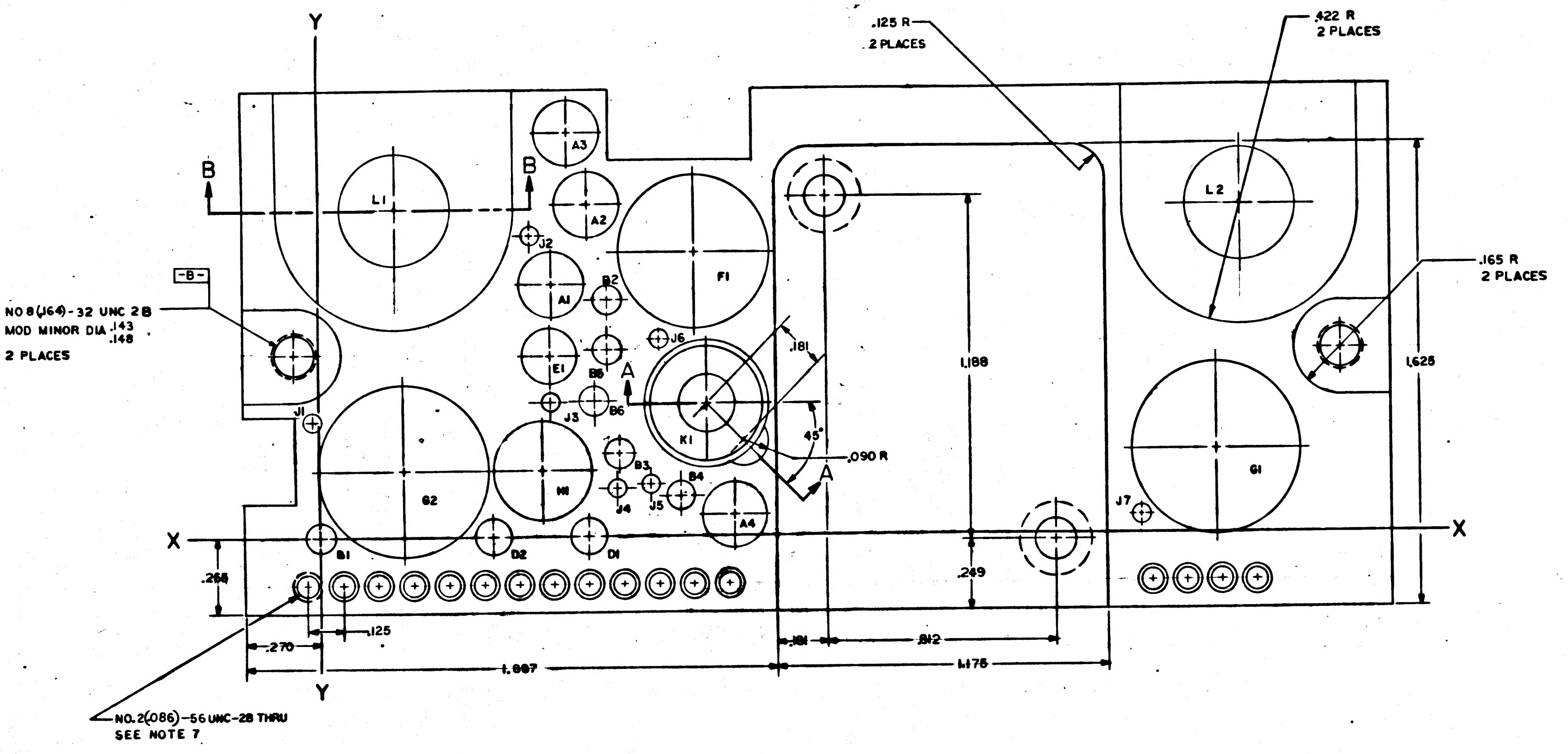
HEATSINK
800 CPS 5% AMPLIFIER

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2008084
SCALE 5/1 WT — SHEET 1 OF

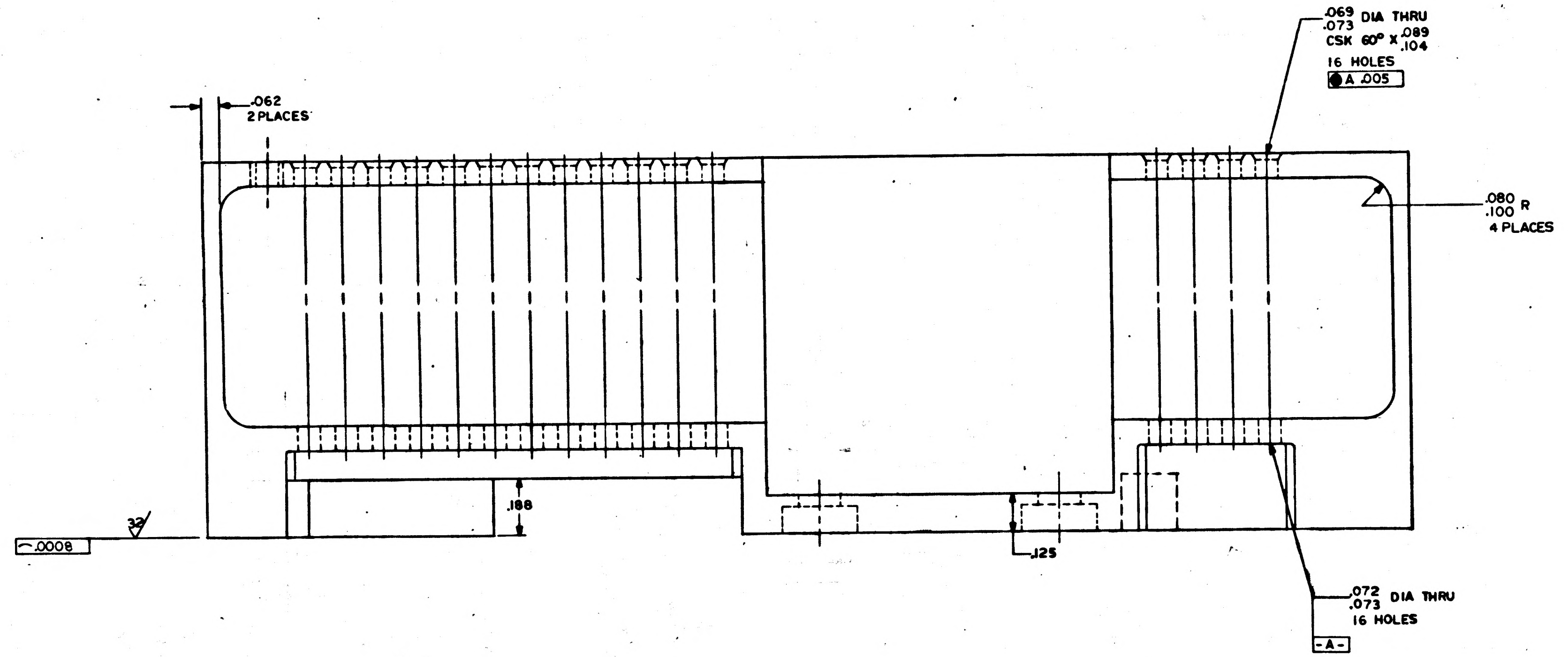
2008084



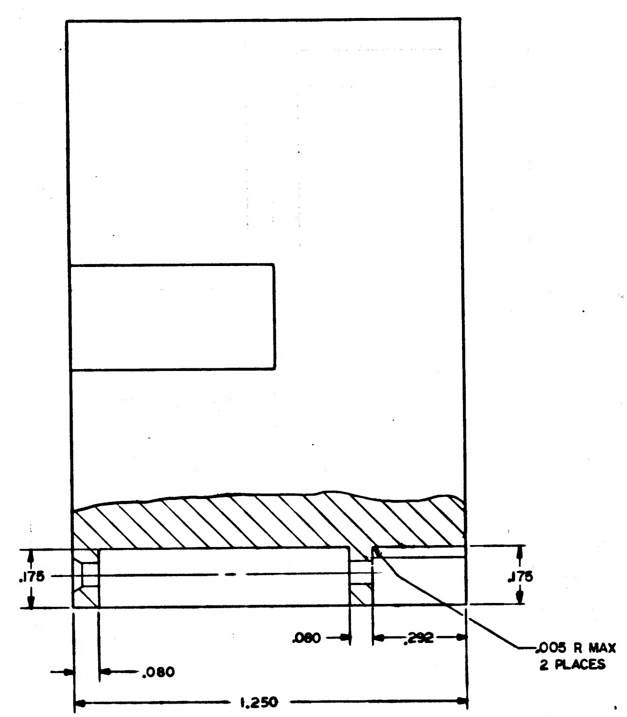
.115 .095 2 PLACES
M1 REF
.656 .687



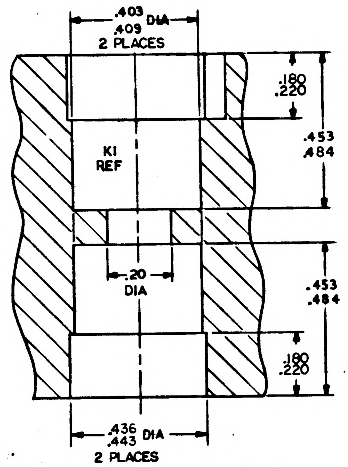
Y
B
B
L1
A3
A2
F1
J2
A1
B2
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143 .148
2 PLACES
E1
J6
B5
A
.181
K1
45°
.090 R
A
J3
B6
J1
G2
M1
B3
J5
J4
B4
A4
X
.268
B1
D2
D1
.125
.270
1.687
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7
Y
.125 R
2 PLACES
1.188
.249
.181
.812
1.178
.422 R
2 PLACES
L2
.165 R
2 PLACES
G1
J7
1.625
X



.062
2 PLACES
.069 .073 DIA THRU
CSK 60° X .089 .104
16 HOLES
A .005
.080 .100 R
4 PLACES
.188
32
.0008
.125
.072 .073 DIA THRU
16 HOLES
-A-

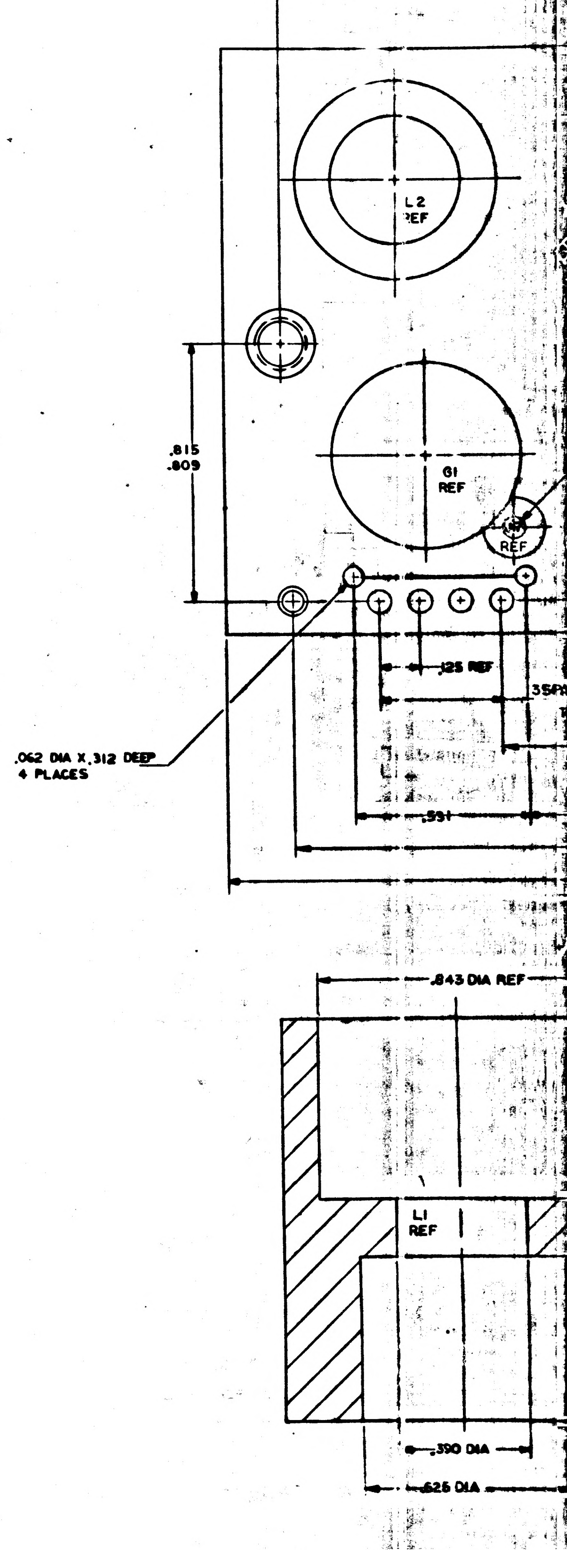


.175
.175
.080
.292
.005 R MAX
2 PLACES
.080
1.250



.403 .409 DIA
2 PLACES
.180 .220
.453 .484
K1 REF
.20 DIA
.453 .484
.180 .220
.436 .443 DIA
2 PLACES

PARTIAL SECTION A-A



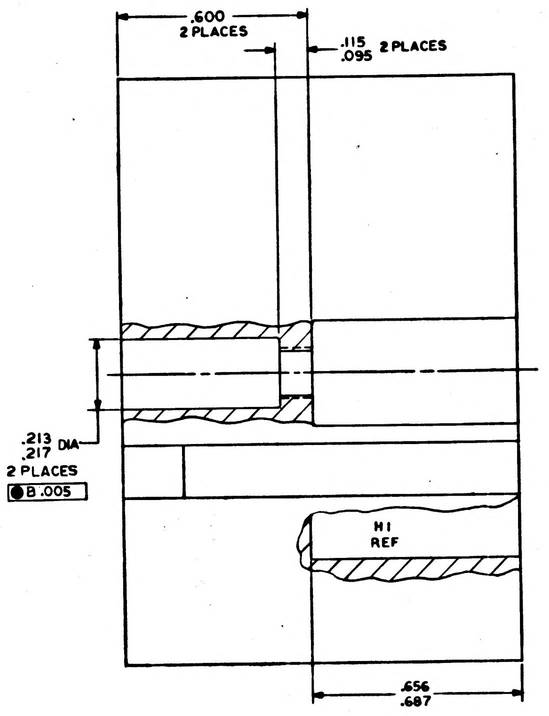
L2 REF
G1 REF
REF
.815 .809
.062 DIA X .312 DEEP
4 PLACES
.125 REF
.591
.843 DIA REF
L1 REF
.390 DIA
.625 DIA

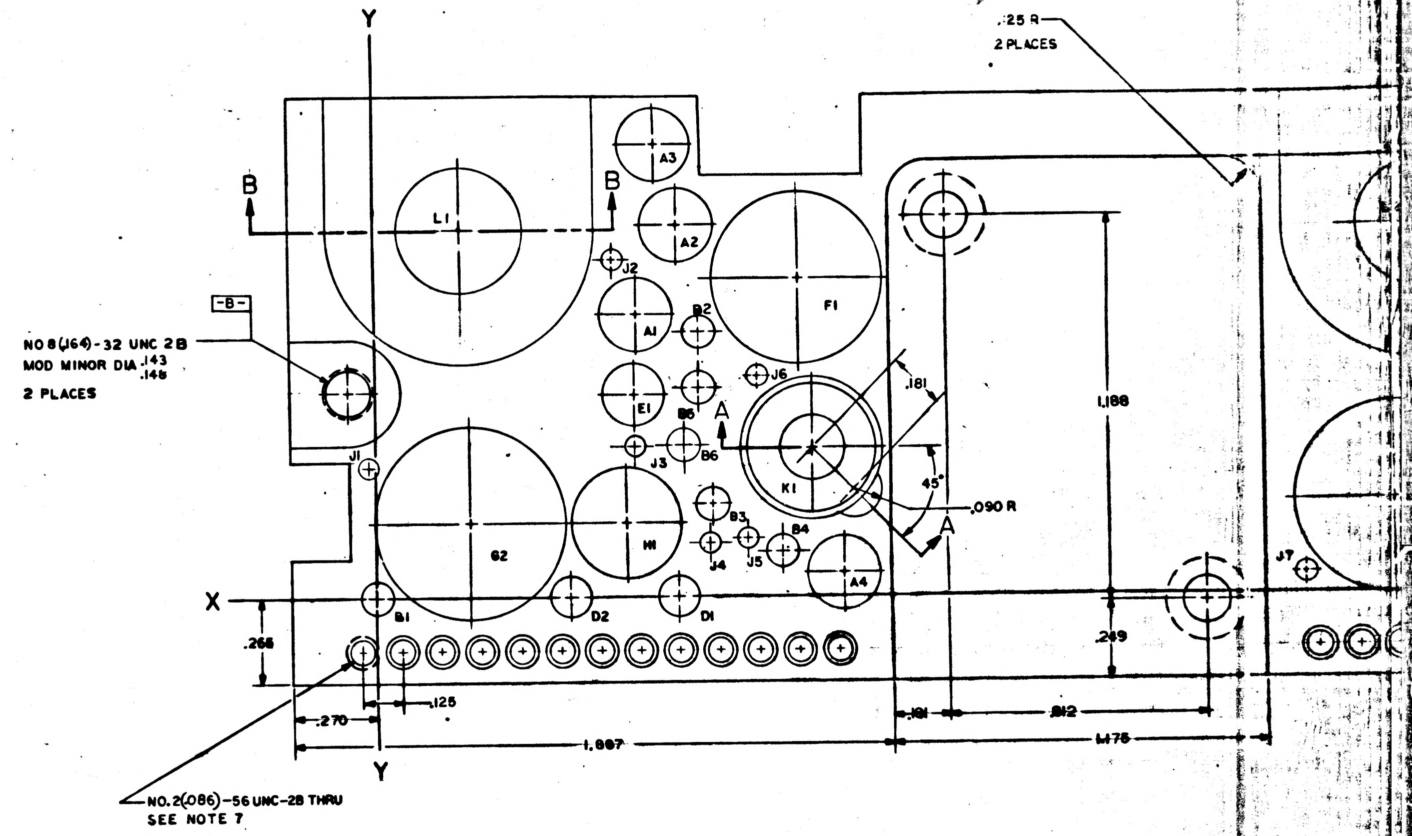
PARTIAL SECTION B-
2 PLACES

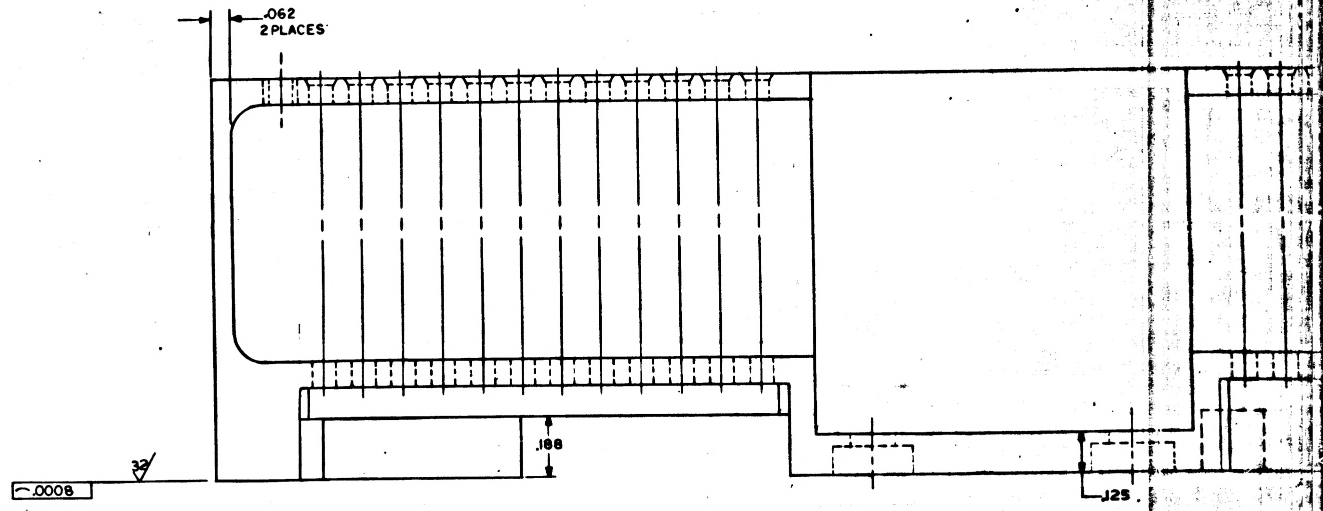
F12

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.820	.880	.227 .231	4
A2	.950	1.160		
A3	.880	1.410		
A4	1.470	.070		
B1	.000	.000	.100 .104	6
B2	1.020	.830		
B3	1.060	.290		
B4	1.280	.140		
B5	1.020	.650		
B6	.970	.475		
D1	.950	.000	.127 .131	2
D2	.610	.000		
E1	.810	.630	.192 .196	1
F1	1.330	.990	.529 .536	1
G1	3.180	.290	.592 .599	2
G2	.290	.230		
H1	.790	.230	.346 .352	1
J1	-.020	.405	.058 .062	7
J2	.750	1.055		
J3	.810	.470		
J4	1.050	.170		
J5	1.170	.180		
J6	1.200	.690		
J7	2.910	.060		
K1	1.370	.460	SEE SECTION A-A	1
L1	.270	1.145	SEE SECTION B-B	2
L2	3.270	1.145		


.600
2 PLACES
.115
.095 2 PLACES
.213 DIA
.217
2 PLACES
B .005
H1
REF
.656
.687


Y
B
B
-B-
NO 8(.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 PLACES
.25 R
2 PLACES
L1
A3
A2
J2
F1
A1
B2
J6
E1
B5
A
.181
B6
J3
K1
45°
.090 R
A
G2
H1
B3
B4
J4
J5
A4
J1
X
B1
D2
D1
J7
.266
.270
.125
1.887
1.188
.249
.181
.812
1.475
Y
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7

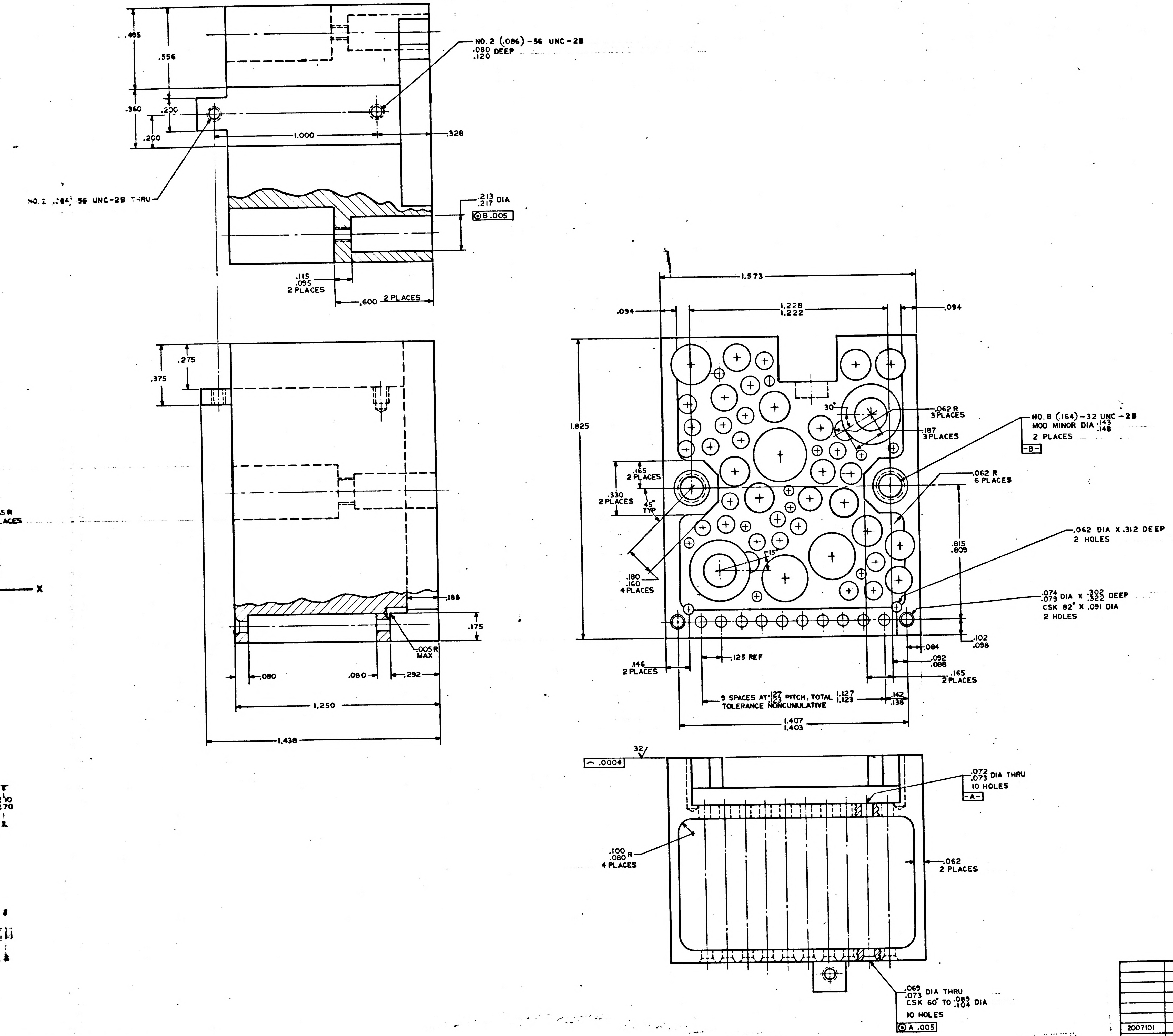

.062
2 PLACES
.188
.0008
32
.125

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
7. THREAD MUST BE FREE OF ANODIZE

3H

F1

REVISIONS 14698			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 21476	7Aug65	[illegible]



4
3
2
1
D
C
B
A
.495
.556
.360
.200
.200
1.000
.328
NO. 2 (.086) -56 UNC-2B
.080 .120 DEEP
NO. 2 (.086) -56 UNC-2B THRU
.213 .217 DIA
◎ B .005
.115 .095 2 PLACES
.600 2 PLACES
.275
.375
.5R
PLACES
X
.188
.175
.005 R MAX
.080
.080
.292
1.250
1.438
1.573
.094
1.228 1.222
.094
1.825
30°
.062 R 3 PLACES
.187 3 PLACES
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
-B-
.165 2 PLACES
.330 2 PLACES
45° TYP
.062 R 6 PLACES
15°
.815 .809
.062 DIA X .312 DEEP
2 HOLES
.180 .160 4 PLACES
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102 .098
.084
.146 2 PLACES
.125 REF
.092 .088
.165 2 PLACES
9 SPACES AT .127 .123 PITCH, TOTAL 1.127 1.123
TOLERANCE NONCUMULATIVE
.142 .138
1.407 1.403
32
⌒ .0004
.072 .073 DIA THRU
10 HOLES
-A-
.100 .080 R
4 PLACES
.062
2 PLACES
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
10 HOLES
◎ A .005

MASTER

(34)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007101	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 5

HEAT TREATMENT ——

FINAL FINISH SEE NOTE 6

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT

DRAWN [illegible] DATE 24 JUN 64
CHECKED [illegible] 15 Jun 64
APPROVAL J.M. B[illegible] 1/Dec/64
APPROVAL [illegible] 12/4/64

NASA APPROVAL [illegible] 12-7-64

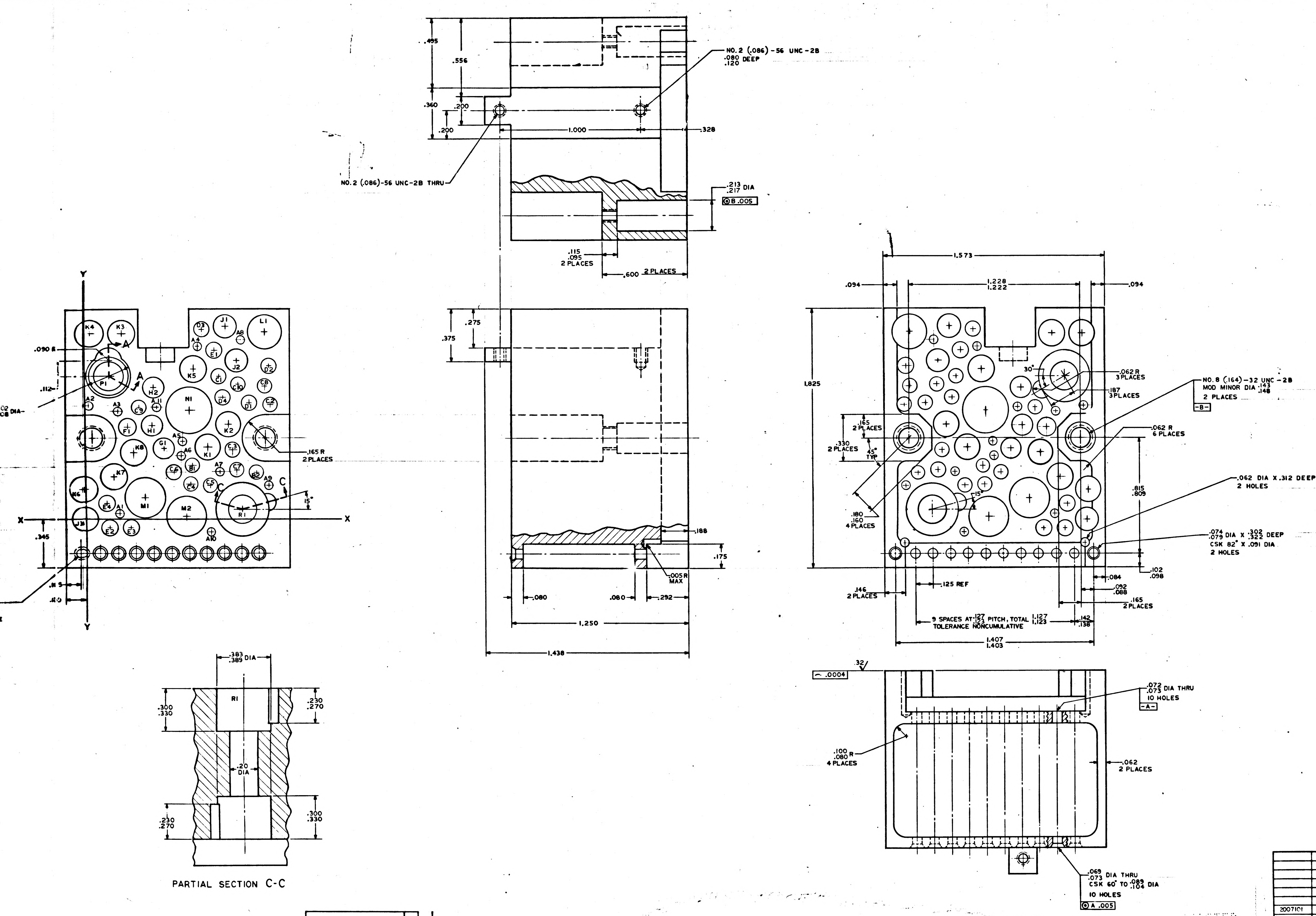
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
DC AMPLIFIER AND PVR

CODE IDENT NO. ——
SIZE J
NASA DRAWING NO. 2008092
SCALE 5/1
WT ——
SHEET 1 OF 1

2008092



5
4
3
2
.495
.556
.360
.200
.200
1.000
.328
NO. 2 (.086)-56 UNC-2B
.080
.120 DEEP
NO. 2 (.086)-56 UNC-2B THRU
.213
.217 DIA
B .005
.115
.095
2 PLACES
.600
2 PLACES
.275
.375
.188
.175
.005 R
MAX
.080
.080
.292
1.250
1.438
Y
X
K4
K3
A
P1
.090 R
.112
J1
D3
A8
L1
A4
E1
J2
K5
C1
D2
C8
C10
H2
A2
A3
A11
C9
N1
D4
D1
C2
F1
H1
K2
.165 R
2 PLACES
A5
G1
K8
A6
K1
C3
C6
B1
A7
C7
B2
K7
C4
C5
A9
C
K6
M1
E4
A1
M2
R1
15°
J3
E2
E3
A10
.345
.115
.110
Y
.383
.389 DIA
R1
.300
.330
.230
.270
.20
DIA
.230
.270
.300
.330
PARTIAL SECTION C-C
1.573
.094
1.228
1.222
.094
1.825
30°
.062 R
3 PLACES
.187
3 PLACES
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
B
.165
2 PLACES
.330
2 PLACES
45°
TYP
.062 R
6 PLACES
15°
.815
.809
.062 DIA X .312 DEEP
2 HOLES
.180
.160
4 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102
.098
.084
.092
.088
.146
2 PLACES
.125 REF
.165
2 PLACES
9 SPACES AT .127
.123 PITCH, TOTAL 1.127
1.123
TOLERANCE NONCUMULATIVE
.142
.138
1.407
1.403
.0004
32
.072
.073 DIA THRU
10 HOLES
A
.100
.080 R
4 PLACES
.062
2 PLACES
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
10 HOLES
A .005

MASTER

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS XX±.02 XXX±.005 ANGLE ±1° DO NOT SCALE THIS DRAWING
		MATERIAL SEE NOTE 5
2007101		HEAT TREATMENT
NEXT ASSY	USED ON	FINAL FINISH SEE NOTE 6
APPLICATION		

QTY REQD

DRAWN

CHECKED

APPROVAL

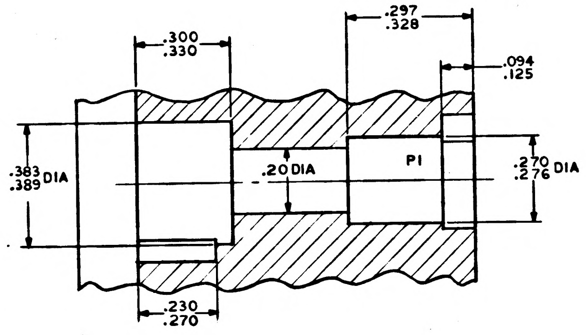
APPROVAL

2008092 A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIMENSION	Y DIMENSION	HOLE DIA	QTY
A1	.230	.040	.058 .062	11
A2	.020	.800		
A3	.220	.760		
A4	.780	1.220		
A5	.670	.550		
A6	.660	.450		
A7	.940	.335		
A8	1.090	1.265		
A9	1.290	.240		
A10	.880	−.090		
A11	.490	.790		
B1	.740	.380	.092 .096	2
B2	1.200	.330		
C1	.930	1.010	.100 .104	10
C2	1.300	.810		
C3	1.030	.490		
C4	.730	.250		
C5	.870	.240		
C6	.610	.330		
C7	1.060	.350		
C8	1.260	.940		
C9	.370	.790		
C10	1.070	.950		
D1	1.150	.820	.105 .109	4
D2	1.290	1.080		
D3	.810	1.340		
D4	.960	.860		
E1	.900	1.190	.112 .116	4
E2	.160	−.060		
E3	.310	−.060		
E4	.140	.110		
F1	.290	.650	.127 .131	1
G1	.540	.500	.143 .147	1
H1	.460	.660	.146 .150	2
H2	.470	.930		

HOLE IDENT	X DIMENSION	Y DIMENSION	HOLE DIA	QTY
J1	.980	1.360	.165 .169	3
J2	1.060	1.120		
J3	.000	.000		
K1	.850	.510	.181 .185	8
K2	1.000	.670		
K3	.250	1.310		
K4	.030	1.310		
K5	.750	1.060		
K6	−.010	.210		
K7	.190	.300		
K8	.330	.470		
L1	1.260	1.320	.237 .241	1
M1	.410	.150	.290	2
M2	.700	.020		
N1	.720	.770	.334	1
P1	.160	1.010	SEE SECTION A-A	
R1	1.100	.070	SEE SECTION C-C	


.300
.330
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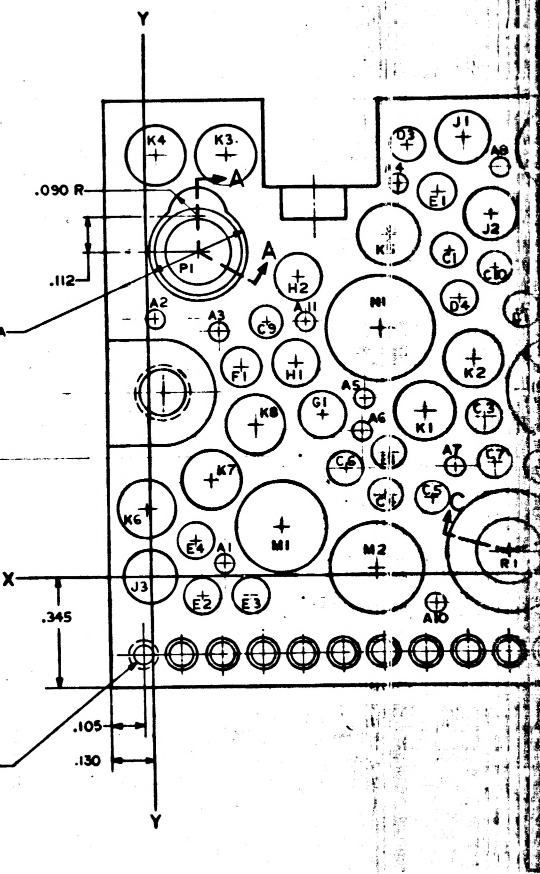
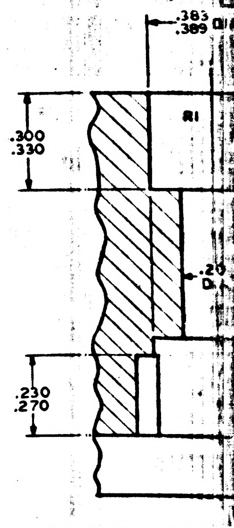
.328
.094
.125
.383
.389 DIA
.20 DIA
P1
.270
.276 DIA
.230
.270

PARTIAL SECTION A-A


Y
K4
K3
A
.090 R
.112
P1
A
H2
.302
.308 DIA
A2
A3
C9
A11
F1
H1
N1
K5
D3
J1
A8
E1
J2
C1
C10
D4
K2
K8
G1
A5
A6
K1
C3
K7
C6
A7
C7
C5
C
K6
E4
A1
M1
M2
R1
X
J3
E2
E3
A10
.345
.105
.130
Y

NO 2 (086)-56 UNC-2B
.16 DEEP
HOLE TO BE FREE OF ANODIZE

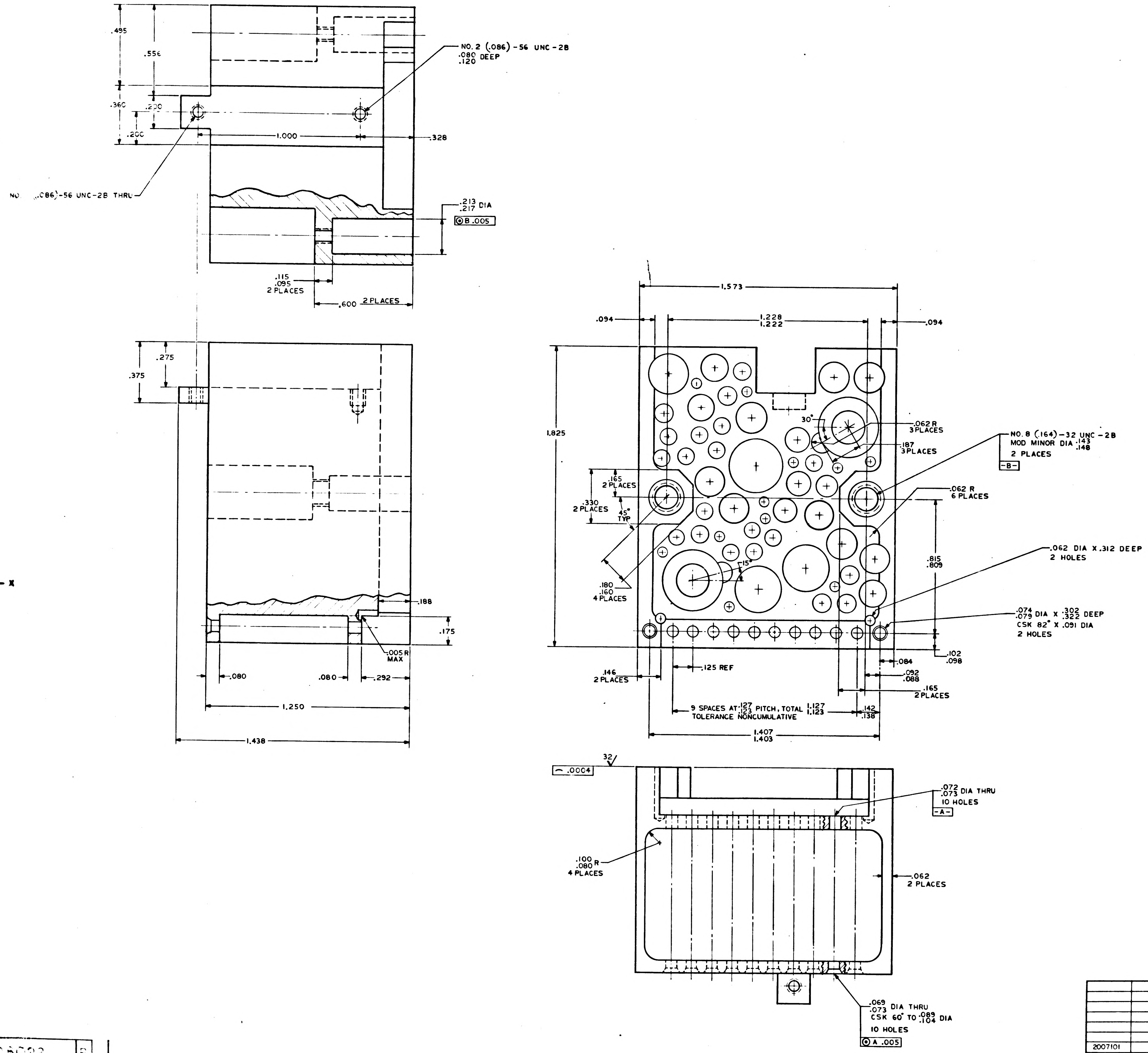

.383
.389
R1
.300
.330
.20
.230
.270

PARTIAL SECT

NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED, $^{125}\surd$ ALL OVER
5. MATERIAL : MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
6. FINISH : ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY PER ND 1002019
8. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

REVISIONS 17698			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 21476	17Aug65	WK
B	REVISED PER TDRR 25785	9FEB 66	UHF CP



.495
.556
.360
.200
.200
1.000
.328
NO. 2 (.086) - 56 UNC - 2B .080 .120 DEEP
NO. (.086)-56 UNC-2B THRU
.213 .217 DIA
⊙ B .005
.115 .095 2 PLACES
.600 2 PLACES
.275
.375
.188
.175
.005 R MAX
.080
.080
.292
1.250
1.438
1.573
.094
1.228 1.222
.094
1.825
30°
.062 R 3 PLACES
.187 3 PLACES
NO. 8 (.164) - 32 UNC - 2B MOD MINOR DIA .143 .148 2 PLACES
-B-
.165 2 PLACES
.330 2 PLACES
45° TYP
.062 R 6 PLACES
15°
.815 .809
.062 DIA X .312 DEEP 2 HOLES
.180 .160 4 PLACES
.074 .079 DIA X .302 .322 DEEP CSK 82° X .091 DIA 2 HOLES
.102 .098
.084
.146 2 PLACES
.125 REF
.092 .088
.165 2 PLACES
9 SPACES AT .127 .123 PITCH, TOTAL 1.127 1.123 TOLERANCE NONCUMULATIVE
.142 .138
1.407 1.403
32
⌒ .0004
.072 .073 DIA THRU 10 HOLES
-A-
.100 .080 R 4 PLACES
.062 2 PLACES
.069 .073 DIA THRU CSK 60° TO .089 .104 DIA 10 HOLES
⊙ A .005

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007101	
NEXT ASSY	USED ON
APPLICATION	

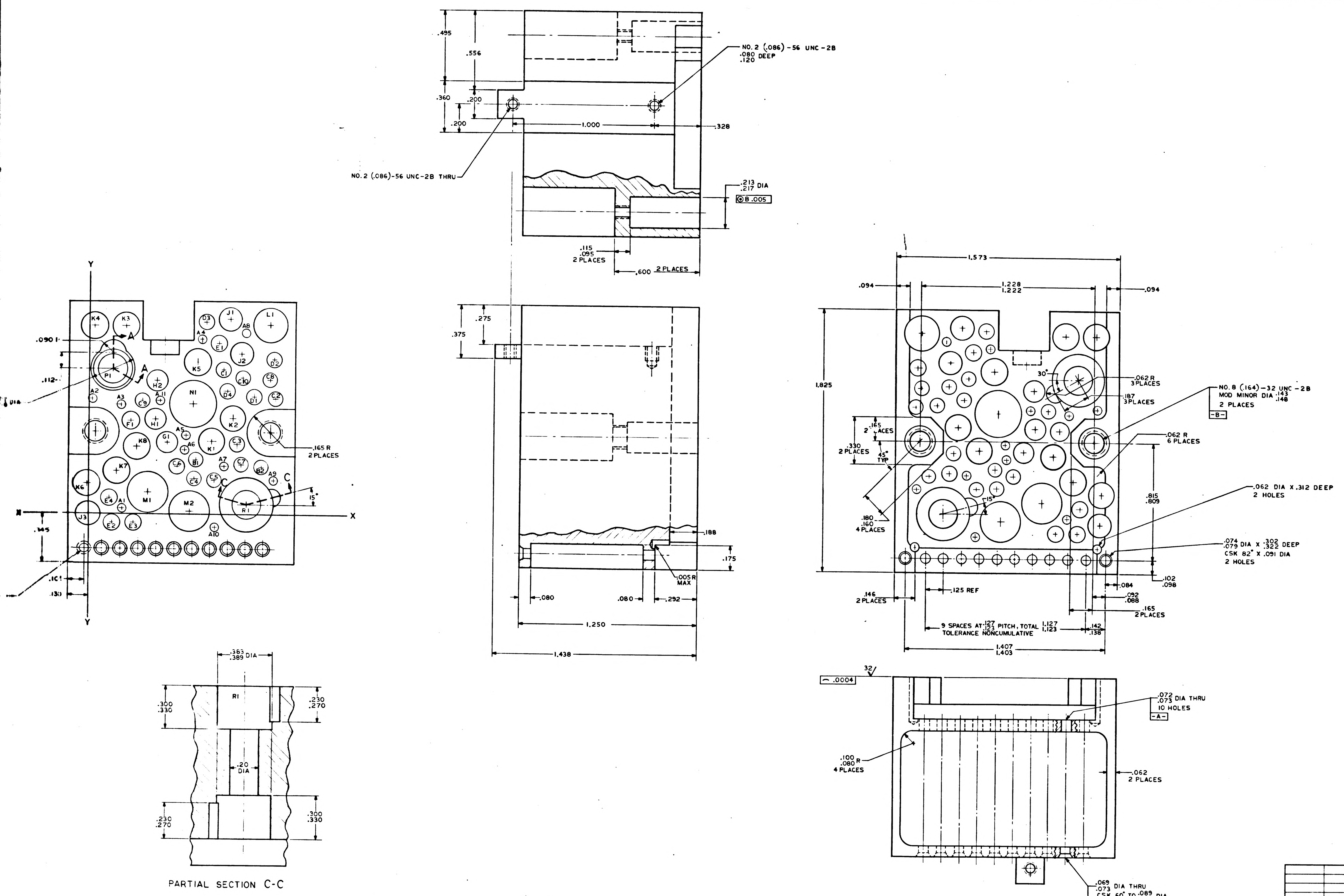
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT ——
FINAL FINISH SEE NOTE 6

MIT INSTRUMENTATION LAB CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Sam J. Dilabio DATE 24 JUN 64
CHECKED R.L. Gangsterberg 5 ... 64
APPROVAL J.M. BAYSHAK 4/DEC/64
APPROVAL 12/4/64
NASA APPROVAL 12-7-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
D C AMPLIFIER AND PVR

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 2008092
SCALE 5/1 WT —— SHEET 1 OF 1



NO. 2 (.086)-56 UNC-2B .080 .120 DEEP
NO. 2 (.086)-56 UNC-2B THRU
.495
.556
.360
.200
.200
1.000
.328
.213 .217 DIA
B .005
.115 .095 2 PLACES
.600 2 PLACES
.275
.375
.188
.175
.005 R MAX
.080
.080
.292
1.250
1.438
Y
X
.090 I
.112
.145
.10!
.130
A
C
15°
.165 R 2 PLACES
K4 K3 D3 J1 A8 L1 A4 E1 J2 D2 K5 C1 C10 C8 H2 N1 D4 D1 C2 A2 A3 C9 A11 P1 F1 H1 K2 A5 A6 K8 G1 K1 C3 C6 B1 A7 C7 K7 C5 B2 A9 K6 E4 A1 M1 M2 R1 J3 E2 E3 A10
.365 .389 DIA
R1
.300 .330
.230 .270
.20 DIA
.230 .270
.300 .330
1.573
.094
1.228 1.222
.094
1.825
.062 R 3 PLACES
.187 3 PLACES
30°
NO. 8 (.164)-32 UNC-2B MOD MINOR DIA .143 .148
2 PLACES
-B-
.165 2 PLACES
.330 2 PLACES
45° TYP
.062 R 6 PLACES
.815 .809
.180 .160 4 PLACES
15°
.062 DIA X .312 DEEP 2 HOLES
.074 .079 DIA X .302 .322 DEEP CSK 82° X .091 DIA 2 HOLES
.102 .098
.146 2 PLACES
.125 REF
.084
.092 .088
.165 2 PLACES
9 SPACES AT .127 .123 PITCH, TOTAL 1.127 1.123 TOLERANCE NONCUMULATIVE
.142 .138
1.407 1.403
.0004
32
.072 .073 DIA THRU 10 HOLES
-A-
.100 .080 R 4 PLACES
.062 2 PLACES
.069 .073 DIA THRU CSK 60° TO .089 .104 DIA 10 HOLES
A .005

PARTIAL SECTION C-C

2007101	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 5

HEAT TREATMENT ——

FINAL FINISH SEE NOTE 6

QTY REQD

DRAWN
CHECKED
APPROVAL
APPROVAL
NASA AP
MIT AP

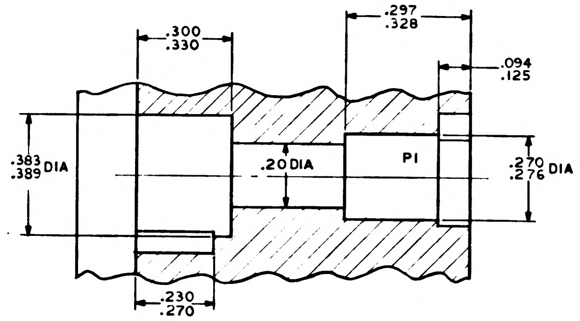
2008092 B

272008092

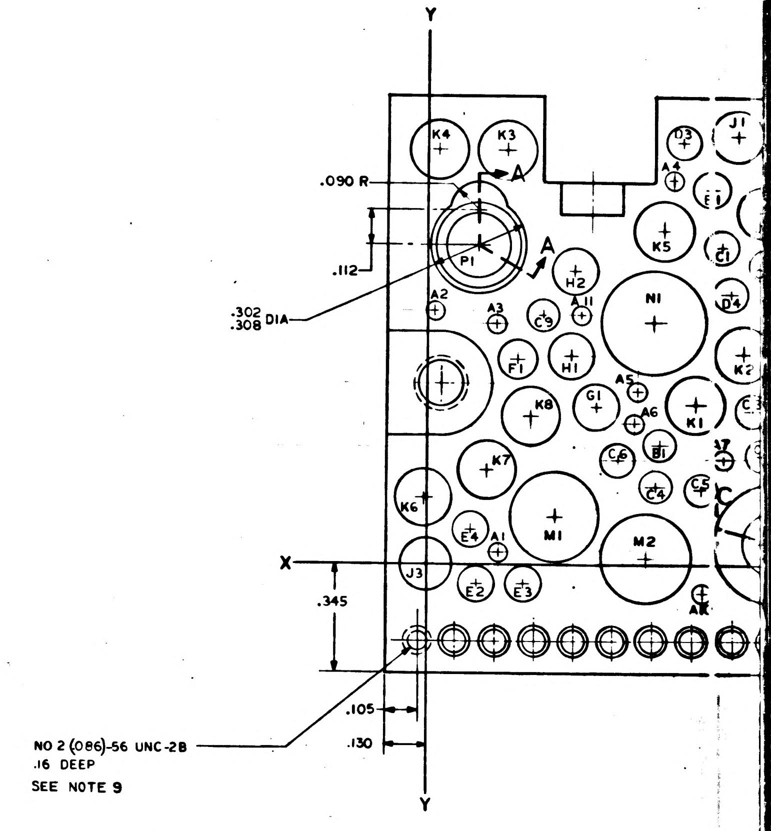
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

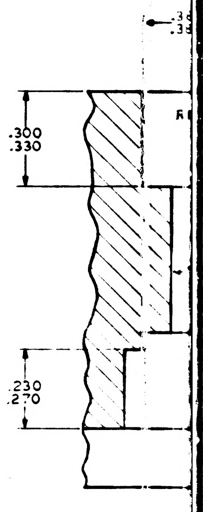
HOLE IDENT	X DIMENSION	Y DIMENSION	HOLE DIA	QTY
A1	.230	.040	.058 .062	11
A2	.020	.800		
A3	.220	.760		
A4	.780	1.220		
A5	.670	.550		
A6	.660	.450		
A7	.940	.335		
A8	1.090	1.265		
A9	1.290	.240		
A10	.880	−.090		
A11	.490	.790		
B1	.740	.380	.092 .096	2
B2	1.200	.330		
C1	.930	1.010	.100 .104	10
C2	1.300	.810		
C3	1.030	.490		
C4	.730	.250		
C5	.870	.240		
C6	.610	.330		
C7	1.060	.350		
C8	1.260	.940		
C9	.370	.790		
C10	1.070	.950		
D1	1.150	.820	.105 .109	4
D2	1.290	1.080		
D3	.810	1.340		
D4	.960	.860		
E1	.900	1.190	.112 .116	4
E2	.160	−.060		
E3	.310	−.060		
E4	.140	.110		
F1	.290	.650	.127 .131	1
G1	.540	.500	.143 .147	1
H1	.460	.660	.146 .150	2
H2	.470	.930		

HOLE IDENT	X DIMENSION	Y DIMENSION	HOLE DIA	QTY
J1	.980	1.360	.165 .169	3
J2	1.060	1.120		
J3	.000	.000		
K1	.950	.510	.181 .185	8
K2	1.000	.670		
K3	.250	1.310		
K4	.030	1.310		
K5	.750	1.060		
K6	−.010	.210		
K7	.190	.300		
K8	.330	.470		
L1	1.260	1.320	.237 .241	1
M1	.410	.150	.290	2
M2	.700	.020		
N1	.720	.770	.334	1
P1	.160	1.010	SEE SECTION A-A	
R1	1.100	.070	SEE SECTION C-C	


.300
.330
.297
.328
.094
.125
.383
.389 DIA
.20 DIA
P1
.270
.276 DIA
.230
.270

PARTIAL SECTION A-A


Y
K4
K3
D3
J1
A4
E1
A
.090 R
K5
C1
A
.112
P1
H2
D4
.302
.308 DIA
A2
A3
C9
A11
N1
F1
H1
K2
A5
G1
K8
A6
K1
C3
B1
C6
A7
K7
C4
C5
K6
E4
A1
M1
M2
X
J3
E2
E3
A8
.345
.105
.130
NO 2 (086)-56 UNC-2B
.16 DEEP
SEE NOTE 9
Y


.300
.330
.230
.270

PARTIAL SE

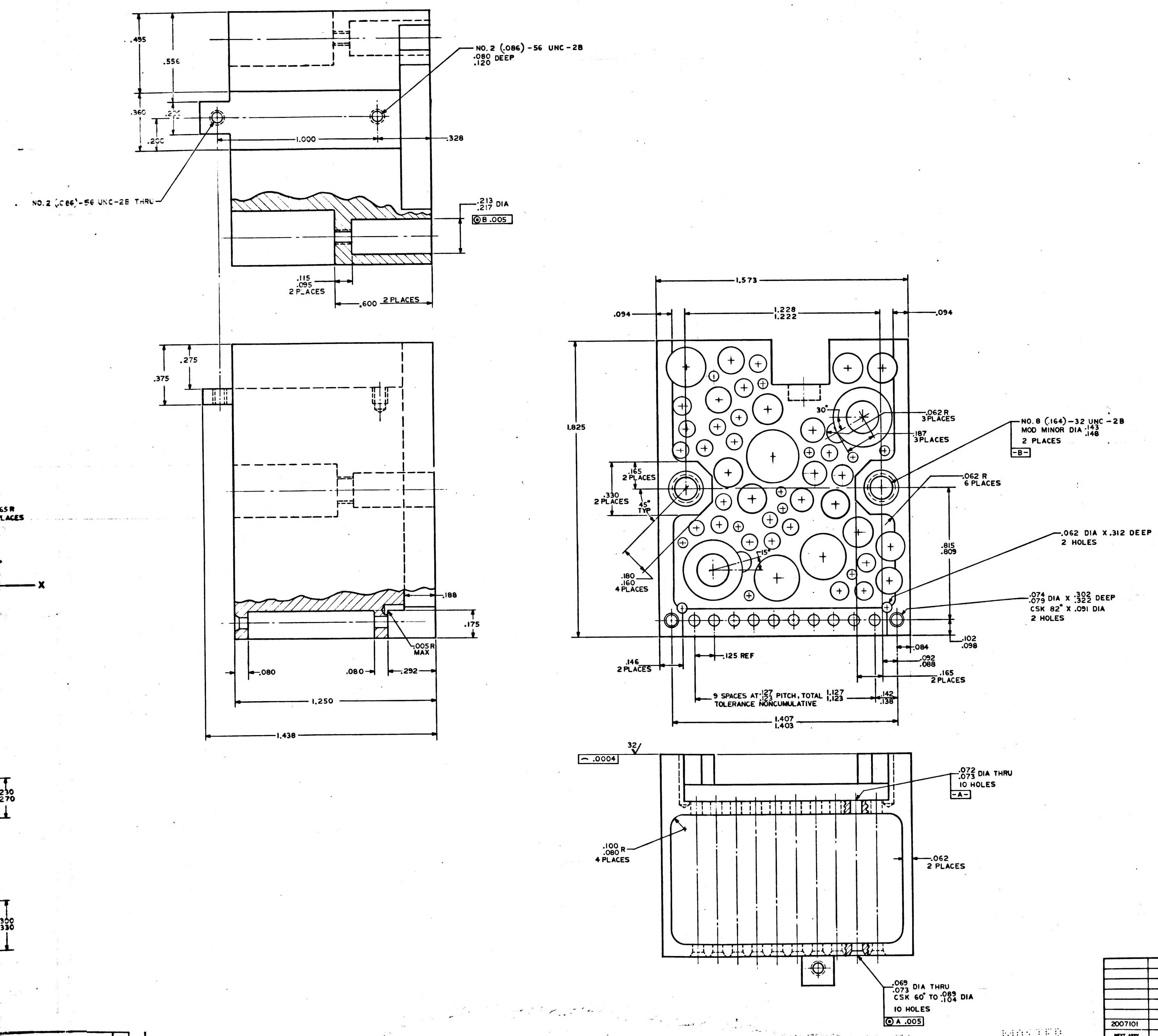
NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED, $\sqrt{}^{125}$ ALL OVER
5. MATERIAL : MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
6. FINISH : ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY PER ND 1002019
8. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE
9. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040.

2008092 B

2008092

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL


.495
.556
.360
.200
.200
1.000
.328
NO. 2 (.086) -56 UNC-2B
.080 .120 DEEP
NO. 2 (.086)-56 UNC-2B THRU
.213 .217 DIA
B .005
.115 .095 2 PLACES
.600 2 PLACES
.275
.375
.188
.175
.005 R MAX
.080
.080
.292
1.250
1.438
65 R
PLACES
X
.230 .270
.300 .330
1.573
.094
1.228 1.222
.094
1.825
30°
.062 R 3 PLACES
.187 3 PLACES
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
-B-
.165 2 PLACES
.330 2 PLACES
45° TYP
.062 R 6 PLACES
.815 .809
.062 DIA X .312 DEEP
2 HOLES
15°
.180 .160 4 PLACES
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102 .098
.084
.092 .088
.146 2 PLACES
.125 REF
.165 2 PLACES
9 SPACES AT .127 .123 PITCH, TOTAL 1.127 1.123
TOLERANCE NONCUMULATIVE
.142 .138
1.407 1.403
32
.0004
.072 .073 DIA THRU
10 HOLES
-A-
.100 .080 R
4 PLACES
.062
2 PLACES
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
10 HOLES
A .005

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007101	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT ——
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN DATE 24 JUN '64
CHECKED 15 JUL 64
APPROVAL J.M. BARSHAK 4/DEC/64
APPROVAL 12/4/64
NASA APPROVAL 12-7-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

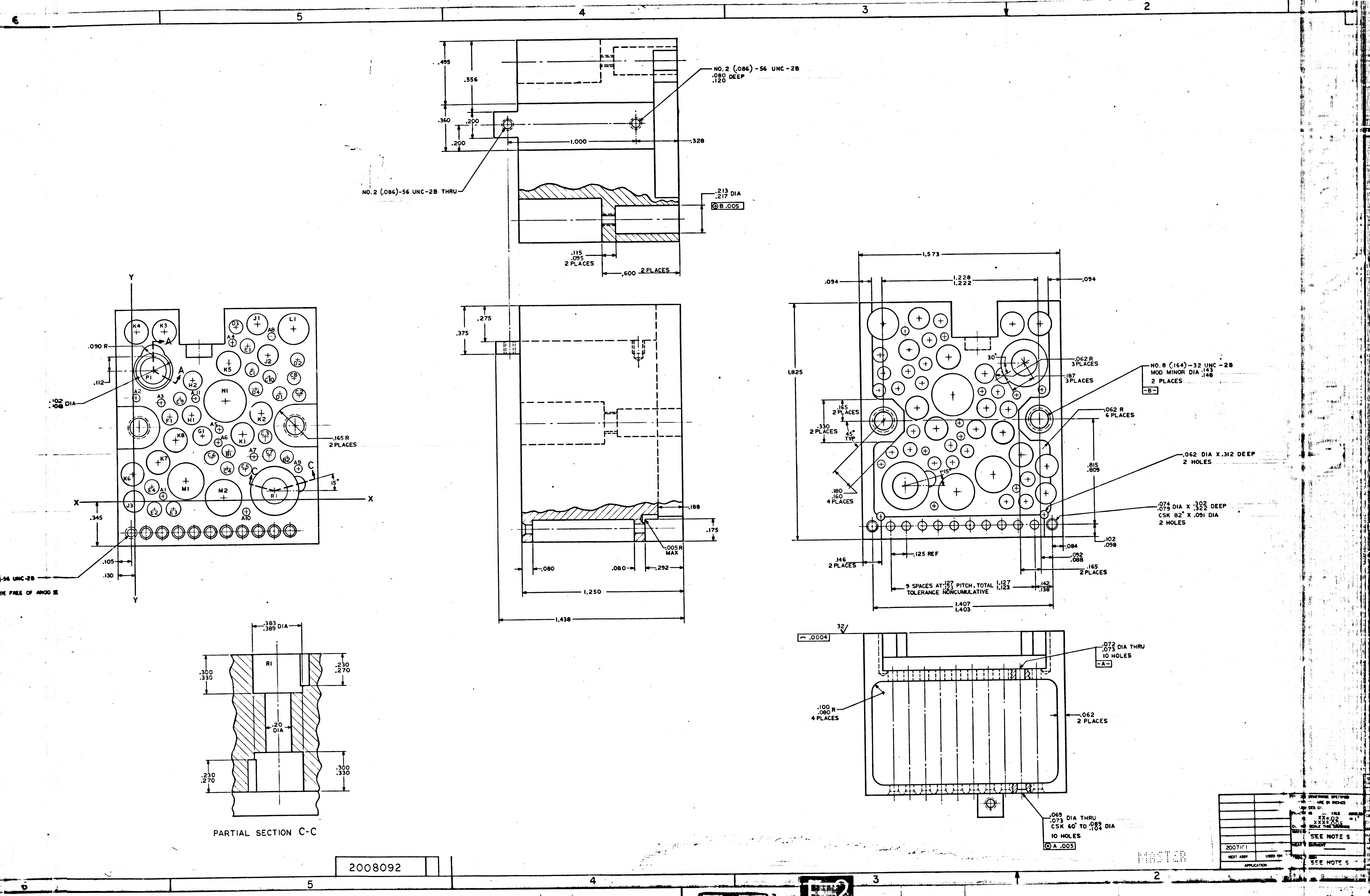
HEATSINK
D C AMPLIFIER AND PVR

CODE IDENT NO. ——
SIZE J
NASA DRAWING NO. 2008092
SCALE 5/1
WT ——
SHEET 1 OF 1

2008092

2008092

F-3

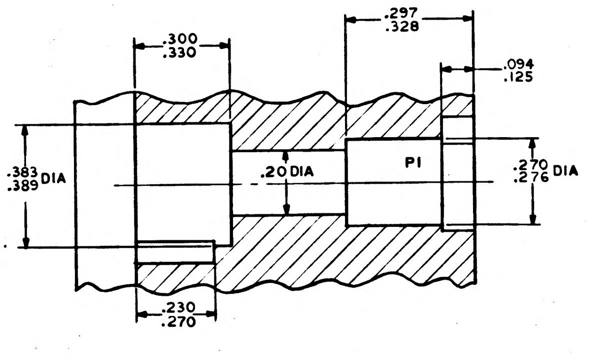

NO. 2 (.086)-56 UNC-2B
.080
.120 DEEP
NO. 2 (.086)-56 UNC-2B THRU
.495
.556
.360
.200
.200
1.000
.328
.213
.217 DIA
B .005
.115
.095
2 PLACES
.600 2 PLACES
.275
.375
.188
.175
.005 R MAX
.080
.080
.292
1.250
1.438
.090 R
.112
.102
.108 DIA
.165 R
2 PLACES
15°
.345
.105
.130
-56 UNC-2B
BE FREE OF ANOD
X
Y
A
C
K4 K3 J1 L1 D3 A4 A8 E1 J2 D2 K5 C1 C10 C8 P1 H2 A11 N1 D4 D1 C2 A2 A3 C9 F1 H1 K2 A5 G1 A6 K1 C3 K8 C6 B1 A7 C7 B2 A9 K7 C4 C5 K6 M1 M2 R1 E4 A1 J3 E2 E3 A10
.383
.389 DIA
R1
.300
.330
.230
.270
.20 DIA
.230
.270
.300
.330
PARTIAL SECTION C-C
1.573
.094
1.228
1.222
.094
1.825
30°
.062 R
3 PLACES
.187
3 PLACES
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
B
.165
2 PLACES
.330
2 PLACES
45° TYP
.062 R
6 PLACES
.815
.809
.062 DIA X .312 DEEP
2 HOLES
.180
.160
4 PLACES
15°
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102
.098
.084
.092
.088
.146
2 PLACES
.125 REF
.165
2 PLACES
9 SPACES AT .127
.123 PITCH, TOTAL 1.127
1.123
TOLERANCE NONCUMULATIVE
.142
.138
1.407
1.403
32
.0004
.072
.073 DIA THRU
10 HOLES
A
.100
.080 R
4 PLACES
.062
2 PLACES
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
10 HOLES
A .005
MASTER
OTHERWISE SPECIFIED
ARE IN INCHES
DECIMALS
ANGLES
XX ± .02
XXX ± .005
± 1°
SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT
FINISH
SEE NOTE 5
2007101
NEXT ASSY
USED ON
APPLICATION
2008092
6 5 4 3 2
D 5 4 3 2
F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008032

HOLE IDENT	X DIMENSION	Y DIMENSION	HOLE DIA	QTY
A1	.230	.040	.058 .062	11
A2	.020	.800		
A3	.220	.760		
A4	.780	1.220		
A5	.670	.550		
A6	.660	.450		
A7	.940	.335		
A8	1.090	1.265		
A9	1.290	.240		
A10	.880	−.090		
A11	.490	.790		
B1	.740	.380	.092 .096	2
B2	1.200	.330		
C1	.930	1.010	.100 .104	10
C2	1.300	.810		
C3	1.030	.490		
C4	.730	.250		
C5	.870	.240		
C6	.610	.330		
C7	1.060	.350		
C8	1.260	.940		
C9	.370	.790		
C10	1.070	.950		
D1	1.150	.820	.105 .109	4
D2	1.290	1.080		
D3	.810	1.340		
D4	.960	.860		
E1	.900	1.190	.112 .116	4
E2	.160	−.060		
E3	.310	−.060		
E4	.140	.110		
F1	.290	.650	.127 .131	1
G1	.540	.500	.143 .147	1
H1	.460	.660	.146 .150	2
H2	.470	.930		

HOLE IDENT	X DIMENSION	Y DIMENSION	HOLE DIA	QTY
J1	.980	1.360	.165 .169	3
J2	1.060	1.120		
J3	.000	.000		
K1	.850	.510	.181 .185	8
K2	1.000	.670		
K3	.250	1.310		
K4	.030	1.310		
K5	.750	1.060		
K6	−.010	.210		
K7	.190	.300		
K8	.330	.470		
L1	1.260	1.320	.237 .241	1
M1	.410	.150	.290	2
M2	.700	.020		
N1	.720	.770	.334	1
P1	.160	1,010	SEE SECTION A-A	
R1	1.100	.070	SEE SECTION C-C	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P1
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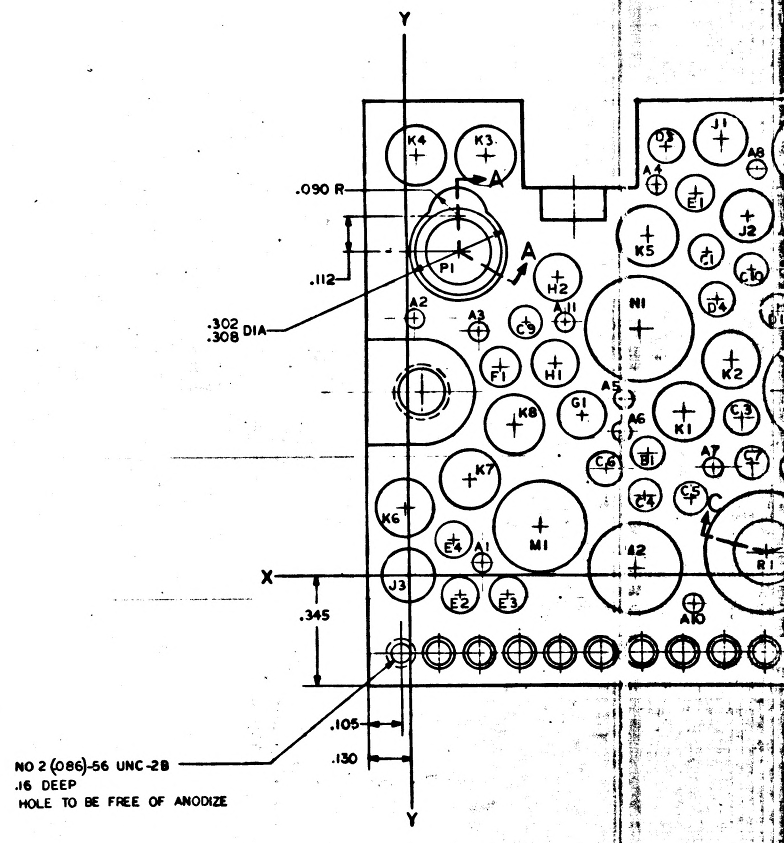
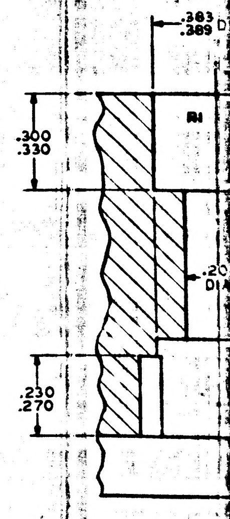
PARTIAL SECTION A-A


Y
K4
K3
A
.090 R
.112
P1
A
.302
.308 DIA
H2
A2
A3
C9
A11
F1
H1
N1
K8
G1
A5
A6
K1
K7
K6
E4
A1
M1
X
J3
E2
E3
A10
.345
.105
.130
NO 2 (086)-56 UNC-2B
.16 DEEP
HOLE TO BE FREE OF ANODIZE
Y
D3
J1
A8
A4
E1
J2
K5
C1
C10
D4
K2
C3
B1
C6
A7
C7
C4
C5
C
R1
A2


.383
.389 D
R1
.300
.330
.20
DI
.230
.270

PARTIAL SE

NOTES :

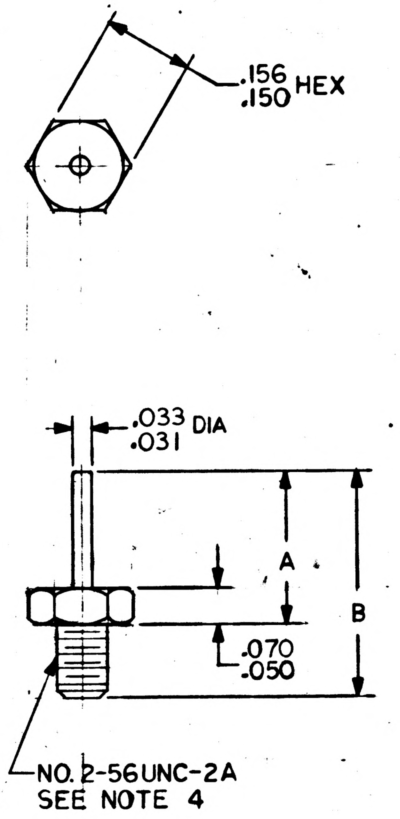
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED, $^{125}\surd$ ALL OVER
5. MATERIAL : MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
6. FINISH : ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY PER ND 1002019

㉞

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008093 | A

REVISIONS 14459			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14798	17 Dec 64	



DASH NO.	DIM. A	DIM. B
-000	.250	.375
-001	.135	.260

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: SHALL BE UNPLATED NICKEL IN ACCORDANCE WITH PS 1015400
3. UNLESS OTHERWISE SPECIFIED SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{125}$
4. ONE & ONE HALF OR LESS IMPERFECT THREADS ARE PERMISSIBLE ADJACENT TO HEX
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.020
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FI N

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± .005 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT ——
FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis A Loof DATE July 10, 64
CHECKED R. P. Kingsbury 15 July 64
APPROVAL E. J. Sisolak 16 July 64
APPROVAL D. [illegible] 10/19/64
NASA APPROVAL
MIT APPROVAL W Kupfer 24 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL,
THREADED

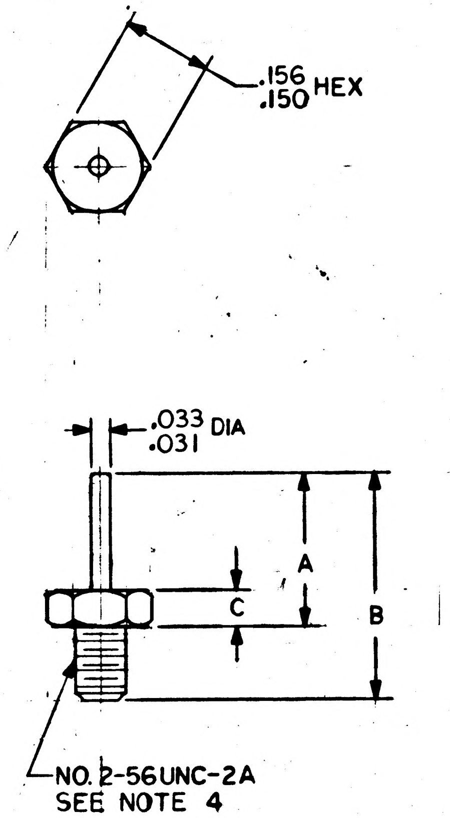
CODE IDENT NO. ——
SIZE C
NASA DRAWING NO. 2008093
SCALE 5/1
WT ——
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008093 B

REVISIONS 14459

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14798	17 DEC 64	
B	REVISED PER TDRR 22194	3 SEPT 65	



DASH NO.	DIM. A	DIM. B	DIM. C
-000	.250	.375	.070/.050
-001	.135	.260	.070/.050
-002	.375	.500	.130/.120

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: SHALL BE UNPLATED NICKEL IN ACCORDANCE WITH PS 1015400
3. UNLESS OTHERWISE SPECIFIED SURFACE ROUGHNESS MUST NOT EXCEED 125
4. ONE & ONE HALF OR LESS IMPERFECT THREADS ARE PERMISSIBLE ADJACENT TO HEX
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.020
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± .005 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT ——

FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Louis A Laof DATE July 10, 64
CHECKED R.P. Kingsbury 15 July 64
APPROVAL E J Sisolak 16 July 64
APPROVAL [illegible] 10/19/64

NASA APPROVAL

MIT APPROVAL W Kupfer 24 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

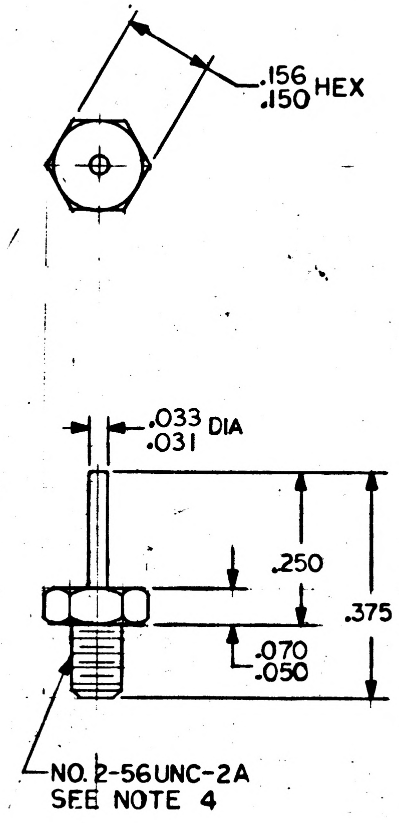
TERMINAL, THREADED

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 2008093
SCALE 5/1
WT ——
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008093

REVISIONS 14459			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: SHALL BE UNPLATED NICKEL IN ACCORDANCE WITH PS 1015400
3. UNLESS OTHERWISE SPECIFIED SURFACE ROUGHNESS MUST NOT EXCEED 125✓
4. ONE & ONE HALF OR LESS IMPERFECT THREADS ARE PERMISSIBLE ADJACENT TO HEX
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.020
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± .005 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT ——

FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Louis A Laof DATE July 10, 64
CHECKED R.P. Kungs July 15 64
APPROVAL E.T. Sisolak 16 July 64
APPROVAL D. Hoag 10/19/64
NASA APPROVAL
MIT APPROVAL W Kupfer 24 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

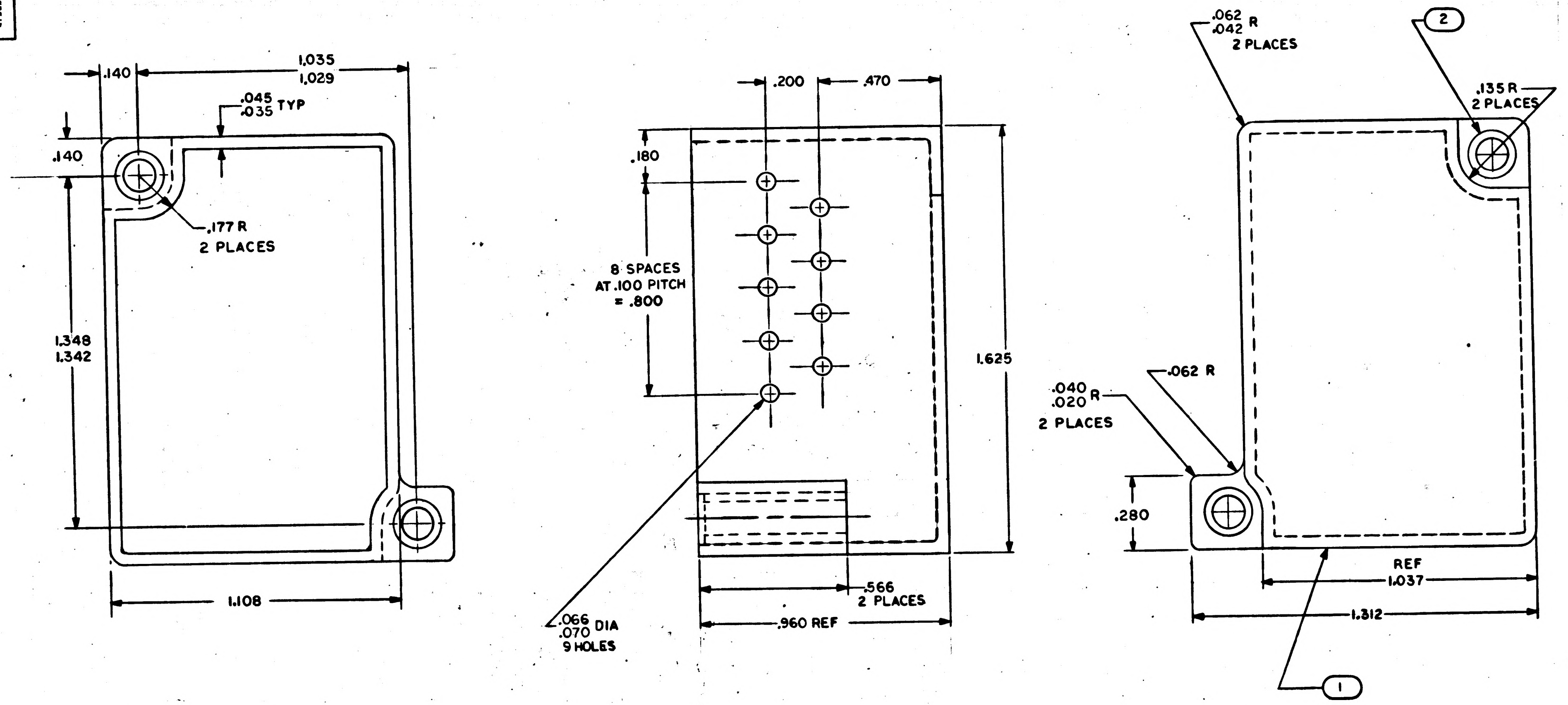
TERMINAL, THREADED

CODE IDENT NO. ——
SIZE C
NASA DRAWING NO. 2008093
SCALE 5/1
WT ——
SHEET 1 OF 1

INCHES
0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15941			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17616	22 MAR 65	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, INSIDE RADII .010 MAX
3. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
4. FINISH: 125√ OR BETTER OUTSIDE 125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE CASE WITH EPOXY POTTING RESINS.
6. IDENTIFY PER ND 1002019
7. FIND NO.2 TO BE FREE FROM FOREIGN MATTER
8. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008139	FERRULE	2
1	2008094-001	HOUSING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007061	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE
CHECKED R.P. Kingsbury 28 Jul 64
APPROVAL 8-22-64
APPROVAL S.C. 10-22-64
NASA APPROVAL 2/4/65
MIT APPROVAL 2 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

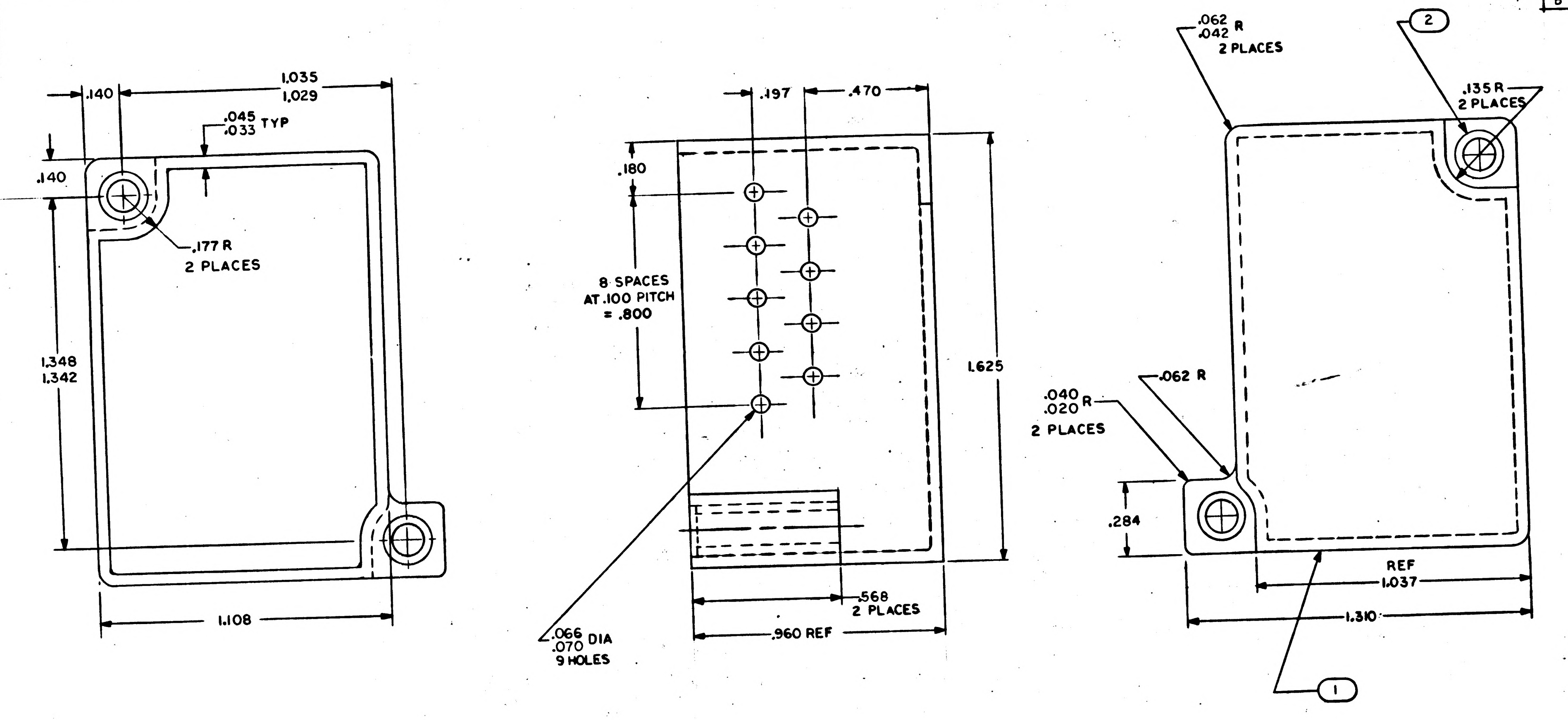
HOUSING
PIP PREAMP, MOLDED

CODE IDENT NO. — SIZE D NASA DRAWING NO. 2008094
SCALE 4/1 WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15941

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17616	12 MAR 65	WK
B	REVISED PER TDRR 22188	3 Sept. 65	



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, INSIDE RADII .010 MAX
3. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
4. FINISH: 125√ OR BETTER OUTSIDE 125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE CASE WITH EPOXY POTTING RESINS.
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO.2 TO BE FREE FROM FOREIGN MATTER
8. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
9. USE OF INSPECTION FIXTURE DRAWING NO.2007087 TO BE USED FOR INSPECTING MOUNTING HOLE DIMENSIONS OF HOUSING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008139	FERRULE	2
1	2008094-001	HOUSING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007061	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL 8-22-64
APPROVAL S. C. 10-22-64
NASA APPROVAL
MIT APPROVAL 2 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

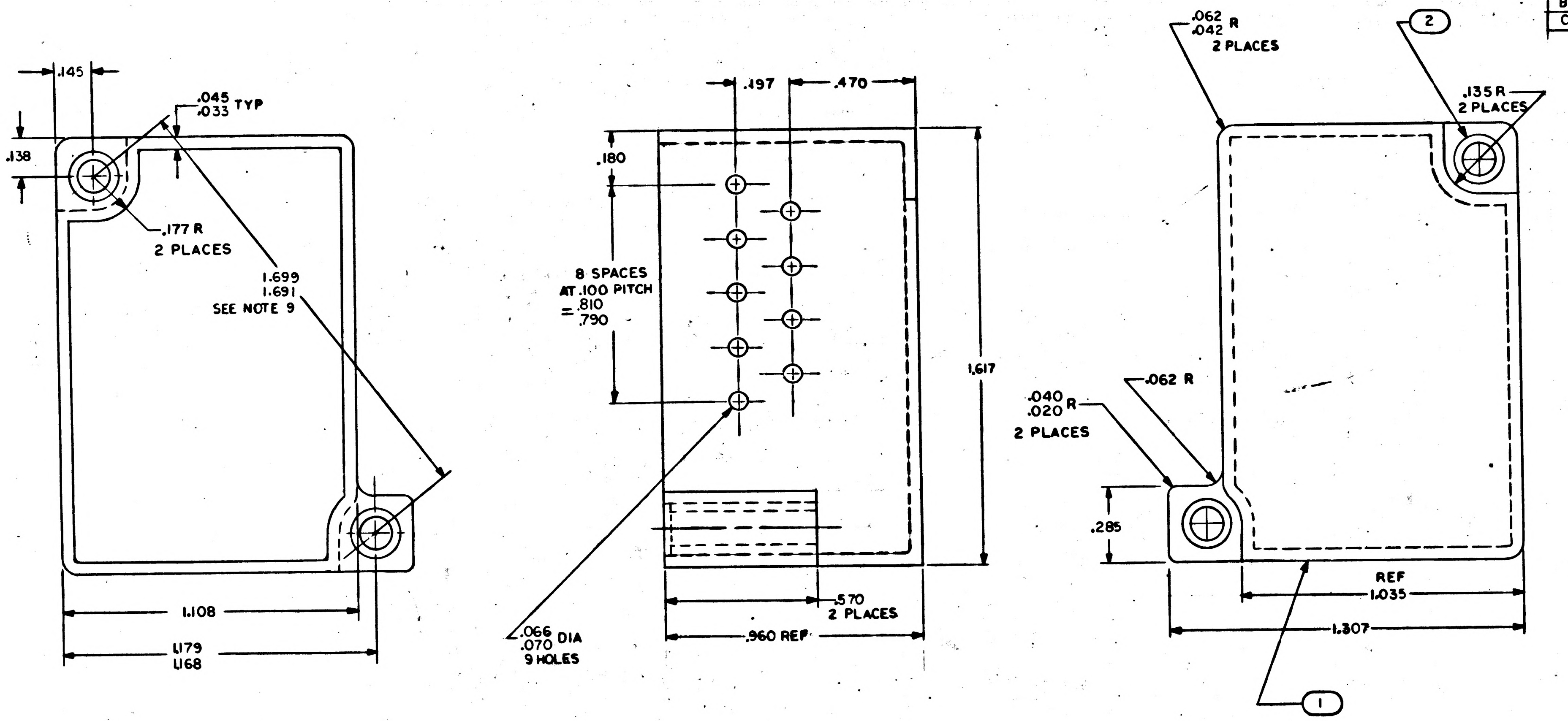
HOUSING
PIP PREAMP. MOLDED

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008094
SCALE 4/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15941

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17616	22MAR65	WK
B	REVISED PER TDRR 22188	3 Sept. 65	
C	REVISED PER TDRR 23527	29OCT65	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, INSIDE RADII .010 MAX
3. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
4. FINISH: 125√ OR BETTER OUTSIDE 125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE CASE WITH EPOXY POTTING RESINS.
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO.2 TO BE FREE FROM FOREIGN MATTER
8. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
9. TOLERANCE IS BASED ON MINIMUM SIZE OF HOLE. FOR INSPECTION PURPOSE GAGE DRAWING NO. 2007087 SHOULD EASILY SLIP INTO HOLES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008139	FERRULE	2
1	2008094-001	HOUSING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007061	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL 10-23-
NASA APPROVAL
MIT APPROVAL 2Feb65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

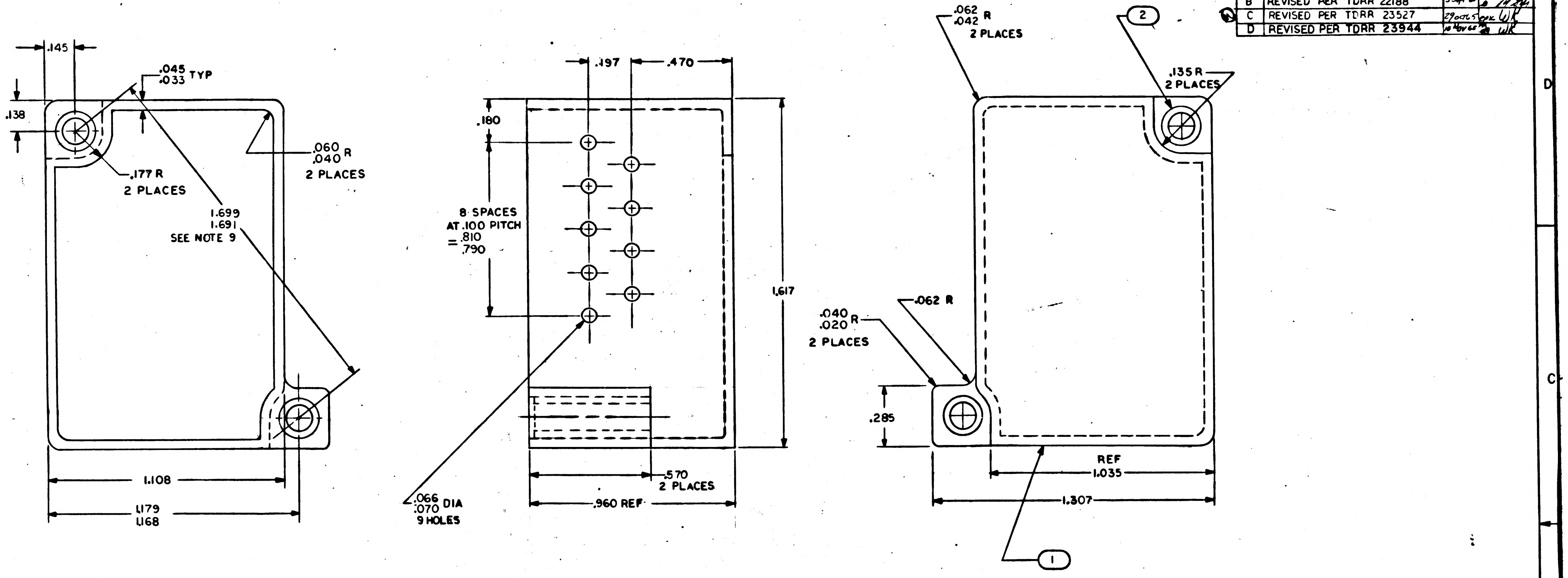
HOUSING
PIP PREAMP, MOLDED

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008094
SCALE 4/1
WT —
SHEET 1 OF 1

2008094 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15941			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17616	22 MAR 65	WK
B	REVISED PER TDRR 22188	3 Sept 65	
C	REVISED PER TDRR 23527	29 OCT 65	WK
D	REVISED PER TDRR 23944	10 Nov 65	WK


.145
.045
.033 TYP
.138
.060
.040 R
2 PLACES
.177 R
2 PLACES
1.699
1.691
SEE NOTE 9
1.108
1.179
1.168
.197
.470
.180
8 SPACES
AT .100 PITCH
= .810
.790
1.617
.570
2 PLACES
.960 REF
.066
.070 DIA
9 HOLES
.062
.042 R
2 PLACES
2
.135 R
2 PLACES
.040
.020 R
2 PLACES
.062 R
.285
REF
1.035
1.307
1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, INSIDE RADII .010 MAX
3. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
4. FINISH: 125√ OR BETTER OUTSIDE 125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE CASE WITH EPOXY POTTING RESINS.
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO.2 TO BE FREE FROM FOREIGN MATTER
8. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
9. TOLERANCE IS BASED ON MINIMUM SIZE OF HOLE. FOR INSPECTION PURPOSE GAGE DRAWING NO. 2007087 SHOULD EASILY SLIP INTO HOLES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008139	FERRULE	2
1	2008094-001	HOUSING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007061	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN DATE
CHECKED
APPROVAL 8-22-65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

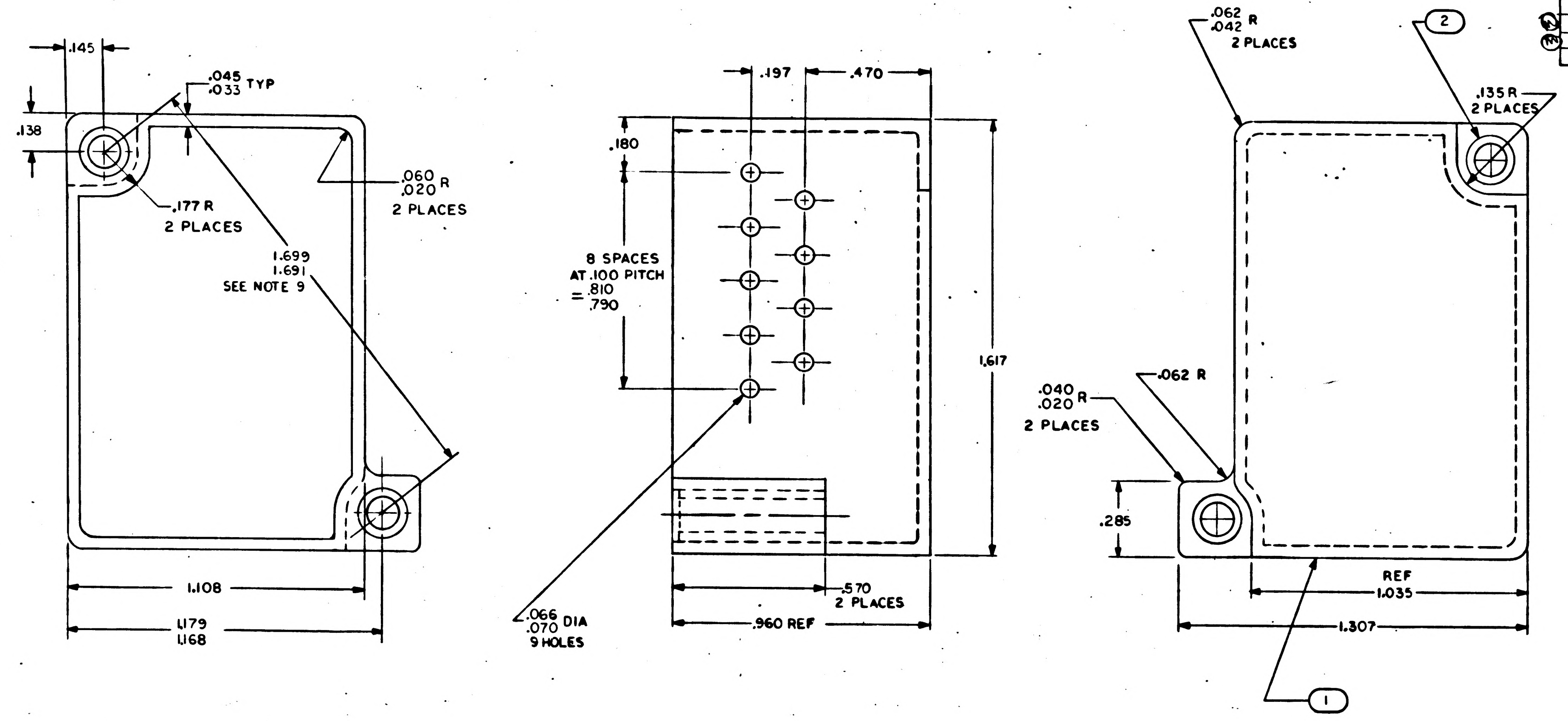
HOUSING
PIP PREAMP, MOLDED

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008094
SCALE 4/1
WT —
SHEET 1 OF 1

2008094 D

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15741			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17616	22 MAR 65	WK
B	REVISED PER TDRR 22188	3 Sept 65	LAL
C	REVISED PER TDRR 23527	29 OCT 65	WK
D	REVISED PER TDRR 23944	18 Nov 65	WK
E	REVISED PER TDRR 34670	26 SEP 6-	DL RWH



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, INSIDE RADII .010 MAX
3. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
4. FINISH: 125√ OR BETTER OUTSIDE 125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE CASE WITH EPOXY POTTING RESINS.
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO.2 TO BE FREE FROM FOREIGN MATTER
8. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
9. TOLERANCE IS BASED ON MINIMUM SIZE OF HOLE. FOR INSPECTION PURPOSE GAGE DRAWING NO. 2007087 SHOULD EASILY SLIP INTO HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008139	FERRULE	2
1	2008094-001	HOUSING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007061	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL D. Sakelos 10-22-64
APPROVAL 10-22-64
NASA APPROVAL
MIT APPROVAL 2 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

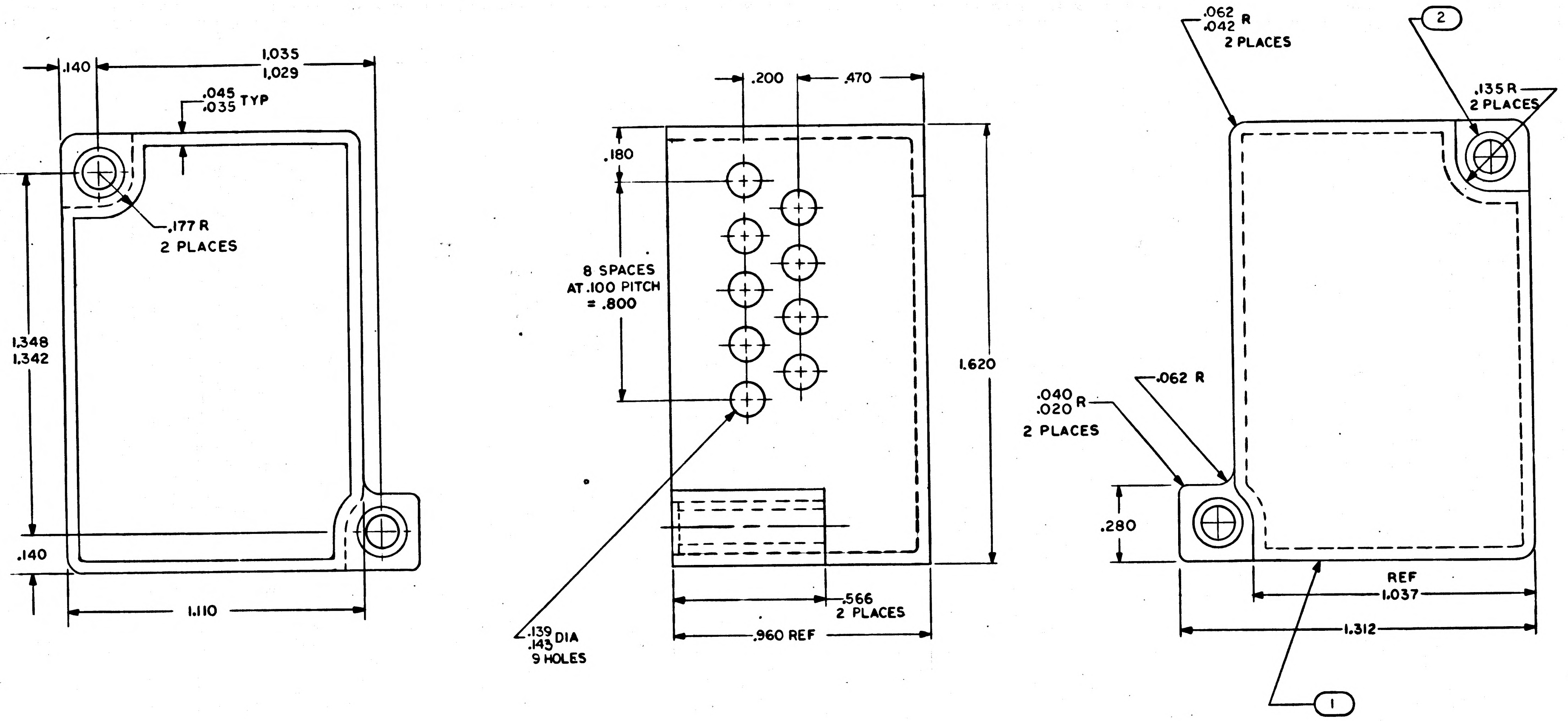
HOUSING
PIP PREAMP, MOLDED

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008094
SCALE 4/1
WT —
SHEET 1 OF 1

2008094 E

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15941			
SYM	DESCRIPTION	DATE	APPROVAL



.140
1.035
1.029
.045
.035 TYP
.177 R
2 PLACES
1.348
1.342
.140
1.110
.200
.470
.180
8 SPACES
AT .100 PITCH
= .800
1.620
.566
2 PLACES
.960 REF
.139
.143 DIA
9 HOLES
.062
.042 R
2 PLACES
2
.135 R
2 PLACES
.040
.020 R
2 PLACES
.062 R
.280
REF
1.037
1.312
1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, INSIDE RADII .010 MAX
3. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
4. FINISH: 125√ OR BETTER OUTSIDE
   125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE.
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE CASE WITH EPOXY POTTING RESINS.
6. IDENTIFY PER ND1002019
7. FIND NO.2 TO BE FREE FROM FOREIGN MATTER
8. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008139	FERRULE	2
1	2008094-001	HOUSING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007061	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
HEAT TREATMENT
FINAL FINISH

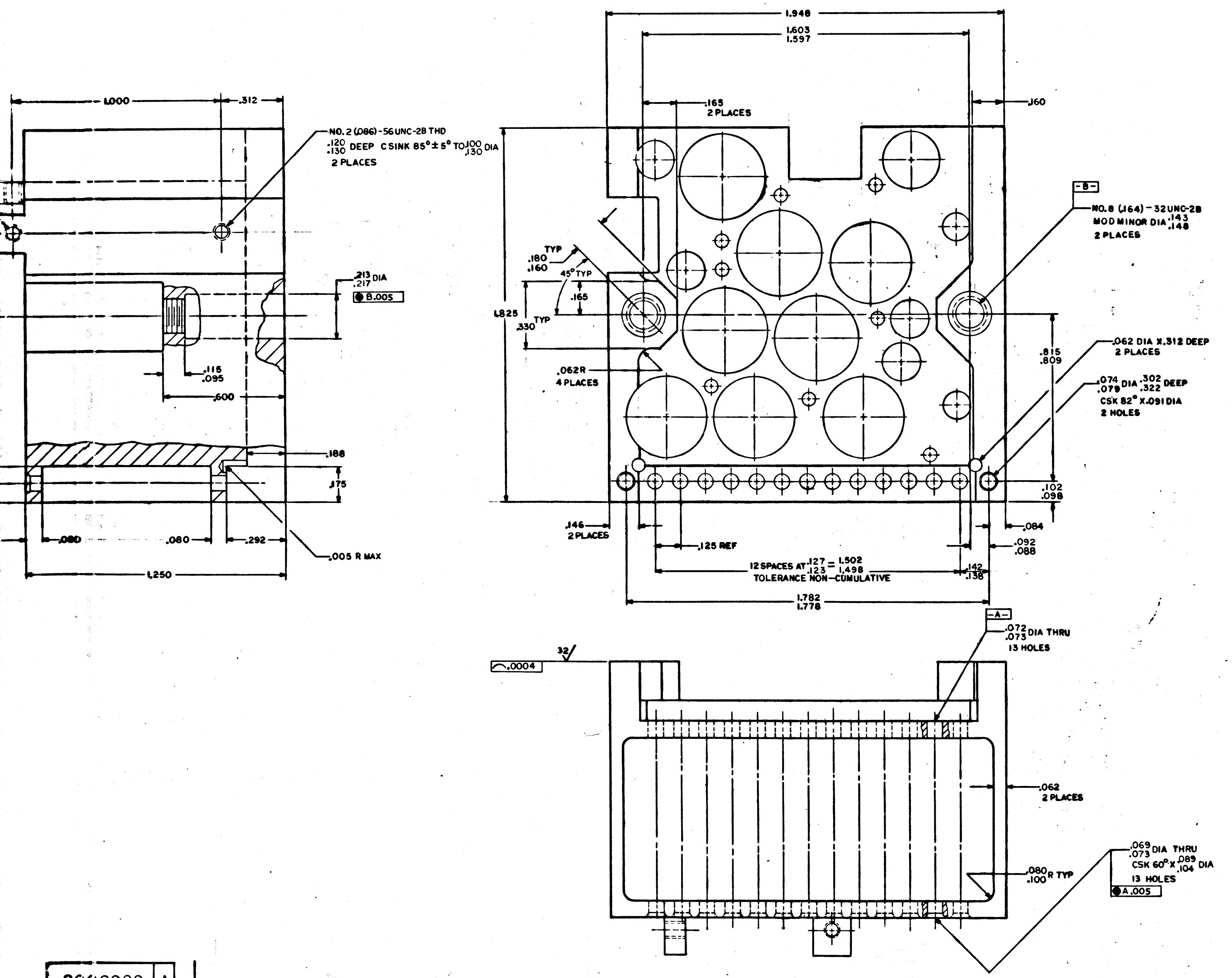
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL 10-22-64
APPROVAL 10-22-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOUSING
PIP PREAMP, MOLDED

CODE IDENT NO. — SIZE D NASA DRAWING NO. 2008094
SCALE 4/1 WT — SHEET 1 OF 1

REVISIONS 15244			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 21476	2-4-65	


1.000
.312
NO. 2 (.086)-56 UNC-2B THD
.120 .130 DEEP CSINK 85° ± 5° TO .100 .130 DIA
2 PLACES
.213 .217 DIA
● B .005
.115 .095
.600
.188
.175
.080
.080
.292
.005 R MAX
1.250
1.948
1.603 1.597
.165 2 PLACES
.160
-B-
NO. 8 (.164) - 32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.180 .160 TYP
45° TYP
.165
1.825
.330 TYP
.062 R
4 PLACES
.815 .809
.062 DIA X .312 DEEP
2 PLACES
.074 .079 DIA .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102 .098
.146
2 PLACES
.084
.125 REF
.092 .088
12 SPACES AT .127 .123 = 1.502 1.498
TOLERANCE NON-CUMULATIVE
.142 .138
1.782 1.778
-A-
.072 .073 DIA THRU
13 HOLES
32
.0004
.062
2 PLACES
.080 .100 R TYP
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
13 HOLES
● A .005

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007105	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT ——
FINAL FINISH SEE NOTE 6

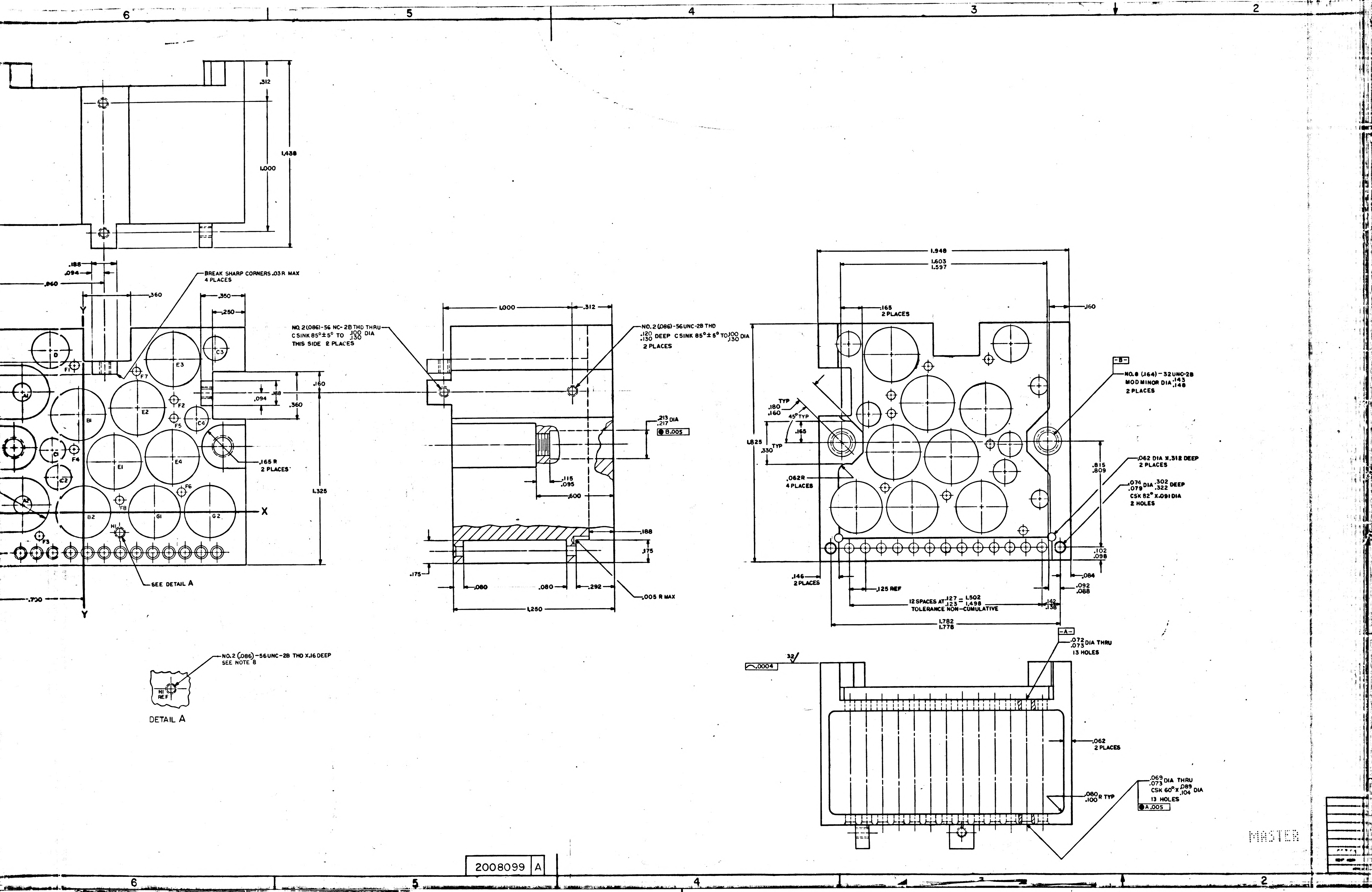
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN W. F. Torg (JC) DATE 12/14/64
CHECKED A. Finchstone 17 Dec 64
APPROVAL J. BLYSHAK
APPROVAL
NASA APPROVAL 1-5-65
MIT APPROVAL 5 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
PIPA CALIBRATION C/M

CODE IDENT NO. ——
SIZE J
NASA DRAWING NO. 2008099
SCALE 5/1
WT ——
SHEET 1 OF 1

2008099 A

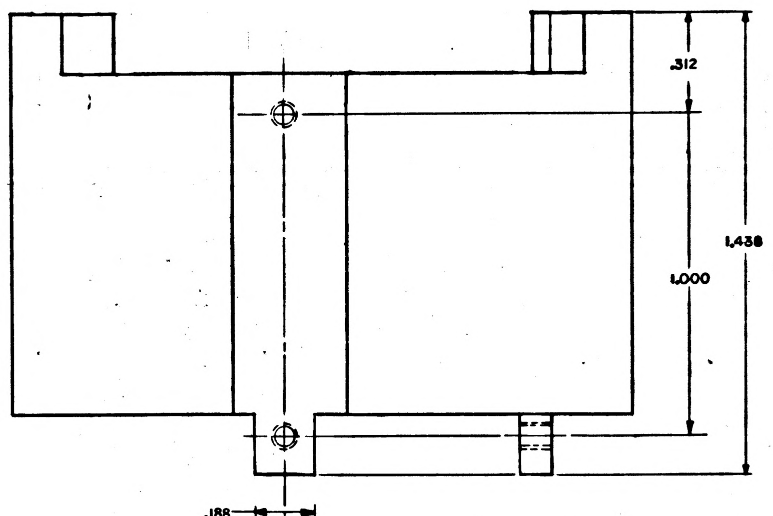

6
5
4
3
2
.312
1.000
1.438
.188
.094
.860
.360
BREAK SHARP CORNERS .03 R MAX
4 PLACES
.350
.250
Y
D
F1
F7
E3
C3
A1
B1
E2
F2
F5
C4
.160
.188
.094
.360
C1
F4
E1
E4
.165 R
2 PLACES
C2
F6
A2
F8
B2
G1
G2
X
F3
H1
1.325
SEE DETAIL A
.700
Y
NO.2 (.086)-56UNC-2B THD X.16 DEEP
SEE NOTE 8
H1
REF
DETAIL A
NO. 2(086)-56 NC-2B THD THRU
CSINK 85°±5° TO .100 .130 DIA
THIS SIDE 2 PLACES
1.000
.312
NO. 2 (.086)-56UNC-2B THD
.120 .130 DEEP CSINK 85°±5° TO .100 .130 DIA
2 PLACES
.213 .217 DIA
● B .005
.115 .095
.600
.188
.175
.175
.080
.080
.292
.005 R MAX
1.250
1.948
1.603 1.597
.165
2 PLACES
.160
-B-
NO.8 (.164)-32UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
TYP
.180 .160
45° TYP
.165
1.825
.330 TYP
.062R
4 PLACES
.815 .809
.062 DIA X.312 DEEP
2 PLACES
.074 .079 DIA .302 .322 DEEP
CSK 82° X.091 DIA
2 HOLES
.102 .098
.146
2 PLACES
.125 REF
.084
.092 .088
12 SPACES AT .127 .123 = 1.502 1.498
TOLERANCE NON-CUMULATIVE
.142 .138
1.782 1.778
-A-
.072 .073 DIA THRU
13 HOLES
32
⌒.0004
.062
2 PLACES
.080 .100 R TYP
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
13 HOLES
● A .005
MASTER
6
5
4
2

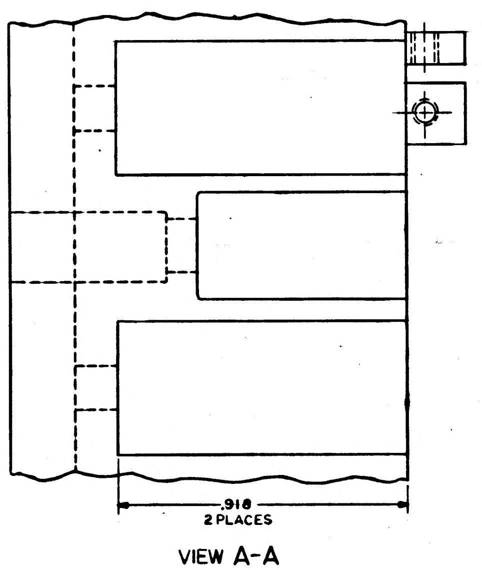
2008099 A

E2

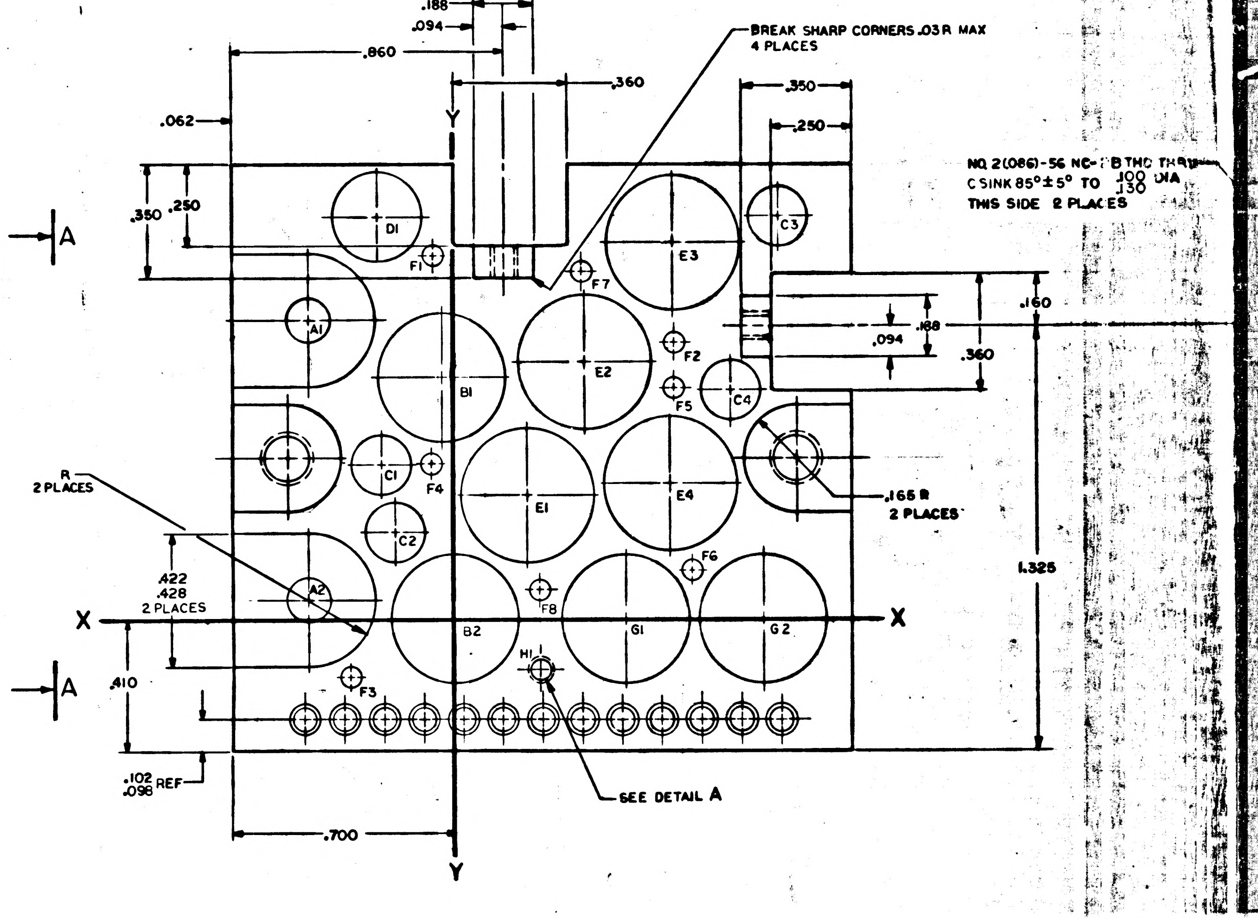
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

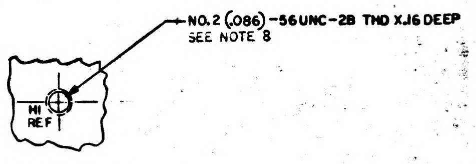
HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.460	.930	.135 .139	2
A2	-.460	.060		
B1	-.040	.750	.402 .409	2
B2	.000	.000		
C1	-.230	.480	.181 .185	4
C2	-.190	.270		
C3	1.020	1.250		
C4	.870	.710		
D1	-.240	1.247	.275 .282	1
E1	.230	.380	.419 .426	4
E2	.410	.800		
E3	.690	1.170		
E4	.680	.420		
F1	-.070	1.130	.058 .062	8
F2	.690	.860		
F3	-.330	-.180		
F4	-.070	.485		
F5	.690	.720		
F6	.750	.150		
F7	.400	1.080		
F8	.270	.090		
G1	.540	.000	.395 .402	2
G2	.970	.000		
H1	.275	-.155	SEE DETAIL A	1


.312
1.438
1.000


.918
2 PLACES

VIEW A-A


.188
.094
.860
.360
BREAK SHARP CORNERS .03 R MAX
4 PLACES
.350
.250
NO. 2(.086)-56 NC-2B THD THRU
CSINK 85° ± 5° TO .100 .130 DIA
THIS SIDE 2 PLACES
.062
Y
A
A
.350
.250
D1
E3
C3
F1
F7
.160
.188
.094
.360
A1
B1
E2
F2
F5
C4
R
2 PLACES
C1
F4
E1
E4
.165 R
2 PLACES
1.325
C2
F6
.422
.428
2 PLACES
A2
F8
X
X
B2
G1
G2
H1
.410
F3
.102
.098 REF
SEE DETAIL A
.700
Y

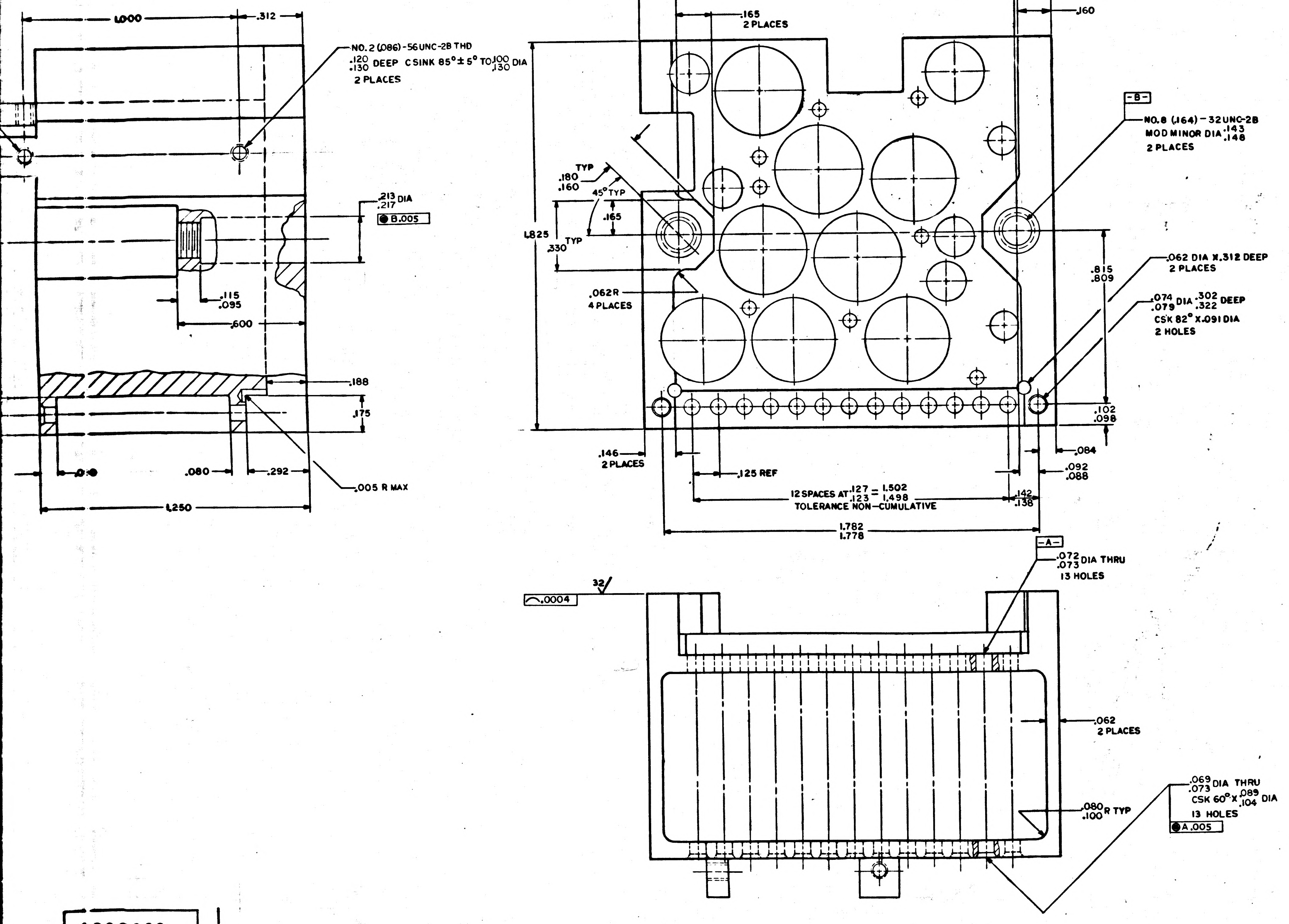

NO. 2 (.086)-56 UNC-2B THD X.16 DEEP
SEE NOTE 8
H1
REF

DETAIL A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
5. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. THREADS TO BE FREE OF ANODIZE
9. APPLY A COATING OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

REVISIONS 15244			
SYM	DESCRIPTION	DATE	APPROVAL


1.000
.312
NO. 2 (.086)-56 UNC-2B THD
.120 .130 DEEP CSINK 85° ± 5° TO .100 .130 DIA
2 PLACES
.213 .217 DIA
● B.005
.115 .095
.600
.188
.175
.080
.292
.005 R MAX
1.250
1.948
1.603 1.597
.165 2 PLACES
.160
-B-
NO. 8 (.164) - 32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
TYP
.180 .160
45° TYP
.165
1.825
.330 TYP
.062R
4 PLACES
.815 .809
.062 DIA X .312 DEEP
2 PLACES
.074 .079 DIA .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102 .098
.146
2 PLACES
.125 REF
12 SPACES AT .127 .123 = 1.502 1.498
TOLERANCE NON-CUMULATIVE
.142 .138
.084
.092 .088
1.782 1.778
-A-
.072 .073 DIA THRU
13 HOLES
32
.0004
.062
2 PLACES
.080 .100 R TYP
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
13 HOLES
● A.005

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH SEE NOTE 6

NEXT ASSY	USED ON
2007105	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W.F. Troy (J.C.) DATE 10/14/64
CHECKED A. Lindstrom 19 Dec 64
APPROVAL J. BLYSHAK
APPROVAL
NASA APPROVAL 1-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
PIPA CALIBRATION C/M

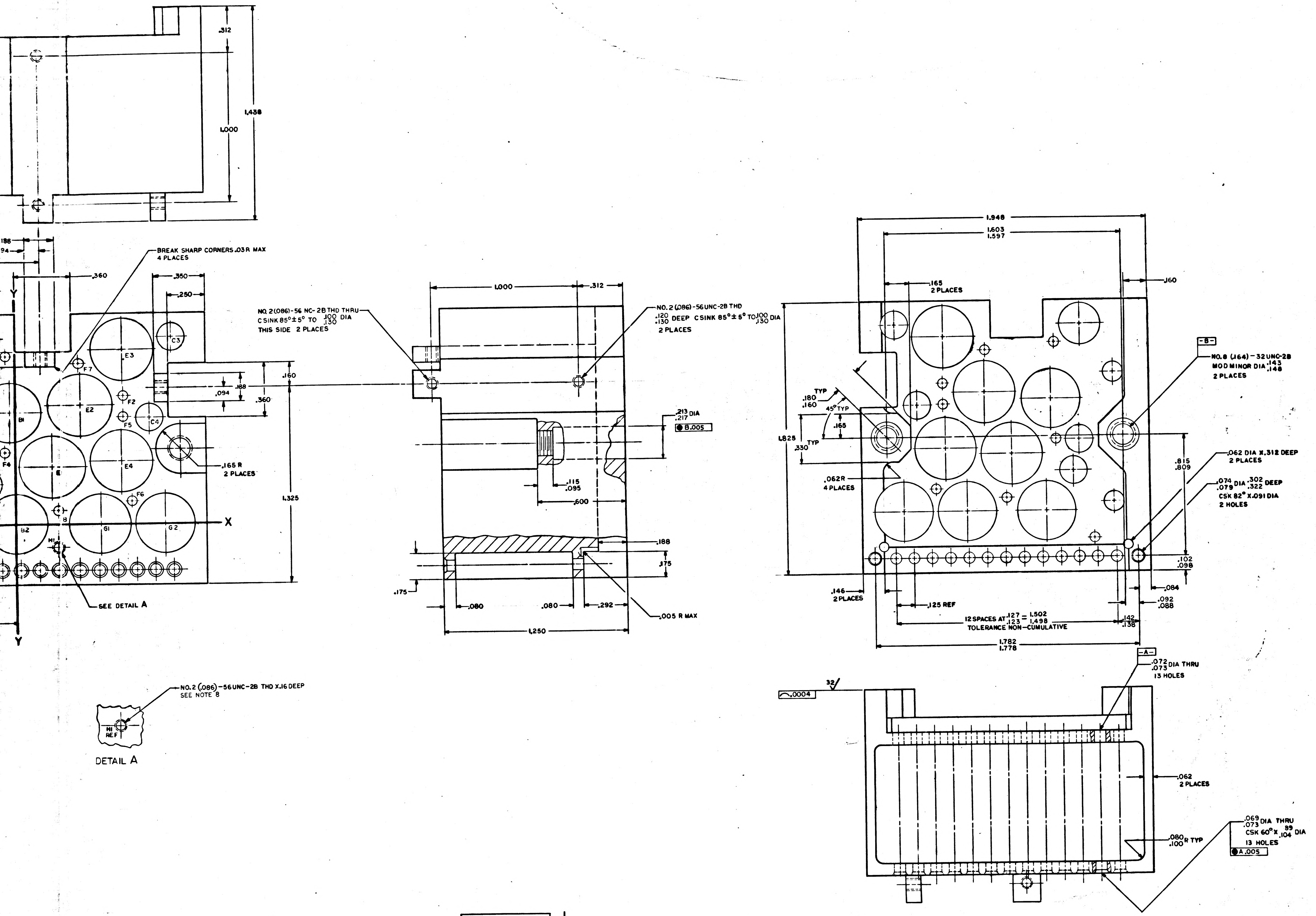
CODE IDENT NO. — | SIZE J | NASA DRAWING NO. 2008099

SCALE 5/1 | WT — | SHEET 1 OF 1

2008099

2008099

F3



.312
1.438
1.000
.188
.094
.360
BREAK SHARP CORNERS .03R MAX
4 PLACES
.350
.250
Y
C3
E3
F7
E2
F2
F5
C4
B1
F4
E
E4
.165 R
2 PLACES
F6
B
B2
G1
G2
X
M1
SEE DETAIL A
Y
.160
.188
.094
.360
1.325
NO. 2 (.086)-56 UNC-2B THD X.16 DEEP
SEE NOTE 8
M1
REF
DETAIL A
NO. 2 (.086)-56 NC-2B THD THRU
C SINK 85° ± 5° TO .100/.130 DIA
THIS SIDE 2 PLACES
1.000
.312
NO. 2 (.086)-56 UNC-2B THD
.120/.130 DEEP C SINK 85° ± 5° TO .100/.130 DIA
2 PLACES
.213/.217 DIA
● B .005
.115/.095
.600
.188
.175
.175
.080
.080
.292
.005 R MAX
1.250
1.948
1.603/1.597
.165
2 PLACES
.160
-B-
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143/.148
2 PLACES
TYP
.180/.160
45° TYP
.165
1.825
.330 TYP
.062R
4 PLACES
.815/.809
.062 DIA X .312 DEEP
2 PLACES
.074/.079 DIA .302/.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.102/.098
.084
.146
2 PLACES
.125 REF
.092/.088
12 SPACES AT .127/.123 = 1.502/1.498
TOLERANCE NON-CUMULATIVE
.142/.138
1.782/1.778
-A-
.072/.073 DIA THRU
13 HOLES
32
.0004
.062
2 PLACES
.069/.073 DIA THRU
CSK 60° X .089/.104 DIA
13 HOLES
.080/.100 R TYP
● A .005

MASTER

[illegible]007105	
NEXT ASSY	US'D ON
APPLICATION	

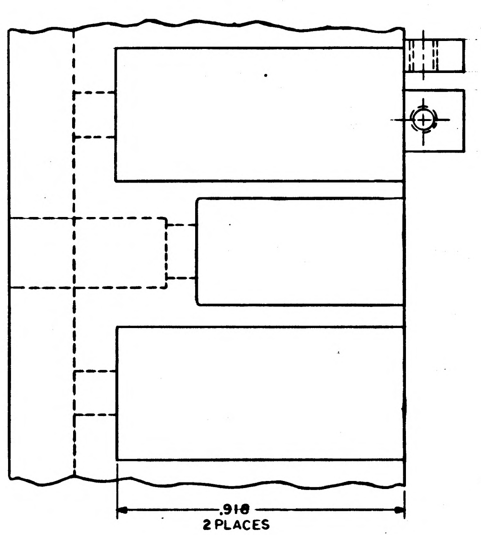
UNLESS OTHERWISE
DIMENSIONS ARE
TOLERANCES ON
FRACTIONS DEC
± —— XX
XXX
DO NOT SCALE
MATERIAL
SEE NO
HEAT TREATMENT
FINAL FINISH
SEE

2008099

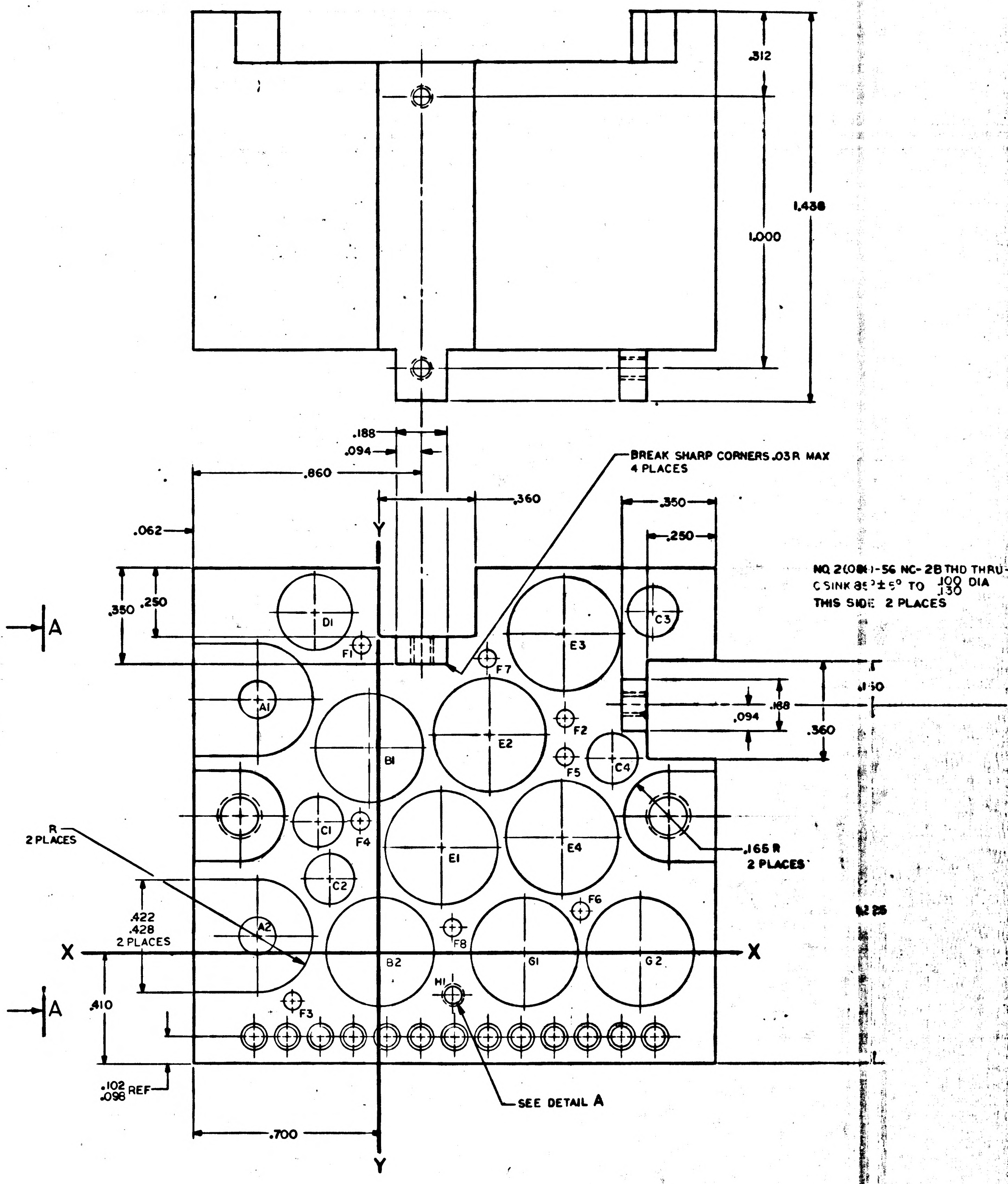
F2

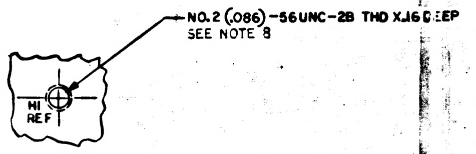
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	−.460	.930	.135 .139	2
A2	−.460	.060		
B1	−.040	.750	.402 .409	2
B2	.000	.000		
C1	−.230	.480	.181 .185	4
C2	−.190	.270		
C3	1.020	1.250		
C4	.870	.710		
D1	−.240	1.247	.275 .282	1
E1	.230	.380	.419 .426	4
E2	.410	.800		
E3	.690	1.170		
E4	.680	.420		
F1	−.070	1.130	.058 .062	8
F2	.690	.860		
F3	−.330	−.180		
F4	−.070	.485		
F5	.690	.720		
F6	.750	.150		
F7	.400	1.080		
F8	.270	.090		
G1	.540	.000	.395 .402	2
G2	.970	.000		
H1	.275	−.155	SEE DETAIL A	1


A
A
.918
2 PLACES

VIEW A-A


.312
1.438
1.000
.188
.094
.860
.360
.062
Y
BREAK SHARP CORNERS .03 R MAX
4 PLACES
.350
.250
.350
.250
NO. 2(.086)-56 NC-2B THD THRU
C SINK 82°±5° TO .100 .130 DIA
THIS SIDE 2 PLACES
D1
F1
F7
E3
C3
A1
B1
E2
F2
F5
C4
.150
.168
.094
.360
C1
F4
C2
E1
E4
.165 R
2 PLACES
R
2 PLACES
.422
.428
2 PLACES
A2
F6
F8
X
B2
G1
G2
X
H1
.410
F3
.102
.098 REF
SEE DETAIL A
.700
Y


NO. 2 (.086)-56UNC-2B THD X.16 DEEP
SEE NOTE 8
H1
REF

DETAIL A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER

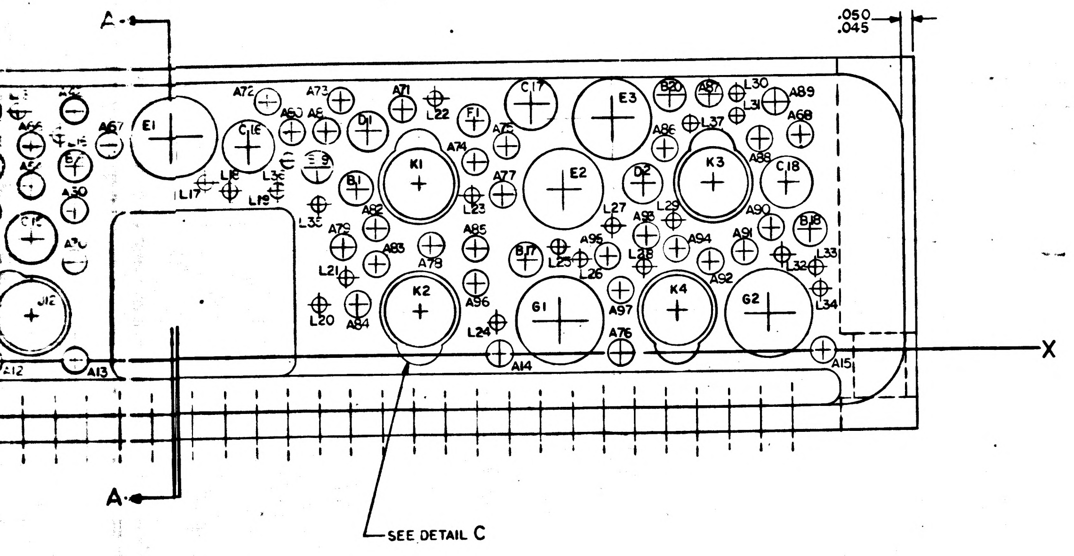
5. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. THREADS TO BE FREE OF ANODIZE

34

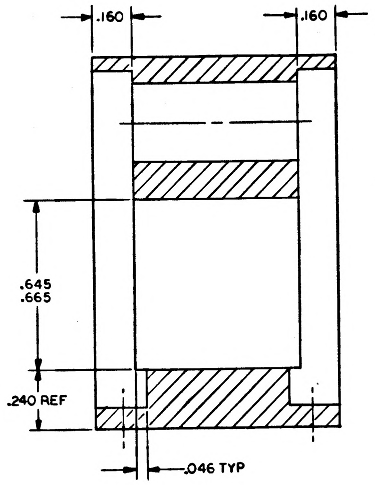
2008102 A

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15563	25 JAN 65	WK

REVISIONS 15124

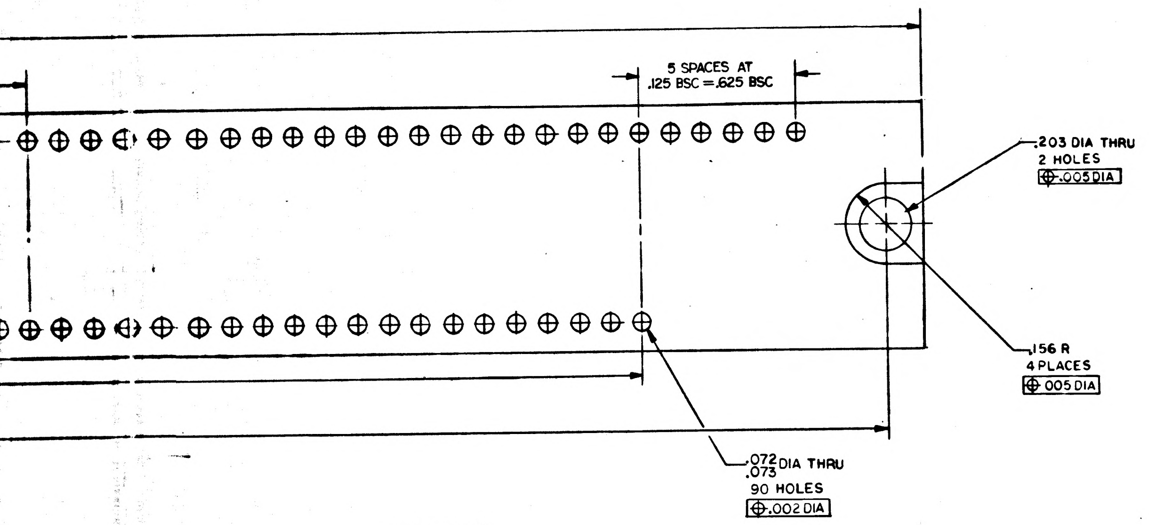


A
A
X
.050
.045
E1
E2
E3
K1
K2
K3
K4
G1
G2
C16
C17
C18
D1
D2
F1
B1
B17
B20
B38
J12
A13
A14
A15
SEE DETAIL C

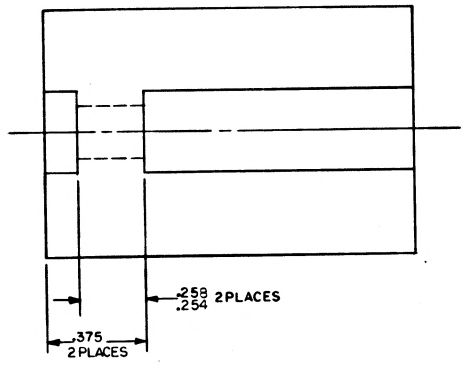


.160
.160
.645
.665
.240 REF
.046 TYP

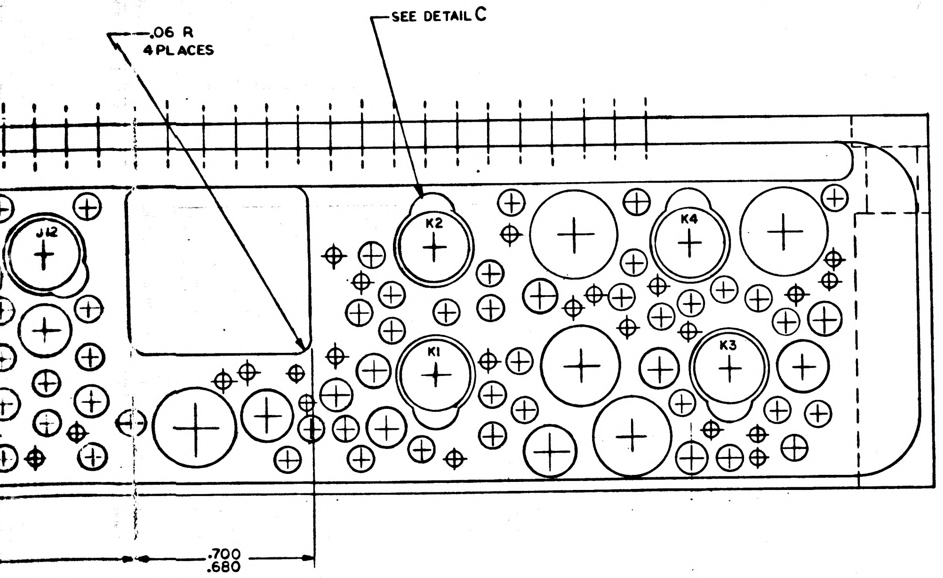
SECTION A-A



5 SPACES AT
.125 BSC = .625 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.156 R
4 PLACES
⊕ .005 DIA
.072
.073 DIA THRU
90 HOLES
⊕ .002 DIA



.258
.254 2 PLACES
.375
2 PLACES



.06 R
4 PLACES
SEE DETAIL C
J12
K1
K2
K3
K4
.700
.680

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007147	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS XXX ± .005 XX .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT ——

FINAL FINISH SEE NOTE 5

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN E. Valley DATE 8 OCT 64
CHECKED 18 DEC 64
APPROVAL 12/22/64
APPROVAL 12/28/64
NASA APPROVAL W J Rhine 12-29-64
MIT APPROVAL 12/29/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
COARSE SYSTEM ELECTRONICS
CDU

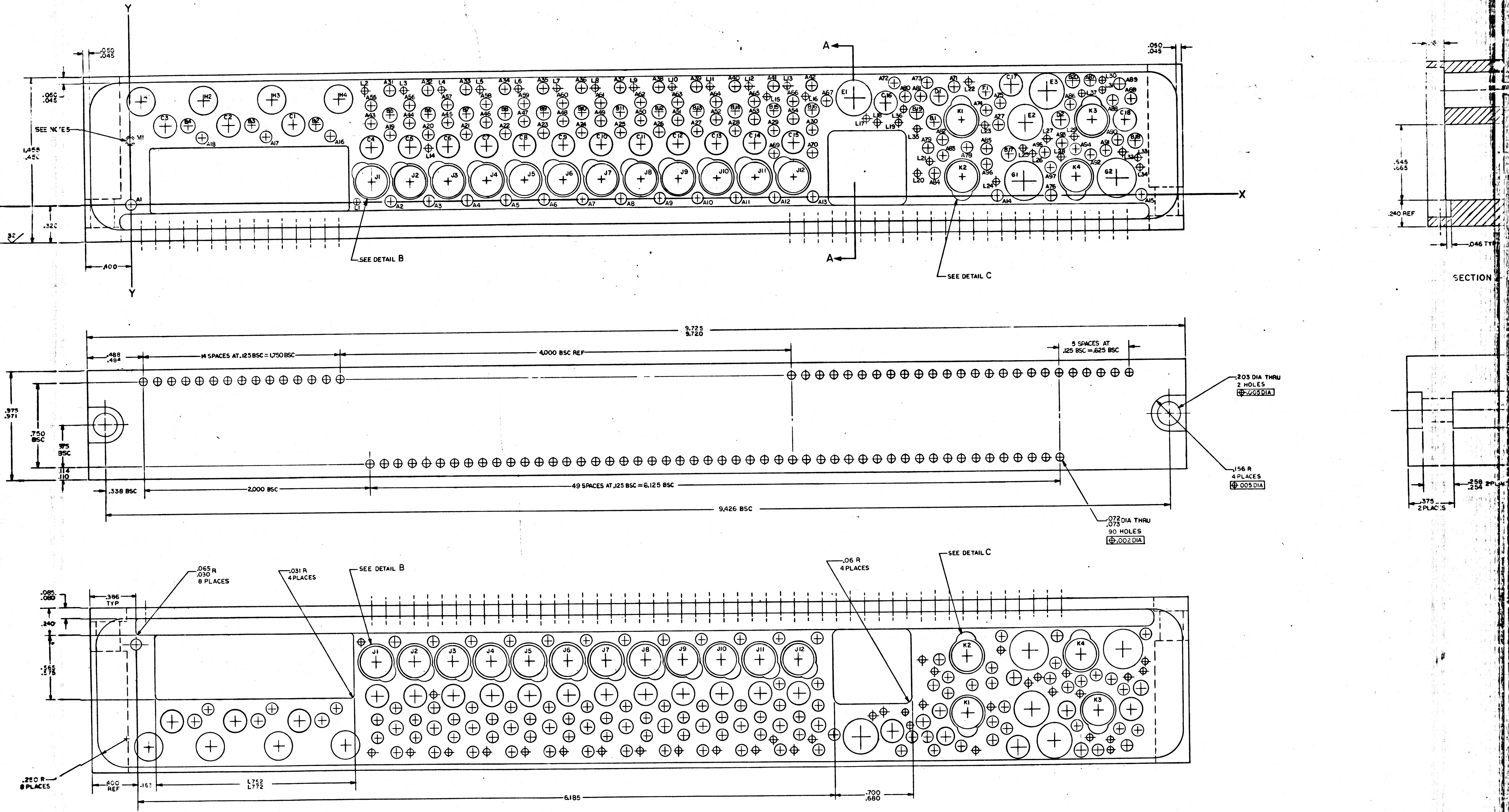
CODE IDENT NO. ——
SIZE J
NASA DRAWING NO 2008102
SCALE 4/1
WT ——
SHEET 1 OF 1

2008102 A

2008102 A

3H

F3


SEE NOTES
SEE DETAIL B
SEE DETAIL C
A
X
Y
.050 .045
1.455 .450
.320
.400
9.725 9.720
.488 .484
14 SPACES AT .125 BSC = 1.750 BSC
4.000 BSC REF
5 SPACES AT .125 BSC = .625 BSC
.375 .371
.750 BSC
.375 BSC
.114 .110
.338 BSC
2.000 BSC
49 SPACES AT .125 BSC = 6.125 BSC
9.426 BSC
.203 DIA THRU 2 HOLES
.005 DIA
.156 R 4 PLACES
.005 DIA
.072 .073 DIA THRU 90 HOLES
.002 DIA
.065 R .030 8 PLACES
.031 R 4 PLACES
.06 R 4 PLACES
.085 .080
.386 TYP
.240
.565 .575
.250 R 8 PLACES
.400 REF
.163
1.752 1.772
6.185
.700 .680
.545 .565
.240 REF
.046 TYP
SECTION
.258 .254 2 PLACES
.375 2 PLACES

2008102 A

F-2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

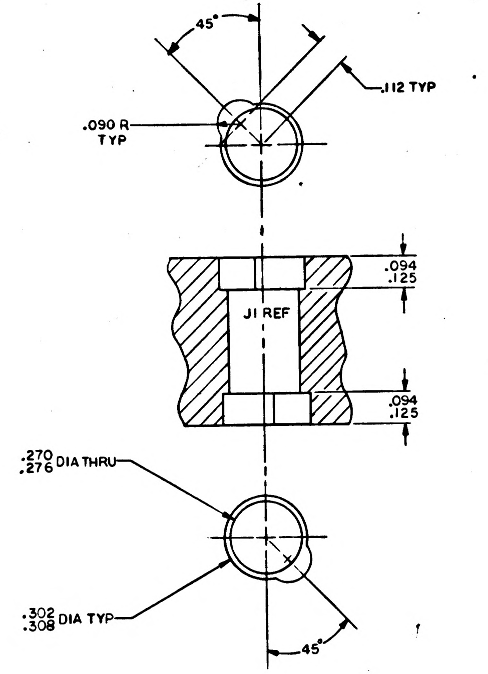
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104 DIA	72
A2	2.300	↓		
A3	2.640	↓		
A4	2.980	↓		
A5	3.320	↓		
A6	3.660	↓		
A7	4.000	↓		
A8	4.340	↓		
A9	4.680	↓		
A10	5.020	↓		
A11	5.360	↓		
A12	5.700	↓		
A13	6.040	↓		
A14	7.680	↓		
A15	8.960	.000		
A16	1.770	.578		
A17	1.200	↓		
A18	.640	↓		
A19	2.300	↓		
A20	2.640	↓		
A21	2.980	↓		
A22	3.320	↓		
A23	3.660	↓		
A24	4.000	↓		
A25	4.340	↓		
A26	4.680	↓		
A27	5.020	↓		
A28	5.360	↓		
A29	5.700	↓		
A30	6.040	.578		
A31	2.300	.980		
A32	2.640	↓		
A33	2.980	↓		
A34	3.320	↓		
A35	3.660	↓		
A36	4.000	↓		
A37	4.340	↓		
A38	4.680	↓		
A39	5.020	↓		
A40	5.360	↓		
A41	5.700	↓		
A42	6.040	.980		
A43	2.130	.682		
A44	2.470	↓		
A45	2.810	↓		
A46	3.150	↓		
A47	3.490	↓		
A48	3.830	↓		
A49	4.170	↓		
A50	4.510	↓		
A51	4.850	↓		
A52	5.190	↓		
A53	5.530	↓		
A54	5.870	.682		
A55	2.130	.840		
A56	2.470	↓		
A57	2.810	↓		
A58	3.150	↓		
A59	3.490	↓		
A60	3.830	↓		
A61	4.170	↓		
A62	4.510	↓		
A63	4.850	↓		
A64	5.190	↓		
A65	5.530	↓		
A66	5.870	↓		
A67	6.180	↓		
A68	8.875	.840		
A69	5.700	.385		
A70	6.040	.385		
A71	7.305	.960		
A72	6.775	.995		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A73	7.065	.995	.100 .104 DIA	25
A74	7.590	.750		
A75	7.715	.812		
A76	8.155	.000		
A77	7.695	.620		
A78	7.415	.420		
A79	7.070	.420		
A80	6.870	.870		
A81	7.005	.870		
A82	7.200	.495		
A83	7.200	.350		
A84	7.125	.200		
A85	7.590	.410		
A86	8.335	.800		
A87	8.515	1.005		
A88	8.710	.830		
A89	8.775	.970		
A90	8.755	.480		
A91	8.645	.390		
A92	8.510	.355		
A93	8.260	.455		
A94	8.380	.405		
A95	8.105	.380		
A96	7.590	.275		
A97	8.155	.245		
B1	7.125	.645	.127 .131 DIA	20
B2	1.645	.682		
B3	1.075	.682		
B4	.515	.682		
B5	2.300	.755		
B6	2.640	↓		
B7	2.980	↓		
B8	3.320	↓		
B9	3.660	↓		
B10	4.000	↓		
B11	4.340	↓		
B12	4.680	↓		
B13	5.020	↓		
B14	5.360	↓		
B15	5.700	↓		
B16	6.040	.755		
B17	7.780	.365		
B18	8.905	.475		
B19	6.965	.735		
B20	8.365	1.005		
C1	1.445	.682	.202 .206 DIA	18
C2	.875	.682		
C3	.315	.682		
C4	2.130	.475		
C5	2.470	↓		
C6	2.810	↓		
C7	3.150	↓		
C8	3.490	↓		
C9	3.830	↓		
C10	4.170	↓		
C11	4.510	↓		
C12	4.850	↓		
C13	5.190	↓		
C14	5.530	↓		
C15	5.870	.475		
C16	6.695	.820		
C17	7.810	.975		
C18	8.812	.660		

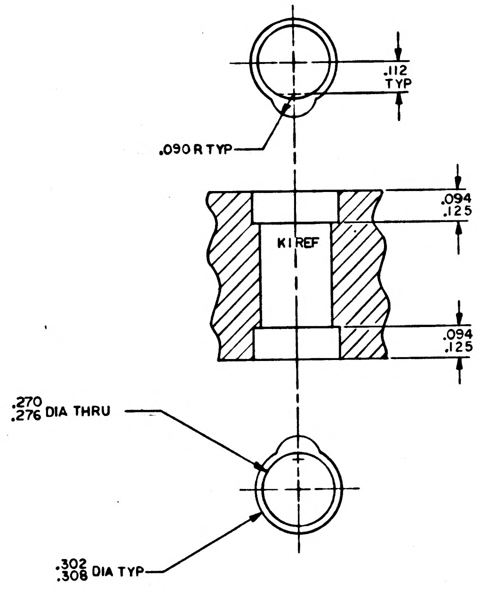
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
D1	7.170	.870	.153 .157 DIA	2
D2	8.255	.660		
E1	6.415	.865	.309 .316 DIA	3
E2	7.930	.640		
E3	8.130	.915		
F1	7.590	.910	.112 .116 DIA	1
G1	7.915	.125	.346 .353 DIA	2
G2	8.745	.145		
H1	.400	.900	.250 DIA	4
H2	.650	↓		
H3	1.250	↓		
H4	1.850	.900		
J1	2.130	.170	SEE DETAIL B	12
J2	2.470	↓		
J3	2.810	↓		
J4	3.150	↓		
J5	3.490	↓		
J6	3.830	↓		
J7	4.170	↓		
J8	4.510	↓		
J9	4.850	↓		
J10	5.190	↓		
J11	5.530	↓		
J12	5.870	.170		
K1	7.370	.665	SEE DETAIL C	4
K2	7.370	.170		
K3	8.530	.665		
K4	8.380	.170		
L1	2.000	.000	.058 .062 DIA	37
L2	2.080	.980		
L3	2.420	↓		
L4	2.760	↓		
L5	3.100	↓		
L6	3.440	↓		
L7	3.780	↓		
L8	4.120	↓		
L9	4.460	↓		
L10	4.800	↓		
L11	5.140	↓		
L12	5.480	↓		
L13	5.820	.980		
L14	2.640	.460		
L15	5.640	.885		
L16	5.985	.885		
L17	6.525	.682		
L18	6.620	.650		
L19	6.805	.650		
L20	6.965	.200		
L21	7.080	.300		
L22	7.435	.995		
L23	7.580	.620		
L24	7.670	.120		
L25	7.915	.415		
L26	7.995	.360		
L27	8.125	.500		
L28	8.250	.335		
L29	8.375	.515		
L30	8.625	1.005		
L31	8.625	.920		
L32	8.795	.378		
L33	8.925	.320		
L34	8.955	.238		
L35	6.965	.578		
L36	6.845	.765		
L37	8.445	.895		
			NO.2-56UNC-2B THD 18 DEEP	1
M1	.000	.578		

NOTES:

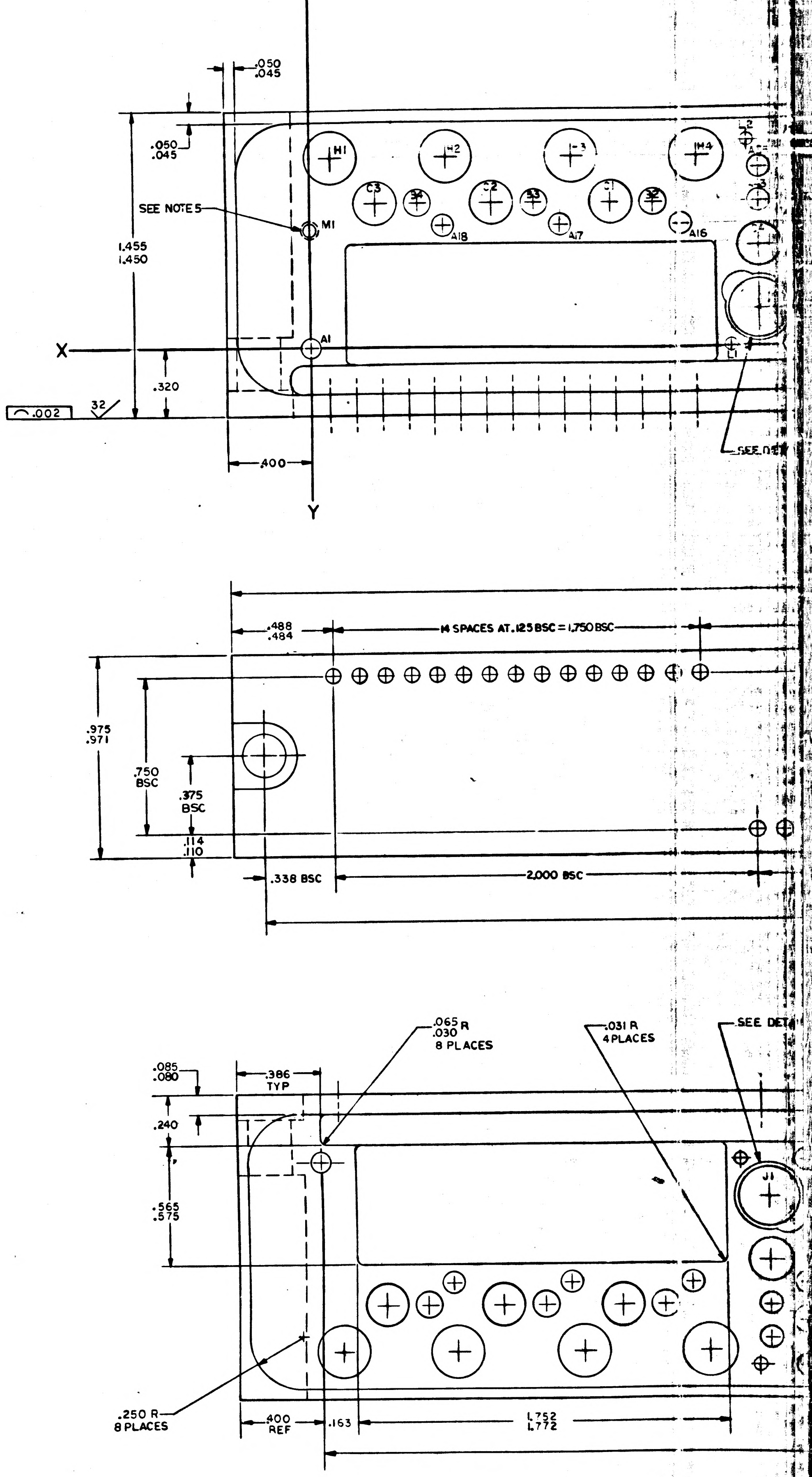
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C. TAPPED HOLE M1 TO BE FREE OF ANODIZE
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
7. IDENTIFY PER ND 1002019

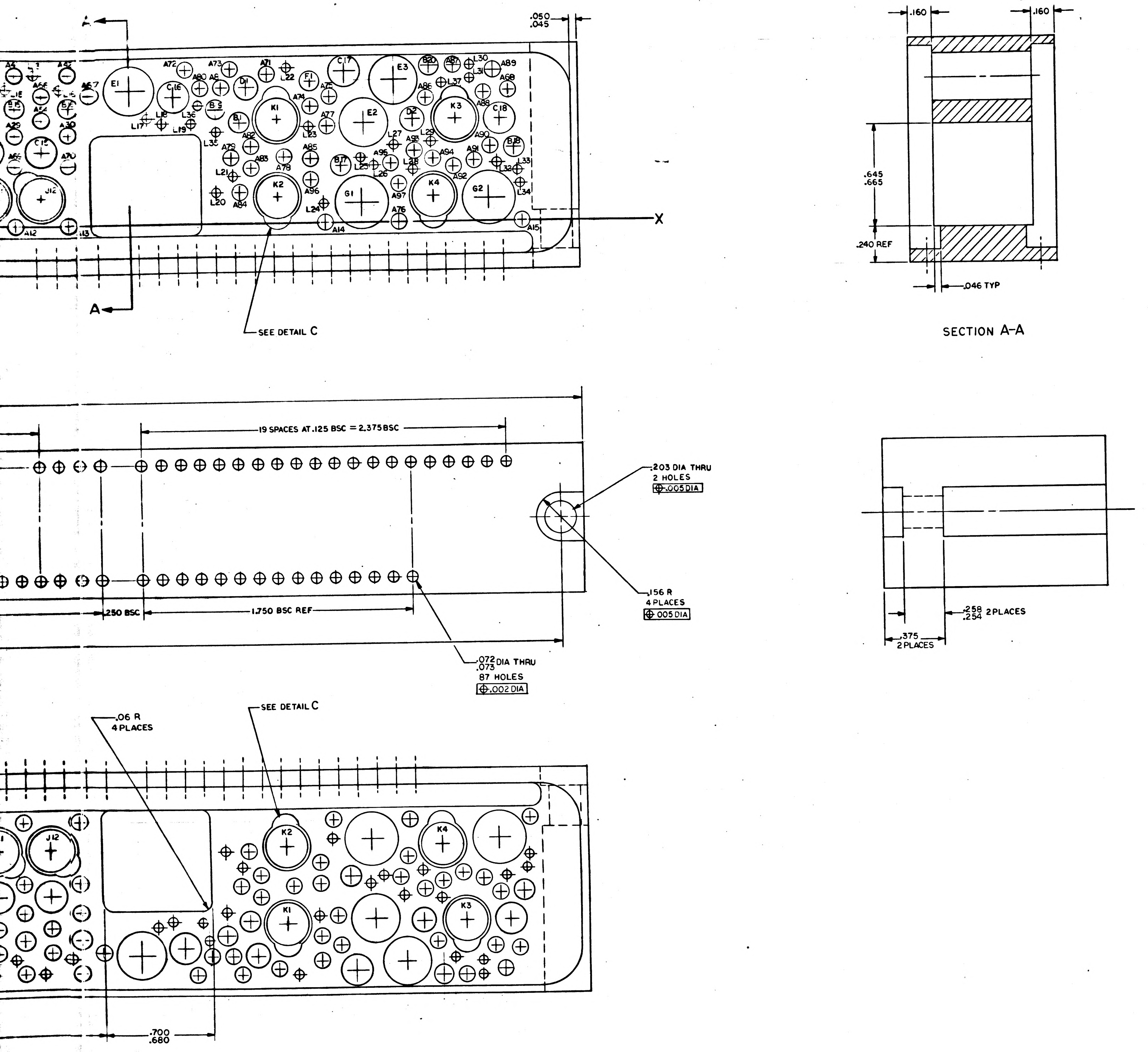

45°
.112 TYP
.090 R TYP
.094
.125
J1 REF
.094
.125
.270
.276 DIA THRU
.302
.308 DIA TYP
45°

DETAIL B
TYP 12 PLACES


.112 TYP
.090 R TYP
.094
.125
K1 REF
.094
.125
.270
.276 DIA THRU
.302
.308 DIA TYP

DETAIL C
TYP 4 PLACES


Y
.050
.045
.050
.045
H1
H2
H3
H4
C3
C2
C1
A18
A17
A16
SEE NOTE 5
M1
1.455
1.450
X
A1
.320
.002
32
.400
Y
SEE NOTE
.488
.484
14 SPACES AT .125 BSC = 1.750 BSC
.975
.971
.750 BSC
.375 BSC
.114
.110
.338 BSC
2.000 BSC
.065 R
.030
8 PLACES
.031 R
4 PLACES
SEE DET
.085
.080
.386 TYP
.240
.565
.575
J1
.250 R
8 PLACES
.400 REF
.163
L752
L772


A
A
X
.050
.045
SEE DETAIL C
.160
.160
.645
.665
.240 REF
.046 TYP
SECTION A-A
19 SPACES AT .125 BSC = 2.375 BSC
.203 DIA THRU
2 HOLES
.005 DIA
.156 R
4 PLACES
.005 DIA
.250 BSC
1.750 BSC REF
.072
.073 DIA THRU
87 HOLES
.002 DIA
.258
.254 2 PLACES
.375
2 PLACES
.06 R
4 PLACES
SEE DETAIL C
.700
.680
E1
E2
E3
K1
K2
K3
K4
G1
G2
J12
C17
C18
D1
D2

2008102

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT —

FINAL FINISH SEE NOTE 5

NEXT ASSY	USED ON
2007147	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE
CHECKED 18 DEC 64
APPROVAL
APPROVAL
NASA APPROVAL 12-24-69
MIT APPROVAL

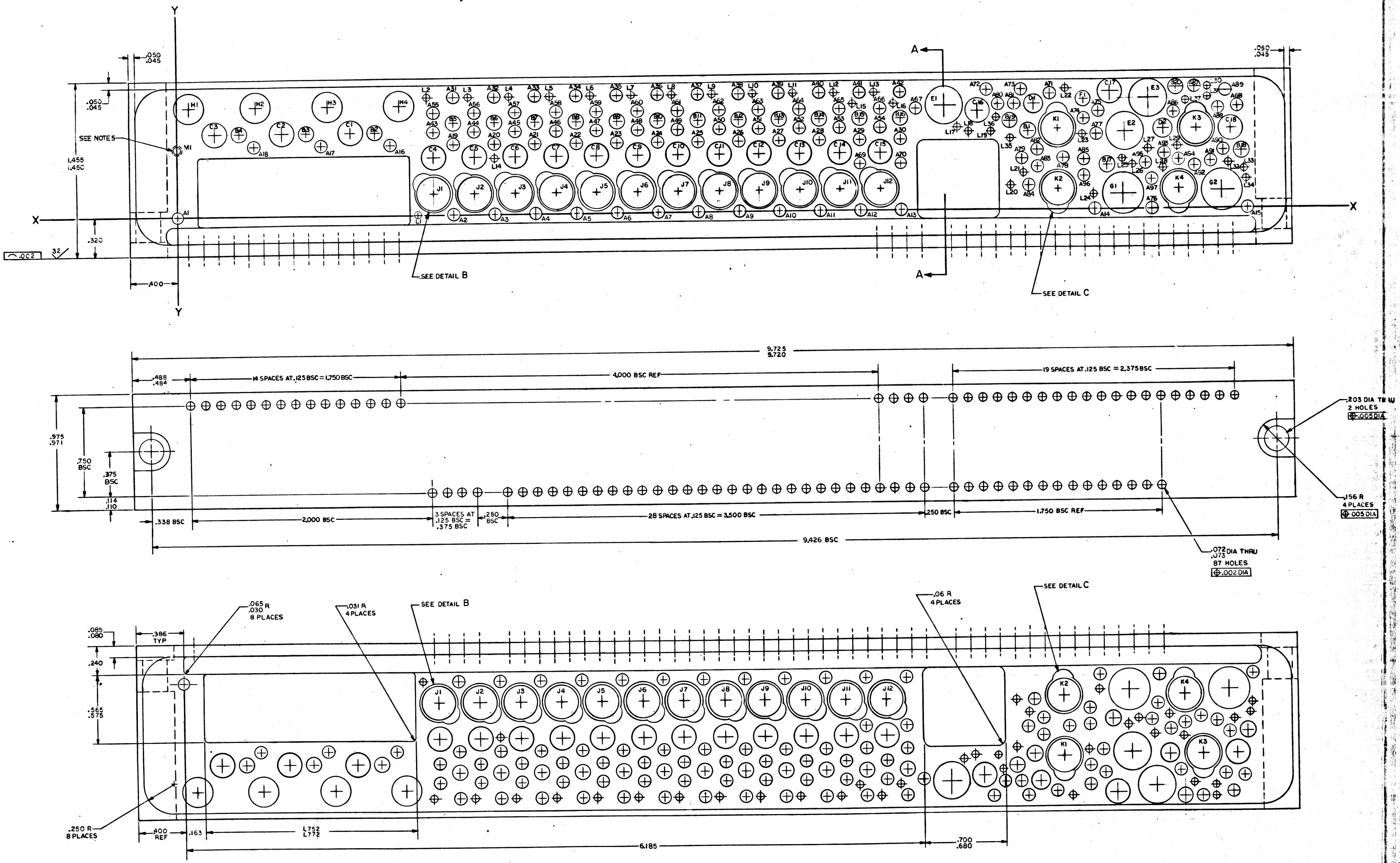
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
COARSE SYSTEM ELECTRONICS
CDU

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008102
SCALE 4/1
WT —
SHEET 1 OF 1

F3

2008102


Y
X
A
SEE NOTE 5
M1
A1
H1
H2
H3
H4
E1
E2
E3
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
K1
K2
K3
K4
G1
G2
.050
.045
1.455
1.450
.320
.400
.002
32
SEE DETAIL B
SEE DETAIL C
9.725
9.720
.488
.484
14 SPACES AT .125 BSC = 1.750 BSC
4.000 BSC REF
19 SPACES AT .125 BSC = 2.375 BSC
.975
.971
.750
BSC
.375
BSC
.114
.110
.338 BSC
2.000 BSC
3 SPACES AT .125 BSC = .375 BSC
.250
BSC
28 SPACES AT .125 BSC = 3.500 BSC
.250 BSC
1.750 BSC REF
9.426 BSC
.203 DIA THRU
2 HOLES
.005 DIA
.156 R
4 PLACES
.005 DIA
.072
.073 DIA THRU
87 HOLES
.002 DIA
.065 R
.030
8 PLACES
.031 R
4 PLACES
.06 R
4 PLACES
.085
.080
.386
TYP
.240
.565
.575
.250 R
8 PLACES
.400
REF
.163
1.752
1.772
6.185
.700
.680
.094
.125

F2

2008102

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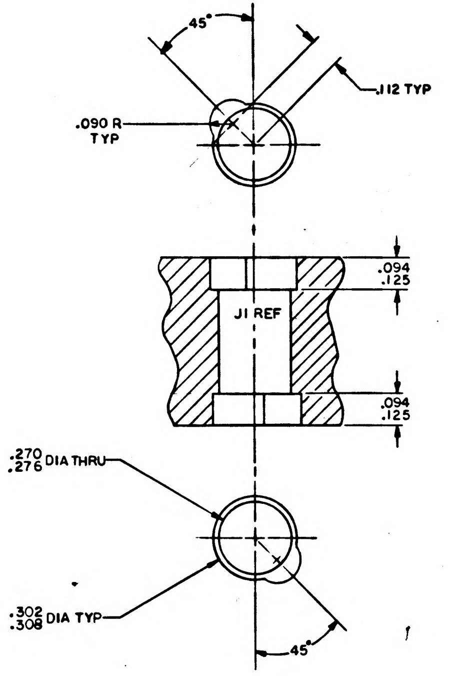
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104 DIA	72
A2	2.300			
A3	2.640			
A4	2.980			
A5	3.320			
A6	3.660			
A7	4.000			
A8	4.340			
A9	4.680			
A10	5.020			
A11	5.360			
A12	5.700			
A13	6.040			
A14	7.680			
A15	8.960	.000		
A16	1.770	.578		
A17	1.200			
A18	.640			
A19	2.300			
A20	2.640			
A21	2.980			
A22	3.320			
A23	3.660			
A24	4.000			
A25	4.340			
A26	4.680			
A27	5.020			
A28	5.360			
A29	5.700			
A30	6.040	.578		
A31	2.300	.980		
A32	2.640			
A33	2.980			
A34	3.320			
A35	3.660			
A36	4.000			
A37	4.340			
A38	4.680			
A39	5.020			
A40	5.360			
A41	5.700			
A42	6.040	.980		
A43	2.130	.682		
A44	2.470			
A45	2.810			
A46	3.150			
A47	3.490			
A48	3.830			
A49	4.170			
A50	4.510			
A51	4.850			
A52	5.190			
A53	5.530			
A54	5.870	.682		
A55	2.130	.840		
A56	2.470			
A57	2.810			
A58	3.150			
A59	3.490			
A60	3.830			
A61	4.170			
A62	4.510			
A63	4.850			
A64	5.190			
A65	5.530			
A66	5.870			
A67	6.180			
A68	8.875	.840		
A69	5.700	.385		
A70	6.040	.385		
A71	7.305	.960		
A72	6.775	.995		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A73	7.065	.995	.100 .104 DIA	25
A74	7.590	.750		
A75	7.715	.812		
A76	8.155	.000		
A77	7.695	.620		
A78	7.415	.420		
A79	7.070	.420		
A80	6.870	.870		
A81	7.005	.870		
A82	7.200	.495		
A83	7.200	.350		
A84	7.125	.200		
A85	7.590	.410		
A86	8.335	.800		
A87	8.515	1.005		
A88	8.710	.830		
A89	8.775	.970		
A90	8.755	.480		
A91	8.645	.390		
A92	8.510	.355		
A93	8.260	.455		
A94	8.380	.405		
A95	8.105	.380		
A96	7.590	.275		
A97	8.155	.245		
B1	7.125	.645	.127 .131 DIA	20
B2	1.645	.682		
B3	1.075	.682		
B4	.515	.692		
B5	2.300	.755		
B6	2.640			
B7	2.980			
B8	3.320			
B9	3.660			
B10	4.000			
B11	4.340			
B12	4.680			
B13	5.020			
B14	5.360			
B15	5.700			
B16	6.040	.755		
B17	7.780	.365		
B18	8.905	.475		
B19	6.965	.735		
B20	8.365	1.005		
C1	1.445	.682	.202 .206 DIA	18
C2	.875	.682		
C3	.315	.682		
C4	2.130	.475		
C5	2.470			
C6	2.810			
C7	3.150			
C8	3.490			
C9	3.830			
C10	4.170			
C11	4.510			
C12	4.850			
C13	5.190			
C14	5.530			
C15	5.870	.475		
C16	6.695	.820		
C17	7.810	.975		
C18	8.812	.660		

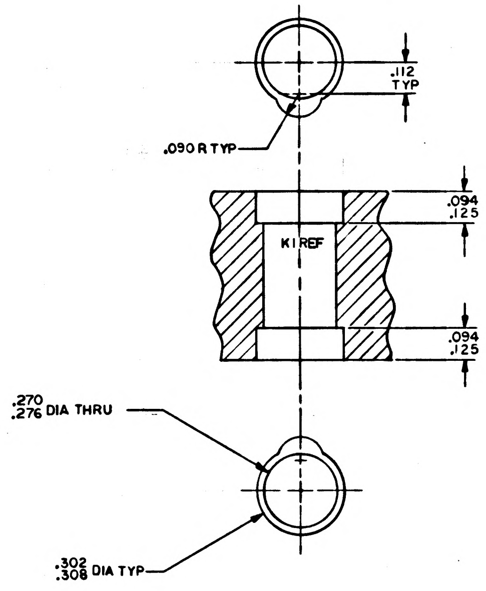
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
D1	7.170	.870	.153 .157 DIA	2
D2	8.255	.660		
E1	6.415	.865	.309 .316 DIA	3
E2	7.930	.640		
E3	8.130	.915		
F1	7.590	.910	.112 .116 DIA	1
G1	7.915	.125	.346 .353 DIA	2
G2	8.745	.145		
H1	.400	.900	.250 DIA	4
H2	.650			
H3	1.250			
H4	1.850	.900		
J1	2.130	.170	SEE DETAIL B	12
J2	2.470			
J3	2.810			
J4	3.150			
J5	3.490			
J6	3.830			
J7	4.170			
J8	4.510			
J9	4.850			
J10	5.190			
J11	5.530			
J12	5.870	.170		
K1	7.370	.665	SEE DETAIL C	4
K2	7.370	.170		
K3	8.530	.665		
K4	8.380	.170		
L1	2.000	.000	.058 .062 DIA	37
L2	2.080	.980		
L3	2.420			
L4	2.760			
L5	3.100			
L6	3.440			
L7	3.780			
L8	4.120			
L9	4.460			
L10	4.800			
L11	5.140			
L12	5.480			
L13	5.820	.980		
L14	2.640	.460		
L15	5.640	.885		
L16	5.985	.885		
L17	6.525	.682		
L18	6.620	.650		
L19	6.805	.650		
L20	6.965	.200		
L21	7.080	.300		
L22	7.435	.995		
L23	7.580	.620		
L24	7.670	.120		
L25	7.915	.415		
L26	7.995	.360		
L27	8.125	.500		
L28	8.250	.335		
L29	8.375	.515		
L30	8.625	1.005		
L31	8.625	.920		
L32	8.795	.378		
L33	8.925	.320		
L34	8.955	.238		
L35	6.965	.578		
L36	6.845	.765		
L37	8.445	.895		
			NO.2-56UNC -2B THD 18 DEEP	1
M1	.000	.578		

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. ALL SURFACES 125 UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C. TAPPED HOLE M1 TO BE FREE OF ANODIZE
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
7. IDENTIFY PER ND 1002019


45°
.112 TYP
.090 R TYP
J1 REF
.094 .125
.094 .125
.270 .276 DIA THRU
.302 .308 DIA TYP
45°

DETAIL B
TYP 12 PLACES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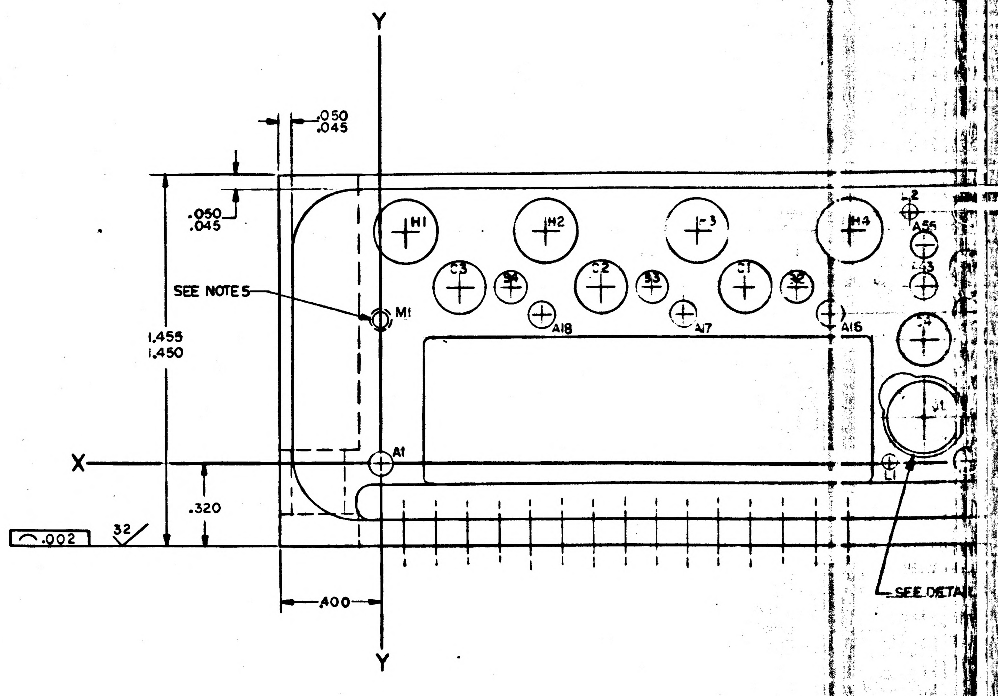
K1 REF
.094 .125
.094 .125
.270 .276 DIA THRU
.302 .308 DIA TYP

DETAIL C
TYP 4 PLACES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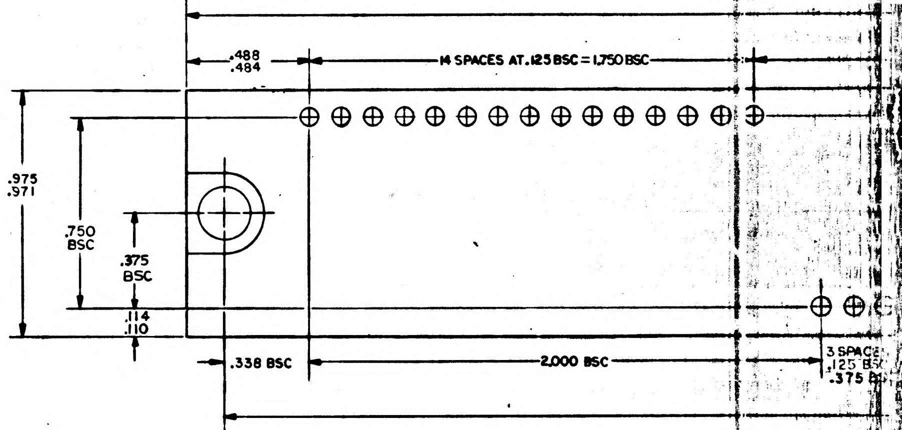
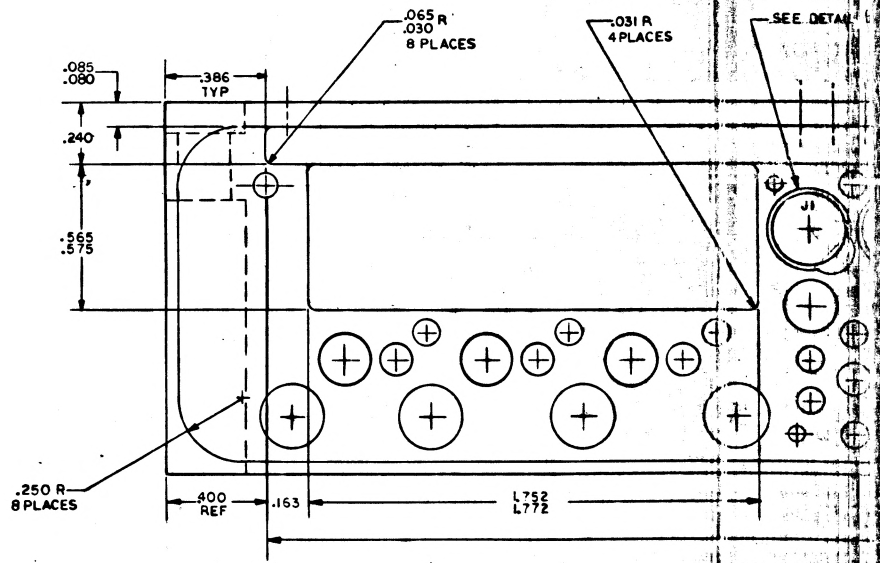
.050 .045
.050 .045
H1
H2
H3
H4
C3
C2
C1
B4
B3
B2
A18
A17
A16
A55
A43
L2
C4
J1
SEE NOTE 5
M1
1.455 1.450
X
A1
L1
.320
.002
32
.400
Y
SEE DETAIL

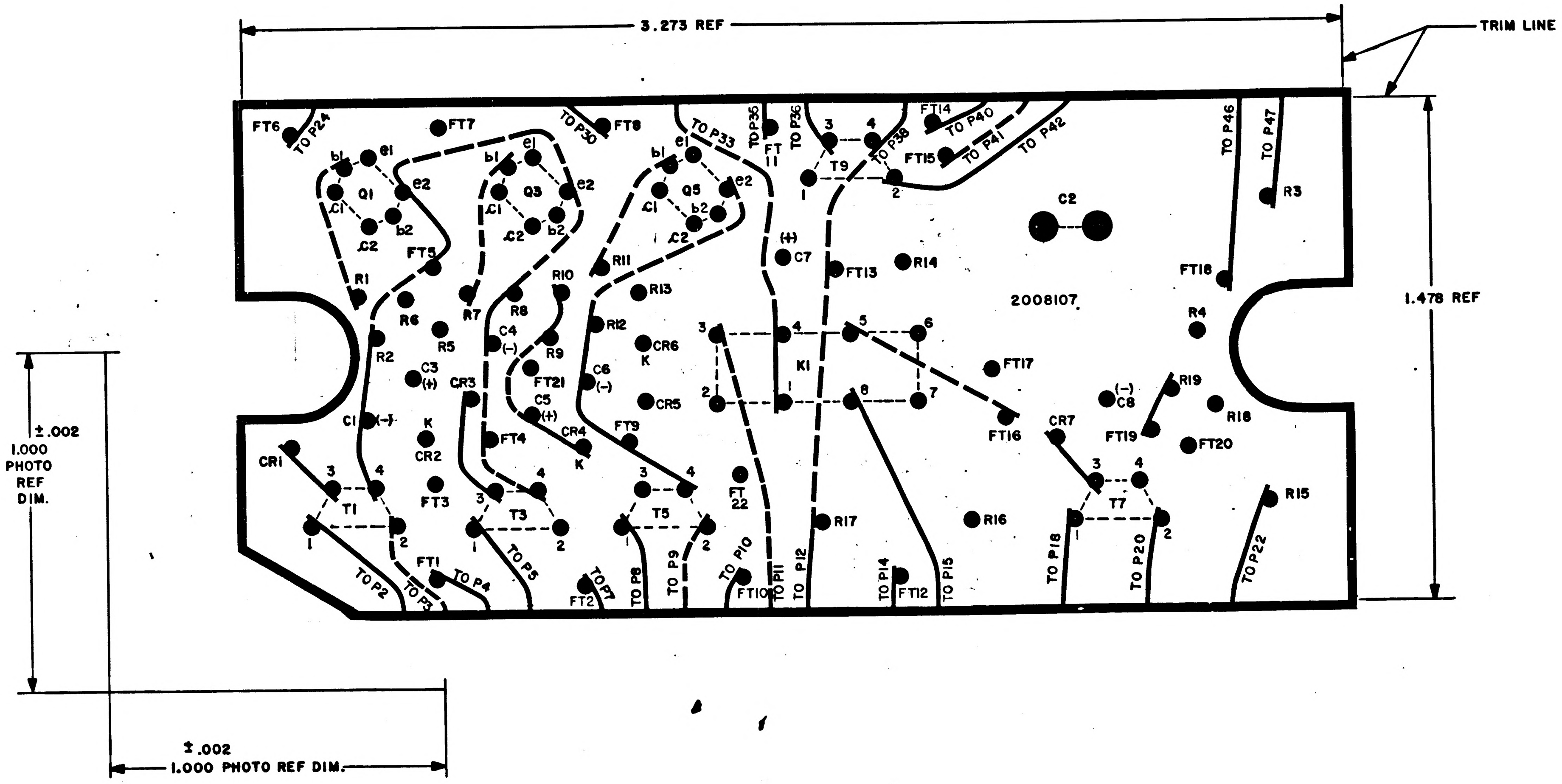

.488 .484
14 SPACES AT .125 BSC = 1.750 BSC
.975 .971
.750 BSC
.375 BSC
.114 .110
.338 BSC
2.000 BSC
3 SPACES .125 BSC
.375 BSC


.065 .030 R 8 PLACES
.031 R 4 PLACES
SEE DETAIL
.085 .080
.386 TYP
.240
.565 .575
J1
.250 R 8 PLACES
.400 REF
.163
1.752 1.772

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14700

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK


3.273 REF
TRIM LINE
1.478 REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
2008107
FT6
TO P24
FT7
TO P30
FT8
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TO P35
FT 11
TO P36
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TO P38
FT14
TO P40
FT15
TO P41
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TO P46
TO P47
R3
C2
b1
e1
e2
Q1
C1
b2
C2
Q3
Q5
FT5
R1
R6
R2
R5
R7
R8
R10
R9
C4
(–)
C3
(+)
CR3
C5
(+)
FT21
CR4
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C1
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CR2
CR1
FT4
FT3
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R11
R12
R13
C6
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CR6
CR5
FT9
FT 22
(+)
C7
FT13
R14
K1
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FT17
FT16
R17
R16
CR7
FT19
C8
(–)
R19
R18
FT20
R15
FT18
R4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA
7. ● .077/.081 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT

DRAWN W. Horgan DATE 27 NOV 64
CHECKED A. Lundstrom 7 Dec '64
APPROVAL J. M. BLYSHAK 7 DEC 64
APPROVAL 12/8/64
NASA APPROVAL 12-8-64
MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP PHOTOGRAPHIC MASTER
GYRO CALIBRATION

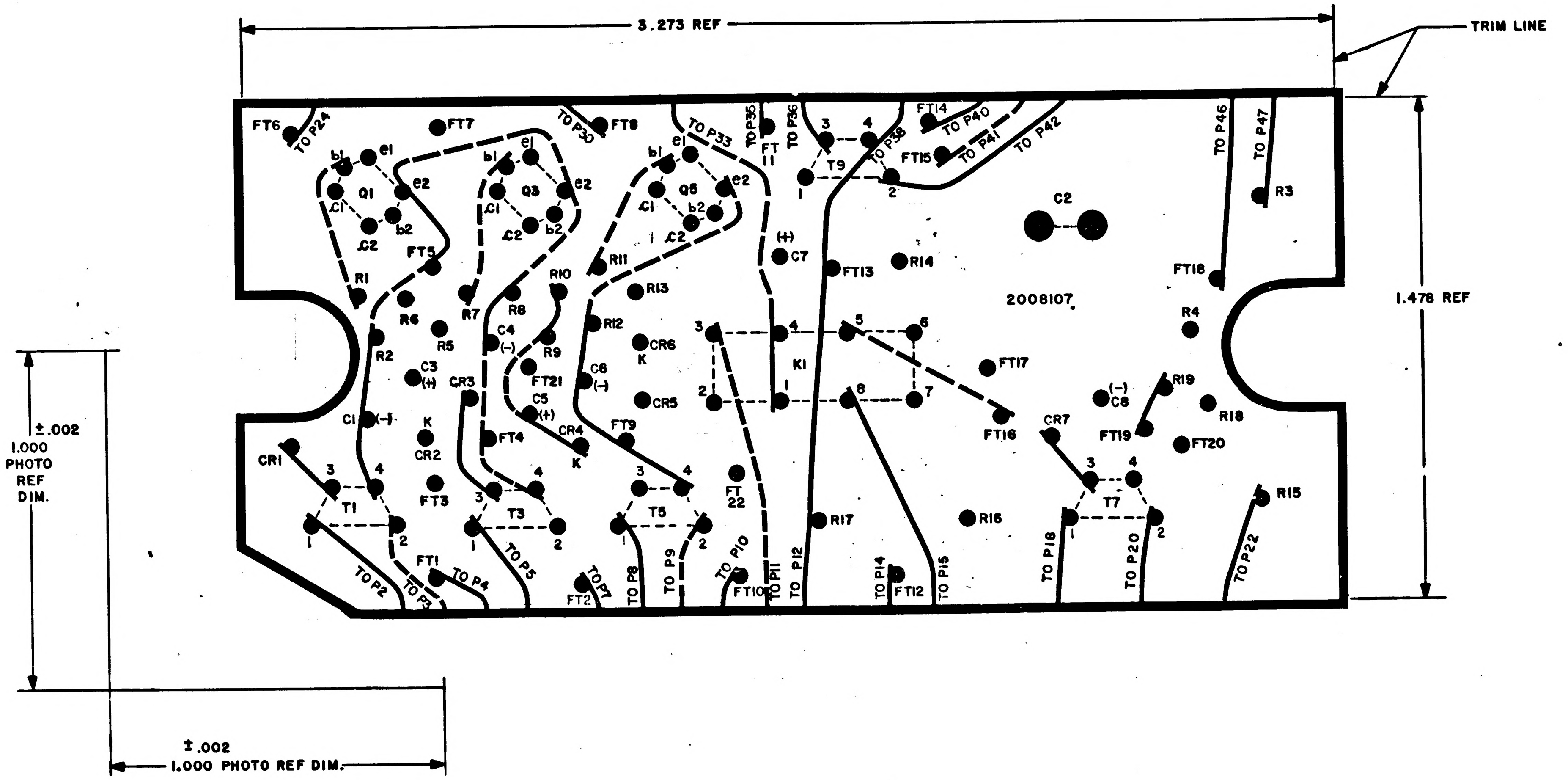
CODE IDENT NO. — SIZE D NASA DRAWING NO. 2008107
SCALE 5/1 WT — SHEET 1 OF 1

8 7 6 5 4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14700

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 18959	12 May '65	WK


3.273 REF
TRIM LINE
1.478 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.
2008107
FT6
TO P24
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R3
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b1
e1
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C1
C2
b2
FT5
R1
R6
R7
R8
R10
R11
R13
C7 (+)
FT13
R14
FT18
R4
R2
R5
C4 (-)
R9
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CR6
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C3 (+)
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C1 (-)
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NOTES:

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2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA
7. ● .077/.081 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007102	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN W. Horgan DATE 27-NOV-64
CHECKED A. Lindstrom 7 Dec '64
APPROVAL J. M. BLYSHAK 7 DEC 64
APPROVAL D. R. Test 12/4/64
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP PHOTOGRAPHIC MASTER
GYRO CALIBRATION

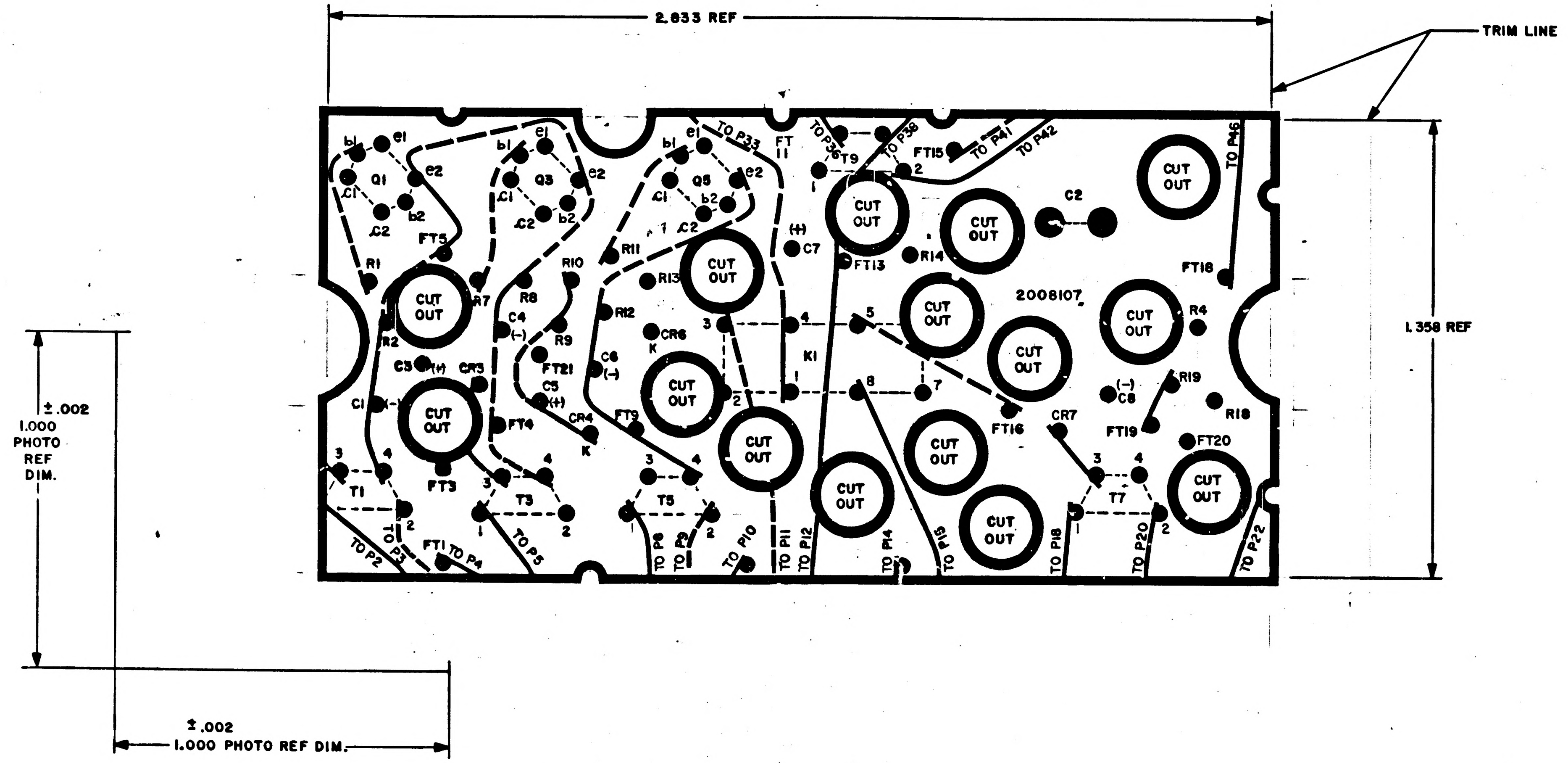
CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008107
SCALE 5/1
WT —
SHEET 1 OF 1

8 7 6 5 4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14701

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 18959	12 May '65	WK
C	REVISED PER TDRR 21466	23 Aug 65	WK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TRIM LINE
1.358 REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
2008107
CUT OUT
Q1
Q3
Q5
b1
b2
e1
e2
C1
C2
C3
C4
C5
C6
C7
C8
R1
R2
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CR3
CR4
CR5
CR6
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K
K1
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NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
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3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA
7. ● .077/.081 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN W. Horgan DATE 27 Nov 64
CHECKED A. Lindstrom 7 Dec '64
APPROVAL J. M. BLYSHAK 7 Dec 64
APPROVAL 12/8/64
NASA APPROVAL 12-8-64
MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

**INSULATOR TOP
PHOTOGRAPHIC MASTER
GYRO CALIBRATION**

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008107
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1470

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 18959	12 May '65	WK
C	REVISED PER TDRR 21466	23 Aug 65	WK
D	REVISED PER TDRR 23332	27 Oct 65	KSM EPK WK

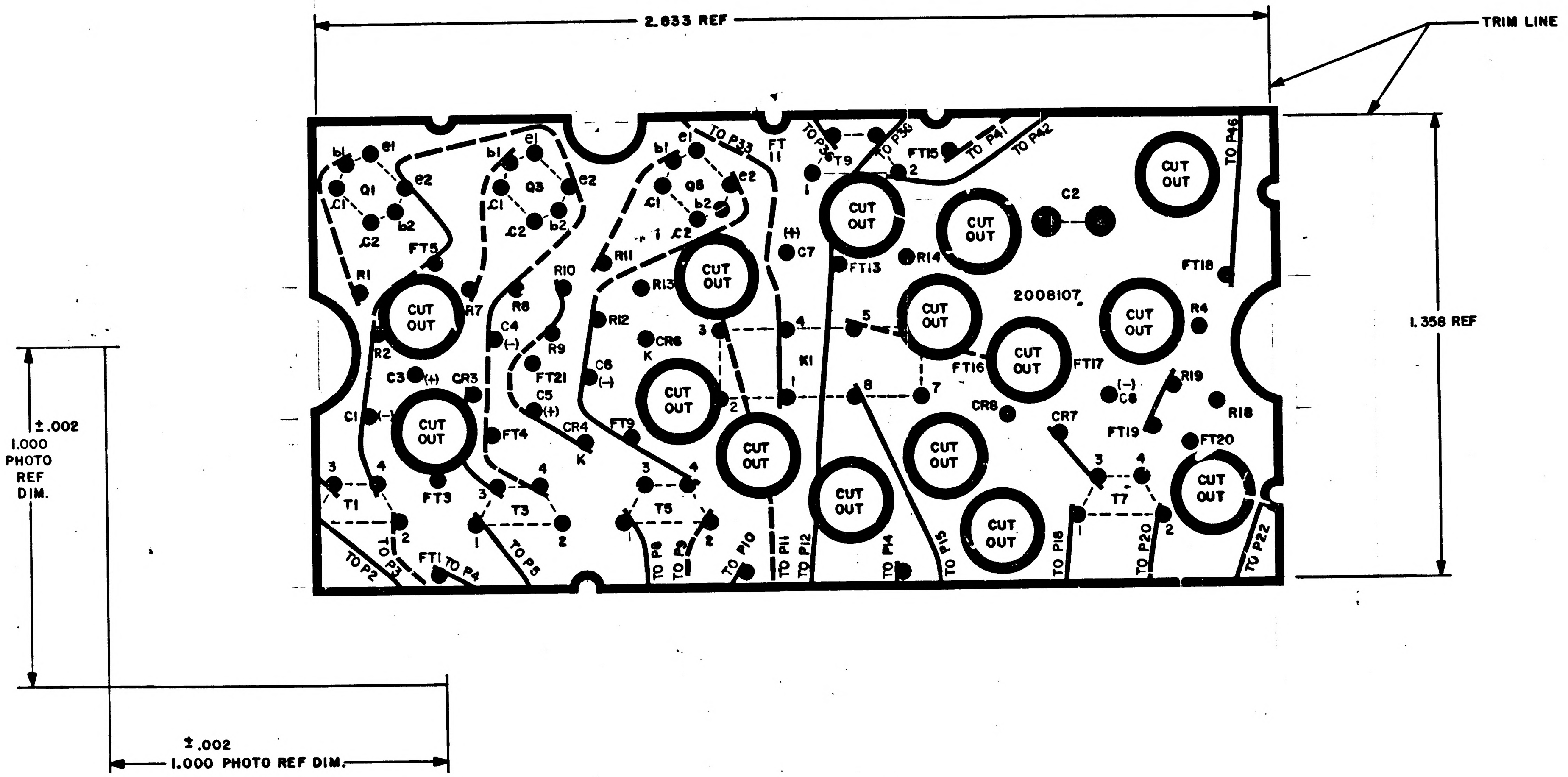
2.833 REF
TRIM LINE
1.358 REF
±.002
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PHOTO
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DIM.
±.002
1.000 PHOTO REF DIM.
2008107
CUT OUT
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e2
Q1
c1
c2
b2
Q3
Q5
FT5
R1
R2
R7
R8
R10
R9
C4 (−)
C3 (+)
CR3
C1 (−)
FT21
C5 (+)
CR4
K
FT4
FT3
T1
T3
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T7
T9
R11
R13
R12
CR6
K
C6 (−)
FT9
C7 (+)
K1
FT11
FT13
R14
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C2
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NOTES:
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5. MAT'L: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA
7. ● .077/.081 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN W. Horgan DATE 27 Nov 64
CHECKED A. Lindstrom 7 Dec '64
APPROVAL J. M. BLYSHAK 7 Dec 64
APPROVAL [illegible] 12/8/64
NASA APPROVAL [illegible] 12-8-64
MIT APPROVAL [illegible] Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP
PHOTOGRAPHIC MASTER
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008107
SCALE 5/1
WT —
SHEET 1 OF 1

2008107 D

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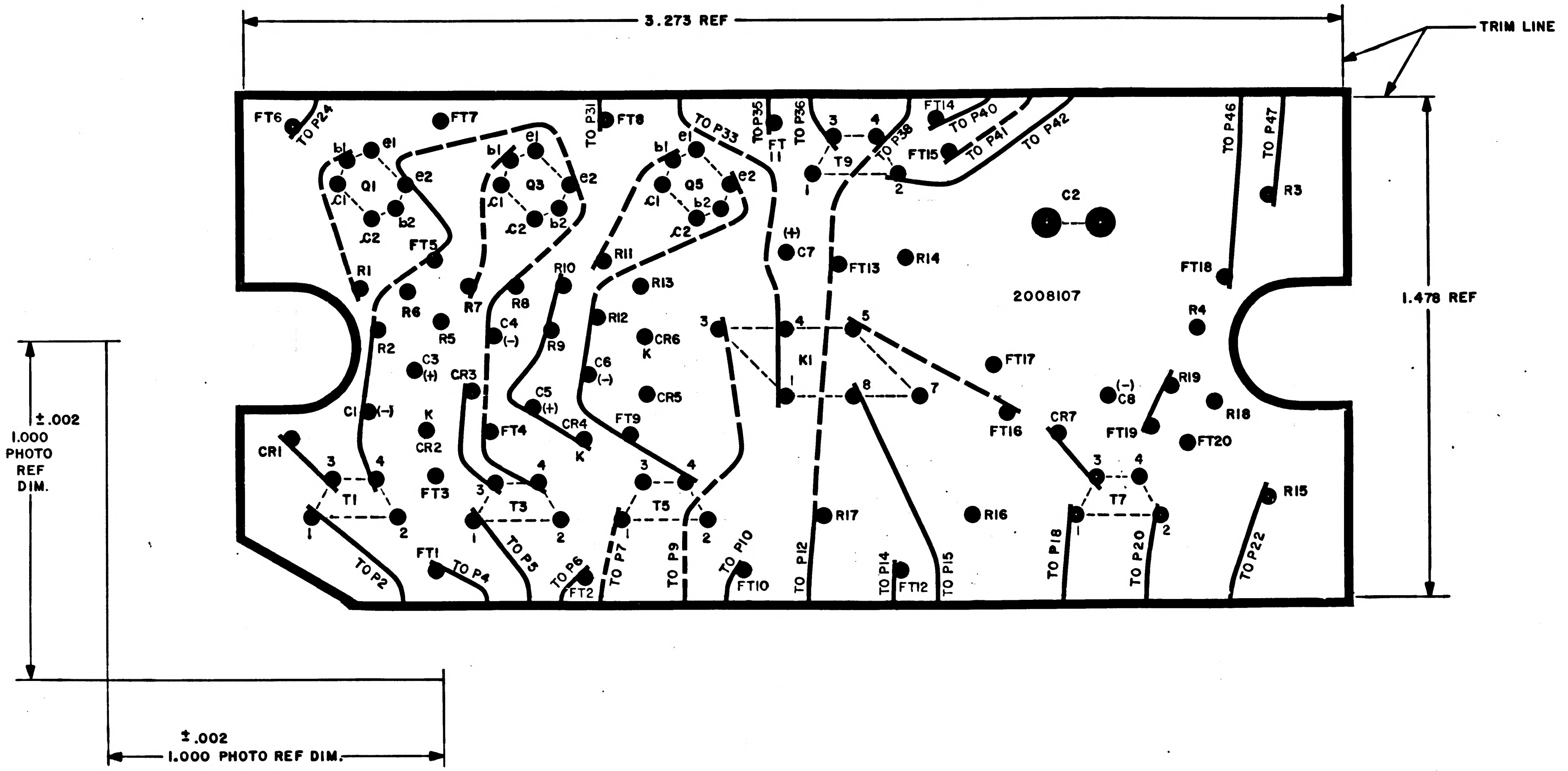
REVISIONS 14700

SYM	DESCRIPTION	DATE	APPROVAL


3.273 REF
TRIM LINE
1.478 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.
2008107
FT6
TO P24
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Q3
Q5
FT5
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R7
R8
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R13
R12
C4 (−)
R9
CR6
K
R2
C3 (+)
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C5 (+)
C6 (−)
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TO P22

NOTES:

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7. ● .077/.081 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN W. Horgan DATE 27-Nov-64
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APPROVAL J. M. BLYSHAK 7 Dec 64
APPROVAL D. A. Test 12/4/64
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP PHOTOGRAPHIC MASTER
GYRO CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008107
SCALE 5/1
WT —
SHEET 1 OF 1

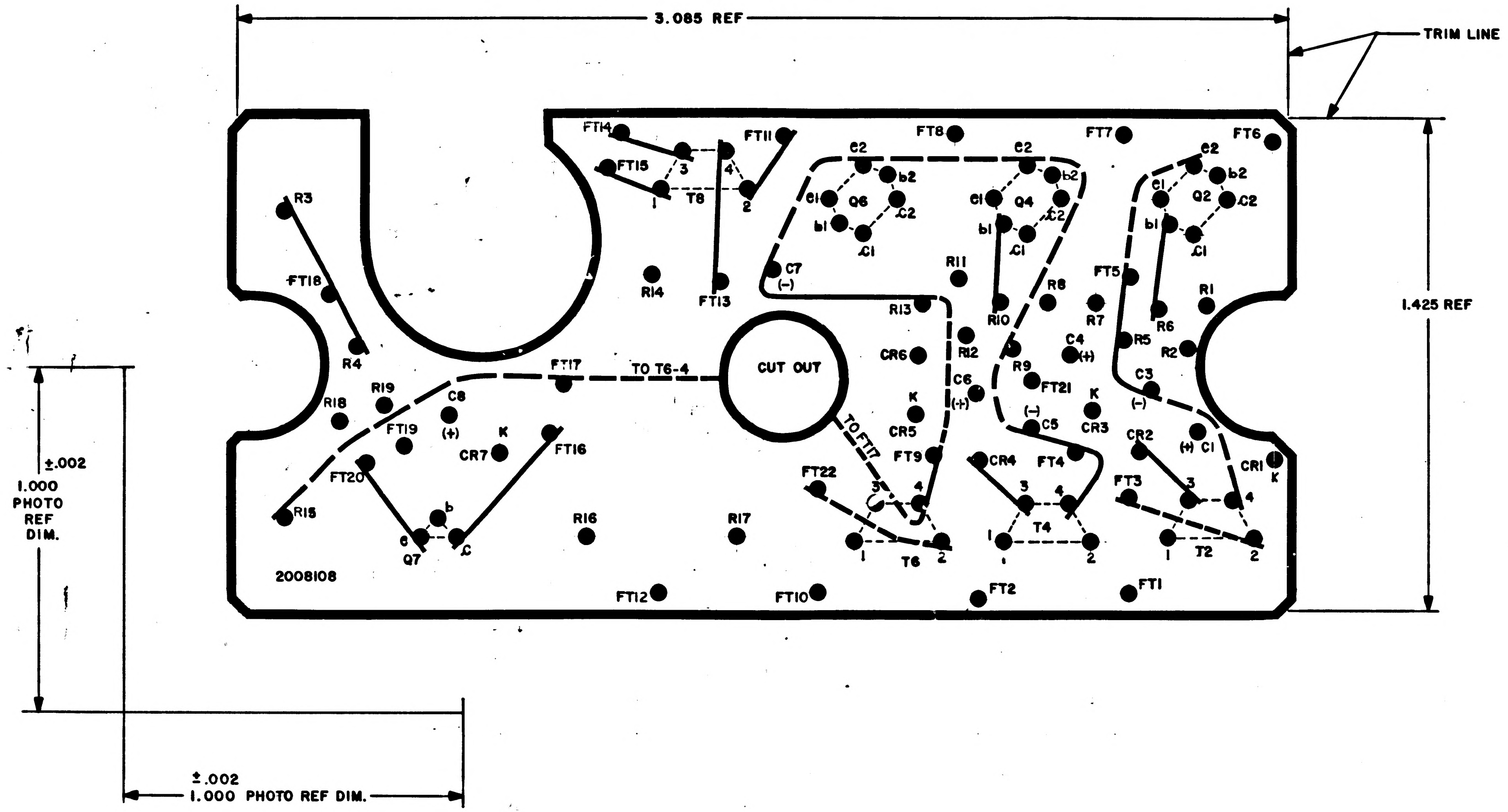
2008107

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14700

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 17685	22 MAR 65	WK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TRIM LINE
1.425 REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
CUT OUT
TO T6-4
TO FT17
2008108
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9
FT10
FT11
FT12
FT13
FT14
FT15
FT16
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FT21
FT22
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R18
R19
C1
C3
C4
C5
C6
C7
C8
(+)
(−)
CR1
CR2
CR3
CR4
CR5
CR6
CR7
K
Q2
Q4
Q6
Q7
e
b
c
e1
e2
b1
b2
C1
C2
T2
T4
T6
T8
1
2
3
4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006 / .008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045 / .055 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN W. Horgan DATE 27-Nov-64
CHECKED [illegible] 7 Dec 64
APPROVAL J.M. BLYSHAK 7/Dec/64
APPROVAL [illegible] 12/4/64
NASA APPROVAL W. J. [illegible] 12-8-64
MIT APPROVAL W Kyf[illegible] 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

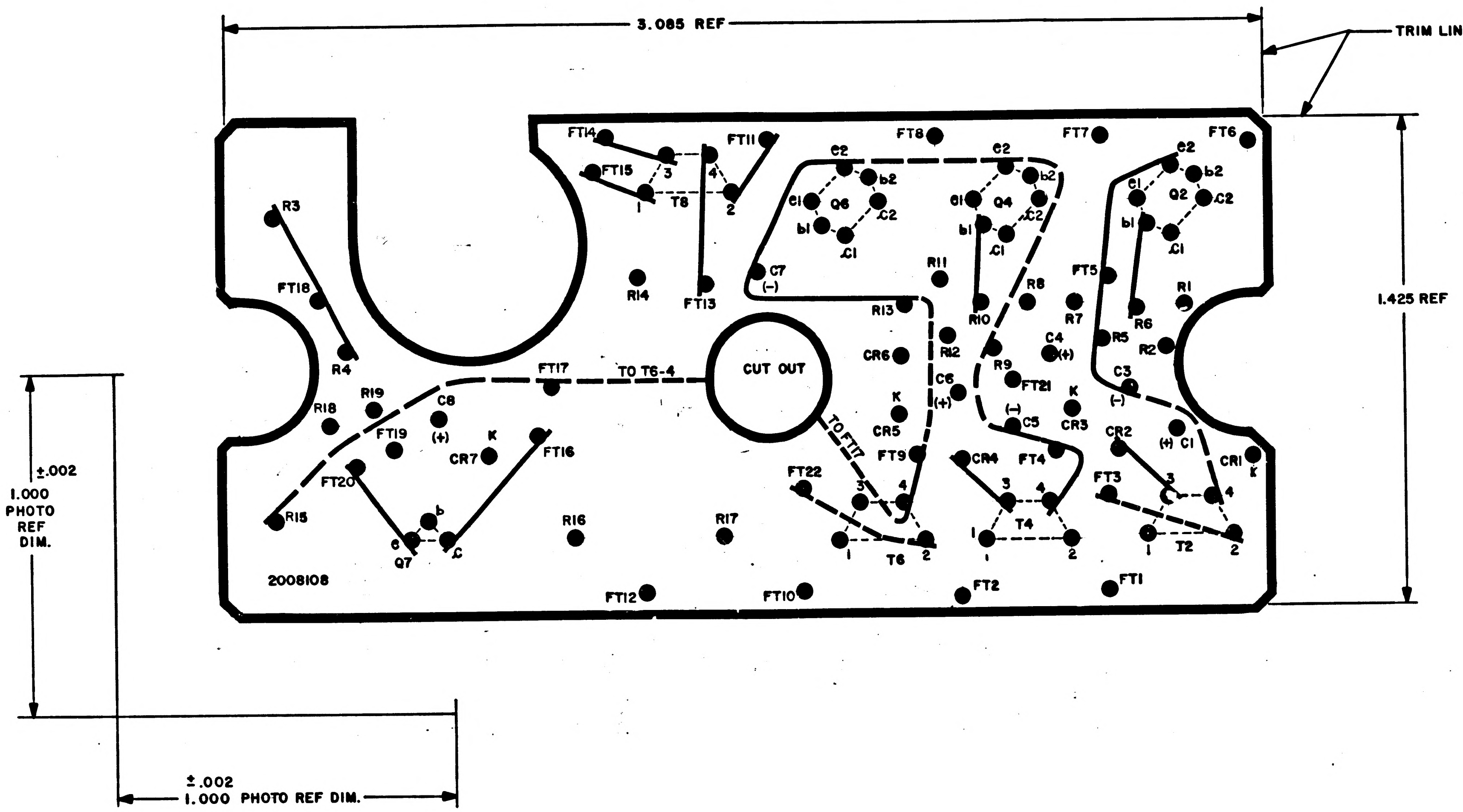
INSULATOR BOTTOM PHOTOGRAPHIC MASTER
GYRO CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008108
SCALE 5 / 1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14700

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 17685	22 MAR 65	WK
C	REVISED PER TDRR 18959	12 MAY 65	WK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TRIM LINE
1.425 REF
±.002
1.000
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REF
DIM.
±.002
1.000 PHOTO REF DIM.
CUT OUT
TO T6-4
TO FT17
2008108
FT14
FT15
T8
FT11
FT13
R14
FT8
FT7
FT6
Q6
Q4
Q2
C7 (-)
R11
R13
CR6
R12
C6 (+)
R10
R9
R8
R7
FT5
C4 (+)
FT21
C5
CR3
R5
R6
R1
R2
C3 (-)
CR2
C1
CR1
R3
FT18
R4
R18
R19
C8 (+)
FT19
CR7
FT17
FT16
FT20
R15
Q7
R16
R17
FT22
CR5
FT9
CR4
FT4
FT3
T6
T4
T2
FT12
FT10
FT2
FT1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006 / .008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045 / .055 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007102	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT

DRAWN W. Horgan DATE 27-NOV-64
CHECKED [illegible] 7 DEC 64
APPROVAL J.M. BLYSHAK 7/DEC/64
APPROVAL [illegible] 12/4/64
NASA APPROVAL [illegible] 12-8-64
MIT APPROVAL WKupfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM PHOTOGRAPHIC MASTER
GYRO CALIBRATION

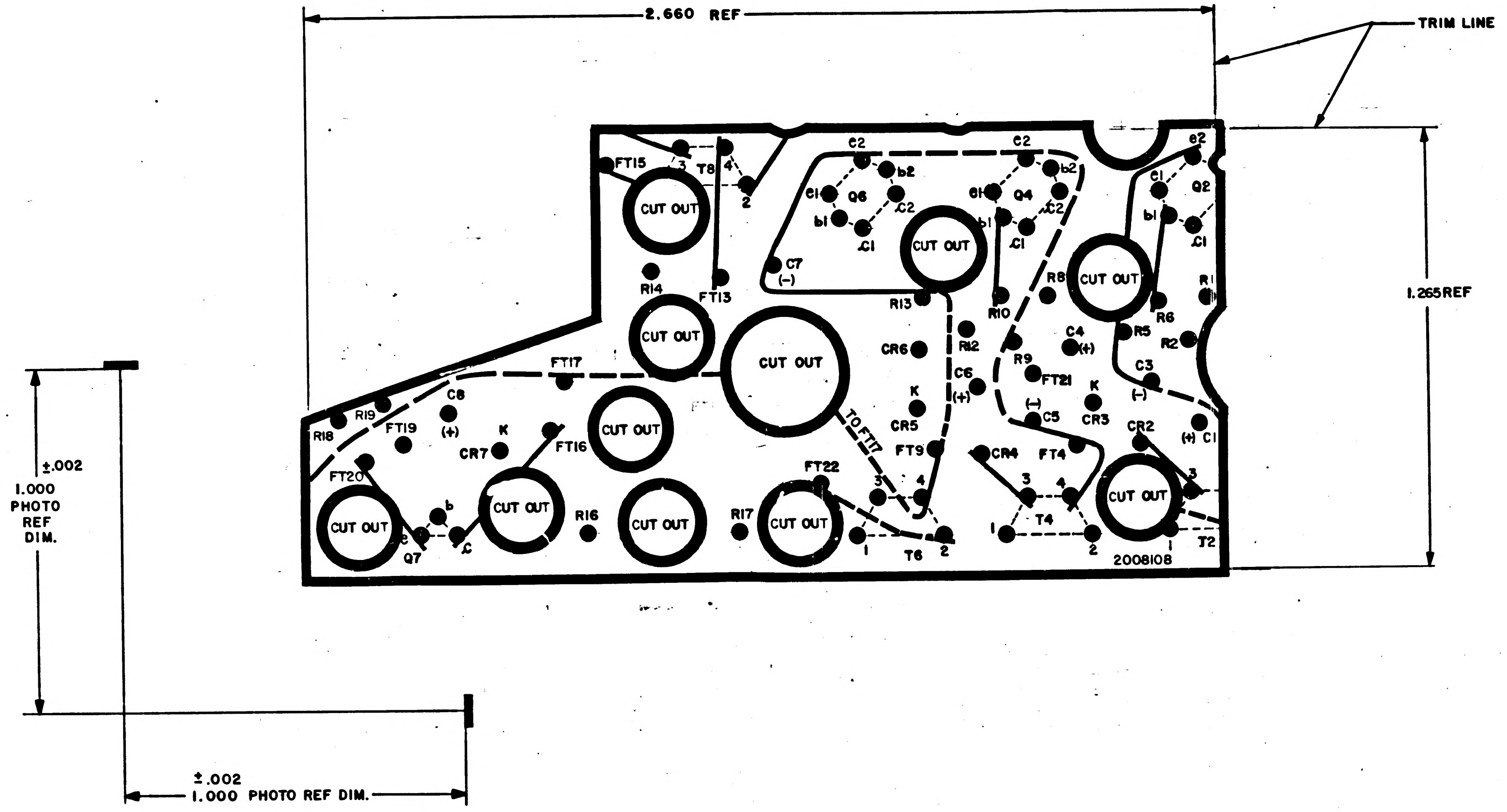
CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008108
SCALE 5 / 1
WT —
SHEET 1 OF 1

2008108 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14700

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 17685	22 MAR 65	WK
C	REVISED PER TDRR 18959	12 MAY '65	WK
D	REVISED PER TDRR 21464	23 AUG 65	WK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TRIM LINE
1.265REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
CUT OUT
FT15
T8
3
4
2
R14
FT13
e2
b2
e1
Q6
c2
b1
c1
C7
(−)
Q4
Q2
R13
R10
R8
R1
R6
R5
R2
CR6
R12
C6
(+)
R9
FT21
C4
(+)
C3
(−)
K
CR5
(−)
C5
CR3
CR2
(+) C1
FT9
CR4
FT4
T4
1
T2
TO FT17
FT17
R19
R18
FT19
C8
(+)
K
CR7
FT16
FT20
b
e
c
Q7
R16
R17
FT22
T6
2008108

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006 / .008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045 / .055 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN W. Horgan DATE 27-NOV-64
CHECKED A. Lindstrom 7 Dec 64
APPROVAL J.M BLYSHAK 7/Dec/64
APPROVAL D. B. Test 12/4/64
NASA APPROVAL W. J. Rhine 12-8-64
MIT APPROVAL W Kupfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

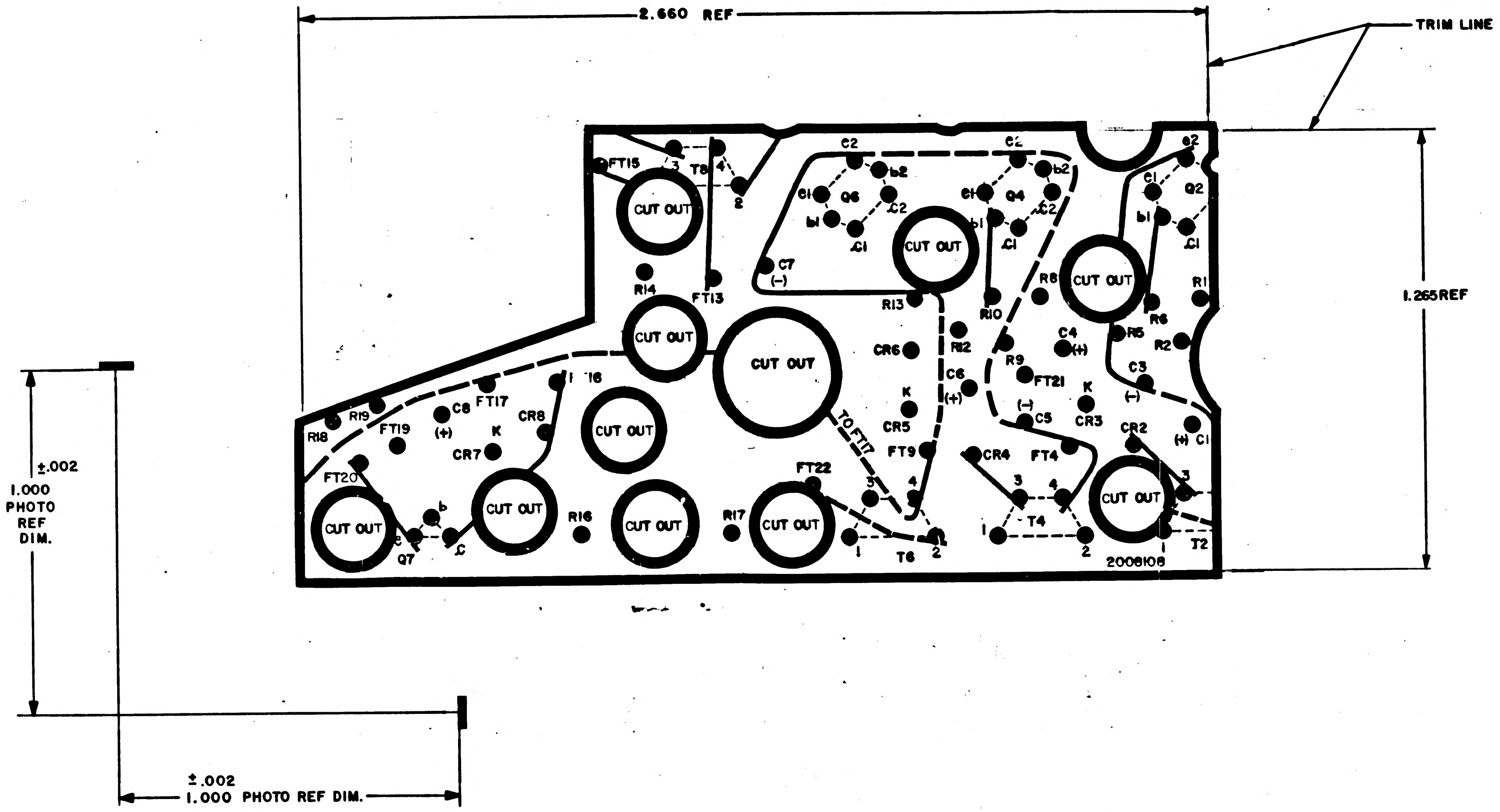
INSULATOR BOTTOM PHOTOGRAPHIC MASTER
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008108
SCALE 5 / 1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14770

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	22 MAR 65	WK
B	REVISED PER TDRR 17685	22 MAR 65	WK
C	REVISED PER TDRR 18959	12 MAY 65	WK
D	REVISED PER TDRR 21464	23 AUG 65	WK
E	REVISED PER TDRR 23332	27 OCT 65	WK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TRIM LINE
1.265REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
CUT OUT
FT15
T8
C2
b2
C1
b1
Q6
Q4
Q2
C7
(−)
R14
FT13
R13
R10
R8
R1
R6
R5
R2
CR6
R12
C6
(+)
R9
C4
(+)
C3
(−)
FT21
K
C5
CR3
CR2
(+) C1
CR5
FT9
TO FT17
CR4
FT4
T4
T2
T6
FT22
R17
R16
R18
R19
FT19
C8
(+)
FT17
K
CR7
CR8
FT16
FT20
Q7
2008108

NOTES:

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MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN W. Horgan DATE 27-Nov-64
CHECKED [illegible] 7 Dec 64
APPROVAL J.M. BLYSHAK 7/Dec/64
APPROVAL [illegible] 12/4/64
NASA APPROVAL [illegible] 12-8-64
MIT APPROVAL [illegible] 8 Dec 64

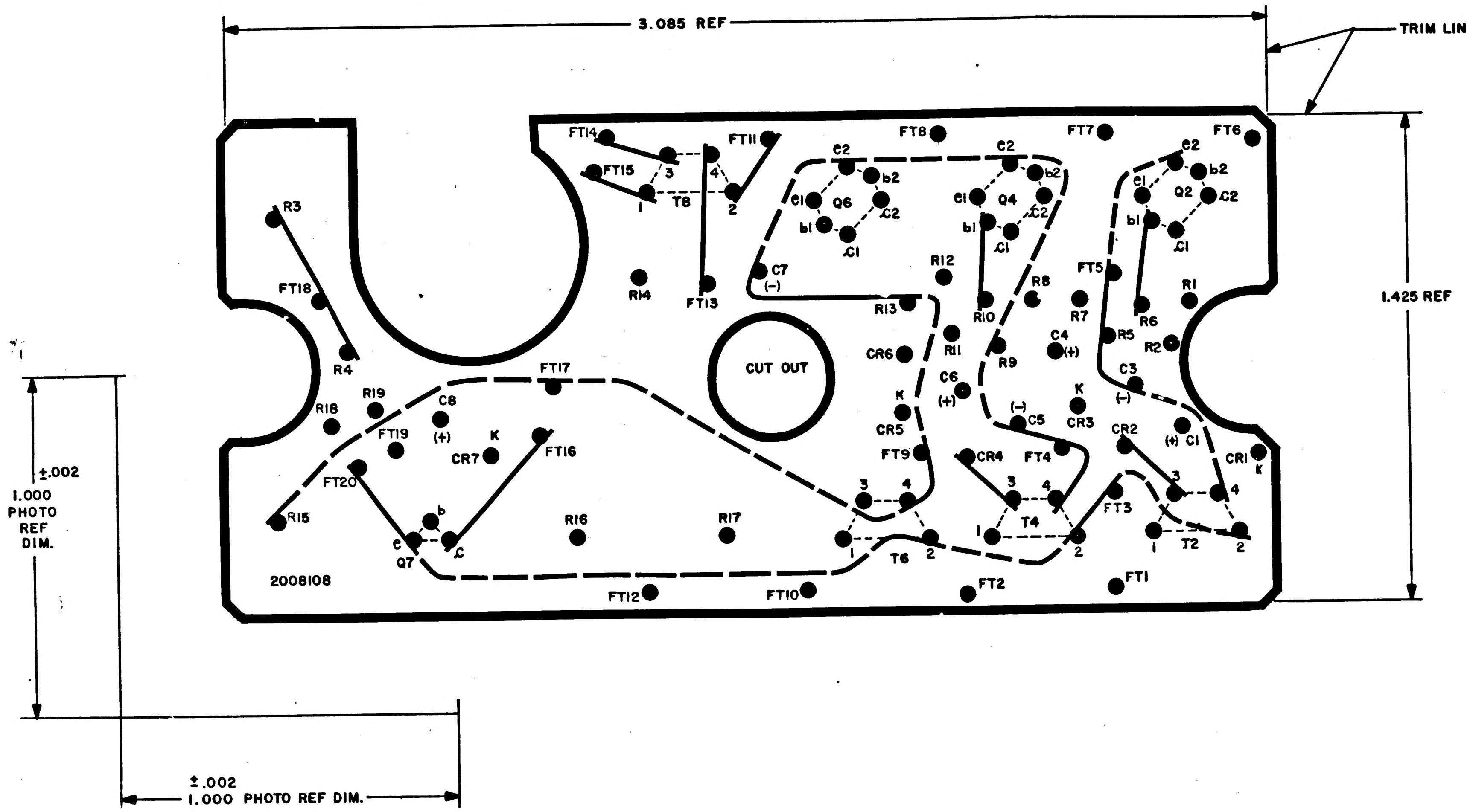
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM
PHOTOGRAPHIC MASTER
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008108
SCALE 5/1
WT —
SHEET 1 OF 1

SYM	REVISIONS 14700 DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


3.085 REF
TRIM LINE
1.425 REF
±.002
1.000
PHOTO
REF
DIM.
±.002
1.000 PHOTO REF DIM.
CUT OUT
2008108
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19
FT1 FT2 FT3 FT4 FT5 FT6 FT7 FT8 FT9 FT10 FT11 FT12 FT13 FT14 FT15 FT16 FT17 FT18 FT19 FT20
C1 C3 C4 (+) C5 (–) C6 (+) C7 (–) C8 (+)
CR1 CR2 CR3 CR4 CR5 CR6 CR7 K
Q2 Q4 Q6 Q7 e2 b2 c2 e1 b1 c1 e b c
T2 T4 T6 T8 1 2 3 4

NOTES:

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3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MAT'L: FILM .006 / .008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045 / .055 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. CONTRACT
DRAWN W. Horgan DAT 27-Nov-64
CHECKED A. [illegible] 7 Dec 64
APPROVAL J.M. BLYSHAK 7/Dec/64
APPROVAL [illegible] 12/4/64
NASA APPROVAL W. J. [illegible] 12-8-64
MIT APPROVAL W [illegible] 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM
PHOTOGRAPHIC MASTER
GYRO CALIBRATION

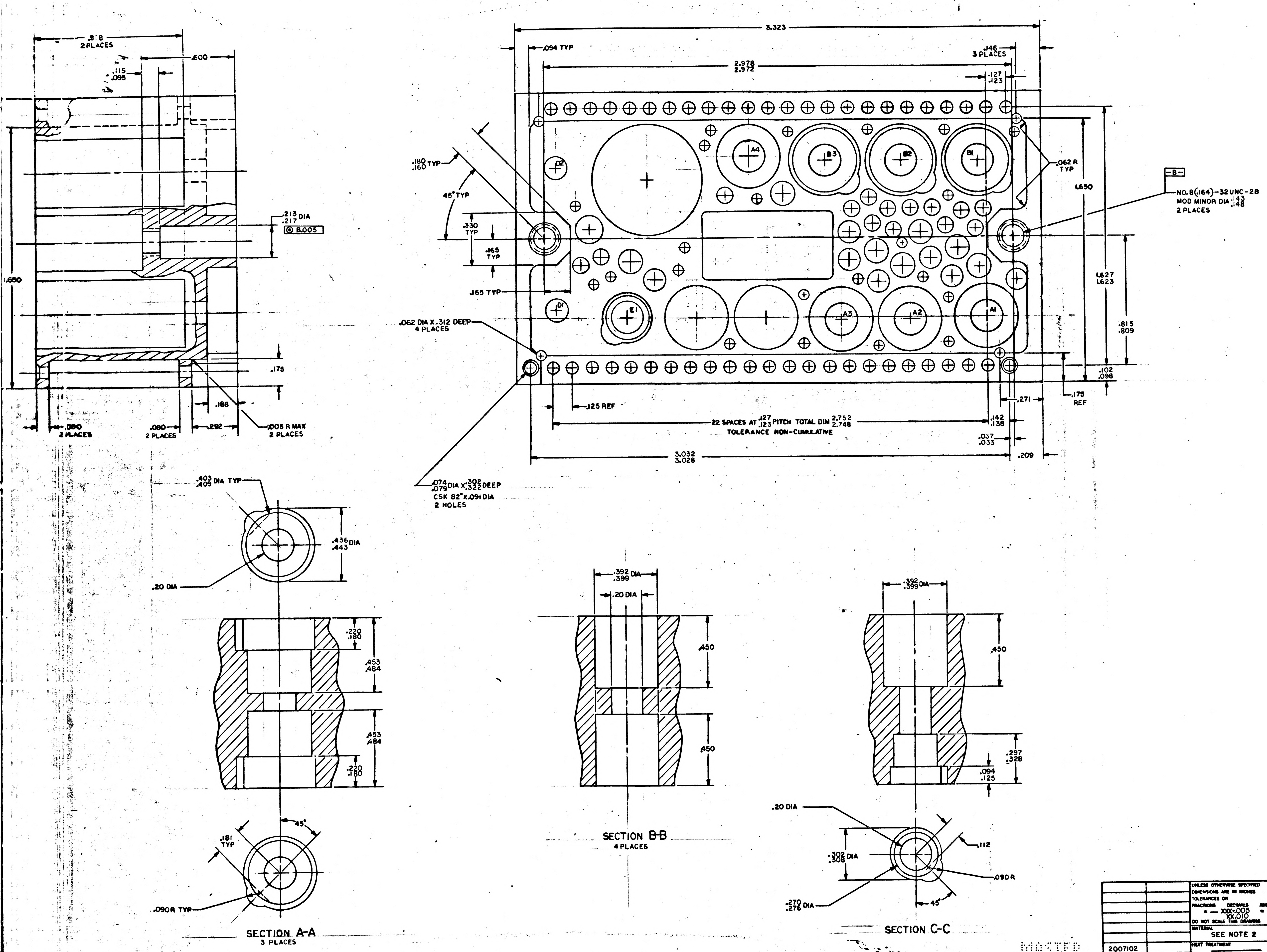
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008108
SCALE 5/1
WT —
SHEET 1 OF 1

2008108

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	25 MAR 65	WR

REVISIONS 14750



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.213
.217 DIA
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.175
.188
.080
2 PLACES
.080
2 PLACES
.292
.005 R MAX
2 PLACES
3.323
.094 TYP
2.978
2.972
.146
3 PLACES
.127
.123
.180
.160 TYP
45° TYP
.330
TYP
.165
TYP
.165 TYP
D2
D1
A4
B3
B2
B1
E1
A3
A2
A1
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TYP
-B-
NO. 8(.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
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1.623
.815
.809
.102
.098
.175
REF
.271
.062 DIA X .312 DEEP
4 PLACES
.125 REF
22 SPACES AT .127 .123 PITCH TOTAL DIM 2.752 2.748
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
3.032
3.028
.209
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.403
.409 DIA TYP
.436
.443 DIA
.20 DIA
.220
.180
.453
.484
.453
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.220
.180
.181
TYP
45°
.090R TYP
SECTION A-A
3 PLACES
.392
.399 DIA
.20 DIA
.450
.450
SECTION B-B
4 PLACES
.392
.399 DIA
.450
.297
.328
.094
.125
.20 DIA
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.112
.090 R
.270
.276 DIA
45°
SECTION C-C
4
3
2

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007102

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 XX.010 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE 3 Dec 64
CHECKED 7 Dec 64
APPROVAL J. M. BLAZNAK 7 DEC 64
APPROVAL 7 Dec 64

NASA APPROVAL 12-8-64

MIT APPROVAL 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
GYRO CALIBRATION

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008109

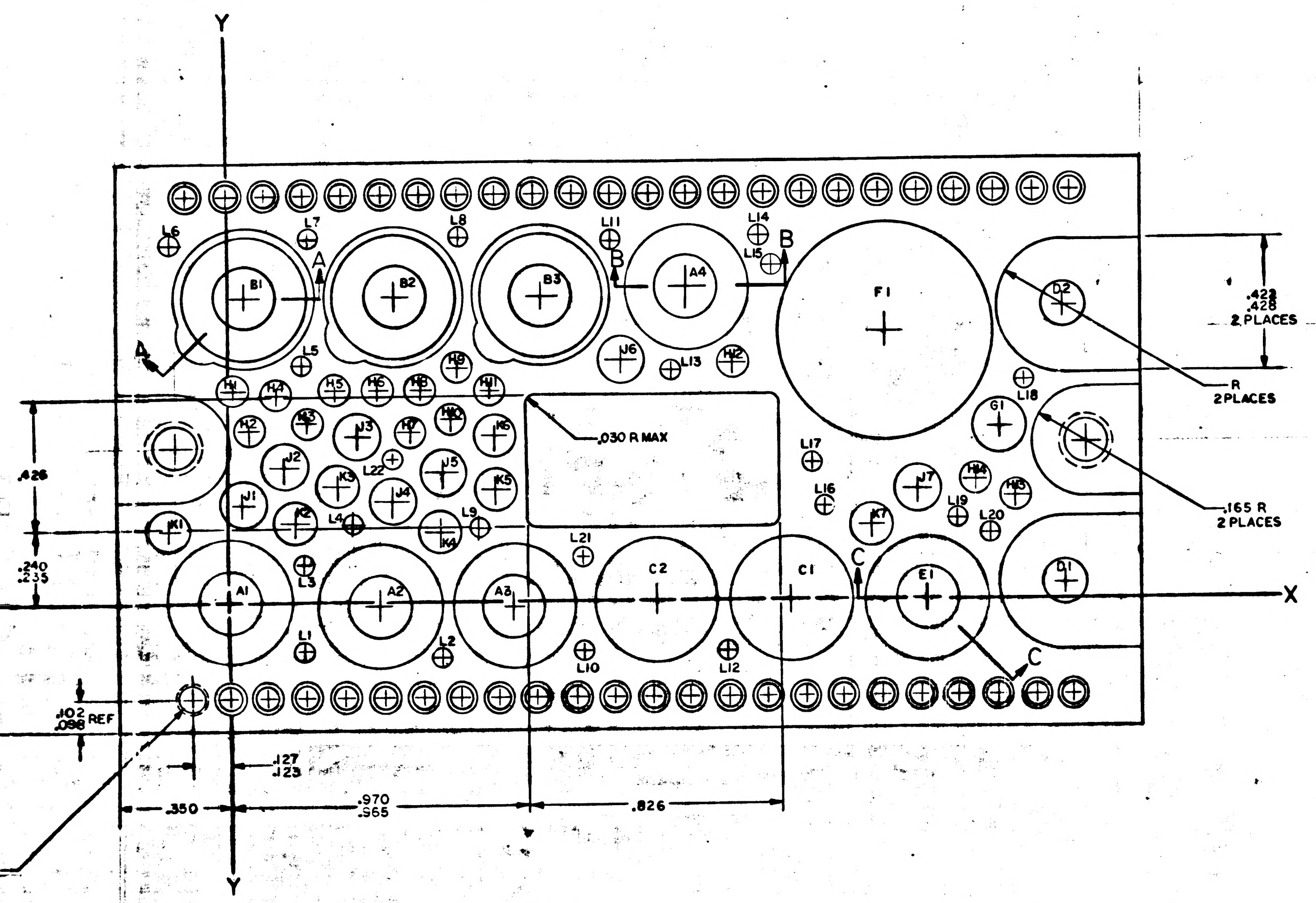
SCALE 5/1
WT —
SHEET 1 OF 1

2008109 A

A

3H

2008109 A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B
B
C
C
B1
B2
B3
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F1
D2
G1
E1
D1
A1
A2
A3
C2
C1
K1
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R
2 PLACES
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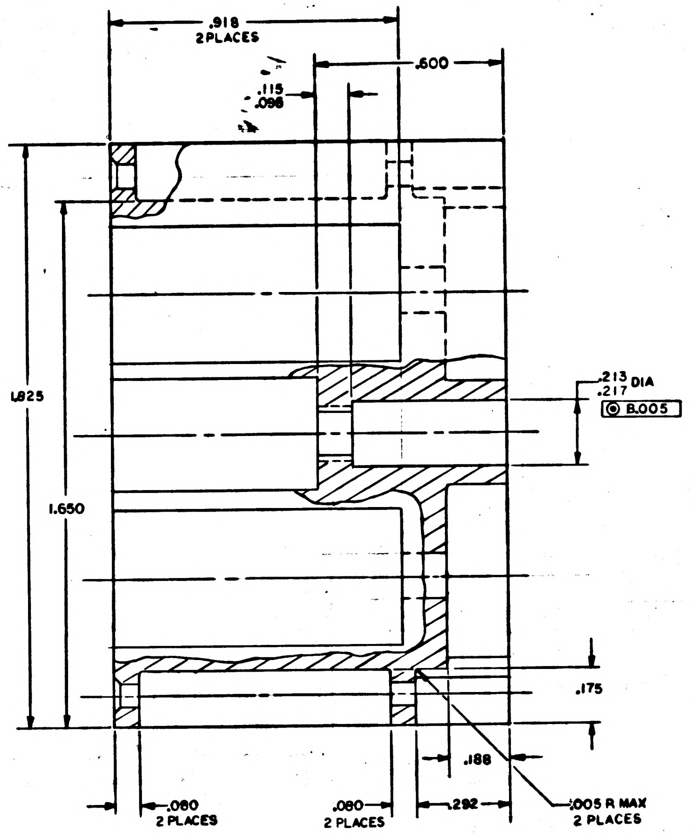
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.600
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1.650
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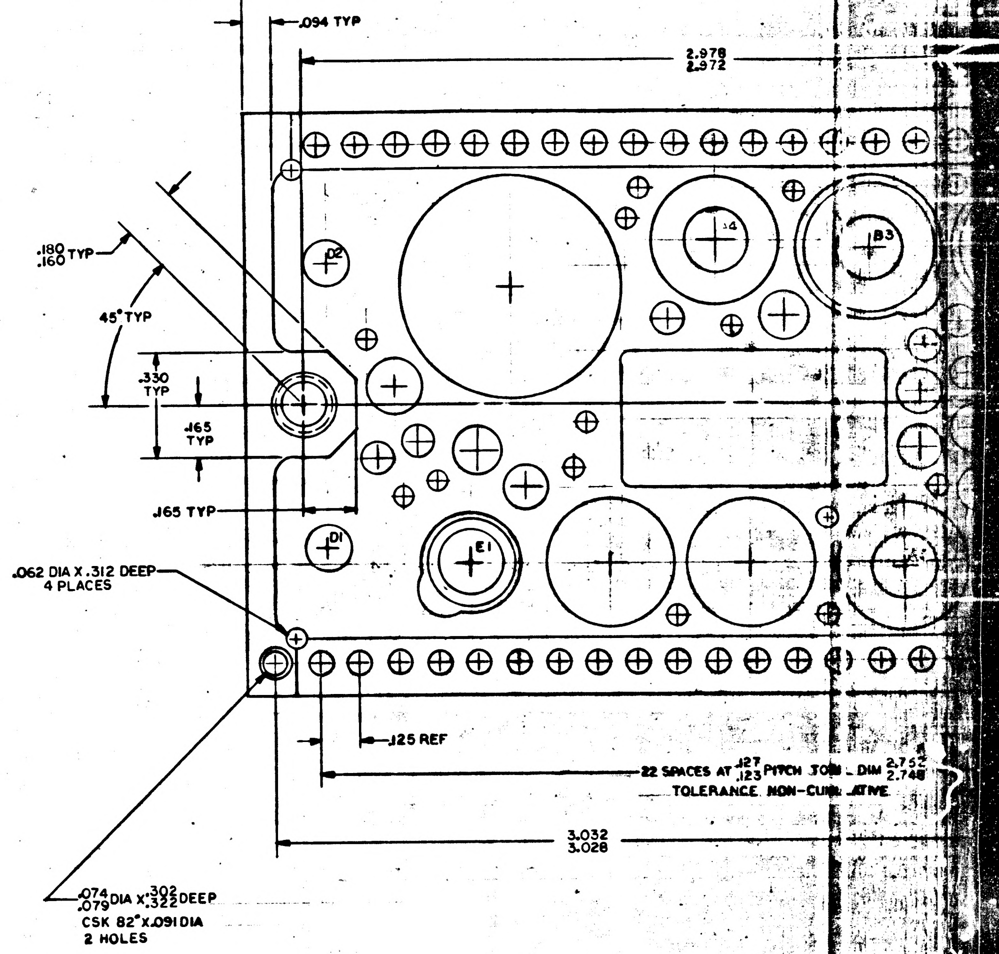
.217 DIA
Ⓞ B .005
.175
.188
.292
.060
2 PLACES
.080
2 PLACES
.005 R MAX
2 PLACES


3.323
.094 TYP
2.978
2.972
.180
.160 TYP
45° TYP
.330
TYP
.165
TYP
.165 TYP
.062 DIA X .312 DEEP
4 PLACES
.125 REF
22 SPACES AT .127
.123 PITCH TOL. DIM 2.752
2.748
TOLERANCE NON-CUMULATIVE
3.032
3.028
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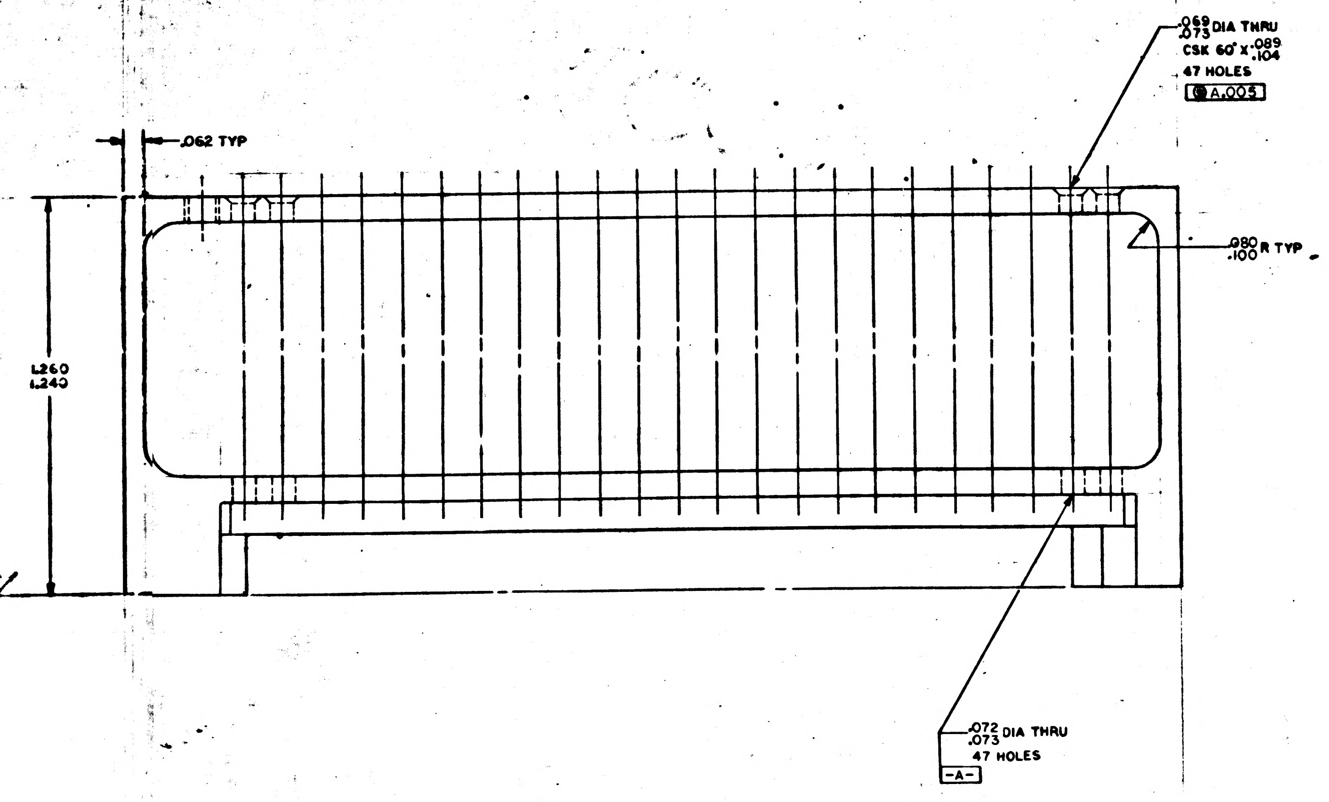
CSK 82° X .091 DIA
2 HOLES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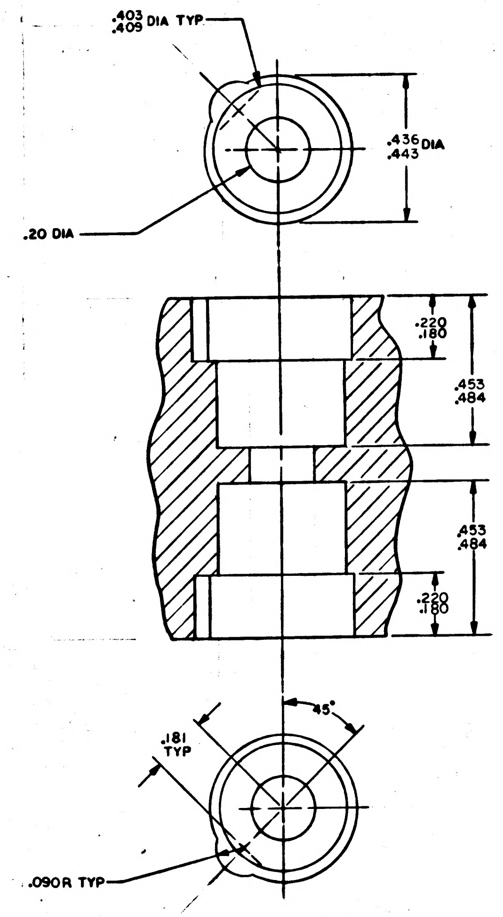
.073 DIA THRU
CSK 60° X .089
.104
47 HOLES
Ⓞ A .005
.062 TYP
.080
.100 R TYP
1.260
1.240
.072
.073 DIA THRU
47 HOLES
-A-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.436
.443 DIA
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.453
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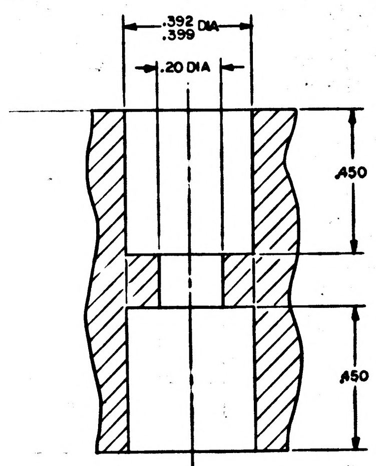
.180
.181
TYP
45°
.090R TYP

SECTION A-A
3 PLACES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.399 DIA
.20 DIA
.450
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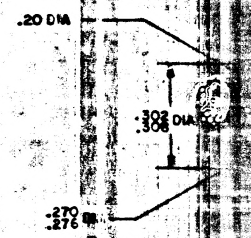
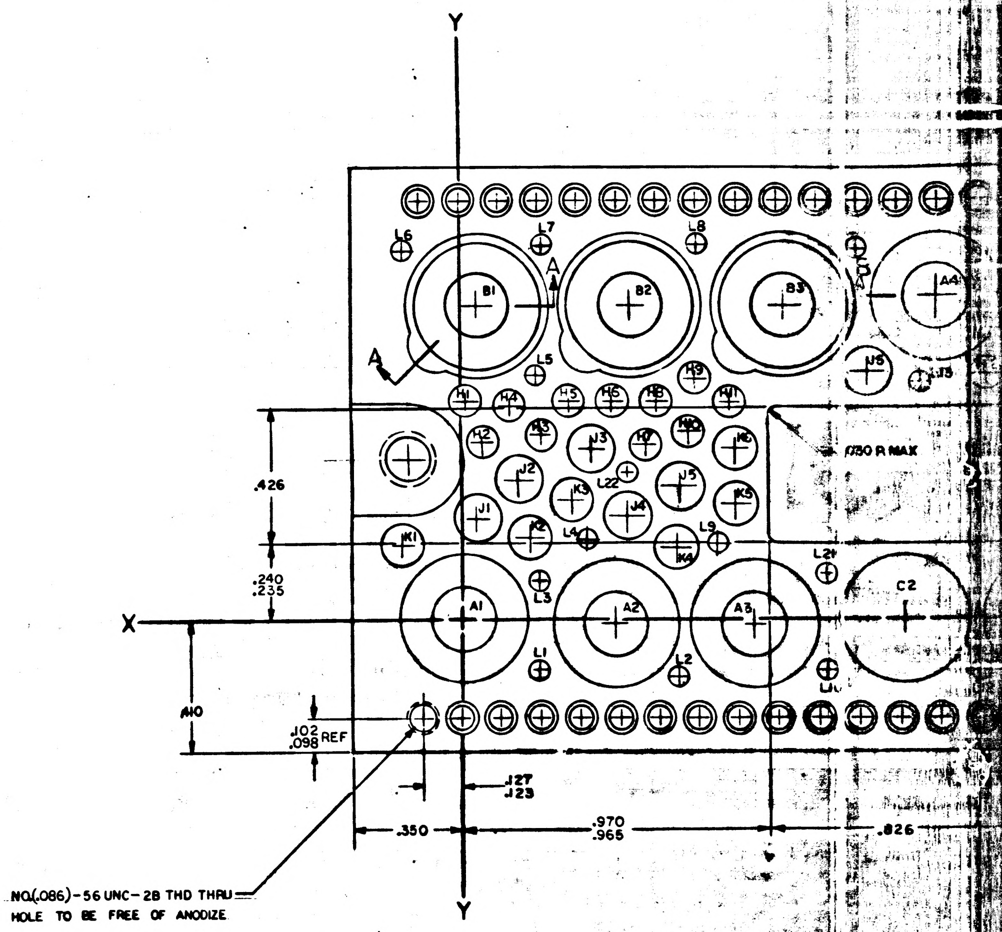
SECTION B-B
4 PLACES


.20 DIA
.302
.306 DIA
.270
.276

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	.000	.000	SEE SECTION B-B	4
A2	.480	−.010		
A3	.920	−.010		
A4	1.490	1.006		
B1	.050	.980	SEE SECTION A-A	3
B2	.540	.980		
B3	1.020	.980		
C1	1.830	.000	.395 .402	2
C2	1.390	.000		
D1	2.720	.050	.135 .139	2
D2	2.720	.940		
E1	2.270	.000	SEE SECTION C-C	1
F1	2.140	.860	.687 .694	1
G1	2.510	.550	.181 .186	1
H1	.014	.670	.100 .104	14
H2	.068	.550		
H3	.258	.572		
H4	.156	.662		
H5	.340	.680		
H6	.480	.680		
H7	.586	.546		
H8	.620	.680		
H9	.740	.750		
H10	.720	.584		
H11	.850	.676		
H12	1.640	.760		
H13	2.560	.330		
H14	2.430	.380		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
J1	.040	.310	.153 .157	7
J2	.178	.430		
J3	.414	.530		
J4	.526	.320		
J5	.690	.416		
J6	1.282	.774		
J7	2.240	.350		
K1	−.190	.230	.127 .131	7
K2	.210	.250		
K3	.348	.368		
K4	.680	.222		
K5	.866	.356		
K6	.860	.526		
K7	2.090	.240		
L1	.240	−.160	.058 .062	22
L2	.680	−.180		
L3	.240	.120		
L4	.400	.246		
L5	.240	.756		
L6	−.180	1.150		
L7	.260	1.170		
L8	.750	1.170		
L9	.816	.236		
L10	1.150	−.160		
L11	1.250	1.160		
L12	1.620	−.160		
L13	1.440	.740		
L14	1.730	1.170		
L15	1.770	1.070		
L16	1.940	.300		
L17	1.900	.440		
L18	2.590	.700		
L19	2.370	.260		
L20	2.480	.210		
L21	1.150	.140		
L22	.526	.460		


Y
X
A
B1
B2
B3
A4
A1
A2
A3
C2
L6
L7
L8
L5
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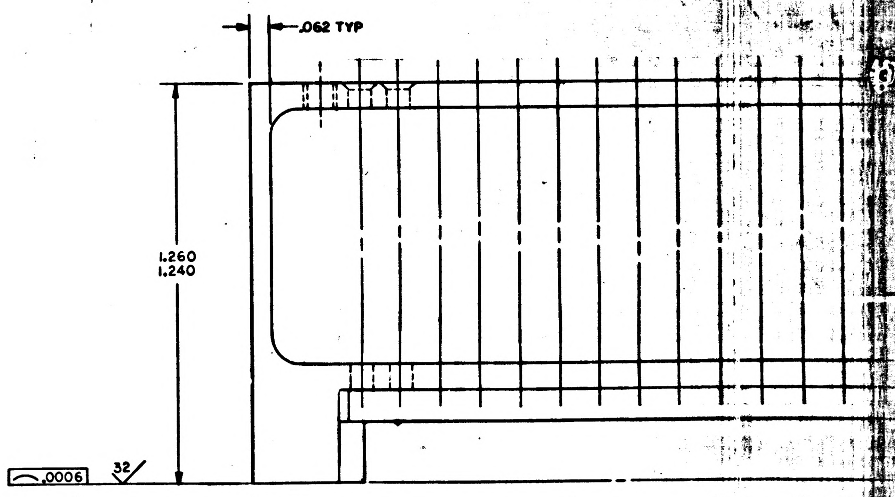
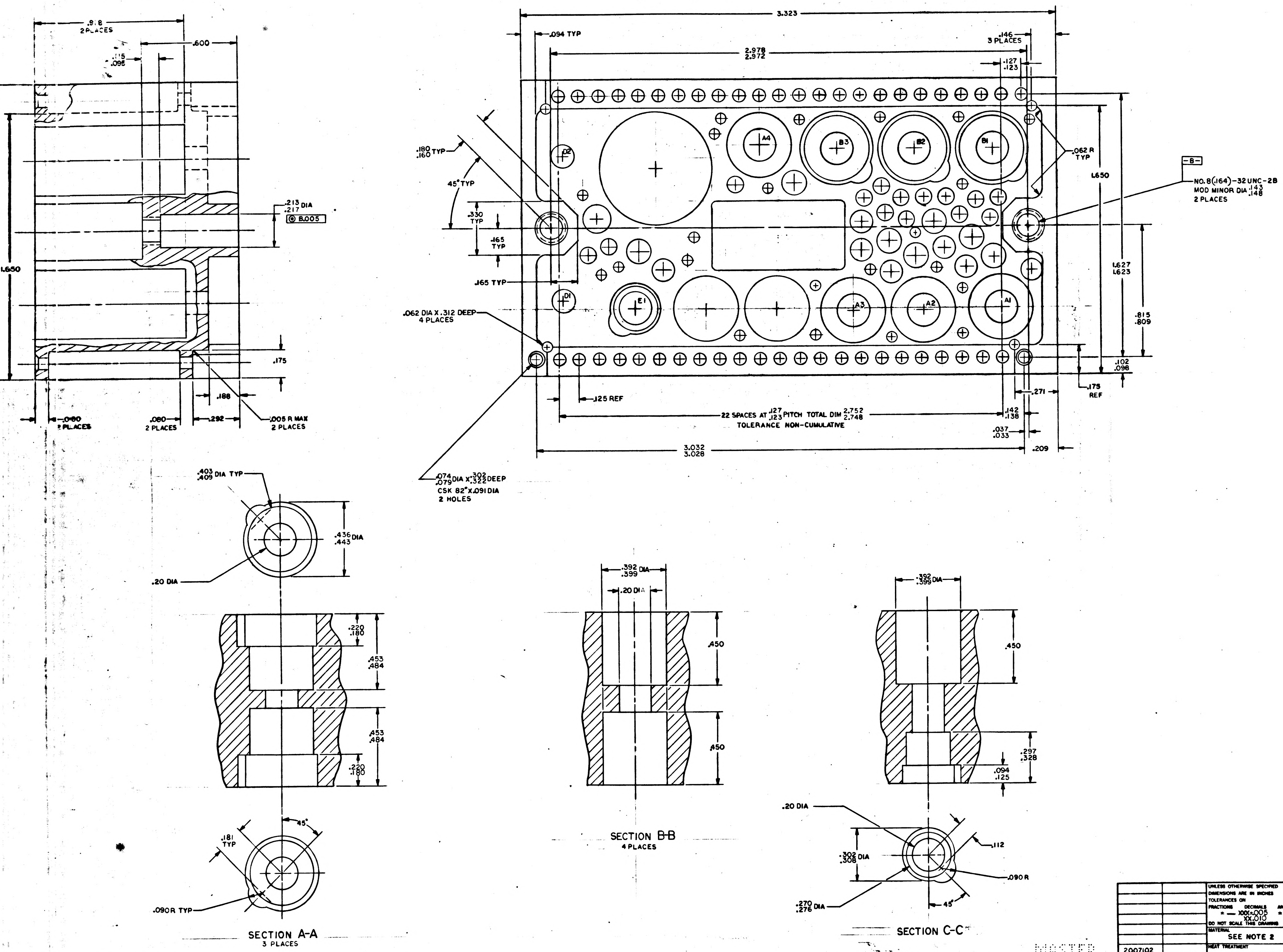
H2
H3
H4
H5
H6
H7
H8
H9
H10
H11
J1
J2
J3
J4
J5
K1
K2
K3
K4
K5
K6
L1
L2
L3
L4
L9
L21
L22
.426
.240
.235
.410
.102
.098 REF
.127
.123
.350
.970
.965
.826
.750 R MAX
NO.(.086)-56 UNC-28 THD THRU
HOLE TO BE FREE OF ANODIZE
Y


.062 TYP
1.260
1.240
.0006
32

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. U LESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125✓ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019

REVISIONS 14700			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	25 MAR 65	WK
B	REVISED PER TDRR 18959	12 May 65	WK



.918 2 PLACES
.600
.115 .095
.213 .217 DIA
◎ B .005
1.650
.175
.188
.292
.080 2 PLACES
.080 2 PLACES
.005 R MAX 2 PLACES
3.323
.094 TYP
2.978 2.972
.146 3 PLACES
.127 .123
.180 .160 TYP
45° TYP
.330 TYP
.165 TYP
.165 TYP
.062 DIA X .312 DEEP 4 PLACES
D2
D1
E1
A4
B3
B2
B1
A3
A2
A1
.062 R TYP
1.650
-B-
NO. 8(.164)-32 UNC-2B MOD MINOR DIA .143 .148 2 PLACES
1.627 1.623
.815 .809
.102 .098
.175 REF
.271
.125 REF
22 SPACES AT .127 .123 PITCH TOTAL DIM 2.752 2.748 TOLERANCE NON-CUMULATIVE
.142 .138
.037 .033
3.032 3.028
.209
.074 .079 DIA X .302 .322 DEEP CSK 82° X .091 DIA 2 HOLES
.403 .409 DIA TYP
.436 .443 DIA
.20 DIA
.220 .180
.453 .484
.453 .484
.220 .180
.181 TYP
45°
.090R TYP
SECTION A-A 3 PLACES
.392 .399 DIA
.20 DIA
.450
.450
SECTION B-B 4 PLACES
.392 .399 DIA
.450
.297 .328
.094 .125
.20 DIA
.302 .308 DIA
.112
.090 R
.270 .276 DIA
45°
SECTION C-C

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007102	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS XXX ± .005 XX .010
ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] DATE 3 Dec 64
CHECKED P. Lindstrom 7 Dec 64
APPROVAL J. M. BLYSHAK 7 DEC 64
APPROVAL [illegible] 7 DEC 64
NASA APPROVAL [illegible] 12-8-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
GYRO CALIBRATION

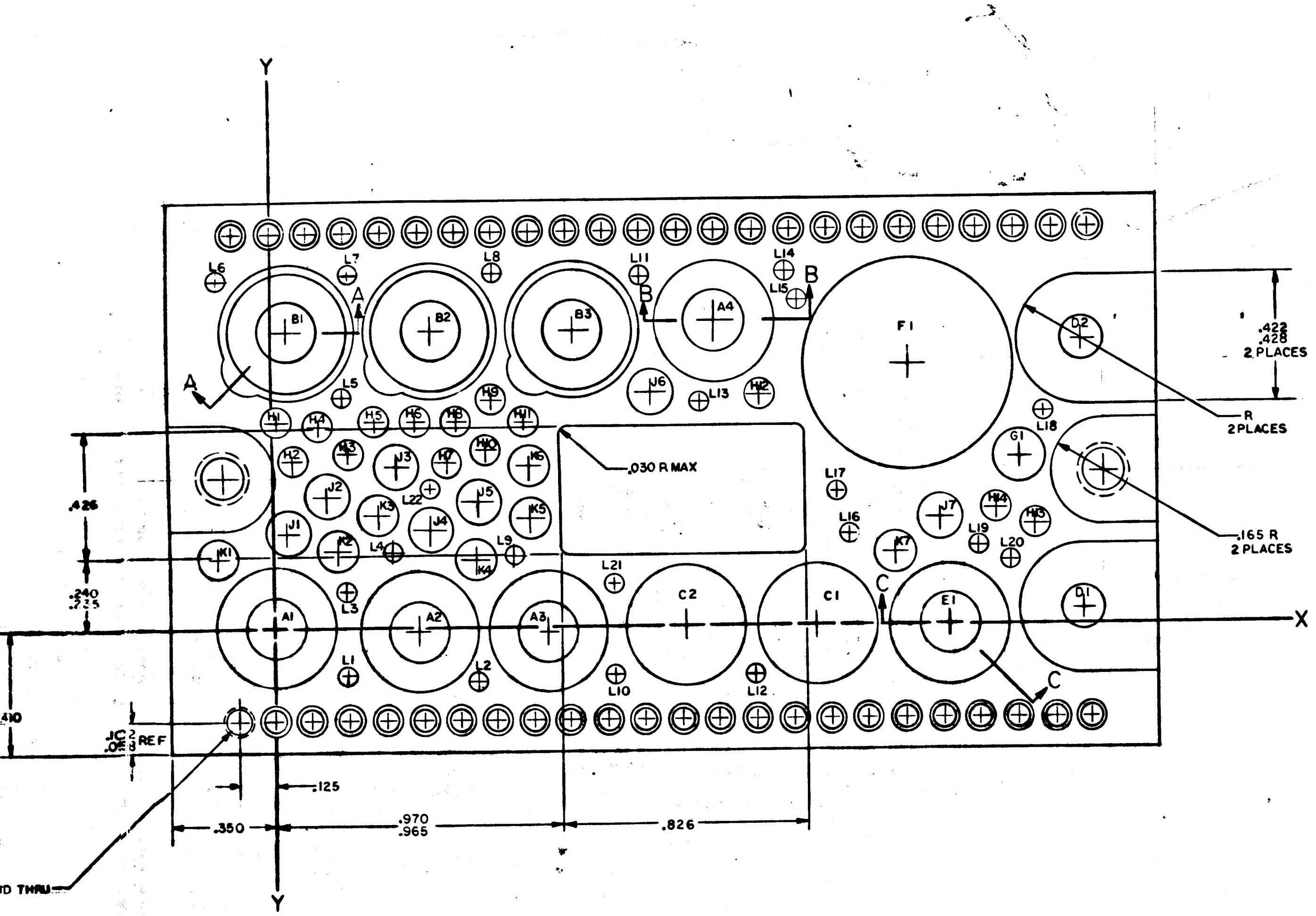
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008109
SCALE 5/1
WT —
SHEET 1 OF 1

2008109 B

2008109 B

34

E-3



Y
Y
X
A
A
B
B
C
C
B1
B2
B3
A4
F1
D2
A1
A2
A3
C2
C1
E1
D1
G1
J1
J2
J3
J4
J5
J6
J7
K1
K2
K3
K4
K5
K6
K7
H1
H2
H3
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H11
H12
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H14
H15
L1
L2
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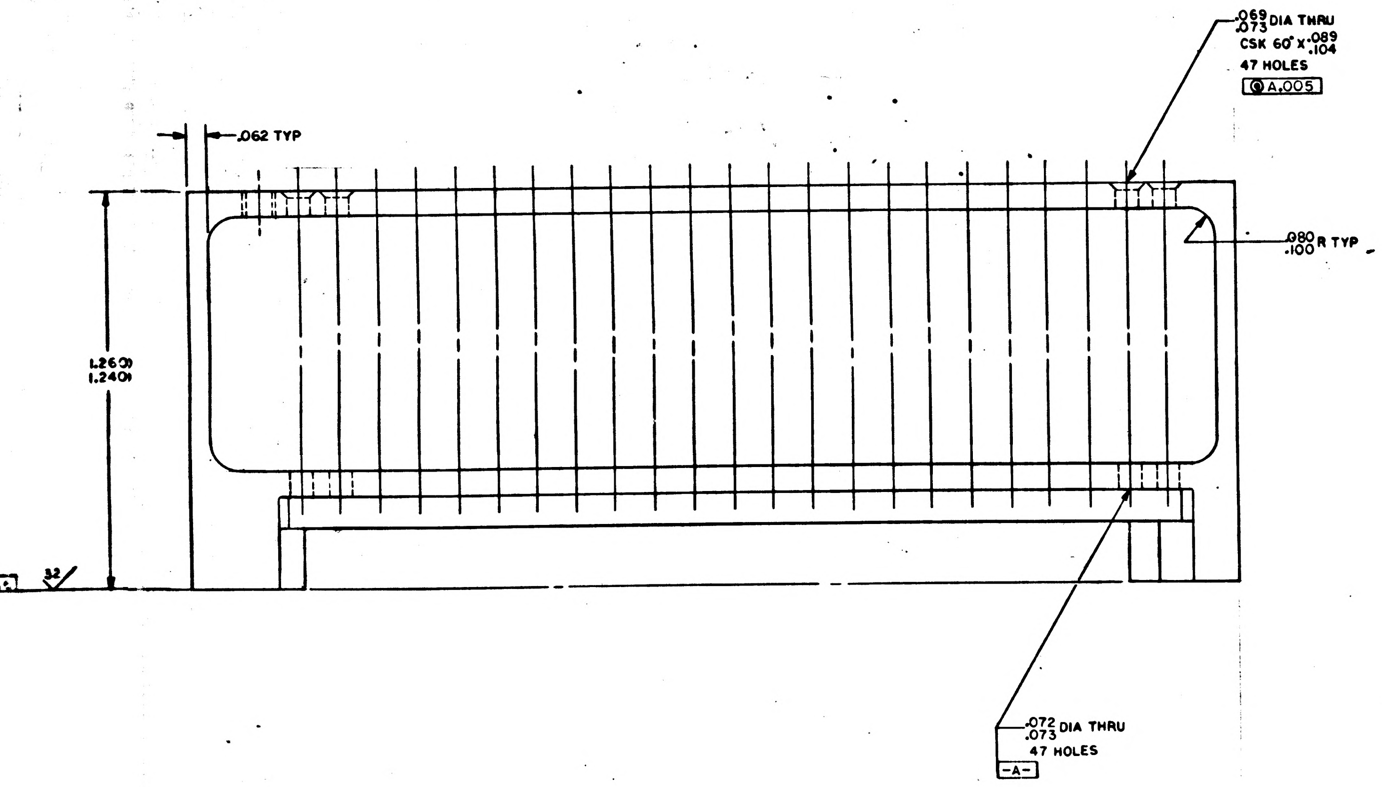
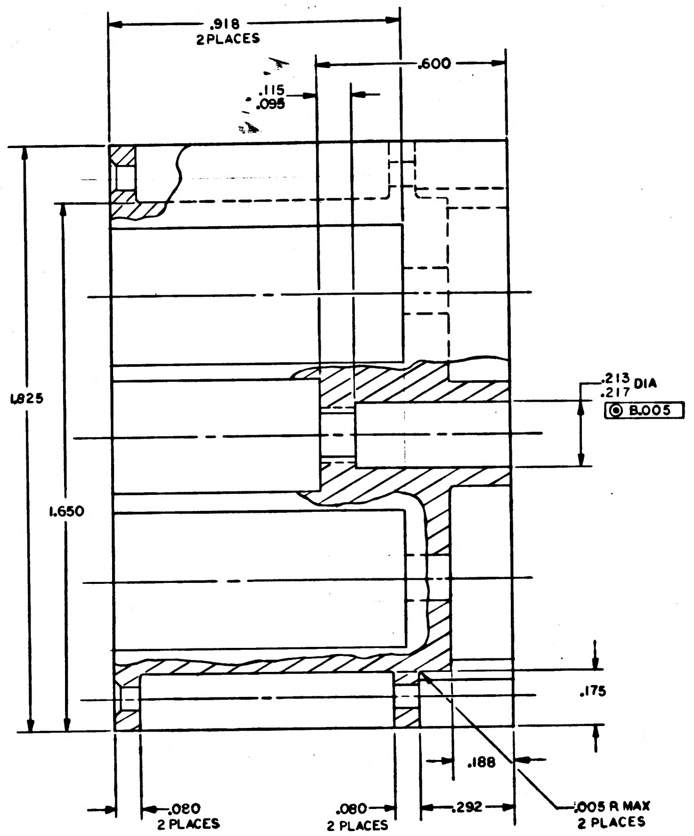
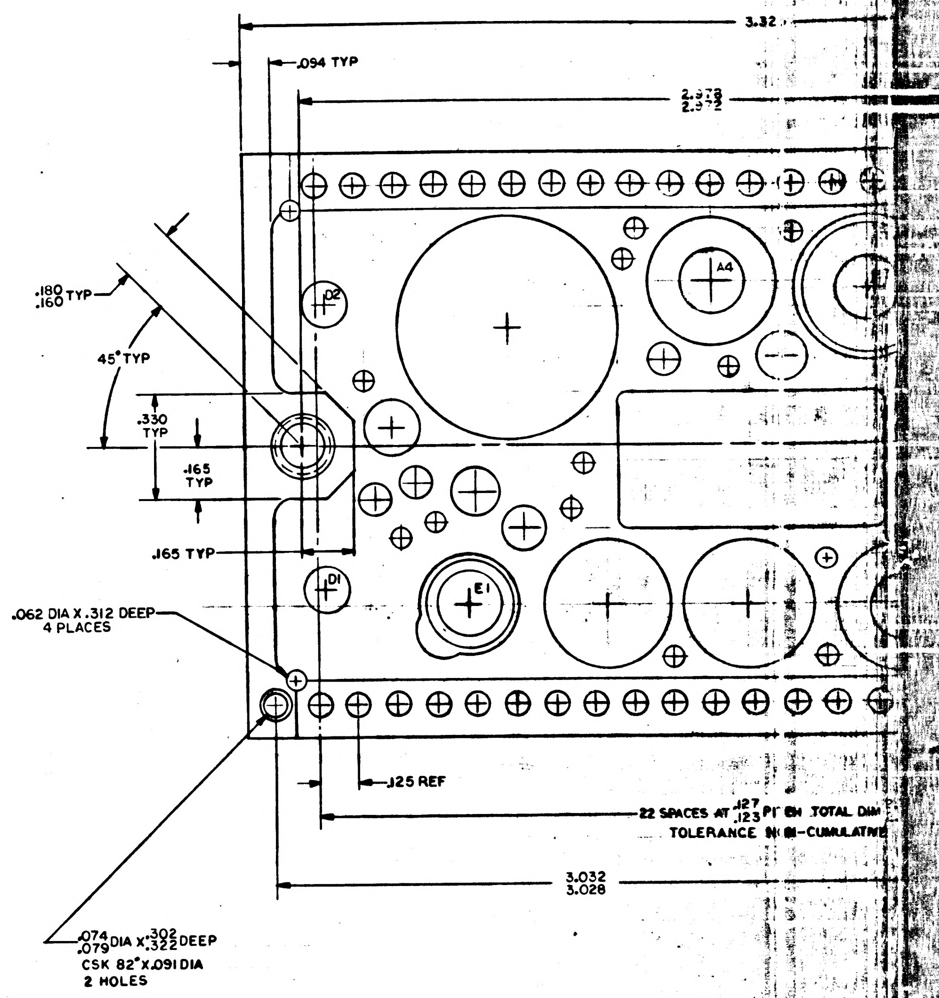
L10
L11
L12
L13
L14
L15
L16
L17
L18
L19
L20
L21
L22
.423
.428
2 PLACES
R
2 PLACES
.030 R MAX
.165 R
2 PLACES
.426
.240
.235
.410
.125
.085 REF
.125
.350
.970
.965
.826
D THRU



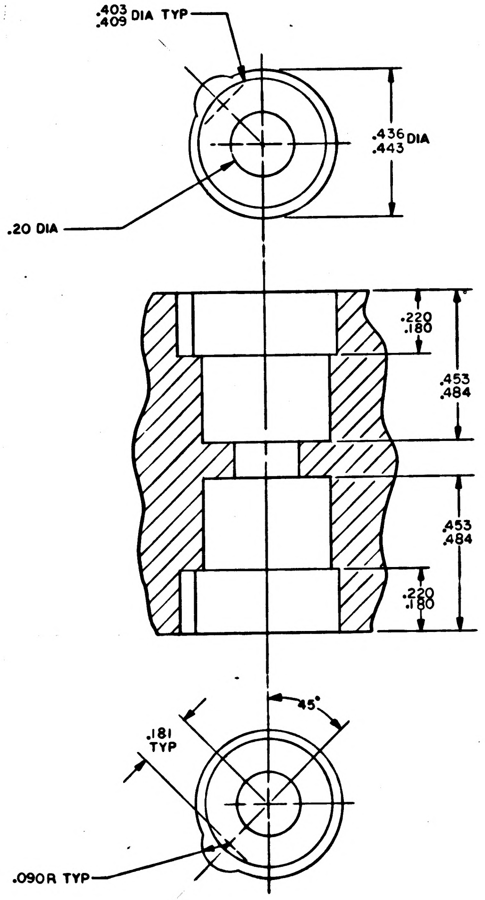
.062 TYP
.069
.073 DIA THRU
CSK 60° X .089
.104
47 HOLES
◎ A .005
.080
.100 R TYP
1.260
1.240
32
.072
.073 DIA THRU
47 HOLES
-A-



.918
2 PLACES
.600
.115
.095
1.825
1.650
.213
.217 DIA
◎ B .005
.175
.188
.080
2 PLACES
.080
2 PLACES
.292
.005 R MAX
2 PLACES



3.32
.094 TYP
2.378
2.372
A4
D2
.180
.160 TYP
45° TYP
.330
TYP
.165
TYP
.165 TYP
E1
D1
.062 DIA X .312 DEEP
4 PLACES
.125 REF
22 SPACES AT .127
.123 PITCH TOTAL DIM
TOLERANCE NON-CUMULATIVE
3.032
3.028
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES



.403
.409 DIA TYP
.436
.443 DIA
.20 DIA
.220
.180
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.484
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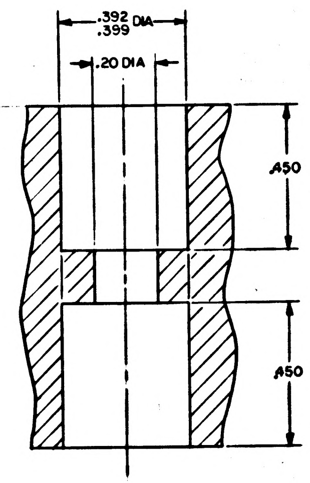
.180
.181
TYP
45°
.090R TYP

SECTION A-A
3 PLACES



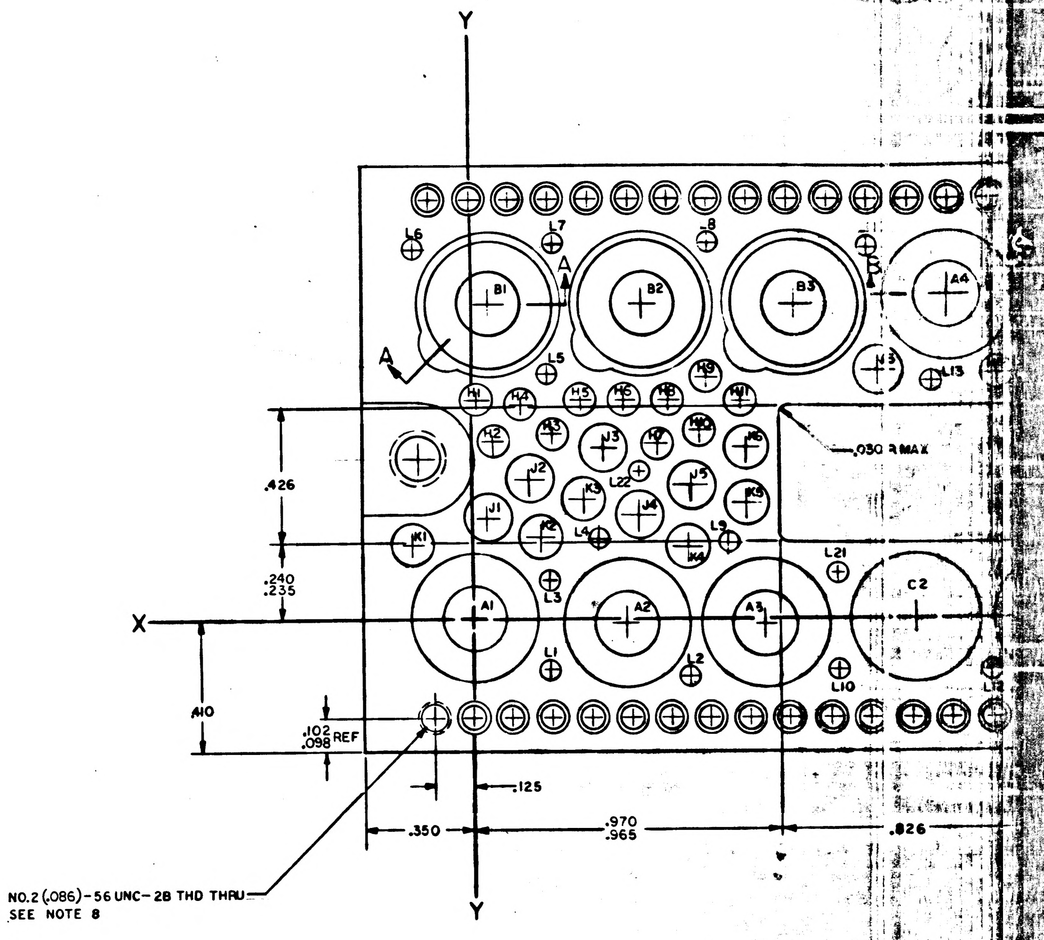
.392
.399 DIA
.20 DIA
.450
.450

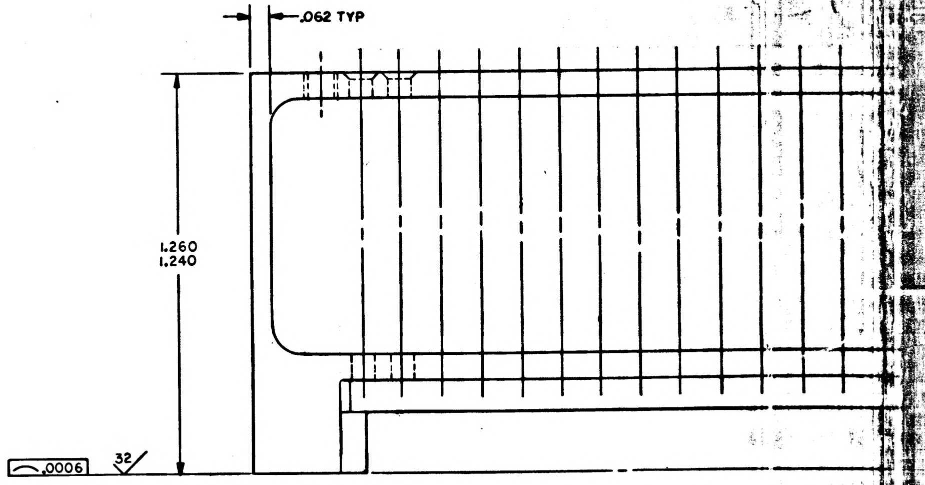
SECTION B-B
4 PLACES

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	.000	.000	SEE SECTION B-B	4
A2	.480	−.010		
A3	.920	−.010		
A4	1.490	1.006		
B1	.050	.980	SEE SECTION A-A	3
B2	.540	.980		
B3	1.020	.980		
C1	1.830	.000	.395 .402	2
C2	1.390	.000		
D1	2.720	.050	.135 .139	2
D2	2.720	.940		
E1	2.270	.000	SEE SECTION C-C	1
F1	2.140	.860	.687 .694	1
G1	2.510	.550	.181 .185	1
H1	.014	.670	.100 .104	14
H2	.068	.550		
H3	.258	.572		
H4	.156	.662		
H5	.340	.680		
H6	.480	.680		
H7	.586	.546		
H8	.620	.680		
H9	.740	.750		
H10	.720	.584		
H11	.850	.676		
H12	1.640	.760		
H13	2.560	.330		
H14	2.430	.380		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
J1	.040	.310	.153 .157	7
J2	.178	.430		
J3	.414	.530		
J4	.526	.320		
J5	.690	.416		
J6	1.282	.774		
J7	2.240	.350		
K1	−.190	.230	.127 .131	7
K2	.210	.250		
K3	.348	.368		
K4	.680	.222		
K5	.866	.356		
K6	.860	.526		
K7	2.090	.240		
L1	.240	−.160	.058 .062	22
L2	.680	−.180		
L3	.240	.120		
L4	.400	.246		
L5	.240	.756		
L6	−.180	1.150		
L7	.260	1.170		
L8	.750	1.170		
L9	.816	.236		
L10	1.150	−.160		
L11	1.250	1.160		
L12	1.620	−.160		
L13	1.440	.740		
L14	1.730	1.170		
L15	1.770	1.070		
L16	1.940	.300		
L17	1.900	.440		
L18	2.590	.700		
L19	2.370	.260		
L20	2.480	.210		
L21	1.150	.140		
L22	.526	.460		


Y
X
A
B
.426
.240
.235
.410
.102
.098 REF
.125
.350
.970
.965
.826
.030 R MAX
B1
B2
B3
A4
A1
A2
A3
C2
L6
L7
L8
L5
L13
L3
L1
L2
L4
L9
L10
L21
L22
H1
H2
H3
H4
H5
H6
H8
H9
H11
J1
J2
J3
J4
J5
K1
K2
K3
K4
K5
K6
NO.2 (.086)-56 UNC-2B THD THRU
SEE NOTE 8
Y


.062 TYP
1.260
1.240
.0006
32

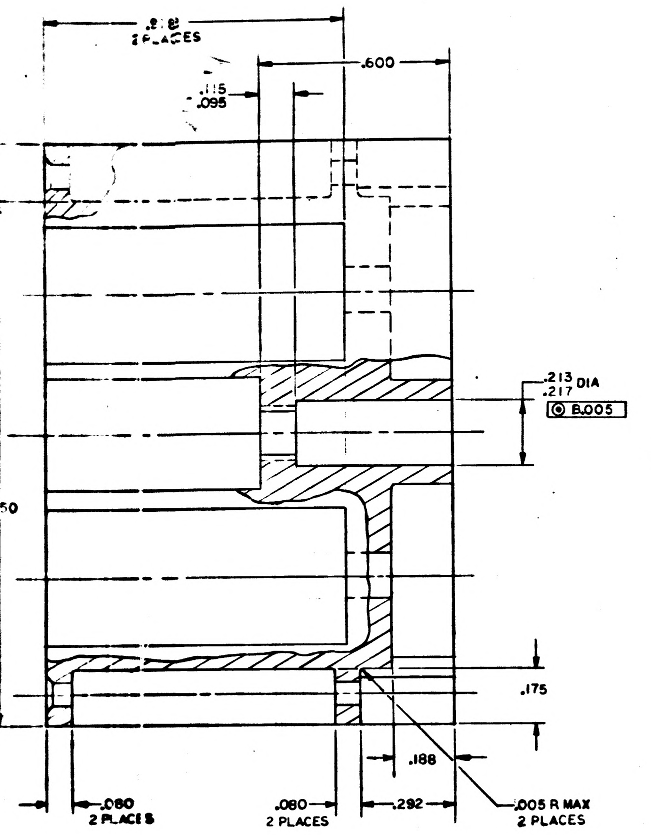
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125 ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

34

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	25 MAR 65	WK
B	REVISED PER TDRR 18959	12 May 65	WK
C	REVISED PER TDRR 21476	[illegible]	[illegible]

REVISIONS 14-4-67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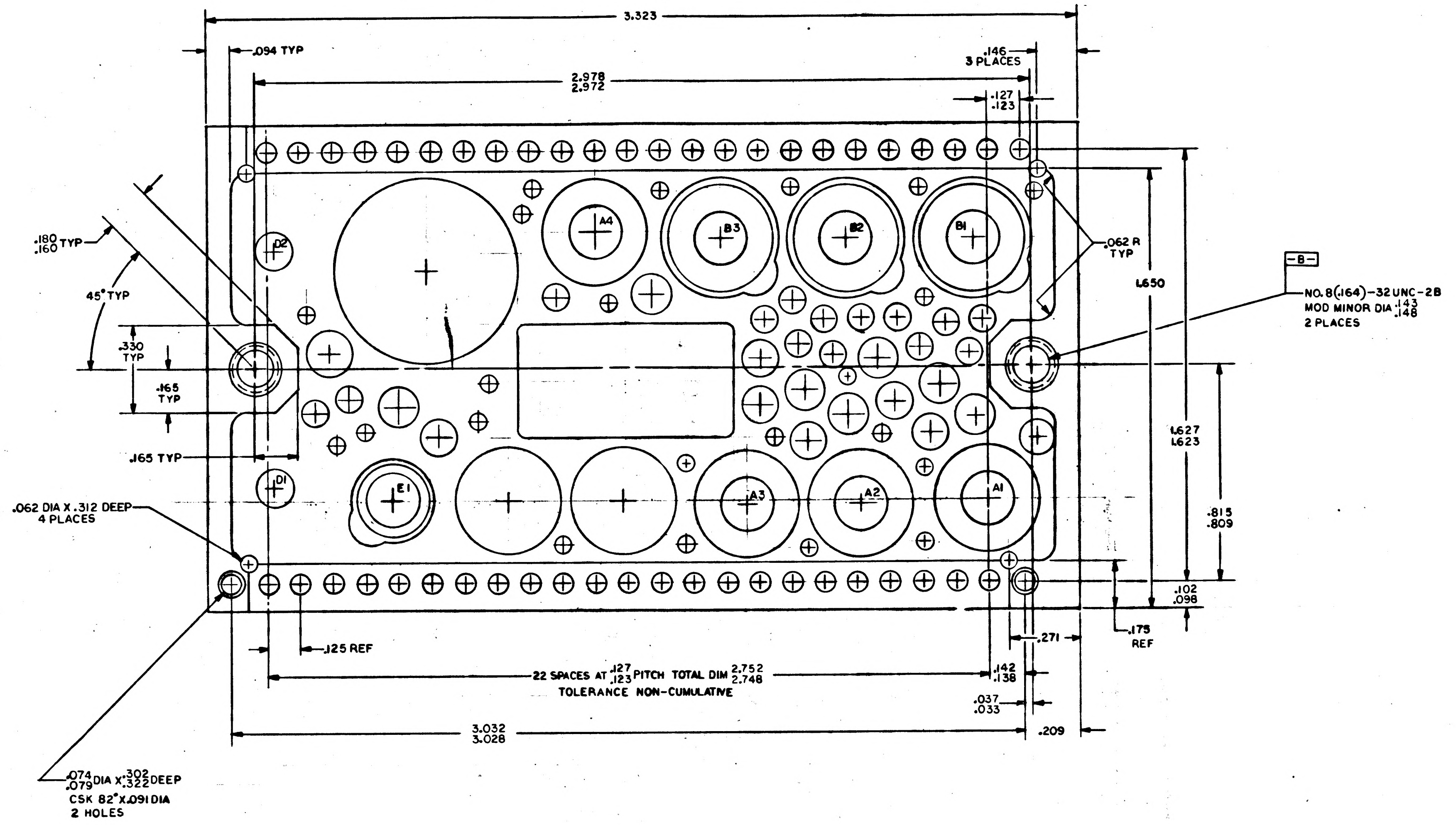
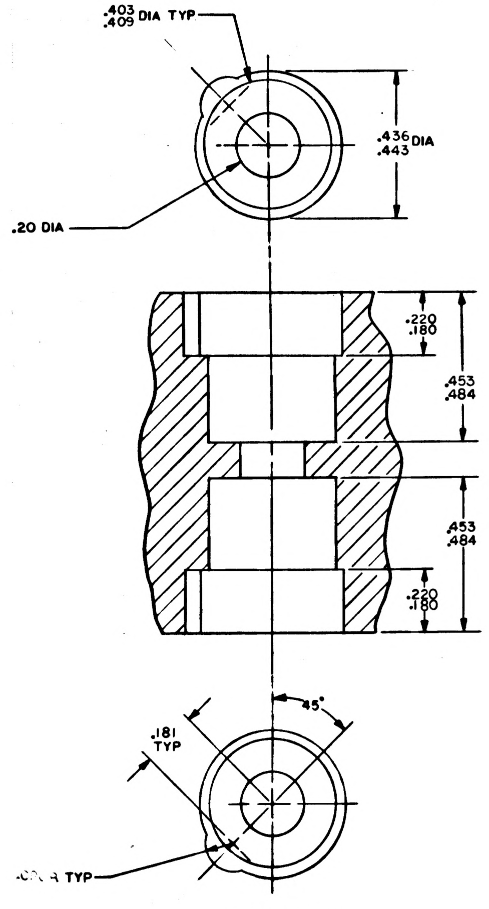
.115
.095
.213 DIA
.217
◎ B .005
50
.175
.188
.080 2 PLACES
.080 2 PLACES
.292
.005 R MAX 2 PLACES


3.323
.094 TYP
2.978
2.972
.146 3 PLACES
.127
.123
.180
.160 TYP
45° TYP
.330 TYP
.165 TYP
.165 TYP
.062 DIA X .312 DEEP 4 PLACES
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
D2
D1
E1
A4
B3
B2
B1
A3
A2
A1
.062 R TYP
1.650
-B-
NO. 8(.164)-32 UNC-2B
MOD MINOR DIA .143
.148
2 PLACES
1.627
1.623
.815
.809
.102
.098
.175 REF
.271
.125 REF
22 SPACES AT .127
.123 PITCH TOTAL DIM 2.752
2.748
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
3.032
3.028
.209


.403
.409 DIA TYP
.436
.443 DIA
.20 DIA
.220
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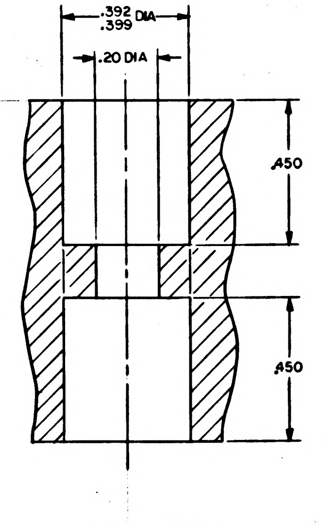
.484
.453
.484
.220
.180
45°
.181 TYP
.090 R TYP

SECTION A-A
3 PLACES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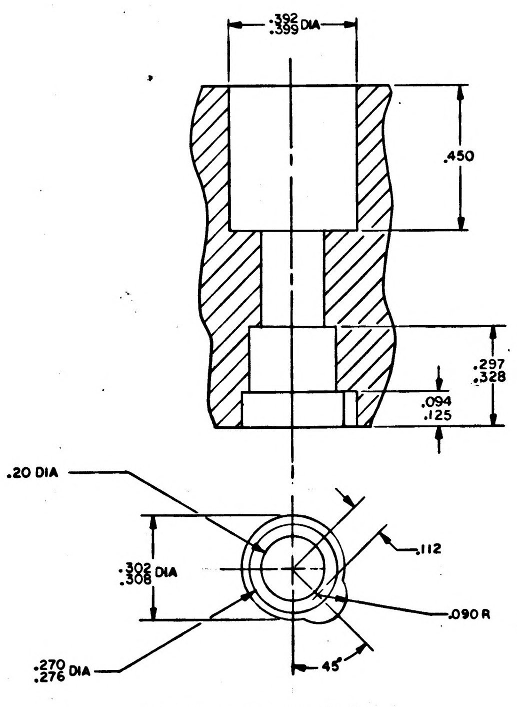
.450

SECTION B-B
4 PLACES


.392
.399 DIA
.450
.297
.328
.094
.125
.20 DIA
.302
.308 DIA
.270
.276 DIA
.112
.090 R
45°

SECTION C-C

3H

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007102	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS XXX ±.005 XX ±.010
ANGLES ± 1°
DO NOT SCALE THIS DRAWING

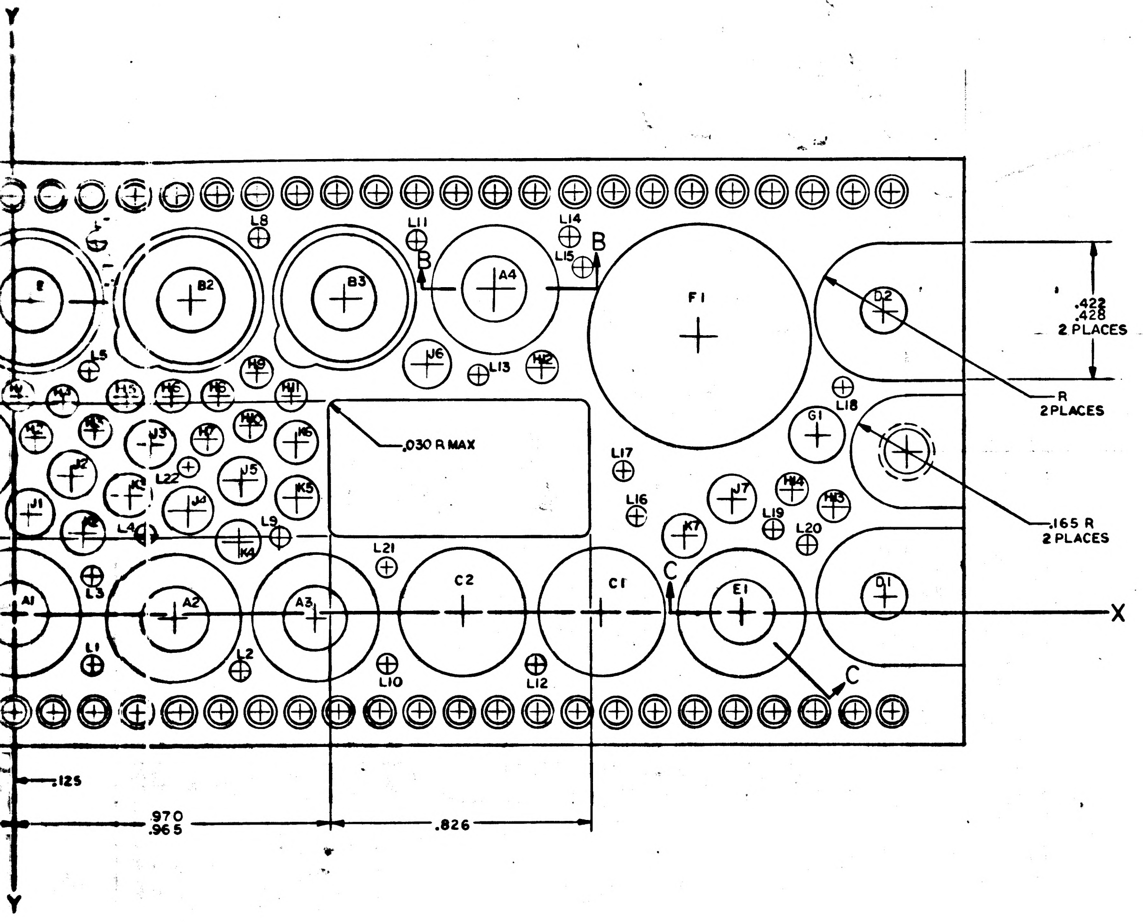
MATERIAL SEE NOTE 2
HEAT TREATMENT ———
FINAL FINISH SEE NOTE 6

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN R. Rpllens DATE 3 Jun 64
CHECKED C. Lindstrom 7 Dec 64
APPROVAL J. M. BUSHAK 7 Dec 64
APPROVAL John E. Miller 7 Dec 64
NASA APPROVAL W. R[illegible] 12-7-64
MIT APPROVAL W Kupfer [illegible]

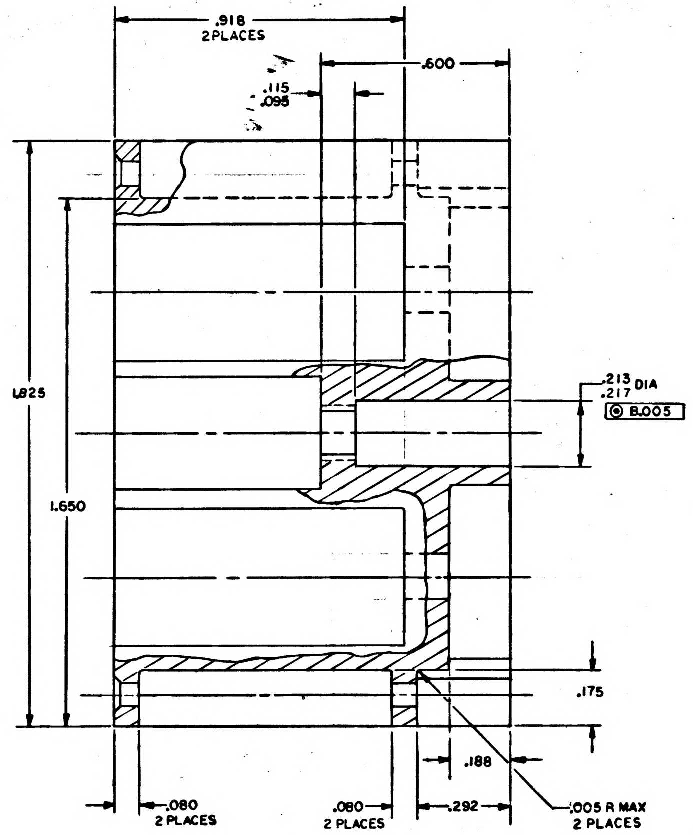
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
GYRO CALIBRATION

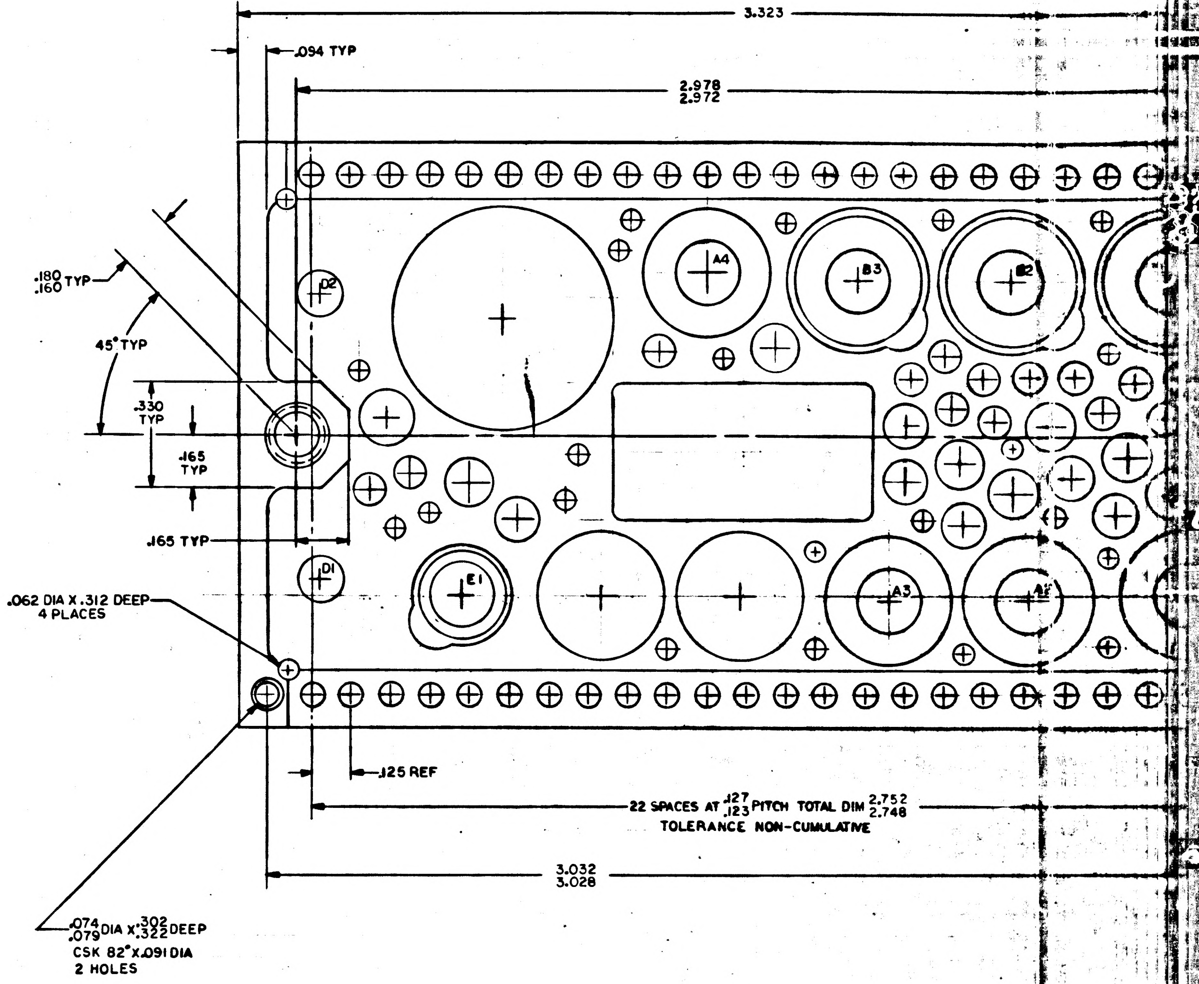
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008109
SCALE 5/1
WT ———
SHEET 1 OF 1



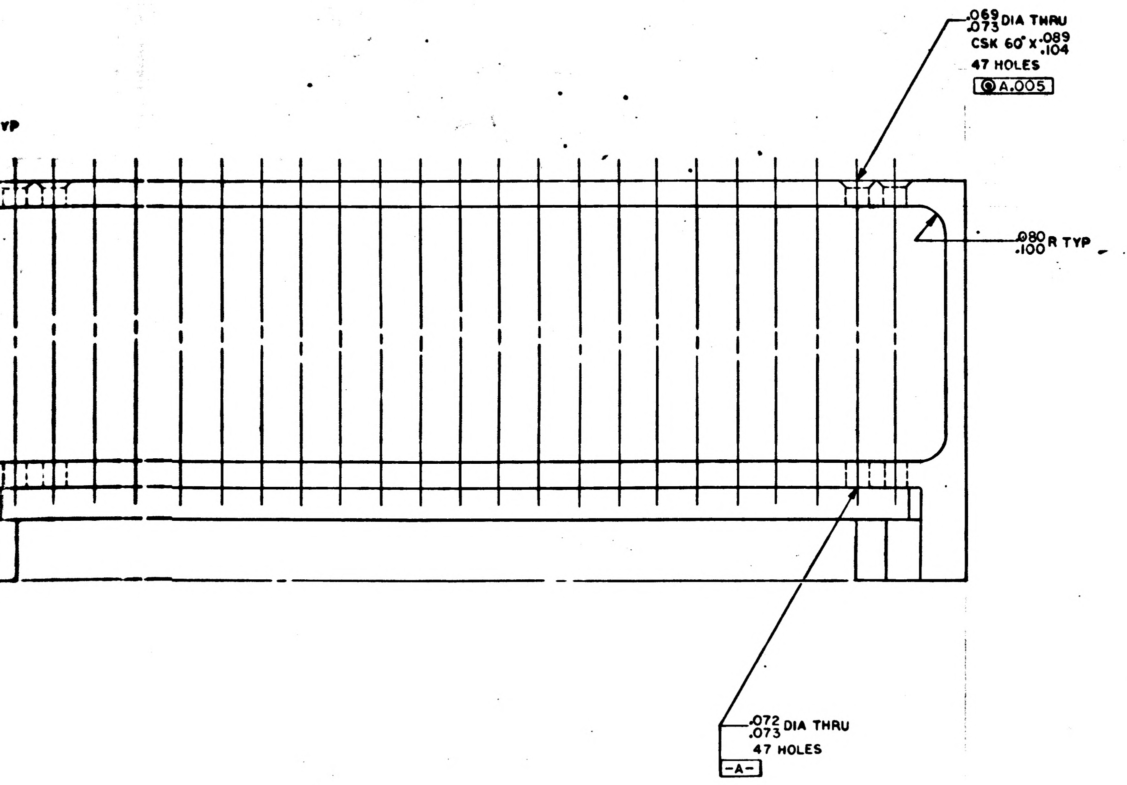
Y
B1 B2 B3 A4 F1 D2
L8 L11 L14 L15 B B L5 L6 L13 L12
.030 R MAX
G1 L18 L17 L16 J7 L19 L20 K7
A1 A2 A3 C2 C1 E1 D1
L1 L2 L3 L4 L9 L10 L12 L21
C C
.422 .428 2 PLACES
R 2 PLACES
.165 R 2 PLACES
X
.125
.970 .965
.826
Y



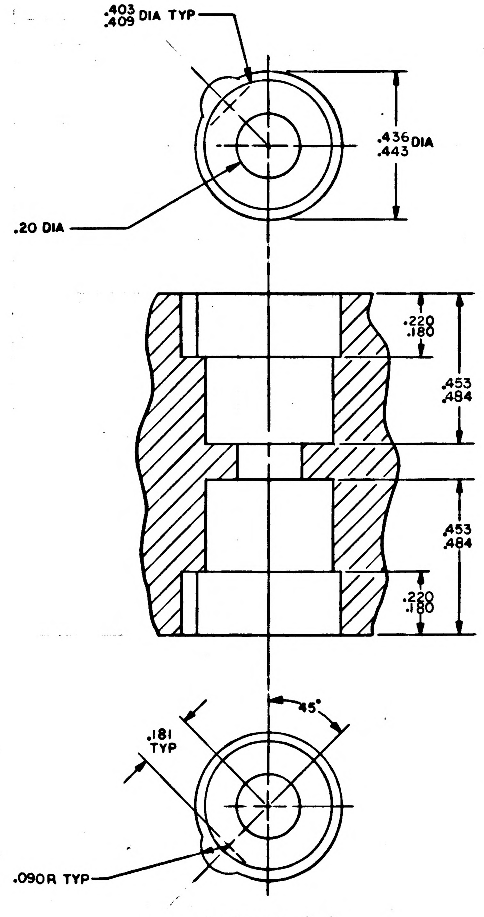
.918 2 PLACES
.600
.115 .095
1.825
1.650
.213 .217 DIA
Ⓞ B.005
.175
.188
.080 2 PLACES
.080 2 PLACES
.292
.005 R MAX 2 PLACES



3.323
.094 TYP
2.978 2.972
.180 .160 TYP
45° TYP
.330 TYP
.465 TYP
.165 TYP
.062 DIA X .312 DEEP 4 PLACES
.125 REF
22 SPACES AT .127 .123 PITCH TOTAL DIM 2.752 2.748
TOLERANCE NON-CUMULATIVE
3.032 3.028
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES

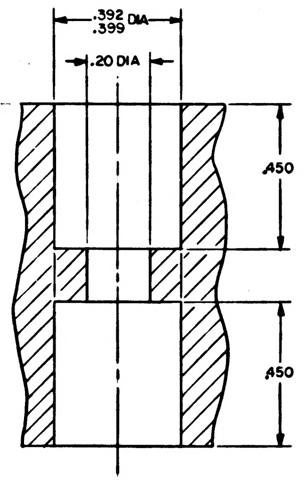


.069 .073 DIA THRU
CSK 60° X .089 .104
47 HOLES
Ⓞ A.005
.080 .100 R TYP
.072 .073 DIA THRU
47 HOLES
-A-



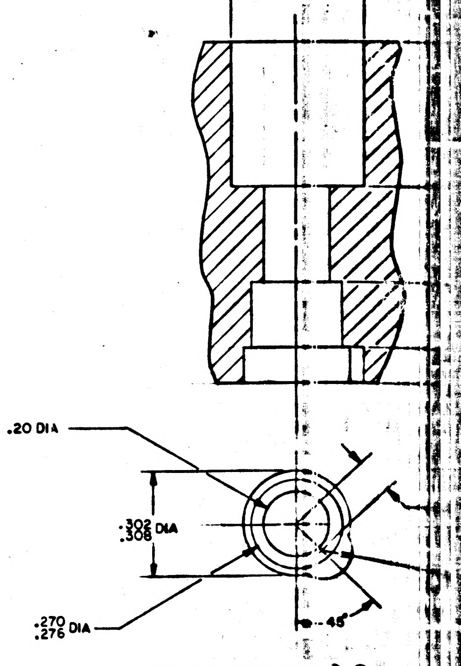
.403 .409 DIA TYP
.436 .443 DIA
.20 DIA
.220 .180
.453 .484
.453 .484
.220 .180
.181 TYP
45°
.090R TYP

SECTION A-A
3 PLACES



.392 .399 DIA
.20 DIA
.450
.450

SECTION B-B
4 PLACES



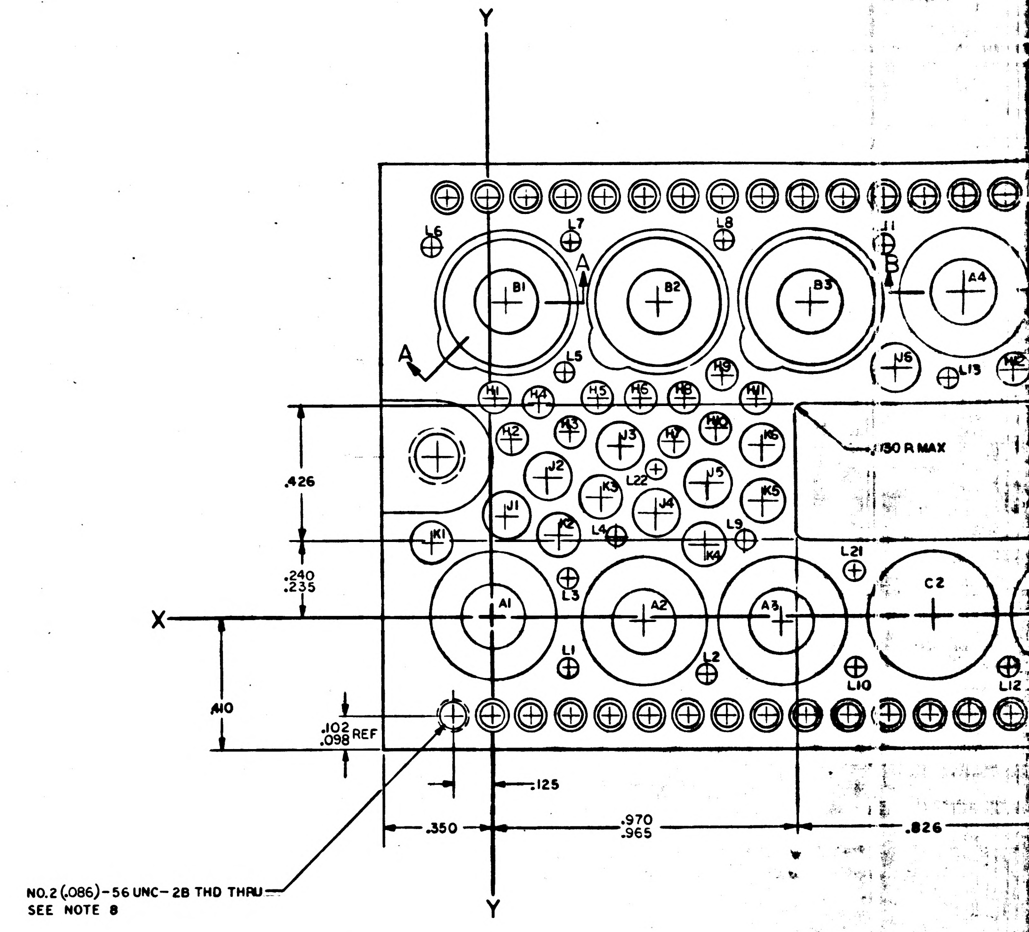
.392 .399 DIA
.20 DIA
.302 .308 DIA
.270 .276 DIA
45°

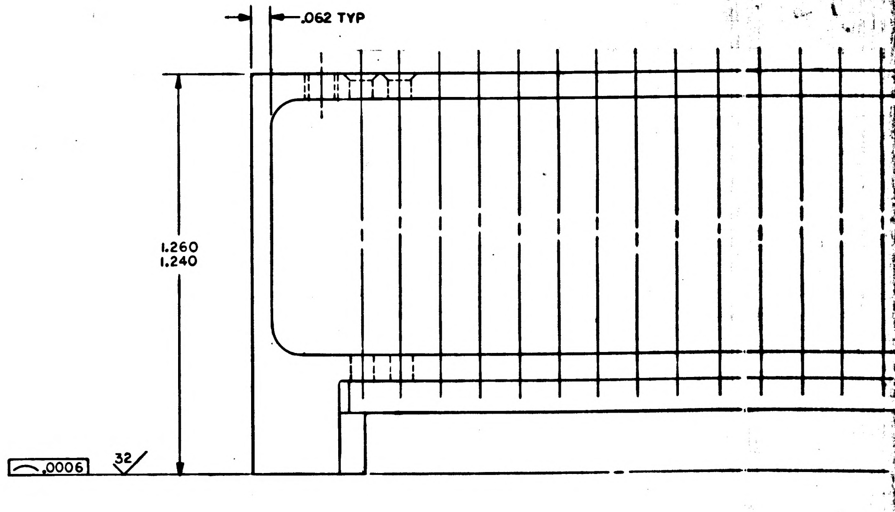
SECTION C-C

[illegible]

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	.000	.000	SEE SECTION B-B	4
A2	.480	−.010		
A3	.920	−.010		
A4	1.490	1.006		
B1	.050	.980	SEE SECTION A-A	3
B2	.540	.980		
B3	1.020	.980		
C1	1.830	.000	.395 .402	2
C2	1.390	.000		
D1	2.720	.050	.135 .139	2
D2	2.720	.940		
E1	2.270	.000	SEE SECTION C-C	1
F1	2.140	.860	.687 .694	1
G1	2.510	.550	.181 .185	1
H1	.014	.670	.100 .104	14
H2	.068	.550		
H3	.258	.572		
H4	.156	.662		
H5	.340	.680		
H6	.480	.680		
H7	.586	.546		
H8	.620	.680		
H9	.740	.750		
H10	.720	.584		
H11	.850	.676		
H12	1.640	.760		
H13	2.560	.330		
H14	2.430	.380		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
J1	.040	.310	.153 .157	7
J2	.178	.430		
J3	.414	.530		
J4	.526	.320		
J5	.690	.416		
J6	1.282	.774		
J7	2.240	.350		
K1	−.190	.230	.127 .131	7
K2	.210	.250		
K3	.348	.368		
K4	.680	.222		
K5	.866	.356		
K6	.860	.526		
K7	2.090	.240		
L1	.240	−.160	.058 .062	22
L2	.680	−.180		
L3	.240	.120		
L4	.400	.246		
L5	.240	.756		
L6	−.180	1.150		
L7	.260	1.170		
L8	.750	1.170		
L9	.816	.236		
L10	1.150	−.160		
L11	1.250	1.160		
L12	1.620	−.160		
L13	1.440	.740		
L14	1.730	1.170		
L15	1.770	1.070		
L16	1.940	.300		
L17	1.900	.440		
L18	2.590	.700		
L19	2.370	.260		
L20	2.480	.210		
L21	1.150	.140		
L22	.526	.460		


Y
A
B
B1
B2
B3
A4
L6
L7
L8
J1
L5
J6
L13
H12
H1
H4
H5
H6
H8
H9
H11
H2
H3
J3
H7
H10
K6
J2
L22
J5
K3
J4
K5
K1
K2
L4
L9
K4
L21
A1
A2
A3
C2
L3
L1
L2
L10
L12
.130 R MAX
.426
.240
.235
X
.410
.102
.098 REF
.125
.350
.970
.965
.826
NO.2 (.086)-56 UNC-2B THD THRU
SEE NOTE 8
Y

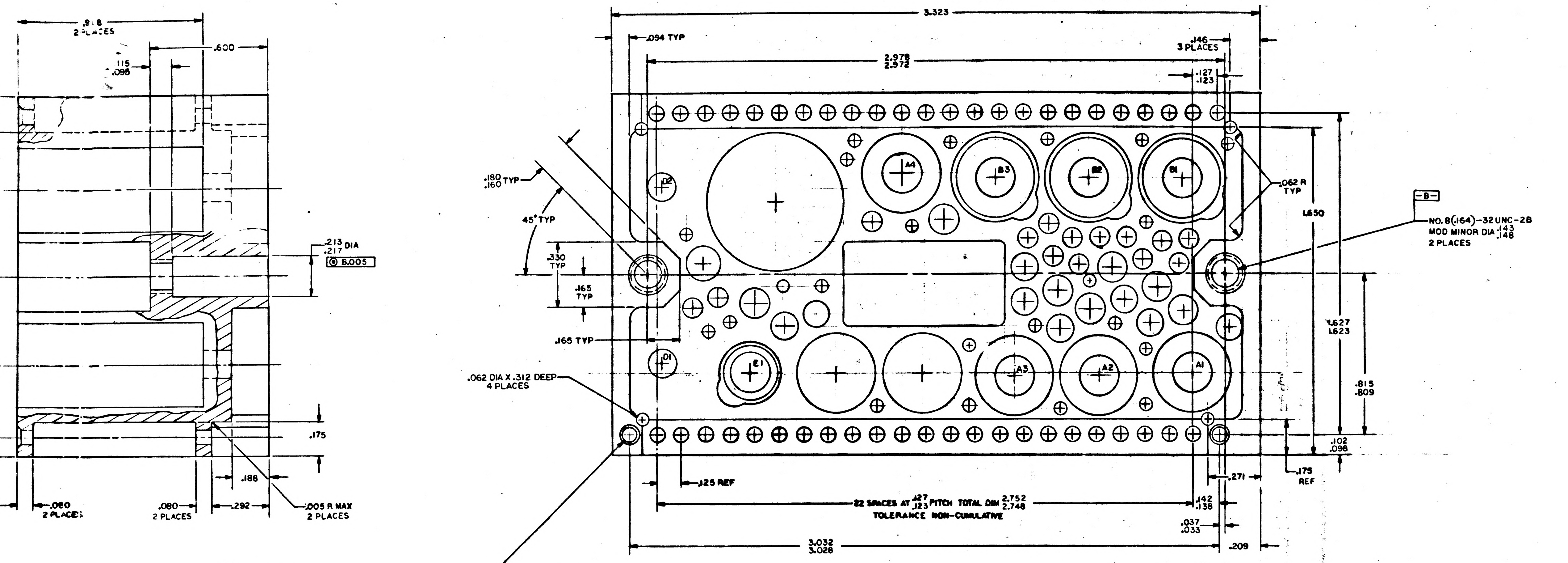

.062 TYP
1.260
1.240
.0006
32

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

34

REVISIONS 14700			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17617	25 MAR 65	WR
B	REVISED PER TDRR 18959	12 May 65	WR
C	REVISED PER TDRR 21476		WR
D	REVISED PER TDRR 23332	25 OCT	WR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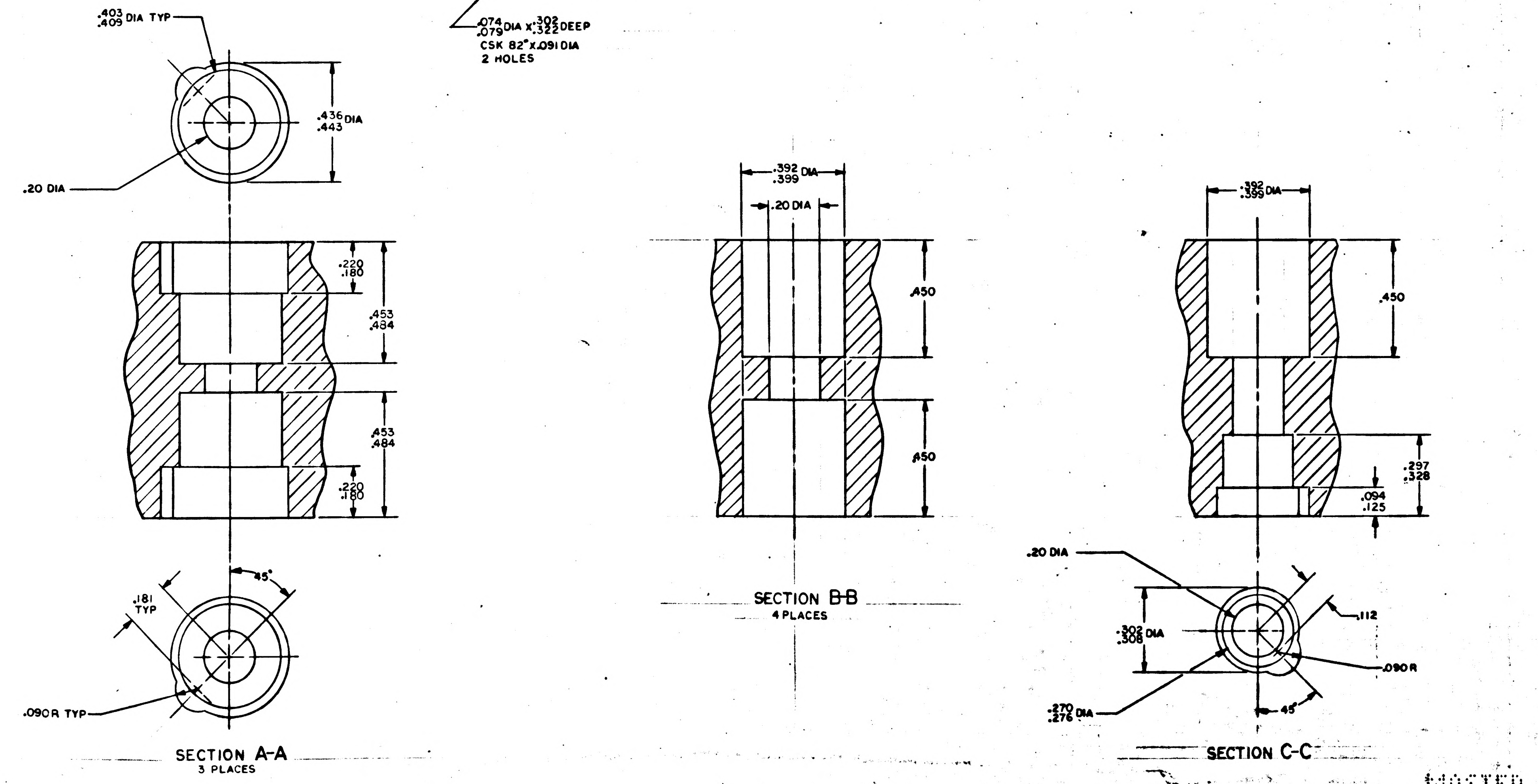
.600
.115 .095
.213 .217 DIA
B .005
.175
.188
.060 2 PLACES
.080 2 PLACES
.292
.005 R MAX 2 PLACES
3.323
.094 TYP
2.978 2.972
.146 3 PLACES
.127 .123
.180 .160 TYP
45° TYP
.330 TYP
.165 TYP
.165 TYP
.062 R TYP
1.650
-B-
NO. 8(.164)-32 UNC-2B MOD MINOR DIA .143 .148 2 PLACES
1.627 1.623
.815 .809
.102 .098
.175 REF
.271
.062 DIA X .312 DEEP 4 PLACES
.125 REF
22 SPACES AT .127 .123 PITCH TOTAL DIM 2.752 2.748
TOLERANCE NON-CUMULATIVE
.142 .138
.037 .033
3.032 3.028
.209
A4
B3
B2
B1
D2
D1
E1
A3
A2
A1


.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.403 .409 DIA TYP
.436 .443 DIA
.20 DIA
.220 .180
.453 .484
.453 .484
.220 .180
.181 TYP
45°
.090 R TYP
SECTION A-A
3 PLACES
.392 .399 DIA
.20 DIA
.450
.450
SECTION B-B
4 PLACES
.392 .399 DIA
.450
.297 .328
.094 .125
.20 DIA
.112
.302 .308 DIA
.090 R
.270 .276 DIA
45
SECTION C-C

MASTER

3H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007102	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX .010 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN DATE 3 Nov 64
CHECKED
APPROVAL J. M. BUSHAR 7 Dec 64
APPROVAL

NASA APPROVAL W. R. 12-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

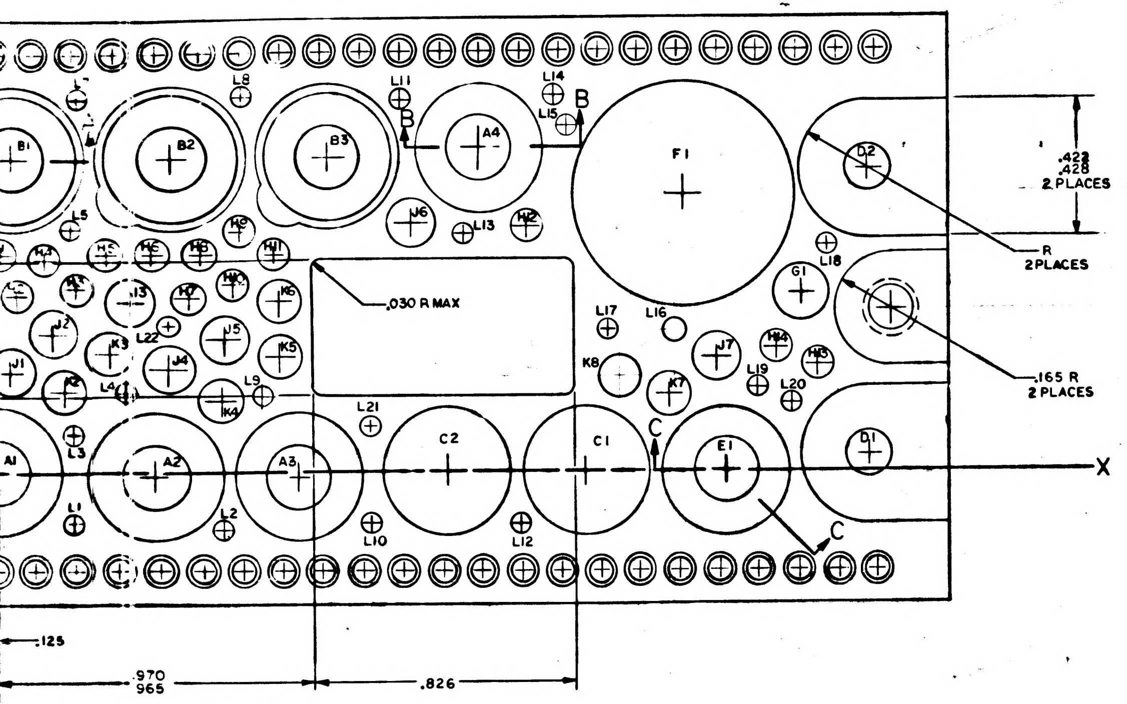
HEATSINK
GYRO CALIBRATION

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008109
SCALE 5/1	WT	SHEET 1 OF 1

2008109 D

2008109 D

E3


B1
B2
B3
A4
F1
D2
L8
L11
L14
L15
B
B
L5
L6
L13
M2
N2
N11
G1
L18
.030 R MAX
L17
L16
L22
K8
K7
J7
M14
L19
L20
M13
L9
L4
L21
A1
A2
A3
C2
C1
C
E1
D1
X
L1
L2
L10
L12
C
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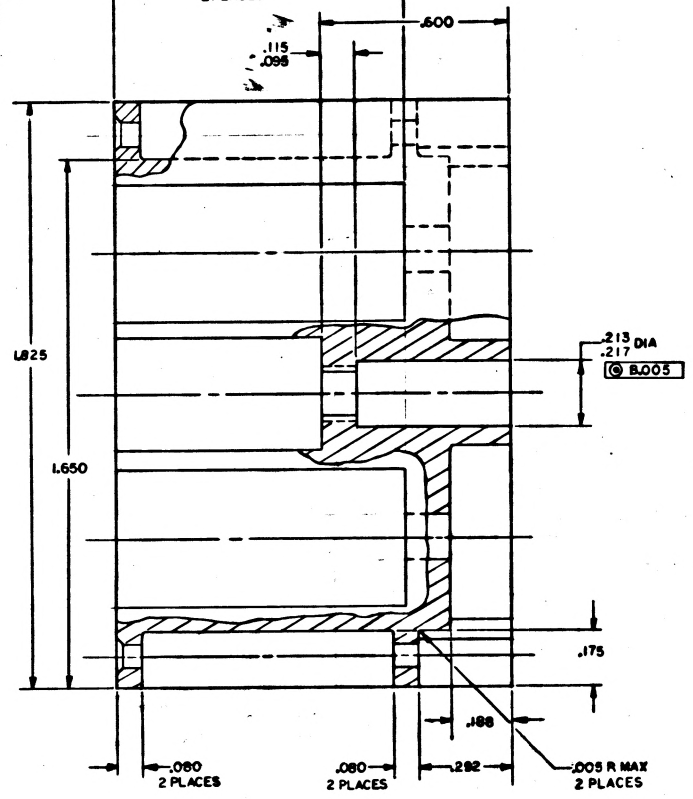
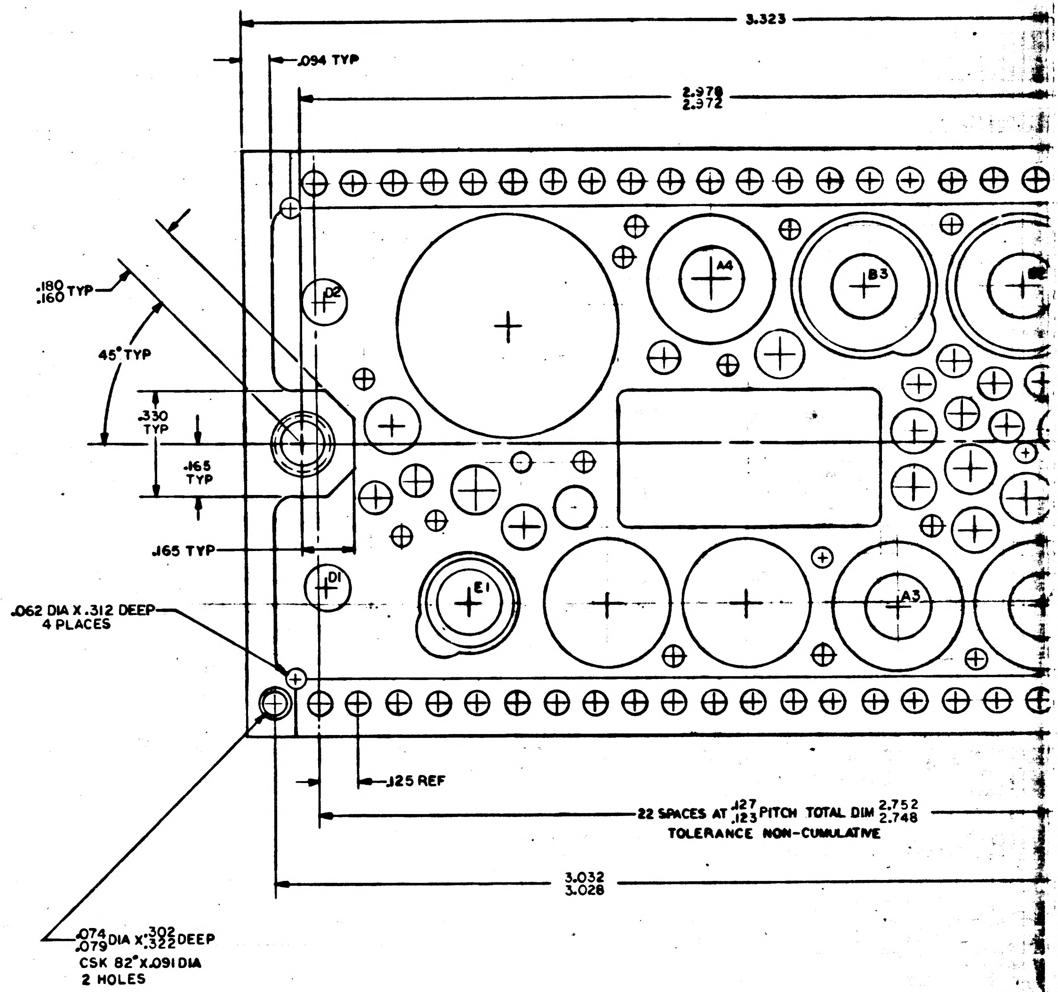
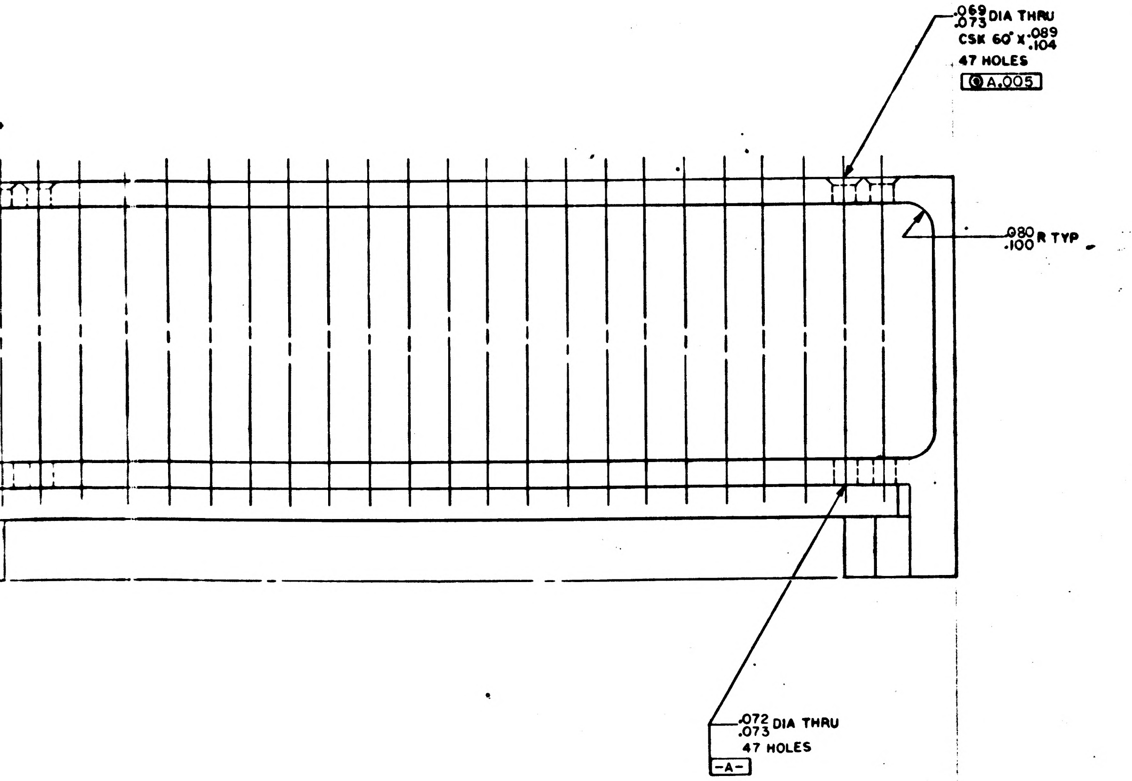
.428
2 PLACES
R
2 PLACES
.165 R
2 PLACES
.125
.970
.965
.826


.918
2 PLACES
.600
.115
.095
1.825
1.650
.213
.217 DIA
◎ B.005
.175
.188
.080
2 PLACES
.080
2 PLACES
.292
.005 R MAX
2 PLACES


3.323
.094 TYP
2.378
2.372
.180
.160 TYP
45° TYP
.330
TYP
.165
TYP
.165 TYP
.062 DIA X .312 DEEP
4 PLACES
A4
B3
D2
E1
D1
A3
.125 REF
22 SPACES AT .127
.123 PITCH TOTAL DIM 2.752
2.748
TOLERANCE NON-CUMULATIVE
3.032
3.028
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES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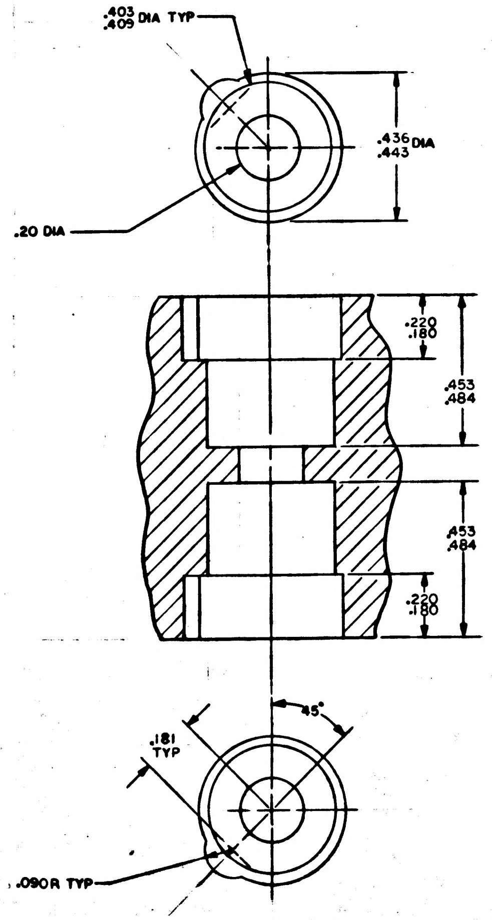
.073 DIA THRU
CSK 60° X .089
.104
47 HOLES
◎ A.005
.080
.100 R TYP
.072
.073 DIA THRU
47 HOLES
-A-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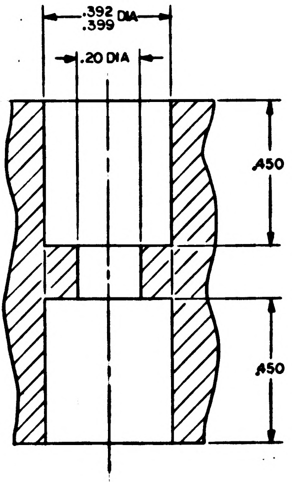
.409 DIA TYP
.436
.443 DIA
.20 DIA
.220
.180
.453
.484
.453
.484
.220
.180
.181
TYP
45°
.090R TYP

SECTION A-A
3 PLACES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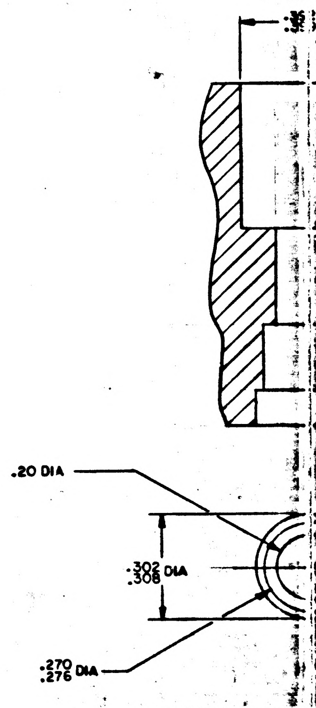
.20 DIA
.450
.450

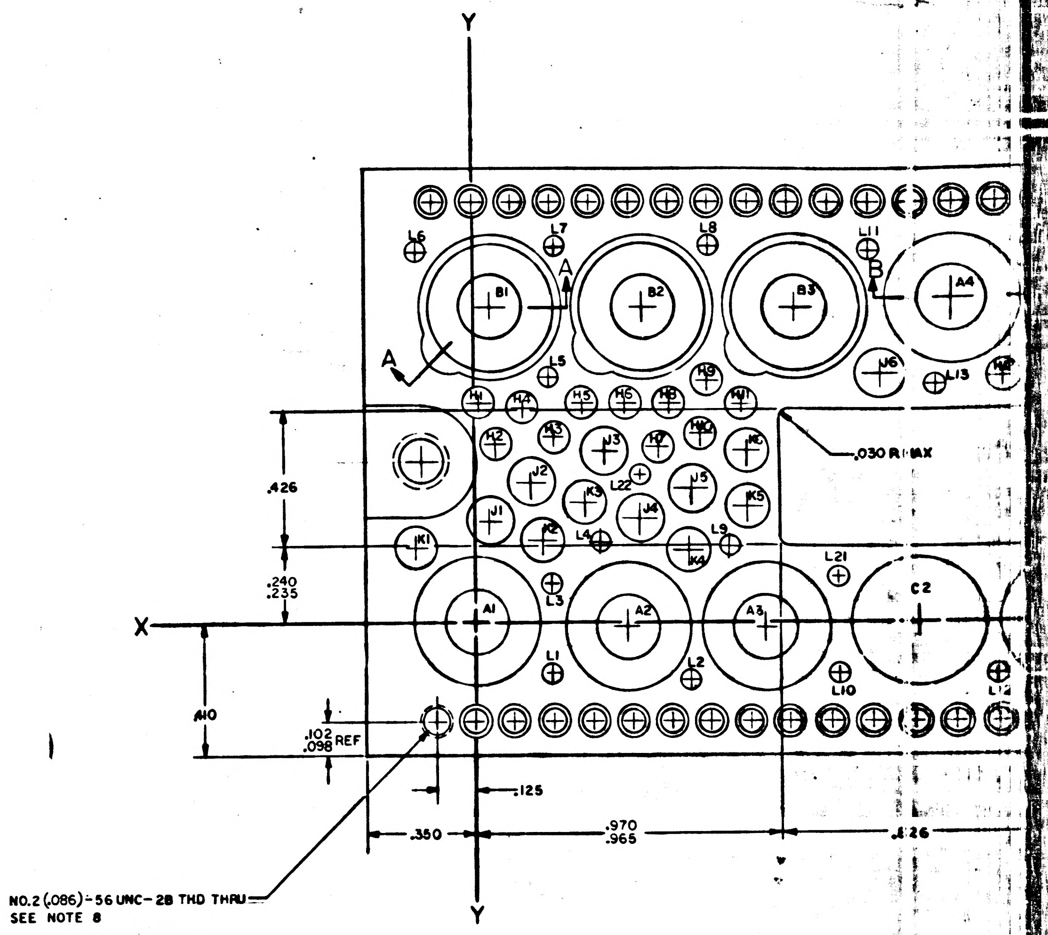
SECTION B-B
4 PLACES

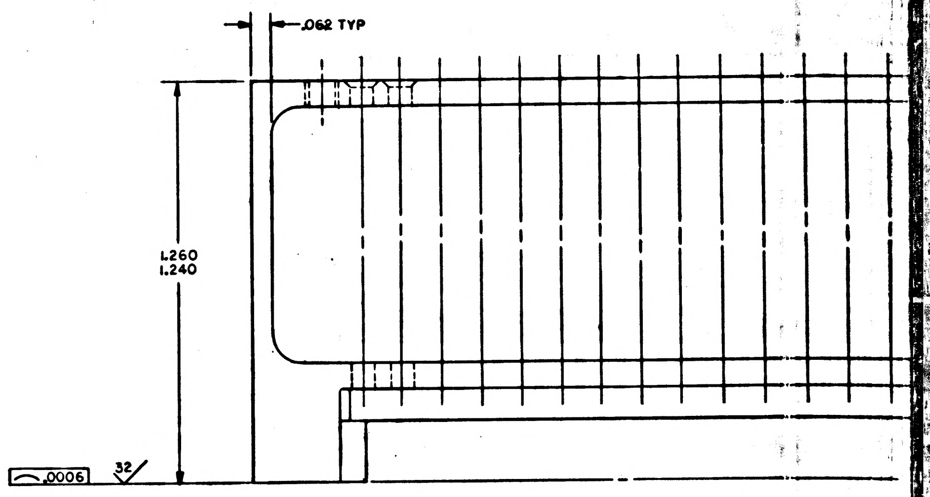

.20 DIA
.302
.308 DIA
.270
.276 DIA

SECT

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	.000	.000	SEE SECTION B-B	4
A2	.480	−.010		
A3	.920	−.010		
A4	1.490	1.006		
B1	.050	.980	SEE SECTION A-A	3
B2	.540	.980		
B3	1.020	.980		
C1	1.830	.000	.395 .402	2
C2	1.390	.000		
D1	2.720	.050	.135 .139	2
D2	2.720	.940		
E1	2.270	.000	SEE SECTION C-C	1
F1	2.140	.860	.687 .694	1
G1	2.510	.550	.181 .185	1
H1	.014	.670	.100 .104	14
H2	.068	.550		
H3	.258	.572		
H4	.156	.662		
H5	.340	.680		
H6	.480	.680		
H7	.586	.546		
H8	.620	.680		
H9	.740	.750		
H10	.720	.584		
H11	.850	.676		
H12	1.640	.760		
H13	2.560	.330		
H14	2.430	.380		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
J1	.040	.310	.153 .157	7
J2	.178	.430		
J3	.414	.530		
J4	.526	.320		
J5	.690	.416		
J6	1.282	.774		
J7	2.240	.350		
K1	−.190	.230	.127 .131	8
K2	.210	.250		
K3	.348	.368		
K4	.680	.222		
K5	.866	.356		
K6	.860	.526		
K7	2.090	.240		
K8	1.930	.300		
L1	.240	−.160	.058 .062	22
L2	.680	−.180		
L3	.240	.120		
L4	.400	.246		
L5	.240	.756		
L6	−.180	1.150		
L7	.260	1.170		
L8	.750	1.170		
L9	.816	.236		
L10	1.150	−.160		
L11	1.250	1.160		
L12	1.620	−.160		
L13	1.440	.740		
L14	1.730	1.170		
L15	1.770	1.070		
L16	2.100	.440		
L17	1.900	.440		
L18	2.590	.700		
L19	2.370	.260		
L20	2.480	.210		
L21	1.150	.140		
L22	.526	.460		


Y
L6
L7
L8
L11
B1
B2
B3
A4
A
B
A
L5
J6
L13
H1
H4
H3
H5
H6
H8
H9
H11
H2
H10
J2
J3
H7
J5
K6
K5
L22
K3
J1
K2
L4
J4
L9
K1
K4
.030 R MAX
.426
L21
.240
.235
L3
X
A1
A2
A3
C2
L1
L2
L10
L12
.140
.102
.098 REF
.125
.350
.970
.965
.126
NO.2 (.086)-56 UNC-2B THD THRU
SEE NOTE 8
Y


.062 TYP
1.260
1.240
.0006
32

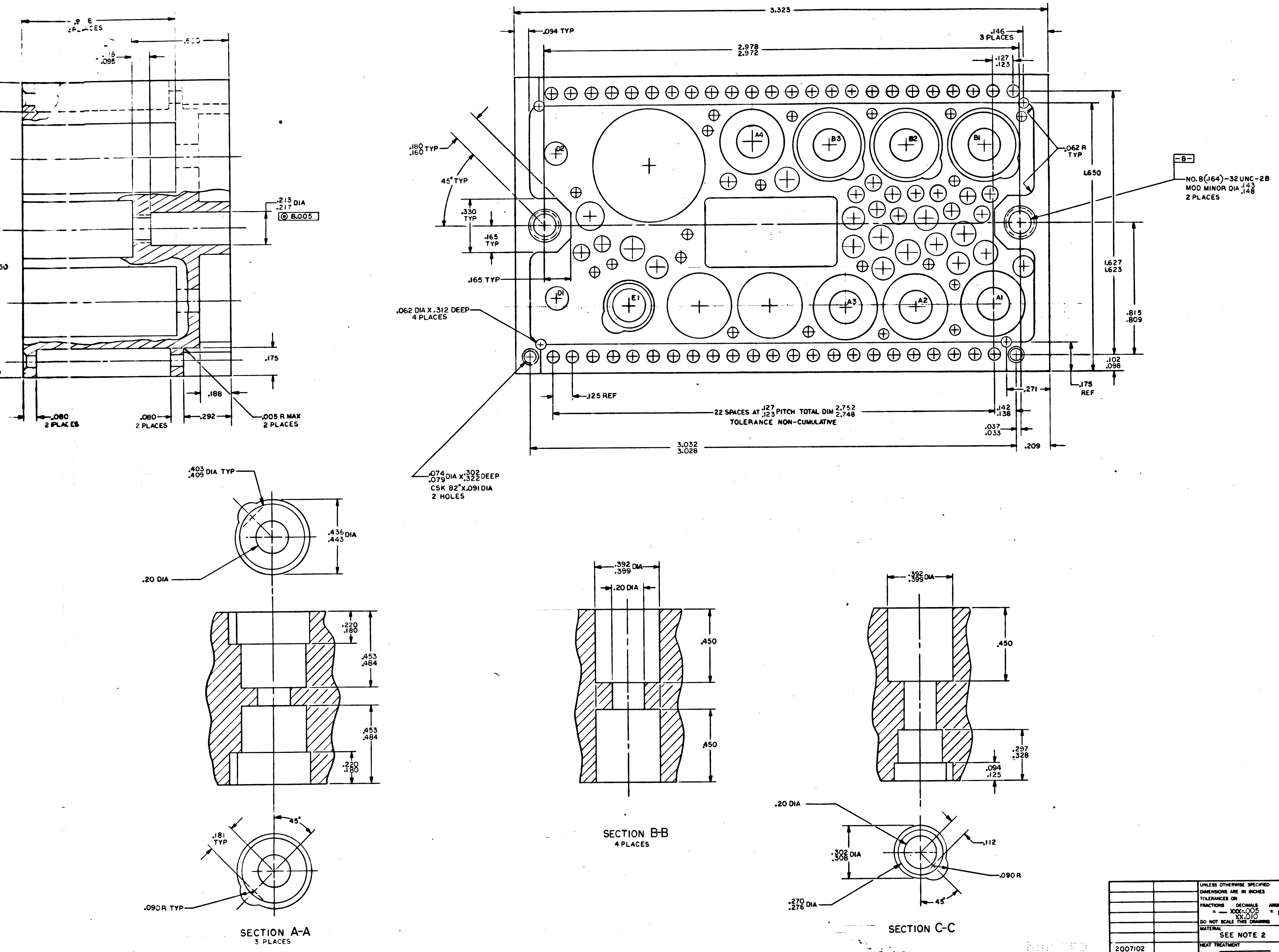
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125 ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

34

F-1

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS			



.8 8
2 PLACES
.600
.115
.095
.213
.217 DIA
⊚ B .005
.175
.188
.080
2 PLACES
.080
2 PLACES
.292
.005 R MAX
2 PLACES
3.323
.094 TYP
2.978
2.972
.146
3 PLACES
.127
.123
.180
.160 TYP
45° TYP
.330
TYP
.165
TYP
.165 TYP
.062 R
TYP
1.650
-B-
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
1.627
1.623
.815
.809
.102
.098
.175
REF
.271
A4
B3
B2
B1
D2
D1
E1
A3
A2
A1
.062 DIA X .312 DEEP
4 PLACES
.125 REF
22 SPACES AT .127 .123 PITCH TOTAL DIM 2.752 2.748
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
3.032
3.028
.209
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.403
.409 DIA TYP
.436
.443 DIA
.20 DIA
.220
.180
.453
.484
.453
.484
.220
.180
.181
TYP
45°
.090R TYP
SECTION A-A
3 PLACES
.392
.399 DIA
.20 DIA
.450
.450
SECTION B-B
4 PLACES
.392
.399 DIA
.450
.297
.328
.094
.125
.20 DIA
.112
.302
.308 DIA
.090 R
.270
.276 DIA
45°
SECTION C-C
4
3
2

2008109

3H

2008109

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007102	
NEXT ASSY	USED ON
APPLICATION	

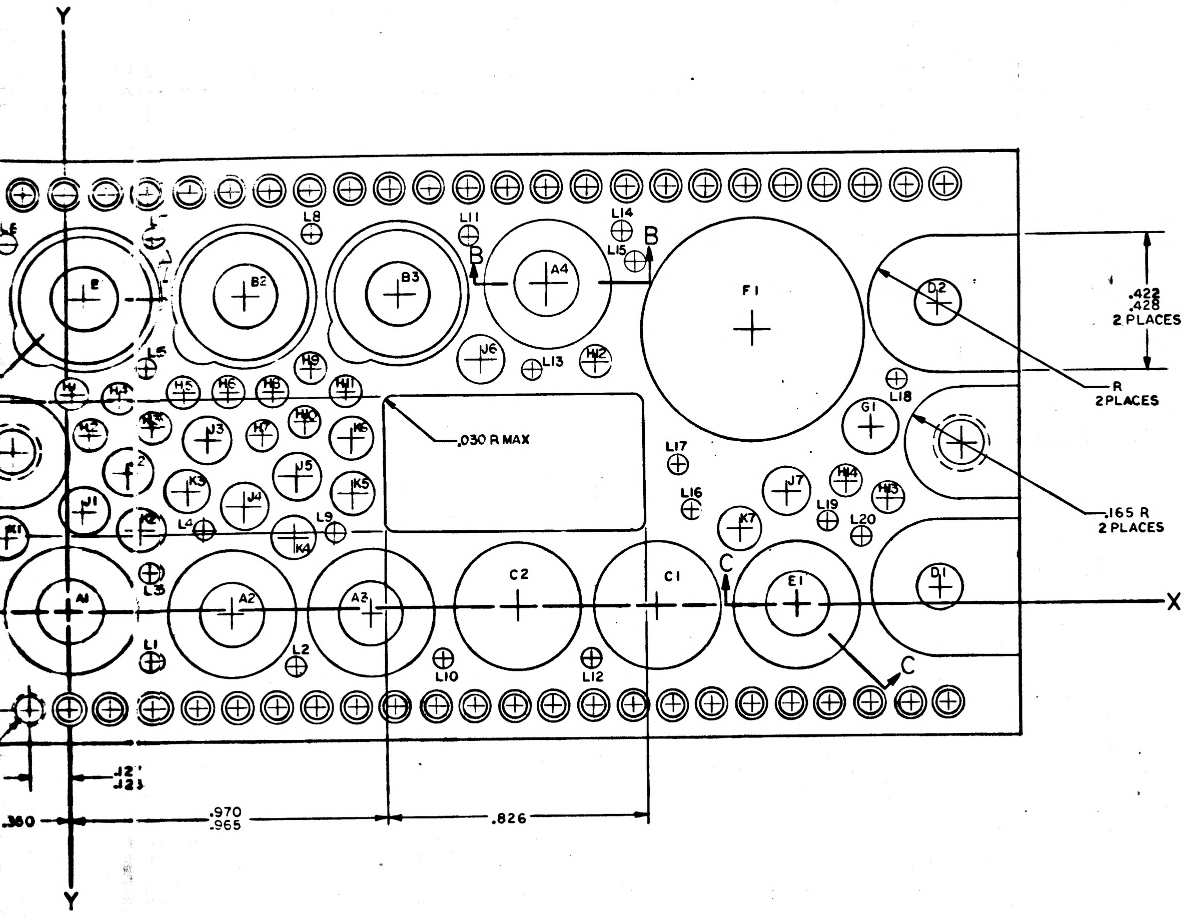
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX .010 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT ——
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN DATE 3 Dec 64
CHECKED A. Lindstrom 7 Dec 64
APPROVAL J. M. BLYSHAK 7 DEC 64
APPROVAL 7 Dec 64
NASA APPROVAL 12-8-64
MIT APPROVAL

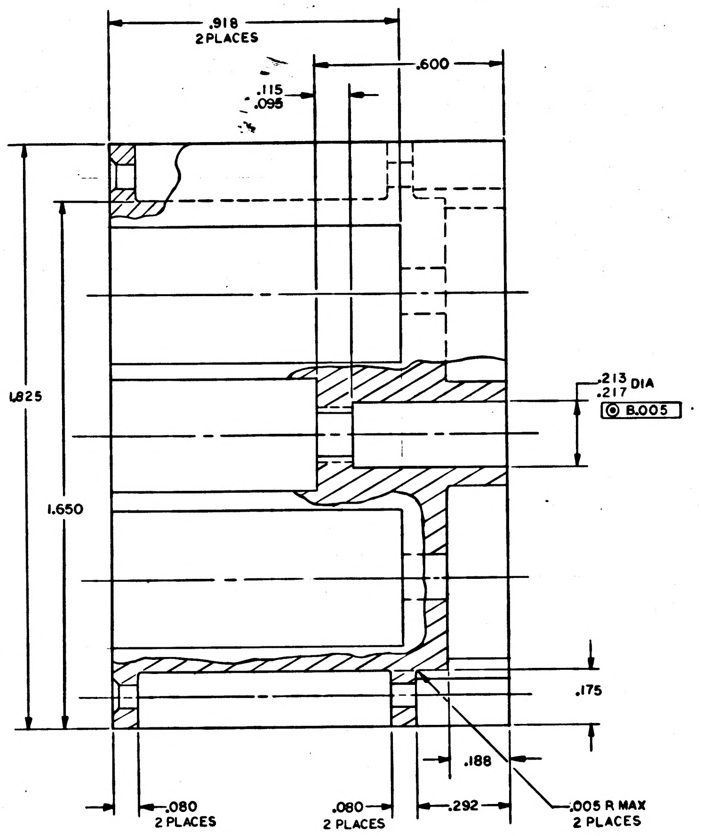
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
GYRO CALIBRATION

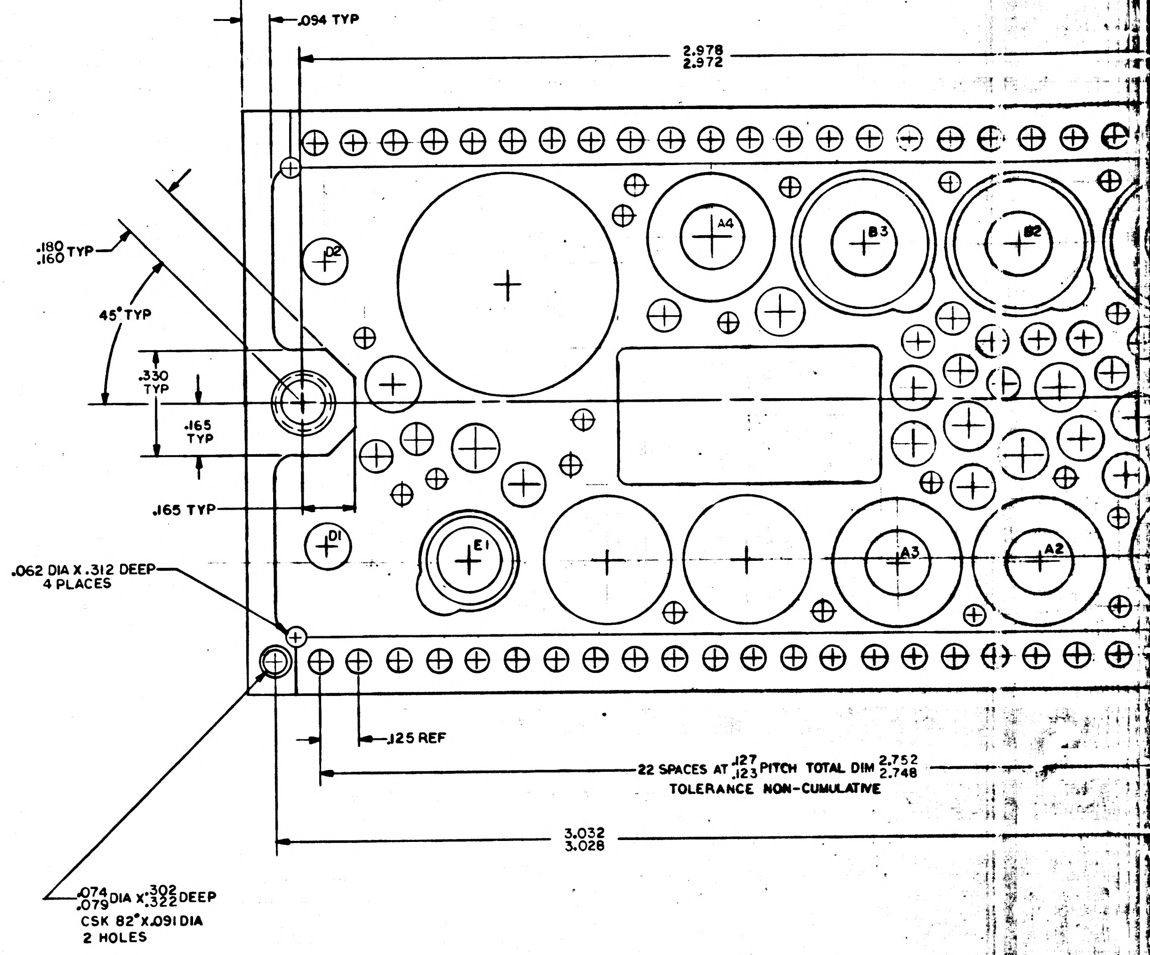
CODE IDENT NO. ——
SIZE J
NASA DRAWING NO. 2008109
SCALE 5/1
WT ——
SHEET 1 OF 1



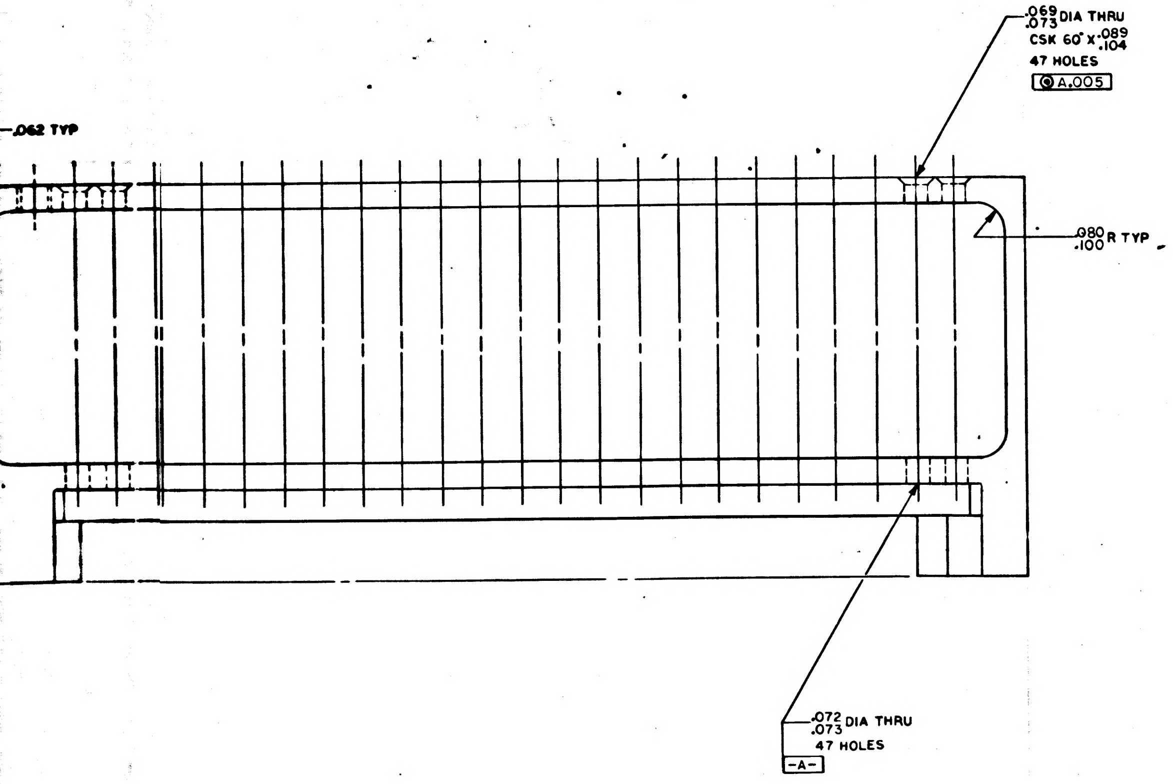
Y
X
Y
B
B
C
C
E
B2
B3
A4
F1
D2
L8
L11
L14
L15
L5
L13
M2
J6
M1
M2
M5
M6
M9
M11
M12
J3
J7
K3
J4
J5
K5
K6
J1
L4
L9
K4
L17
L16
J7
M4
M3
G1
L18
L19
L20
K7
A1
A2
A3
C2
C1
E1
D1
L1
L2
L3
L10
L12
.422
.428
2 PLACES
R
2 PLACES
.030 R MAX
.165 R
2 PLACES
.12'
.123
.360
.970
.965
.826



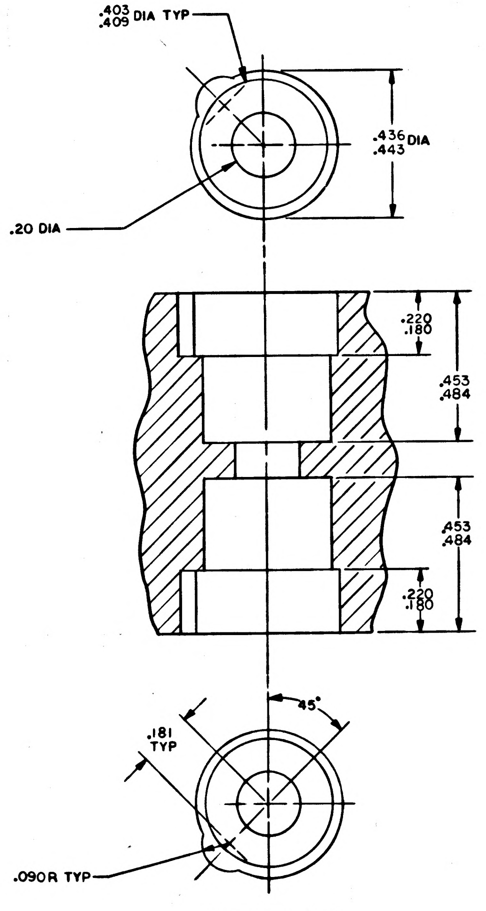
.918
2 PLACES
.600
.115
.095
1.825
1.650
.213
.217 DIA
◎ B.005
.175
.188
.080
2 PLACES
.080
2 PLACES
.292
.005 R MAX
2 PLACES



3.323
.094 TYP
2.978
2.972
.180
.160 TYP
45° TYP
.330
TYP
.165
TYP
.165 TYP
.062 DIA X .312 DEEP
4 PLACES
D2
A4
B3
B2
D1
E1
A3
A2
.125 REF
22 SPACES AT .127 .123 PITCH TOTAL DIM 2.752 2.748
TOLERANCE NON-CUMULATIVE
3.032
3.028
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES



.062 TYP
.069 .073 DIA THRU
CSK 60° X .089 .104
47 HOLES
◎ A.005
.080 .100 R TYP
.072 .073 DIA THRU
47 HOLES
-A-



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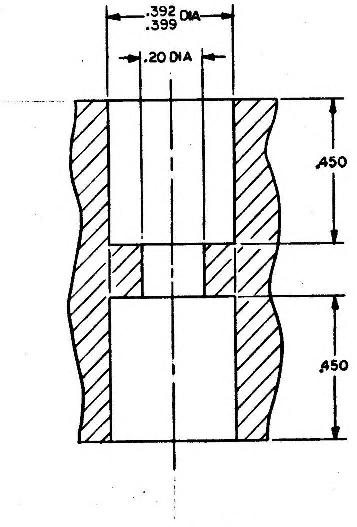
.436 .443 DIA
.20 DIA
.220
.180
.453
.484
.453
.484
.220
.180
.181
TYP
45°
.090 R TYP

SECTION A-A
3 PLACES



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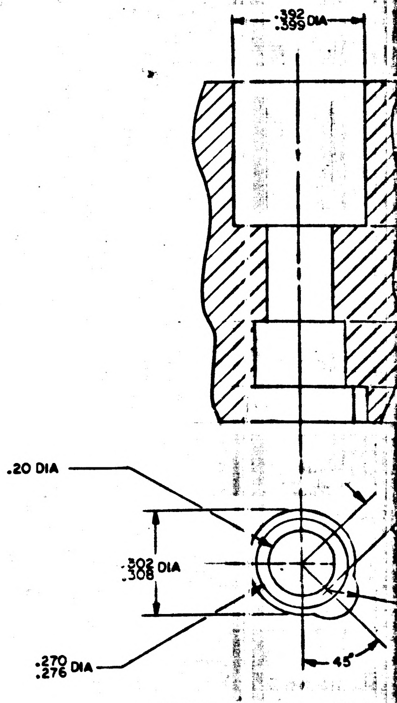
.20 DIA
.450
.450

SECTION B-B
4 PLACES



.392 .399 DIA
.20 DIA
.302 .308 DIA
.270 .276 DIA
45°

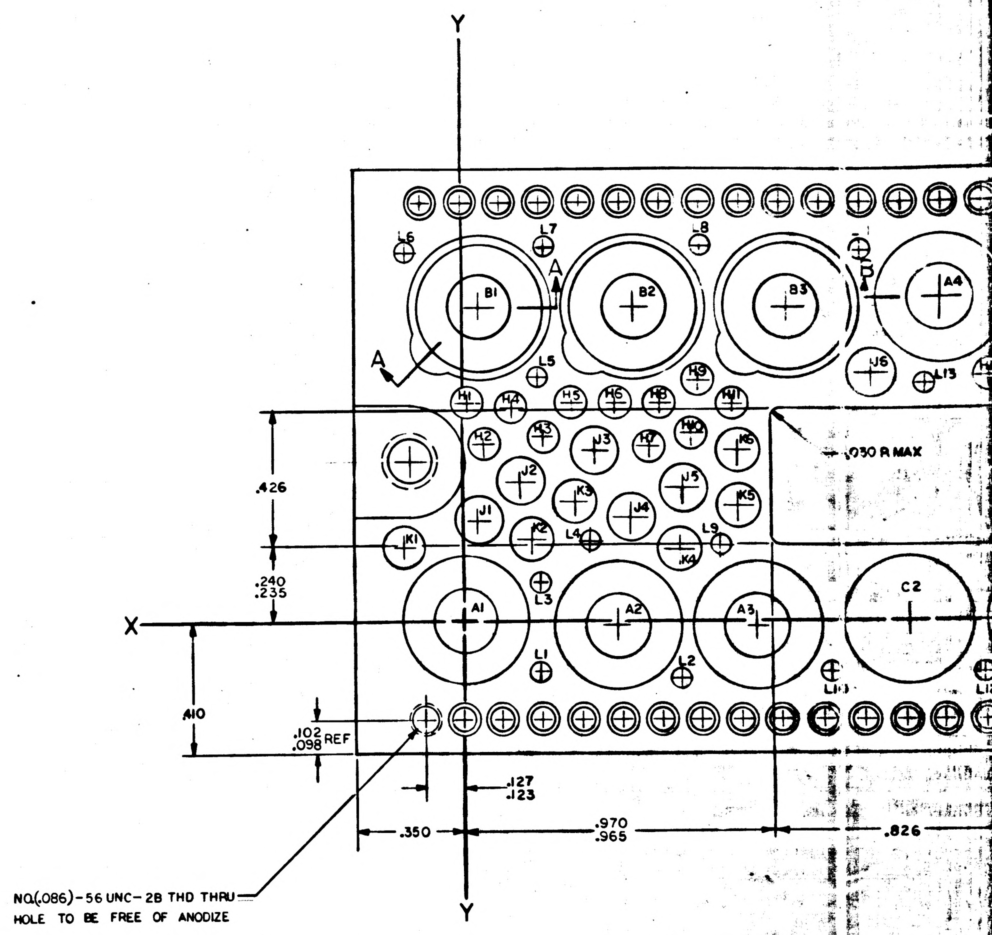
SECTION C-C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	.000	.000	SEE SECTION B-B	4
A2	.480	−.010		
A3	.920	−.010		
A4	1.490	1.006		
B1	.050	.980	SEE SECTION A-A	3
B2	.540	.980		
B3	1.020	.980		
C1	1.830	.000	.395 .402	2
C2	1.390	.000		
D1	2.720	.050	.135 .139	2
D2	2.720	.940		
E1	2.270	.000	SEE SECTION C-C	1
F1	2.140	.860	.687 .694	1
G1	2.510	.550	.181 .185	1
H1	.014	.670	.100 .104	14
H2	.068	.550		
H3	.258	.572		
H4	.156	.662		
H5	.340	.680		
H6	.480	.680		
H7	.586	.546		
H8	.620	.680		
H9	.740	.750		
H10	.720	.584		
H11	.850	.676		
H12	1.640	.760		
H13	2.560	.330		
H14	2.430	.380		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
J1	.040	.310	.153 .157	7
J2	.178	.430		
J3	.414	.530		
J4	.526	.320		
J5	.690	.416		
J6	1.282	.774		
J7	2.240	.350		
K1	−.190	.230	.127 .131	7
K2	.210	.250		
K3	.348	.368		
K4	.680	.222		
K5	.866	.356		
K6	.860	.526		
K7	2.090	.240		
L1	.240	−.160	.058 .062	20
L2	.680	−.180		
L3	.240	.120		
L4	.400	.246		
L5	.240	.756		
L6	−.180	1.150		
L7	.260	1.170		
L8	.750	1.170		
L9	.816	.236		
L10	1.150	−.160		
L11	1.250	1.160		
L12	1.620	−.160		
L13	1.440	.740		
L14	1.730	1.170		
L15	1.770	1.070		
L16	1.940	.300		
L17	1.900	.440		
L18	2.590	.700		
L19	2.370	.260		
L20	2.480	.210		


Y
L6
L7
L8
A
B
B1
B2
B3
A4
A
L5
J6
L13
H1
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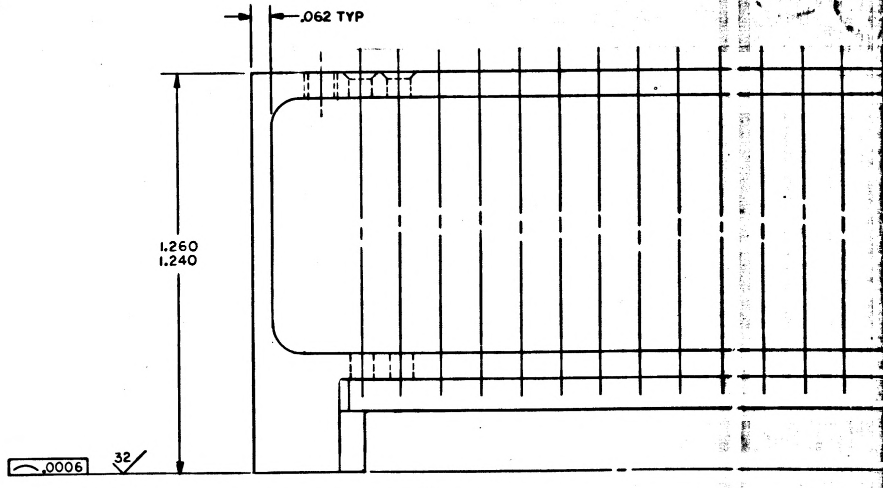
H6
H8
H9
H11
H2
H3
J3
H7
H10
K6
.030 R MAX
J2
J5
.426
K3
K5
J1
J4
K1
K2
L4
L9
K4
.240
.235
L3
C2
X
A1
A2
A3
L1
L2
L11
L12
.410
.102
.098 REF
.127
.123
.350
.970
.965
.826
NO.(.086)-56 UNC-2B THD THRU
HOLE TO BE FREE OF ANODIZE
Y

C

B


.062 TYP
1.260
1.240
.0006
32

NOTES

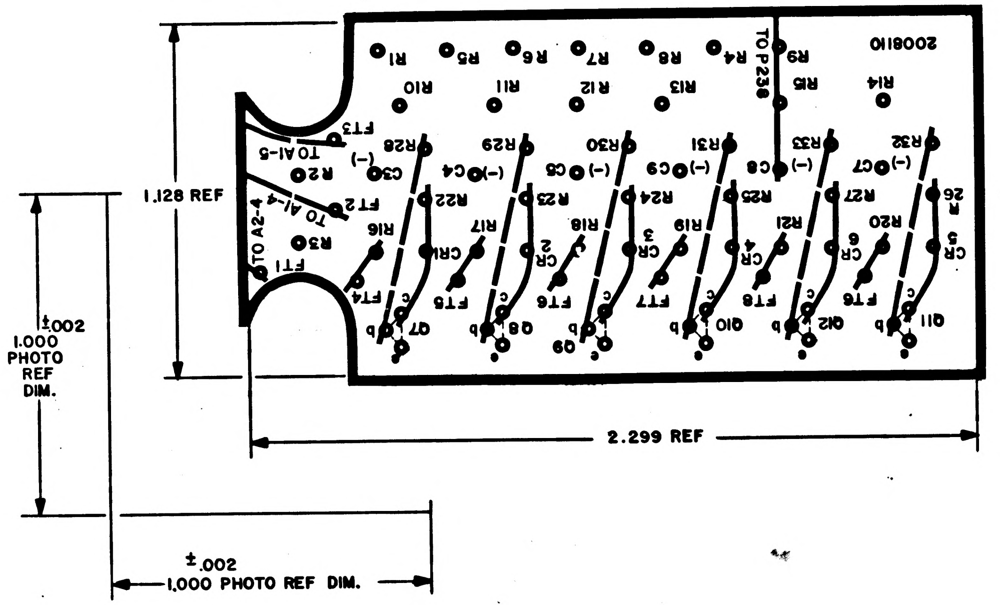
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125✓ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND 1002019

3+

A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14704			
SYM	DESCRIPTION	DATE	APPROVAL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±.002
1.000
PHOTO
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DIM.
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±.002
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2008110
TO P23-8
TO A1-5
TO A1-4
TO A2-4
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Q11

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ⊙ .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007143	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis A Lowe DATE Nov. 64
CHECKED A. Lindstrom 7 Dec 64
APPROVAL
APPROVAL D. B. Test 12/4/64
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL W Kupfer 8 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (A)
PHOTOGRAPHIC MASTER
QUADRANT SELECTOR MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008110
SCALE 4/1	WT —	SHEET 1 OF 1

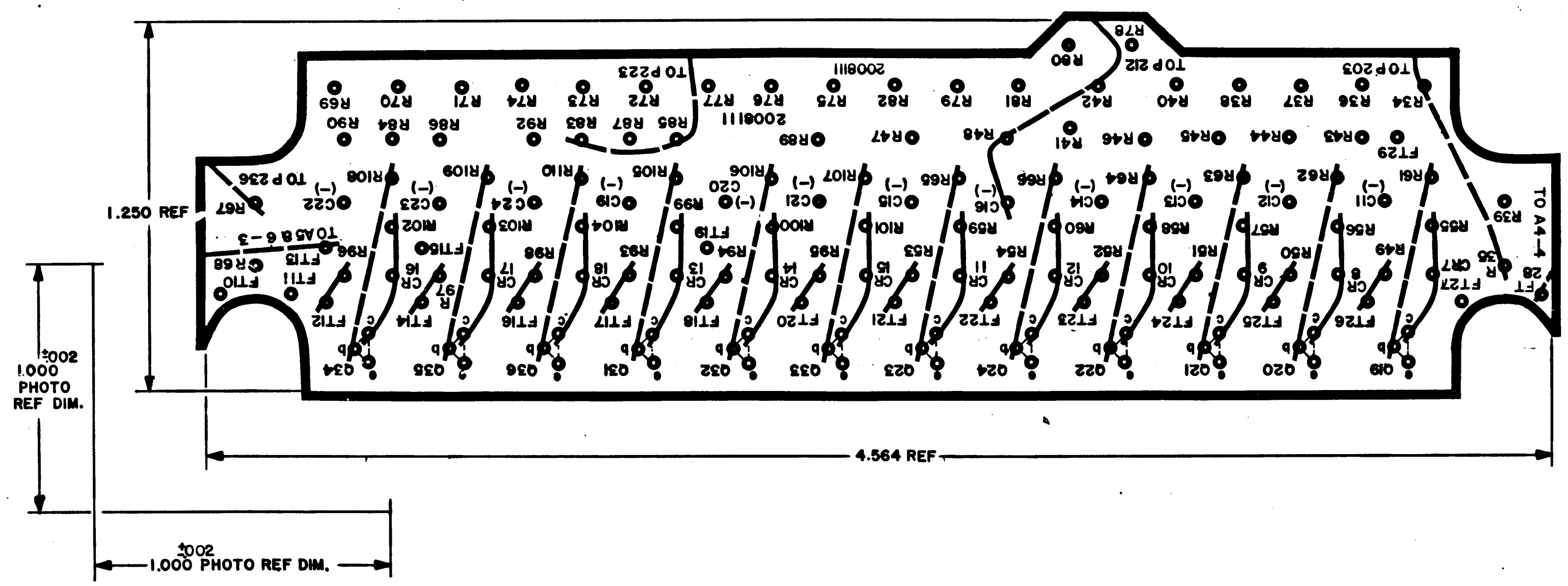
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2008110

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14704			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSTIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ⊙ .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007143	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis A Lane DATE Nov 6, 64
CHECKED A Lindstrom 7 Dec 64
APPROVAL
APPROVAL D.R. Test 12/4/64
NASA APPROVAL W J Rhine 12-9-64
MIT APPROVAL W Kupfer 8 Dec 64

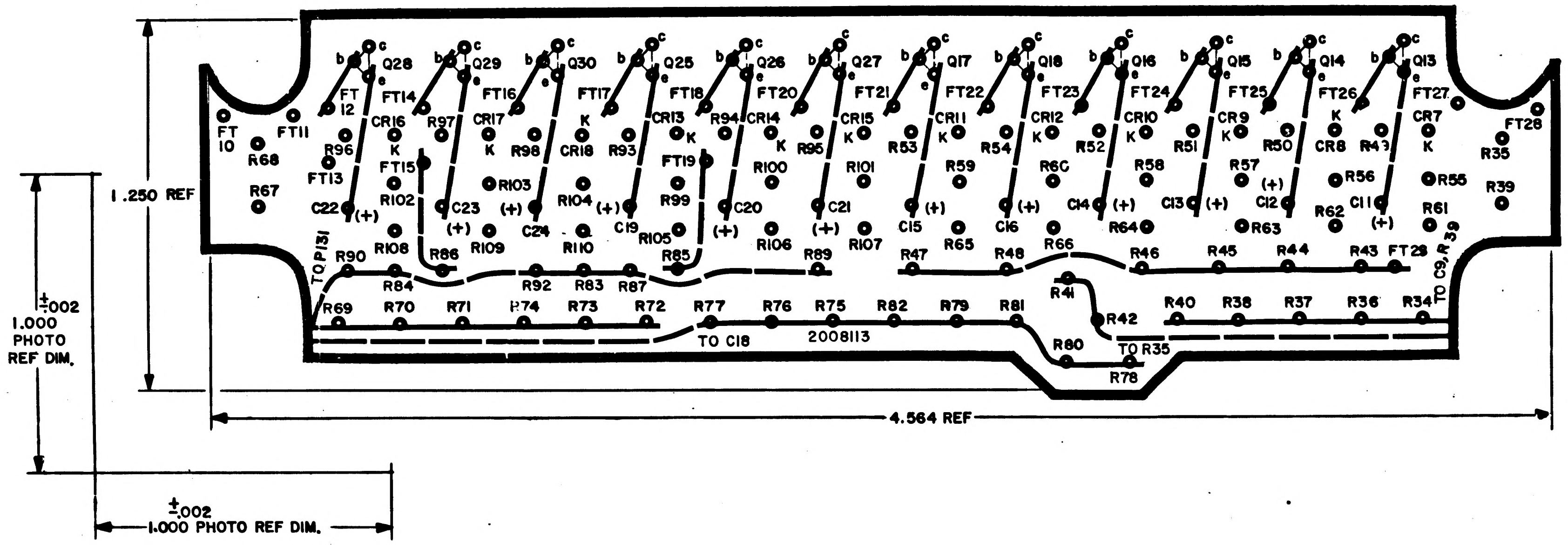
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (B)
PHOTOGRAPHIC MASTER
QUADRANT SELECTOR MODULE

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008111
SCALE 4/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14704			
SYM	DESCRIPTION	DATE	APPROVAL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C12
C11
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R109
R110
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R106
R107
R65
R64
R63
R62
R61
TO P131
R90
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R89
R47
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R44
R84
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R41
R42
TO C9, R 39
R69
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R71
R74
R73
R72
R77
R76
R75
R82
R79
R81
R40
R38
R37
R36
R34
TO C18
2008113
R80
TO R35
R78
1.250 REF
4.564 REF
±.002
1.000
PHOTO
REF DIM.
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .045/.055 DIA PUNCH ALL HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007143	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. CONTRACT
DRAWN Lois A Lord DATE Nov 6, 64
CHECKED A. Lindstrom 4 Dec 64
APPROVAL
APPROVAL D. R. Test 12/4/64
NASA APPROVAL W J Rhine 12-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

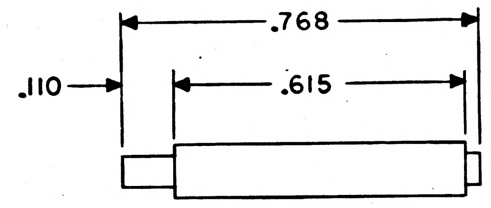
INSULATOR (D)
PHOTOGRAPHIC MASTER
QUADRANT SELECTOR MODULE

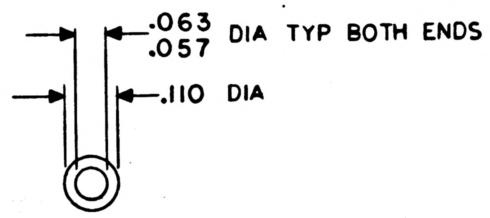
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008113
SCALE 4/1
WT —
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15941

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED





NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ROD GLASS EPOXY PER 1010692-5 TYPE GEE
3. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007060	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	J Brigham	11/12/64
CHECKED	R.P. Kingsbury	10 Dec 64
APPROVED	N Sabelos	21 JAN 65
APPROVED	S.C. Smith	1-21-65
APPROVED MIT	W Kupfer	2 Feb 65
APPROVED MSC		2/4/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SPACER INSULATED
PIP PREAMP

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008115

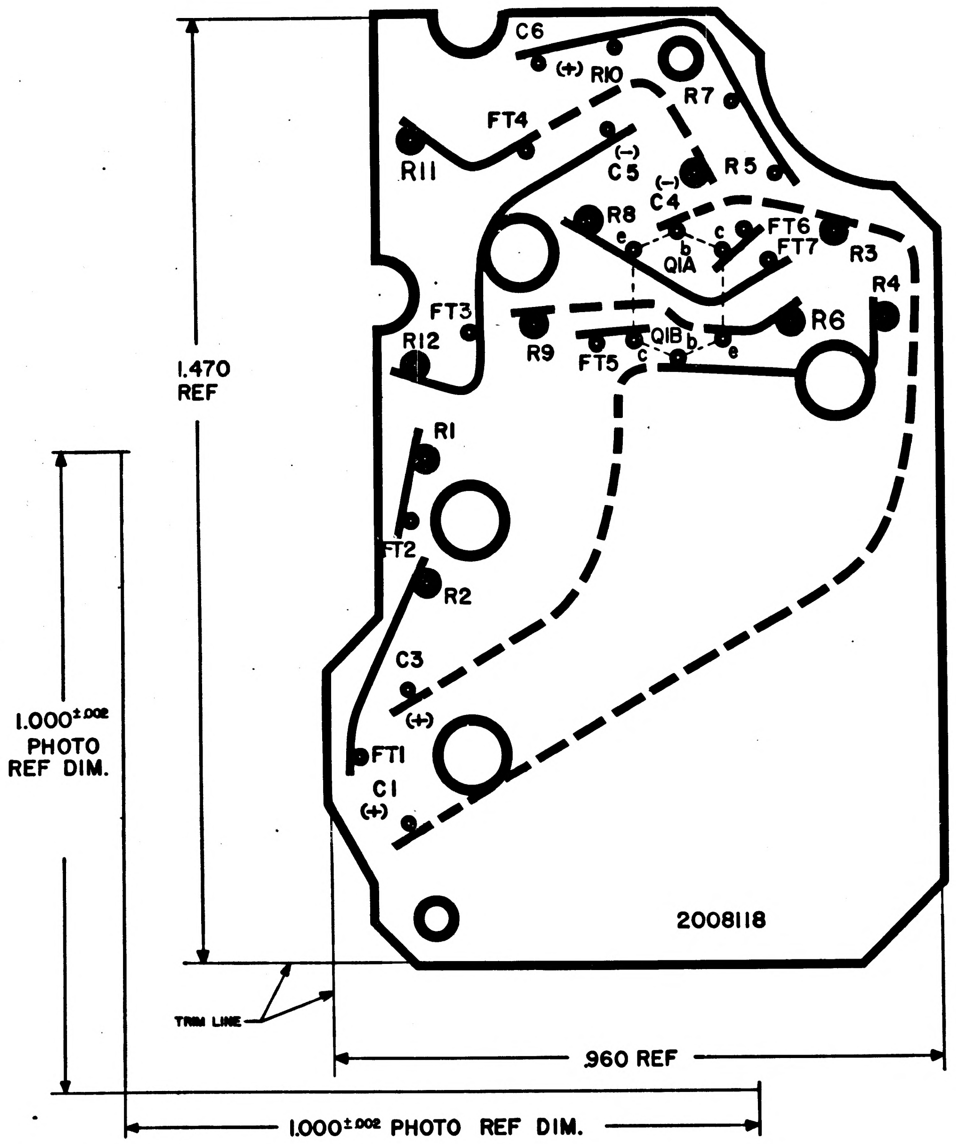
SCALE 4/1 —— SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008116

REVISIONS 15941

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 11/9/64
CHECKED
APPROVED 1-20-65
APPROVED 1-20-65
APPROVED MIT
APPROVED MSC 2/4/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD, TOP
PIP PREAMP ASSEMBLY (GME)

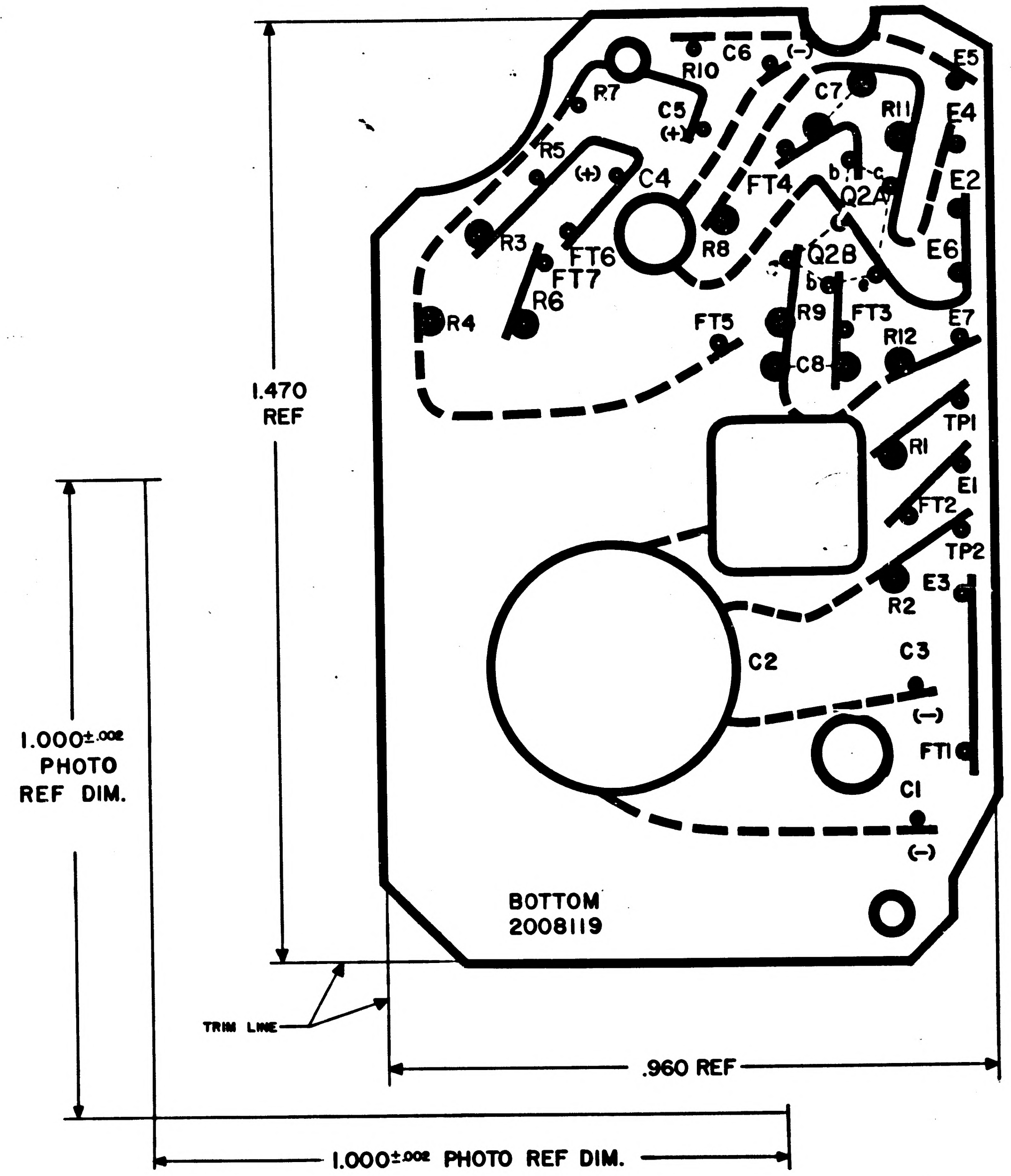
CODE IDENT NO. —
SIZE E
DRAWING NO. 2008116
SCALE 10/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008117 A

REVISIONS 15941

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23542			1 Nov. 65	


R7
R10
C6
(−)
E5
C5
(+)
C7
R11
E4
R5
(+)
C4
FT4
b
c
Q2A
E2
R3
FT6
R8
Q2B
b
e
E6
FT7
R6
R4
FT5
R9
FT3
R12
E7
C8
TP1
R1
E1
FT2
TP2
E3
R2
C2
C3
(−)
FT1
C1
(−)
BOTTOM
2008119
1.470 REF
1.000±.002 PHOTO REF DIM.
TRIM LINE
.960 REF
1.000±.002 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	J. Brigham	11/14/64
CHECKED		12-24-64
APPROVED		1-20-65
APPROVED	L. Schmidt	1-20-65
APPROVED MIT		12-6-65
APPROVED MSC		4/4/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD, BOTTOM
PIP PREAMP ASSEMBLY (GME)

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008117

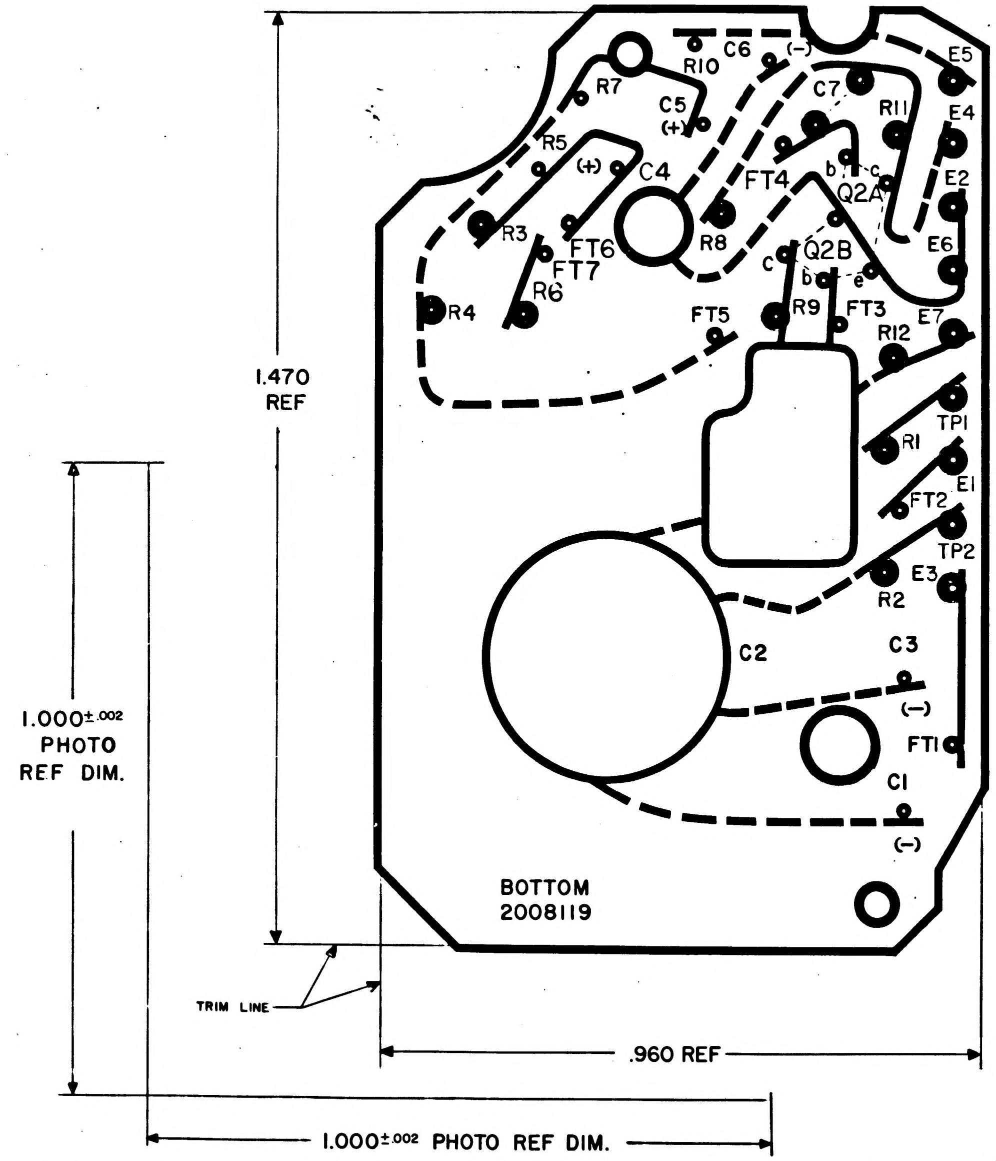
SCALE 10/1 — SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008117 B

REVISIONS 1594/

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 23542			17 Mar 65	WK
B		REVISED PER TDRR 25511	A.N.		1FEB66	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J Brigham 11/18/64
CHECKED 12 Dec 64
APPROVED D Sakelos 1-20-65
APPROVED 1-20-65
APPROVED MIT W Kupfer 2 Feb 65
APPROVED MSC 4/1
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

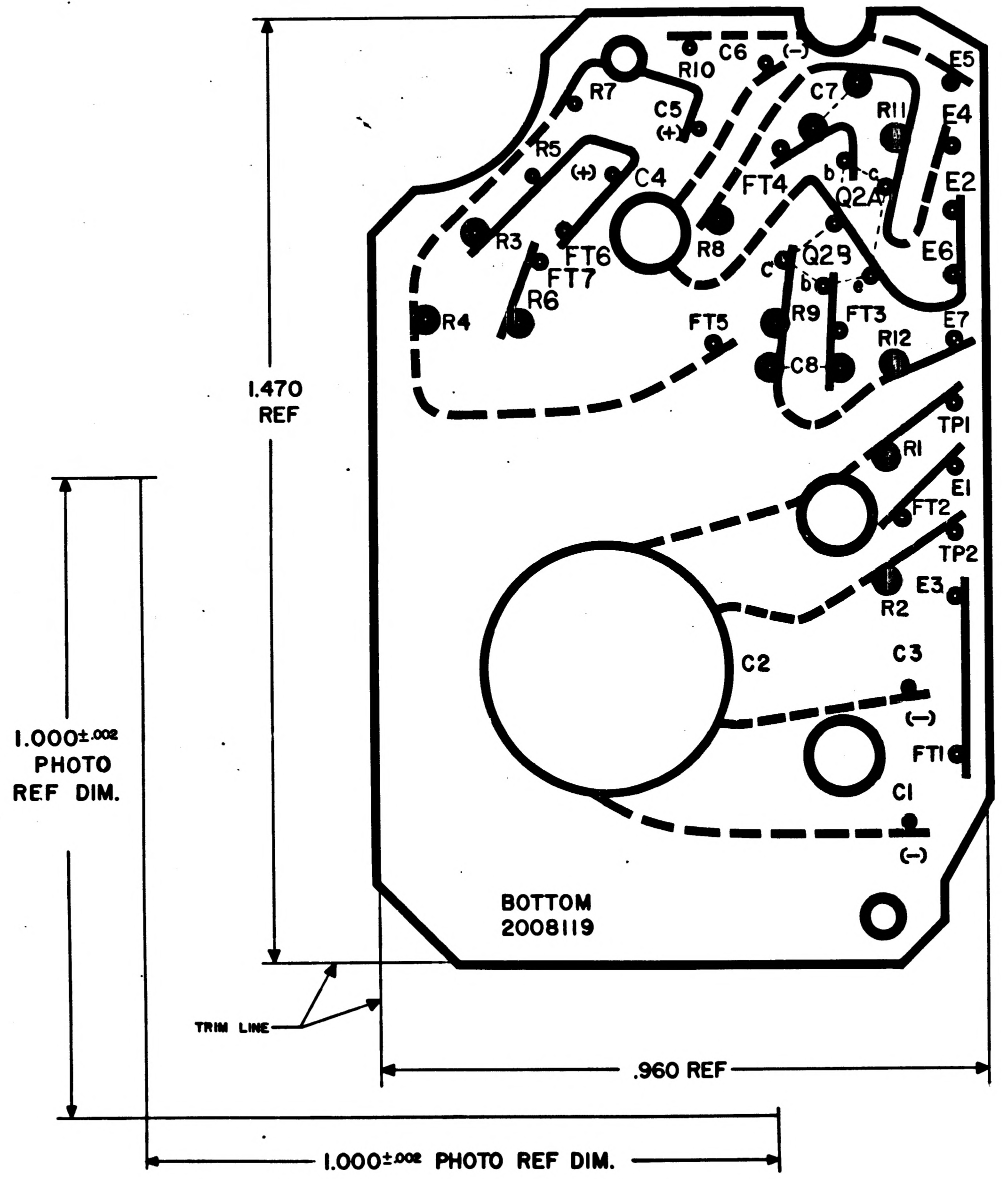
PHOTOGRAPHIC MASTER
WIRING BOARD, BOTTOM
PIP PREAMP ASSEMBLY (GME)

CODE IDENT NO —
SIZE E
DRAWING NO. 2008117
SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008117

REVISIONS 1594						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



R7
R10
C6
(–)
E5
C5
(+)
C7
R11
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R5
(+)
C4
FT4
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c
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E2
R3
FT6
FT7
R8
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Q2B
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E6
R6
R4
FT5
R9
FT3
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C8
R12
TP1
R1
E1
FT2
TP2
E3
R2
C2
C3
(–)
FT1
C1
(–)
BOTTOM
2008119
1.470 REF
1.000±.002 PHOTO REF DIM.
TRIM LINE
.960 REF
1.000±.002 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	J Brigham	11/16/64
CHECKED		12-21-64
APPROVED		1-20-65
APPROVED		1-20-65
APPROVED MIT	W Kupfer	2/6/65
APPROVED MSC		4/4/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

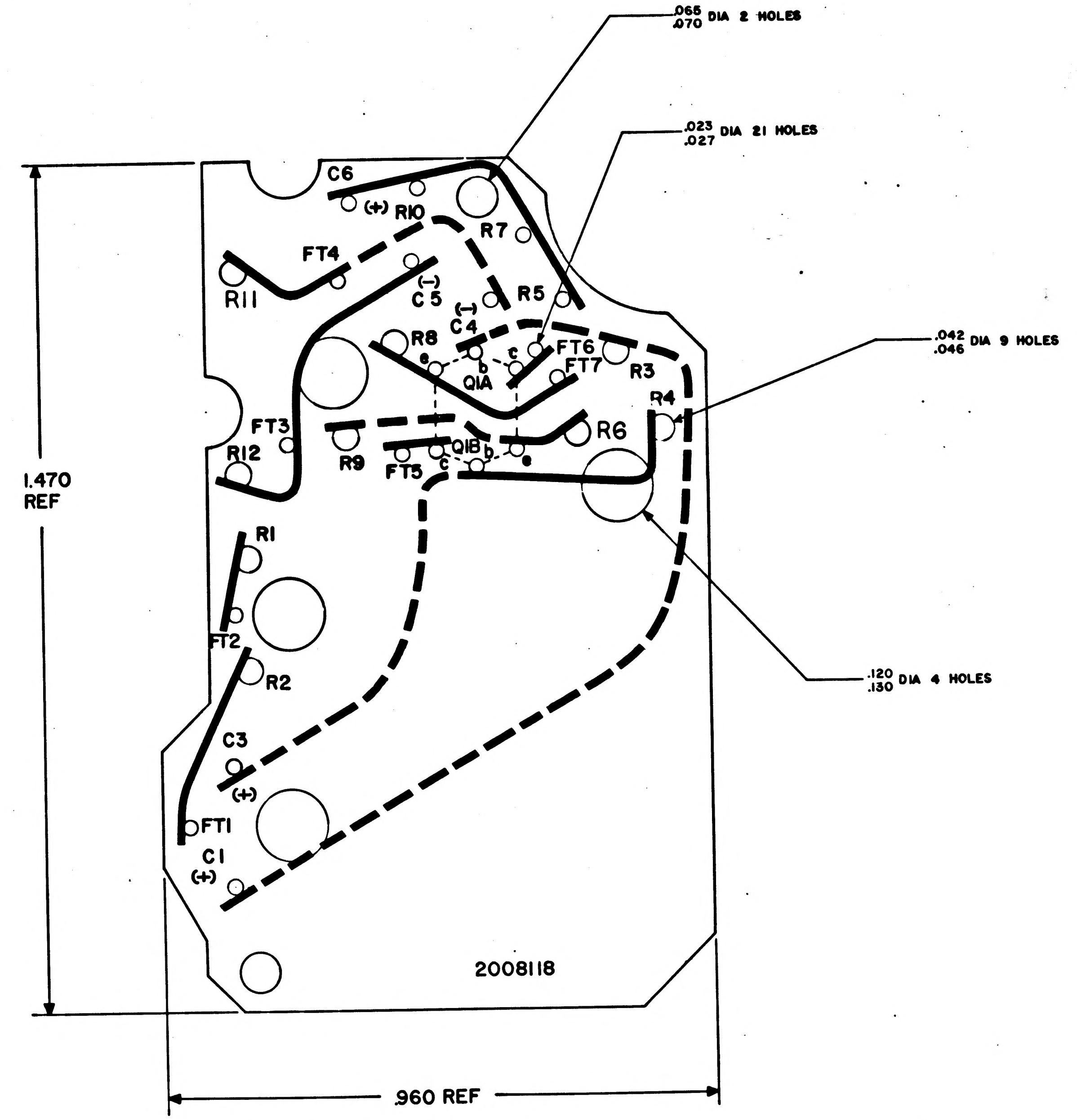
PHOTOGRAPHIC MASTER
WIRING BOARD, BOTTOM
PIP PREAMP ASSEMBLY (GME)

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008117
SCALE 10/1	—	SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

VISIONS

SYM	ZONE	DESC	DR	CHK	DATE	APPROVED



REF:
DRAWING NO. 2008116 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS
PRESCRIBED BY MIL-D-70327
2. MARK BLACK CHARACTERS PER ND1002019
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007060	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	J Brigham	11/17/64
CHECKED		12-?-64
APPROVED		1-20-65
APPROVED	L C Smith	1-20-65
APPROVED MIT	W Kupfer	2 Feb 65
APPROVED MSC		2/2/6
		DATE

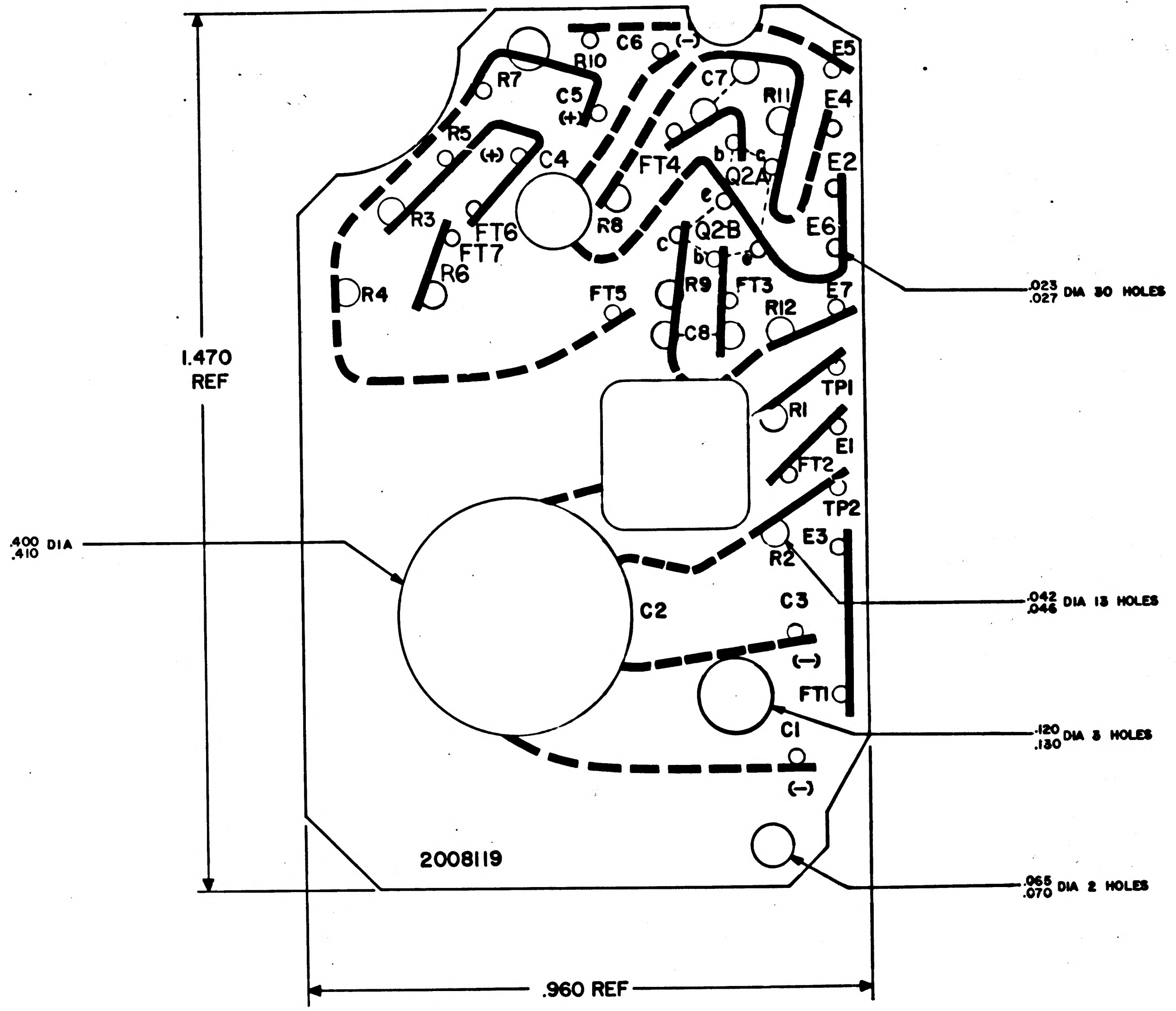
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD, TOP
PIP PREAMP ASSEMBLY (GME)

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008118
SCALE 10/1	—	SHEET 1 OF 1

REVISIONS 15941						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23542				

2008119 A



1.470 REF
.960 REF
.400 DIA
.410
.023 DIA 30 HOLES
.027
.042 DIA 13 HOLES
.046
.120 DIA 5 HOLES
.130
.065 DIA 2 HOLES
.070
2008119
C6
(−)
E5
R10
R7
C7
R11
C5
(+)
E4
R5
(+)
C4
FT4
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c
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Q2A
e
R3
FT6
R8
c
Q2B
E6
FT7
b
e
R6
R4
FT5
R9
FT3
R12
E7
C8
TP1
R1
E1
FT2
TP2
E3
R2
C2
C3
(−)
FT1
C1
(−)

REF:
DRAWING NO. 2008117 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MARK BLACK CHARACTERS PER ND1002019
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007060	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 11/10/64
CHECKED
APPROVED 1-20-65
APPROVED 1-20-65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD, BOTTOM
PIP PREAMP ASSEMBLY (SME)

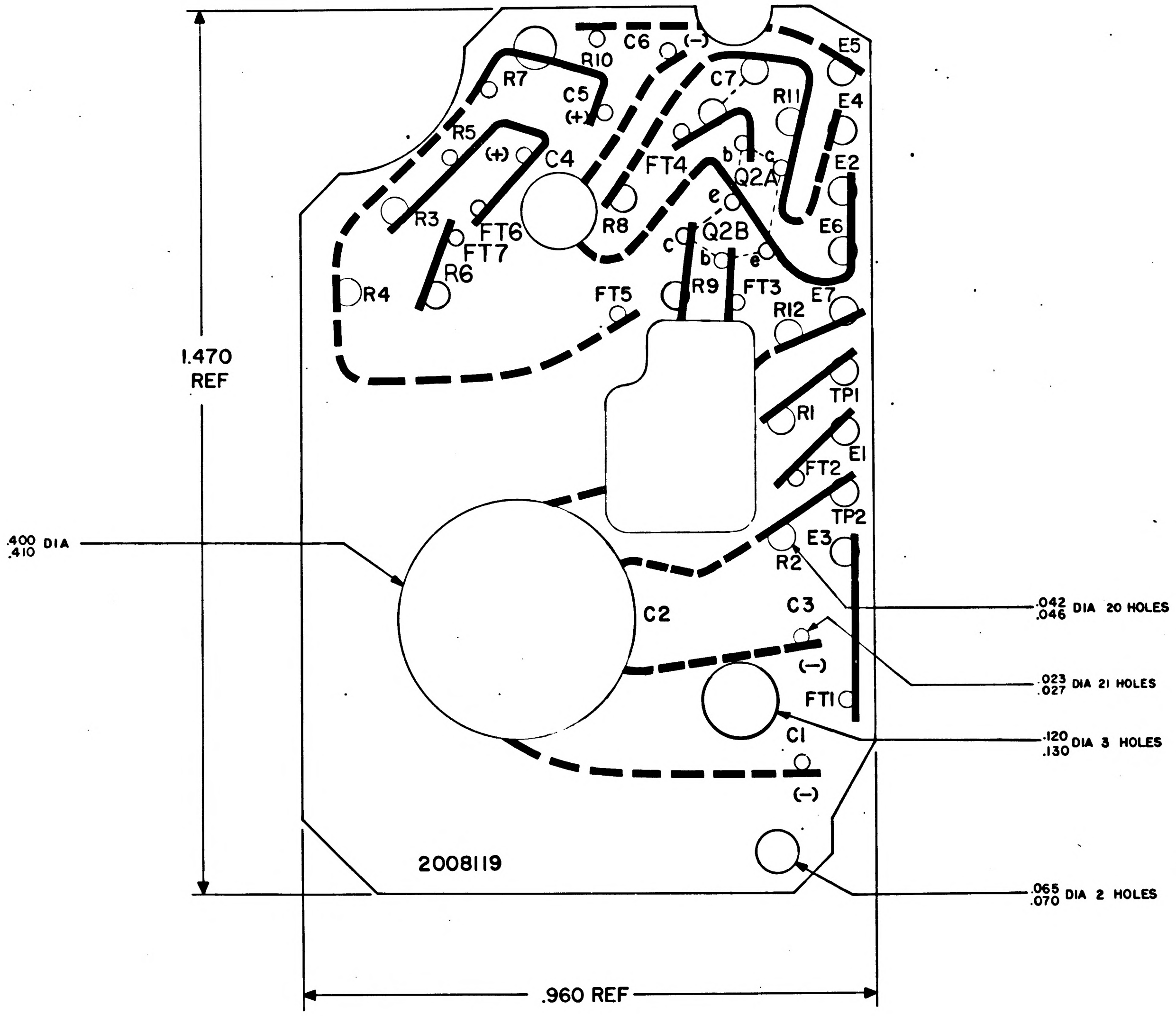
CODE IDENT NO. —
SIZE E
DRAWING NO. 2008119
SCALE 10/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008119 B

REVISIONS 15941

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23542		PRK		
B		REVISED PER TDRR 25511	A.N.		1FEB66	



C6
(−)
E5
R10
R7
C7
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R11
E4
R5
(+)
C4
FT4
b
c
Q2A
E2
e
R3
FT6
R8
c
Q2B
E6
FT7
b
e
R6
R4
FT5
R9
FT3
R12
E7
1.470 REF
TP1
R1
E1
FT2
TP2
.400 .410 DIA
E3
R2
C3
C2
.042 .046 DIA 20 HOLES
(−)
.023 .027 DIA 21 HOLES
FT1
C1
.120 .130 DIA 3 HOLES
(−)
2008119
.065 .070 DIA 2 HOLES
.960 REF

REF:
DRAWING NO. 2008117 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MARK BLACK CHARACTERS PER ND1002019
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007060	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN J Brigham 11/18/64
CHECKED
APPROVED D Sokolos
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD, BOTTOM
PIP PREAMP ASSEMBLY (GME)

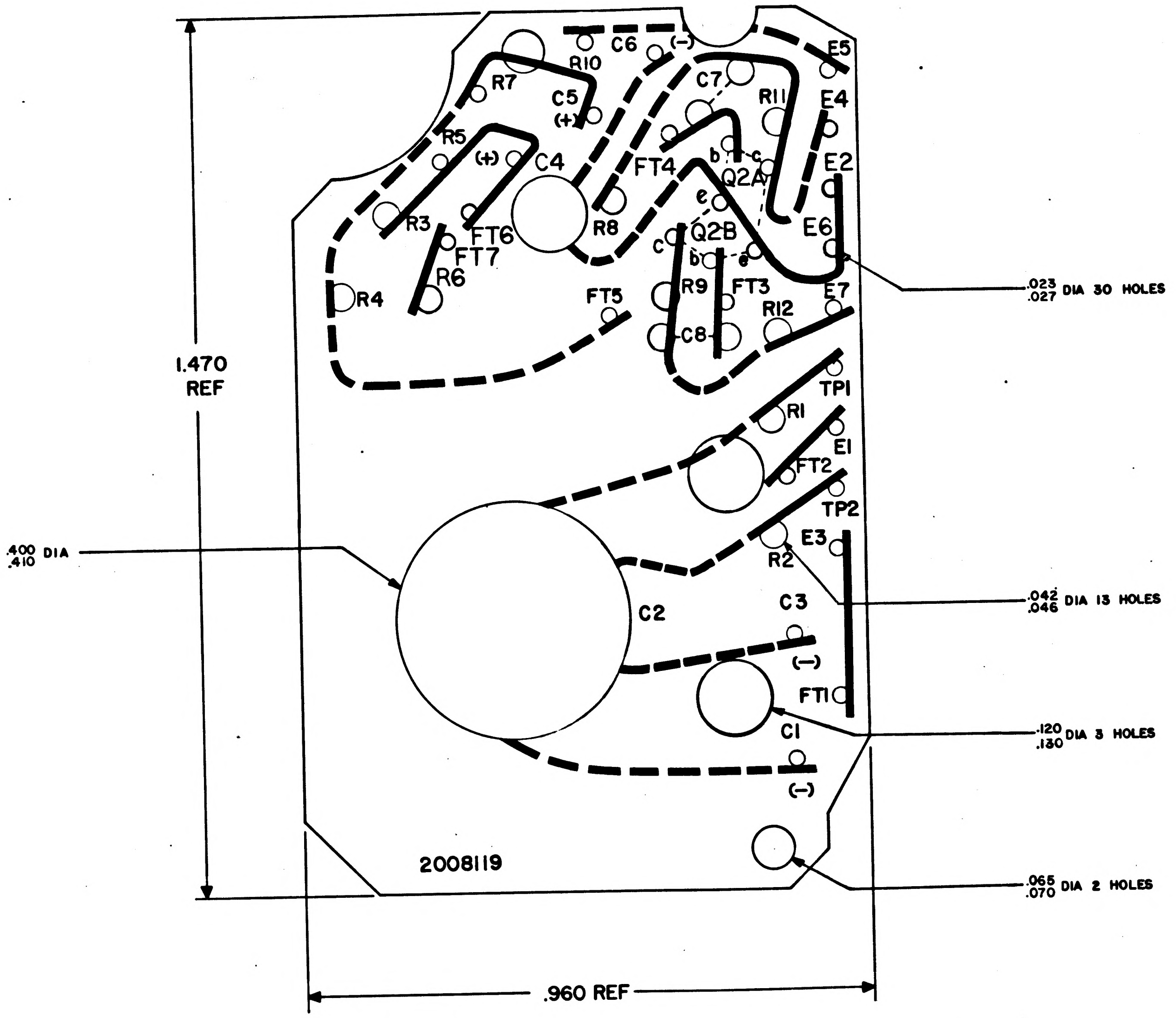
CODE IDENT NO —
SIZE E
DRAWING NO 2008119
SCALE 10/1
SHEET 1 OF 1

2008119 B

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2008119

SYM	ZONE	REVISIONS DESCRIPTION	BY	CHK	DATE	APPROVED



R10
C6
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E5
R7
C7
C5
(+)
R11
E4
R5
(+)
C4
b
c
E2
FT4
Q2A
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R3
FT6
R8
Q2B
E6
FT7
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b
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R6
R4
FT5
R9
FT3
R12
E7
C8
.023
.027 DIA 30 HOLES
1.470
REF
TP1
R1
E1
FT2
TP2
E3
R2
.400
.410 DIA
C2
C3
.042
.046 DIA 13 HOLES
(−)
FT1
C1
.120
.130 DIA 3 HOLES
(−)
2008119
.065
.070 DIA 2 HOLES
.960 REF

REF:
DRAWING NO. 2008117 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MARK BLACK CHARACTERS PER ND1002019
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

2007060	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

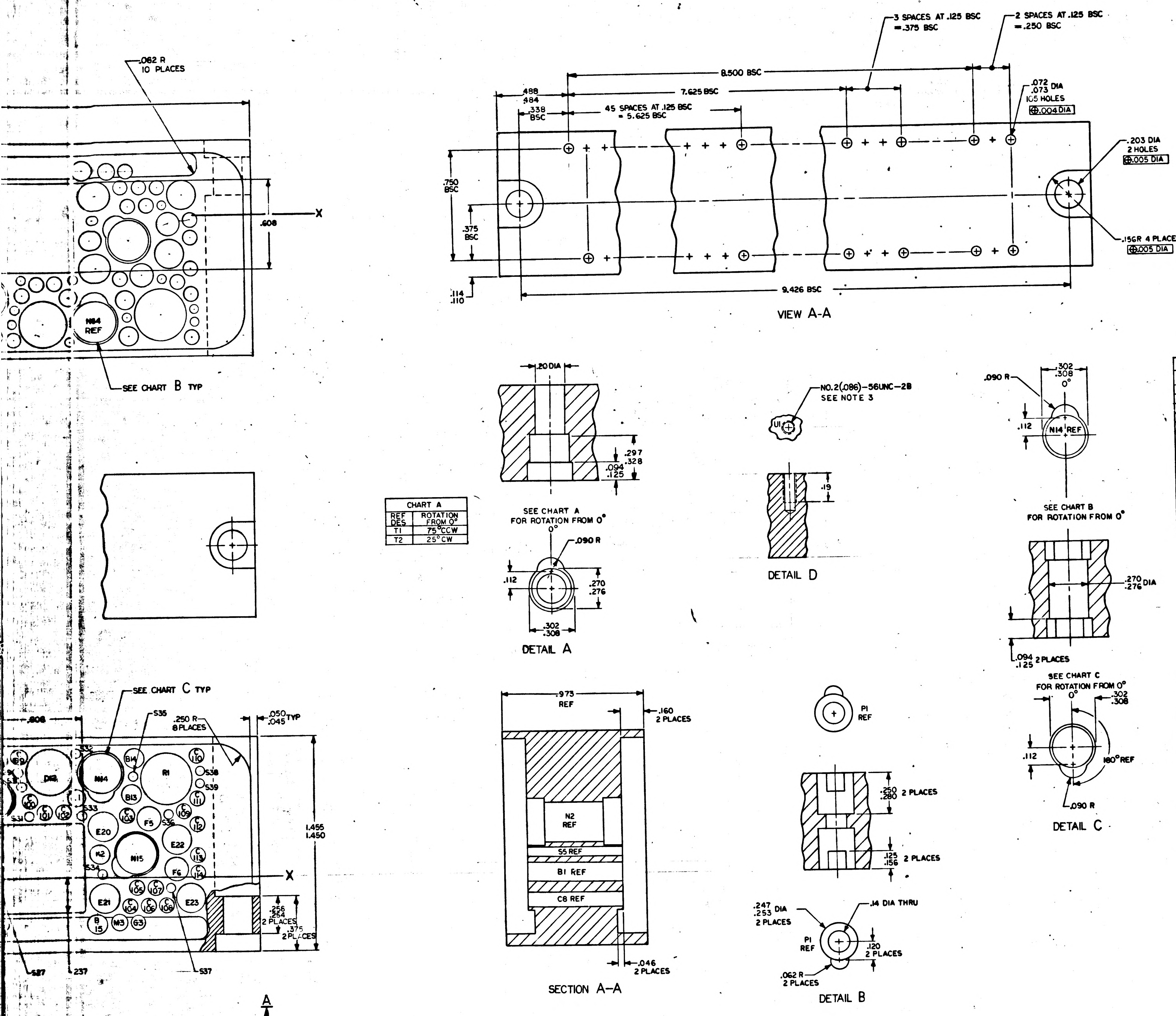
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J Brigham 11/10/64
CHECKED R. P. Kaplan 12/20/64
APPROVED D Sabatini 1-20-65
APPROVED L. C. Smith 1-20-65
APPROVED MIT W Kupfer 2/1/65
APPROVED MSC 2/4/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD, BOTTOM
PIP PREAMP ASSEMBLY (6ME)

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008119
SCALE 10/1
SHEET 1 OF



3 SPACES AT .125 BSC = .375 BSC
2 SPACES AT .125 BSC = .250 BSC
8.500 BSC
7.625 BSC
.488
.484
.338 BSC
45 SPACES AT .125 BSC = 5.625 BSC
.072 DIA
.073
105 HOLES
⊕ .004 DIA
.203 DIA
2 HOLES
⊕ .005 DIA
.750 BSC
.375 BSC
.15 R 4 PLACES
⊕ .005 DIA
.114
.110
9.426 BSC
VIEW A-A
.062 R
10 PLACES
.608
X
N14 REF
SEE CHART B TYP
.20 DIA
.297
.328
.094
.125
SEE CHART A FOR ROTATION FROM 0°
0°
.090 R
.112
.270
.276
.302
.308
DETAIL A
NO.2 (.086)-56UNC-2B
SEE NOTE 3
U1
.19
DETAIL D
.090 R
.302
.308
0°
.112
N14 REF
SEE CHART B FOR ROTATION FROM 0°
.270
.276 DIA
.094 2 PLACES
.125
SEE CHART C FOR ROTATION FROM 0°
0°
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.308
.112
180° REF
.090 R
DETAIL C
SEE CHART C TYP
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.250 R
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.050
.045 TYP
.608
1.455
1.450
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R1
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B13
E20
F5
E22
N15
N2
F6
E21
E23
N13
G3
S33
S34
S36
S37
S38
S39
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.254
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.375
2 PLACES
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A
.973 REF
.160
2 PLACES
N2 REF
S5 REF
B1 REF
C8 REF
.046
2 PLACES
SECTION A-A
P1 REF
.250
.280 2 PLACES
.125
.156 2 PLACES
.247
.253 DIA
2 PLACES
.14 DIA THRU
P1 REF
.120
2 PLACES
.062 R
2 PLACES
DETAIL B

CHART A	
REF DES	ROTATION FROM 0°
T1	75°CCW
T2	25°CW

CHART B	
REF DES	ROTATION FROM 0°
N1	169.5°CCW
N2	147.5°CCW
N3	98°CCW
N4	57°CCW
N5	110.5°CCW
N6	125°CW
N7	128°5CW
N8	133°CW
N10	0°
N11	105.5°CW
N12	30.5°CW
N13	145°CCW
N14	0°
N15	45°CCW
N16	45°CW

CHART C	
REF DES	ROTATION FROM 0°
N1	10.5°CCW
N2	32.5°CCW
N3	82° CCW
N4	123° CCW
N5	69.5°CCW
N6	55°CW
N7	51.5°CW
N8	47° CW
N10	180°
N11	74.5°CW
N12	149.5°CW
N13	35°CCW
N14	180°
N15	135°CCW
N16	0°

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007149	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 XX±.02 ANGLES ±.5°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT ——

FINAL FINISH SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 22 JAN 65
APPROVAL [illegible]
APPROVAL [illegible] 2/4/65
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
MSA & QUADRATURE REJECTION
CDU ELECTRONICS

CODE IDENT NO. —— SIZE J NASA DRAWING NO. 2008122

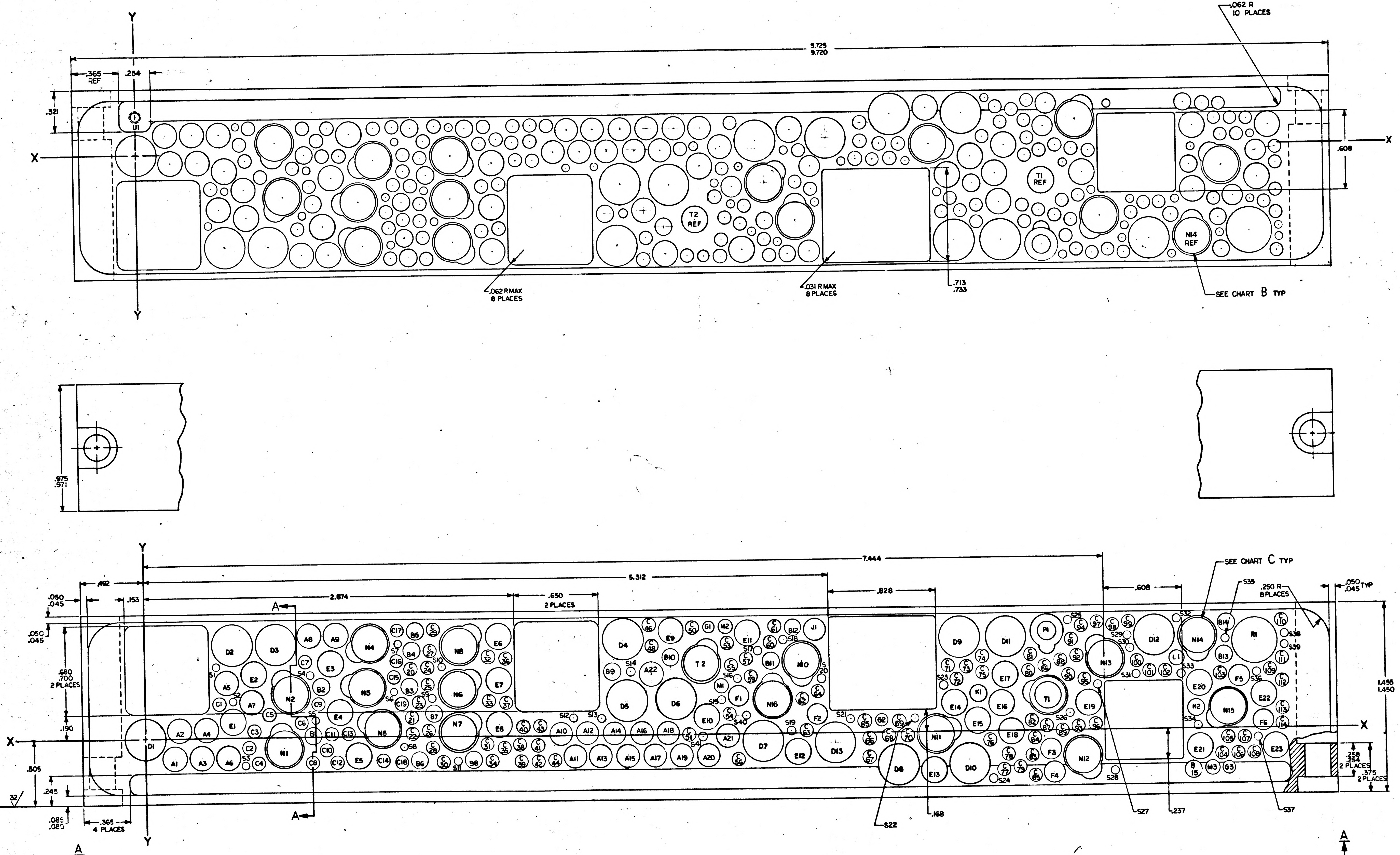
SCALE 4/1 WT —— SHEET 1 OF 1

REVISIONS

2008122

F3

2008122



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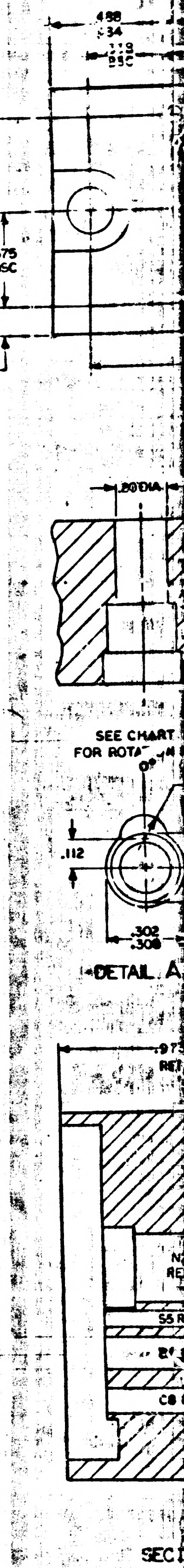
9.720
.365
REF
.254
.321
.062 R
10 PLACES
.608
X
Y
U1
T1
REF
T2
REF
N14
REF
.062 R MAX
8 PLACES
.031 R MAX
8 PLACES
.713
.733
SEE CHART B TYP
.975
.971
7.444
5.312
2.874
.650
2 PLACES
.828
.608
SEE CHART C TYP
.192
.153
.050
.045
.680
.700
2 PLACES
.190
.505
.245
.085
.080
.365
4 PLACES
.250 R
8 PLACES
.050
.045 TYP
1.455
1.450
.258
.254
2 PLACES
.375
2 PLACES
.168
.237
S22
S27
S35
S37
A

CHART A	
REF DES	ROTATION FROM 0°
T1	75° CCW
T2	25° CW



.488
.34
.750
BSC
.375
BSC
.114
.110
.80 DIA
SEE CHART
FOR ROTA
0°
.112
.302
.308
DETAIL A
.973
REF
SEC

F 2

2008122

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
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A2	.265	.065		
A3	.435	—.150		
A4	.475	.065		
A5	.642	.425		
A6	.645	—.150		
A7	.836	.275		
A8	1.287	.780		
A9	1.492	.780		
A10	3.225	.016		
A11	3.330	—.161		
A12	3.430	.016		
A13	3.535	—.161		
A14	3.635	.016		
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A18	4.057	.016		
A19	4.160	—.161		
A20	4.365	—.161		
A21	4.525	—.017		
A22	3.933	.468		
B1	1.310	.005	.127 .131	15
B2	1.377	.387		
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B5	2.107	.808		
B6	2.130	—.180		
B7	2.245	.175		
B8	2.545	—.180		
B9	3.630	.490		
B10	4.085	.595		
B11	4.862	.557		
B12	5.038	.808		
B13	8.368	.560		
B14	8.386	.808		
B15	8.120	—.318		
C1	.580	.268	.100 .104	58
C2	.806	—.075		
C3	.850	.053		
C4	.878	—.195		
C5	.970	.170		
C6	1.218	.110		
C7	1.267	.580		
C8	1.300	—.195		
C9	1.356	.250		
C10	1.408	—.100		
C11	1.450	.022		
C12	1.487	—.195		
C13	1.580	.022		
C14	1.845	—.180		
C15	1.943	.455		
C16	1.957	.580		
C17	1.967	.817		
C18	1.992	—.195		
C19	2.000	.250		
C20	2.068	.518		
C21	2.075	.143		
C22	2.075	.017		
C23	2.130	.260		
C24	2.200	.528		
C25	2.200	.397		
C26	2.203	.042		
C27	2.218	.663		
C28	2.230	—.085		
C29	2.250	.820		
C30	2.315	—.195		
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C32	2.672	.610		
C33	2.672	.270		
C34	2.688	—.188		
C35	2.776	—.090		
C36	2.802	.597		
C37	2.802	.255		
C38	2.905	—.065		
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C40	2.935	.072		
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C42	3.045	—.195		
C43	3.065	.080		
C44	3.169	—.185		
C46	3.920	.843		
C48	3.940	.680		
C50	4.260	.817		
C51	4.225	.000		
C53	4.528	.693		
C54	4.540	.150		
C55	4.555	.527		
C56	4.600	—.195		
C57	4.670	.573		
C59	4.710	.437		
C60	4.857	.700		
C61	4.895	.820		
C62	5.102	.262		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
C63	5.135	.020	.100 .104	52
C64	5.223	.313		
C65	5.580	.087		
C66	5.617	—.045		
C67	5.617	—.185		
C68	5.765	—.023		
C69	5.845	.087		
C70	5.910	—.023		
C71	6.227	.505		
C72	6.295	.400		
C73	6.375	.495		
C74	6.500	.573		
C75	6.500	.448		
C76	6.555	—.070		
C77	6.660	—.295		
C78	6.698	—.178		
C79	6.785	—.275		
C80	6.855	.458		
C81	6.870	.585		
C82	6.875	.080		
C83	6.880	—.190		
C84	6.900	—.055		
C85	6.900	—.340		
C86	6.987	.497		
C87	6.993	.035		
C88	7.107	.537		
C89	7.118	.000		
C90	7.166	.425		
C91	7.188	.695		
C92	7.230	.570		
C93	7.241	.030		
C94	7.266	.800		
C95	7.290	.390		
C96	7.369	.046		
C97	7.388	.823		
C98	7.510	.800		
C99	7.632	.823		
C100	7.693	.525		
C101	7.790	.445		
C102	7.914	.445		
C103	8.335	.418		
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C105	8.395	—.068		
C106	8.470	—.193		
C107	8.520	—.068		
C108	8.595	—.193		
C109	8.720	.445		
C110	8.814	.823		
C111	8.814	.530		
C112	8.814	.360		
C113	8.814	.150		
C114	8.814	.026		
D1	.000	.000	.309 .316	13
D2	.686	.715		
D3	1.023	.715		
D4	3.717	.735		
D5	3.744	.265		
D6	4.130	.278		
D7	4.795	—.060		
D8	5.839	—.250		
D9	6.323	.720		
D10	6.394	—.250		
D11	6.683	.720		
D12	7.835	.717		
D13	5.351	—.073		
E1	.683	.125	.202 .206	23
E2	.852	.488		
E3	1.450	.565		
E4	1.518	.190		
E5	1.655	—.142		
E6	2.750	.767		
E7	2.750	.427		
E8	2.750	.087		
E9	4.090	.800		
E10	4.365	.132		
E11	4.687	.770		
E12	5.065	—.142		
E13	6.116	—.295		
E14	6.280	.220		
E15	6.460	.080		
E16	6.645	.212		
E17	6.675	.430		
E18	6.720	.005		
E19	7.319	.210		
E20	8.175	.347		
E21	8.177	—.142		
E22	8.672	.255		
E23	8.763	—.142		
F1	4.613	.287	.153 .157	6
F2	5.218	.147		
F3	7.025	—.145		
F4	7.050	—.322		
F5	8.492	.398		
F6	8.664	.052		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	4.385	.820	.092 .096	3
G2	5.710	.095		
G3	8.395	—.305		
J1	5.206	.790	.165 .169	1
K1	6.470	.290	.124 .129	2
K2	8.150	.160		
L1	8.005	.540	.112 .116	1
M1	4.480	.369	.105 .109	3
M2	4.515	.822		
M3	8.267	—.305		
N1	1.082	—.083	SEE DETAIL C	15
N2	1.141	.330		
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N4	1.756	.717		
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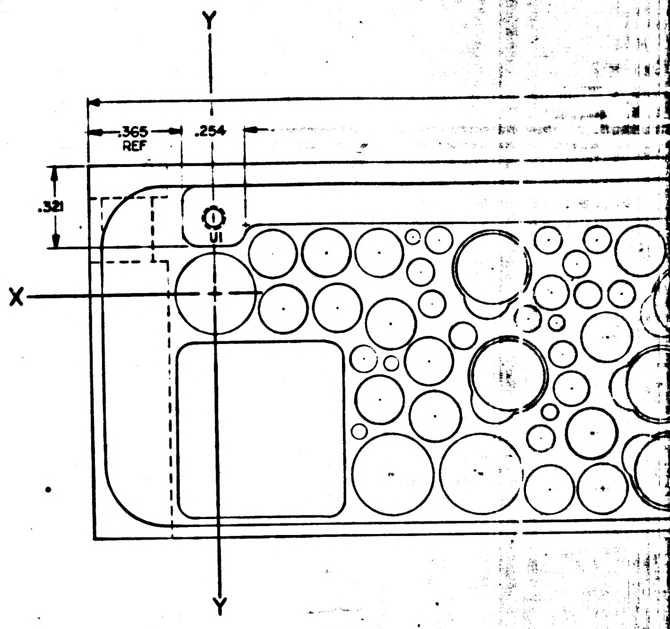
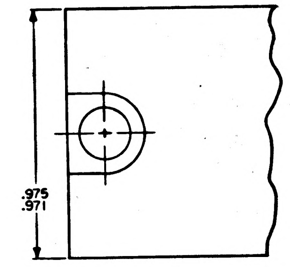
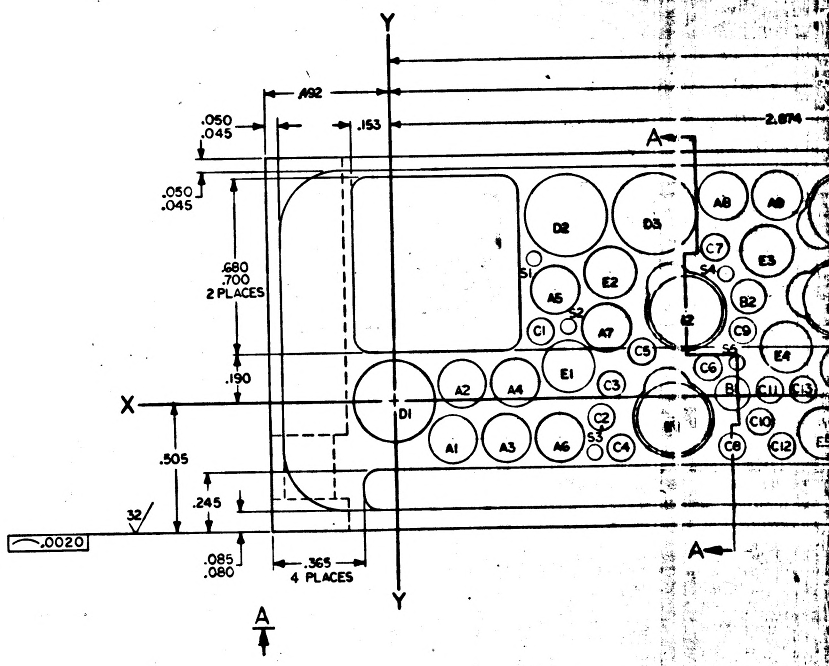
N8	2.448	.697		
N10	5.100	.552		
N11	6.141	—.020		
N12	7.269	—.193		
N13	7.455	.545		
N14	8.167	.709		
N15	8.400	.160		
N16	4.869	.266		
P1	7.000	.751	SEE DETAIL B	1
R1	8.609	.670	.346 .353	1
S1	.561	.545	.058 .062	41
S2	.687	.283		
S3	.775	—.210		
S4	1.292	.480		
S5	1.325	.128		
S6	1.937	.343		
S7	1.974	.708		
S8	2.010	—.078		
S9	2.235	.294		
S10	2.312	.535		
S11	2.424	—.185		
S12	3.325	.137		
S13	3.543	.131		
S14	3.770	.490		
S15	4.480	.260		
S16	4.603	.425		
S17	4.763	.637		
S18	4.964	.715		
S19	5.017	.012		
S20	5.256	.418		
S21	5.470	.105		
S22	5.965	.105		
S23	6.196	.350		
S24	6.573	—.364		
S25	7.165	.844		
S26	7.175	.135		
S27	7.392	.349		
S28	7.518	—.315		
S29	7.626	.720		
S30	7.645	.625		
S31	7.689	.422		
S32	8.005	.844		
S33	8.035	.422		
S34	8.162	.024		
S35	8.377	.685		
S36	8.617	.443		
S37	8.624	—.075		
S38	8.835	.721		
S39	8.835	.639		
S40	4.670	.140		
S41	4.330	.018		
T1	7.005	.266	SEE DETAIL A	2
T2	4.322	.547		
U1	.000	—.297	SEE DETAIL D	1

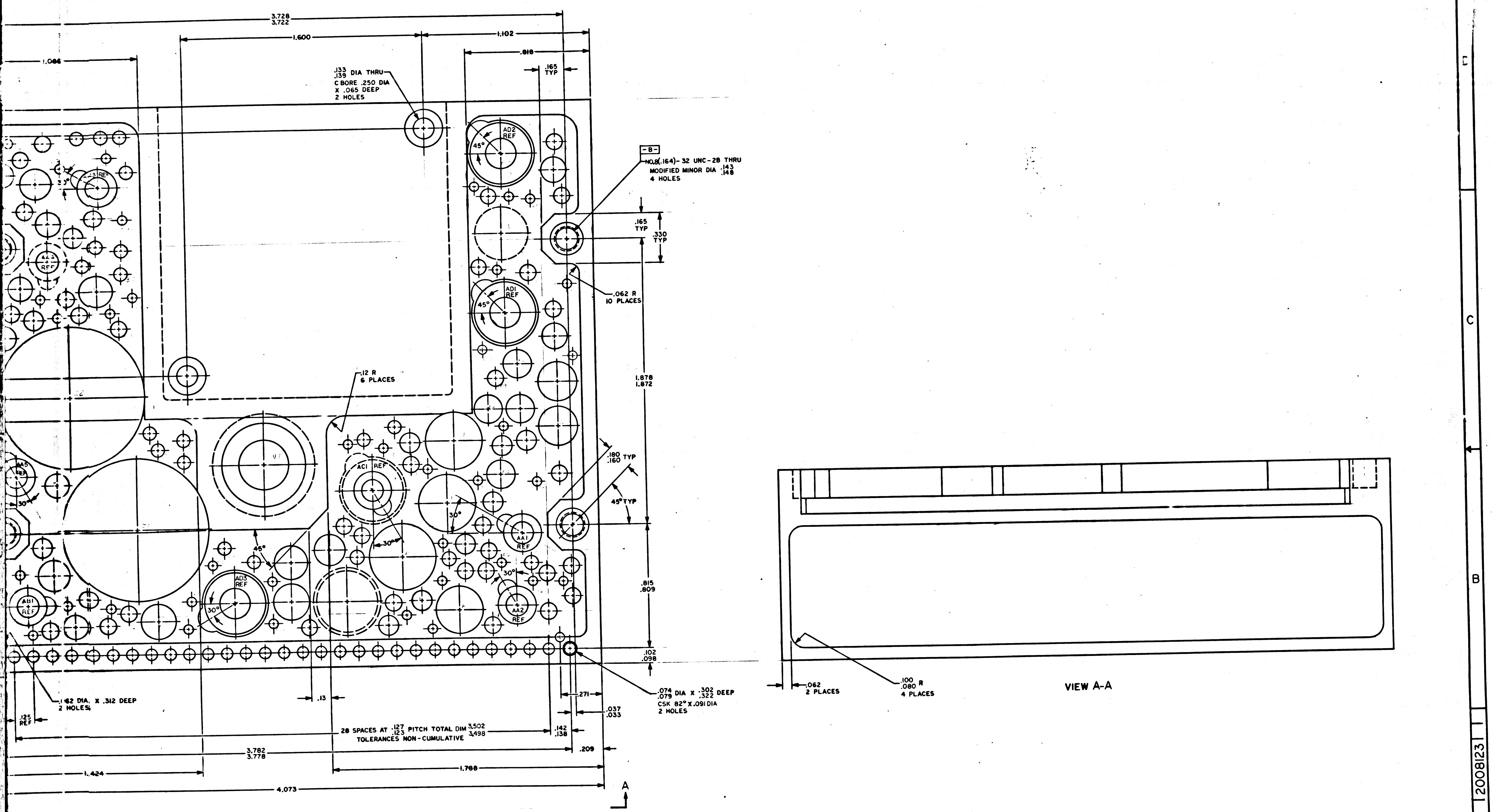
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAG ALLOY ZK60A-T5 PER QQ-M-31
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C. HOLE U1 TO BE FREE OF ANODIZE
4. UNLESS OTHERWISE SPECIFIED ALL SURFACES 125√
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
7. IDENTIFY PER ND 1002019








3.728
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1.600
1.102
.818
1.086
.165 TYP
.133
.139 DIA THRU
C BORE .250 DIA
X .065 DEEP
2 HOLES
AD2 REF
45°
-B-
NO.8(.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143
.148
4 HOLES
.165 TYP
.330 TYP
.062 R
10 PLACES
AD1 REF
1.878
1.872
.12 R
6 PLACES
AC1 REF
30°
.180
.160 TYP
45° TYP
AA1 REF
AA2 REF
AD3 REF
AB1 REF
AA5 REF
.815
.809
.102
.098
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.062 DIA. X .312 DEEP
2 HOLES
.125 REF
.13
.271
.037
.033
28 SPACES AT .127
.123 PITCH TOTAL DIM 3.502
3.498
TOLERANCES NON-CUMULATIVE
.142
.138
3.782
3.778
.209
1.424
1.788
4.073
A
.062
2 PLACES
.100 R
.080 4 PLACES
VIEW A-A
REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
4
3
2
C
B
A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007106	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS XX ± .010 XXX ± .005
ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

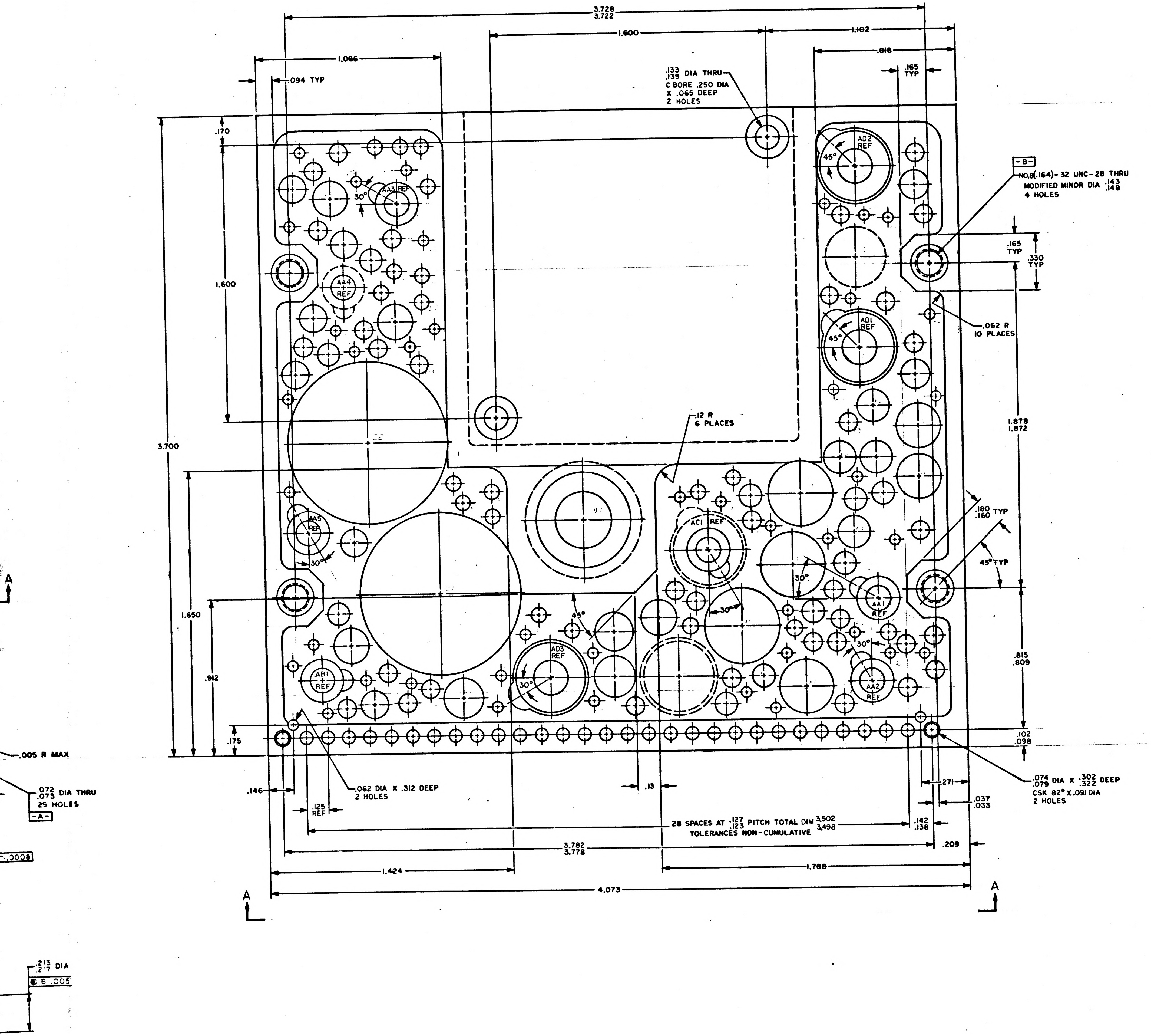
DRAWN Ken Healy DATE 29 Dec 64
CHECKED D. Lindstrom 12 Jan 65
APPROVAL J. [illegible] 12 Jan 65
APPROVAL D. [illegible] 13 Jan 65
NASA APPROVAL W. J. [illegible] 1-13-65
MIT APPROVAL [illegible] 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK,
PULSE TORQUE POWER SUPPLY

CODE IDENT NO. —
SIZE J
NASA DRAWING NO 2008123
SCALE 5/1
WT —
SHEET 1 OF 1

2008123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3.722
1.600
1.102
1.086
.818
.094 TYP
.165 TYP
.133
.139 DIA THRU
C BORE .250 DIA
X .065 DEEP
2 HOLES
-B-
NO.8(.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
4 HOLES
.170
AD2 REF
45°
AA3 REF
30°
1.600
AA4 REF
.165 TYP
.330 TYP
.062 R
10 PLACES
AD1 REF
3.700
.12 R
6 PLACES
1.878
1.872
.180
.160 TYP
45° TYP
AA5 REF
30°
AC1 REF
30°
AA1 REF
1.650
45°
30°
.912
AD3 REF
30°
AA2 REF
AB1 REF
.815
.809
.175
.102
.098
.005 R MAX
.072
.073 DIA THRU
29 HOLES
-A-
.0008
.146
.062 DIA X .312 DEEP
2 HOLES
.125 REF
.13
.271
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.037
.033
28 SPACES AT .127
.123 PITCH TOTAL DIM 3.502
3.498
TOLERANCES NON-CUMULATIVE
.142
.138
3.782
3.778
.209
1.424
1.788
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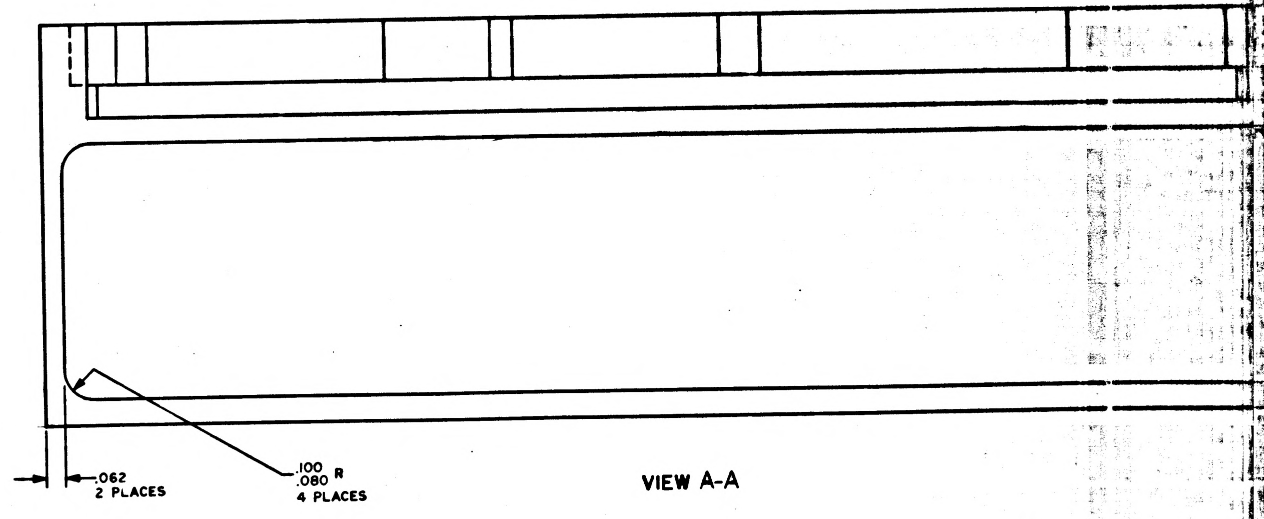
A
A
A
.213
.217 DIA
B .005


.062
2 PLACES
.100
.080 R
4 PLACES

VIEW A-A

2007106	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .010 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

QTY REQD
PART OR IDENTIFYING NO.

LIST OF MA

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

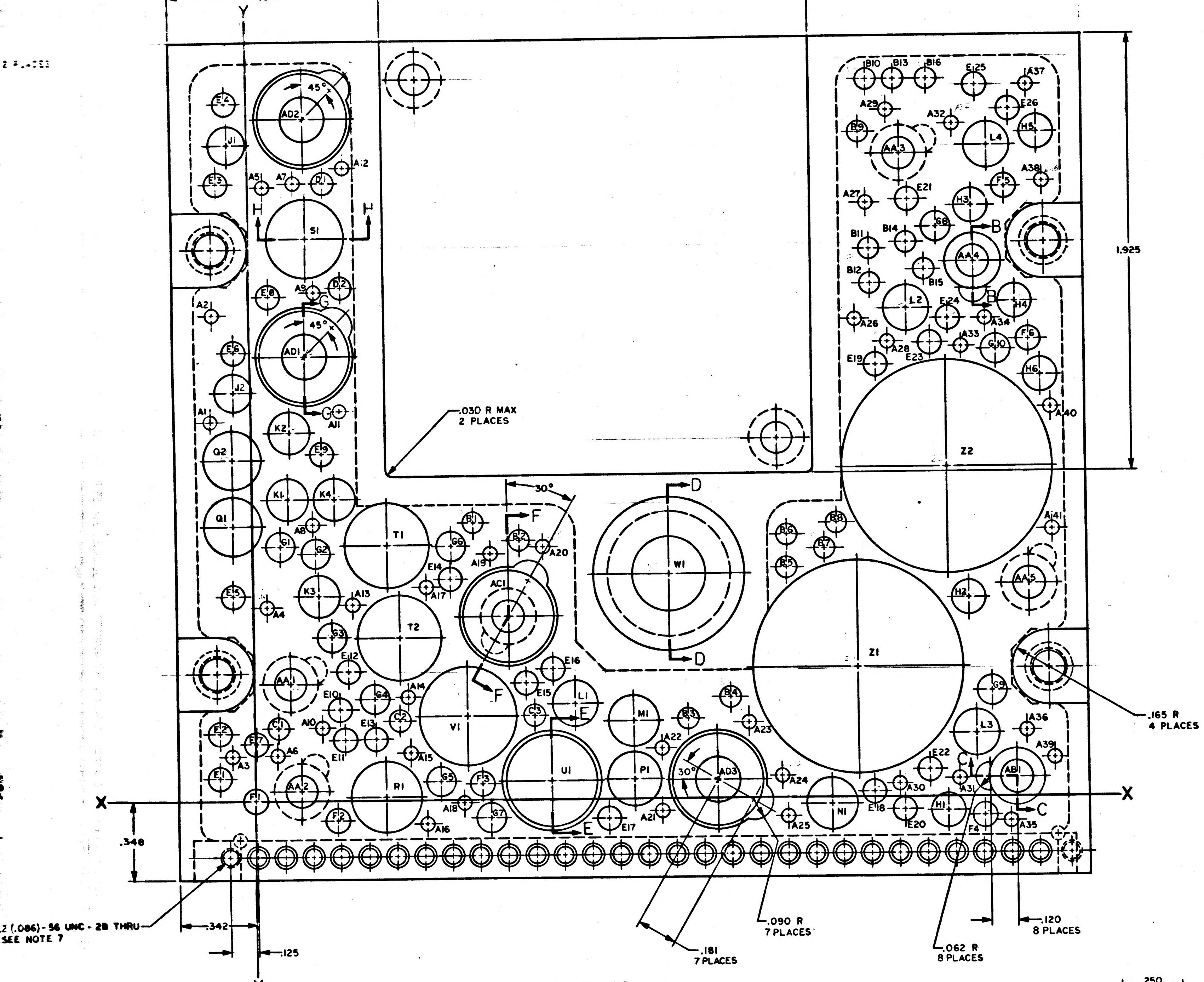
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

PULSE

CODE IDENT NO.

2008123

F3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Y
X
H
G
D
F
E
C
B
45°
30°
AD1
AD2
AD3
AC1
AA1
AA2
AA3
AA4
AA5
AB1
S1
T1
T2
V1
U1
W1
Z1
Z2
R1
P1
M1
N1
L1
L2
L3
L4
Q1
Q2
J1
J2
K1
K2
K3
K4
.030 R MAX 2 PLACES
.165 R 4 PLACES
.348
.342
.125
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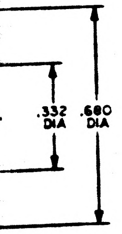
.181 7 PLACES
.090 R 7 PLACES
.062 R 8 PLACES
.120 8 PLACES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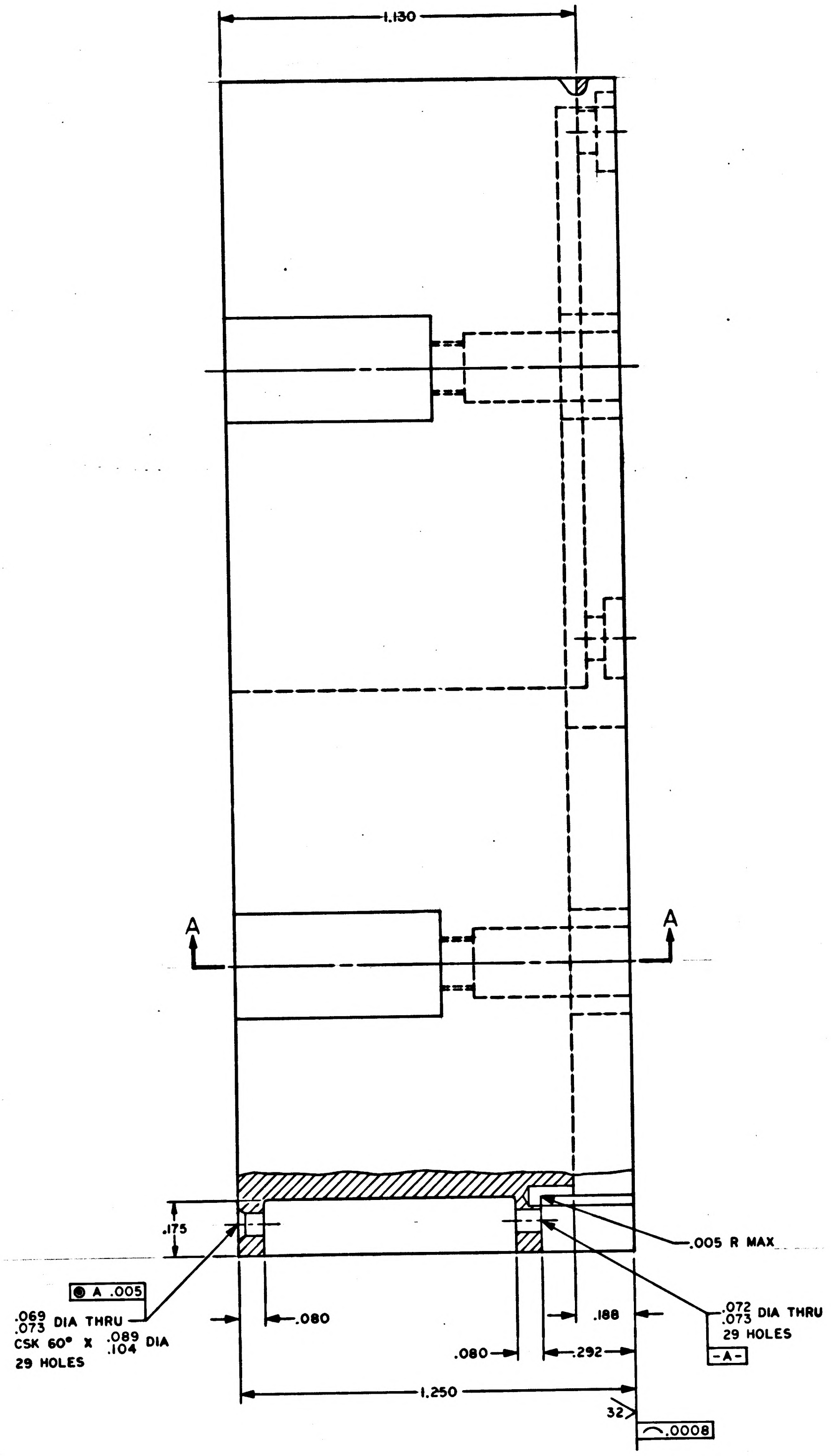
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A
A
.175
.005 R MAX
A .005
.069 .073 DIA THRU CSK 60° X .089 .104 DIA 29 HOLES
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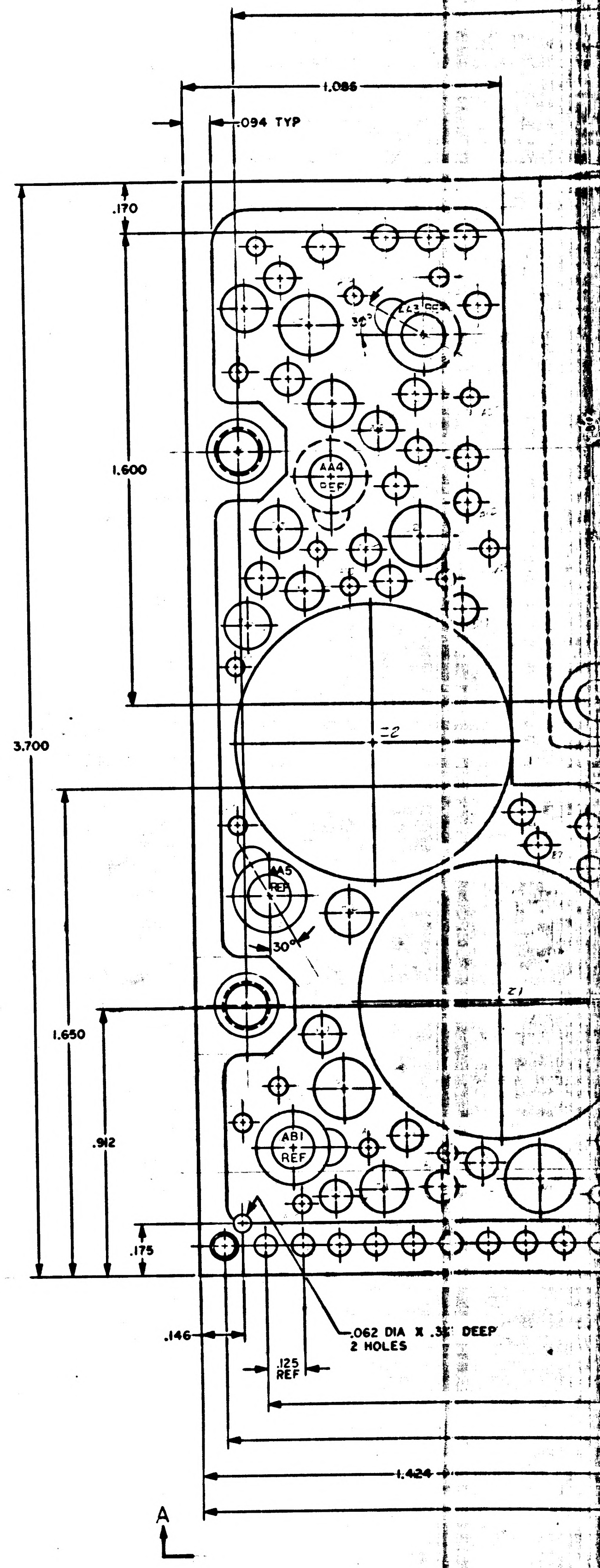
.188
.292
.072 .073 DIA THRU 29 HOLES
-A-
1.250
32
.0008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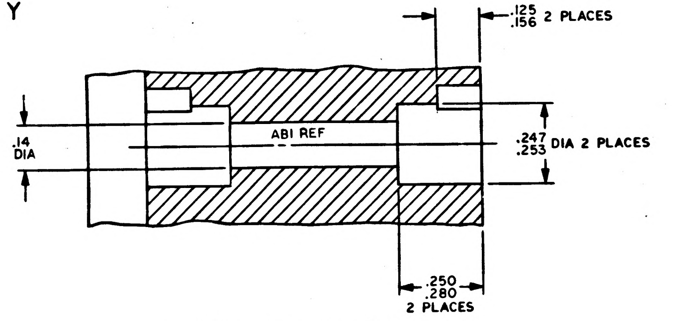
.094 TYP
.170
1.600
3.700
1.650
.912
.175
.146
.125 REF
.062 DIA X .35 DEEP 2 HOLES
1.424
AA4 REF
AA5 REF
AB1 REF
Z2
Z1
30°
A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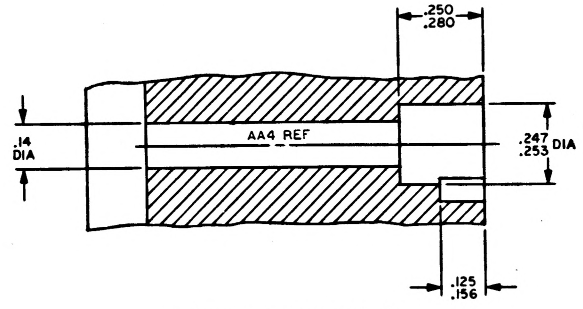
AB1 REF
.247 .253 DIA 2 PLACES
.250 .280 2 PLACES

PARTIAL SECTION C-C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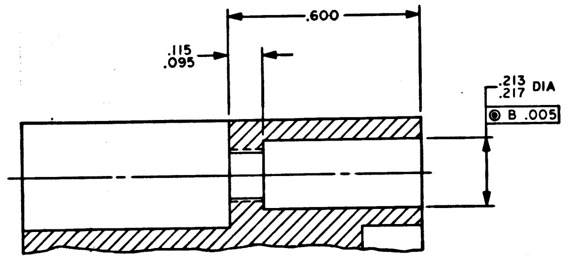
PARTIAL SECTION B-B


.600
.115 .095
.213 .217 DIA
B .005

PARTIAL SECTION A-A

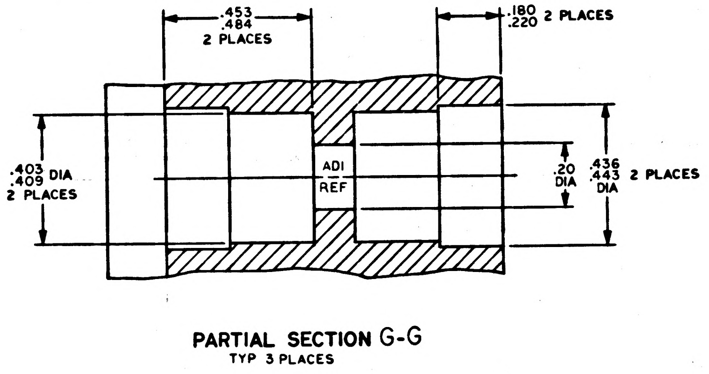
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A1	-.178	1.676	.058/.062	41
A2	-.166	2.146		
A3	-.102	.196		
A4	.060	.854		
A5	.066	2.710		
A6	.100	.200		
A7	.204	2.726		
A8	.272	1.218		
A9	.292	2.244		
A10	.304	.322		
A11	.414	1.720		
A12	.430	2.792		
A13	.448	.864		
A14	.688	.454		
A15	.698	.208		
A16	.768	-.106		
A17	.778	.940		
A18	.936	-.014		
A19	1.066	1.086		
A20	1.302	1.116		
A21	1.820	-.056		
A22	1.822	.220		
A23	2.214	.332		
A24	2.360	.096		
A25	2.382	-.084		
A26	2.710	2.104		
A27	2.764	2.616		
A28	2.856	2.002		
A29	2.860	3.024		
A30	2.884	.056		
A31	3.150	.078		
A32	3.152	2.962		
A33	3.182	1.982		
A34	3.290	2.104		
A35	3.378	-.108		
A36	3.454	.290		
A37	3.484	3.132		
A38	3.550	2.706		
A39	3.576	.168		
A40	3.576	1.710		
A41	3.578	1.174		
B1	.992	1.222	.088/.092	16
B2	1.196	1.142		
B3	1.942	.350		
B4	2.134	.444		
B5	2.390	1.014		
B6	2.392	1.158		
B7	2.562	1.096		
B8	2.616	1.208		
B9	2.734	2.930		
B10	2.772	3.160		
B11	2.776	2.412		
B12	2.780	2.260		
B13	2.894	3.160		
B14	2.942	2.438		
B15	3.020	2.320		
B16	3.040	3.160		
C1	.106	.320	.093/.097	3
C2	.650	.350		
C3	1.256	.370		
D1	.340	2.725	.095/.099	2
D2	.412	2.262		
E1	-.160	.100	.100/.104	7
E2	-.156	.298		
E3	-.142	2.725		
E4	-.100	3.081		
E5	-.090	.904		
E6	-.072	1.981		
E7	.004	.250		

HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
E8	.088	2.225	.100/.104	19
E9	.318	1.530		
E10	.384	.400		
E11	.406	.268		
E12	.425	.568		
E13	.543	.270		
E14	.887	.974		
E15	1.220	.514		
E16	1.340	.575		
E17	1.582	-.087		
E18	2.772	.022		
E19	2.803	1.900		
E20	2.906	-.056		
E21	2.950	2.628		
E22	3.020	.118		
E23	3.044	1.996		
E24	3.125	2.104		
E25	3.256	3.134		
E26	3.404	3.024		
F1	.000	.000	.106/.110	6
F2	.370	-.088		
F3	1.020	.068		
F4	3.262	-.084		
F5	3.382	2.684		
F6	3.482	2.010		
G1	.124	1.122	.127/.131	10
G2	.284	1.090		
G3	.352	.720		
G4	.540	.446		
G5	.834	.080		
G6	.892	1.118		
G7	1.056	-.081		
G8	3.076	2.506		
G9	3.302	.464		
G10	3.336	1.966		
H1	3.100	-.062	.153/.157	6
H2	3.202	.874		
H3	3.232	2.598		
H4	3.422	2.176		
H5	3.528	2.922		
H6	3.532	1.850		
J1	-.090	2.896	.165/.169	2
J2	-.076	1.804		
K1	.160	1.330	.181/.185	4
K2	.174	1.625		
K3	.296	.902		
K4	.372	1.330		
L1	1.437	.420	.202/.206	4
L2	2.940	2.148		
L3	3.230	.278		
L4	3.306	2.864		
M1	1.698	.342	.220/.224	1
N1	2.580	-.031	.227/.231	1
P1	1.700	.084	.241/.245	1
Q1	-.086	1.214	.255/.262	2
Q2	-.086	1.506		

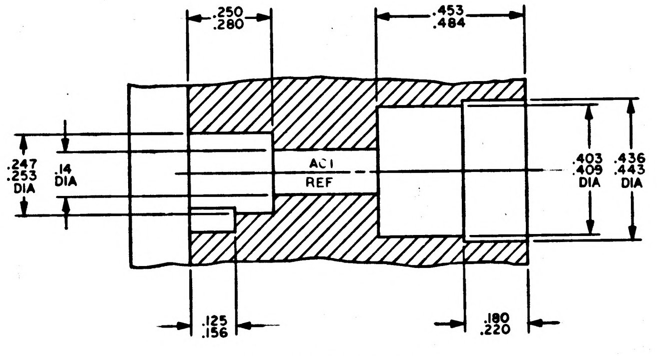
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
R1	.587	.014	.310/.317	1
S1	2.58	2.480	SEE SECTION H-H	1
T1	.604	1.125	.373/.380	2
T2	.654	.716		
U1	1.328	.080	SEE SECTION E-E	1
V1	.956	.368	.436/.443	1
W1	1.864	.988	SEE SECTION D-D	1
Z1	2.704	.572	.936/.943	2
Z2	3.112	1.450		
AA1	.162	.516	SEE SECTION B-B	5
AA2	.206	.042		
AA3	2.918	2.830		
AA4	3.240	2.352		
AA5	3.472	.934		
AB1	3.405	.082	SEE SECTION C-C	1
AC1	1.144	.808	SEE SECTION F-F	1
AD1	.246	1.960	SEE SECTION G-G	3
AD2	.252	3.008		
AD3	2.070	.080		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED BLACK
7. THREAD TO BE FREE OF ANODIZE
8. IDENTIFY PER ND1002019



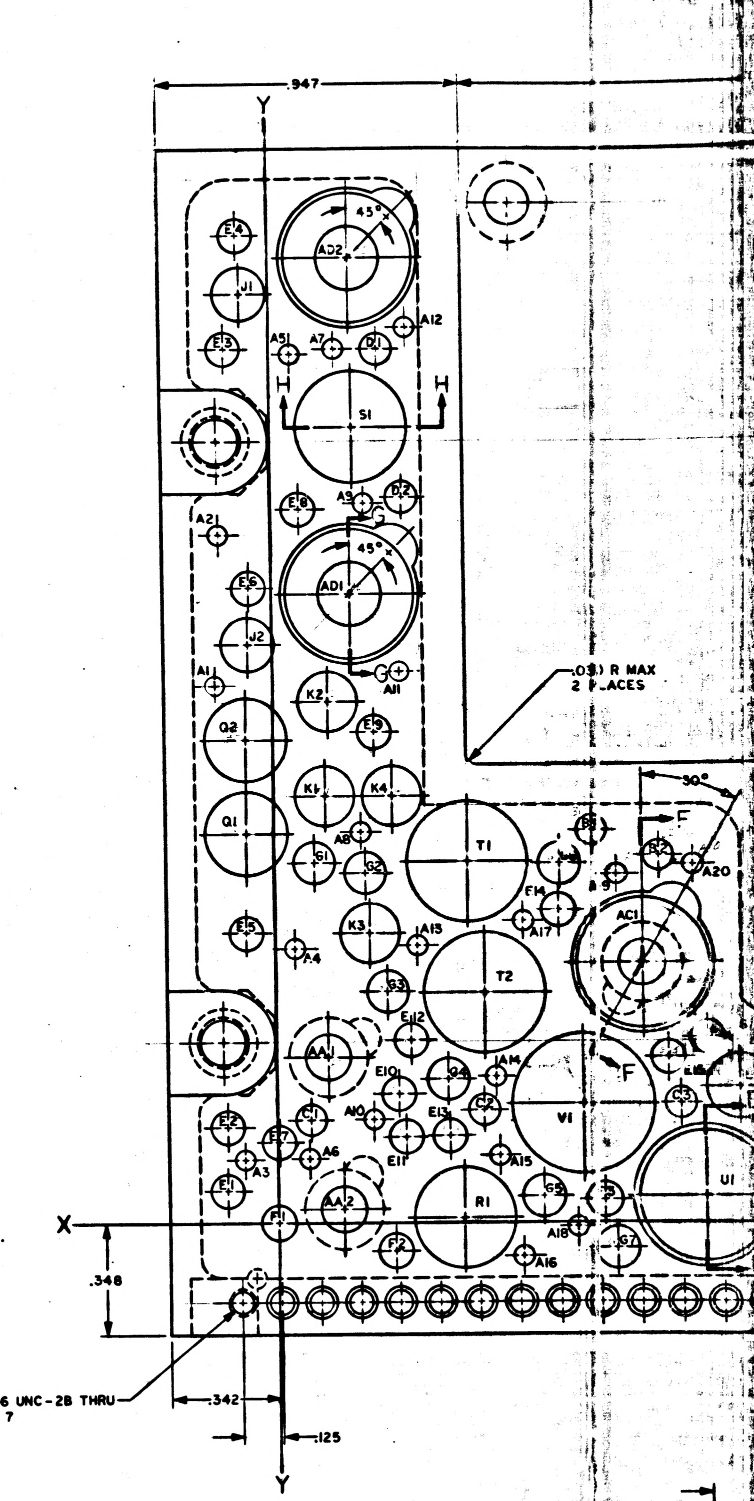
.453
.484
2 PLACES
.180
.220 2 PLACES
.403 DIA
.409
2 PLACES
AD1
REF
.20
DIA
.436
.443
DIA
2 PLACES

PARTIAL SECTION G-G
TYP 3 PLACES

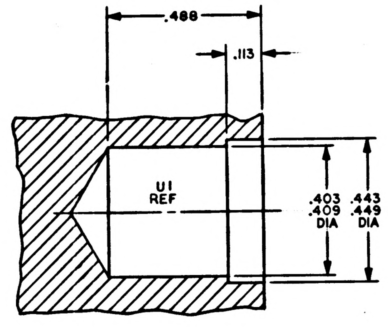


.250
.280
.453
.484
.247
.253
DIA
.14
DIA
AC1
REF
.403
.409
DIA
.436
.443
DIA
.125
.156
.180
.220

PARTIAL SECTION F-F

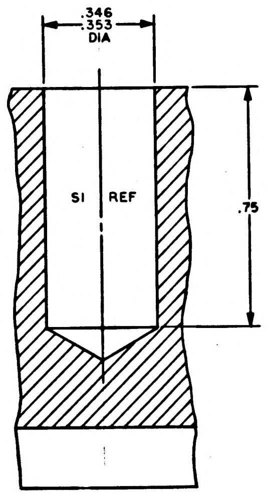


.947
Y
45°
AD2
AD1
E4
J1
E3
A5
A7
D1
A12
H
S1
E8
A9
D2
G
A21
E6
J2
A1
A11
K2
E9
Q2
Q1
K1
K4
A8
G1
G2
T1
.03 R MAX
2 PLACES
30°
F
A20
A17
AC1
E5
A4
K3
A13
G3
T2
E12
AA1
E10
A14
C1
A10
E13
C2
V1
C3
E2
E7
A6
E11
A15
A3
E1
AA2
R1
G5
U1
F1
F2
A18
G7
A16
X
.348
.342
.125
Y
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7



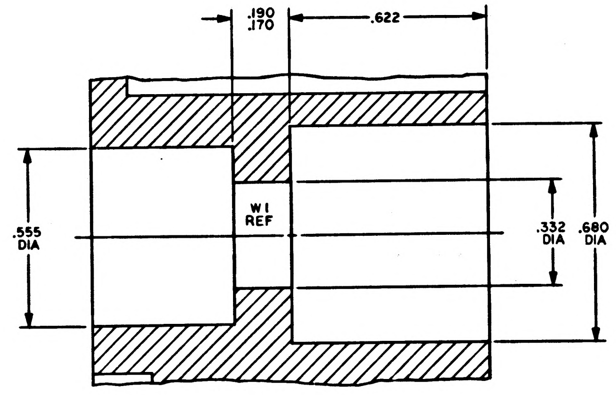
.488
.113
U1
REF
.403
.409
DIA
.443
.449
DIA

PARTIAL SECTION E-E



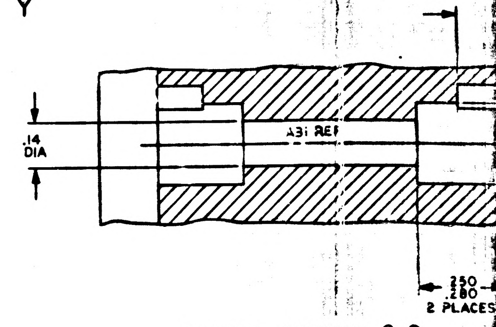
.346
.353
DIA
S1
REF
.75

PARTIAL SECTION H-H



.190
.170
.622
W1
REF
.555
DIA
.332
DIA
.680
DIA

PARTIAL SECTION D-D



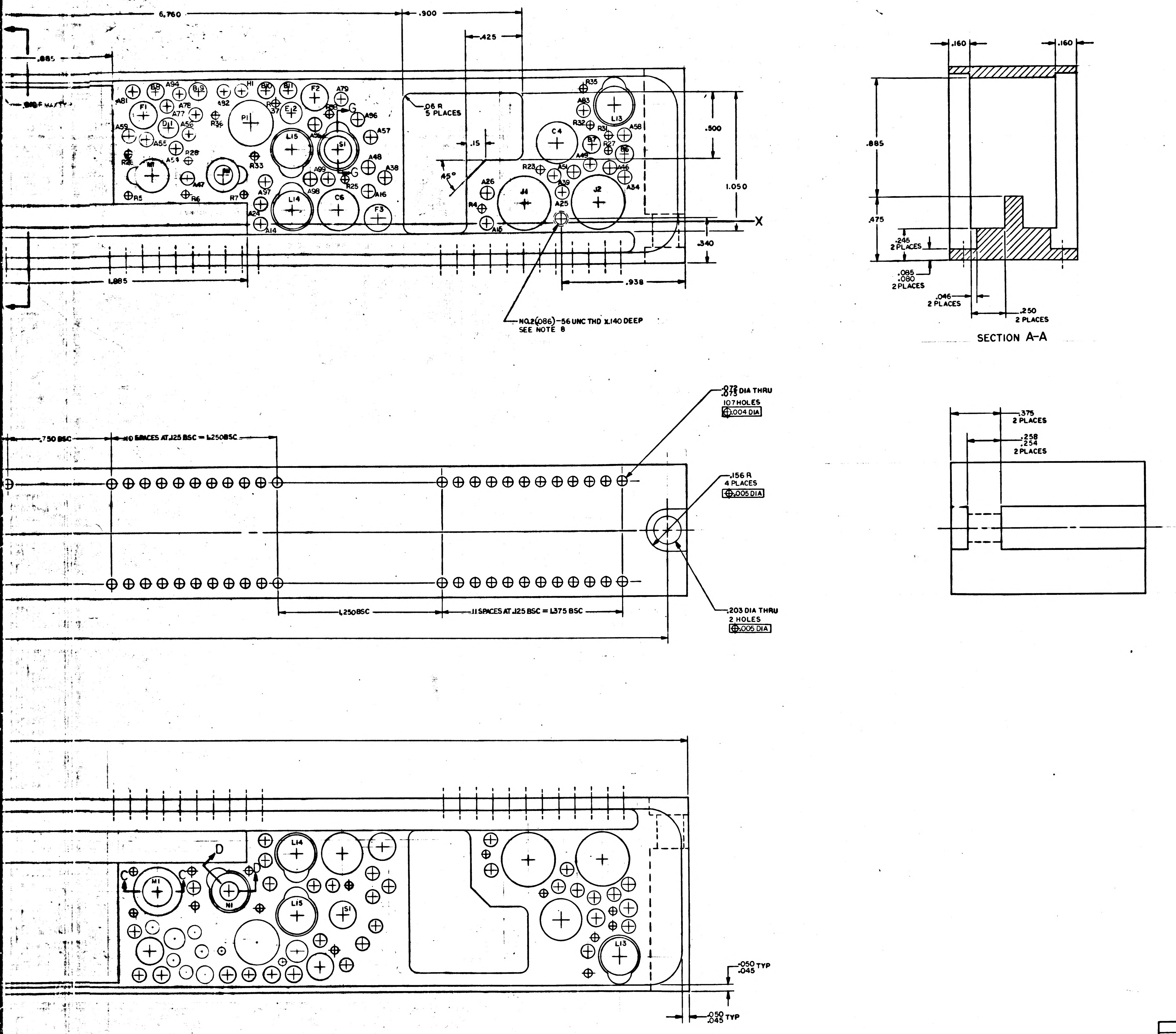
.14
DIA
AB1 REF
.250
.280
2 PLACES

PARTIAL SECTION C-C

2008123

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17981	5 APR 65	

REVISIONS



6.760
.900
.425
.885
.06 R
5 PLACES
.15
45°
.500
1.050
X
.340
1.885
.938
NO.2(.086)-56 UNC THD X.140 DEEP
SEE NOTE 8
.160
.160
.885
.475
.245
2 PLACES
.085
.080
2 PLACES
.046
2 PLACES
.250
2 PLACES
SECTION A-A
.078
.073 DIA THRU
107 HOLES
⊕ .004 DIA
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.156 R
4 PLACES
⊕ .005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.375
2 PLACES
.258
.254
2 PLACES
.050
.045 TYP
.050
.045 TYP
F1
F2
F3
P1
S1
L13
L14
L15
C4
C6
J1
J2
M1
N1
D
C

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007150	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.005 .XX .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE 29 Dec 64
CHECKED
APPROVAL 2/16/65
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kupfer 17 Feb 65

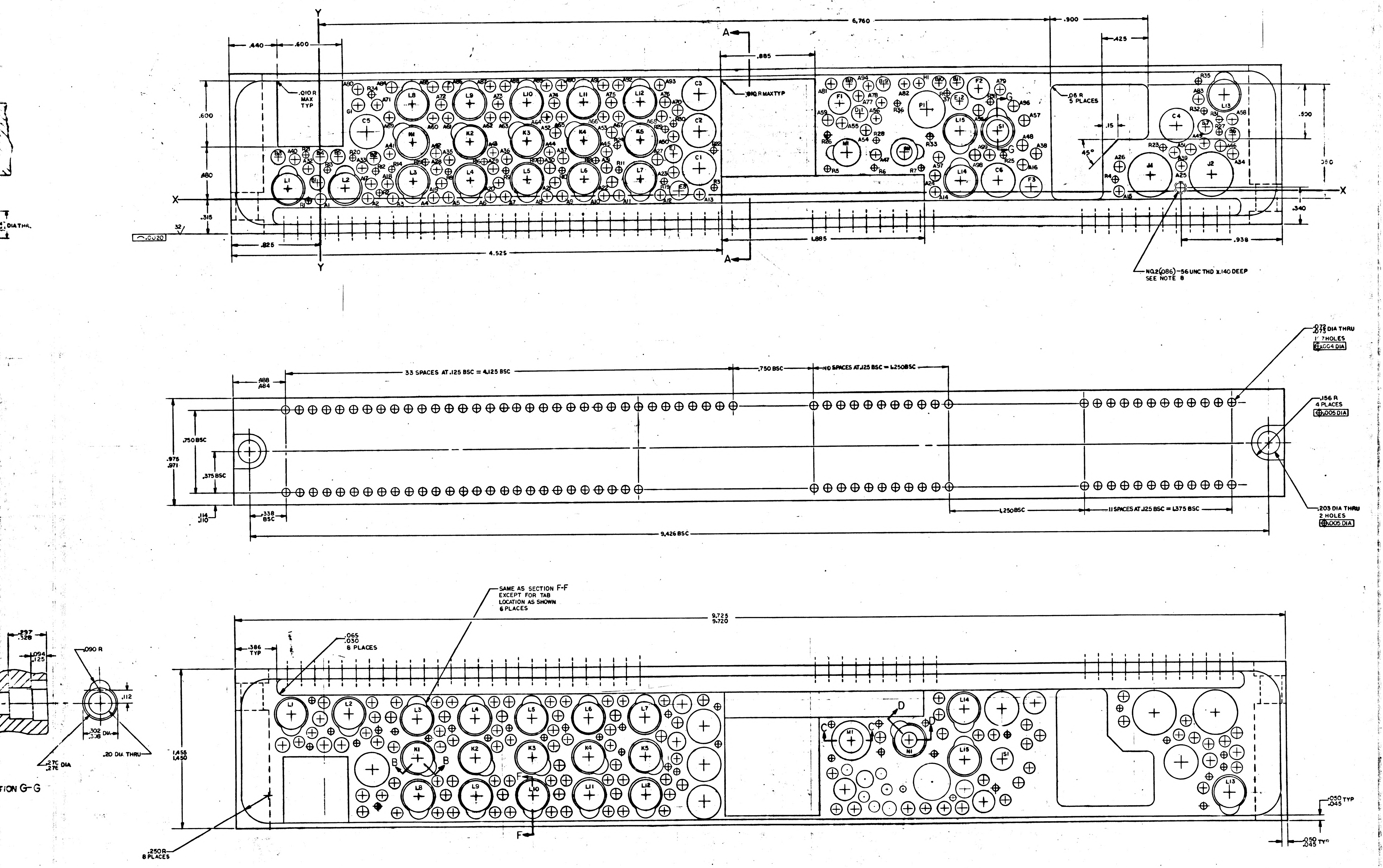
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
D/A CONVERTER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008126

SCALE 4/1 WT —— SHEET 1 OF 1

2008126 A



6.760
.900
.425
.440
.600
.885
A
Y
X
.010 R MAX TYP
.010 R MAX TYP
.06 R 5 PLACES
.15
45°
.600
.480
.315
.500
.050
.340
.938
.825
4.525
1.885
.0020
32
NO.2(.086)-56 UNC THD X.140 DEEP SEE NOTE 8
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.488 .484
.750 BSC
.976 .971
.375 BSC
.114 .110
.338 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
9.426 BSC
.072 .073 DIA THRU 1 7 HOLES .004 DIA
.156 R 4 PLACES .005 DIA
.203 DIA THRU 2 HOLES .005 DIA
SAME AS SECTION F-F EXCEPT FOR TAB LOCATION AS SHOWN 6 PLACES
9.725 9.720
.386 TYP
.065 .030 8 PLACES
1.455 1.450
.250 R 8 PLACES
.050 .045 TYP
.050 .045 TYP
B
C
D
F
.297 .328
.094 .125
.090 R
.112
.302 .308 DIA
.270 .276 DIA
.20 DIA THRU
TION G-G
DIA THRU
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15
K1 K2 K3 K4 K5
C1 C2 C3 C4 C5 C6
J1 J2 M1 N1 P1 S1 F1 F2 F3 E1 E2 E3 D1
7 6 5 4 3

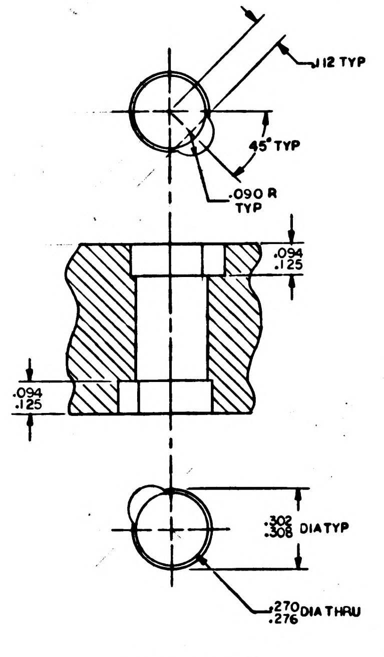
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A1	.000	.000	.100 .104	70
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	-.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	↓		
A37	2.235	↓		
A38	6.625	↓		
A39	7.910	.350		
A40	-.235	.385		
A41	.635	.400		
A42	1.060	↓		
A43	1.585	↓		
A44	2.110	↓		
A45	2.635	.400		
A46	8.335	.410		
A47	5.150	.450		
A48	6.500	.425		
A49	8.185	.425		
A50	3.260	.535		
A51	8.060	.375		
A52	2.160	.575		
A53	2.685	.575		
A54	5.050	.575		
A55	4.830	.645		
A56	5.145	.680		
A57	6.525	.650		
A58	8.450	.650		
A59	4.700	.675		
A60	1.035	.725		
A61	1.175	↓		
A62	1.560	↓		
A63	1.700	↓		
A64	2.085	↓		
A65	2.225	↓		
A66	2.610	↓		
A67	2.750	↓		
A68	3.150	.725		
A69	.635	.735		
A70	3.300	.775		

HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A71	.525	.850	.100 .104	29
A72	1.110	↓		
A73	1.635	↓		
A74	2.160	↓		
A75	2.685	↓		
A76	3.185	.850		
A77	4.985	.890		
A78	5.200	.830		
A79	6.300	.925		
A80	.350	1.000		
A81	4.735	1.000		
A82	5.415	1.000		
A83	8.135	.835		
A84	.655	1.010		
A85	1.035	↓		
A86	1.175	↓		
A87	1.560	↓		
A88	1.700	↓		
A89	2.085	↓		
A90	2.225	↓		
A91	2.610	↓		
A92	2.750	↓		
A93	3.140	1.010		
A94	5.080	.980		
A95	6.100	.750		
A96	6.425	.785		
A97	5.725	.325		
A98	6.060	.335		
A99	6.200	.335		
B1	-.025	.150	.127 .131	11
B2	.485	.375		
B3	-.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	5.725	1.000		
B11	5.900	1.000		
C1	3.500	.235	.310 .317	6
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	1
J1	7.685	.150	.395 .402	2
J2	8.250	.150		

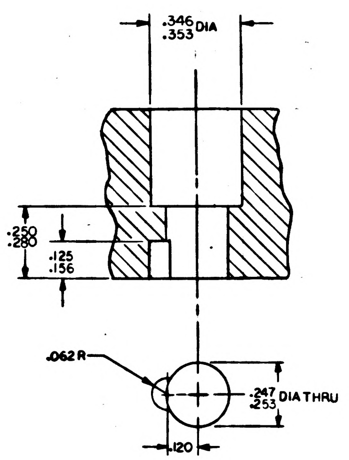
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
K1	.845	.510	SEE SECTION B-B	5
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
K5	2.945	.510		
L1	-.300	.100	SEE SECTION F-F	15
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	2.945	.150		
L8	.845	.860		
L9	1.375	↓		
L10	1.900	↓		
L11	2.420	↓		
L12	2.945	.860		
L13	8.375	.875		
L14	5.925	.100		
L15	5.925	.560		
M1	4.870	.375	SEE SECTION C-C	1
N1	5.400	.375	SEE SECTION D-D	1
P1	5.625	.760	.346 .353	1
R1	-.110	-.010	.058 .062	38
R2	.535	.050		
R3	3.635	.060		
R4	7.360	.110		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	-.125	.400		
R22	3.635	.400		
R23	7.800	.400		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.210	.825		
S1	6.275	.560	SEE SECTION G-G	1

NOTES

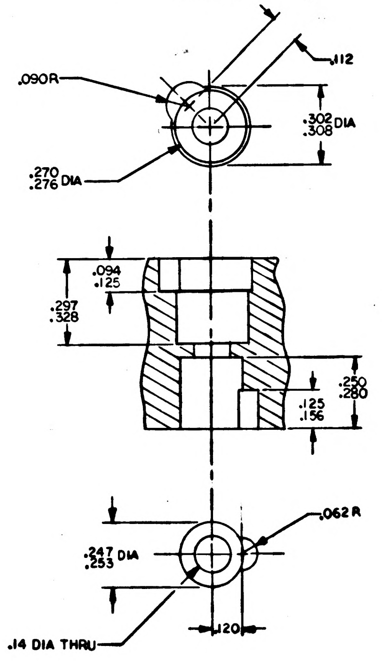
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND1002019
8. THREAD MUST BE FREE OF ANODIZE


.112 TYP
45° TYP
.090 R TYP
.094
.125
.094
.125
.302
.308 DIA TYP
.270
.276 DIA THRU

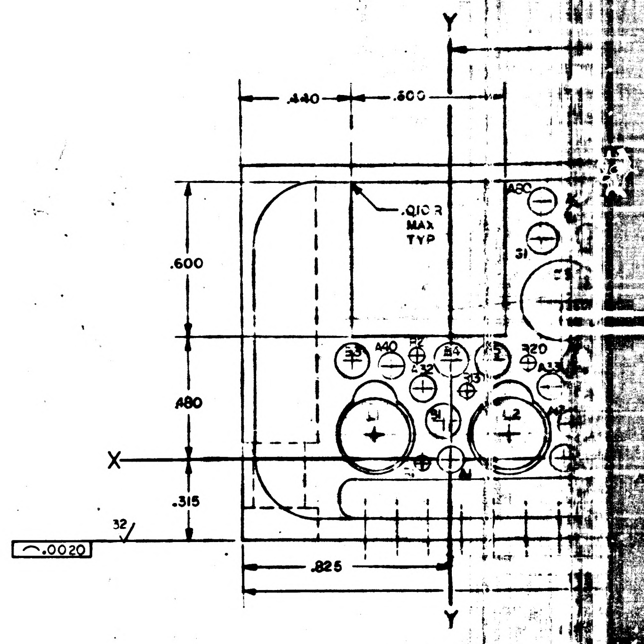
SECTION B-B
5 PLACES


.346
.353 DIA
.250
.280
.125
.156
.062 R
.247
.253 DIA THRU
.120

SECTION C-C


.090 R
.112
.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
.250
.280
.125
.156
.062 R
.247
.253 DIA
.14 DIA THRU
.120

SECTION D-D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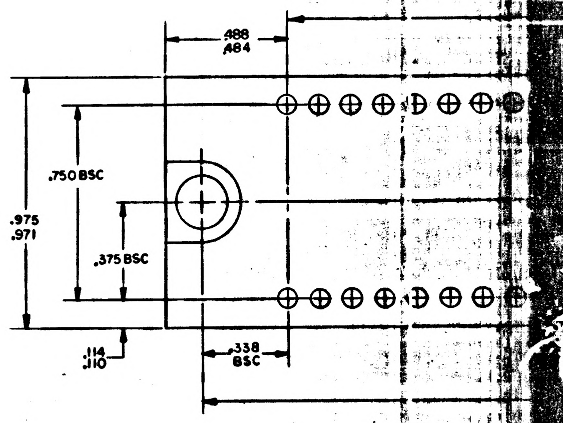
.440
.600
.010 R MAX TYP
.600
.480
X
.315
32
.825
.0020
Y
A80
A40
L1
L2
31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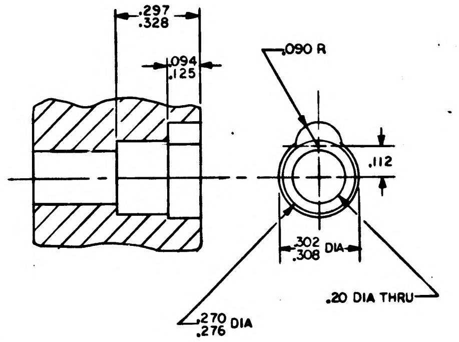
.484
.750 BSC
.975
.971
.375 BSC
.114
.110
.338 BSC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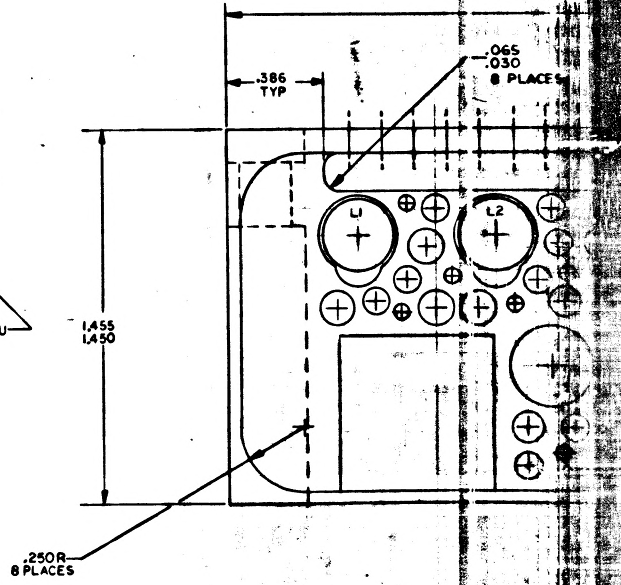
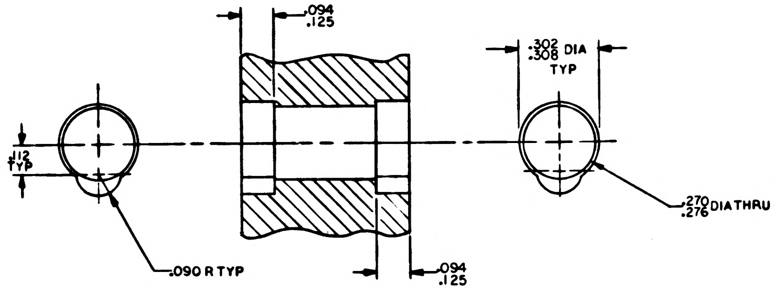
.112
.302
.308 DIA
.270
.276 DIA
.20 DIA THRU

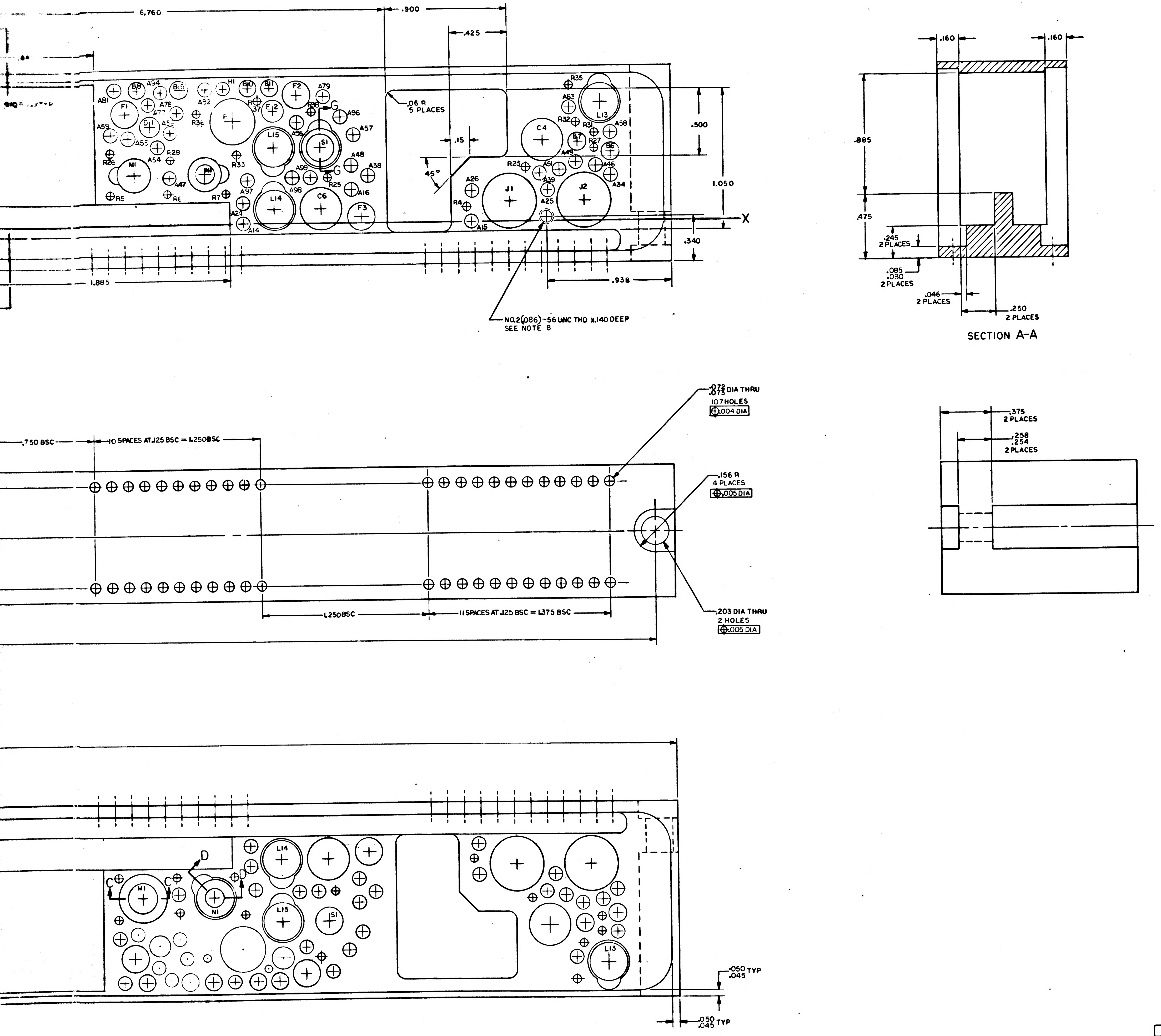
SECTION G-G


.065
.030
8 PLACES
.386 TYP
1.455
1.450
.250 R
8 PLACES
L1
L2


.094
.125
.112 TYP
.302
.308 DIA TYP
.270
.276 DIA THRU
.090 R TYP
.094
.125

SECTION F-F
15 PLACES

SYM	DESCRIPTION	DATE	APPROVAL
B	REVISED PER TDRR 20779		


6.760
.900
.425
.06 R
5 PLACES
.15
45°
.500
1.050
.340
.938
1.885
X
G
NO.2(.086)-56 UNC THD X.140 DEEP
SEE NOTE 8
.160
.885
.475
.245
2 PLACES
.085
.080
2 PLACES
.046
2 PLACES
.250
2 PLACES
SECTION A-A
.375
2 PLACES
.258
.254
2 PLACES
.078
.073 DIA THRU
107 HOLES
⊕ .004 DIA
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.156 R
4 PLACES
⊕ .005 DIA
.203 DIA THRU
2 HOLES
⊕ .005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.050
.045 TYP
.050
.045 TYP
C
D
M1
N1
L13
L14
L15
S1
J1
J2
C4
C6
F1
F2
F3
H1
A14
A15
A16
A24
A25
A26
A34
A38
A39
A46
A47
A48
A49
A51
A54
A55
A56
A57
A58
A59
A78
A79
A81
A82
A83
A96
A97
A98
A99
R4
R5
R6
R7
R23
R25
R26
R27
R29
R31
R32
R33
R35
R36
B6
B7

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007150
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS XXX ±.005 XX .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH
SEE NOTE 6

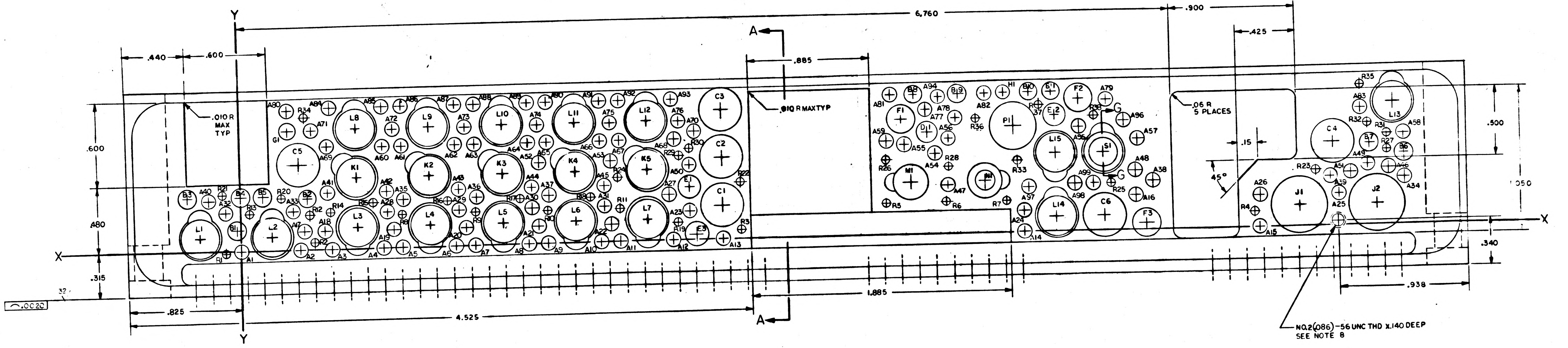
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN F. Pellissa DATE 29 Dec 64
CHECKED
APPROVAL 2/10/65
APPROVAL 2/10/65
NASA APPROVAL
MIT APPROVAL 17 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
D/A CONVERTER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO 2008126
SCALE 4/1
WT
SHEET 1 OF 1

2008126 B


6.760
.900
.425
.440
.600
.885
A
A
Y
Y
X
X
.010 R MAX TYP
.010 R MAX TYP
.06 R 5 PLACES
.15
45°
.600
.480
.315
.500
1.050
.340
.825
4.525
1.885
.938
.0020
NO.2(.086)-56 UNC THD X.140 DEEP SEE NOTE 8
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
L15
K1
K2
K3
K4
K5
C1
C2
C3
C4
C5
C6
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S1
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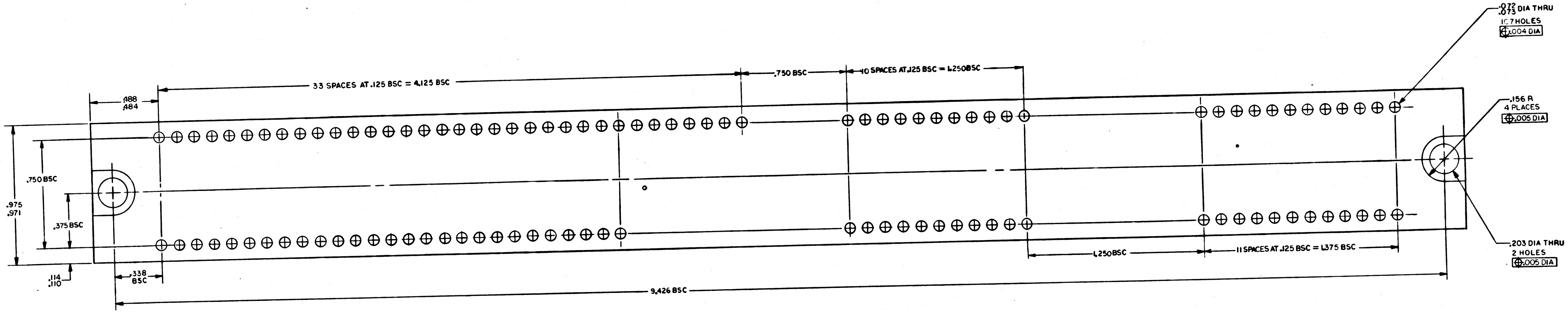
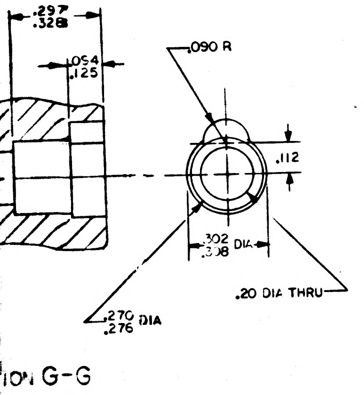
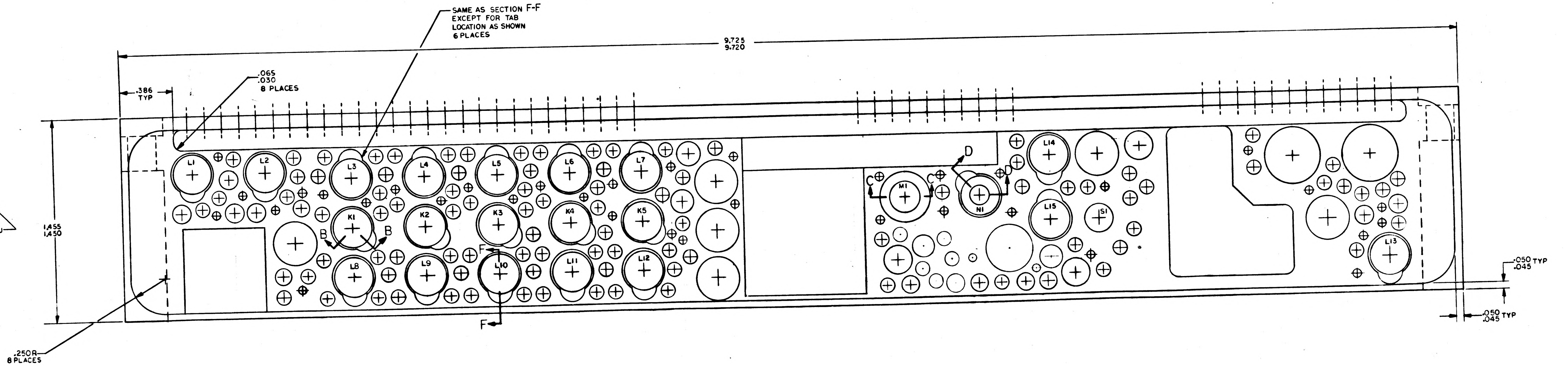
F2
F3
E1
E2
E3
G
G


.072 .073 DIA THRU
107 HOLES
.004 DIA
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.488 .484
.156 R 4 PLACES
.005 DIA
.750 BSC
.975 .971
.375 BSC
.114 .110
.338 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU 2 HOLES
.005 DIA
9.426 BSC

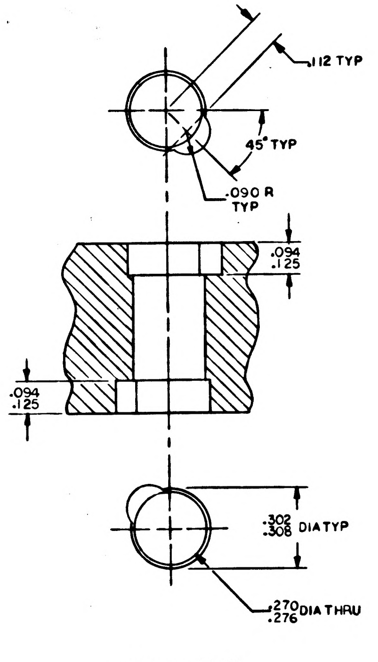

.297 .328
.054 .125
.090 R
.112
.302 .308 DIA
.270 .276 DIA
.20 DIA THRU
ION G-G


SAME AS SECTION F-F EXCEPT FOR TAB LOCATION AS SHOWN 6 PLACES
9.725 9.720
.065 .030 8 PLACES
.386 TYP
1.455 1.450
.250 R 8 PLACES
.050 TYP .045
.050 .045 TYP
B
B
C
C
D
D
F
F
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
L15
K1
K2
K3
K4
K5
M1
N1
S1

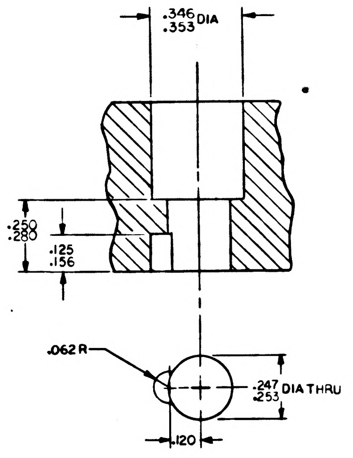
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A1	.000	.000	.100 .104	70
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	-.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	↓		
A37	2.235	↓		
A38	6.625	↓		
A39	7.910	.350		
A40	-.235	.385		
A41	.635	.400		
A42	1.060	↓		
A43	1.585	↓		
A44	2.110	↓		
A45	2.635	.400		
A46	8.335	.410		
A47	5.150	.345		
A48	6.500	.425		
A49	8.185	.425		
A50	3.260	.535		
A51	8.060	.375		
A52	2.160	.575		
A53	2.685	.575		
A54	5.050	.575		
A55	4.830	.645		
A56	5.145	.680		
A57	6.525	.650		
A58	8.450	.650		
A59	4.700	.675		
A60	1.035	.725		
A61	1.175	↓		
A62	1.560	↓		
A63	1.700	↓		
A64	2.085	↓		
A65	2.225	↓		
A66	2.610	↓		
A67	2.750	↓		
A68	3.150	.725		
A69	.635	.735		
A70	3.300	.775		

HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A71	.525	.850	.100 .104	29
A72	1.110	↓		
A73	1.635	↓		
A74	2.160	↓		
A75	2.685	↓		
A76	3.185	.850		
A77	4.985	.890		
A78	5.200	.830		
A79	6.300	.925		
A80	.350	1.000		
A81	4.735	1.000		
A82	5.415	1.000		
A83	8.135	.835		
A84	.655	1.010		
A85	1.035	↓		
A86	1.175	↓		
A87	1.560	↓		
A88	1.700	↓		
A89	2.085	↓		
A90	2.225	↓		
A91	2.610	↓		
A92	2.750	↓		
A93	3.140	1.010		
A94	5.080	.980		
A95	6.100	.750		
A96	6.425	.785		
A97	5.725	.325		
A98	6.060	.335		
A99	6.200	.335		
B1	-.025	.150	.127 .131	11
B2	.485	.375		
B3	-.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	5.725	1.000		
B11	5.900	1.000		
C1	3.500	.235	.310 .317	6
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	1
J1	7.685	.150	.395 .402	2
J2	8.250	.150		

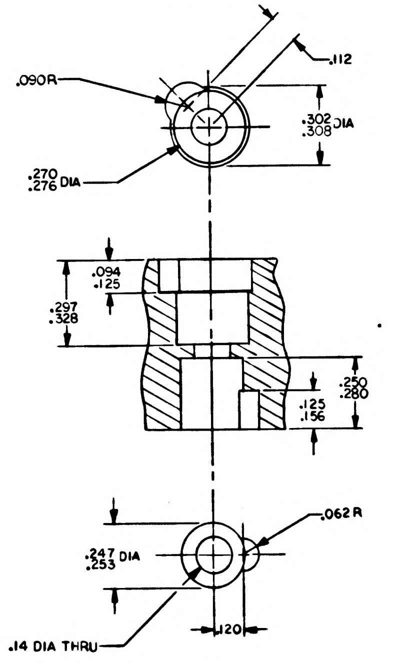
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
K1	.845	.510	SEE SECTION B-B	5
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
K5	2.945	.510		
L1	-.300	.100	SEE SECTION F-F	15
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	2.945	.150		
L8	.845	.860		
L9	1.375	↓		
L10	1.900	↓		
L11	2.420	↓		
L12	2.945	.860		
L13	8.375	.875		
L14	5.925	.100		
L15	5.925	.560		
M1	4.870	.375	SEE SECTION C-C	1
N1	5.400	.375	SEE SECTION D-D	1
P1	5.625	.760	.346 .353	1
R1	-.110	-.010	.058 .062	38
R2	.535	.050		
R3	3.635	.060		
R4	7.360	.110		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	-.125	.400		
R22	3.635	.400		
R23	7.800	.400		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.210	.825		
S1	6.275	.560	SEE SECTION G-G	1


.112 TYP
45° TYP
.090 R TYP
.094
.125
.094
.125
.302
.308 DIA TYP
.270
.276 DIA THRU

SECTION B-B
5 PLACES


.346
.353 DIA
.250
.280
.125
.156
.062 R
.247
.253 DIA THRU
.120

SECTION C-C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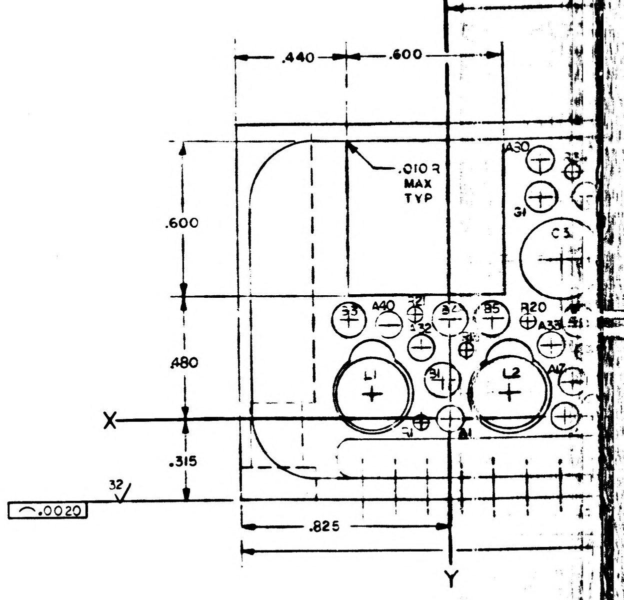
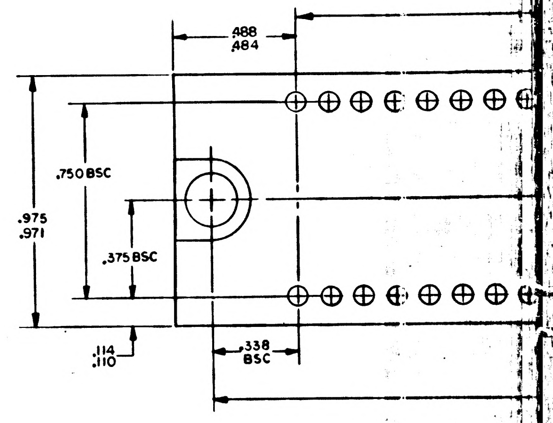
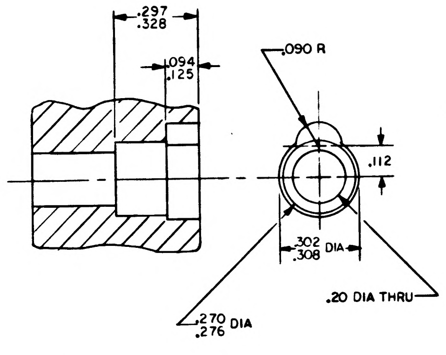
.112
.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
.250
.280
.125
.156
.062 R
.247
.253 DIA
.14 DIA THRU
.120

SECTION D-D


Y
.440
.600
.010 R
MAX
TYP
.600
A80
X
.315
32
.0020
.825
Y
A30
C5
L1
L2
R20


.488
.484
.750 BSC
.375 BSC
.975
.971
.114
.110
.338
BSC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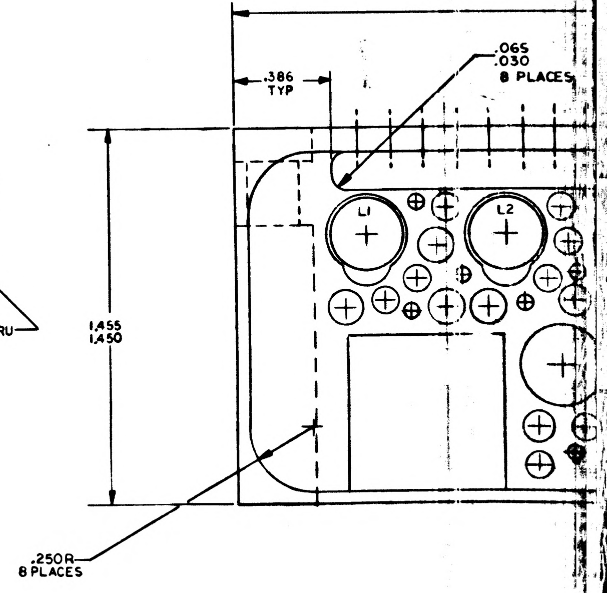
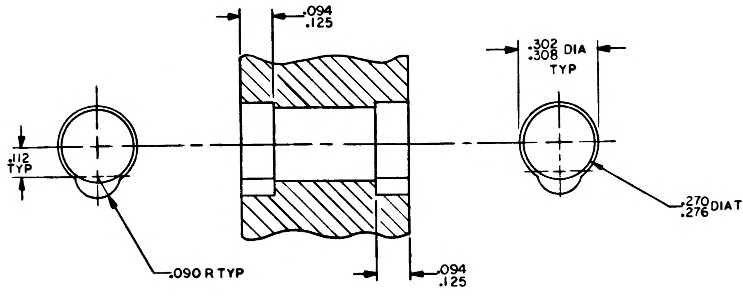
.328
.094
.125
.090 R
.112
.302
.308 DIA
.270
.276 DIA
.20 DIA THRU

SECTION G-G


.065
.030
8 PLACES
.386
TYP
1.455
1.450
L1
L2
.250R
8 PLACES

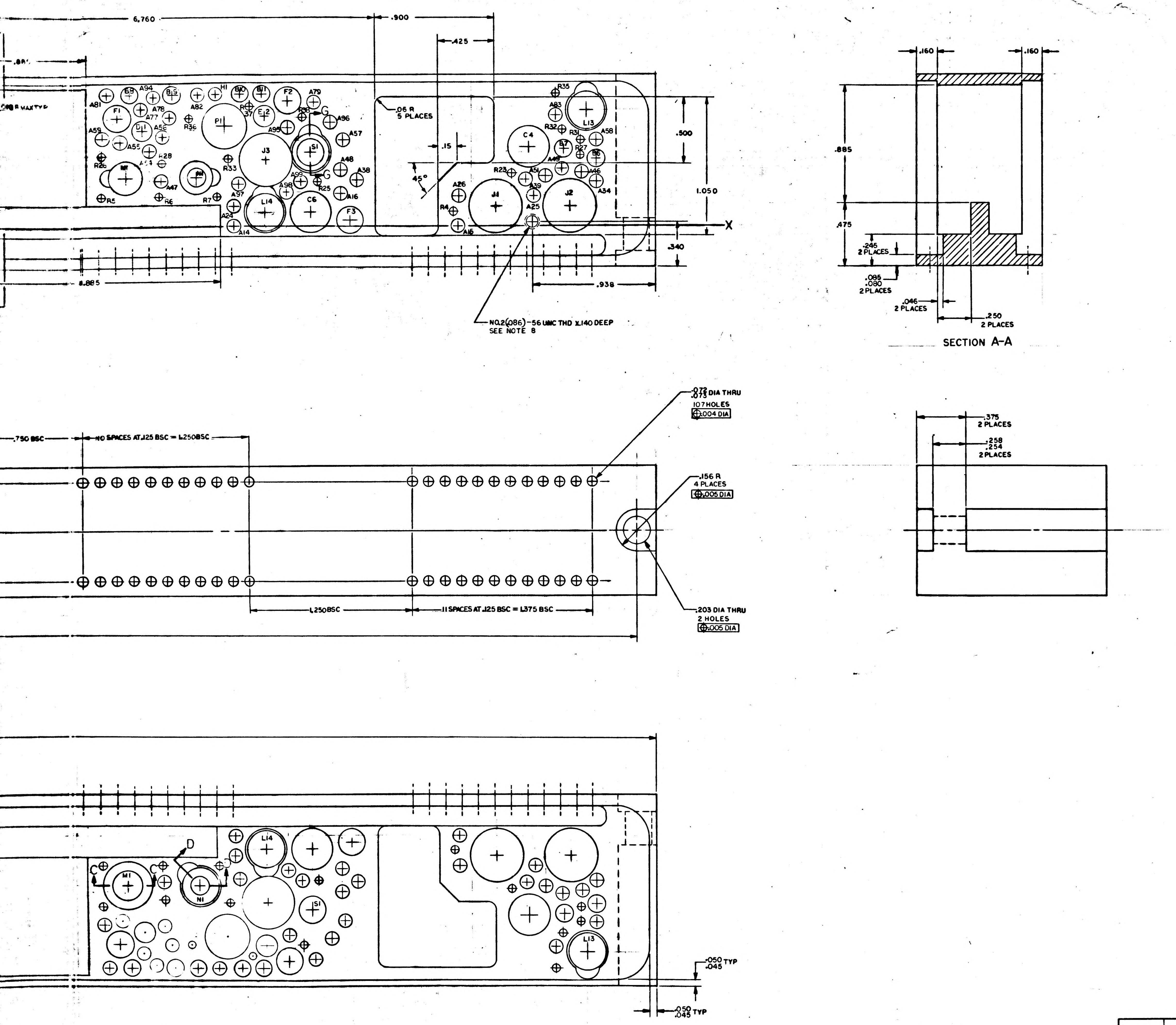

.094
.125
.302
.308 DIA
TYP
.112
TYP
.090 R TYP
.270
.276 DIA THRU
.094
.125

SECTION F-F
15 PLACES

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125✓ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND1002019
8 THREAD MUST BE FREE OF ANODIZE

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17981	5 APR 65	[illegible]
B	REVISED PER TDRR 20779	[illegible] 65	[illegible]
C	REVISED PER TDRR 22216	[illegible] 65	[illegible]



6.760
.900
.425
.06 R
5 PLACES
.15
45°
.500
1.050
X
.340
.938
.885
NO.2(.086)-56 UNC THD X.140 DEEP
SEE NOTE 8
F1
F2
F3
P1
J1
J2
J3
J4
C4
C6
L13
L14
S1
M1
N1
G
D
C
.160
.160
.885
.475
.245
2 PLACES
.085
.080
2 PLACES
.046
2 PLACES
.250
2 PLACES
SECTION A-A
.076
.073 DIA THRU
107 HOLES
.004 DIA
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.156 R
4 PLACES
.005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU
2 HOLES
.005 DIA
.375
2 PLACES
.258
.254
2 PLACES
.050
.045 TYP
.050
.045 TYP

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007150	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ± .005 XX .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] DATE 29 Dec 64
CHECKED [illegible]
APPROVAL [illegible] 2/10/65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 17 Feb 65

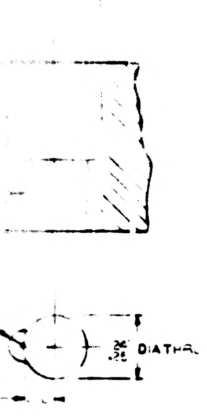
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
D/A CONVERTER

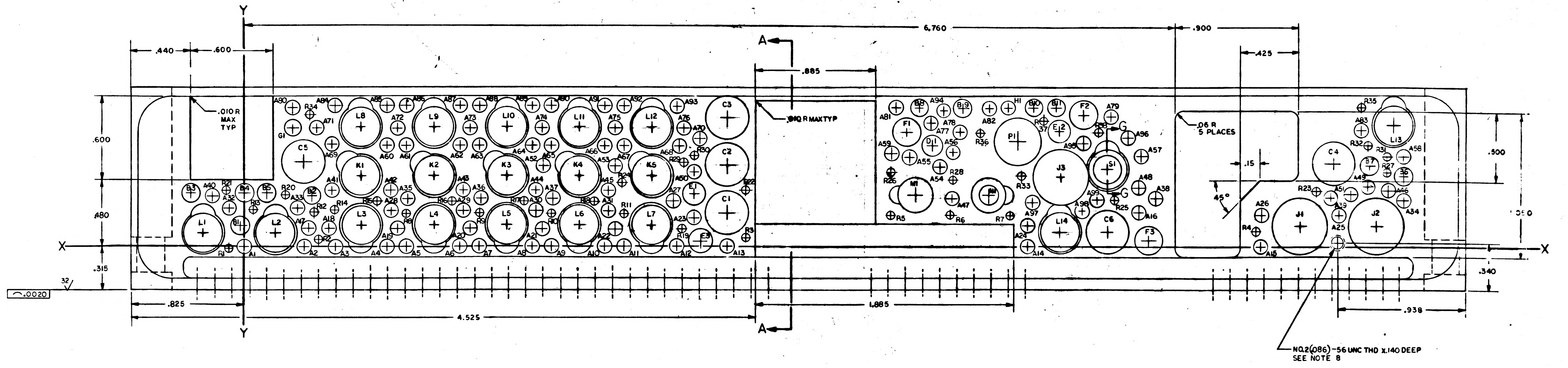
CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008126
SCALE 4/1	WT	SHEET 1 OF 1

2008126 C

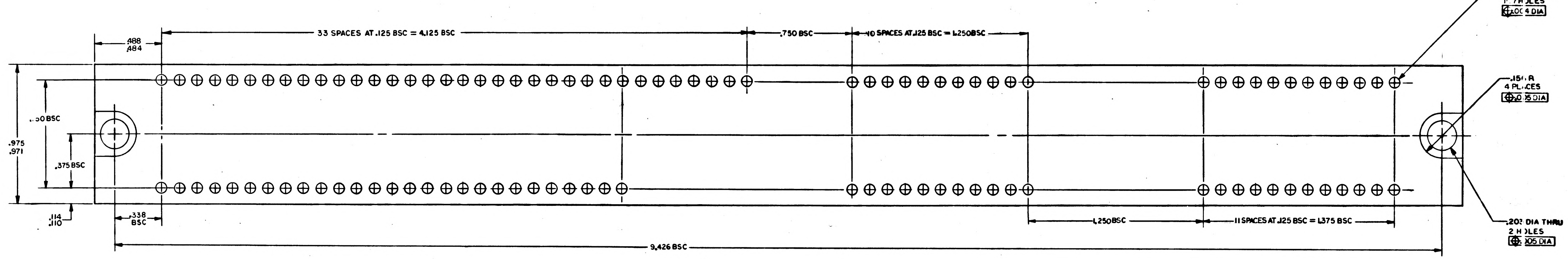
2008126 C



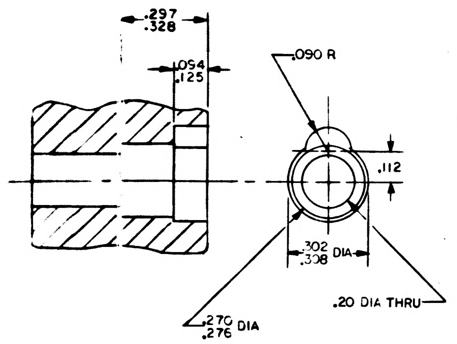
ECTION C-C



Y
6.760
.900
.425
.440
.600
.885
A
.010 R MAX TYP
.010 R MAX TYP
.06 R 5 PLACES
.15
45°
.600
.480
.315
.500
1.050
.340
X
.0020
32
.825
4.525
1.885
.938
NO.2(.086)-56 UNC THD X.140 DEEP SEE NOTE 8
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
K1
K2
K3
K4
K5
C1
C2
C3
C4
C5
C6
J1
J2
J3
P1
M1
N1
S1
F1
F2
F3
G

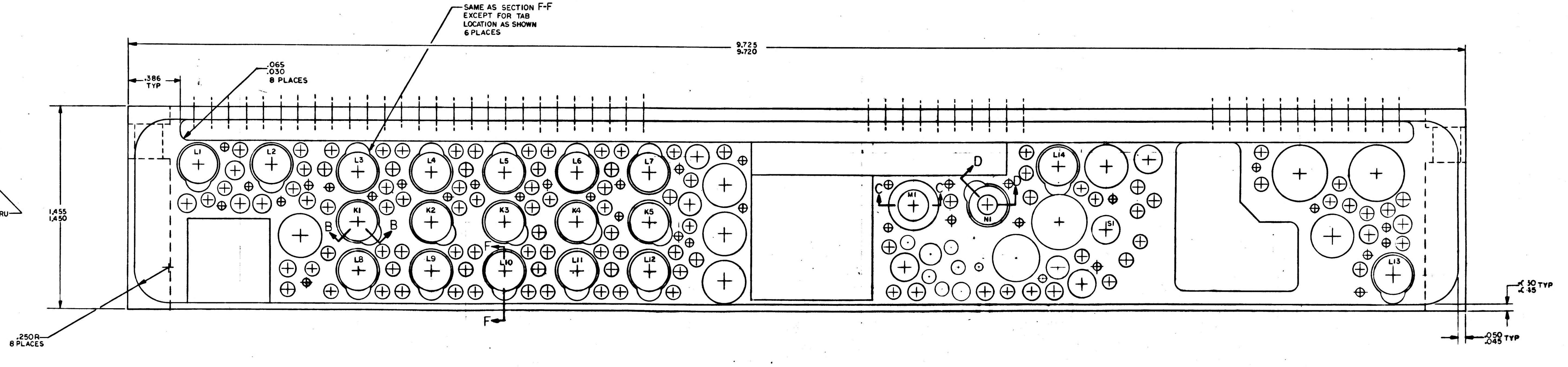


.488
.484
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.073
.075 DIA THRU
107 HOLES
.004 DIA
.750 BSC
.975
.971
.375 BSC
.156 R
4 PLACES
.005 DIA
.114
.110
.338
BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU
2 HOLES
.005 DIA
9.426 BSC



.297
.328
.094
.125
.090 R
.112
.302
.308
DIA
.270
.276 DIA
.20 DIA THRU

SECTION G-G



SAME AS SECTION F-F
EXCEPT FOR TAB
LOCATION AS SHOWN
6 PLACES
9.725
9.720
.065
.030
8 PLACES
.386
TYP
1.455
1.450
.250 R
8 PLACES
.050
.045 TYP
.050
.045 TYP
B
C
D
F
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
K1
K2
K3
K4
K5
M1
N1
S1

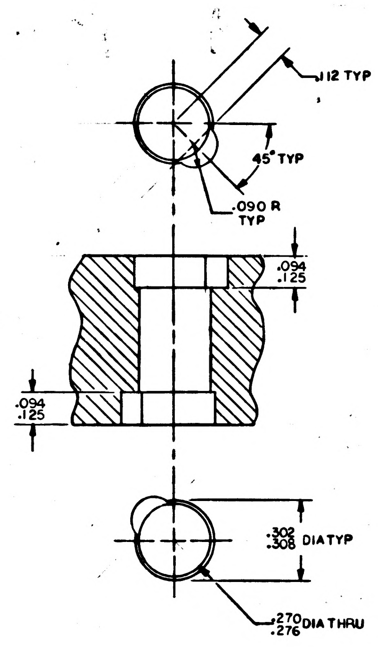
HOLE IDENT	X- DIM	Y- DIM	HOLE DIA	QTY
A1	.000	.000	.100 .104	70
A2	.435			
A3	.660			
A4	1.035			
A5	1.175			
A6	1.570			
A7	1.700			
A8	2.090			
A9	2.225			
A10	2.610			
A11	2.750			
A12	3.140			
A13	3.500			
A14	5.685			
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610			
A19	1.110			
A20	1.635			
A21	2.160			
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	-.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710			
A37	2.235			
A38	6.625			
A39	7.910	.350		
A40	-.235	.385		
A41	.635	.400		
A42	1.060			
A43	1.585			
A44	2.110			
A45	2.635	.400		
A46	8.335	.410		
A47	5.150	.345		
A48	6.500	.425		
A49	8.185	.425		
A50	3.260	.535		
A51	8.060	.375		
A52	2.160	.575		
A53	2.685	.575		
A54	5.050	.575		
A55	4.830	.645		
A56	5.145	.680		
A57	6.525	.650		
A58	8.450	.650		
A59	4.700	.675		
A60	1.035	.725		
A61	1.175			
A62	1.560			
A63	1.700			
A64	2.085			
A65	2.225			
A66	2.610			
A67	2.750			
A68	3.150	.725		
A69	.635	.735		
A70	3.300	.775		

HOLE IDENT	X- DIM	Y- DIM	HOLE DIA	QTY
A71	.525	.850	.100 .104	29
A72	1.110			
A73	1.635			
A74	2.160			
A75	2.685			
A76	3.185	.850		
A77	4.985	.890		
A78	5.200	.830		
A79	6.300	.925		
A80	.350	1.000		
A81	4.735	1.000		
A82	5.415	1.000		
A83	8.135	.835		
A84	.655	1.010		
A85	1.035			
A86	1.175			
A87	1.560			
A88	1.700			
A89	2.085			
A90	2.225			
A91	2.610			
A92	2.750			
A93	3.140	1.010		
A94	5.080	.980		
A95	6.100	.750		
A96	6.425	.785		
A97	5.725	.325		
A98	6.085	.261		
A99	6.200	.335		
B1	-.025	.150	.127 .131	11
B2	.485	.375		
B3	-.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	5.725	1.000		
B11	5.900	1.000		
C1	3.500	.235	.310 .317	6
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	1
J1	7.685	.150	.395 .402	3
J2	8.250	.150		
J3	5.931	.505		

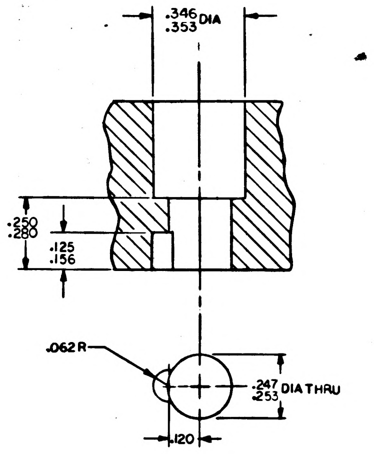
HOLE IDENT	X- DIM	Y- DIM	HOLE DIA	QTY
K1	.845	.510	SEE SECTION B-B	5
K2	1.375			
K3	1.900			
K4	2.420			
K5	2.945	.510		
L1	-.300	.100	SEE SECTION F-F	14
L2	.225	.100		
L3	.845	.150		
L4	1.375			
L5	1.900			
L6	2.420			
L7	2.945	.150		
L8	.845	.860		
L9	1.375			
L10	1.900			
L11	2.420			
L12	2.945	.860		
L13	8.375	.875		
L14	5.925	.100		
M1	4.870	.375	SEE SECTION C-C	1
N1	5.400	.375	SEE SECTION D-D	1
P1	5.625	.760	.346 .353	1
R1	-.110	-.010	.058 .062	38
R2	.535	.050		
R3	3.635	.060		
R4	7.360	.110		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	-.125	.400		
R22	3.635	.400		
R23	7.800	.400		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.210	.825		
S1	6.275	.560	SEE SECTION G-G	1

NOTES

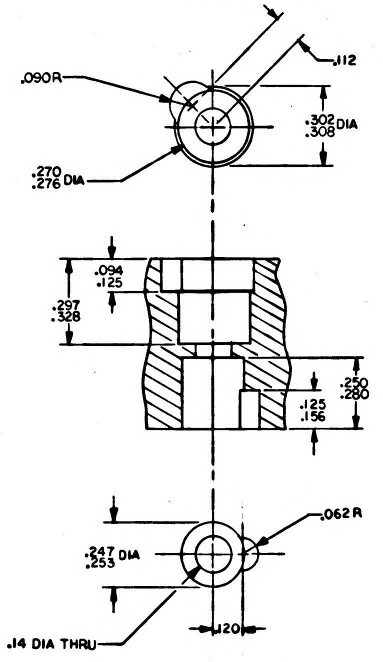
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\overset{125}{\checkmark}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND1002019
8 THREAD MUST BE FREE OF ANODIZE


.112 TYP
45° TYP
.090 R TYP
.094
.125
.094
.125
.302
.308 DIA TYP
.270
.276 DIA THRU

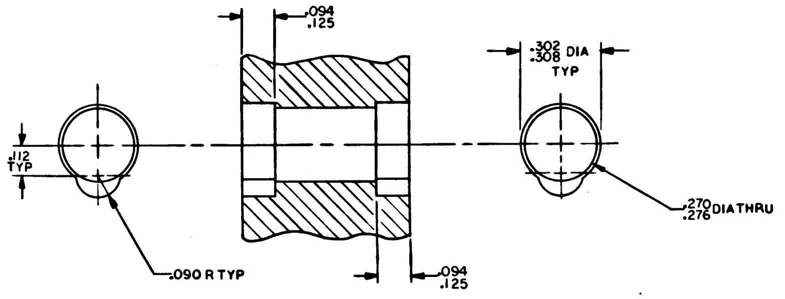
SECTION B-B
5 PLACES


.346
.353 DIA
.250
.280
.125
.156
.062R
.247
.253 DIA THRU
.120

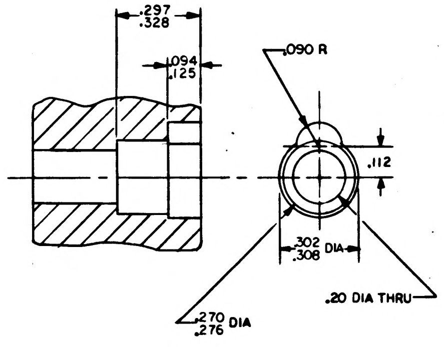
SECTION C-C


.090R
.112
.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
.250
.280
.125
.156
.062 R
.247
.253 DIA
.120
.14 DIA THRU

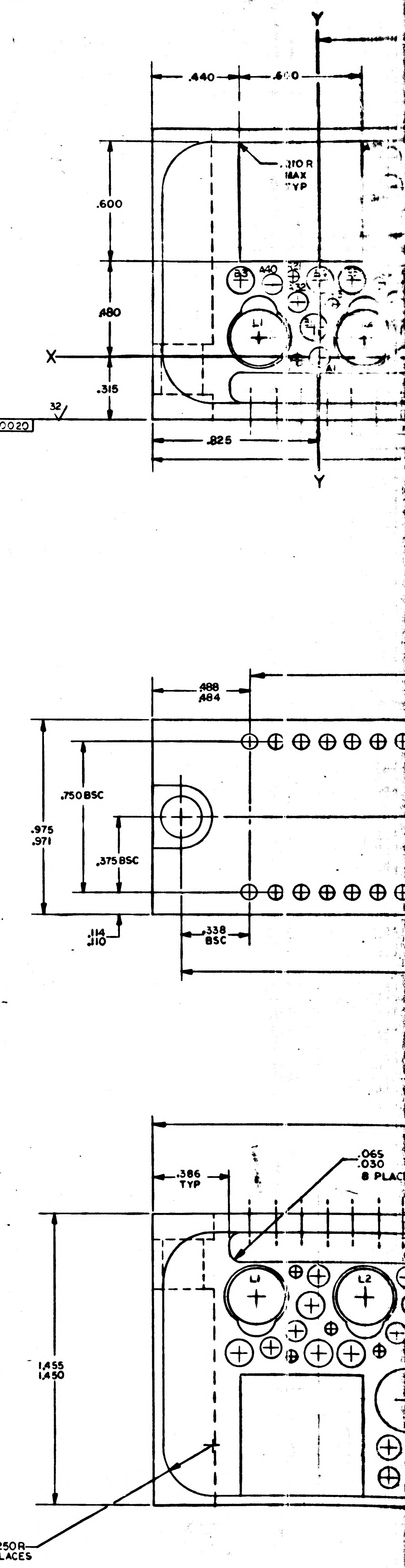
SECTION D-D

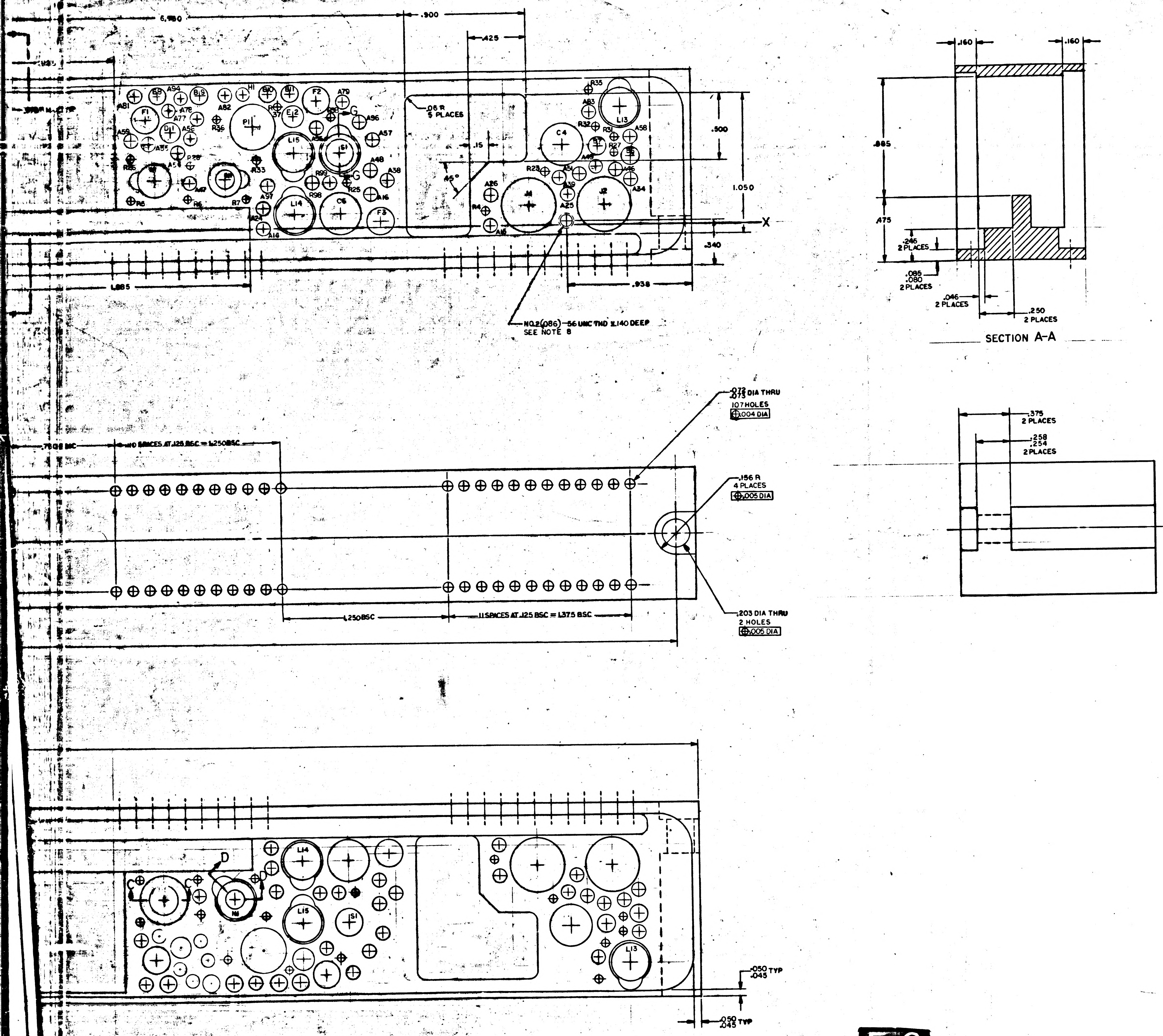

.094
.125
.302
.308 DIA
TYP
.112
TYP
.090 R TYP
.270
.276 DIA THRU
.094
.125

SECTION F-F
14 PLACES


.297
.328
.094
.125
.090 R
.112
.302
.308 DIA
.270
.276 DIA
.20 DIA THRU

SECTION G-G


Y
.440
.600
.310 R
MAX
TYP
.480
X
.315
32
.0020
.825
Y
L1
A1
.488
.484
.750 BSC
.975
.971
.375 BSC
.114
.110
.338
BSC
.065
.030
8 PLAC
.386
TYP
1.455
1.450
L1
L2
.250R
8 PLACES


6.980
.900
.425
.06 R
5 PLACES
.15
45°
.500
1.050
.340
.938
1.885
X
NO.2(.086)-56 UNC THD X.140 DEEP
SEE NOTE 8
.160
.885
.475
.246
2 PLACES
.085
.080
2 PLACES
.046
2 PLACES
.250
2 PLACES
SECTION A-A
10 SPACES AT .125 BSC = 1.250 BSC
.073 DIA THRU
107 HOLES
.004 DIA
.156 R
4 PLACES
.005 DIA
.203 DIA THRU
2 HOLES
.005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.375
2 PLACES
.258
.254
2 PLACES
.050
.045 TYP
P1
L13
L14
L15
C4
C6
J1
J2
F1
F2
F3
S1
N1
D
C
G

F3

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007150	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT —

FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE 29 Dec
CHECKED
APPROVAL 2/10/65
APPROVAL

NASA APPROVAL

MIT APPROVAL 17 Feb 65

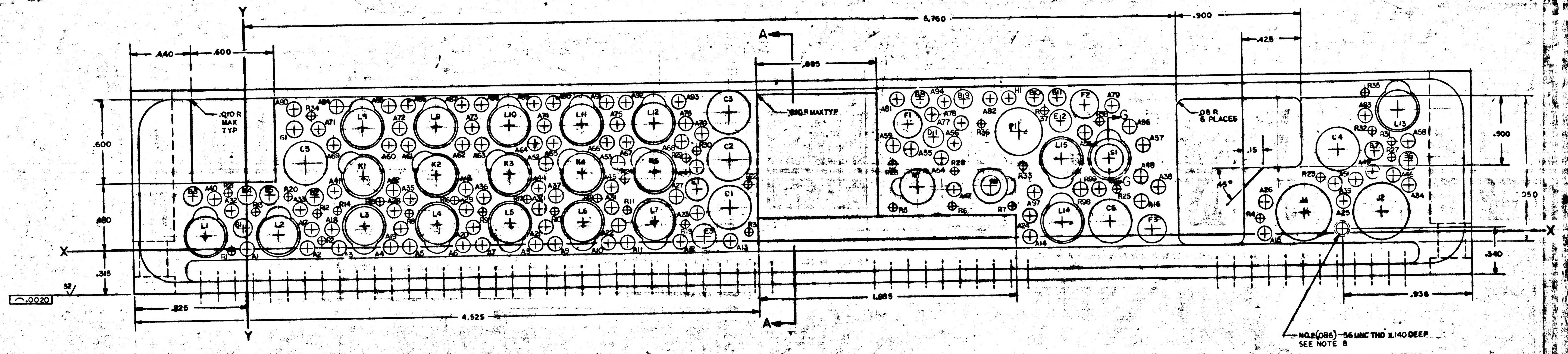
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

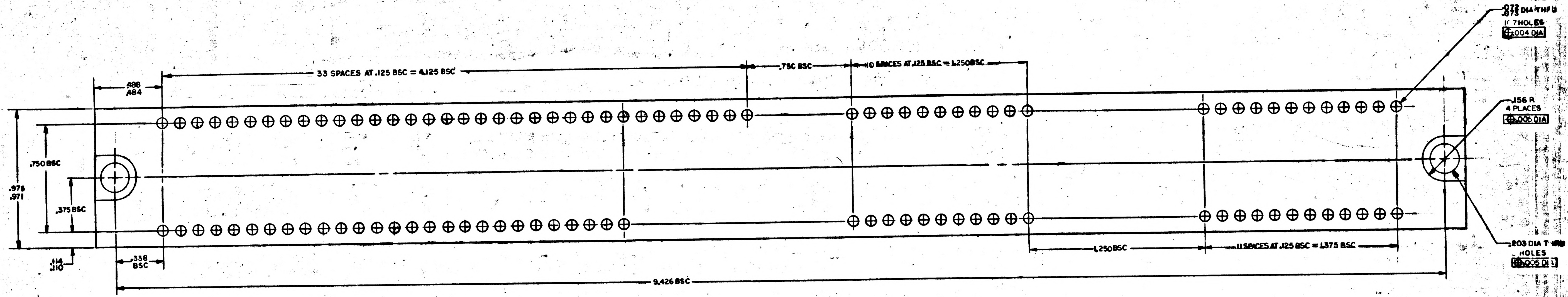
HEADER HOUSING
D/A CONVERTER

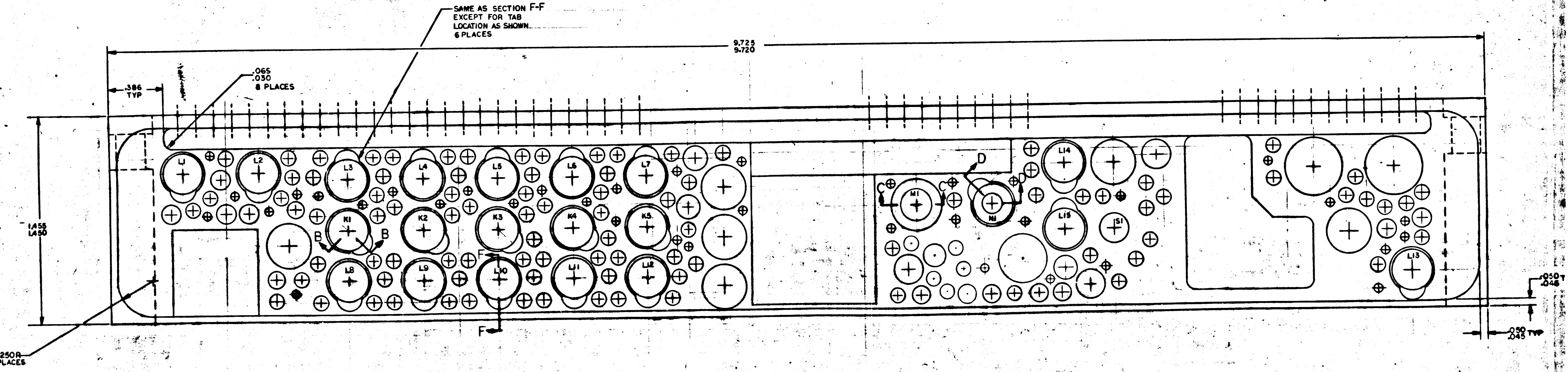
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008126

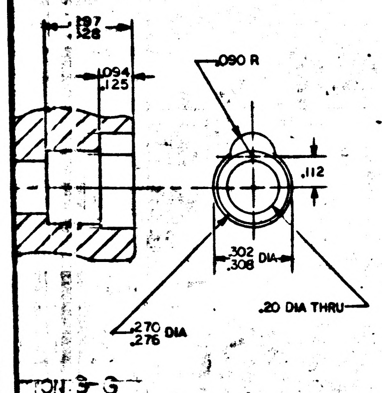
SCALE 4/1 WT — SHEET 1 OF 1

2008126


6.760
.900
.425
A
.885
.440
.600
.010 R MAX TYP
.010 R MAX TYP
.08 R 6 PLACES
.15
45°
.500
.050
.600
.480
.315
.340
.938
X
Y
.825
4.525
1.885
.0020
NO.2(.086)-56 UNC THD X .140 DEEP SEE NOTE 8
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15
K1 K2 K3 K4 K5
C1 C2 C3 C4 C5 C6
F1 F2 F3
J1 J2
M1
S1
G


33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.488 .484
.750 BSC
.375 BSC
.975 .971
.114 .110
.338 BSC
9.426 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.073 .072 DIA THRU
7 HOLES
.004 DIA
.156 R 4 PLACES
.005 DIA
.203 DIA THRU HOLES
.005 DIA


SAME AS SECTION F-F EXCEPT FOR TAB LOCATION AS SHOWN 6 PLACES
9.725 9.720
.386 TYP
.065 .030 8 PLACES
1.455 1.450
.250 R 8 PLACES
.050 .045
.050 .045 TYP
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15
K1 K2 K3 K4 K5
M1 S1
B
C
D
F


.197 .126
.094 .125
.090 R
.112
.302 .308 DIA
.270 .276 DIA
.20 DIA THRU
SECTION G-G

F-2

2008126

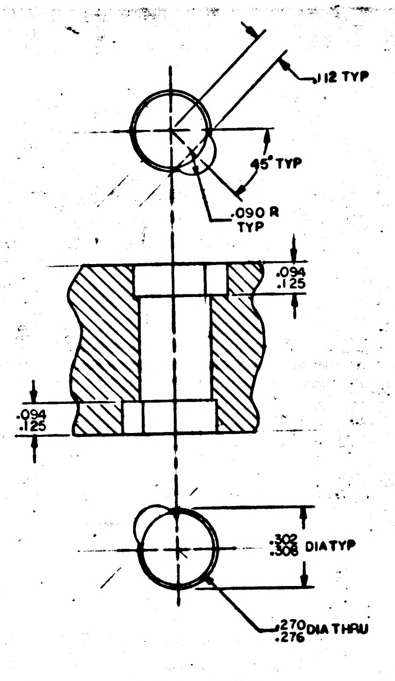
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A1	.000	.000	.100 .104	70
A2	.435			
A3	.660			
A4	1.035			
A5	1.175			
A6	1.570			
A7	1.700			
A8	2.090			
A9	2.225			
A10	2.610			
A11	2.750			
A12	3.140			
A13	3.500			
A14	5.685			
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610			
A19	1.110			
A20	1.635			
A21	2.160			
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.586	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	−.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710			
A37	2.235			
A38	6.625			
A39	7.910	.350		
A40	−.235	.385		
A41	.635	.400		
A42	1.060			
A43	1.585			
A44	2.110			
A45	2.635	.400		
A46	8.335	.410		
A47	5.150	.450		
A48	6.500	.425		
A49	8.185	.425		
A50	3.260	.535		
A51	8.060	.375		
A52	2.160	.575		
A53	2.685	.575		
A54	5.050	.575		
A55	4.830	.645		
A56	5.145	.680		
A57	6.525	.650		
A58	8.450	.650		
A59	4.700	.675		
A60	1.035	.725		
A61	1.175			
A62	1.560			
A63	1.700			
A64	2.085			
A65	2.225			
A66	2.610			
A67	2.750			
A68	3.150	.725		
A69	.635	.735		
A70	3.300	.775		

HOLE IDENT	X-DIA	Y-DIA	HOLE DIA	QTY
A71	.525	.850	.100 .104	29
A72	1.110			
A73	1.635			
A74	2.160			
A75	2.685			
A76	3.185	.850		
A77	4.985	.890		
A78	5.200	.830		
A79	6.300	.925		
A80	.850	1.000		
A81	4.735	1.000		
A82	5.415	1.000		
A83	8.435	.835		
A84	.655	1.010		
A85	1.035			
A86	1.175			
A87	1.560			
A88	1.700			
A89	2.085			
A90	2.225			
A91	2.610			
A92	2.750			
A93	3.140	1.010		
A94	5.080	.980		
A95	6.100	.750		
A96	6.425	.785		
A97	5.725	.325		
A98	6.060	.335		
A99	6.200	.335		
B1	−.025	.150	[illegible]	11
B2	.485	.375		
B3	−.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	.845	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	5.725	1.000		
B11	5.900	1.000		
C1	3.500	.335	.110 .117	6
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	1
J1	7.685	.150	.398 .402	2
J2	8.250	.150		

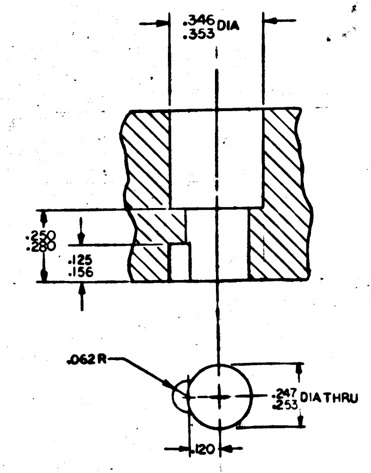
HOLE IDENT	X-DIA	Y-DIA	HOLE DIA	QTY
K1	.845	.510	SEE SECTION B-B	5
K2	1.375			
K3	1.900			
K4	2.420			
K5	2.945	.510		
L1	−.300	.100	SEE SECTION F-F	15
L2	.225	.100		
L3	.845	.150		
L4	1.375			
L5	1.900			
L6	2.420			
L7	2.945	.150		
L8	.845	.860		
L9	1.375			
L10	1.900			
L11	2.420			
L12	2.945	.860		
L13	8.375	.875		
L14	5.925	.100		
L15	5.925	.560		
M1	4.870	.375	SEE SECTION C-C	1
N1	5.400	.375	SEE SECTION D-D	1
P1	5.625	.760	.346 .353	1
R1	−.110	−.010	.058 .062	38
R2	.535	.050		
R3	3.635	.060		
R4	7.360	.110		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	−.125	.400		
R22	3.635	.400		
R23	7.800	.400		
R24	2.735	.460		
R25	6.325	.340		
R26	4.635	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	[illegible]	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.210	.825		
S1	6.275	.560	SEE SECTION G-G	1

NOTES

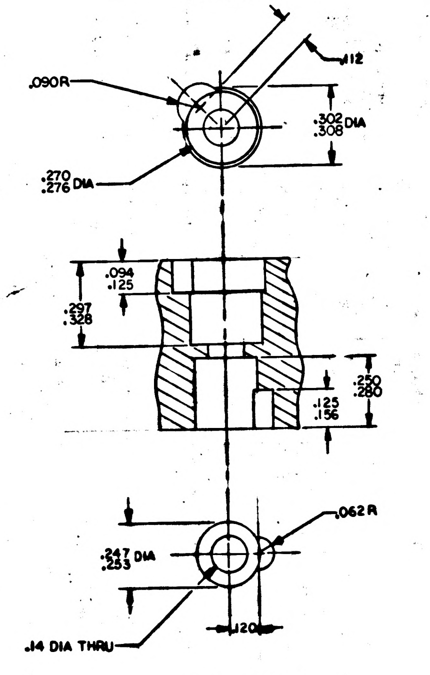
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-31
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. IDENTIFY PER ND1002019
8. THREAD MUST BE FREE OF ANODIZE


.112 TYP
45° TYP
.090 R TYP
.094
.125
.094
.125
.302
.308 DIA TYP
.270
.276 DIA THRU

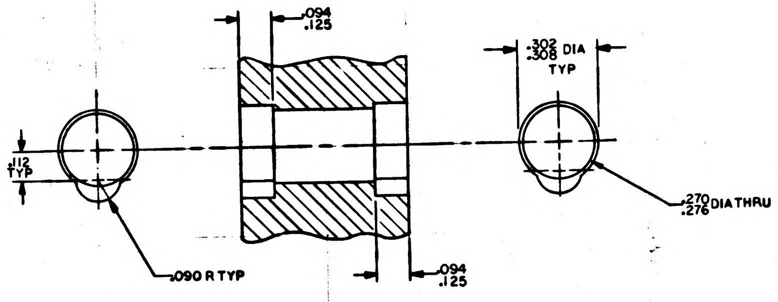
SECTION B-B
5 PLACES


.346
.353 DIA
.094
.125
.250
.280
.125
.156
.062R
.247
.253 DIA THRU
.120

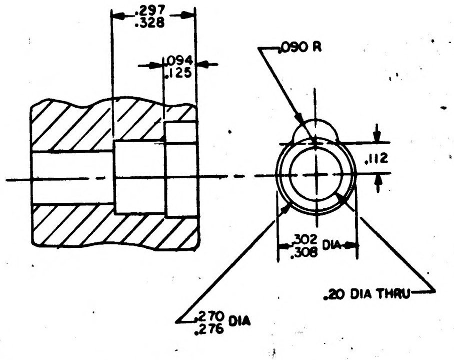
SECTION C-C


.090R
.112
.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
.250
.280
.125
.156
.062 R
.247
.253 DIA
.14 DIA THRU
.120

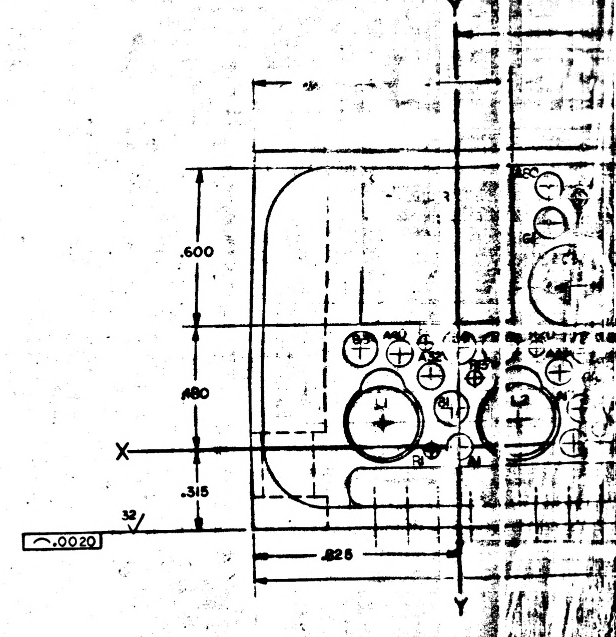
SECTION D-D

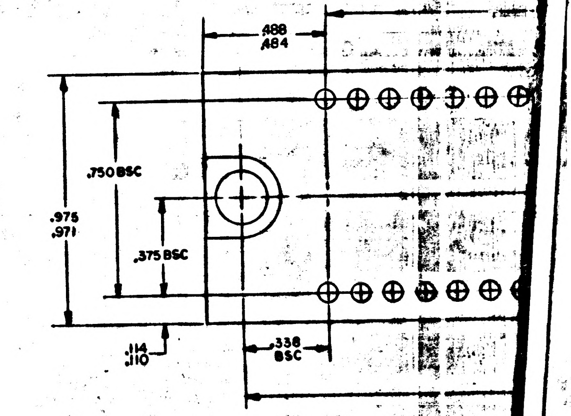

.112
TYP
.094
.125
.302
.308 DIA
TYP
.270
.276 DIA THRU
.090 R TYP
.094
.125

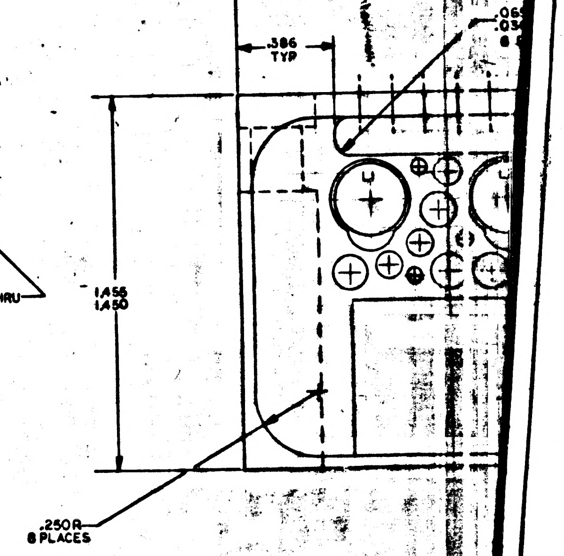
SECTION F-F
15 PLACES


.297
.328
.094
.125
.090 R
.112
.302
.308 DIA
.270
.276 DIA
.20 DIA THRU

SECTION G-G


Y
.600
.480
X
.315
32
.0020
.825
Y

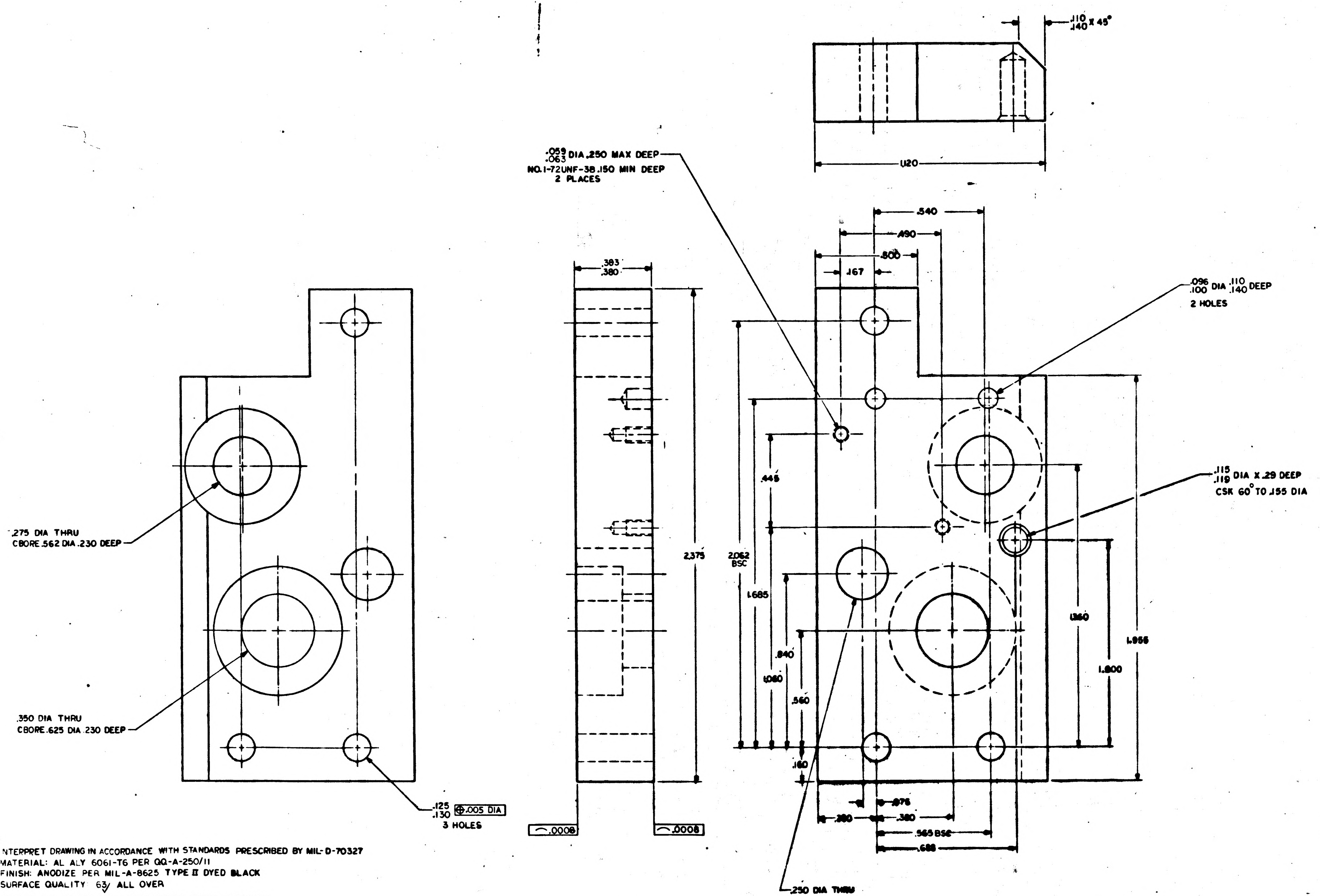

.488
.484
.750 BSC
.975
.971
.375 BSC
.114
.110
.338
BSC


.386
TYP
1.456
1.450
.250R
8 PLACES

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15936

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 23039	6 OCT 65	WK


.110
.140 X 45°
1.120
.059
.063 DIA .250 MAX DEEP
NO.1-72UNF-3B .150 MIN DEEP
2 PLACES
.540
.490
.300
.167
.383
.380
.096
.100 DIA .110
.140 DEEP
2 HOLES
.275 DIA THRU
CBORE .562 DIA .230 DEEP
.350 DIA THRU
CBORE .625 DIA .230 DEEP
.125
.130 ⊕ .005 DIA
3 HOLES
⌒ .0008
⌒ .0008
2.375
2.062
BSC
1.685
.445
.840
1.060
.560
.160
.115
.119 DIA X .29 DEEP
CSK 60° TO .155 DIA
1.360
1.955
1.800
.076
.280
.380
.565 BSC
.688
.250 DIA THRU

NOTES:

1. NTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: AL ALY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED BLACK
4. SURFACE QUALITY 63√ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.010
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007064	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —   DECIMALS ±.005   ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2
HEAT TREATMENT: —
FINAL FINISH: SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.   CONTRACT
DRAWN   DATE 6-JAN-64
CHECKED
APPROVAL 1-20-65
APPROVAL 1-20-65
NASA APPROVAL
MIT APPROVAL

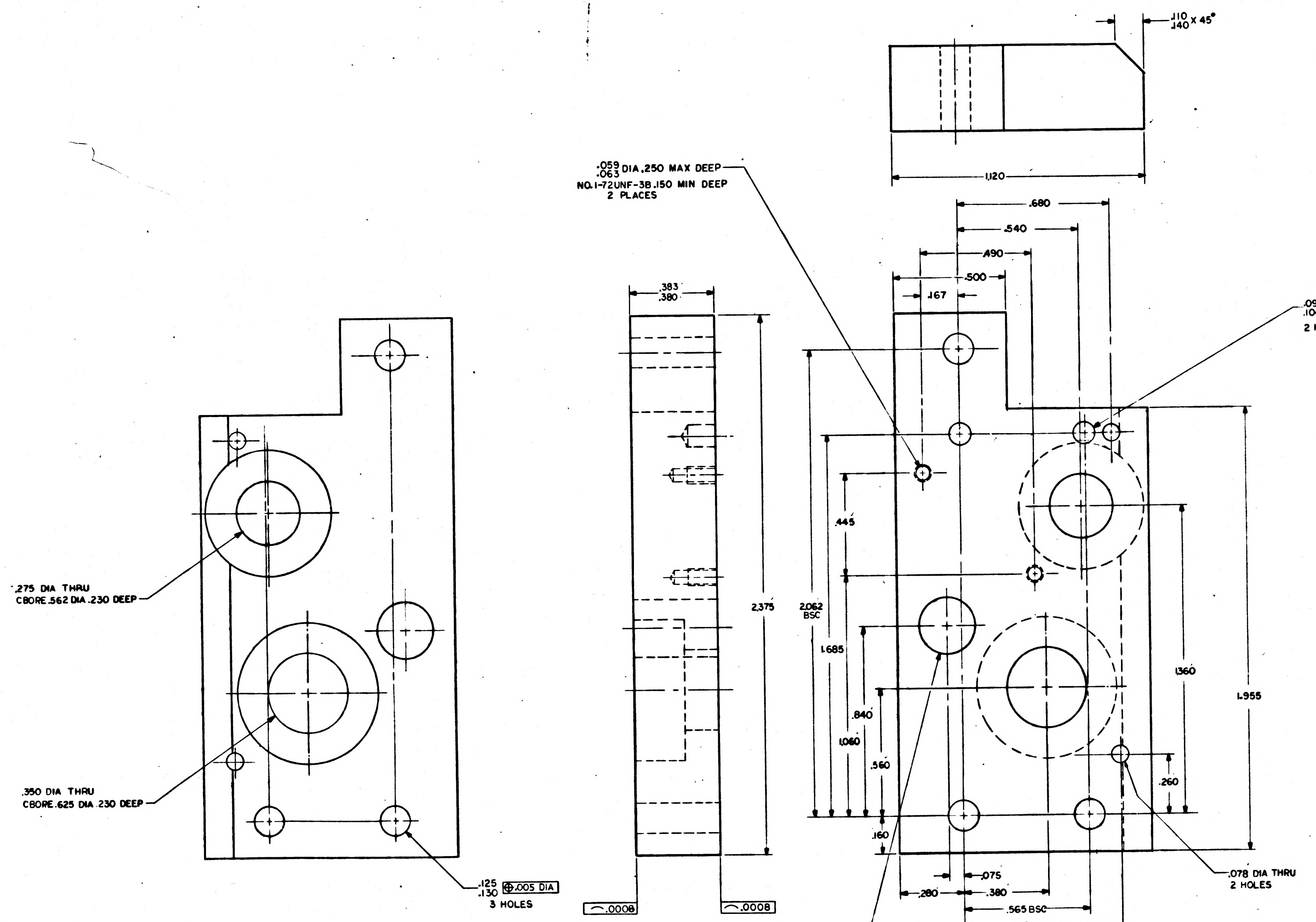
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
TEMPERATURE CONTROL MODULE

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008134
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15926			
SYM	DESCRIPTION	DATE	APPROVAL


.110
.140 X 45°
1.120
.059
.063 DIA .250 MAX DEEP
NO. 1-72UNF-3B .150 MIN DEEP
2 PLACES
.680
.540
.490
.500
.167
.096
.100 DIA .110
.140 DEEP
2 HOLES
.383
.380
2.375
2.062
BSC
.445
1.685
.840
1.060
.560
.160
1.360
1.955
.260
.275 DIA THRU
CBORE .562 DIA .230 DEEP
.350 DIA THRU
CBORE .625 DIA .230 DEEP
.125
.130 ⊕ .005 DIA
3 HOLES
⌒ .0008
⌒ .0008
.075
.280
.380
.565 BSC
.710
.078 DIA THRU
2 HOLES
.250 DIA THRU

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: AL ALY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED BLACK
4. SURFACE QUALITY: 63√ ALL OVER
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.010
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007064	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
——
FINAL FINISH
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN DATE 6-JAN-64
CHECKED
APPROVAL 1-20-65
APPROVAL 1-20-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

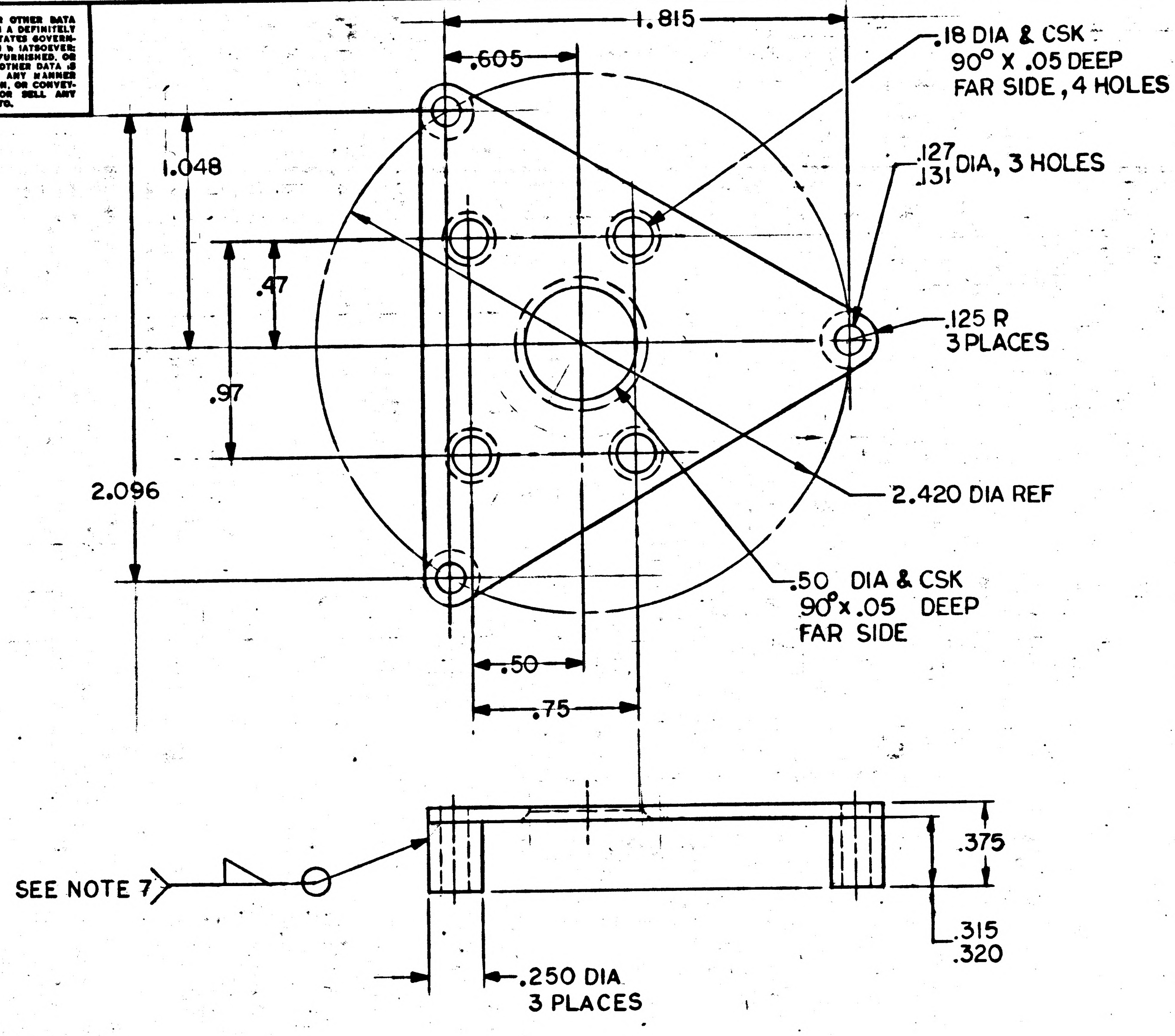
HEATSINK
TEMPERATURE CONTROL MODULE

CODE IDENT NO. ——
SIZE E
NASA DRAWING NO. 2008134
SCALE 5/1
WT ——
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16273

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17271	WFH			



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: 6061-T6 AL PER QQ-A-250/11
3. 125√ ALL OVER
4. REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX
5. ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
7. WELDING: INERT GAS WELD PER MIL-W-8604

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007019	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —, DECIMALS .XX ± .01, .XXX ± .005, ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN		21JAN65
CHECKED		4FEB65
APPROVED		8FEB65
APPROVED		2-8-65
APPROVED MIT		9Feb65
APPROVED MSC		2-9-65

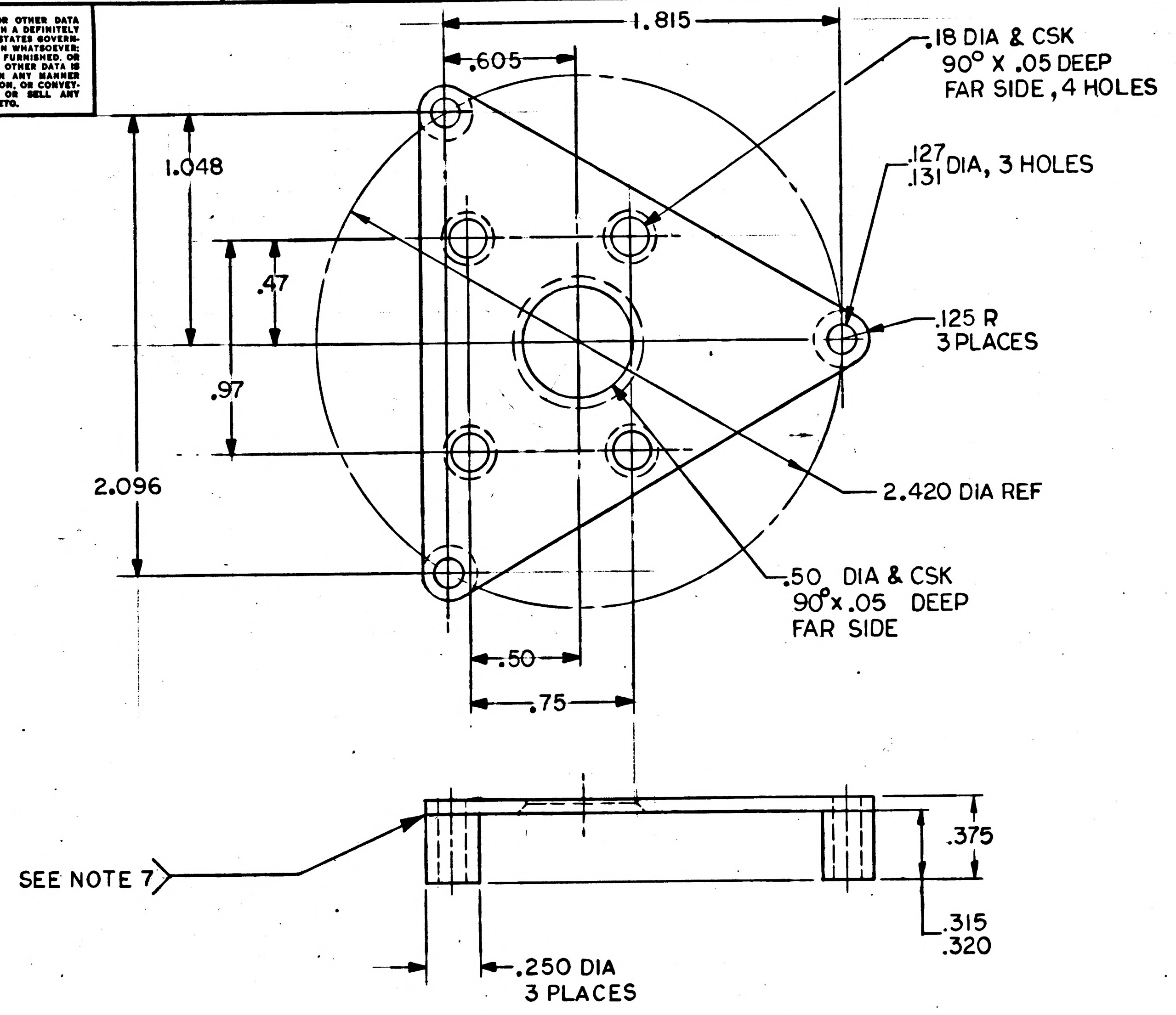
BASE, DUCOSYN TRANSFORMER

CODE IDENT NO. —
SIZE C
DRAWING NO. 2008141
SCALE 2/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16273

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17271	WFH	epk		WK
B		REVISED PER TDRR 17983	TAM	A.W.L.	5 APR 65	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: 6061-T6 AL PER QQ-A-250/11
3. 125/ ALL OVER
4. REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX
5. ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
7. DIP BRAZE PER ND1002073

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007019	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS XX ±.01 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN C.A. Prestia 21JAN65
CHECKED R. Lizdani 4FEB65
APPROVED N Sakolov 8FEB65
APPROVED J.C. Smith 2-8-65
APPROVED MIT W Kupfer 9Feb65
APPROVED MSC W J Rhine 2-9-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

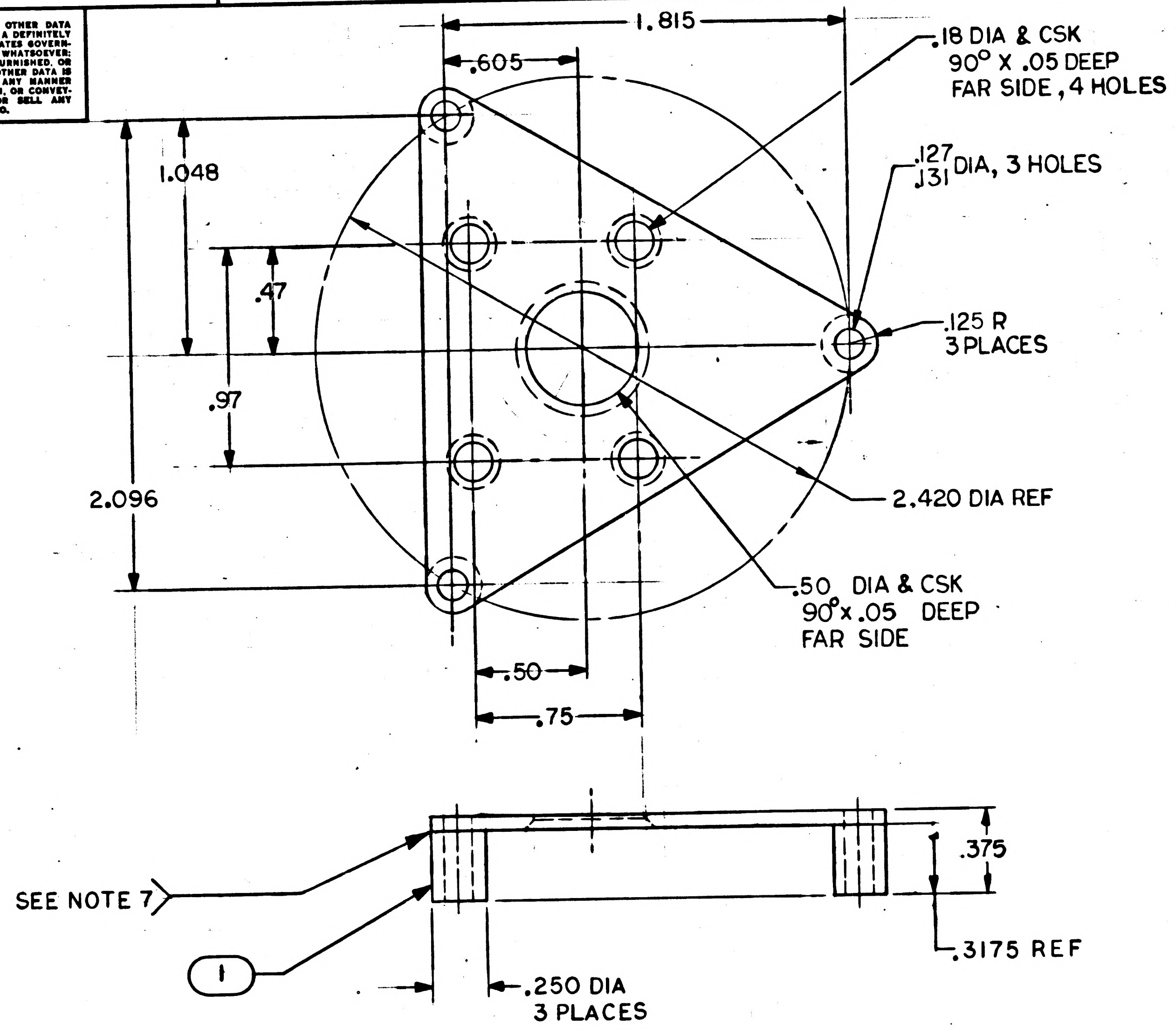
BASE, DUCOSYN TRANSFORMER

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008141
SCALE 2/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16273

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17271	WFH	EPK		WK
B		REVISED PER TDRR 17983	TAH	A.W.L.	5 APR 65	WK
C		REVISED PER TDRR 19810	AJD	CAP	7 June '65	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: 6061-T6 AL PER QQ-A-250/11
3. 125√ ALL OVER
4. REMOVE ALL BURRS & BREAK SHARP EDGES .02 MAX
5. ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
7. DIP BRAZE PER ND1002073

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008154	SPACER, BASE	1

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2007019	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS XX ±.01 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

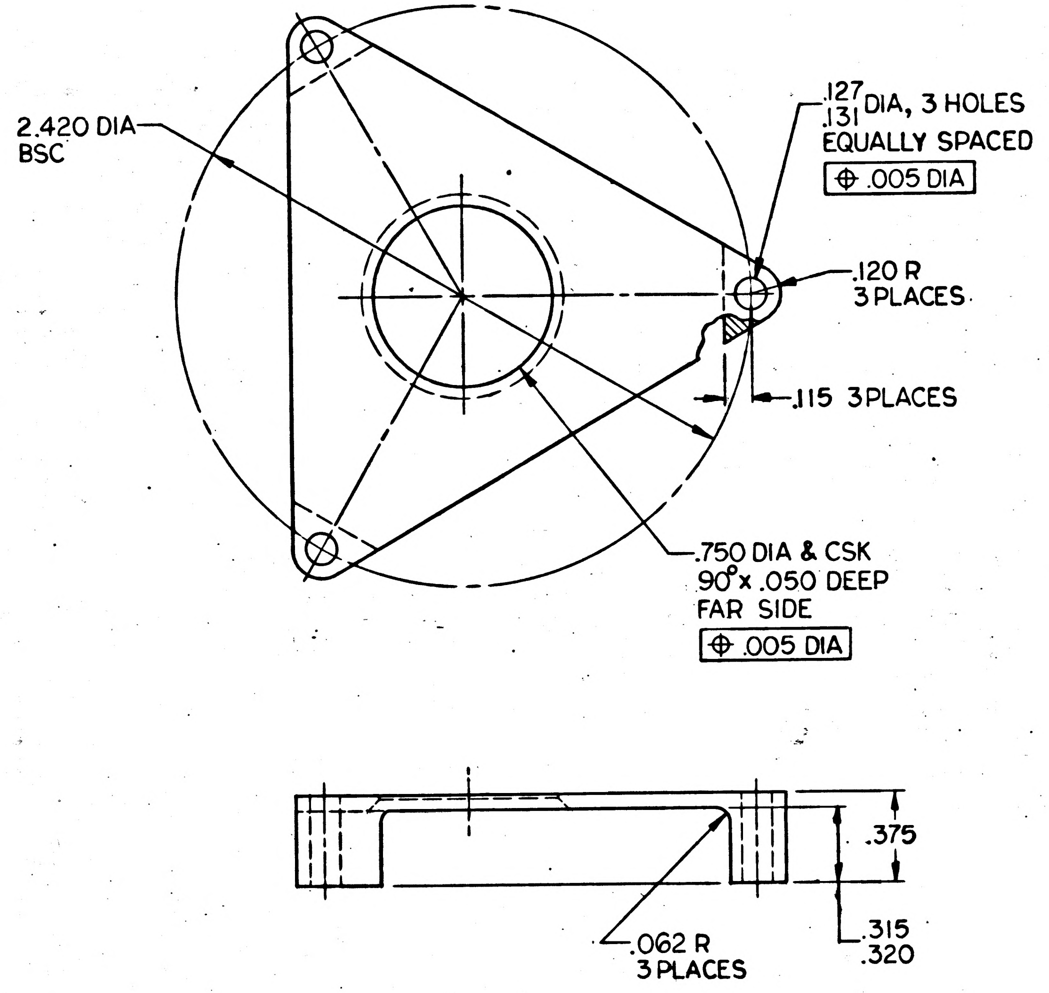
DRAWN C.A. Prestia 21 JAN 65
CHECKED R. Lizdoni 4 FEB 65
APPROVED N. Sekden 8 FEB 65
APPROVED N.C. Smith 2-8-65
APPROVED MIT W. Kupfer 9 Feb 65
APPROVED MSC W.J. Rhine 2-9-65
DATE

BASE, DUCOSYN TRANSFORMER

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008141
SCALE 2/1
SHEET 1 OF 1

REVISIONS 16273						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: 6061-T6 AL PER QQ-A-250/11, TEMPER T6
3. $^{125}\surd$ ALL OVER
4. REMOVE ALL BURRS & BREAK SHARP EDGES .005/.015
5. ANODIZE PER MIL-A-8625, TYPE II DYED BLACK
6. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007019	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES $\pm\frac{1}{2}^{\circ}$
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN C.A. Crestia 21JAN65
CHECKED R. Lizdani 4FEB65
APPROVED N. Sokolov 8FEB65
APPROVED N.C. Smith 2-8-65
APPROVED MIT W Kupfer 9Feb65
APPROVED MSC W J Rhine 2-9-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, DUCOSYN
TRANSFORMER

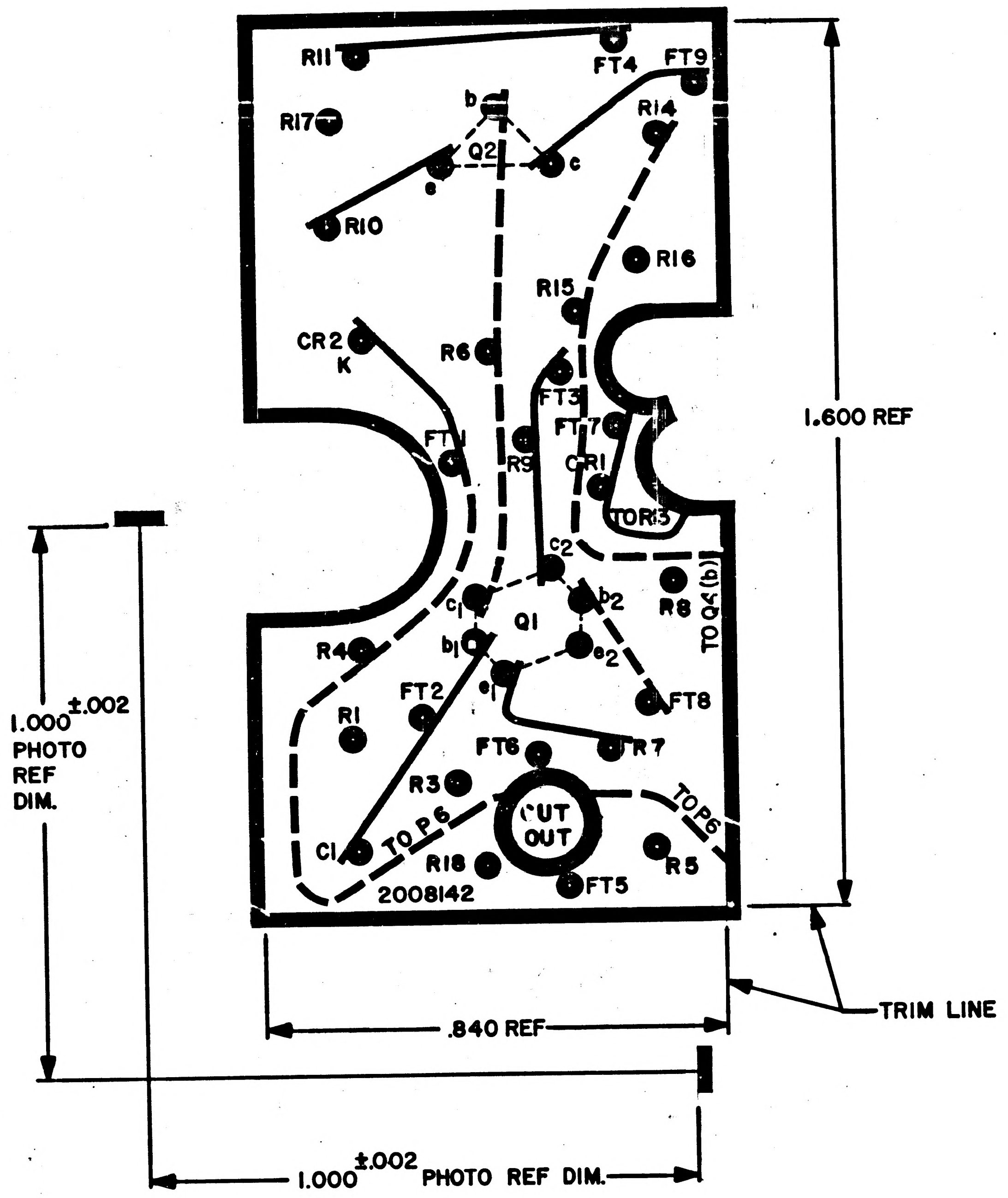
CODE IDENT NO. —
SIZE C
DRAWING NO. 2008141
SCALE 2/1
SHEET 1 OF 1

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17030

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



R11
FT4
FT9
b
R17
Q2
e
c
R14
R10
R16
R15
CR2
K
R6
FT3
FT7
FT1
R9
CR1
TO R13
c2
R8
c1
Q1
b2
TO Q4(b)
R4
b1
e2
e1
FT2
FT8
R1
FT6
R7
R3
CUT OUT
TO P6
TO P5
C1
R18
R5
FT5
2008142
1.600 REF
1.000 ±.002 PHOTO REF DIM.
.840 REF
TRIM LINE
1.000 ±.002 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2 STYLE IA
6. ● .040/.050 DIA PUNCH ALL HOLES

MASTER

2007110	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	C.A. Giestra	26JAN65
CHECKED	A. Lindstrom	17Feb65
APPROVED	E.T. Sisolak	23Feb65
APPROVED	D.B. Test	2/24/65
APPROVED MIT	W Krupp	3 Mar 65
APPROVED MSC	W.J. Rhine	8-2-65
		DATE

INSULATOR, TOP
PHOTOGRAPHIC MASTER
800 CPS 1% AMPLIFIER

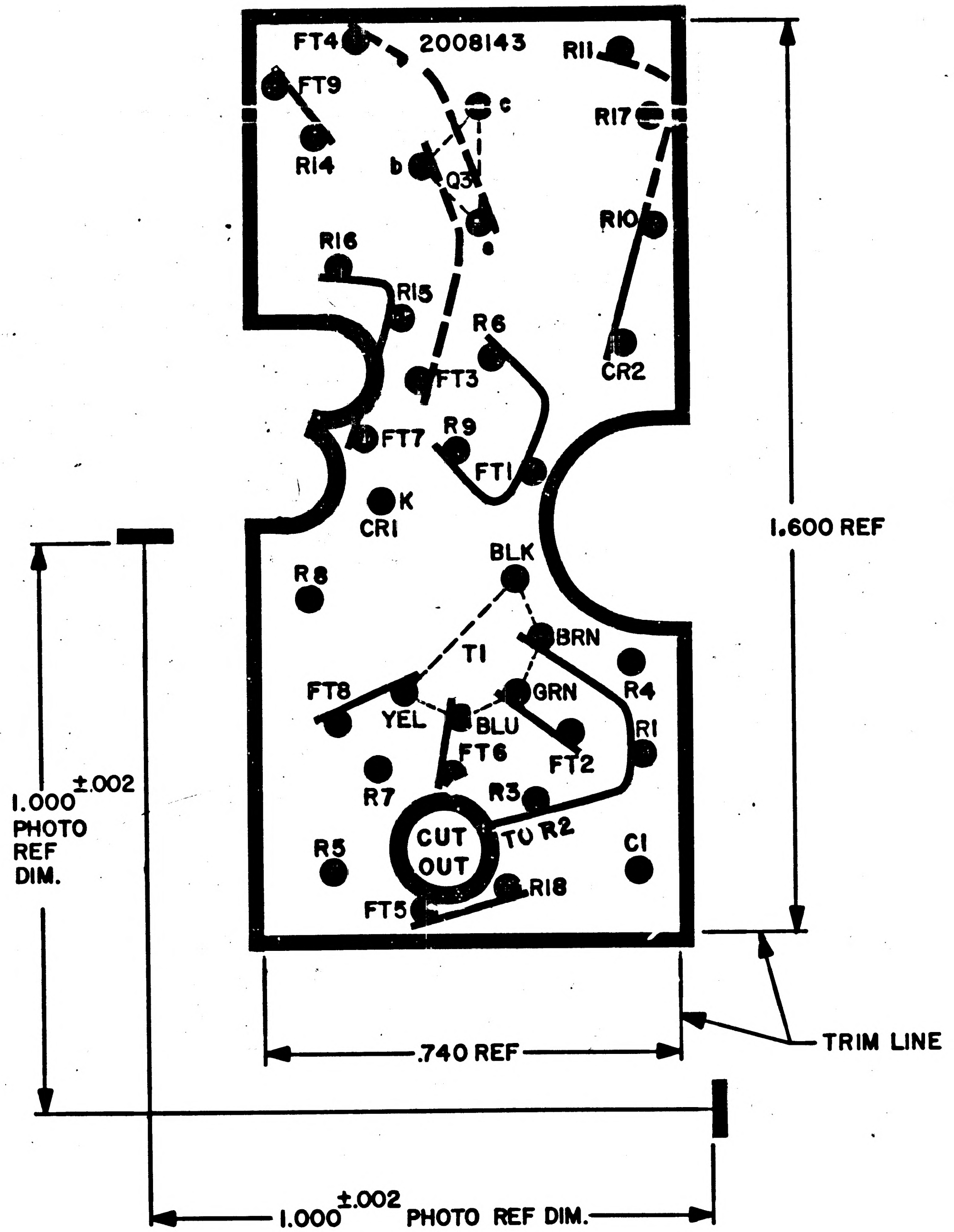
CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008142
SCALE 5/1	—	SHEET 1 OF 1

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17030

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



2008143
FT4
FT9
R14
b
c
Q3
e
R11
R17
R10
R16
R15
R6
CR2
FT3
FT7
R9
FT1
K
CR1
1.600 REF
R8
BLK
BRN
T1
R4
FT8
YEL
GRN
BLU
R1
FT6
FT2
R7
R3
CUT OUT
TO R2
R5
C1
FT5
R18
1.000 ±.002 PHOTO REF DIM.
.740 REF
TRIM LINE
1.000 ±.002 PHOTO REF DIM.

NOTES:

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3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB CLASS 2, STYLE IA
6. ● .040/.050 DIA PUNCH ALL HOLES

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007110	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	C.A. Pristi	26JAN65
CHECKED	A. Lindstrom	17Feb65
APPROVED	E.H. Sirolak	23FEB65
APPROVED	D.R. Test	2/24/65
APPROVED MIT	W Kupfer	2Mar65
APPROVED MSC		3-2-65
		DATE

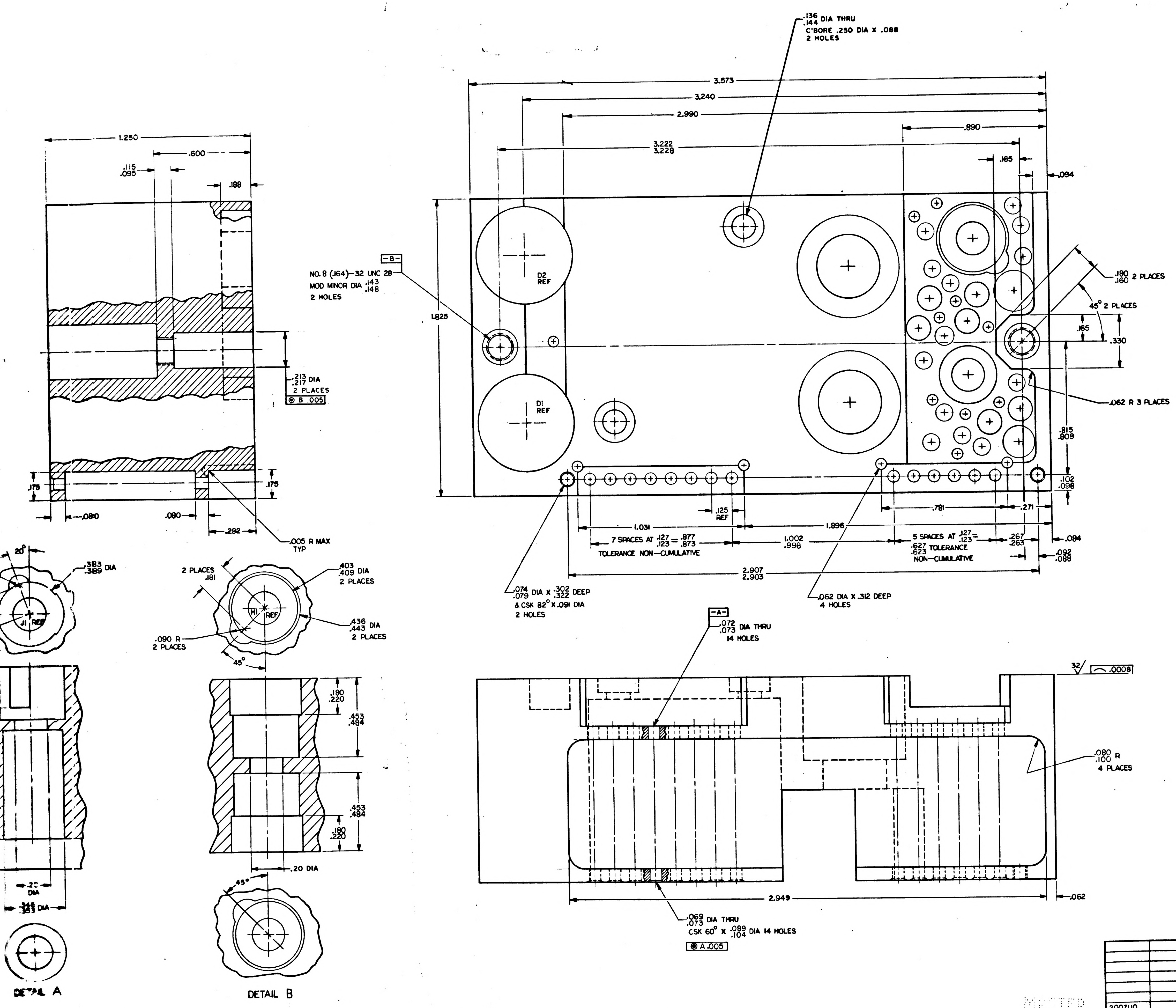
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
800 CPS 1% AMPLIFIER

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008143

SCALE 5/1 —— SHEET 1 OF 1

REVISIONS 17030			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17984	6 APRIL '65	WK



.136 / .144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
3.222 / 3.228
.890
.165
.094
1.250
.600
.115 / .095
.188
NO. 8 (.164)–32 UNC 2B
MOD MINOR DIA .143 / .148
2 HOLES
-B-
1.825
D2 REF
D1 REF
.180 / .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 / .809
.102 / .098
.213 / .217 DIA
2 PLACES
◎ B .005
.175
.175
.080
.080
.292
.005 R MAX TYP
.125 REF
1.031
1.896
.781
.271
7 SPACES AT .127 / .123 = .877 / .873
TOLERANCE NON–CUMULATIVE
1.002 / .998
5 SPACES AT .127 / .123 =
.627 / .623 TOLERANCE
NON–CUMULATIVE
.267 / .263
.084
.092 / .088
2.907 / 2.903
.074 / .079 DIA X .302 / .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 HOLES
20°
.383 / .389 DIA
J1 REF
2 PLACES .181
.403 / .409 DIA
2 PLACES
H1 REF
.436 / .443 DIA
2 PLACES
.090 R
2 PLACES
45°
-A-
.072 / .073 DIA THRU
14 HOLES
32
.0008
.180 / .220
.453 / .484
.453 / .484
.180 / .220
.080 / .100 R
4 PLACES
.20 DIA
.20 DIA
.346 / .351 DIA
45°
2.949
.062
.069 / .073 DIA THRU
CSK 60° X .089 / .104 DIA 14 HOLES
◎ A .005
DETAIL A
DETAIL B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007110	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE 3/65
CHECKED
APPROVAL 2/5/65
APPROVAL 2/20/65
NASA APPROVAL 3-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008144
SCALE 5/1
WT
SHEET 1 OF 1

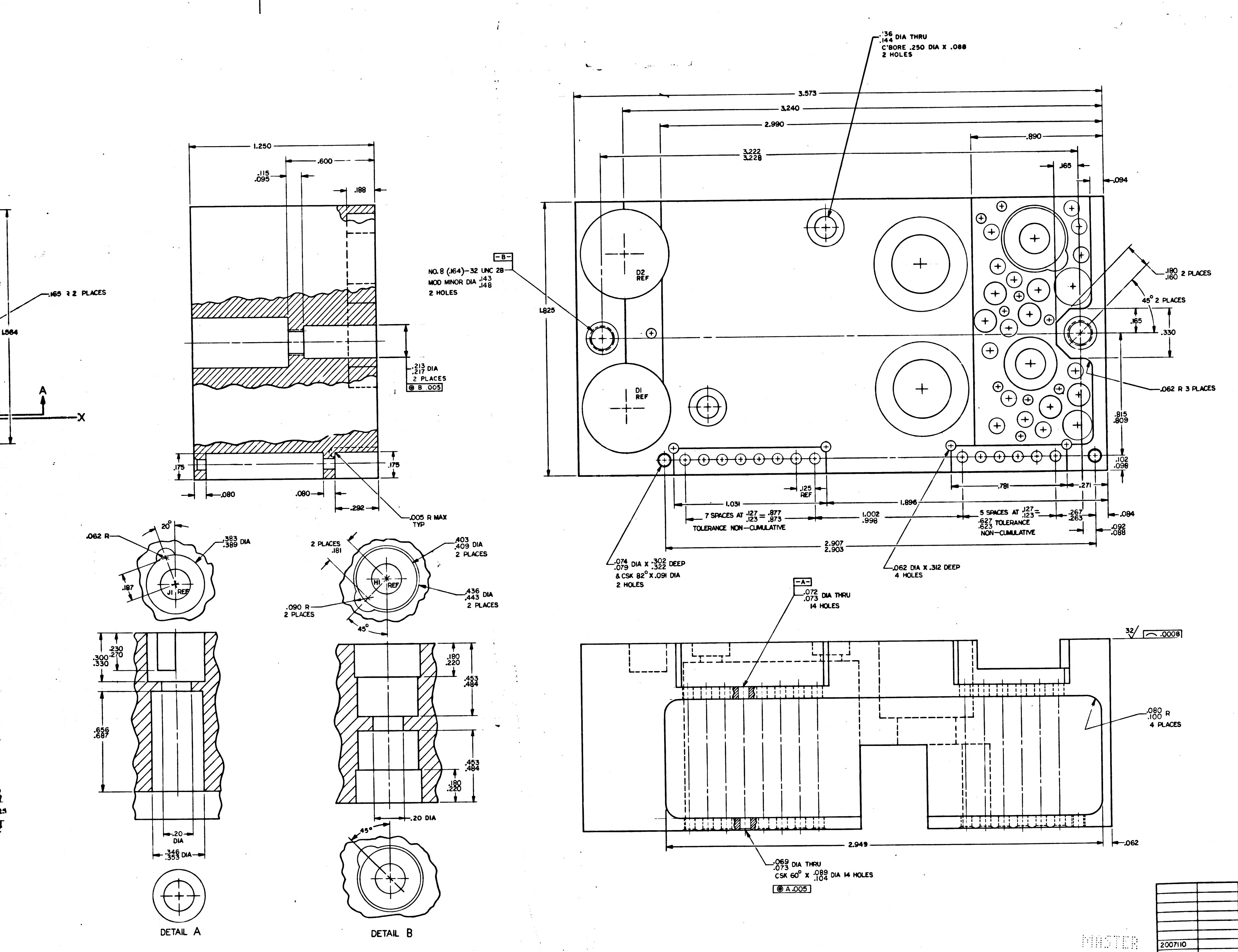
MASTER

2008144 A

3H

F-3

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17984	APRIL '65	[illegible]



.136 .144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
.890
3.222 3.228
.165
.094
1.250
.600
.115 .095
.188
.165 R 2 PLACES
1.564
A
X
NO. 8 (.164)–32 UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
-B-
1.825
D2 REF
D1 REF
.190 .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 .809
.102 .098
.213 .217 DIA
2 PLACES
◎ B .005
.175
.080
.080
.175
.292
.005 R MAX TYP
.125 REF
1.031
1.896
.781
.271
7 SPACES AT .127 .123 = .877 .873
TOLERANCE NON-CUMULATIVE
1.002 .998
5 SPACES AT .127 .123 = .627 .623 TOLERANCE NON-CUMULATIVE
.267 .263
.084
.092 .088
2.907 2.903
.074 .079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 HOLES
.062 R
20°
.383 .389 DIA
.187
J1 REF
2 PLACES .181
.403 .409 DIA 2 PLACES
H1 REF
.436 .443 DIA 2 PLACES
.090 R 2 PLACES
45°
-A-
.072 .073 DIA THRU
14 HOLES
32
⌒ .0008
.080 .100 R
4 PLACES
.230 .270
.300 .330
.656 .687
.180 .220
.453 .484
.453 .484
.180 .220
.20 DIA
.20 DIA
.346 .353 DIA
45°
2.949
.062
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA 14 HOLES
◎ A .005
DETAIL A
DETAIL B
5
4
3
2
1
B
C
A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

2007110
NEXT ASSY | USED ON
APPLICATION

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 2/65
CHECKED 17 Feb 65
APPROVAL 23 Feb 65
APPROVAL 2/24/65
NASA APPROVAL 3-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008144
SCALE 5/1
WT
SHEET 1

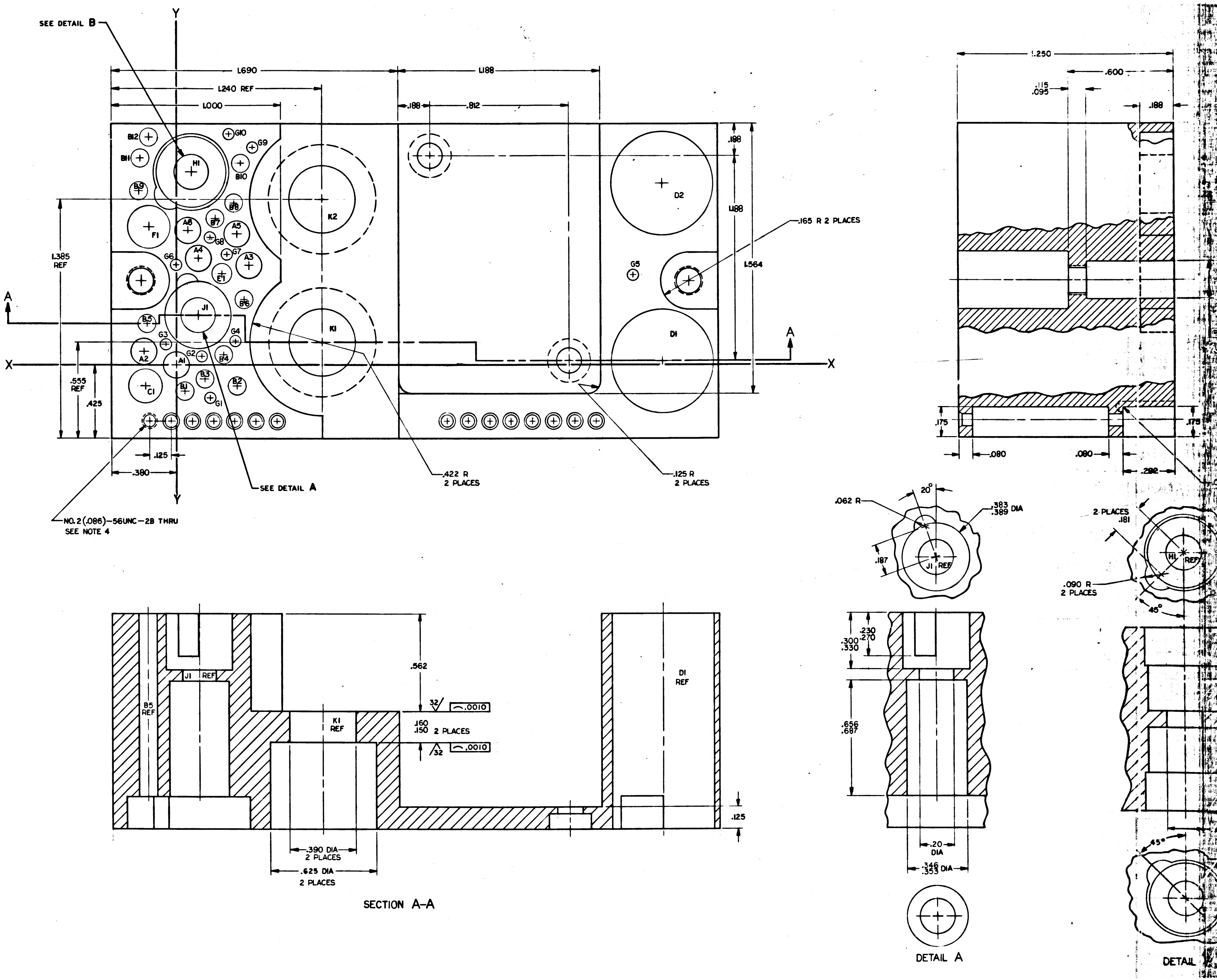
2008144 | A

2008144 | A

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.146 .150	6
A2	—.190	.080		
A3	.430	.580		
A4	.130	.620		
A5	.360	.760		
A6	.070	.782		
B1	.050	—.150	.100 .104	12
B2	.360	—.120		
B3	.170	—.080		
B4	.280	.060		
B5	—.170	.240		
B6	.400	.380		
B7	.230	.850		
B8	.340	.940		
B9	—.220	1.010		
B10	.380	1.170		
B11	—.210	1.200		
B12	—.160	1.320		
C1	—.180	—.120	.192 .196	1
D1	2.860	.020	.592 .599	2
D2	2.860	1.050		
E1	.270	.530	.112 .116	1
F1	—.160	.800	.245 .249	1
G1	.200	—.190	.058 .062	10
G2	.150	.050		
G3	—.060	.120		
G4	.350	.140		
G5	2.690	.520		
G6	.000	.580		
G7	.300	.640		
G8	.200	.740		
G9	.450	1.260		
G10	.310	1.340		
H1	.090	1.120	SEE DETAIL B	1
J1	.130	.290	SEE DETAIL A	1
K1	.860	.130	SEE SECT A-A	2
K2	.860	.960		

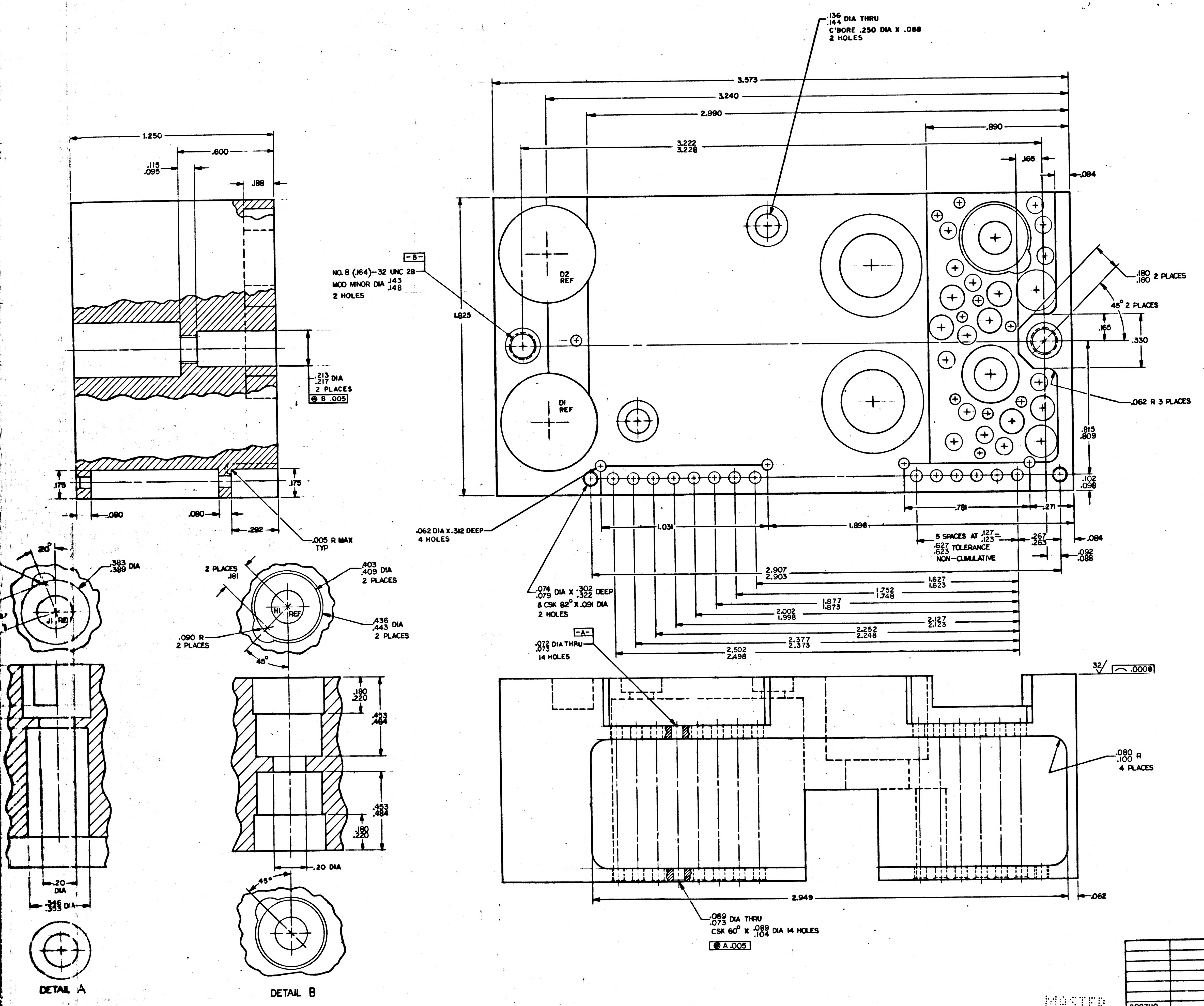

SEE DETAIL B
Y
1.690
1.240 REF
1.000
1.188
.188
.812
.188
1.188
1.564
.165 R 2 PLACES
1.385 REF
.555 REF
.425
A
X
B12
B11
H1
G10
G9
B10
B9
B8
K2
D2
F1
A6
B7
A5
G8
G6
A4
G7
A3
E1
G5
J1
B5
B6
K1
D1
G3
G4
A2
A1
G2
B4
B3
B2
C1
B1
G1
.125
.390
NO. 2 (.086)-56UNC-2B THRU
SEE NOTE 4
SEE DETAIL A
.422 R
2 PLACES
.125 R
2 PLACES
1.250
.600
.115
.095
.188
.175
.080
.090
.175
.292
.062 R
20°
.383
.389 DIA
.187
J1 REF
2 PLACES
.181
H1
REF
.090 R
2 PLACES
45°
J1 REF
B5 REF
K1 REF
D1 REF
.562
32
.0010
.160
.150 2 PLACES
32
.0010
.125
.390 DIA
2 PLACES
.625 DIA
2 PLACES
SECTION A-A
.230
.270
.300
.330
.656
.687
.20
DIA
.346
.353 DIA
DETAIL A
45°
DETAIL

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

34

2008144	A

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS 17130		
A	REVISED PER TDRR 17984	6 APRIL '65	
B	REVISED PER TDRR 18845	10 MAY '65	



4
3
2
1
D
C
B
A
.136 .144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
3.222 3.228
.890
.165
.094
1.250
.600
.115 .095
.188
-B-
NO. 8 (.164)-32 UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
1.825
D2 REF
D1 REF
.180 .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 .809
.102 .098
.213 .217 DIA
2 PLACES
B .005
.175
.080
.080
.292
.005 R MAX TYP
.062 DIA X .312 DEEP
4 HOLES
.781
.271
1.031
1.896
5 SPACES AT .127 .123 = .627 .623 TOLERANCE NON-CUMULATIVE
.267 .263
.084
.092 .088
2.907 2.903
1.627 1.623
1.752 1.748
1.877 1.873
2.002 1.998
2.127 2.123
2.252 2.248
2.377 2.373
2.502 2.498
.074 .079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
-A-
.072 .073 DIA THRU
14 HOLES
32
.0008
.080 .100 R
4 PLACES
2.949
.062
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA 14 HOLES
A .005
20°
.383 .389 DIA
J1 REF
.20 DIA
.346 .353 DIA
DETAIL A
2 PLACES .181
.403 .409 DIA 2 PLACES
H1 REF
.090 R 2 PLACES
.436 .443 DIA 2 PLACES
45°
.180 .220
.453 .484
.453 .484
.180 .220
.20 DIA
45°
DETAIL B
MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007110	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE
CHECKED
APPROVAL 23 Feb 65
APPROVAL
NASA APPROVAL 3-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008144
SCALE 5/1
WT
SHEET 1 OF 1

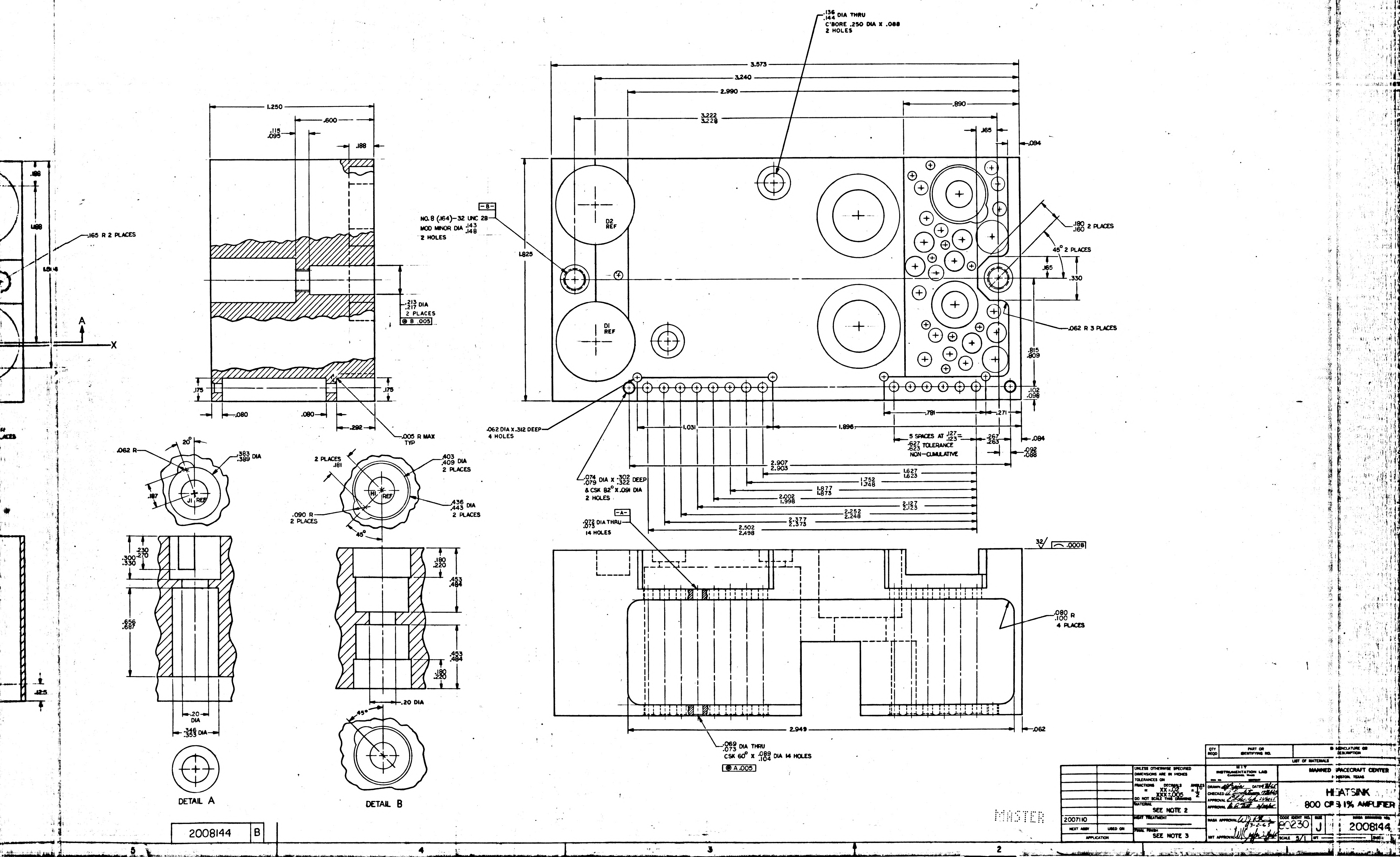
2008144 B

3H

20J8144 B

A18005

E-3



5
4
3
2
1
.136 .144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
.890
3.222 3.228
.165
.094
1.250
.600
.115 .095
.188
.188
1.188
1.848
.165 R 2 PLACES
A
X
-B-
NO. 8 (.164)-32 UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
1.825
D2 REF
D1 REF
.180 .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 .809
.102 .098
.213 .217 DIA
2 PLACES
⊚ B .005
.175
.175
.080
.080
.292
.005 R MAX TYP
.062 DIA X .312 DEEP
4 HOLES
1.031
1.896
.781
.271
5 SPACES AT .127 .123 =
.627 .623 TOLERANCE
NON-CUMULATIVE
.267 .263
.084
.092 .088
2.907 2.903
1.627 1.623
1.752 1.748
1.877 1.873
2.002 1.998
2.127 2.123
2.252 2.248
2.377 2.373
2.502 2.498
.074 .079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
-A-
.072 .075 DIA THRU
14 HOLES
32
⌒ .0008
.080 .100 R
4 PLACES
2.949
.062
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA 14 HOLES
⊚ A .005
.062 R
20°
.383 .389 DIA
.187
J1 REF
.230 .270
.300 .330
.656 .687
.20 DIA
.346 .353 DIA
DETAIL A
2 PLACES .181
.403 .409 DIA
2 PLACES
H1 REF
.436 .443 DIA
2 PLACES
.090 R
2 PLACES
45°
.180 .220
.453 .484
.453 .484
.180 .220
.20 DIA
45°
DETAIL B
.125
MASTER

SYM	DESCRIPTION	DATE
A	REVISED PER TDR 17984	
B	REVISED PER TDR 18845	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 3

2007110	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVAL
APPROVAL

NASA APPROVAL 3-2-65

MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

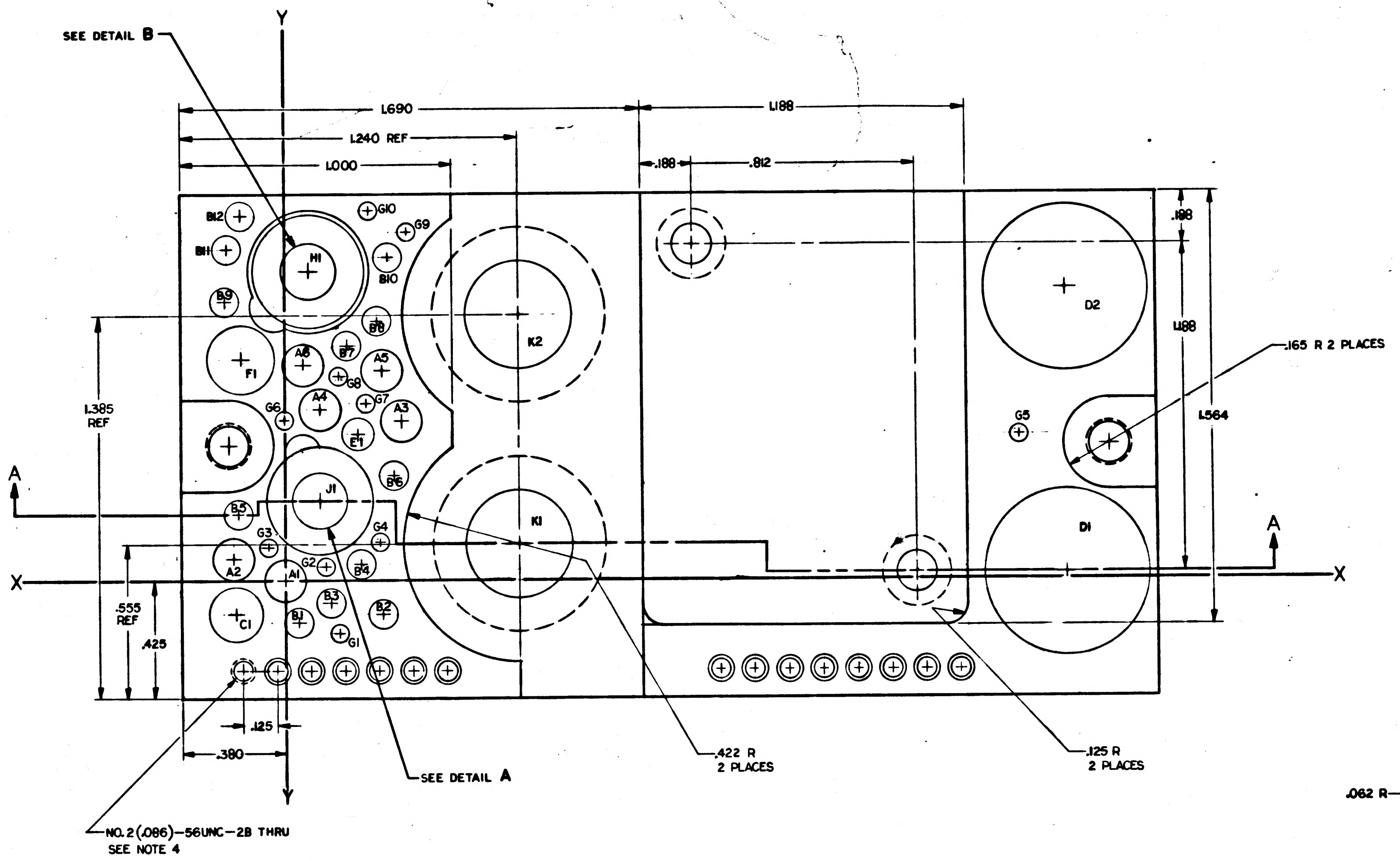
HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008144
SCALE 5/1

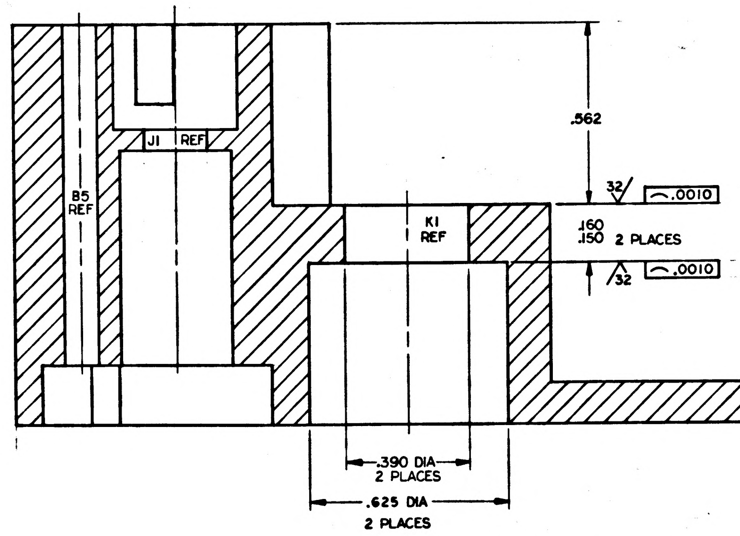
2008144	B

F-2

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.146 .150	6
A2	−.190	.080		
A3	.430	.580		
A4	.130	.620		
A5	.360	.760		
A6	.070	.782		
B1	.050	−.150	.100 .104	12
B2	.360	−.120		
B3	.170	−.080		
B4	.280	.060		
B5	−.170	.240		
B6	.400	.380		
B7	.230	.850		
B8	.340	.940		
B9	−.220	1.010		
B10	.380	1.170		
B11	−.210	1.200		
B12	−.160	1.320		
C1	−.180	−.120	.192 .196	1
D1	2.860	.020	.592 .599	2
D2	2.860	.050		
E1	.270	.530	.112 .116	1
F1	−.160	.800	.245 .249	1
G1	.200	−.190	.058 .062	10
G2	.150	.050		
G3	−.060	.120		
G4	.350	.140		
G5	2.690	.520		
G6	.000	.580		
G7	.300	.640		
G8	.200	.740		
G9	.450	1.260		
G10	.310	1.340		
H1	.090	1.120	SEE DETAIL B	1
J1	.130	.290	SEE DETAIL A	1
K1	.860	.130	SEE SECT A-A	2
K2	.860	.960		

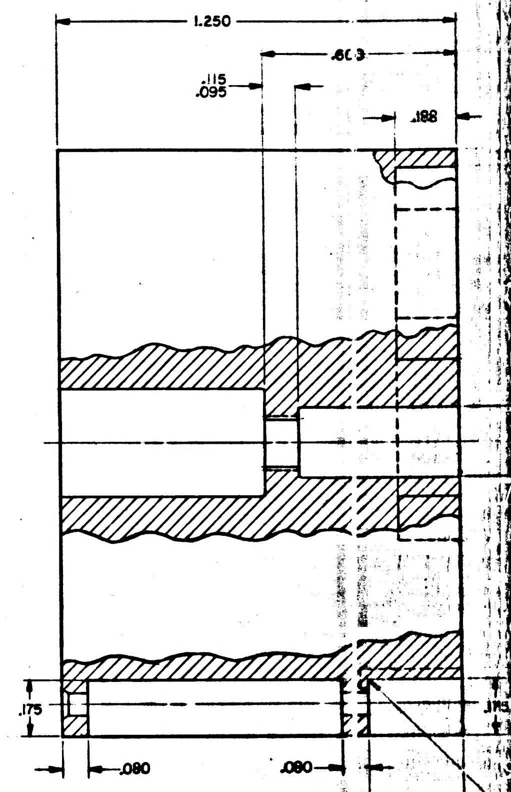


SEE DETAIL B
Y
1.690
1.240 REF
1.000
1.188
.188
.812
.188
1.188
1.564
.165 R 2 PLACES
1.385 REF
.555 REF
.425
A
A
X
X
B12
B11
B9
H1
G10
G9
B10
B8
F1
A6
B7
G8
A5
G6
A4
G7
A3
E1
B6
J1
B5
G3
G4
K1
K2
D2
D1
G5
A2
A1
G2
B4
B3
B2
C1
B1
G1
.125
.380
NO. 2 (.086)—56UNC—2B THRU
SEE NOTE 4
SEE DETAIL A
.422 R
2 PLACES
.125 R
2 PLACES

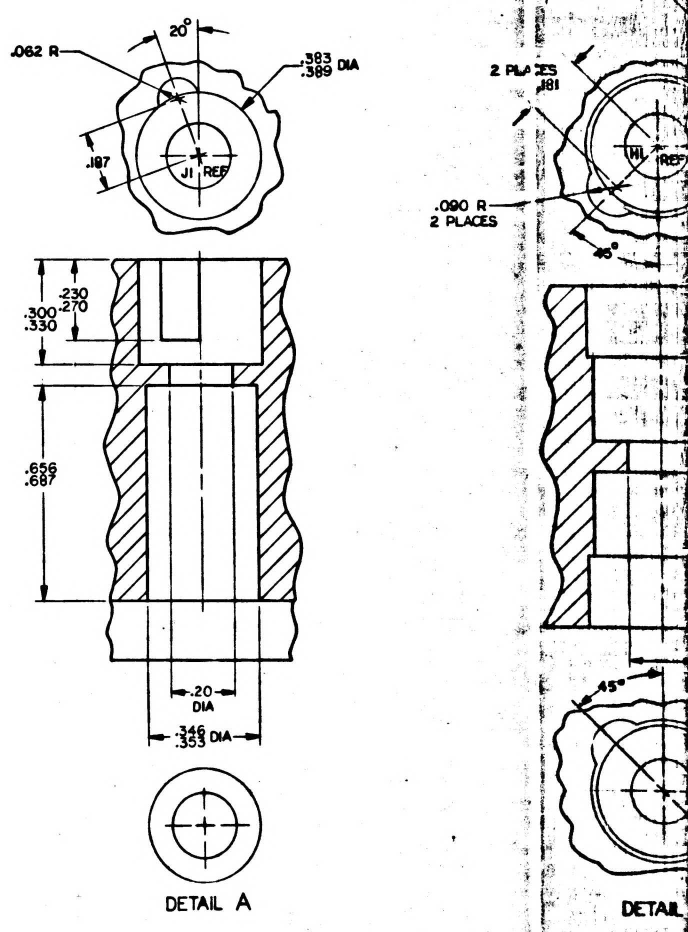


J1 REF
B5 REF
K1 REF
D1 REF
.562
32
.0010
.160
.150
2 PLACES
32
.0010
.125
.390 DIA
2 PLACES
.625 DIA
2 PLACES

SECTION A-A



1.250
.115
.095
.803
.188
.175
.090
.080
.292
.115



.062 R
20°
.383
.389 DIA
.187
J1 REF
.230
.270
.300
.330
.656
.687
.20 DIA
.346
.353 DIA
2 PLACES
.181
H1 REF
.090 R
2 PLACES
45°
45°

DETAIL A

DETAIL

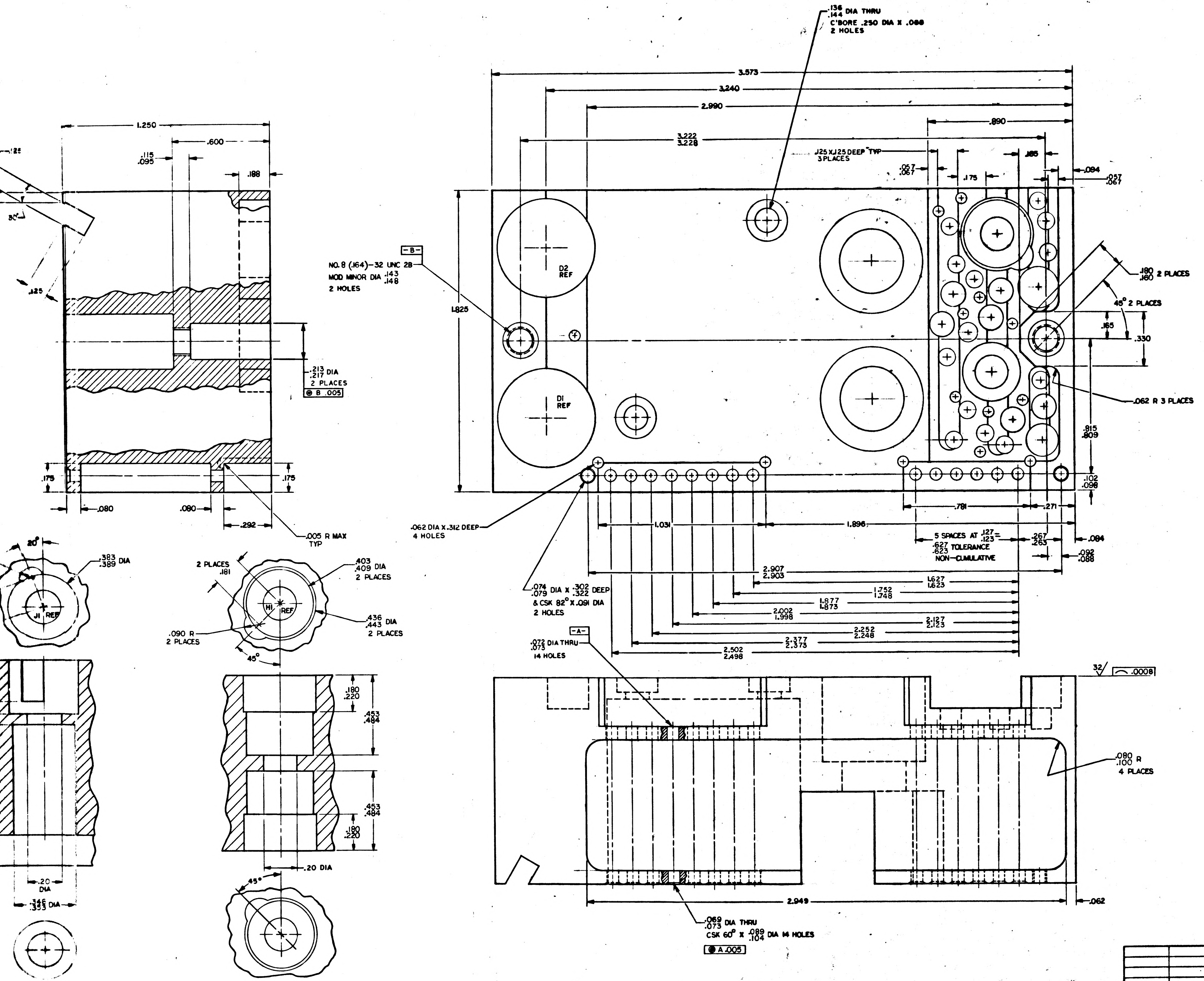
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

34

2008144	B

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17984	APRIL '65	WR
B	REVISED PER TDRR 18845	[illegible]	WR
C	REVISED PER TDRR 23038	[illegible]	WM

REVISIONS 12130



.136 .144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
.890
3.222 3.228
.125 X .125 DEEP TYP 3 PLACES
.057 .067
.175
.165
.084
.057 .067
1.250
.600
.115 .095
.188
.125
30°
NO. 8 (.164)-32 UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
-B-
1.825
D2 REF
D1 REF
.180 .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 .809
.102 .098
.213 .217 DIA
2 PLACES
B .005
.175
.080
.080
.292
.175
.005 R MAX TYP
.062 DIA X .312 DEEP 4 HOLES
1.031
1.896
.781
.271
5 SPACES AT .127 .123
.627 .623 TOLERANCE NON-CUMULATIVE
.267 .263
.084
.092 .088
2.907 2.903
1.627 1.623
1.752 1.748
1.877 1.873
2.002 1.998
2.127 2.123
2.252 2.248
2.377 2.373
2.502 2.498
.074 .079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
.072 .073 DIA THRU
14 HOLES
-A-
20°
.383 .389 DIA
J1 REF
2 PLACES .181
.403 .409 DIA 2 PLACES
H1 REF
.090 R 2 PLACES
45°
.436 .443 DIA 2 PLACES
.180 .220
.453 .484
.453 .484
.180 .220
.20 DIA
.20 DIA
.346 .325 DIA
45°
32
.0008
.080 .100 R 4 PLACES
2.949
.062
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA 14 HOLES
A .005

DETAIL A

DETAIL B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 3

NEXT ASSY	USED ON
2007110	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN DATE
CHECKED
APPROVAL
APPROVAL

NASA APPROVAL 3-2-65

MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
800 CPS 1% AMPLIFIER

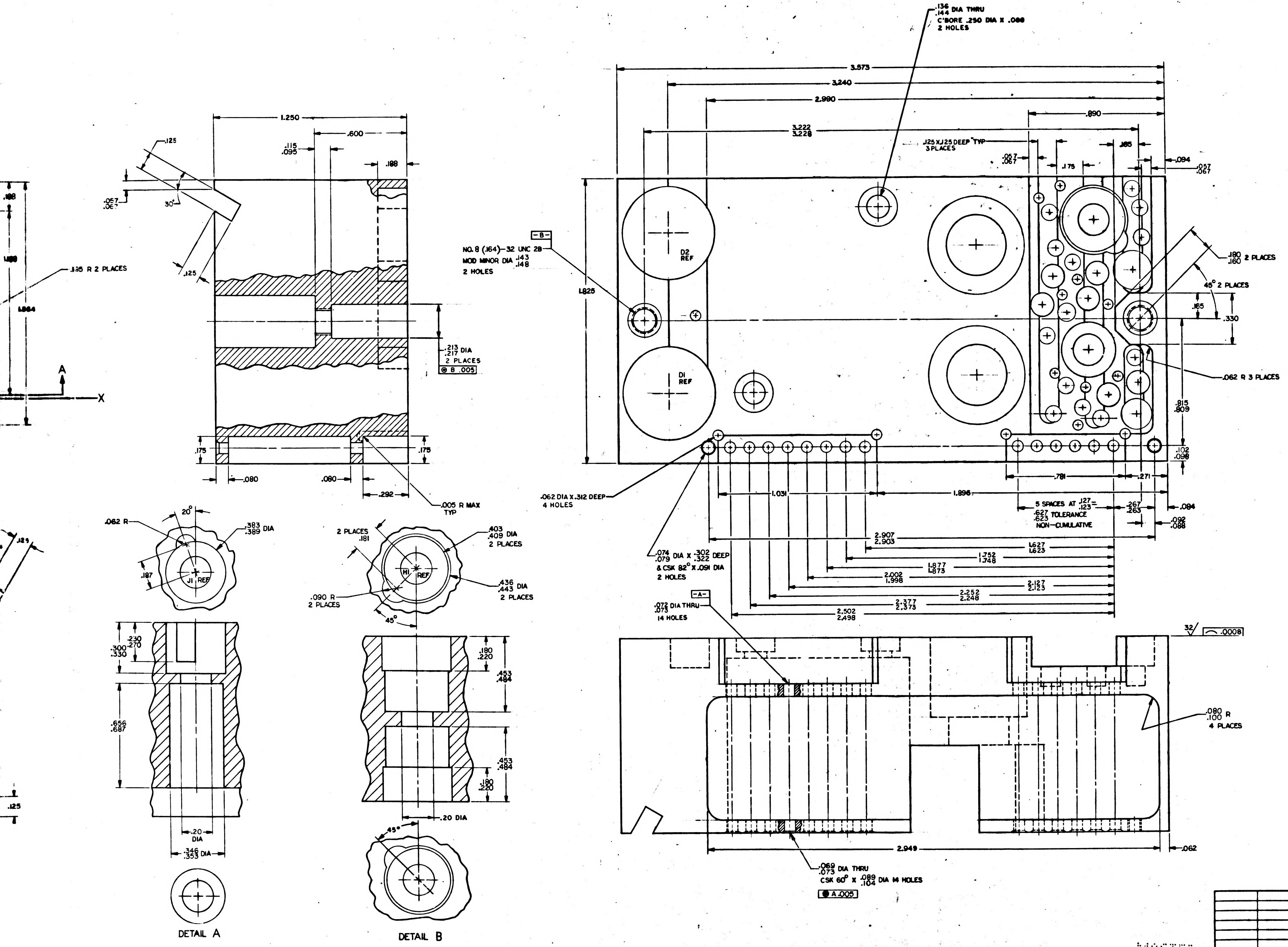
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008144
SCALE 5/1
WT
SHEET 1 OF 1

2008144 C

3H

2008144 C

LTR	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17984		
B	REVISED PER TDRR 18845		
C	REVISED PER TDRR 23038		



.136 .144 DIA THRU C'BORE .250 DIA X .088 2 HOLES
3.573
3.240
2.990
3.222 3.228
.890
.125 X .125 DEEP TYP 3 PLACES
.057 .067
.175
.165
.094
.057 .067
NO. 8 (.164)-32 UNC 2B MOD MINOR DIA .143 .148 2 HOLES
-B-
D2 REF
D1 REF
1.825
.180 .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 .809
.102 .098
.781
.271
1.031
1.896
5 SPACES AT .127 .123 = .627 .623 TOLERANCE NON-CUMULATIVE
.267 .263
.084
.092 .088
.062 DIA X .312 DEEP 4 HOLES
.074 .079 DIA X .302 .322 DEEP & CSK 82° X .091 DIA 2 HOLES
2.907 2.903
1.627 1.623
1.752 1.748
1.877 1.873
2.002 1.998
2.127 2.123
2.252 2.248
2.377 2.373
2.502 2.498
-A-
.072 .073 DIA THRU 14 HOLES
32
.0008
.080 .100 R 4 PLACES
2.949
.062
.069 .073 DIA THRU CSK 60° X .089 .104 DIA 14 HOLES
A .005
1.250
.600
.115 .095
.188
.125
.057 .067
30°
.125
.188
.135 R 2 PLACES
1.864
.213 .217 DIA 2 PLACES
B .005
A
X
.175
.080
.080
.175
.292
.005 R MAX TYP
.062 R
20°
.383 .389 DIA
.187
J1 REF
2 PLACES .181
.403 .409 DIA 2 PLACES
H1 REF
.090 R 2 PLACES
45°
.436 .443 DIA 2 PLACES
.300 .330
.230 .270
.656 .687
.20 DIA
.346 .353 DIA
.180 .220
.453 .484
.453 .484
.180 .220
.20 DIA
45°
DETAIL A
DETAIL B

MASTER

2007110	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.

LIST OF MATERIALS

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 3-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

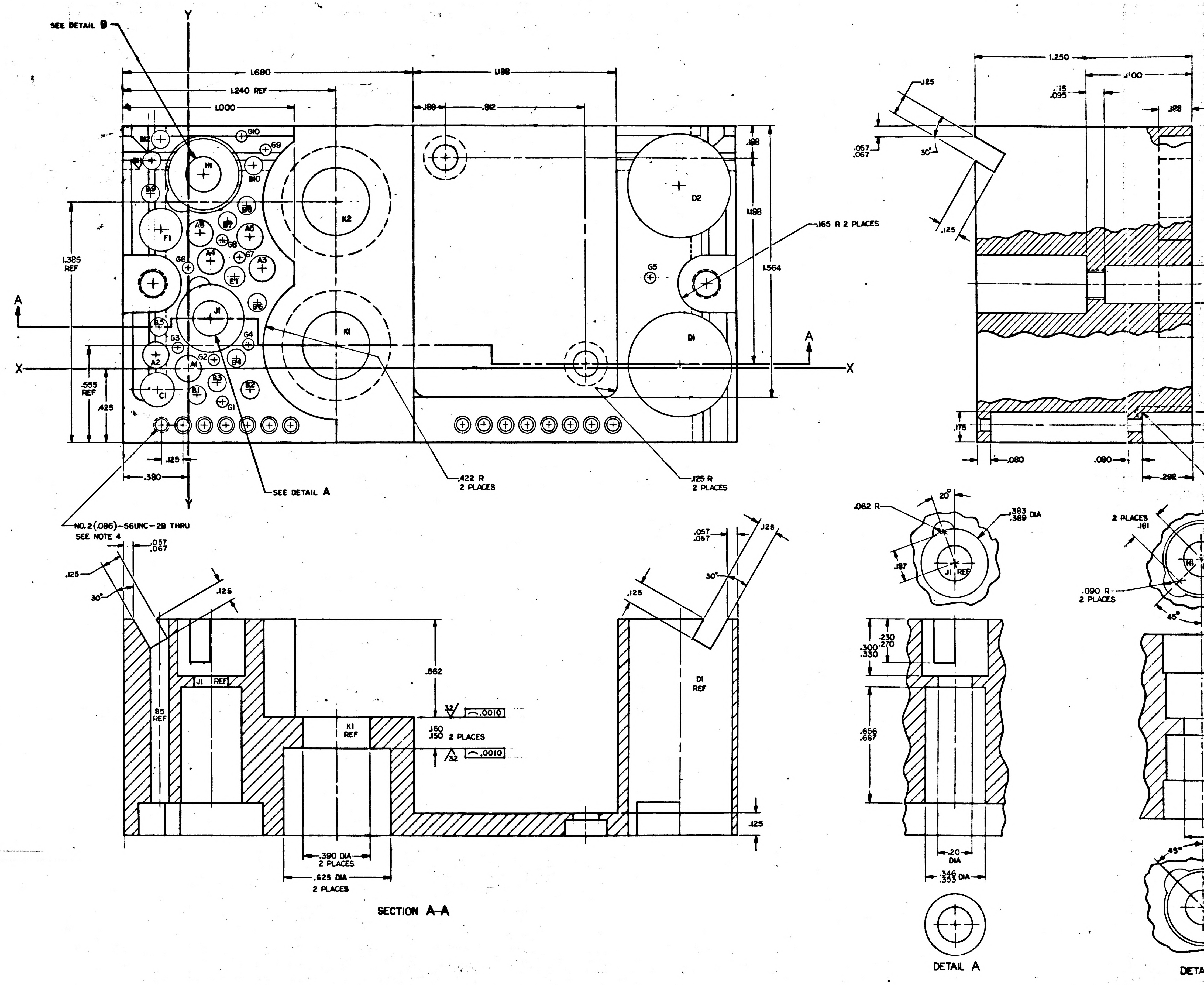
HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008144
SCALE 5/1
WT

2008144 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

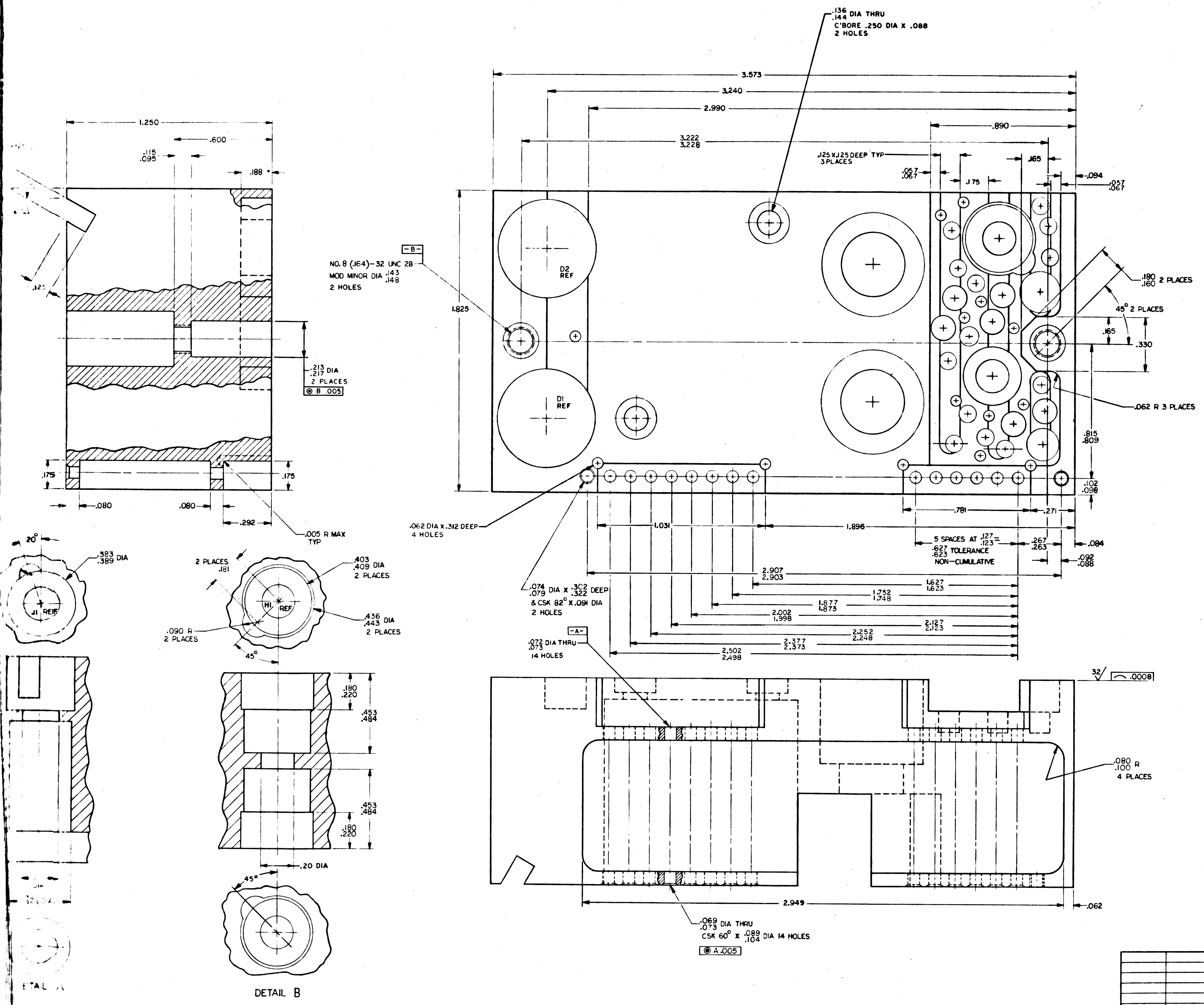
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.146 .150	6
A2	—.190	.080		
A3	.430	.580		
A4	.130	.620		
A5	.360	.760		
A6	.070	.782		
B1	.050	—.150	.100 .104	12
B2	.360	—.120		
B3	.170	—.080		
B4	.280	.060		
B5	—.170	.240		
B6	.400	.380		
B7	.230	.850		
B8	.340	.940		
B9	—.220	1.010		
B10	.380	1.170		
B11	—.210	1.200		
B12	—.160	1.320		
C1	—.180	—.120	.192 .196	1
D1	2.860	.020	.592 .599	2
D2	2.860	1.050		
E1	.270	.530	.112 .116	1
F1	—.160	.800	.245 .249	1
G1	.200	—.190	.058 .062	10
G2	.150	.050		
G3	—.060	.120		
G4	.350	.140		
G5	2.690	.520		
G6	.000	.580		
G7	.300	.640		
G8	.200	.740		
G9	.450	1.260		
G10	.310	1.340		
H1	.090	1.120	SEE DETAIL B	1
J1	.130	.290	SEE DETAIL A	1
K1	.860	.130	SEE SECT A-A	2
K2	.860	.960		


SEE DETAIL B
Y
1.690
1.240 REF
1.000
1.188
.188
.812
G10
G9
B12
B11
H1
B10
B9
K2
D2
.188
1.188
1.564
.165 R 2 PLACES
1.385 REF
F1
A6
E1
A5
G8
G6
A4
G7
A3
G5
B6
J1
K1
D1
A
A
X
X
B5
G3
G4
A2
A1
G2
B4
.555 REF
.425
C1
B1
B3
B2
G1
.125
.380
SEE DETAIL A
.422 R 2 PLACES
.125 R 2 PLACES
NO.2 (.086)-56UNC-2B THRU
SEE NOTE 4
.057
.067
.125
30°
.125
J1 REF
.85 REF
.562
32
.0010
.160
.150 2 PLACES
K1 REF
D1 REF
.125
.390 DIA 2 PLACES
.625 DIA 2 PLACES
SECTION A-A
1.250
1.100
.115
.095
.188
.057
.067
30°
.125
.175
.080
.080
.292
.062 R
20°
.383
.389 DIA
.187
J1 REF
.300
.330
.230
.270
.656
.687
.20 DIA
.346
.353 DIA
DETAIL A
2 PLACES
.181
H1
.090 R
2 PLACES
45°
45°
DETA

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND1002187 TYPE II TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

34

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 12030			
A	REVISED PER TDRR 17984	4 APRIL 65	WR
B	REVISED PER TDRR 18845	10 MAY 65	WR
C	REVISED PER TDRR 23C38		
D	REVISED PER TDRR 27140	23-MAR-66	B.


.136
.144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
3.222
3.228
.890
.125 X .125 DEEP TYP
3 PLACES
.057
.067
.175
.165
.094
.057
.067
1.250
.600
.115
.095
.188
.124
20°
NO. 8 (.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 HOLES
-B-
1.825
D2
REF
D1
REF
.190
.160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815
.809
.102
.098
.213
.217 DIA
2 PLACES
◎ B .005
.175
.175
.080
.080
.292
.005 R MAX
TYP
.062 DIA X .312 DEEP
4 HOLES
1.031
1.896
.781
.271
5 SPACES AT .127
.123 =
.627
.623 TOLERANCE
NON-CUMULATIVE
.267
.263
.084
.092
.088
2.907
2.903
1.627
1.623
1.752
1.748
1.877
1.873
2.002
1.998
2.127
2.123
2.252
2.248
2.377
2.373
2.502
2.498
.074
.079 DIA X .302
.322 DEEP
& CSK 82° X .091 DIA
2 HOLES
-A-
.072
.073 DIA THRU
14 HOLES
32
.0008
.080
.100 R
4 PLACES
2.949
.062
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA 14 HOLES
◎ A .005
20°
.383
.389 DIA
J1 REF
2 PLACES
.181
.403
.409 DIA
2 PLACES
H1 REF
.090 R
2 PLACES
.436
.443 DIA
2 PLACES
45°
.180
.220
.453
.484
.453
.484
.180
.220
.20 DIA
45°
DETAIL A
DETAIL B

2008144	D	3H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

NEXT ASSY	USED ON
2007110	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT

DRAWN DiPaoia DATE 9 Feb 65
CHECKED A. Lindstrom 17 Feb 65
APPROVAL
APPROVAL D. R. Test 2/24/65
NASA APPROVAL 3-2-65
MIT APPROVAL W. Cuffe 2 Mar 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

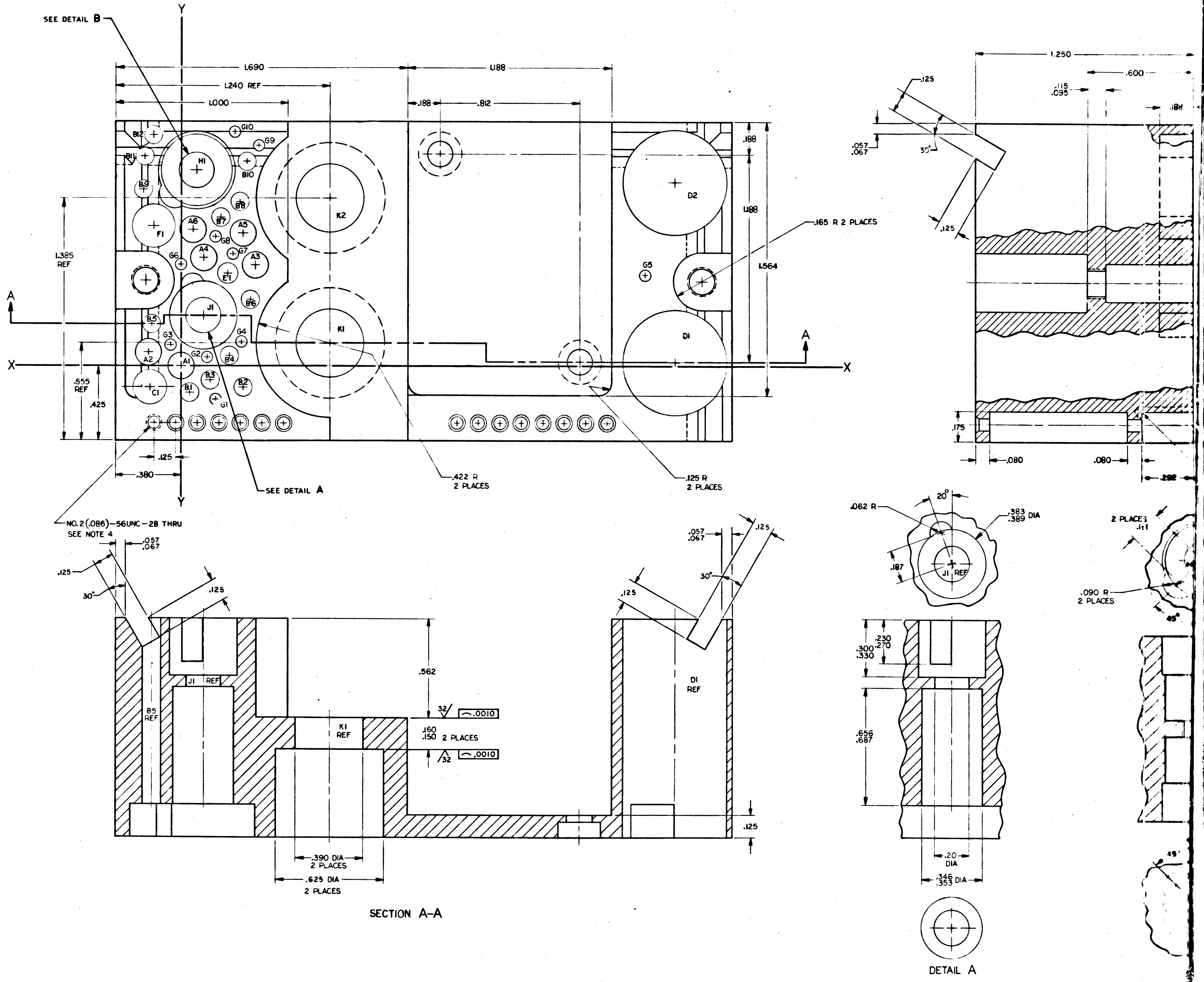
HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO 2008144
SCALE 5/1 WT — SHEET 1 OF 1

2/2008144

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.146 .150	6
A2	—.190	.080		
A3	.430	.580		
A4	.130	.620		
A5	.360	.760		
A6	.070	.782		
B1	.050	—.150	.100 .104	12
B2	.360	—.120		
B3	.170	—.080		
B4	.280	.060		
B5	—.170	.240		
B6	.400	.380		
B7	.230	.850		
B8	.340	.940		
B9	—.220	1.010		
B10	.380	1.170		
B11	—.210	1.200		
B12	—.160	1.320		
C1	—.180	—.120	.192 .196	1
D1	2.860	.020	.592 .599	2
D2	2.860	1.050		
E1	.270	.530	.112 .116	1
F1	—.160	.800	.245 .249	1
G1	.200	—.190	.058 .062	10
G2	.150	.050		
G3	—.060	.120		
G4	.350	.140		
G5	2.690	.520		
G6	.000	.580		
G7	.300	.640		
G8	.200	.740		
G9	.450	1.260		
G10	.310	1.340		
H1	.090	1.120	SEE DETAIL B	1
J1	.130	.290	SEE DETAIL A	1
K1	.860	.130	SEE SECT A-A	2
K2	.860	.960		

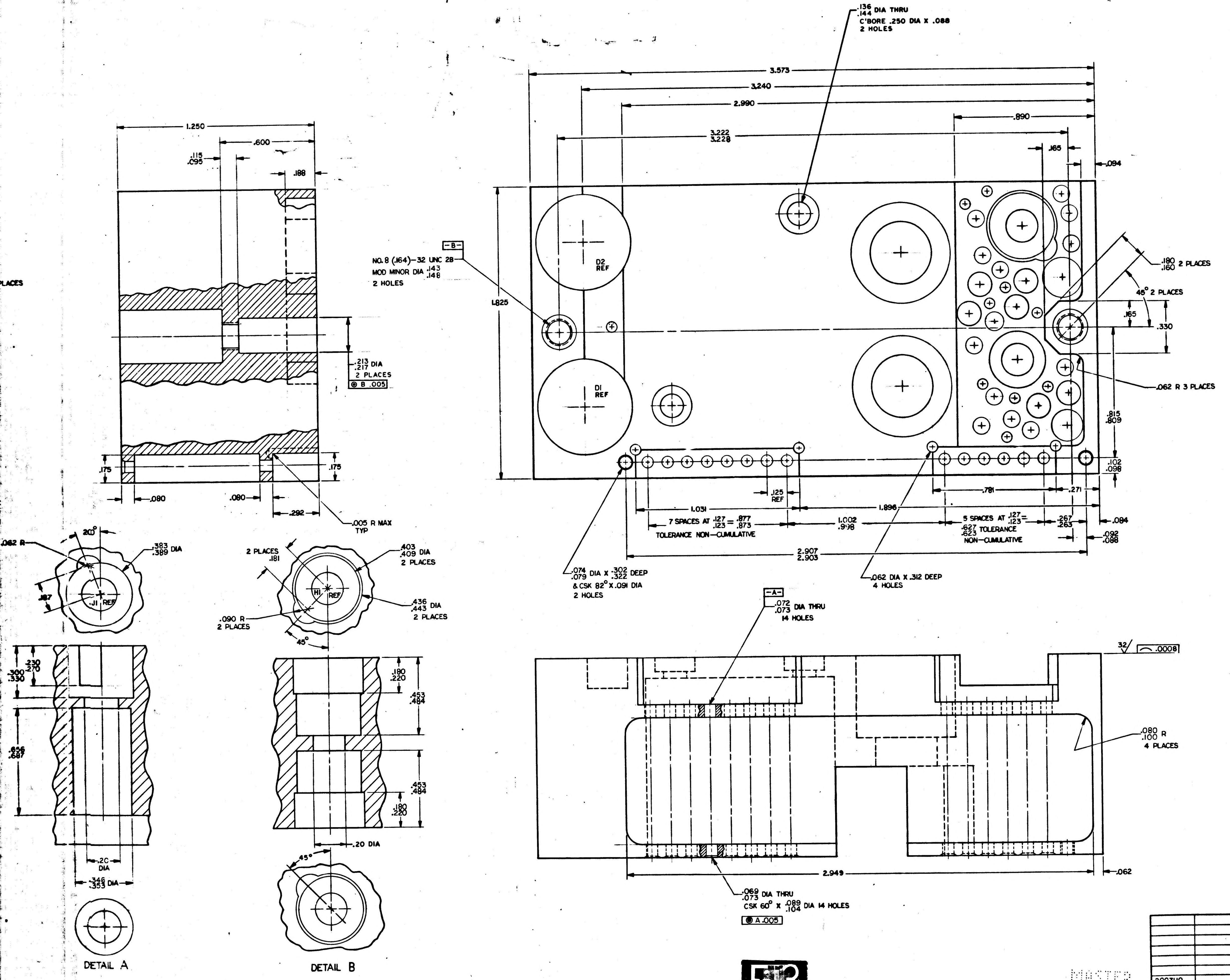

SEE DETAIL B
Y
1.690
1.240 REF
1.000
1.188
.188
.812
H1
K2
K1
D1
D2
J1
F1
C1
E1
A1
A2
A3
A4
A5
A6
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
1.385 REF
.555 REF
.425
.125
.380
A
X
.188
1.188
1.564
.165 R 2 PLACES
.422 R 2 PLACES
.125 R 2 PLACES
SEE DETAIL A
NO. 2 (.086)-56UNC-2B THRU
SEE NOTE 4
.057
.067
.125
30°
.562
32
.0010
.160
.150 2 PLACES
.125
J1 REF
B5 REF
K1 REF
D1 REF
.390 DIA
2 PLACES
.625 DIA
2 PLACES
1.250
.600
.115
.095
.188
.175
.080
.080
.292
.062 R
20°
.383
.389 DIA
.187
J1 REF
2 PLACES
.090 R
2 PLACES
45°
.230
.270
.300
.330
.656
.687
.20
DIA
.346
.353 DIA

SECTION A-A

DETAIL A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: APPLY CHEMICAL FILM PER MIL-C-5541, GRADE C, CLASS 2.
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND1002187 TYPE II TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

2008144	D


.136 .144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
3.222 3.228
.890
.165
.094
1.250
.600
.115 .095
.188
NO. 8 (.164)-32 UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
-B-
1.825
D2 REF
D1 REF
.180 .160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815 .809
.102 .098
.213 .217 DIA
2 PLACES
B .005
.175
.080
.080
.292
.005 R MAX TYP
.125 REF
1.031
1.896
.781
.271
7 SPACES AT .127 .123 = .877 .873
TOLERANCE NON-CUMULATIVE
1.002 .998
5 SPACES AT .127 .123 = .627 .623 TOLERANCE NON-CUMULATIVE
.267 .263
.084
.092 .088
2.907 2.903
.074 .079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 HOLES
20°
.062 R
.383 .389 DIA
.187
.11 REF
2 PLACES .181
.403 .409 DIA 2 PLACES
.10 REF
.436 .443 DIA 2 PLACES
.090 R 2 PLACES
45°
-A-
.072 .073 DIA THRU
14 HOLES
32
.0008
.080 .100 R
4 PLACES
.230 .270
.300 .330
.656 .687
.180 .220
.453 .484
.453 .484
.180 .220
.20 DIA
.2C DIA
.346 .353 DIA
45°
2.949
.062
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA 14 HOLES
A .005
DETAIL A
DETAIL B
PLACES
5
4
3
2
1
D
C
B
A

2008144

E13

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT

FINAL FINISH SEE NOTE 3

NEXT ASSY	USED ON
2007110	

APPLICATION

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE
CHECKED
APPROVAL 23 Feb 65
APPROVAL 2/24/65

NASA APPROVAL 3-2-65

MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

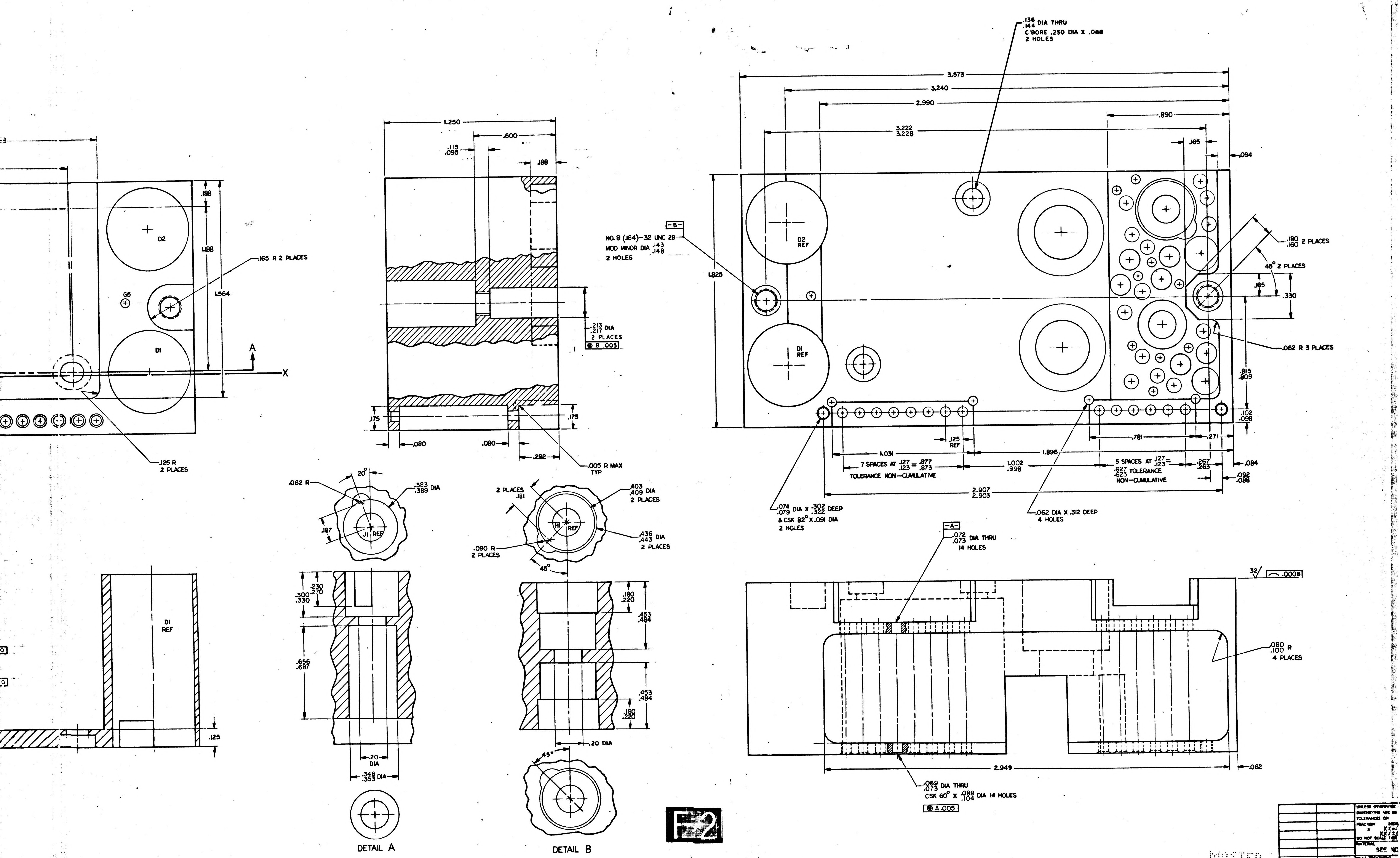
HEATSINK
800 CPS 1% AMPLIFIER

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2008144

SCALE 5/1
WT —
SHEET 1 OF 1

2008144

3H


5
4
3
2
.136
.144 DIA THRU
C'BORE .250 DIA X .088
2 HOLES
3.573
3.240
2.990
.890
3.222
3.228
.165
.094
1.250
.600
.115
.095
.188
.198
1.188
1.564
D2
G5
D1
.165 R 2 PLACES
A
X
.125 R
2 PLACES
.213
.217 DIA
2 PLACES
B .005
.175
.080
.292
.005 R MAX
TYP
-B-
NO. 8 (.164)-32 UNC 2B
MOD MINOR DIA .143
.148
2 HOLES
1.825
D2
REF
D1
REF
.180
.160 2 PLACES
45° 2 PLACES
.165
.330
.062 R 3 PLACES
.815
.809
.102
.098
.125
REF
1.031
1.896
.781
.271
7 SPACES AT .127/.123 = .877/.873
TOLERANCE NON-CUMULATIVE
1.002
.998
5 SPACES AT .127/.123 =
.627/.623 TOLERANCE
NON-CUMULATIVE
.267
.263
.084
.092
.088
2.907
2.903
.074
.079 DIA X .302/.322 DEEP
& CSK 82° X .091 DIA
2 HOLES
.062 DIA X .312 DEEP
4 HOLES
-A-
.072
.073 DIA THRU
14 HOLES
32
.0008
.080
.100 R
4 PLACES
2.949
.062
.069
.073 DIA THRU
CSK 60° X .089/.104 DIA 14 HOLES
A .005
.062 R
20°
.383
.389 DIA
.187
J1 REF
2 PLACES
.181
.403
.409 DIA
2 PLACES
H1
REF
.436
.443 DIA
2 PLACES
.090 R
2 PLACES
45°
.230
.270
.300
.330
.656
.687
.20
DIA
.346
.353 DIA
.180
.220
.453
.484
.20 DIA
45°
D1
REF
.125
DETAIL A
DETAIL B

F-2

MASTER

2008144

2007110	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTION ± DECIMALS .XX ± .2 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH
SEE NOTE

QTY REQD
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

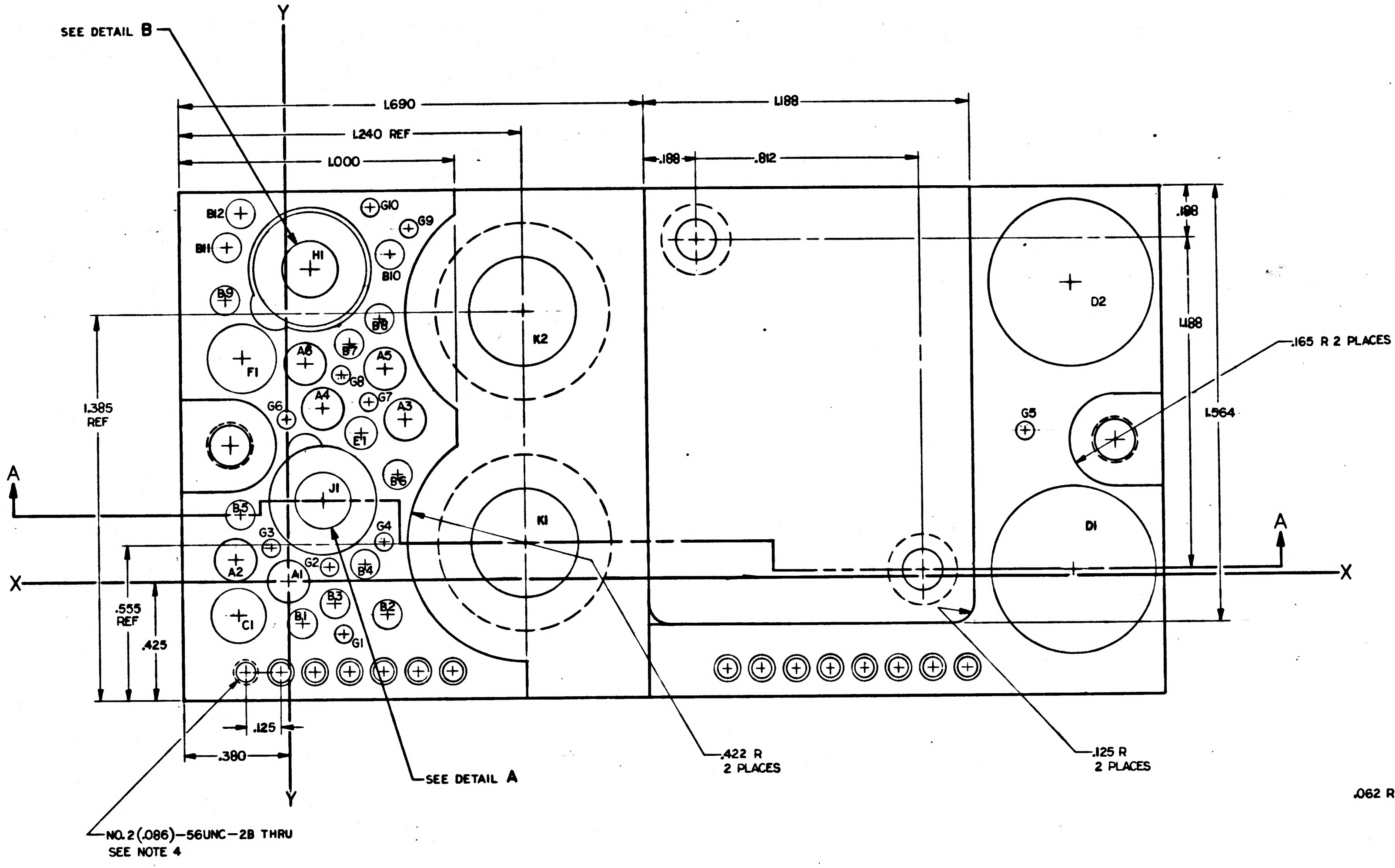
D

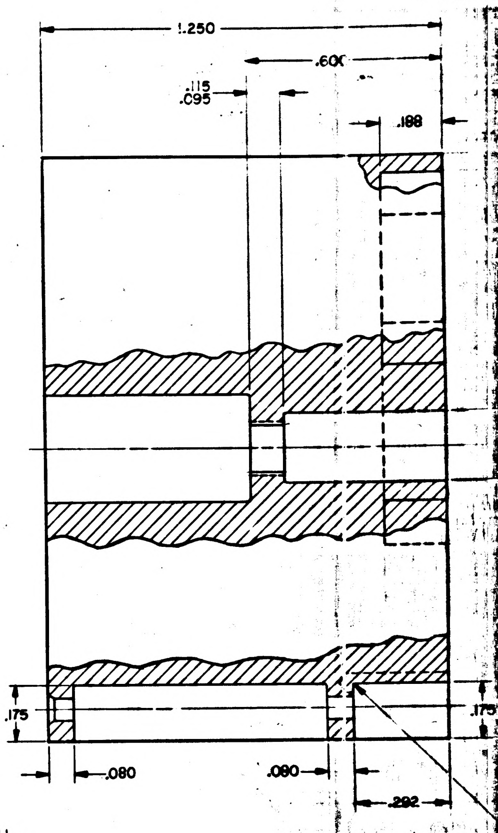
C

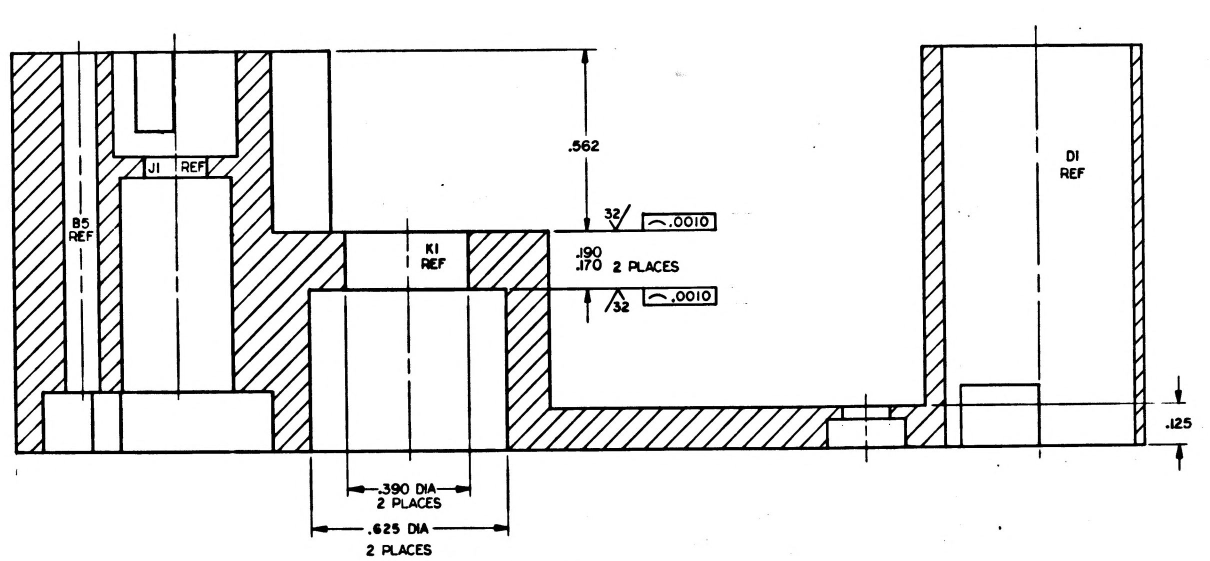
B

A

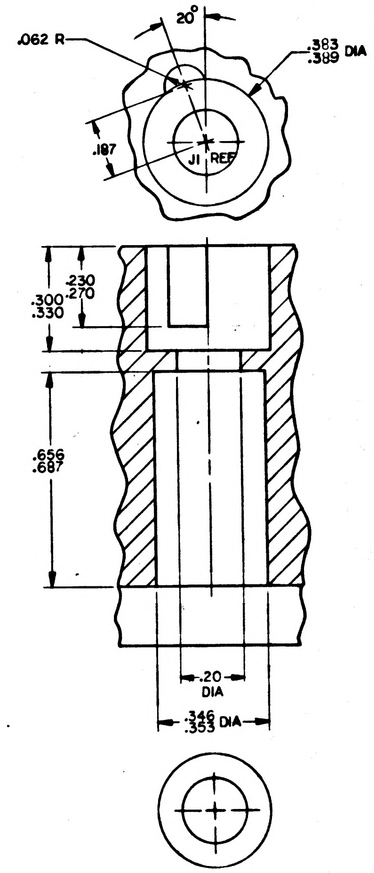
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.146 .150	6
A2	−.190	.080		
A3	.430	.580		
A4	.130	.620		
A5	.360	.760		
A6	.070	.782		
B1	.050	−.150	.100 .104	12
B2	.360	−.120		
B3	.170	−.080		
B4	.280	.060		
B5	−.170	.240		
B6	.400	.380		
B7	.230	.850		
B8	.340	.940		
B9	−.220	1.010		
B10	.380	1.170		
B11	−.210	1.200		
B12	−.160	1.320		
C1	−.180	−.120	.192 .196	1
D1	2.860	.020	.592 .599	2
D2	2.860	1.050		
E1	.270	.530	.112 .116	1
F1	−.160	.800	.245 .249	1
G1	.200	−.190	.058 .062	10
G2	.150	.050		
G3	−.060	.120		
G4	.350	.140		
G5	2.690	.520		
G6	.000	.580		
G7	.300	.640		
G8	.200	.740		
G9	.450	1.260		
G10	.310	1.340		
H1	.090	1.120	SEE DETAIL B	1
J1	.130	.290	SEE DETAIL A	1
K1	.860	.130	SEE SECT A-A	2
K2	.860	.960		


SEE DETAIL B
Y
1.690
1.240 REF
1.000
1.188
.188
.812
.198
1.188
1.564
.165 R 2 PLACES
1.385 REF
.555 REF
.425
.125
.380
A
X
B12
B11
H1
G10
G9
B10
B9
B8
K2
D2
F1
A6
B7
A5
G8
G6
A4
G7
A3
E1
B6
G5
J1
B5
G3
G4
K1
D1
A2
G2
A1
B4
B3
C1
B1
B2
G1
NO. 2 (.086)–56UNC–2B THRU
SEE NOTE 4
SEE DETAIL A
.422 R
2 PLACES
.125 R
2 PLACES

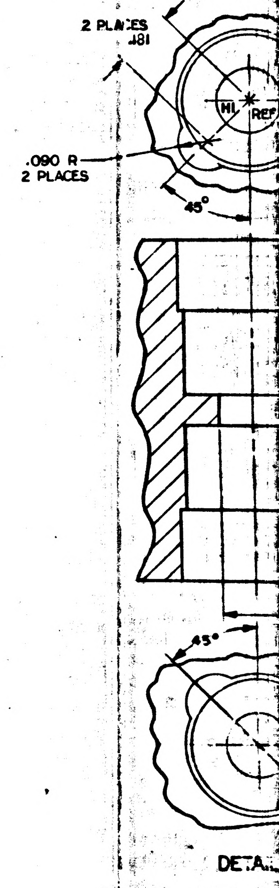

1.250
.600
.115
.095
.188
.175
.080
.080
.292
.175


B5 REF
J1 REF
K1 REF
D1 REF
.562
32
.0010
.190
.170 2 PLACES
32
.0010
.125
.390 DIA
2 PLACES
.625 DIA
2 PLACES

SECTION A–A


.062 R
20°
.383
.389 DIA
.187
J1 REF
.230
.270
.300
.330
.656
.687
.20 DIA
.346
.353 DIA

DETAIL A


2 PLACES
.181
H1
REF
.090 R
2 PLACES
45°
45°

DETA

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ–M–31
3. FINISH: ANODIZE PER MIL–M–45202 TYPE I CLASS C
4. THREADS TO BE FREE OF ANODIZE
5. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
8. IDENTIFY PER ND1002019

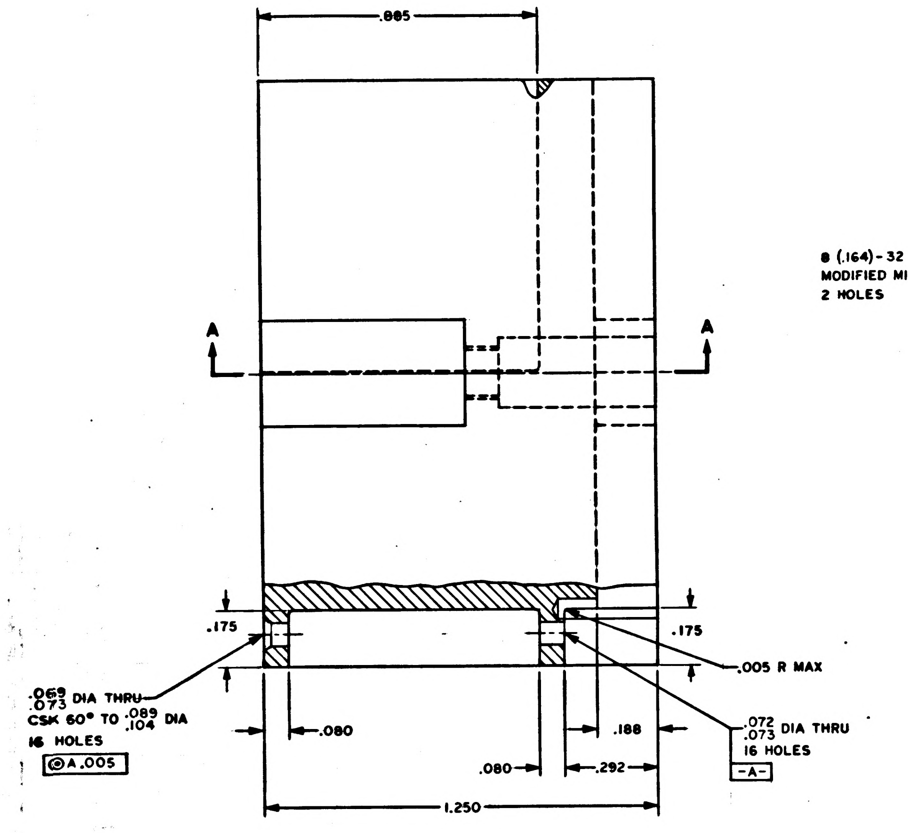
3#

F-1

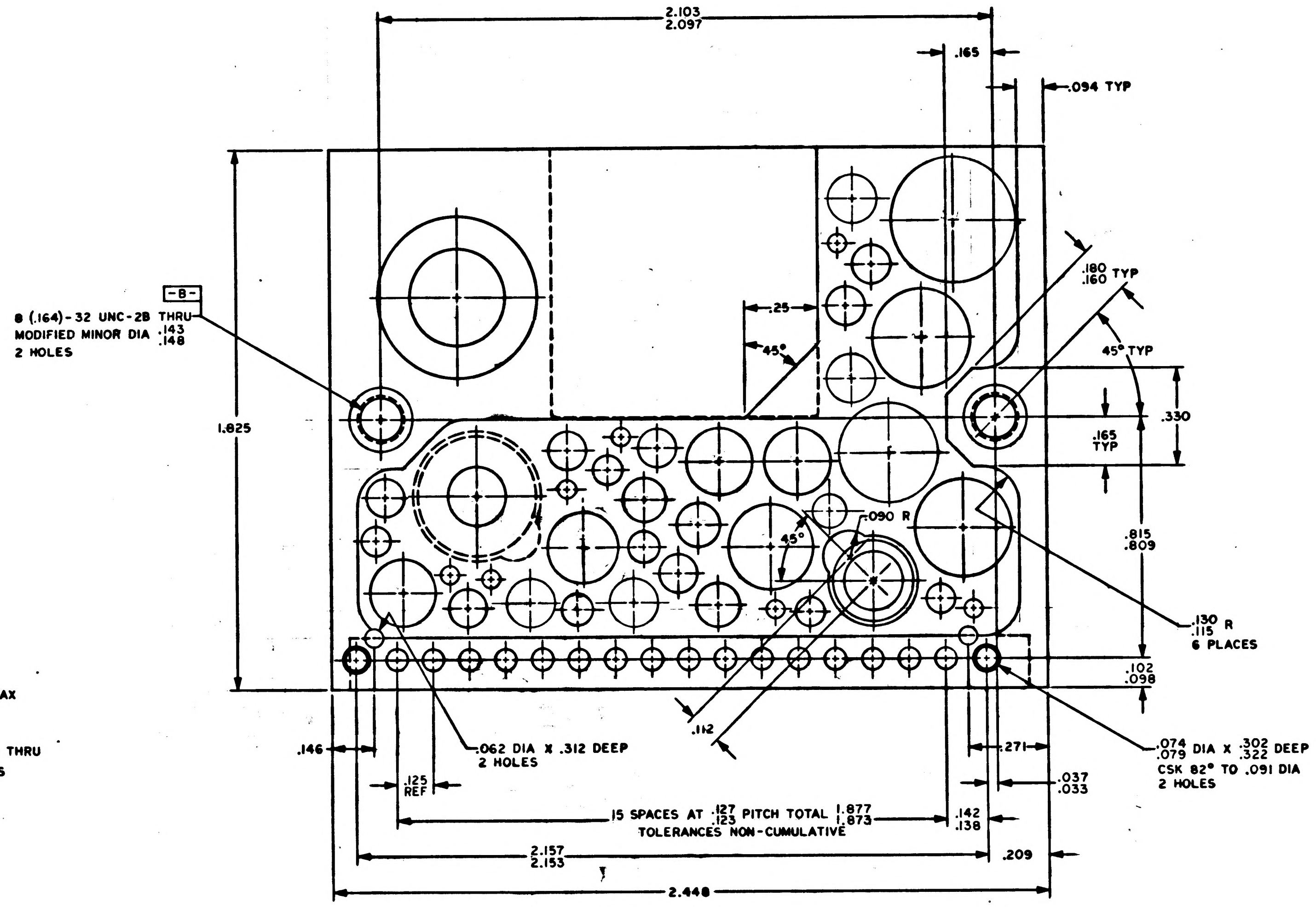
2008144

REVISIONS 18843

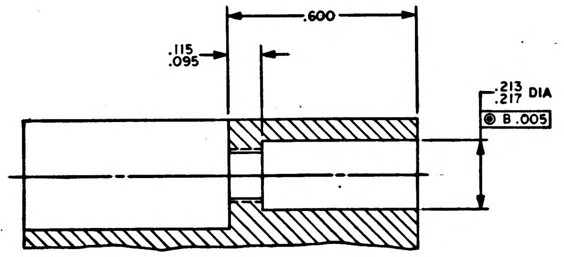
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20144			21JUN65	



.885
A
A
.175
.175
.005 R MAX
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
16 HOLES
◎A.005
.080
.080
.188
.292
.072 .073 DIA THRU
16 HOLES
-A-
1.250

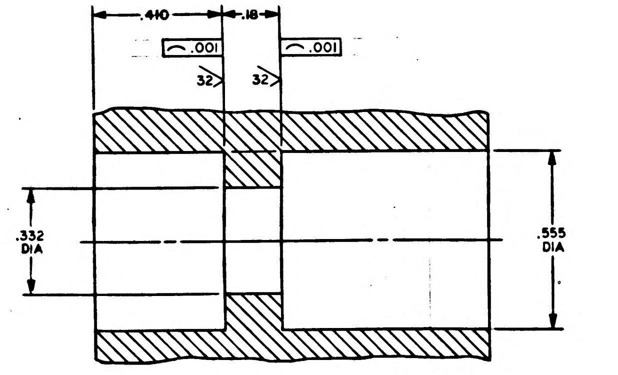


2.103 2.097
.165
.094 TYP
-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.825
.25
45°
.180 .160 TYP
45° TYP
.330
.165 TYP
.090 R
45°
.815 .809
.130 .115 R
6 PLACES
.102 .098
.112
.146
.062 DIA X .312 DEEP
2 HOLES
.125 REF
.271
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.037 .033
15 SPACES AT .127 .123 PITCH TOTAL 1.877 1.873
TOLERANCES NON-CUMULATIVE
.142 .138
2.157 2.153
.209
2.448



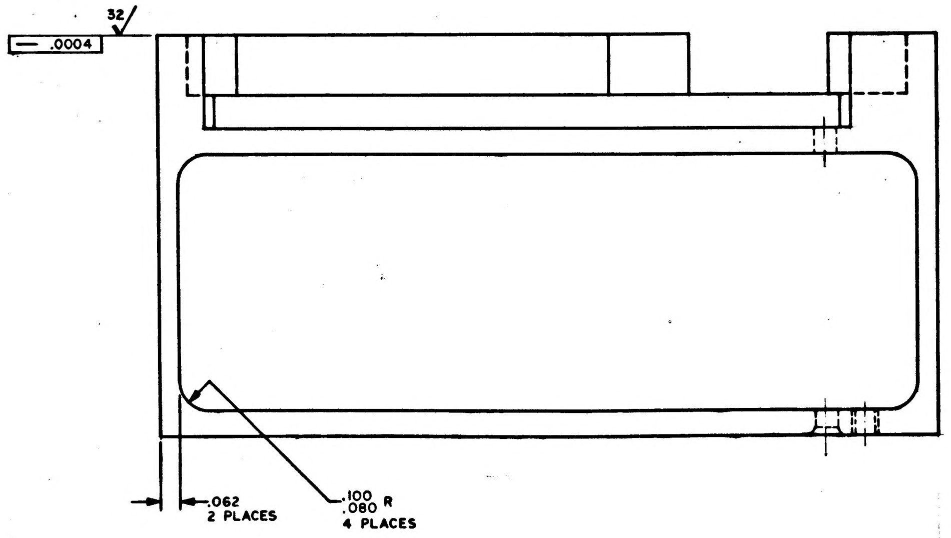
.600
.115 .095
.213 .217 DIA
◎ B.005

PARTIAL SECTION A-A



.410
.18
⌒.001
⌒.001
32
32
.332 DIA
.555 DIA

PARTIAL SECTION B-B



32
— .0004
.062
2 PLACES
.100 .080 R
4 PLACES

2008147 A

2 17

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007119	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS XX ± .010 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Ken Hyaly
CHECKED K. Listeno 4MAY65
APPROVED 4MAY65
APPROVED 5/4/65
APPROVED MIT 4May65
APPROVED MSC 5-4-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

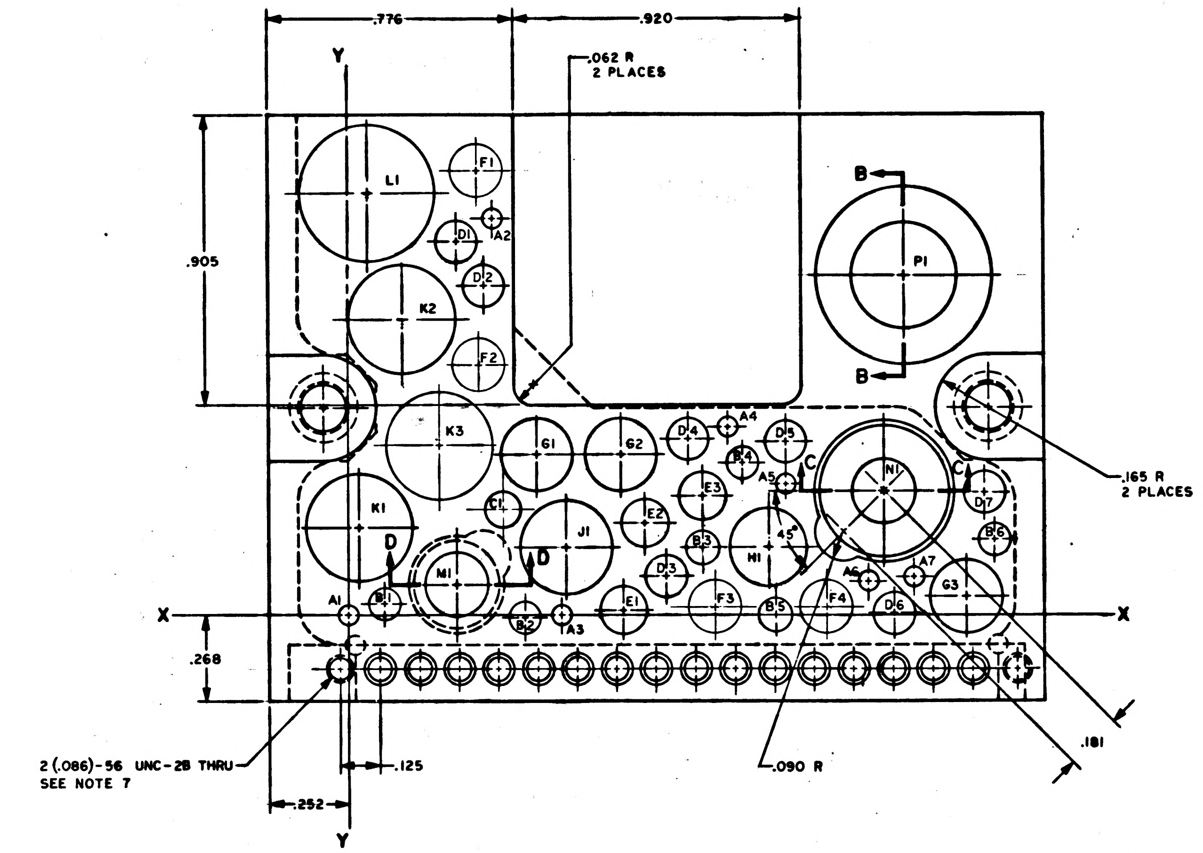
HEATSINK,
POWER SUPPLY SIGNAL CONDITIONER

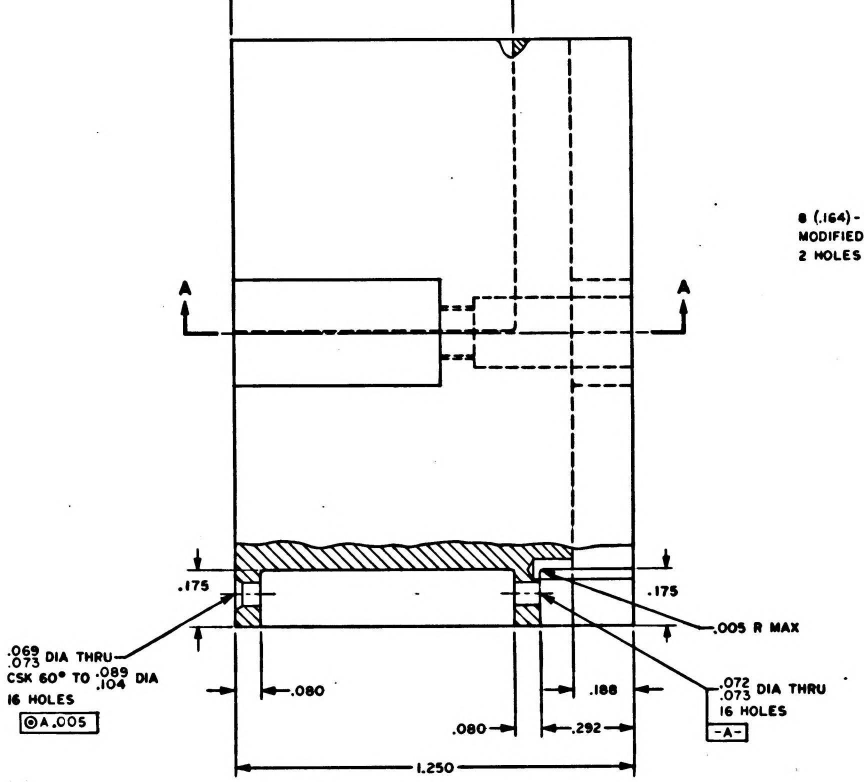
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008147
SCALE 5/1
SHEET 1 OF 1

2008147 A

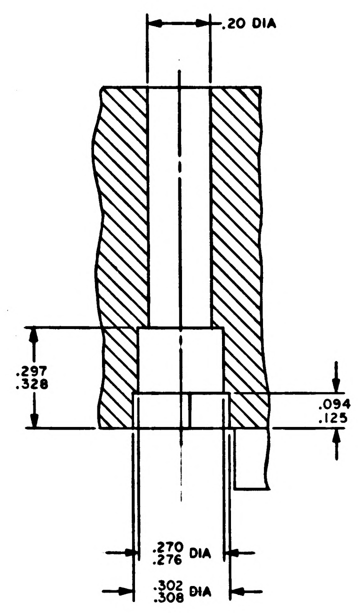
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.058/.062	7
A2	.456	1.234		
A3	.674	.000		
A4	1.200	.584		
A5	1.384	.406		
A6	1.646	.104		
A7	1.788	.118		
B1	.112	.034	.100/.104	6
B2	.558	-.008		
B3	1.122	.210		
B4	1.246	.472		
B5	1.352	.000		
B6	2.042	.234		
C1	.490	.330	.112/.116	1
D1	.342	1.162	.127/.131	7
D2	.430	1.024		
D3	1.006	.122		
D4	1.076	.546		
D5	1.384	.538		
D6	1.726	.004		
D7	2.010	.380		
E1	.870	.014	.146/.150	3
E2	.938	.286		
E3	1.122	.370		
F1	.406	1.384	.166/.170	4
F2	.414	.780		
F3	1.160	.025		
F4	1.515	.025		
G1	.596	.498	.227/.231	3
G2	.864	.498		
G3	1.954	.058		
H1	1.330	.210	.241/.245	1
J1	.690	.210	.288/.295	1
K1	.034	.272	.330/.337	3
K2	.172	.920		
K3	.286	.530		
L1	.062	1.315	.420/.427	1
M1	.342	.094	SEE SECT D-D	1
N1	1.694	.384	SEE SECT C-C	1
P1	1.758	1.056	SEE SECT B-B	1

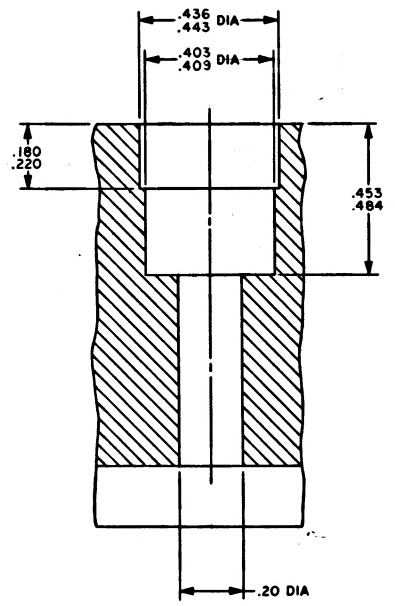

.776
.920
.062 R
2 PLACES
Y
X
.905
B
L1
F1
D1
A2
D2
K2
F2
P1
K3
G1
G2
D4
A4
D5
E3
C1
K1
D
M1
J1
E2
B3
H1
45°
B4
A5
C
N1
D7
B6
A7
G3
A6
F4
F3
D3
E1
B2
A3
B5
D6
A1
B1
.165 R
2 PLACES
.268
2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125
.252
.090 R
.181


.885
A
.175
.069/.073 DIA THRU
CSK 60° TO .089/.104 DIA
16 HOLES
⊚ A .005
.080
.080
.188
.292
1.250
.175
.005 R MAX
.072/.073 DIA THRU
16 HOLES
-A-

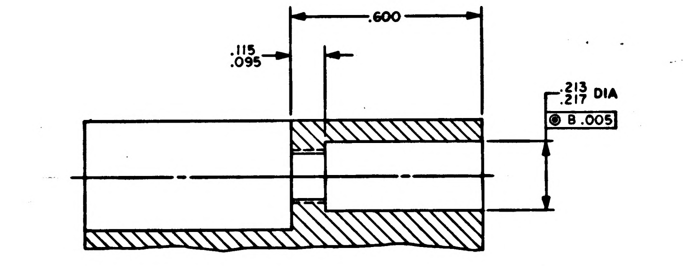
-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143/.148
2 HOLES
1.825
.145
32
— .0004


.20 DIA
.297/.328
.094/.125
.270/.276 DIA
.302/.308 DIA

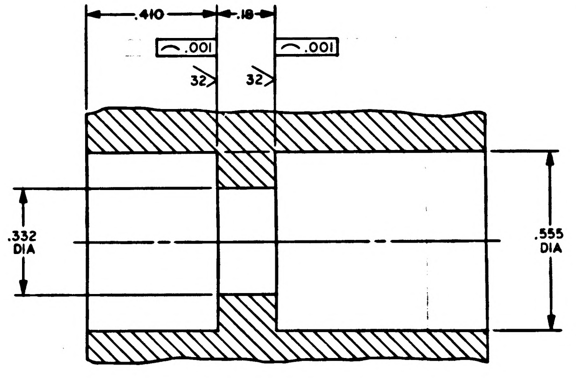
PARTIAL SECTION D-D


.436/.443 DIA
.403/.409 DIA
.180/.220
.453/.484
.20 DIA

PARTIAL SECTION C-C


.600
.115/.095
.213/.217 DIA
⊚ B .005

PARTIAL SECTION A-A


.410
.18
⌒ .001
⌒ .001
32
32
.332 DIA
.555 DIA

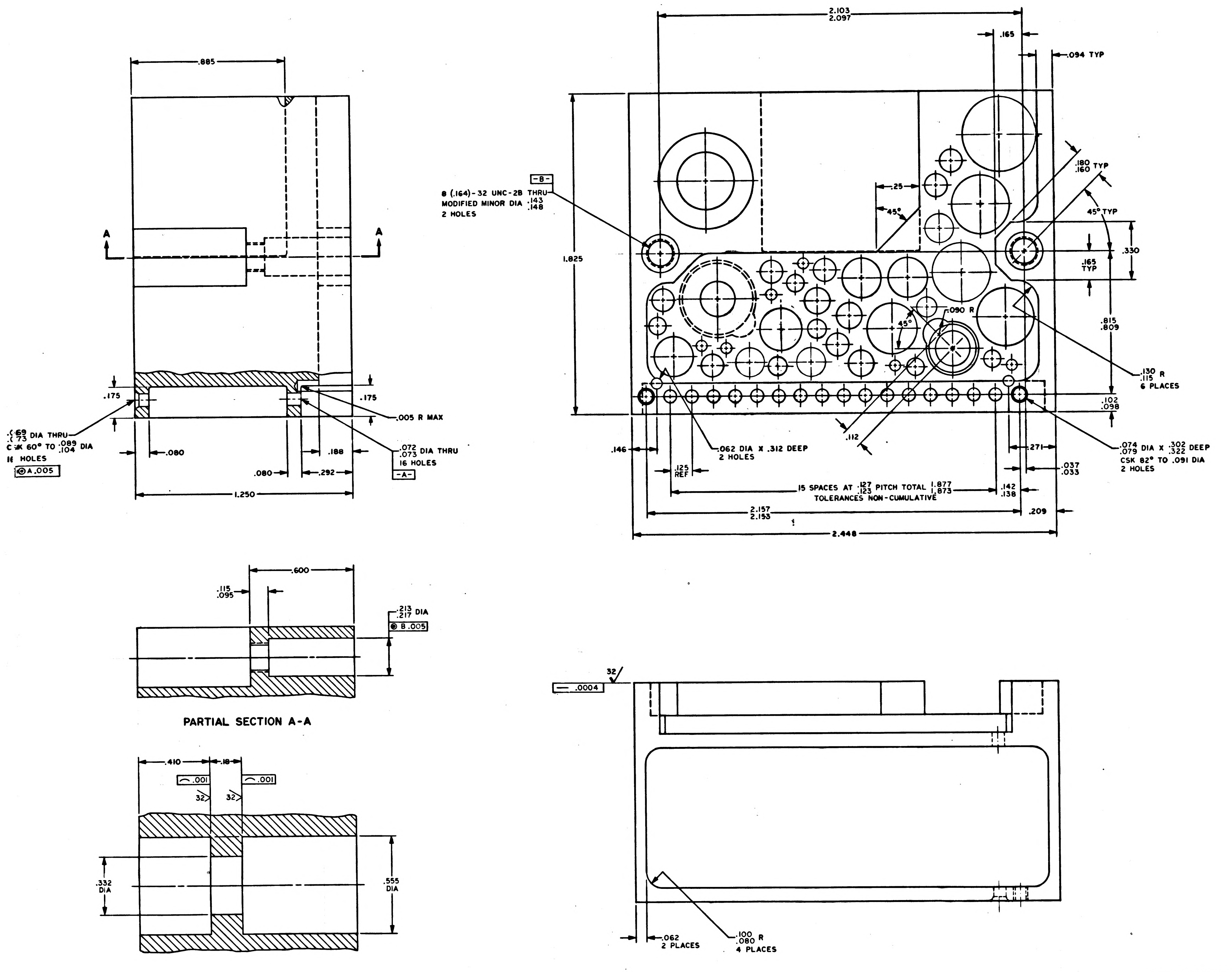
PARTIAL SECTION B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

2008147 A

REVISIONS 18843						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20144			21JUN65	
B		REVISED PER TDRR 20419			21 Jul 65	



.885
A
A
.175
.175
.005 R MAX
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
16 HOLES
◎ A .005
.080
.188
.080
.292
.072 .073 DIA THRU
16 HOLES
-A-
1.250
2.103 2.097
.165
.094 TYP
-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.25
45°
.180 .160 TYP
45° TYP
.330
.165 TYP
1.825
.090 R
45°
.815 .809
.130 .115 R
6 PLACES
.102 .098
.112
.146
.062 DIA X .312 DEEP
2 HOLES
.271
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125 REF
.037 .033
15 SPACES AT .127 .123 PITCH TOTAL 1.877 1.873
TOLERANCES NON-CUMULATIVE
.142 .138
2.157 2.153
.209
2.448
.600
.115 .095
.213 .217 DIA
◎ B .005
.410
.18
⌒ .001
⌒ .001
32
32
.332 DIA
.555 DIA
32
— .0004
.062
2 PLACES
.100 .080 R
4 PLACES

PARTIAL SECTION A-A

PARTIAL SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±   DECIMALS .XX ± .010 .XXX ± .005   ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007119	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Van Healy 3 Apr 65
CHECKED 4MAY65
APPROVED 4MAY65
APPROVED 5/4/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK,
POWER SUPPLY
SIGNAL CONDITIONER

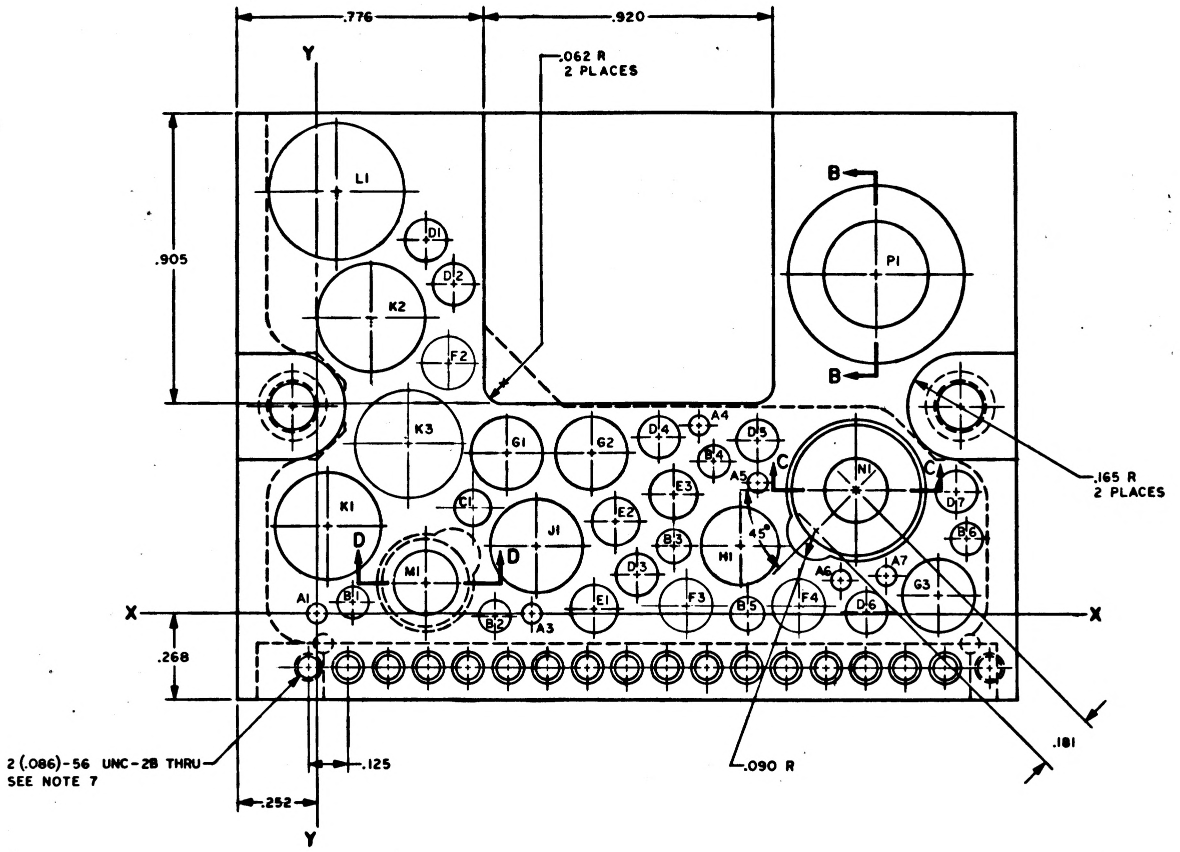
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008147
SCALE 5/1
SHEET 1 OF 1

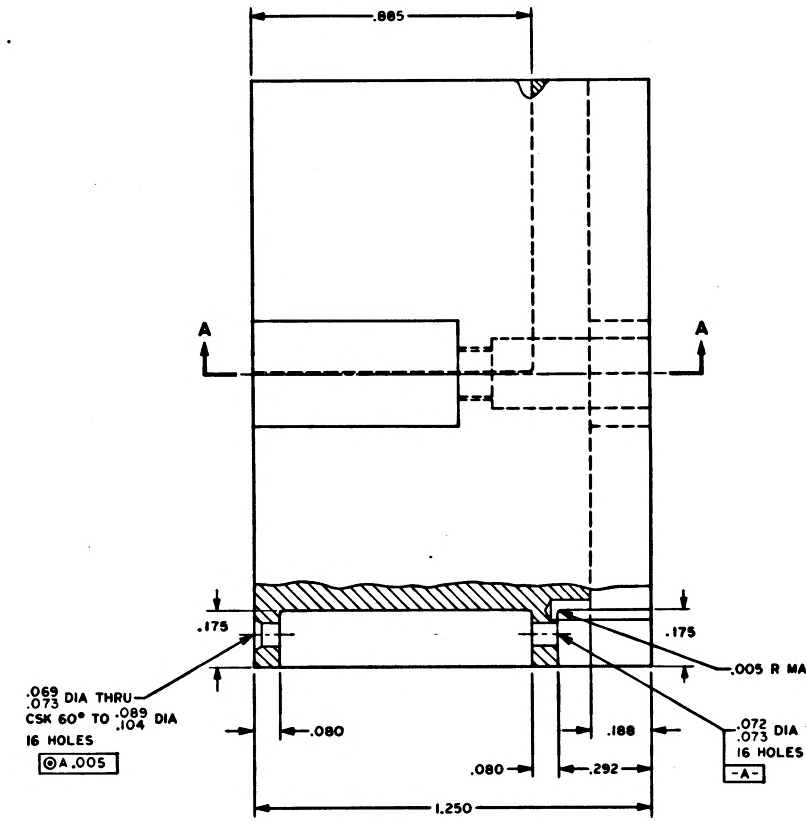
2008147 B

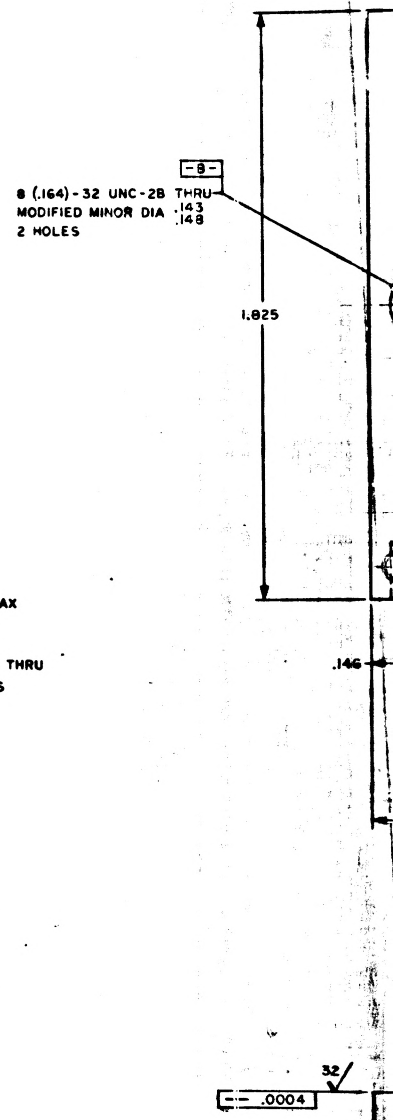
2008147 B

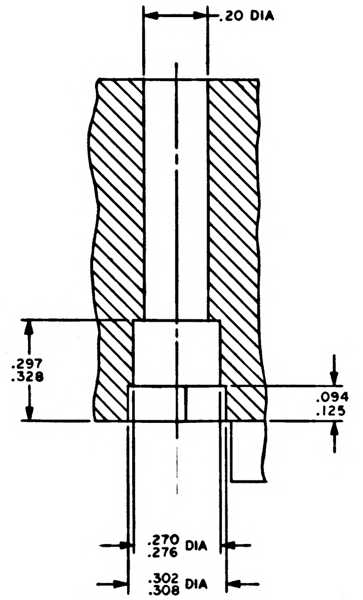
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.058/.062	6
A3	.674	.000		
A4	1.200	.584		
A5	1.384	.406		
A6	1.646	.104		
A7	1.788	.118		
B1	.112	.034	.100/.104	6
B2	.558	-.008		
B3	1.122	.210		
B4	1.246	.472		
B5	1.352	.000		
B6	2.042	.234		
C1	.490	.330	.112/.116	1
D1	.342	1.162	.127/.131	7
D2	.430	1.024		
D3	1.006	.122		
D4	1.076	.546		
D5	1.384	.538		
D6	1.726	.004		
D7	2.010	.380		
E1	.870	.014	.146/.150	3
E2	.938	.286		
E3	1.122	.370		
F2	.414	.780	.166/.170	3
F3	1.160	.025		
F4	1.515	.025		
G1	.596	.498	.227/.231	3
G2	.864	.498		
G3	1.954	.058		
H1	1.330	.210	.241/.245	1
J1	.690	.210	.288/.295	1
K1	.034	.272	.330/.337	3
K2	.172	.920		
K3	.286	.530		
L1	.062	1.315	.420/.427	1
M1	.342	.094	SEE SECT D-D	1
N1	1.694	.384	SEE SECT C-C	1
P1	1.758	1.056	SEE SECT B-B	1

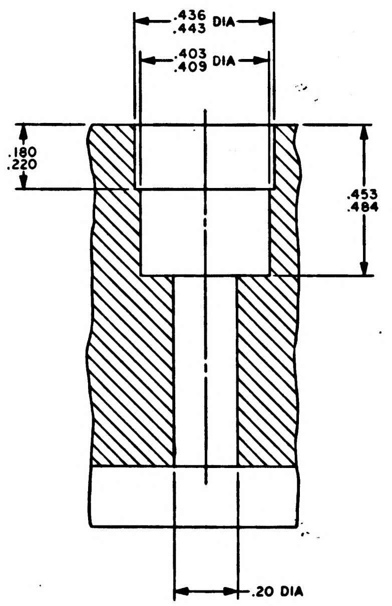

.776
.920
.062 R
2 PLACES
Y
X
.905
L1
D1
D2
K2
F2
P1
B
K3
G1
G2
D4
A4
B4
D5
C
N1
A5
E3
K1
C1
J1
E2
B3
45°
H1
D7
B6
D
M1
D3
A6
A7
G3
A1
B1
B2
A3
E1
F3
B5
F4
D6
.268
.165 R
2 PLACES
.181
.090 R
2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125
.252


.885
A
.175
.175
.005 R MAX
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
16 HOLES
◎ A .005
.080
.188
.080
.292
.072 .073 DIA THRU
16 HOLES
-A-
1.250

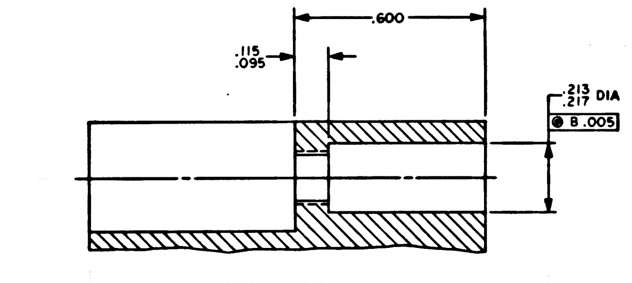

-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.825
.146
32
.0004


.20 DIA
.297 .328
.094 .125
.270 .276 DIA
.302 .308 DIA

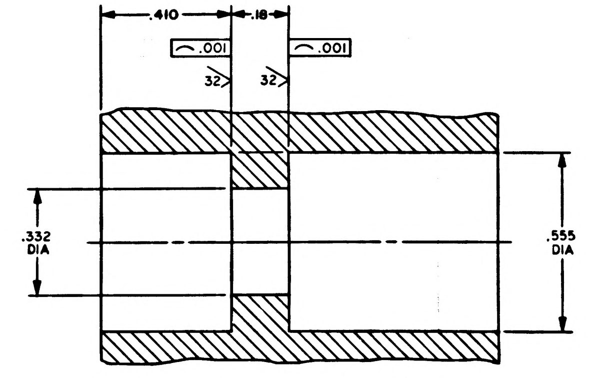
PARTIAL SECTION D-D


.436 .443 DIA
.403 .409 DIA
.180 .220
.453 .484
.20 DIA

PARTIAL SECTION C-C


.600
.115 .095
.213 .217 DIA
◎ B .005

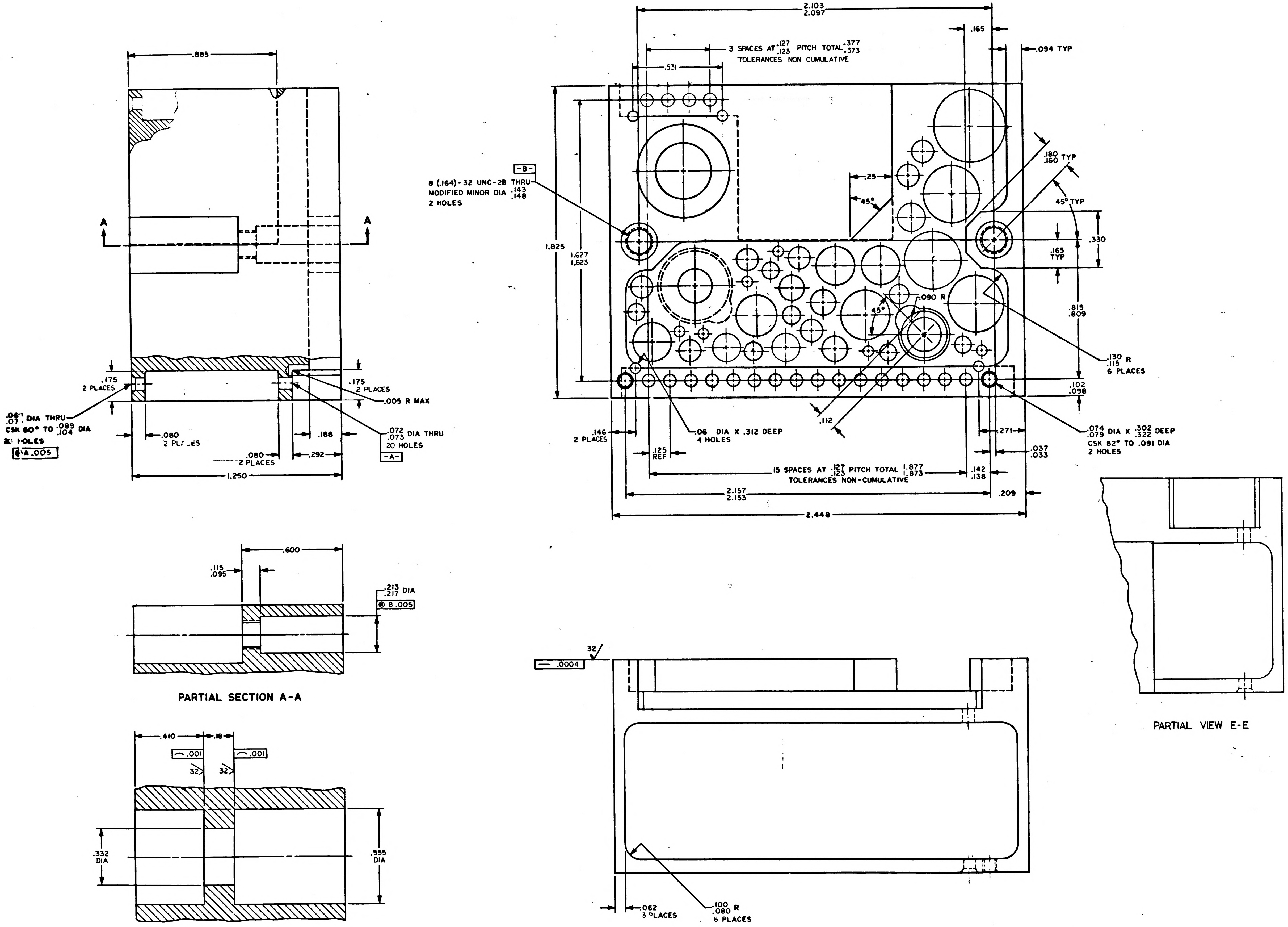
PARTIAL SECTION A-A


.410
.18
⌒ .001
⌒ .001
32
32
.332 DIA
.555 DIA

PARTIAL SECTION B-B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE 1, CLASS C.
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

SYM	ZONE	REVISIONS 18843 DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20144			23JUN65	
B		REVISED PER TDRR 20419				WK
C		REVISED PER TDRR 21314				WK



.885
A
A
.175
2 PLACES
.175
2 PLACES
.005 R MAX
.06 .07 DIA THRU
CSK 60° TO .089 .104 DIA
20 HOLES
Ⓐ A .005
.080
2 PLACES
.072 .073 DIA THRU
20 HOLES
-A-
.188
.292
.080
2 PLACES
1.250
2.103 2.097
.165
3 SPACES AT .127 .123 PITCH TOTAL .377 .373
TOLERANCES NON CUMULATIVE
.531
.094 TYP
-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.825
1.627 1.623
.25
45°
.180 .160 TYP
45° TYP
.330
.165 TYP
.090 R
45°
.815 .809
.130 .115 R
6 PLACES
.102 .098
.112
.146
2 PLACES
.06 DIA X .312 DEEP
4 HOLES
.271
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.037 .033
.125 REF
15 SPACES AT .127 .123 PITCH TOTAL 1.877 1.873
TOLERANCES NON-CUMULATIVE
.142 .138
2.157 2.153
.209
2.448
.600
.115 .095
.213 .217 DIA
Ⓞ B .005
PARTIAL SECTION A-A
32
.0004
.410
.18
.001
.001
32
32
.332 DIA
.555 DIA
.062
3 PLACES
.100 .080 R
6 PLACES
PARTIAL VIEW E-E

PARTIAL SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007119	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.010 .XXX ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Ken Healy
CHECKED 4MAY65
APPROVED
APPROVED 5/4/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK,
POWER SUPPLY
SIGNAL CONDITIONER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008147
SCALE 5/1
SHEET 1 OF 1

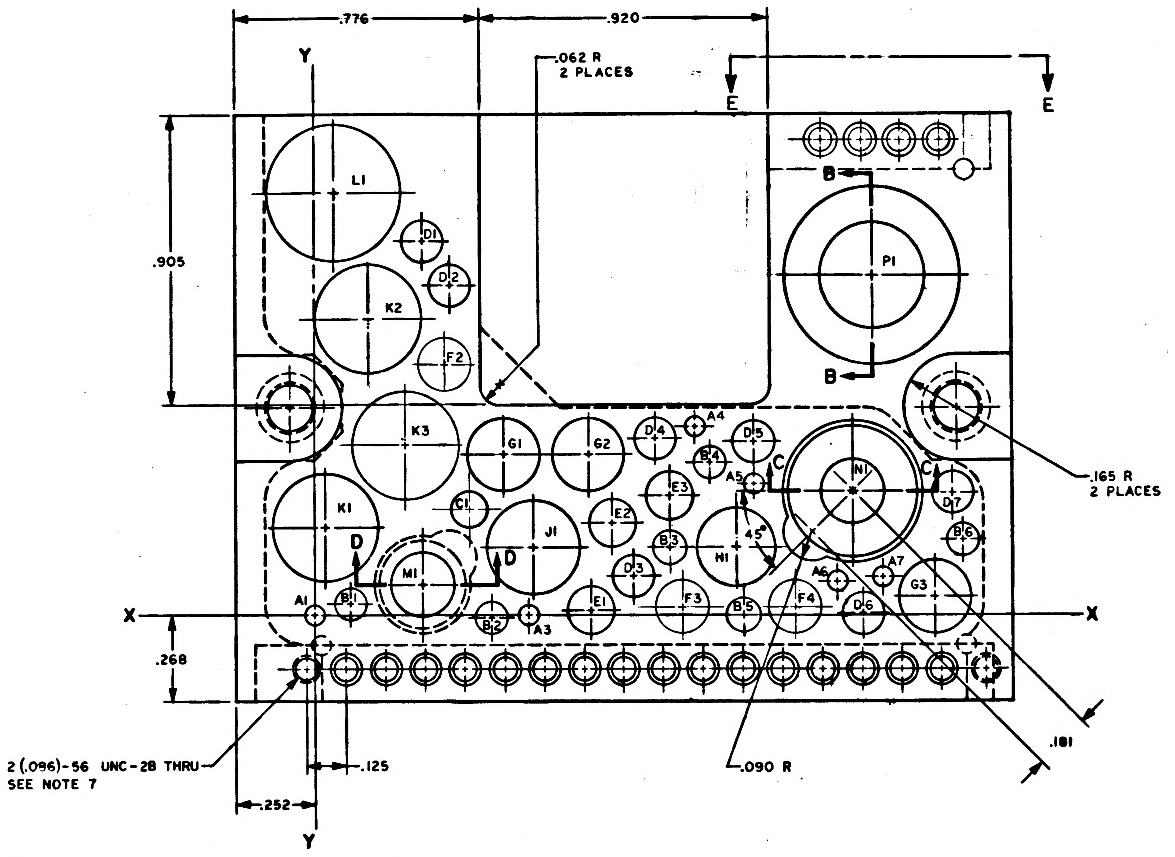
2008147 C

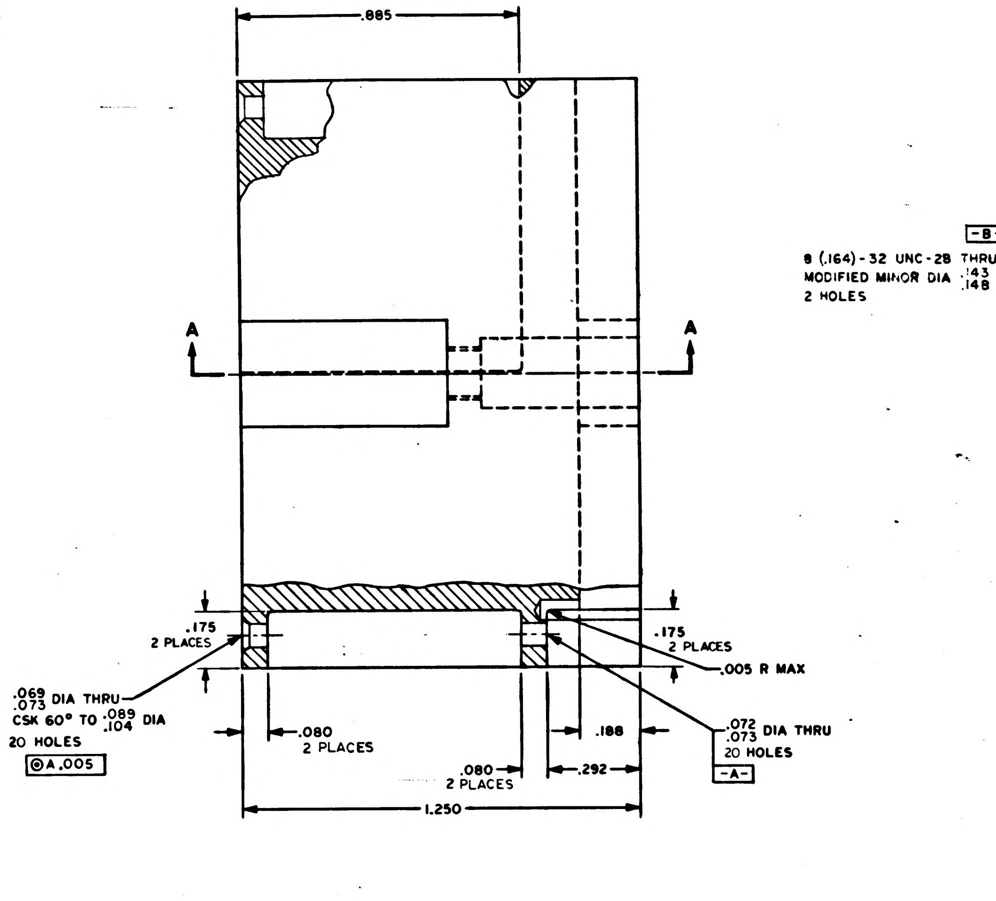
2 14

F-2

[illegible] DRAWINGS, SPECIFICATIONS, OR OTHER DATA [illegible] USED FOR [illegible] CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

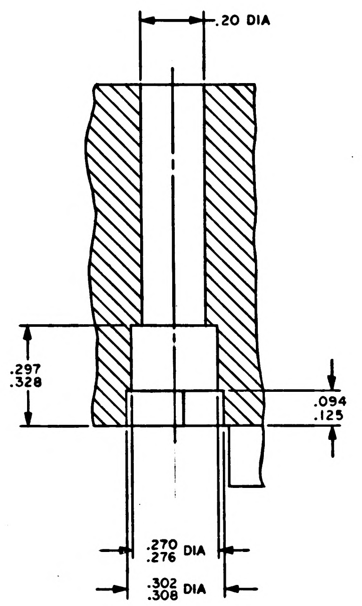
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.058/.062	6
A3	.674	.000		
A4	1.200	.584		
A5	1.384	.406		
A6	1.646	.104		
A7	1.788	.118		
B1	.112	.034	.100/.104	6
B2	.558	-.008		
B3	1.122	.210		
B4	1.246	.472		
B5	1.352	.000		
B6	2.042	.234		
C1	.490	.330	.112/.116	1
D1	.342	1.162	.127/.131	7
D2	.430	1.024		
D3	1.006	.122		
D4	1.076	.546		
D5	1.384	.538		
D6	1.726	.004		
D7	2.010	.380		
E1	.870	.014	.146/.150	3
E2	.938	.286		
E3	1.122	.370		
F2	.414	.780	.166/.170	3
F3	1.160	.025		
F4	1.515	.025		
G1	.596	.498	.227/.231	3
G2	.864	.498		
G3	1.954	.058		
H1	1.330	.210	.241/.245	1
J1	.690	.210	.288/.295	1
K1	.034	.272	.330/.337	3
K2	.172	.920		
K3	.286	.530		
L1	.062	1.315	.420/.427	1
M1	.342	.094	SEE SECT D-D	1
N1	1.694	.384	SEE SECT C-C	1
P1	1.758	1.056	SEE SECT B-B	1


.776
.920
.062 R
2 PLACES
Y
E
E
B
B
.905
L1
K2
D1
D2
F2
P1
K3
G1
G2
D4
A4
D5
B4
E3
C
A5
N1
C
D7
K1
C1
E2
B3
45°
B6
H1
J1
D
D
M1
D3
A6
A7
G3
A1
B1
B2
A3
E1
F3
B5
F4
D6
X
X
.268
.165 R
2 PLACES
2 (.096)-56 UNC-2B THRU
SEE NOTE 7
.125
.252
Y
.090 R
.181


.885
-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143/.148
2 HOLES
A
A
.175
2 PLACES
.175
2 PLACES
.005 R MAX
.069/.073 DIA THRU
CSK 60° TO .089/.104 DIA
20 HOLES
⊚ A .005
.080
2 PLACES
.080
2 PLACES
.188
.292
.072/.073 DIA THRU
20 HOLES
-A-
1.250

1.125
1.627/1.523
.188
2 PLACES
32
.0004

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019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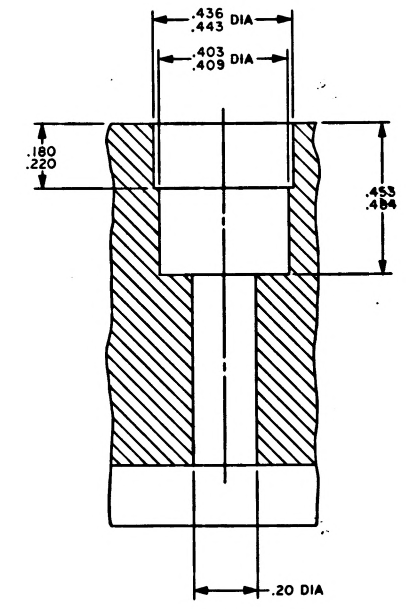
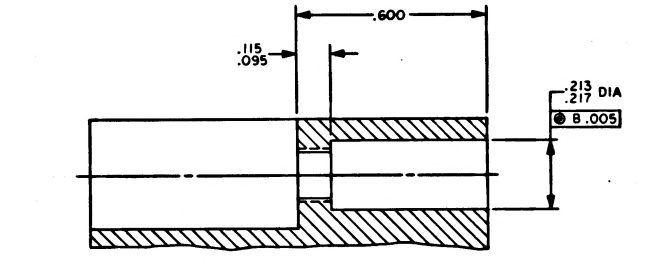
.297/.328
.094/.125
.270/.276 DIA
.302/.308 DIA

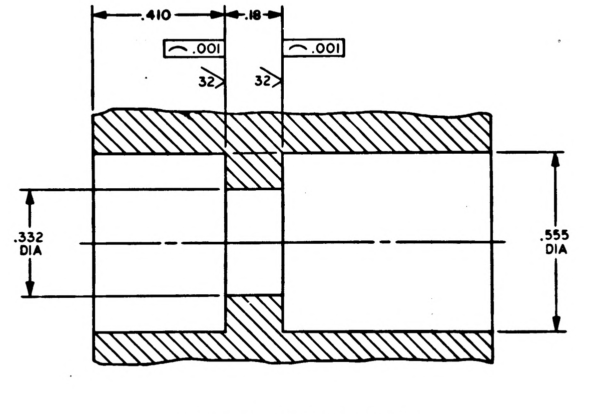
PARTIAL SECTION D-D


.436/.443 DIA
.403/.409 DIA
.180/.220
.453/.484
.20 DIA

PARTIAL SECTION C-C


.600
.115/.095
.213/.217 DIA
⊚ B .005

PARTIAL SECTION A-A


.410
.18
⌒ .001
⌒ .001
32
32
.332 DIA
.555 DIA

PARTIAL SECTION B-B

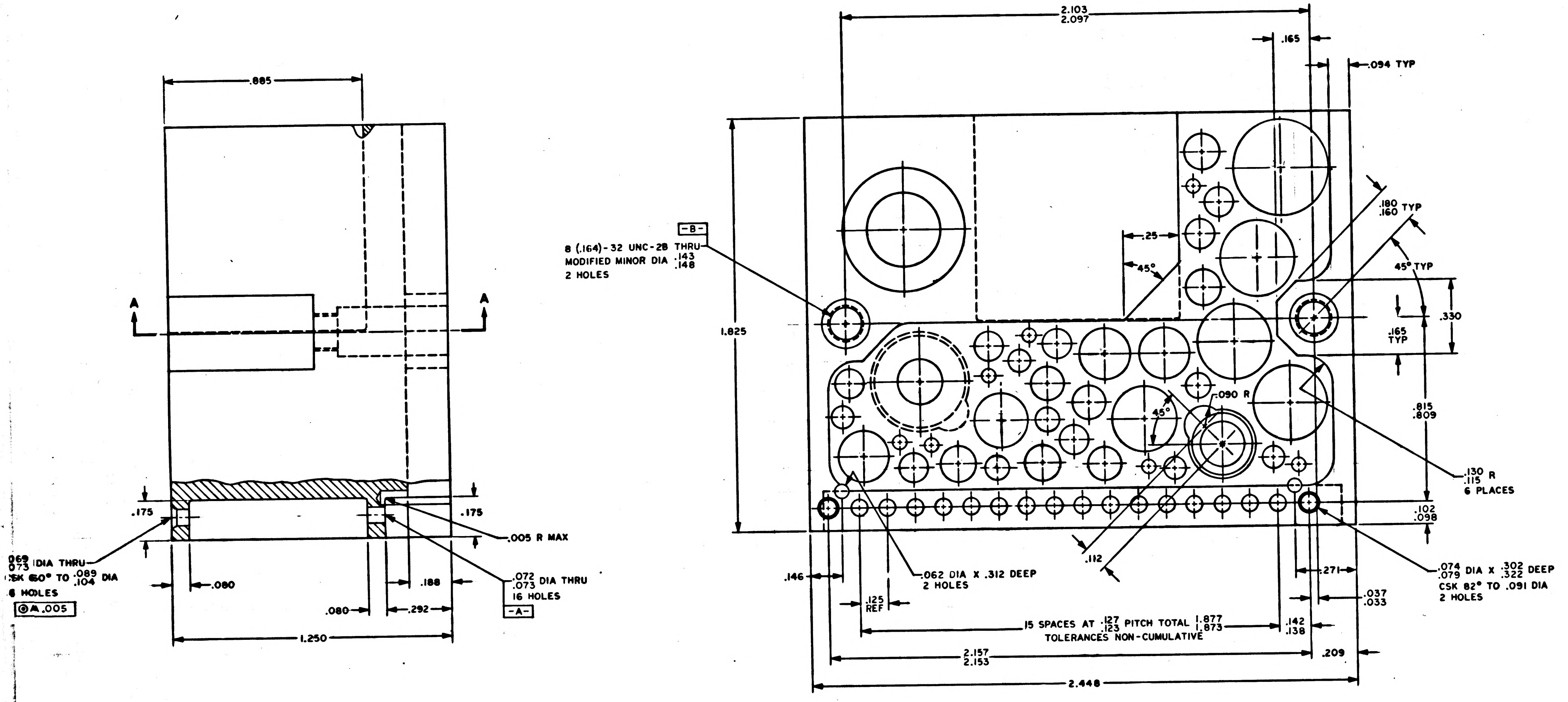
24

2008147 C

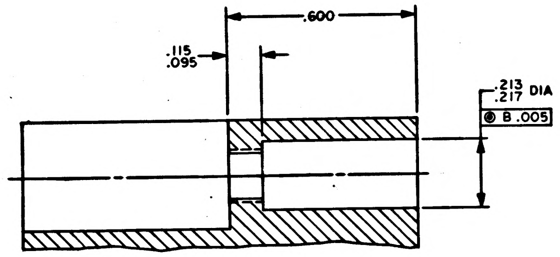
F-1

REVISIONS 8843

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED



.885
A
A
.175
.175
.005 R MAX
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
6 HOLES
⊚A .005
.080
.188
.072 .073 DIA THRU
16 HOLES
-A-
.080
.292
1.250
2.103 2.097
.165
.094 TYP
-B-
8 (.164)-32 UNC-28 THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.25
45°
.180 .160 TYP
45° TYP
.330
.165 TYP
1.825
.090 R
45°
.815 .809
.130 .115 R
6 PLACES
.102 .098
.112
.062 DIA X .312 DEEP
2 HOLES
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.146
.125 REF
.271
.037 .033
15 SPACES AT .127 .123 PITCH TOTAL 1.877 1.873
TOLERANCES NON-CUMULATIVE
.142 .138
2.157 2.153
.209
2.448



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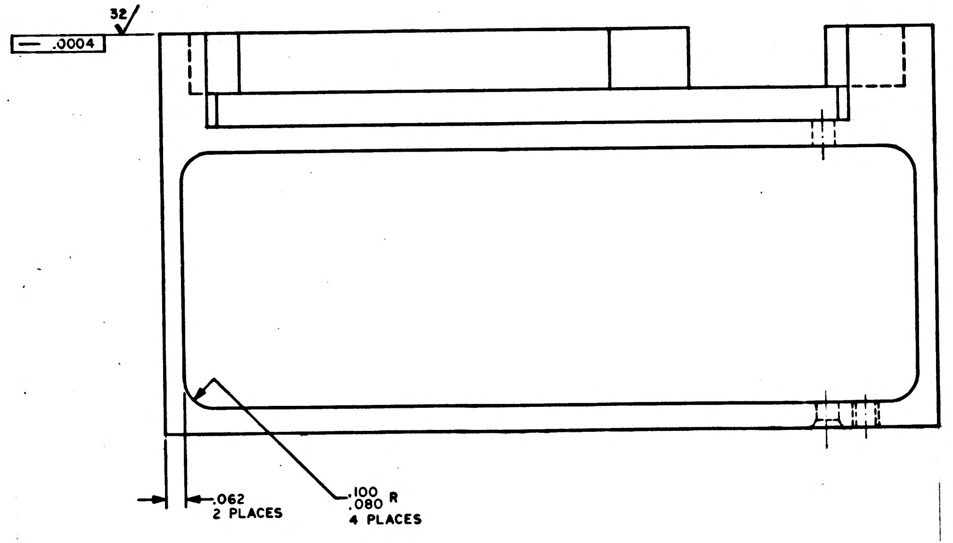
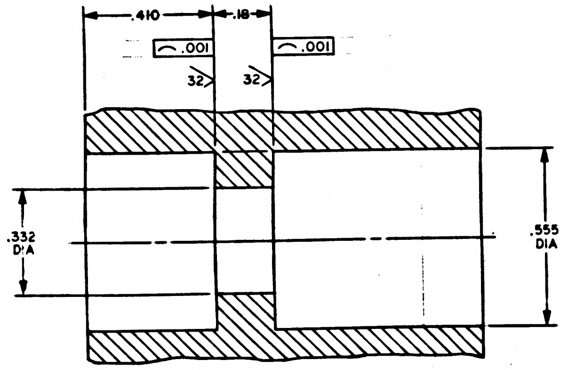
.115 .095
.213 .217 DIA
⊚ B .005

PARTIAL SECTION A-A



32
— .0004
.062
2 PLACES
.100 .080 R
4 PLACES



.410
.18
⌒ .001
⌒ .001
32
32
.332 DIA
.555 DIA

PARTIAL SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007119	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS XX ± .010 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED 4MAY65
APPROVED 3MA-65
APPROVED 5/4/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK,
POWER SUPPLY
SIGNAL CONDITIONER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008147
SCALE 5/1
SHEET 1 OF 1

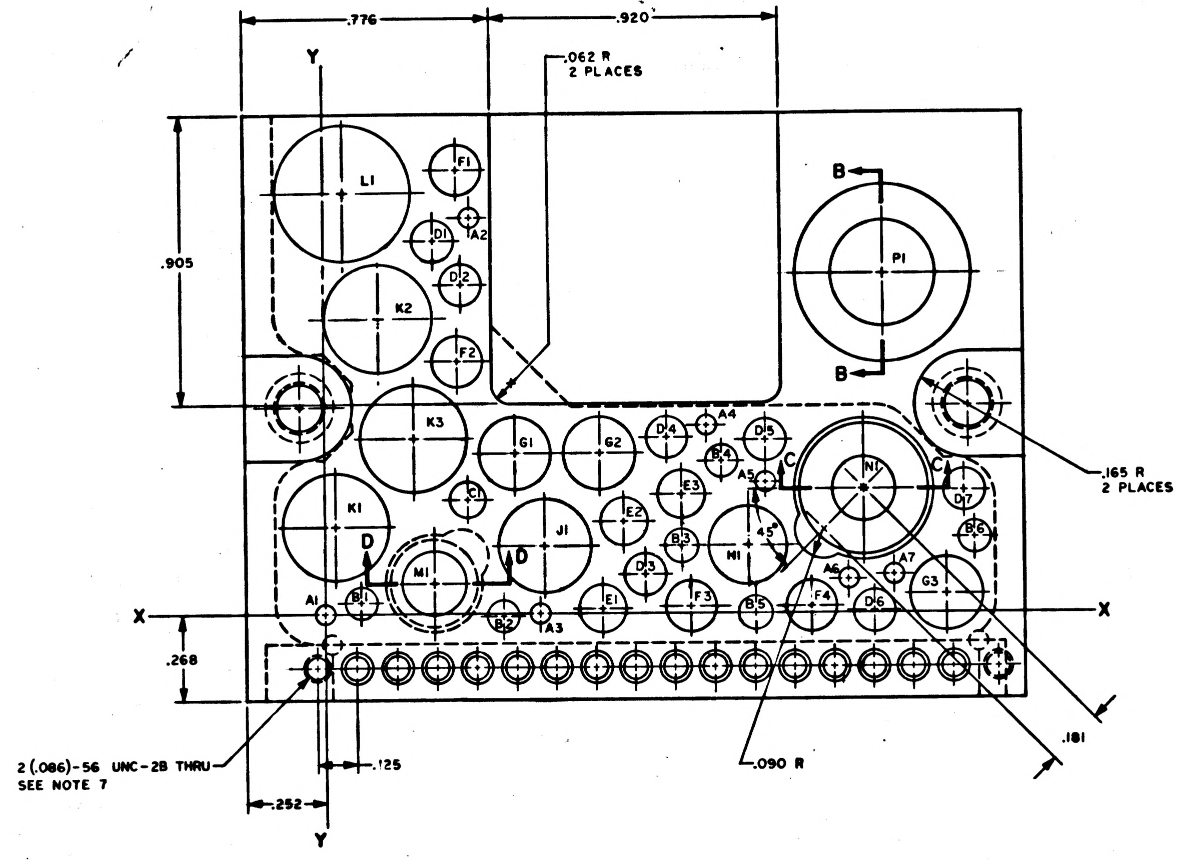
2008147

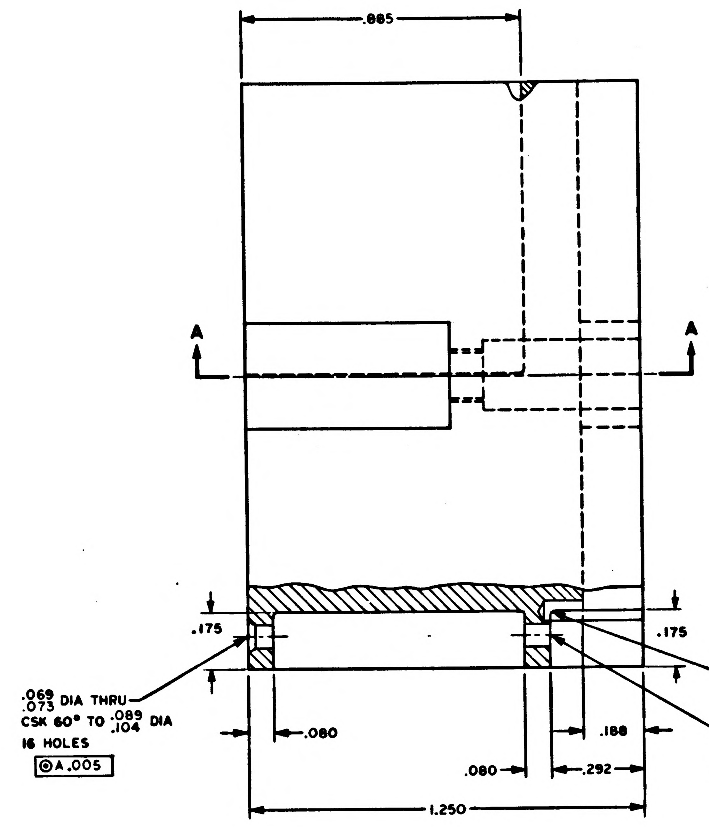
2H

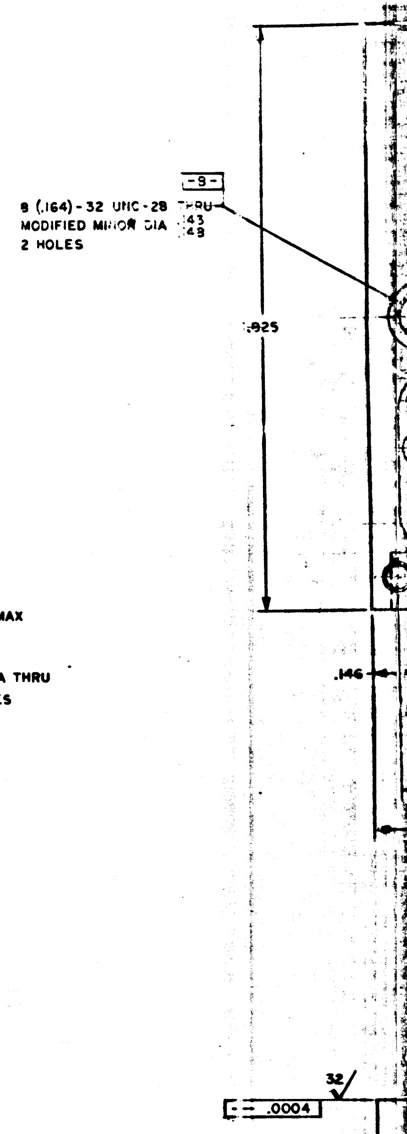
2008147

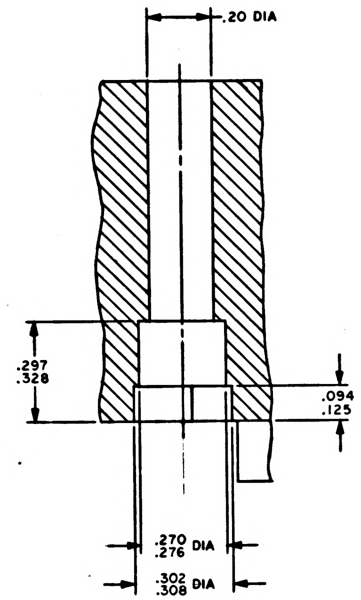
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.058/.062	7
A2	.456	1.234		
A3	.674	.000		
A4	1.200	.584		
A5	1.384	.406		
A6	1.646	.104		
A7	1.788	.118		
B1	.112	.034	.100/.104	6
B2	.558	-.008		
B3	1.122	.210		
B4	1.246	.472		
B5	1.352	.000		
B6	2.042	.234		
C1	.448	.354	.112/.116	1
D1	.342	1.162	.127/.131	7
D2	.430	1.024		
D3	1.006	.122		
D4	1.076	.546		
D5	1.384	.538		
D6	1.726	.004		
D7	2.010	.380		
E1	.870	.014	.146/.150	3
E2	.938	.286		
E3	1.122	.370		
F1	.416	1.384	.156/.160	4
F2	.418	.786		
F3	1.148	.020		
F4	1.528	.020		
G1	.596	.498	.227/.231	3
G2	.864	.498		
G3	1.954	.058		
H1	1.330	.210	.241/.245	1
J1	.690	.210	.288/.295	1
K1	.034	.272	.330/.337	3
K2	.172	.920		
K3	.280	.546		
L1	.062	1.315	.420/.427	1
M1	.342	.094	SEE SECT D-D	1
N1	1.694	.384	SEE SECT C-C	1
P1	1.758	1.056	SEE SECT B-B	1

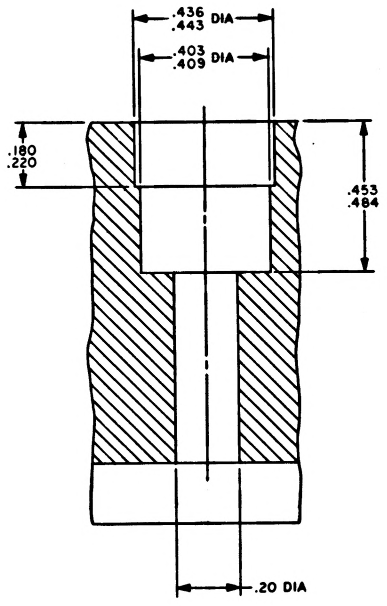

.776
.920
.062 R
2 PLACES
Y
.905
L1
F1
A2
D1
D2
K2
F2
P1
B
B
K3
G1
G2
D4
A4
D5
B4
A5
C
N1
C
E3
D7
K1
C1
E2
J1
B3
N1
45°
B6
D
M1
D
D3
A6
A7
G3
A1
B1
B2
A3
E1
F3
B5
F4
D6
X
X
.268
.165 R
2 PLACES
.181
2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125
.252
.090 R
Y


.885
A
A
.175
.175
.005 R MAX
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
16 HOLES
◎A.005
.080
.080
.188
.292
.072
.073 DIA THRU
16 HOLES
-A-
1.250

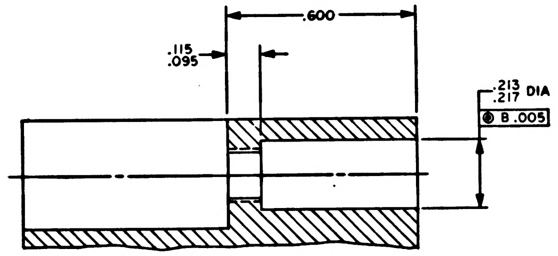

-B-
8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
.925
.146
32
.0004


.20 DIA
.297
.328
.094
.125
.270
.276 DIA
.302
.308 DIA

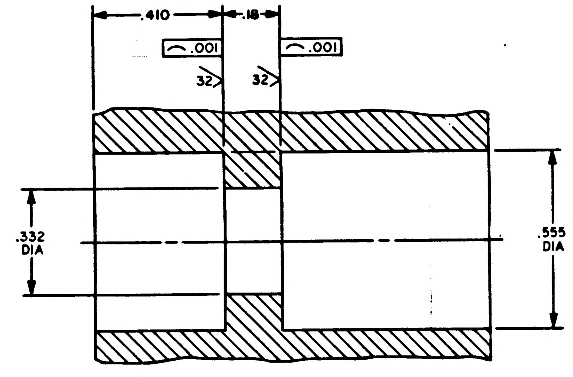
PARTIAL SECTION D-D


.436
.443 DIA
.403
.409 DIA
.180
.220
.453
.484
.20 DIA

PARTIAL SECTION C-C


.600
.115
.095
.213
.217 DIA
◎ B.005

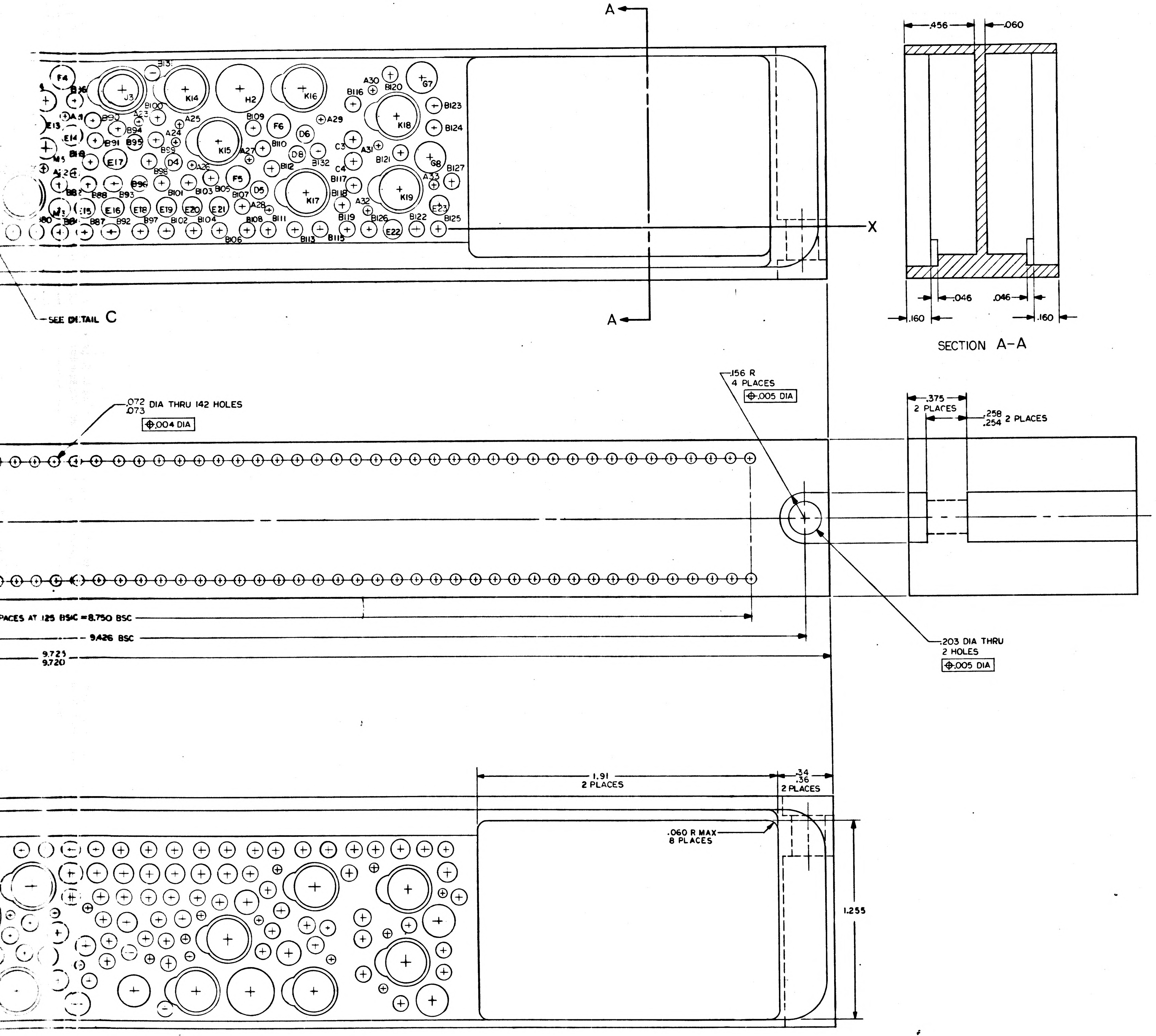
PARTIAL SECTION A-A


.410
.18
⌒.001
⌒.001
32
32
.332
DIA
.555
DIA

PARTIAL SECTION B-B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS ~952						
A		REVISED PER TDRR 21130				


A
A
X
SEE DETAIL C
.456
.060
.046
.046
.160
.160
SECTION A-A
.156 R
4 PLACES
⊕.005 DIA
.072
.073 DIA THRU 142 HOLES
⊕.004 DIA
.375
2 PLACES
.258
.254 2 PLACES
.203 DIA THRU
2 HOLES
⊕.005 DIA
PACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
1.91
2 PLACES
.34
.36
2 PLACES
.060 R MAX
8 PLACES
1.255
F4
J3
K14
H2
K16
G7
K18
K15
K17
K19
F5
F6
D4
D5
D6
D8
E17
E22
E23
G8
B123
B124
B125
B127

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007152	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R. Romey
CHECKED
APPROVED
APPROVED 3/23/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

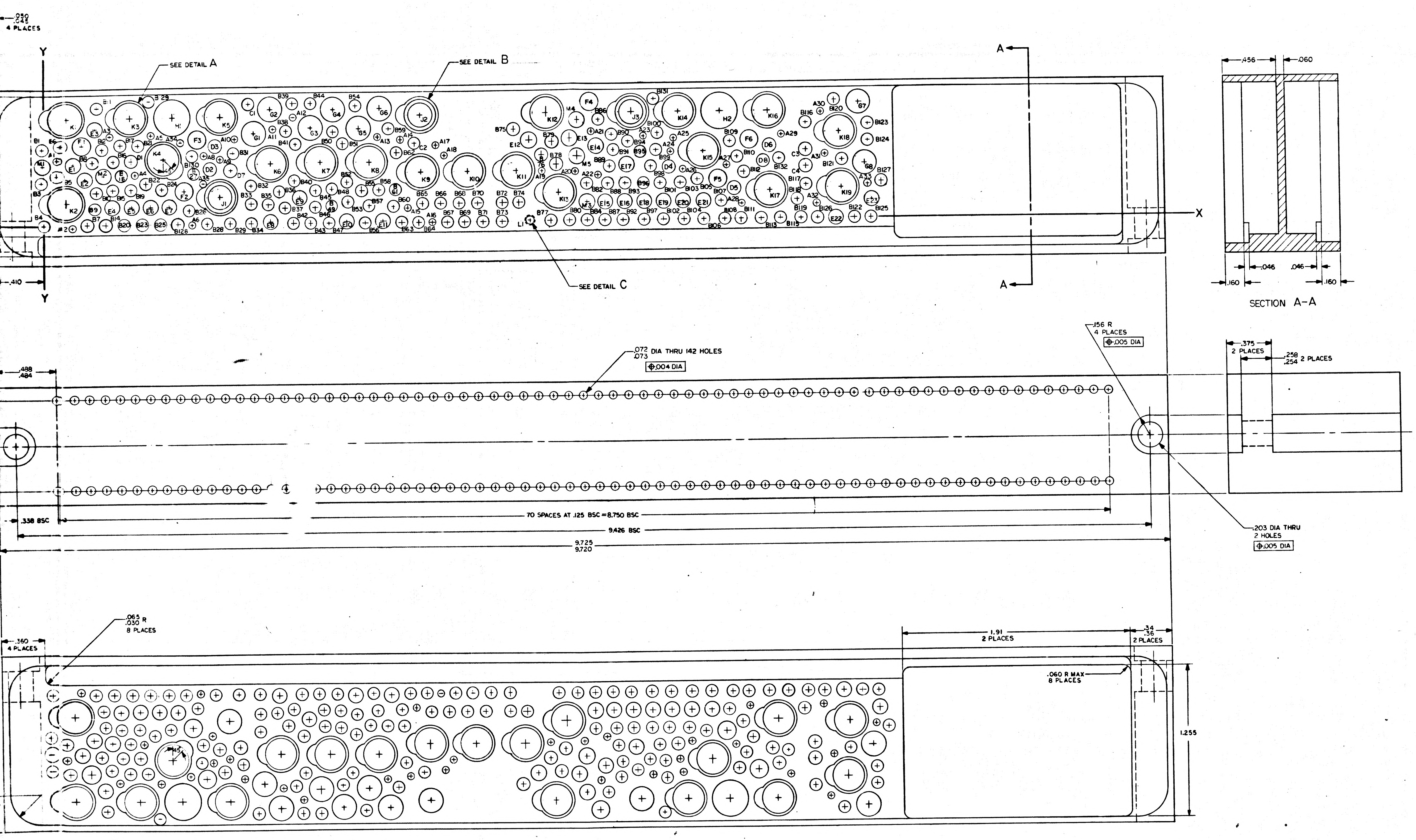
HEADER HOUSING
MODE MODULE

CODE IDENT NO —
SIZE J
DRAWING NO. 2008148
SCALE 4/1
SHEET 1 OF 1

2008148 A

3H

E3


.050
.045
4 PLACES
Y
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
A
A
X
Y
.410
.456
.060
.160
.046
.046
.160
SECTION A-A
.156 R
4 PLACES
⌖.005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.072
.073 DIA THRU 142 HOLES
⌖.004 DIA
.488
.484
.338 BSC
70 SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
.203 DIA THRU
2 HOLES
⌖.005 DIA
.065
.030 R
8 PLACES
.360
4 PLACES
1.91
2 PLACES
.34
.36
2 PLACES
.060 R MAX
8 PLACES
1.255

MASTER

2008148 A

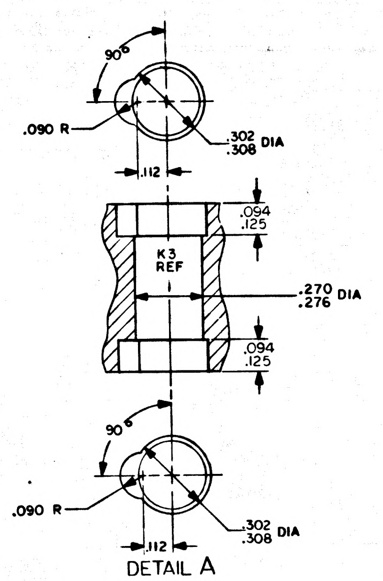
F-2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

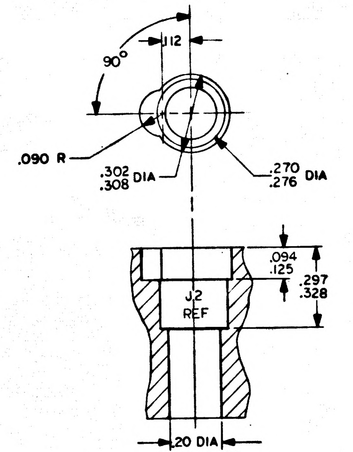
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.100	.537	.058 .062	34
A2	.215	-.025		
A3	.520	.730		
A4	.725	.410		
A5	.860	.735		
A6	1.195	-.010		
A7	——	——		
A8	1.300	.550		
A9	1.440	.532		
A10	1.565	.695		
A11	1.885	.775		
A12	2.055	.870		
A13	2.767	.707		
A14	2.955	.685		
A15	3.012	.120		
A16	3.215	.000		
A17	3.250	.637		
A18	3.315	.550		
A19	4.130	.407		
A20	4.408	.400		
A21	4.542	.732		
A22	4.592	.375		
A23	4.980	.692		
A24	5.202	.560		
A25	5.225	.670		
A26	5.300	.410		
A27	5.665	.440		
A28	5.790	.125		
A29	6.130	.690		
A30	6.450	.875		
A31	6.488	.525		
A32	6.410	.115		
A33	6.835	.275		
A34	1.104	.674		
A35	1.293	.334		
B1	-.010	.632	.100 .104	71
B2	——	——		
B3	-.017	.350		
B4	.000	.000		
B5	.100	.407		
B6	.125	.655		
B7	.330	.000		
B8	.377	.515		
B9	.390	.130		
B10	.407	.265		
B11	.415	.967		
B12	.457	.625		
B13	——	——		
B14	.480	.000		
B15	.542	.287		
B16	.545	.527		
B17	.607	.657		
B18	.610	.407		
B19	.687	.287		
B20	.630	.000		
B21	.750	.652		
B22	.817	.337		
B23	.780	.000		
B24	.945	.287		
B25	.930	.000		
B26	1.172	.110		
B27	1.215	.412		
B28	1.325	.000		
B29	1.520	.000		
B30	——	——		
B31	1.550	.580		
B32	1.700	.310		
B33	1.700	.160		
B34	1.700	.000		
B35	1.840	.155		
B36	1.935	.262		
B37	1.980	.125		
B38	1.997	.762		
B39	2.050	.985		
B40	2.065	.350		
B41	2.075	.650		
B42	2.050	.000		
B43	2.195	.000		
B44	2.205	.985		
B45	2.240	.270		
B46	2.235	.132		
B47	2.350	.000		
B48	2.380	.280		
B49	2.375	.140		
B50	2.392	.750		
B51	2.475	.645		
B52	2.505	.335		
B53	2.515	.175		
B54	2.580	.967		
B55	2.625	.265		
B56	2.655	.000		
B57	2.685	.140		
B58	2.770	.270		
B59	2.865	.775		
B60	2.892	.135		
B61	2.912	.270		
B62	2.920	.570		
B63	2.960	.000		
B64	3.100	.000		
B65	3.135	.155		
B66	3.280	.155		
B67	3.340	.000		
B68	3.435	.155		
B69	3.482	.000		
B70	3.590	.155		
B71	3.630	.000		
B72	3.795	.155		
B73	3.795	.000		
B74	3.935	.155		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B75	3.897	.762	.100 .104	54
B76	4.127	.542		
B77	4.200	.000		
B78	4.252	.465		
B79	4.215	.652		
B80	4.355	.000		
B81	——	——		
B82	4.500	.300		
B83	——	——		
B84	4.500	.000		
B85	——	——		
B86	4.600	.830		
B87	4.650	.000		
B88	4.677	.300		
B89	4.690	.442		
B90	4.710	.707		
B91	4.725	.575		
B92	4.800	.000		
B93	4.817	.300		
B94	4.845	.650		
B95	4.950	.560		
B96	4.970	.300		
B97	4.975	.000		
B98	5.037	.442		
B99	5.082	.575		
B100	5.097	.715		
B101	5.110	.300		
B102	5.135	.000		
B103	5.282	.300		
B104	5.305	.000		
B105	5.420	.325		
B106	5.470	.000		
B107	5.615	.150		
B108	5.645	.000		
B109	5.695	.642		
B110	5.757	.512		
B111	5.782	.000		
B112	5.810	.385		
B113	5.950	.000		
B114				
B115	6.110	.000		
B116	6.325	.785		
B117	6.325	.275		
B118	6.250	.150		
B119	6.275	.000		
B120	6.567	.970		
B121	6.625	.480		
B122	6.725	.000		
B123	6.845	.777		
B124	6.845	.637		
B125	6.865	.000		
B126	6.415	.000		
B127	6.950	.300		
B128	1.075	.000		
B129	.843	1.022		
B130	1.200	.560		
B131	5.066	1.000		
B132	6.108	.491		
C1	1.680	.985	.106 .110	4
C2	3.070	.652		
C3	6.325	.562		
C4	6.325	.425		
D1	.690	.525	.112 .116	8
D2	1.352	.450		
D3	1.395	.642		
D4	5.187	.430		
D5	5.732	.250		
D6	6.027	.605		
D7	1.530	.440		
D8	5.975	.475		
E1	.220	.500	.127 .131	23
E2	.317	.375		
E3	.400	.792		
E4	.535	.142		
E5	.694	.142		
E6	.850	.142		
E7	1.007	.142		
E8	1.860	.010		
E9	2.105	.207		
E10	2.500	.010		
E11	2.807	.010		
E12	4.025	.667		
E13	4.362	.677		
E14	4.580	.610		
E15	4.650	.150		
E16	4.815	.150		
E17	4.837	.455		
E18	4.975	.150		
E19	5.135	.150		
E20	5.302	.150		
E21	5.470	.150		
E22	6.572	.000		
E23	6.865	.150		
F1	.292	.657	.153 .157	6
F2	1.132	.272		
F3	1.245	.697		
F4	4.525	.975		
F5	5.585	.325		
F6	5.855	.650		

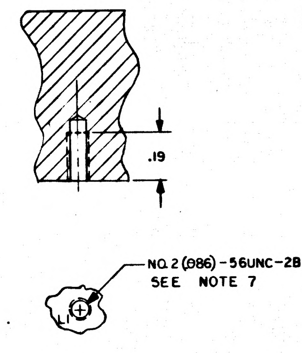
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	1.725	.742	.202 .206	8
G2	1.862	.942		
G3	2.207	.785		
G4	2.395	.937		
G5	2.610	.777		
G6	2.785	.940		
G7	6.767	.950		
G8	6.815	.452		
H1	1.040	.882	.310 .317	2
H2	5.612	.887		
J1	1.435	.217	SEE DETAIL B	3
J2	3.125	.887		
J3	4.875	.887		
K1	.162	.882	SEE DETAIL A	19
K2	.162	.180		
K3	.687	.882		
K4	.962	.537		
K5	1.440	.882		
K6	1.867	.492		
K7	2.282	.500		
K8	2.690	.500		
K9	3.120	.415		
K10	3.512	.415		
K11	3.915	.415		
K12	4.170	.890		
K13	4.265	.230		
K14	5.265	.887		
K15	5.472	.562		
K16	6.010	.887		
K17	6.025	.230		
K18	6.600	.710		
K19	6.615	.250		
L1	4.025	.010	SEE DETAIL C	1
M1	-.010	.492	.124 .128	5
M2	.465	.404		
M3	4.500	.150		
M4	4.427	.827		
M5	4.427	.530		



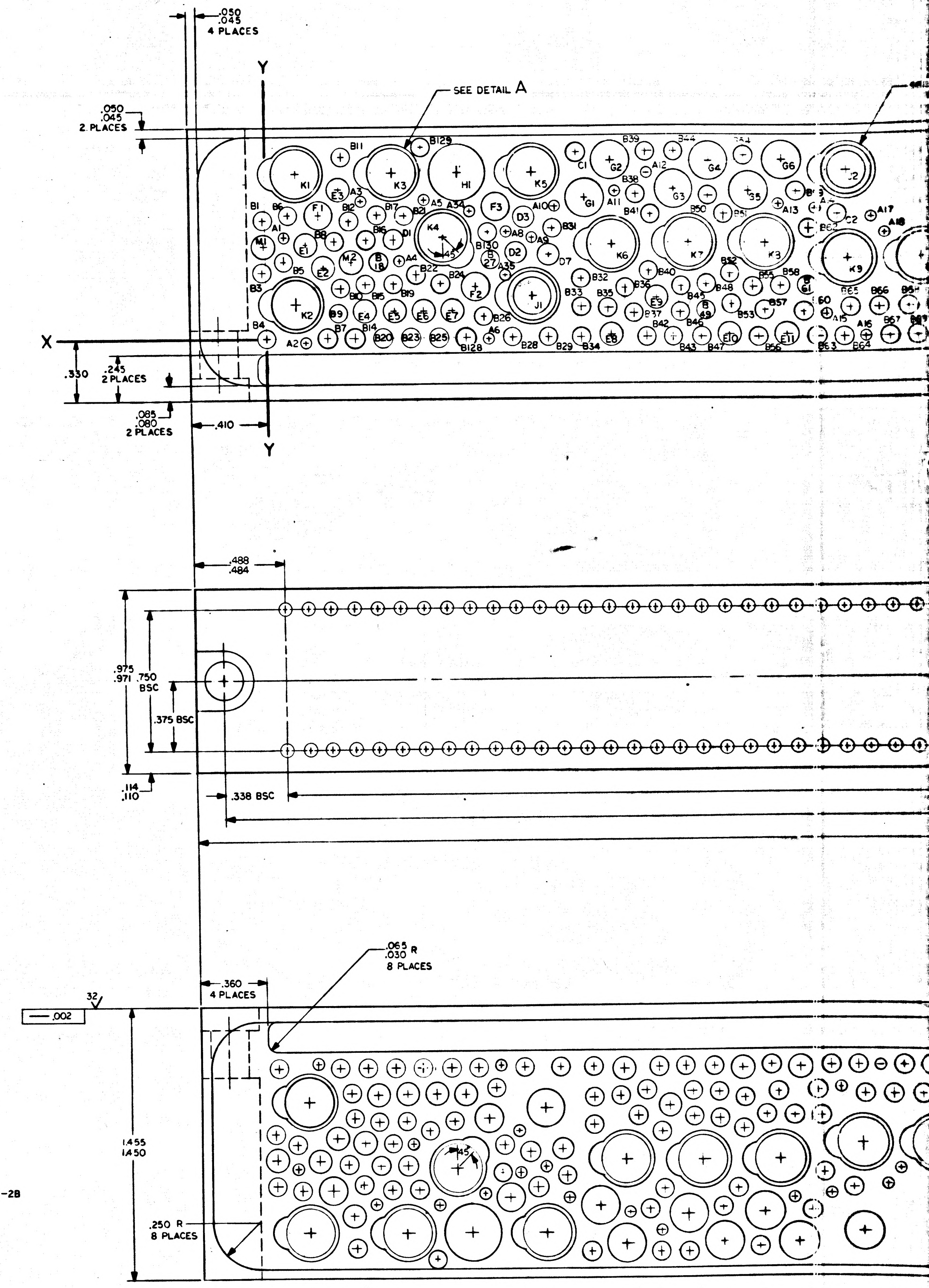
DETAIL A
TYP 19 PLACES



DETAIL B
TYP 3 PLACES

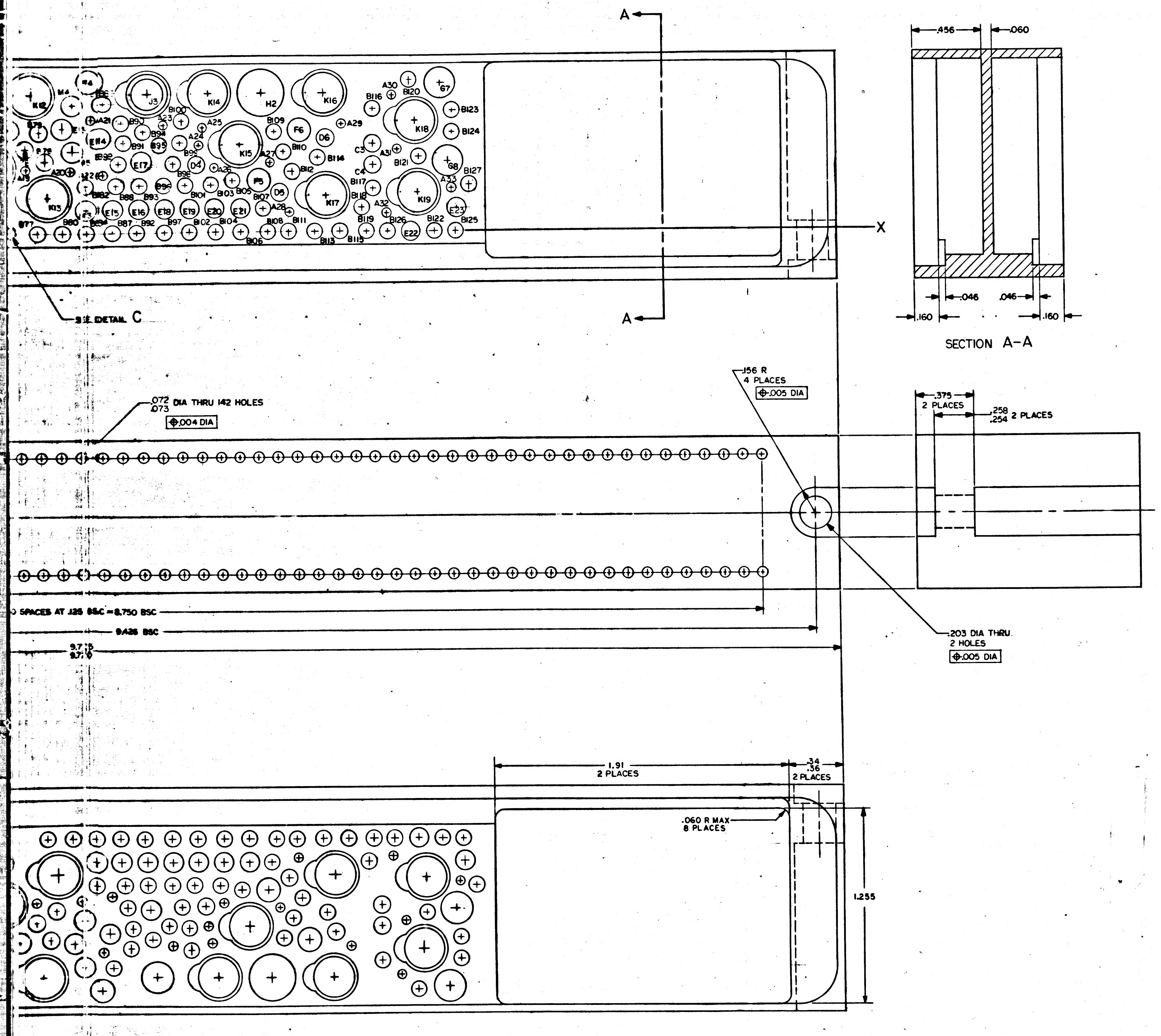


DETAIL C



NOTES
1.INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2.MATERIAL: MAGNESIUM ALLOY ZK60A–T5 PER QQ-M-31 TEMP 5
3.UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
5.REMOVE BURRS AND SHARP EDGES .005–.015
6.FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7.TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8.IDENTIFY WITH DRAWING NO. AND REVISION
PER ND1002019

2008148	A



A
A
X
SEE DETAIL C
.456
.060
.046
.046
.160
.160
SECTION A-A
.156 R
4 PLACES
⊕.005 DIA
.072 / .073 DIA THRU 142 HOLES
⊕.004 DIA
.375
2 PLACES
.258 / .254 2 PLACES
.203 DIA THRU
2 HOLES
⊕.005 DIA
SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.7
1.91
2 PLACES
.34 / .36
2 PLACES
.060 R MAX
8 PLACES
1.255
K12
K13
J3
K14
H2
K16
K15
K17
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K19
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G8
D4
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C3
C4
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B123
B124
B125
B127

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS 17952

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007152	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ±.005 .XX ±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. Romney 17 Mar 65
CHECKED A. Lindstrom 30 Mar 65
APPROVED R V Lunda
APPROVED A. G. Test 3/23/65
APPROVED MIT W Kyle
APPROVED MSC W J Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
MODE MODULE

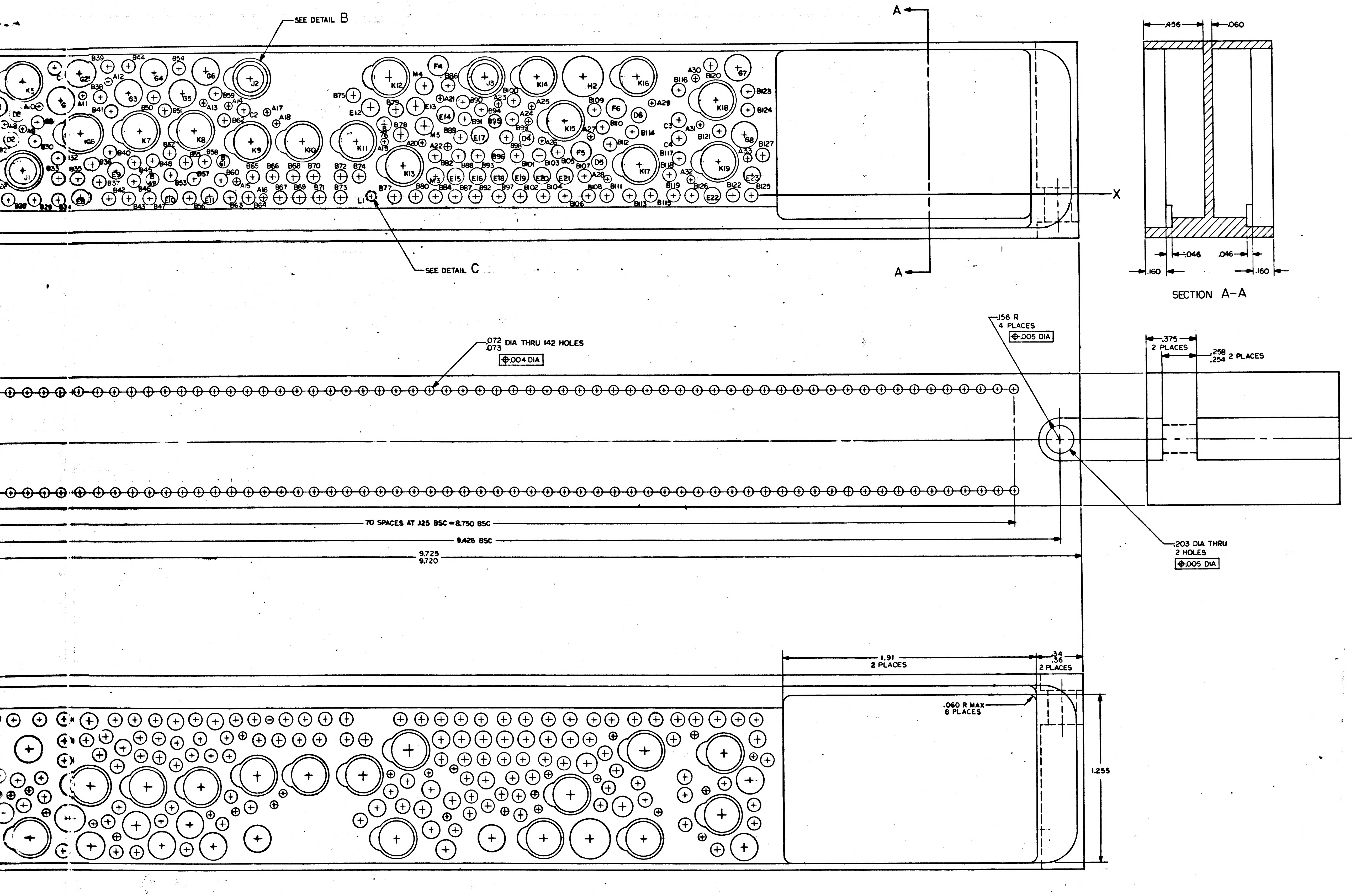
CODE IDENT NO. —
SIZE J
DRAWING NO. 2008148
SCALE 4/1
SHEET 1 OF 1

2008148

MASTER

H2

5 4 3 2



SEE DETAIL B
SEE DETAIL C
A
A
X
K5
G2
G3
G4
G5
G6
J1
J2
J3
K6
K7
K8
K9
K10
K11
K12
K13
K14
K15
K16
K17
K18
K19
H2
F4
F5
F6
D2
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D6
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B126
B127
.456
.060
.046
.046
.160
.160
SECTION A-A
.156 R
4 PLACES
⌖.005 DIA
.072 .073 DIA THRU 142 HOLES
⌖.004 DIA
.375
2 PLACES
.258 .254 2 PLACES
70 SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725 9.720
.203 DIA THRU
2 HOLES
⌖.005 DIA
1.91
2 PLACES
.34 .36
2 PLACES
.060 R MAX
8 PLACES
1.255

MASTER

2007152	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μF
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS
± 1/ .XXX ± .005 .XX ± .02
DO NOT SCALE THIS DRAWING

MATERIAL

SEE NOTE

QTY REQD

DRAWN
CHECKED
APPROVED
APPROVED
MIT
APPROVED
MISC

2008148

5 4 3 2

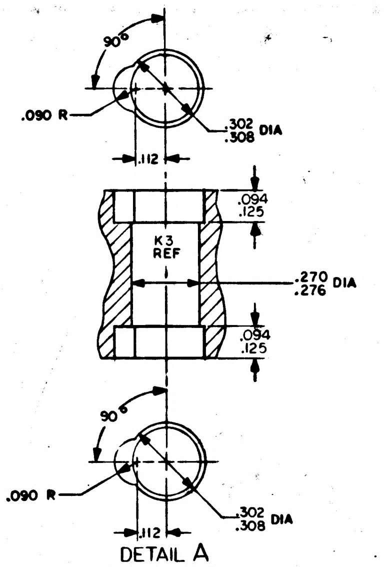
F-12

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

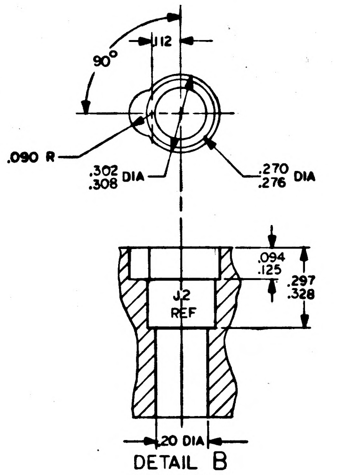
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.100	.537	.058 .062	33
A2	.215	-.025		
A3	.520	.730		
A4	.725	.410		
A5	.860	.735		
A6	1.195	-.010		
A7	1.200	.560		
A8	1.300	.560		
A9	1.440	.532		
A10	1.565	.695		
A11	1.885	.775		
A12	2.055	.870		
A13	2.767	.707		
A14	2.955	.685		
A15	3.012	.120		
A16	3.215	.000		
A17	3.250	.637		
A18	3.315	.550		
A19	4.130	.407		
A20	4.408	.400		
A21	4.542	.732		
A22	4.592	.375		
A23	4.980	.692		
A24	5.202	.560		
A25	5.225	.670		
A26	5.300	.410		
A27	5.665	.440		
A28	5.790	.125		
A29	6.130	.690		
A30	6.450	.875		
A31	6.488	.525		
A32	6.410	.115		
A33	6.835	.275		
B1	-.010	.632	.100 .104	72
B2	———	———		
B3	-.017	.350		
B4	.000	.000		
B5	.100	.407		
B6	.125	.655		
B7	.330	.000		
B8	.377	.515		
B9	.390	.130		
B10	.407	.265		
B11	.415	.967		
B12	.457	.625		
B13	———	———		
B14	.480	.000		
B15	.542	.287		
B16	.545	.527		
B17	.607	.657		
B18	.610	.407		
B19	.687	.287		
B20	.630	.000		
B21	.750	.652		
B22	.817	.337		
B23	.780	.000		
B24	.945	.287		
B25	.930	.000		
B26	1.172	.110		
B27	1.215	.412		
B28	1.325	.000		
B29	1.520	.000		
B30	1.530	.440		
B31	1.550	.580		
B32	1.700	.310		
B33	1.700	.160		
B34	1.700	.000		
B35	1.840	.155		
B36	1.935	.262		
B37	1.980	.125		
B38	1.997	.762		
B39	2.050	.985		
B40	2.065	.350		
B41	2.075	.650		
B42	2.050	.000		
B43	2.195	.000		
B44	2.205	.985		
B45	2.240	.270		
B46	2.235	.132		
B47	2.350	.000		
B48	2.380	.280		
B49	2.375	.140		
B50	2.392	.750		
B51	2.475	.645		
B52	2.505	.335		
B53	2.515	.175		
B54	2.580	.967		
B55	2.625	.265		
B56	2.655	.000		
B57	2.685	.140		
B58	2.770	.270		
B59	2.865	.775		
B60	2.892	.135		
B61	2.912	.270		
B62	2.920	.570		
B63	2.960	.000		
B64	3.100	.000		
B65	3.135	.155		
B66	3.280	.155		
B67	3.340	.000		
B68	3.435	.155		
B69	3.482	.000		
B70	3.590	.155		
B71	3.630	.000		
B72	3.795	.155		
B73	3.795	.000		
B74	3.935	.155		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B75	3.897	.762	.100 .104	51
B76	4.127	.542		
B77	4.200	.000		
B78	4.252	.465		
B79	4.215	.652		
B80	4.355	.000		
B81	———	———		
B82	4.500	.300		
B83	———	———		
B84	4.500	.000		
B85	———	———		
B86	4.600	.830		
B87	4.650	.000		
B88	4.677	.300		
B89	4.690	.442		
B90	4.710	.707		
B91	4.725	.575		
B92	4.800	.000		
B93	4.817	.300		
B94	4.845	.650		
B95	4.950	.560		
B96	4.970	.300		
B97	4.975	.000		
B98	5.037	.442		
B99	5.082	.575		
B100	5.097	.715		
B101	5.110	.300		
B102	5.135	.000		
B103	5.282	.300		
B104	5.305	.000		
B105	5.420	.325		
B106	5.470	.000		
B107	5.615	.150		
B108	5.645	.000		
B109	5.695	.642		
B110	5.757	.512		
B111	5.782	.000		
B112	5.810	.385		
B113	5.950	.000		
B114	5.975	.475		
B115	6.110	.000		
B116	6.325	.785		
B117	6.325	.275		
B118	6.250	.150		
B119	6.275	.000		
B120	6.567	.970		
B121	6.625	.480		
B122	6.725	.000		
B123	6.845	.777		
B124	6.845	.637		
B125	6.865	.000		
B126	6.415	.000		
B127	6.950	.300		
B128	1.075	.000		
C1	1.680	.985	.106 .110	4
C2	3.070	.652		
C3	6.325	.562		
C4	6.325	.425		
D1	.690	.525	.112 .116	6
D2	1.352	.450		
D3	1.395	.642		
D4	5.187	.430		
D5	5.732	.250		
D6	6.027	.605		
E1	.220	.500	.127 .131	23
E2	.317	.375		
E3	.400	.792		
E4	.535	.142		
E5	.694	.142		
E6	.850	.142		
E7	1.007	.142		
E8	1.860	.010		
E9	2.105	.207		
E10	2.500	.010		
E11	2.807	.010		
E12	4.025	.667		
E13	4.362	.677		
E14	4.580	.610		
E15	4.650	.150		
E16	4.815	.150		
E17	4.837	.455		
E18	4.975	.150		
E19	5.135	.150		
E20	5.302	.150		
E21	5.470	.150		
E22	6.572	.000		
E23	6.865	.150		
F1	.292	.657	.153 .157	6
F2	1.132	.272		
F3	1.245	.697		
F4	4.525	.975		
F5	5.585	.325		
F6	5.855	.650		

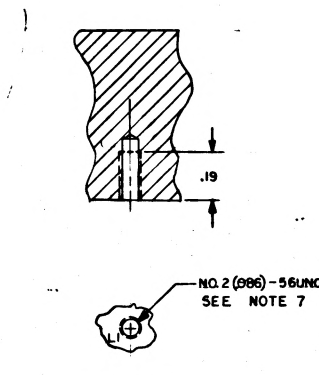
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	1.725	.742	.202 .206	8
G2	1.862	.942		
G3	2.207	.785		
G4	2.395	.937		
G5	2.610	.777		
G6	2.785	.940		
G7	6.767	.950		
G8	6.815	.452		
H1	1.040	.882	.310 .317	2
H2	5.612	.887		
J1	1.435	.217	SEE DETAIL B	3
J2	3.125	.887		
J3	4.875	.887		
K1	.162	.882	SEE DETAIL A	19
K2	.162	.180		
K3	.687	.882		
K4	.962	.537		
K5	1.440	.882		
K6	1.867	.492		
K7	2.282	.500		
K8	2.690	.500		
K9	3.120	.415		
K10	3.512	.415		
K11	3.915	.415		
K12	4.170	.890		
K13	4.265	.230		
K14	5.265	.887		
K15	5.472	.562		
K16	6.010	.887		
K17	6.025	.230		
K18	6.600	.710		
K19	6.615	.250		
L1	4.025	.010	SEE DETAIL C	1
M1	-.010	.492	.124 .128	5
M2	.465	.404		
M3	4.500	.150		
M4	4.427	.827		
M5	4.427	.530		



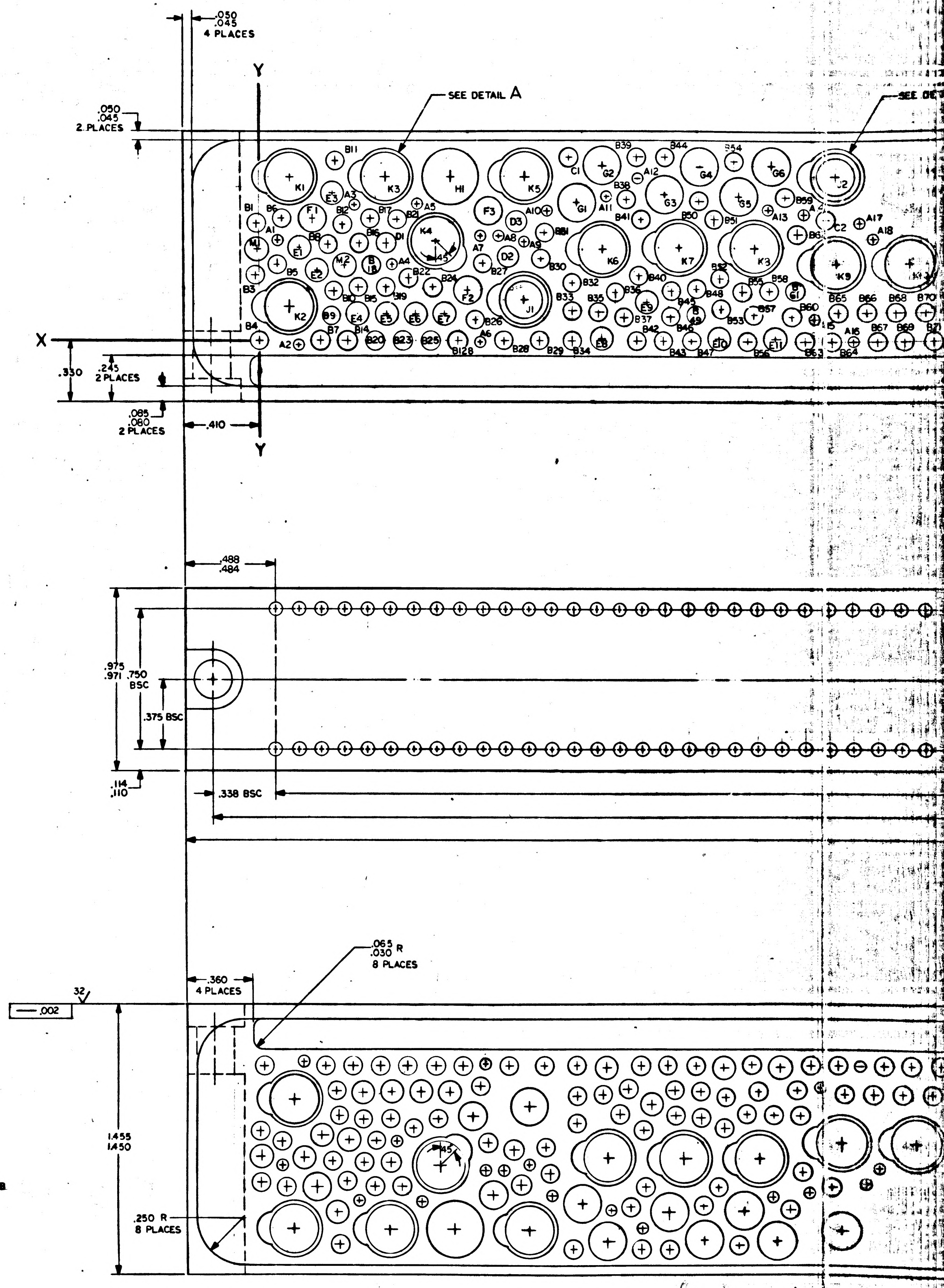
DETAIL A
TYP 19 PLACES



DETAIL B
TYP 3 PLACES.



DETAIL C



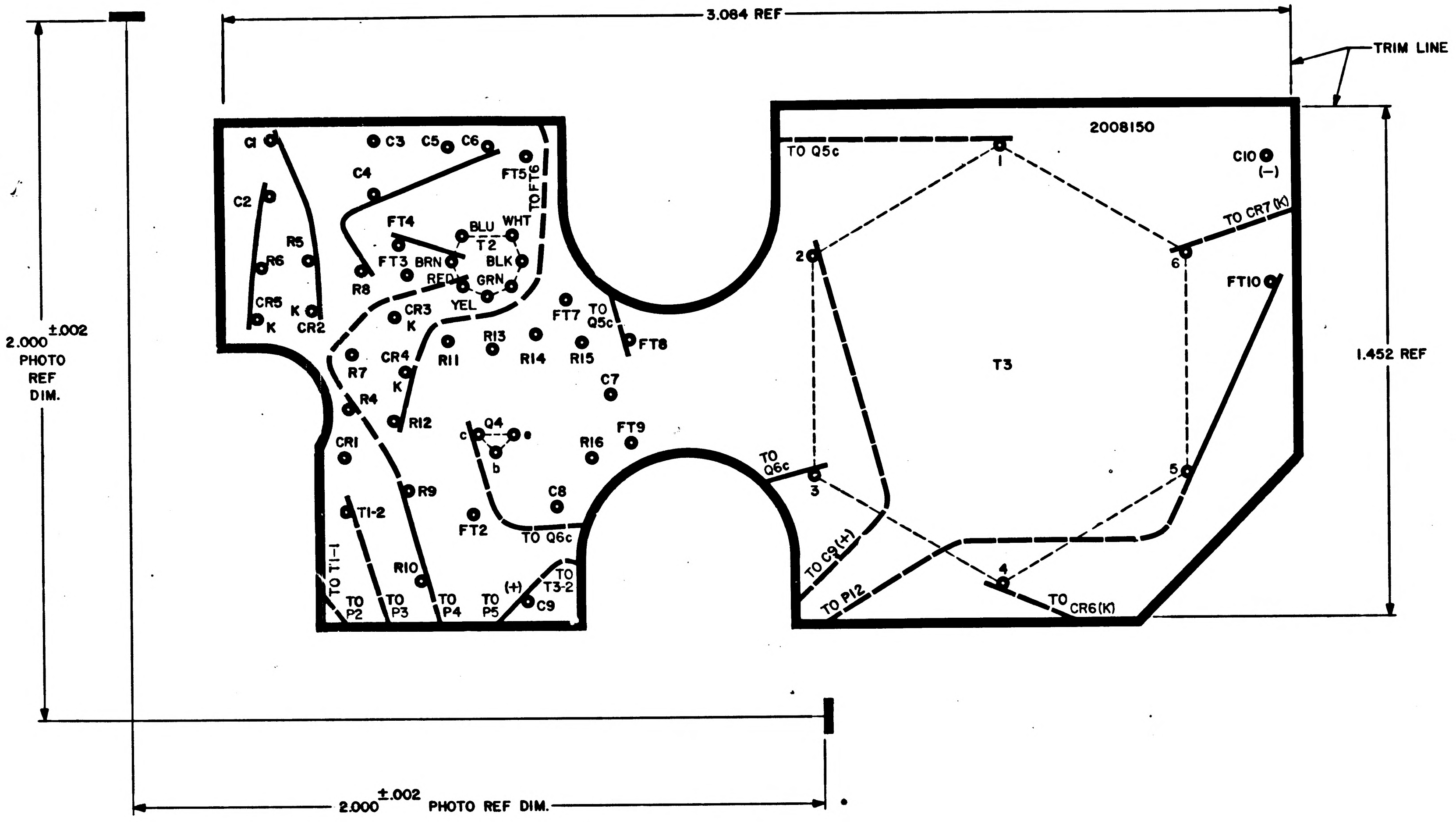
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE, COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

2008148

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.084 REF
TRIM LINE
2008150
2.000 ±.002 PHOTO REF DIM.
1.452 REF
2.000 ±.002 PHOTO REF DIM.
C1
C3
C5
C6
C4
C2
FT5
TO FT6
FT4
BLU
WHT
T2
R5
R6
FT3
BRN
BLK
R8
RED
GRN
CR5
K
K
CR2
CR3
K
YEL
FT7
TO Q5c
FT8
CR4
K
R11
R13
R14
R15
R7
R4
C7
R12
Q4
c
e
b
CR1
R16
FT9
R9
C8
T1-2
FT2
TO Q6c
TO T1-1
R10
TO P2
TO P3
TO P4
TO P5
(+)
TO T3-2
C9
TO Q5c
1
C10
(−)
TO CR7 (K)
2
6
FT10
T3
TO Q6c
3
5
TO C9 (+)
4
TO P12
TO CR6 (K)

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. BROKEN LINE DENOTES SLEEVING
4. CUT TO WITHIN .010 OF TRIM LINE
5. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
6. MATERIAL: FILM .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
7. ◉ .040/.050 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007107	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L. Krahn	25 FEB 65
CHECKED	R. Lindemi	18 MAR 65
APPROVED	E. F. Sisolak	23 Mar 65
APPROVED	D. [illegible]	3/23/65
APPROVED MIT	W. Kupfer	24 Mar 65
APPROVED MSC	[illegible]	3/24/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

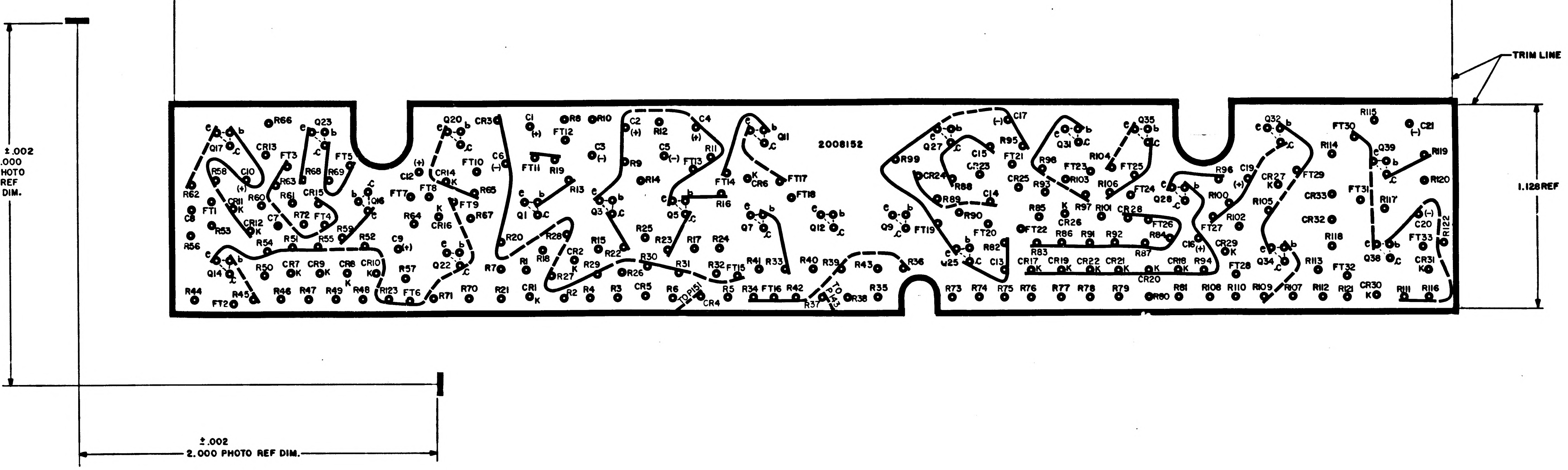
INSULATOR, TOP PHOTOGRAPHIC MASTER
POWER SUPPLY -28VDC

CODE IDENT NO.	SIZE	DRAWING NO.
—	D	2008150

SCALE 5/1 — SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


7.110 REF
TRIM LINE
±.002
2.000
PHOTO
REF
DIM.
1.128REF
±.002
2.000 PHOTO REF DIM.
2008152
R66
Q23
Q17
CR13
FT3
FT5
R58
C10
(+)
R68
R69
R63
R62
CR11
K
R60
R61
CR15
Q16
FT1
C8
CR12
R53
C7
R72
FT4
R59
R56
R54
R51
R55
R52
Q14
R50
CR7
CR9
CR8
CR10
R44
R45
FT2
R46
R47
R49
R48
R123
FT6
Q20
CR3
C1
R8
R10
FT12
C12
CR14
FT10
C6
(–)
FT11
R19
FT7
FT8
FT9
R65
R67
R64
CR16
C9
Q22
R57
R71
R70
R21
R7
Q1
R13
R20
R28
R1
R18
CR1
CR2
R27
R2
R4
R3
C2
C3
R9
R12
C4
C5
R11
FT13
R14
Q3
Q5
R16
FT14
CR6
FT17
Q11
FT18
Q7
Q12
R25
R23
R17
R24
R15
R22
R29
R30
R26
R31
R32
FT15
CR5
R6
TO P151
CR4
R5
R41
R33
R40
R39
R43
R36
R34
FT16
R42
R37
TO P143
R38
R35
Q9
FT19
R99
Q27
C17
R95
C15
CR23
FT21
CR24
R88
R89
C14
R90
FT20
R82
Q25
C13
R73
R74
R75
R76
R77
R78
R79
R80
Q31
R98
R93
CR25
R85
CR26
R97
R101
R103
R104
R106
FT23
FT25
Q35
FT24
CR28
FT26
FT22
R86
R91
R92
R84
R83
R87
CR17
CR19
CR22
CR21
CR18
CR20
R94
R81
Q28
R96
C19
R100
FT27
C16
R102
CR29
FT28
R108
R110
Q32
CR27
FT29
R105
Q34
R109
R107
R113
R112
R114
CR33
CR32
R118
FT32
R121
CR30
FT30
R115
Q39
FT31
R117
Q38
C21
R119
R120
C20
FT33
CR31
R122
R111
R116

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. ● .040/.050 DIA HOLE
7. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007154	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	W. Horgan	11 FEB 65
CHECKED	A. Lichtman	20 Mar 65
APPROVED	R. V. [illegible]	3-20-65
APPROVED	[illegible]	3/23/65
APPROVED MIT	W. [illegible]	[illegible] 65
APPROVED MSC	[illegible]	4-4-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR A
PHOTOGRAPHIC MASTER
MODE MODULE

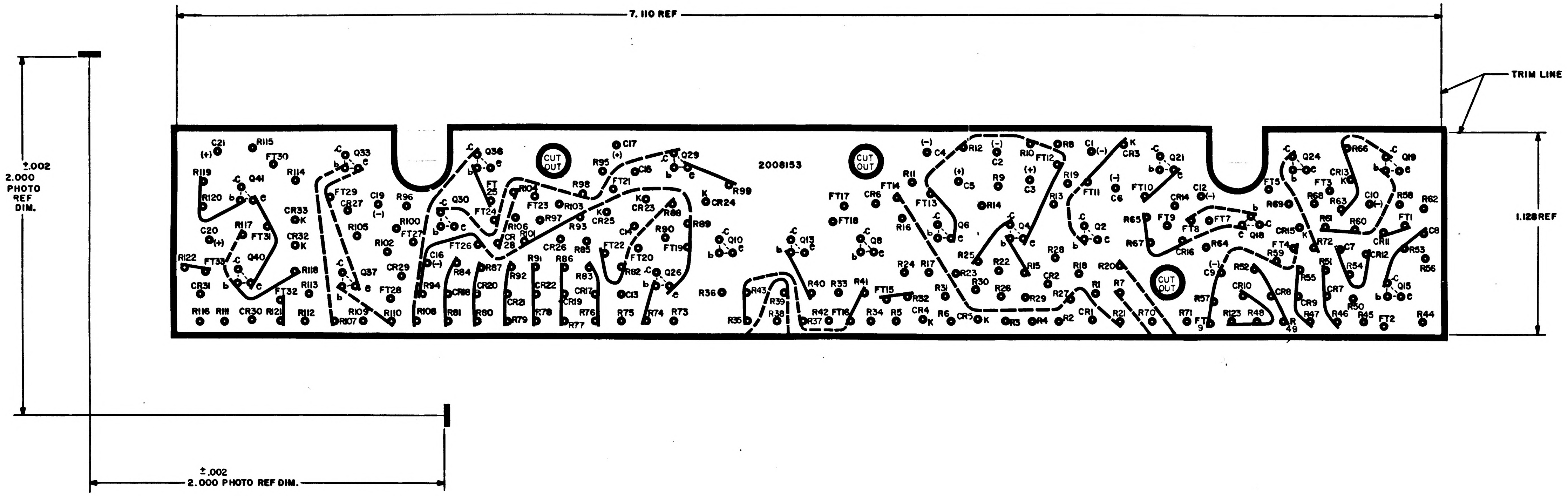
CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008152

SCALE 4/1 SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17852

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006 / .008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. ● .040 / .050 DIA HOLE
7. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007154	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

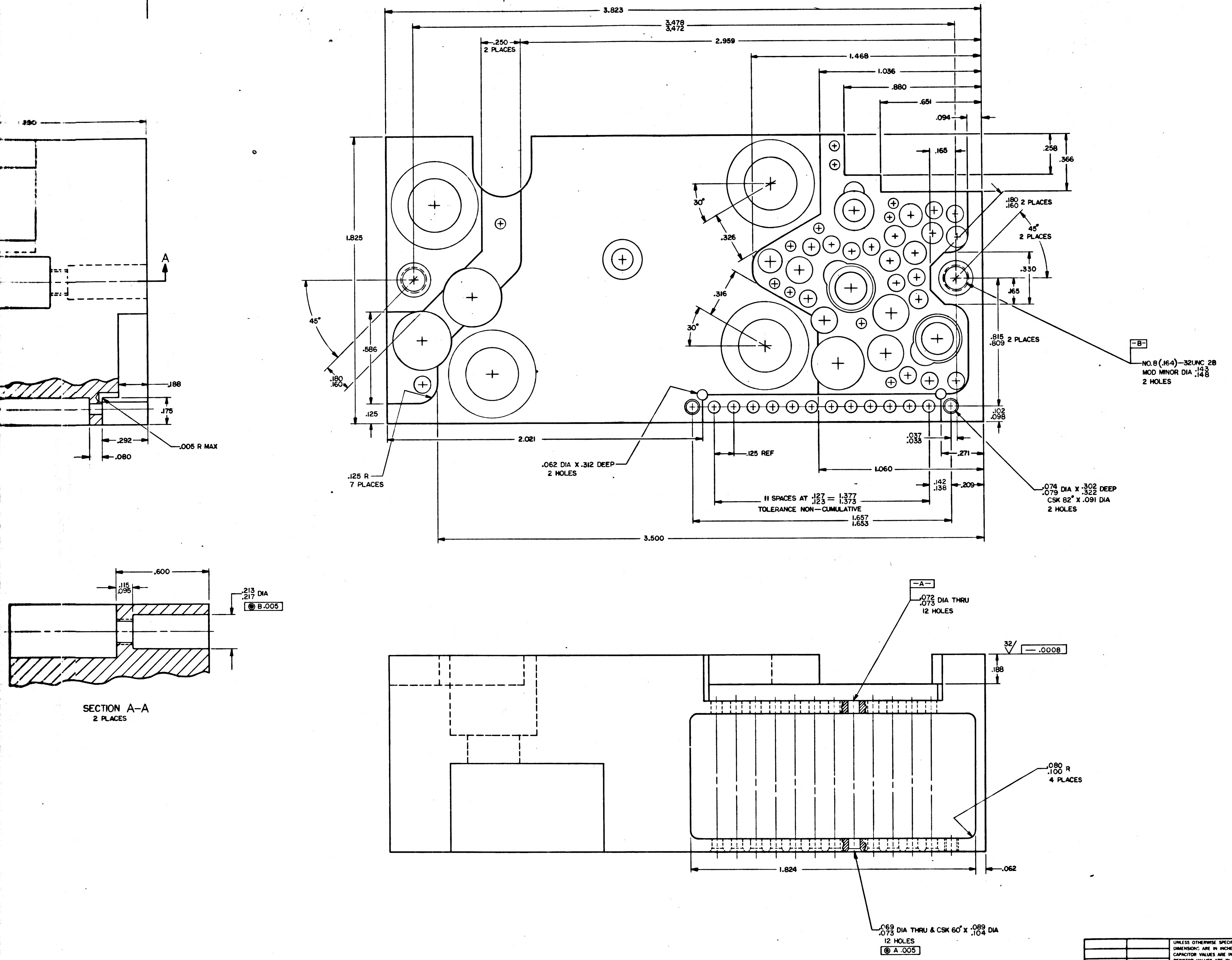
DRAWN	W. Horgan	26 FEB 65
CHECKED	A. Lindstrom	20 Mar 65
APPROVED	R. V. Nangle	22 Mar
APPROVED	S. R. Test	3/23/65
APPROVED MIT	W. Kupfer	1 Apr 65
APPROVED MSC		4-4-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR B
PHOTOGRAPHIC MASTER
MODE MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008153
SCALE 4/1	—	SHEET 1 OF 1

REVISIONS 17831						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19814	RT		8 JUN 65	


3.823
3.478 3.472
.250 2 PLACES
2.959
1.468
1.036
.880
.651
.094
.165
.258
.366
.180 .160 2 PLACES
45° 2 PLACES
.330
.165
.815 .809 2 PLACES
-B-
NO. 8 (.164)-32UNC 2B MOD MINOR DIA .143 .148 2 HOLES
.102 .098
.074 .079 DIA X .302 .322 DEEP CSK 82° X .091 DIA 2 HOLES
.271
.209
.037 .033
.142 .138
1.060
.125 REF
11 SPACES AT .127 .123 = 1.377 1.373 TOLERANCE NON-CUMULATIVE
1.657 1.653
3.500
2.021
.062 DIA X .312 DEEP 2 HOLES
.125 R 7 PLACES
.125
.586
1.825
45°
.180 .160
.316
30°
.326
30°
A
.320
.188
.175
.292
.080
.005 R MAX
.600
.115 .095
.213 .217 DIA
B .005
SECTION A-A 2 PLACES
-A-
.072 .073 DIA THRU 12 HOLES
32
.0008
.188
.080 .100 R 4 PLACES
1.824
.062
.069 .073 DIA THRU & CSK 60° X .089 .104 DIA 12 HOLES
A .005

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.02 XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007107	
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN D. J. Papia 27 Jan 65
CHECKED R. Lizzani
APPROVED
APPROVED D. Tut
APPROVED MIT
APPROVED MSC
DATE

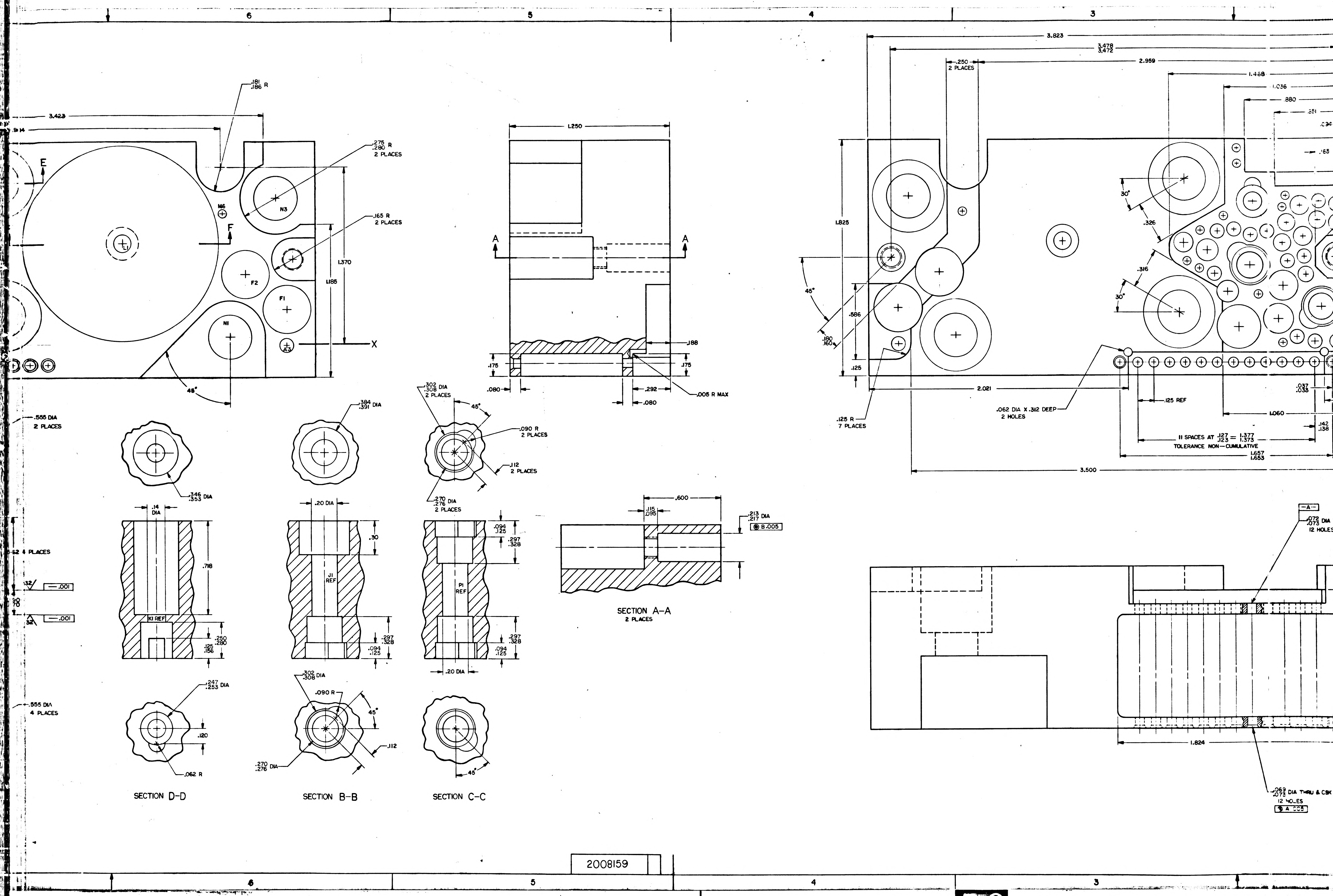
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
POWER SUPPLY -28VDC

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008159
SCALE 5/1
SHEET 1 OF 1

3H

2008159



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5
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3
3.423
.914
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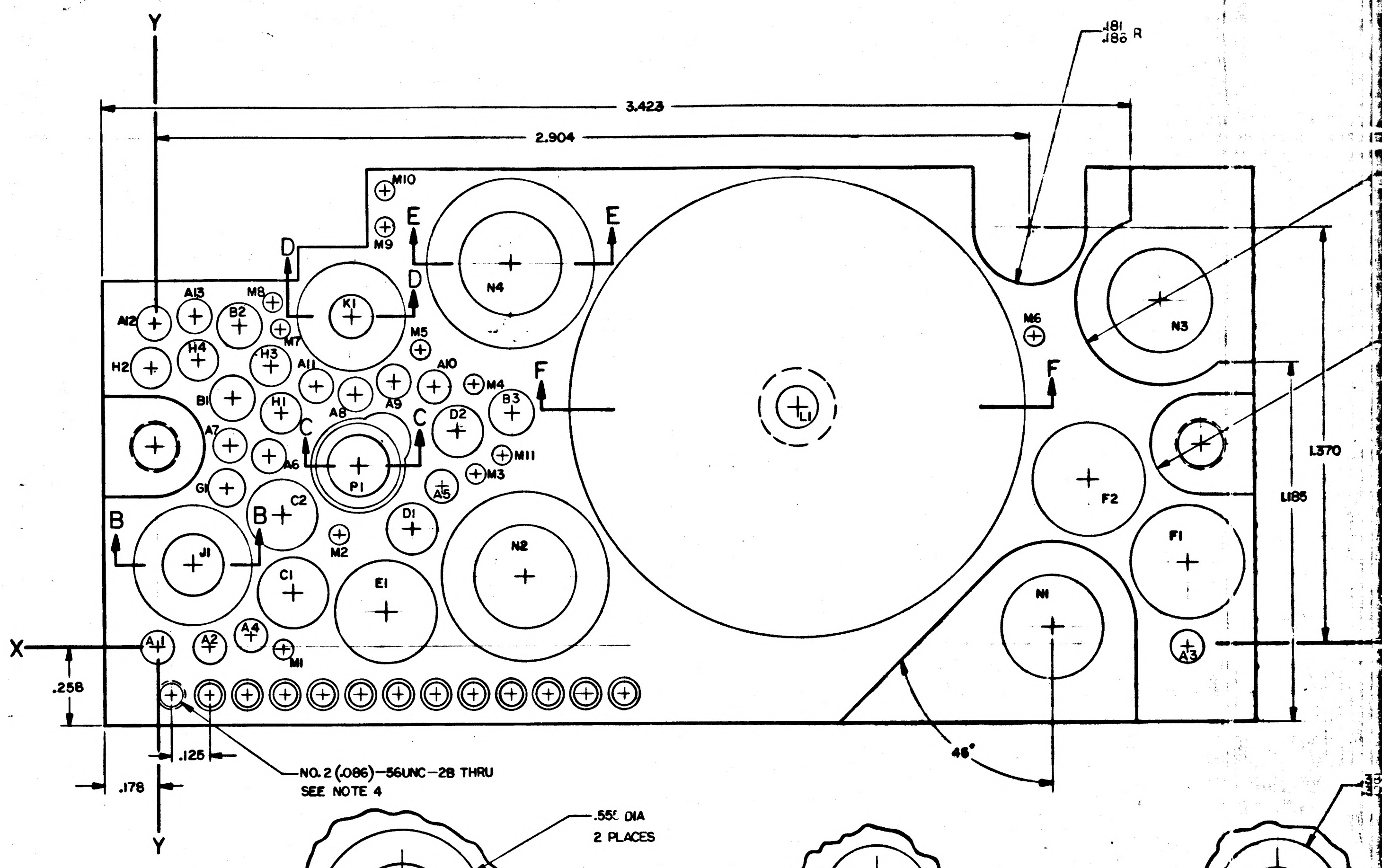
.275 .280 R 2 PLACES
.165 R 2 PLACES
E
F
M6
N3
F2
F1
N1
A3
X
1.370
1.185
48°
.555 DIA 2 PLACES
.555 DIA 4 PLACES
4 PLACES
.001
1.250
A
A
.188
.175
.175
.080
.292
.080
.005 R MAX
.384 .391 DIA
.302 .308 DIA 2 PLACES
45°
.090 R 2 PLACES
.112 2 PLACES
.270 .276 DIA 2 PLACES
.346 .353 DIA
.14 DIA
.718
K1 REF
.250 .280
.125 .156
.20 DIA
.30
J1 REF
.297 .328
.094 .125
.094 .125
.297 .328
P1 REF
.297 .328
.094 .125
.20 DIA
.600
.115 .095
.213 .217 DIA
B .005
SECTION A–A
2 PLACES
.247 .253 DIA
.120
.062 R
.302 .308 DIA
.090 R
45°
.112
.270 .276 DIA
45°
SECTION D–D
SECTION B–B
SECTION C–C
3.823
3.478 3.472
.250 2 PLACES
2.959
1.468
1.036
.880
.851
.034
.165
1.825
30°
.326
.316
30°
45°
.586
.180 .160
.125
.125 R 7 PLACES
2.021
.062 DIA X .312 DEEP 2 HOLES
.125 REF
.037 .033
1.060
.142 .138
11 SPACES AT .127 .123 = 1.377 1.373
TOLERANCE NON—CUMULATIVE
1.657 1.653
3.500
-A-
.072 .073 DIA 12 HOLES
1.824
.069 .073 DIA THRU & CSK
12 HOLES
A .005

2008159

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	13
A2	.170	.000		
A3	3.420	—.008		
A4	.308	.037		
A5	.944	.526		
A6	.374	.626		
A7	.244	.662		
A8	.660	.830		
A9	.788	.872		
A10	.920	.853		
A11	.531	.856		
A12	—.004	1.063		
A13	.130	1.087		
B1	.254	.816	.146 .150	3
B2	.279	1.056		
B3	1.179	.768		
C1	.448	.176	.227 .231	2
C2	.414	.434		
D1	.843	.386	.165 .169	2
D2	.998	.706		
E1	.756	.114	.330 .337	1
F1	3.422	.268	.366 .373	2
F2	3.096	.542		
G1	.232	.522	.112 .116	1
H1	.415	.768	.127 .131	4
H2	—.016	.918		
H3	.382	.924		
H4	.141	.943		
J1	.116	.268	SEE SECTION B-B	1
K1	.646	1.086	SEE SECTION D-D	1
L1	2.129	.782	SEE SECTION F-F	1
M1	.416	—.006	.058 .062	11
M2	.602	.366		
M3	1.058	.566		
M4	1.054	.860		
M5	.874	.974		
M6	2.916	1.012		
M7	.414	1.044		
M8	.390	1.132		
M9	.764	1.382		
M10	.764	1.500		
M11	1.146	.626		
N1	2.974	.056	SEE SECTION E-E	4
N2	1.221	.228		
N3	3.336	1.130		
N4	1.179	1.258		
P1	.668	.594	SEE SECTION C-C	1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3.423
2.904
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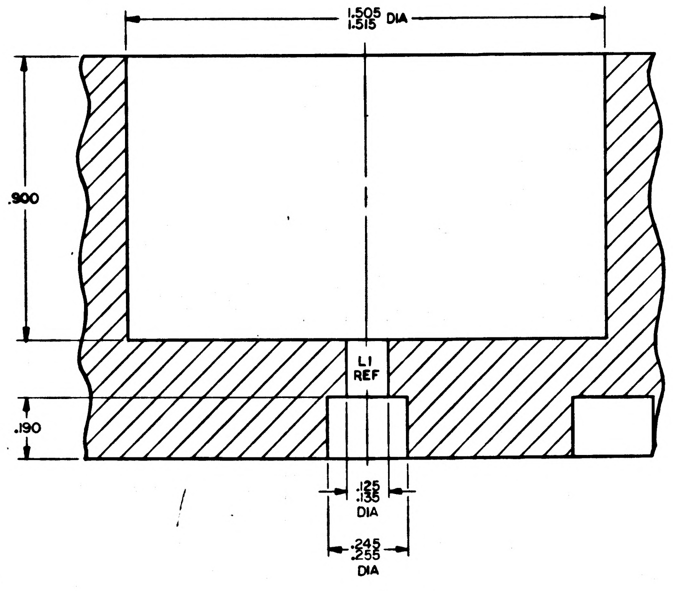
.186 R
M10
M9
E
E
D
D
K1
N4
N3
M6
M8
A13
B2
A12
M7
M5
A10
M4
H4
H3
A11
H2
F
F
B1
H1
A8
A9
C
C
D2
B3
L1
A7
A6
P1
M11
A5
M3
G1
C2
B
B
D1
J1
M2
N2
C1
E1
F1
F2
N1
X
A1
A2
A4
M1
A3
1.370
1.185
.258
.125
.178
NO. 2 (.086)—56UNC—2B THRU
SEE NOTE 4
45°
Y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L1
REF
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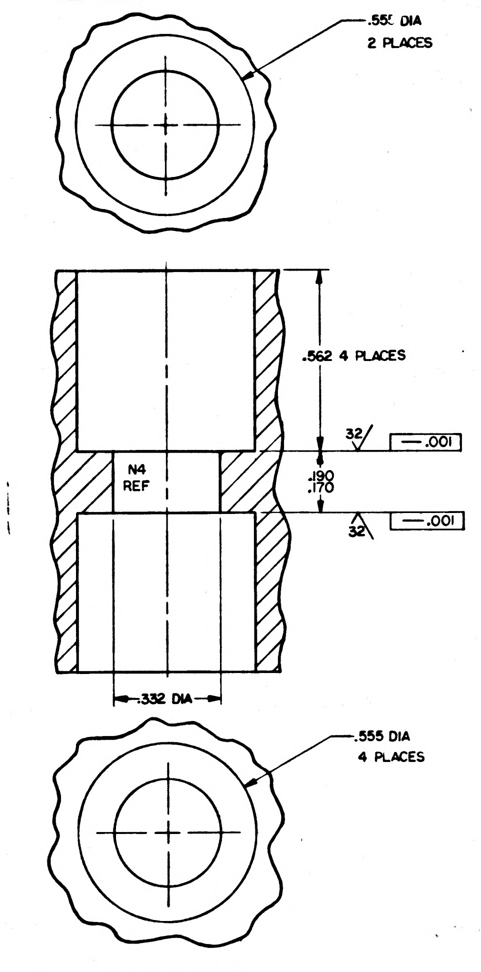
.135
DIA
.245
.255
DIA

SECTION F-F


.555 DIA
2 PLACES
.562 4 PLACES
32
.001
N4
REF
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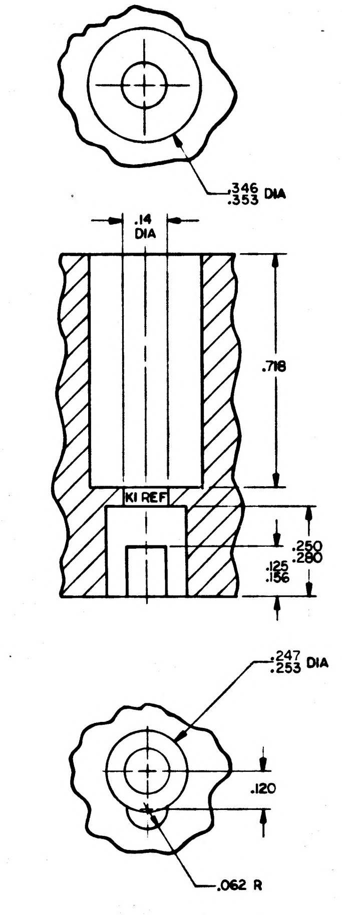
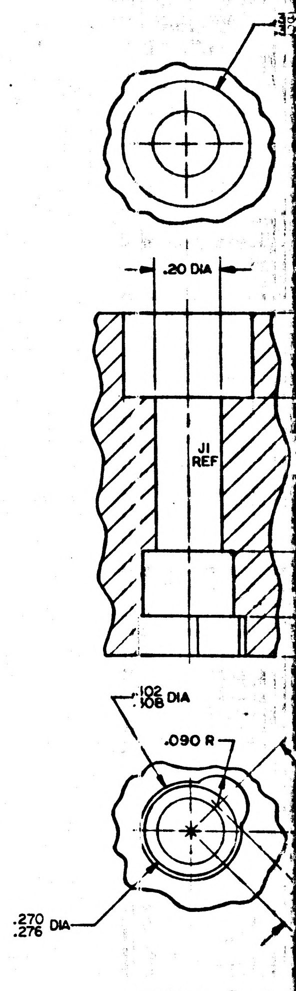
.170
32
.001
.332 DIA
.555 DIA
4 PLACES

SECTION E-E


.346
.353 DIA
.14
DIA
.718
K1 REF
.250
.280
.125
.156
.247
.253 DIA
.120
.062 R

SECTION D-D


.20 DIA
J1
REF
.102
.108 DIA
.090 R
.270
.276 DIA

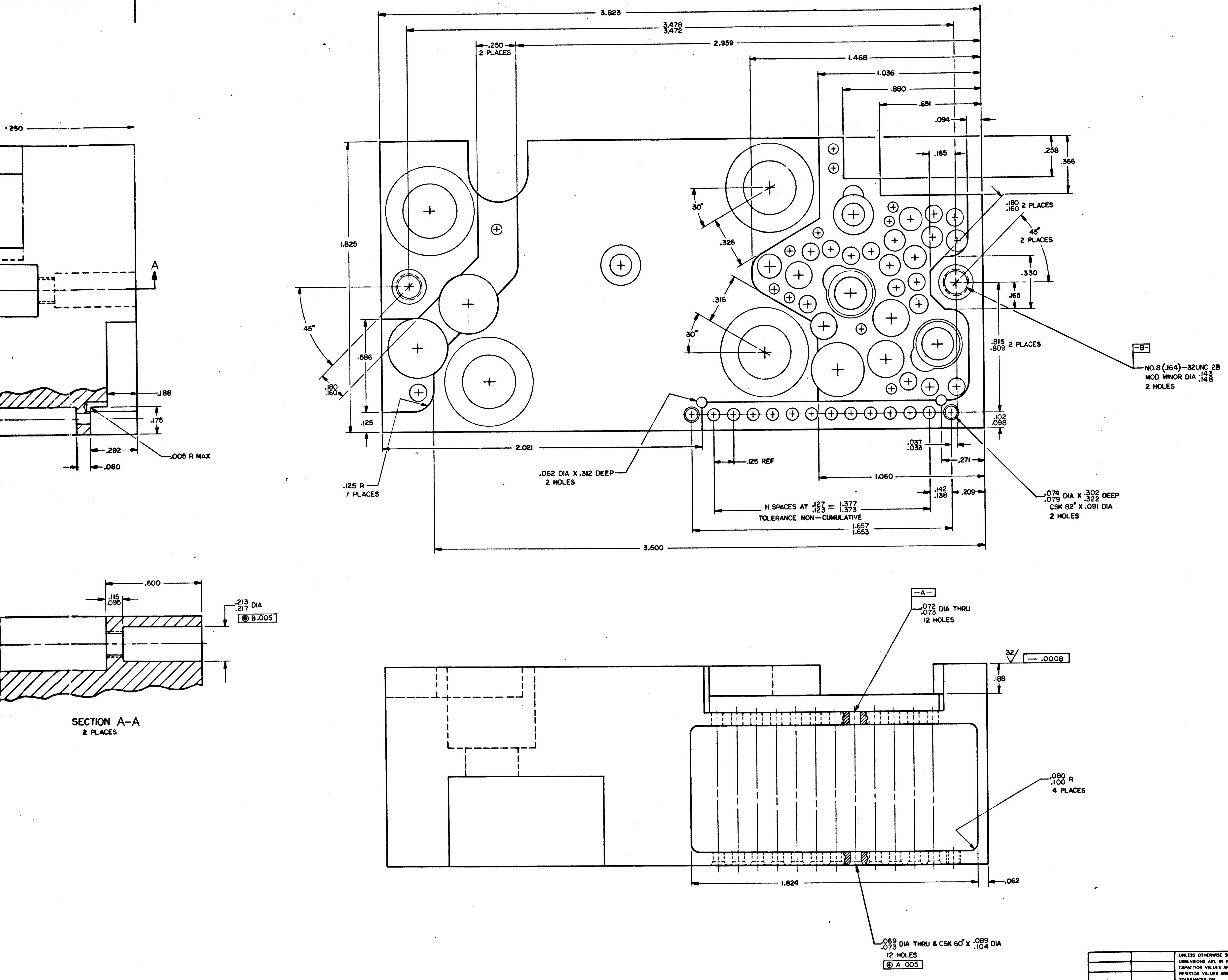
SECTION B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A—T5 PER QQ—M—31, TEMP 5
3. FINISH: ANODIZE PER MIL—M—45202 TYPE I, CLASS C
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
7. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

3H

REVISIONS 17831							
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 19814	RT		8JUN65		
B		REVISED PER TDRR 21476					WK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3
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1
D
C
B
A
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3.478
3.472
.250
2 PLACES
2.959
1.468
1.036
.880
.651
.094
.165
.258
.366
1.250
1.825
30°
.326
.180
.160 2 PLACES
45°
2 PLACES
.330
.165
A
45°
.316
30°
.586
.180
.160
.125
.815
.809 2 PLACES
-B-
NO.8 (.164)-32UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
.188
.175
.292
.080
.005 R MAX
.125 R
7 PLACES
2.021
.062 DIA X .312 DEEP
2 HOLES
.125 REF
.037
.033
.271
.102
.098
1.060
.142
.138
.209
11 SPACES AT .127 .123 = 1.377 1.373
TOLERANCE NON-CUMULATIVE
1.657
1.653
3.500
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.600
.115
.095
.213
.217 DIA
◎ B .005
SECTION A-A
2 PLACES
-A-
.072
.073 DIA THRU
12 HOLES
32/
— .0008
.188
.080
.100 R
4 PLACES
1.824
.062
.069
.073 DIA THRU & CSK 60° X .089 .104 DIA
12 HOLES
◎ A .005

2008 59	B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007107	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XX ±.02 XXX ±.005 ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN B.J. Papia 27 Feb 65
CHECKED
APPROVED
APPROVED D. Tait 3/4/65
APPROVED MIT W. Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

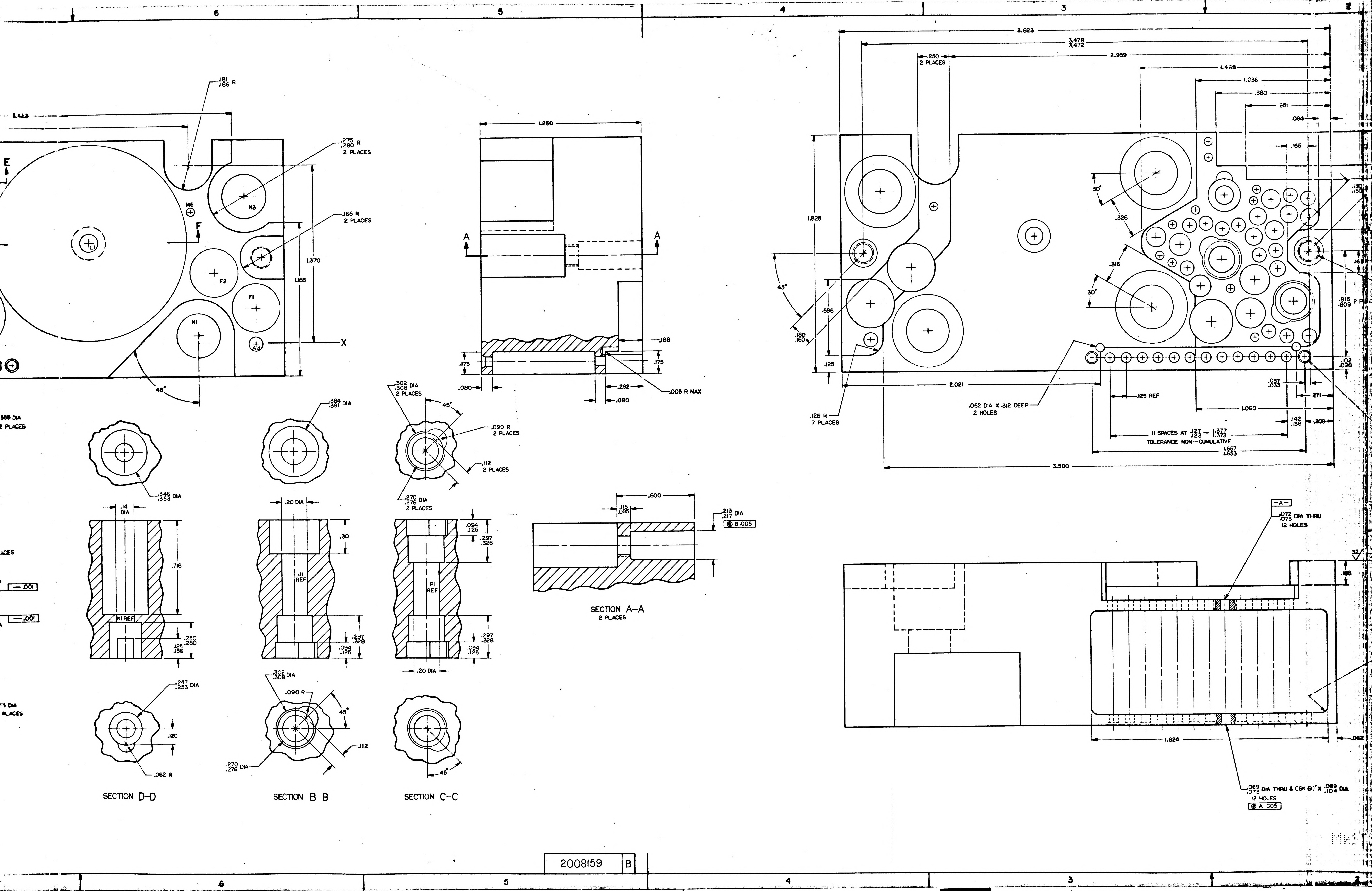
HEATSINK
POWER SUPPLY -28VDC

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008159
SCALE 5/1
SHEET 1 OF 1

2008159 B

3 H

F3

6
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4
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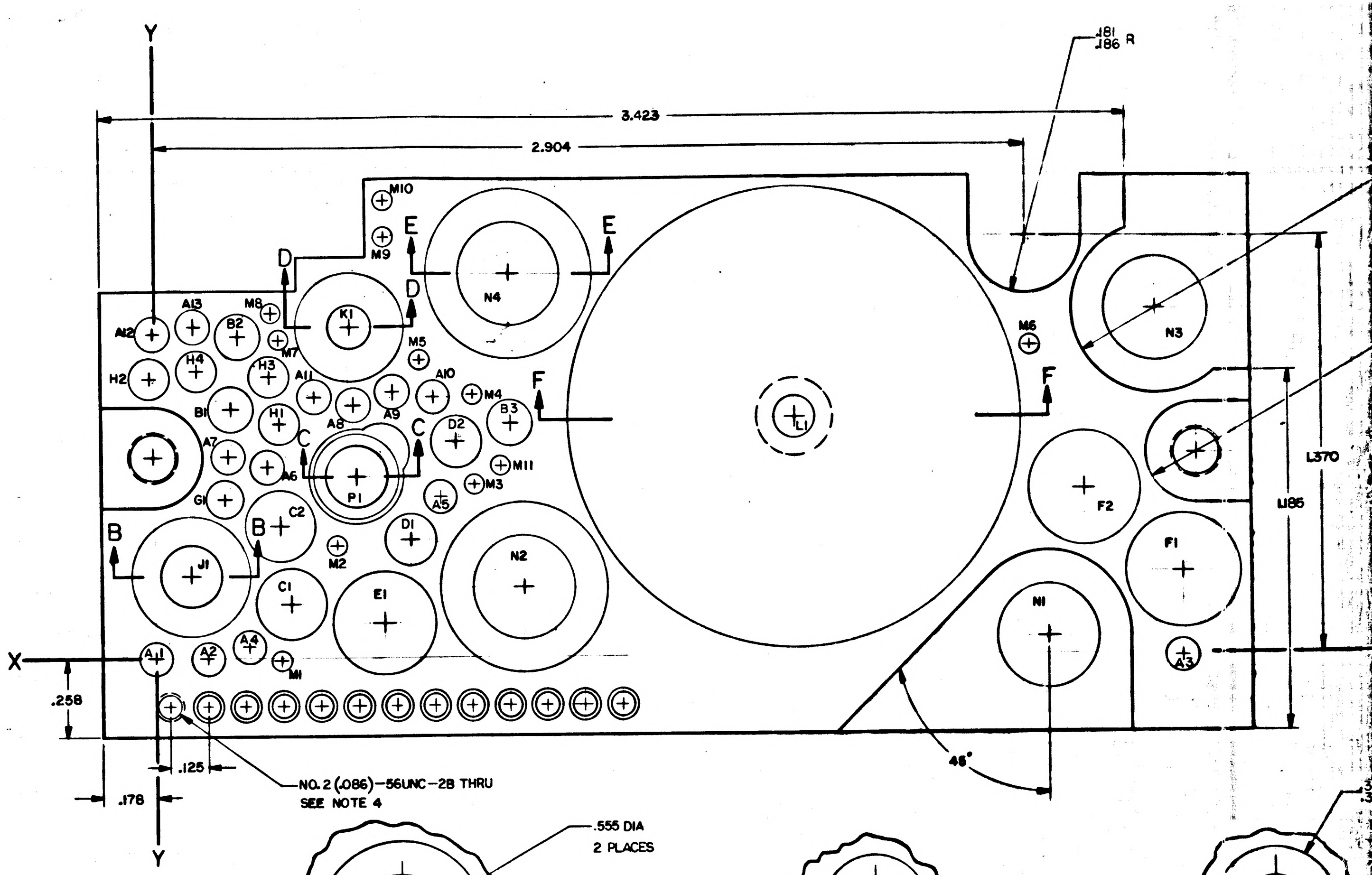
.275 .280 R 2 PLACES
.165 R 2 PLACES
1.423
E
F
M6
N3
L1
F2
F1
N1
A3
X
1.370
1.185
45°
.555 DIA 2 PLACES
1.250
A
A
.188
.175
.175
.080
.292
.080
.005 R MAX
3.823
3.478 3.472
.250 2 PLACES
2.959
1.468
1.036
.880
.651
.094
.165
1.825
30°
.326
.316
30°
45°
.586
.180 .160
.125
.125 R 7 PLACES
2.021
.062 DIA X .312 DEEP 2 HOLES
.125 REF
1.060
11 SPACES AT .127 .123 = 1.377 1.373
TOLERANCE NON-CUMULATIVE
1.657 1.653
3.500
.037 .033
.271
.142 .138
.209
.102 .098
.815 .809
.130 .150
.165
.384 .391 DIA
.302 .308 DIA 2 PLACES
45°
.090 R 2 PLACES
.112 2 PLACES
.270 .276 DIA 2 PLACES
.346 .353 DIA
.14 DIA
.20 DIA
.30
.718
K1 REF
J1 REF
P1 REF
.250 .280
.125 .156
.297 .328
.094 .125
.094 .125
.297 .328
.297 .328
.094 .125
.20 DIA
.001
.001
.600
.115 .095
.213 .217 DIA
B .005
SECTION A-A 2 PLACES
A
.072 .073 DIA THRU 12 HOLES
.188
1.824
.062
.069 .073 DIA THRU & CSK 60° X .089 .104 DIA 12 HOLES
A .005
.247 .253 DIA
.120
.062 R
.302 .308 DIA
.090 R
45°
.112
.270 .276 DIA
45°
SECTION D-D
SECTION B-B
SECTION C-C

F-2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	13
A2	.170	.000		
A3	3.420	—.008		
A4	.308	.037		
A5	.944	.526		
A6	.374	.626		
A7	.244	.662		
A8	.660	.830		
A9	.788	.872		
A10	.920	.853		
A11	.531	.856		
A12	—.004	1.063		
A13	.130	1.087		
B1	.254	.816	.146 .150	3
B2	.279	1.056		
B3	1.179	.768		
C1	.448	.176	.227 .231	2
C2	.414	.434		
D1	.843	.386	.165 .169	2
D2	.998	.706		
E1	.756	.114	.330 .337	1
F1	3.422	.268	.366 .373	2
F2	3.096	.542		
G1	.232	.522	.112 .116	1
H1	.415	.768	.127 .131	4
H2	—.016	.918		
H3	.382	.924		
H4	.141	.943		
J1	.116	.268	SEE SECTION B-B	1
K1	.646	1.086	SEE SECTION D-D	1
L1	2.129	.782	SEE SECTION F-F	1
M1	.416	—.006	.058 .062	11
M2	.602	.366		
M3	1.058	.566		
M4	1.054	.860		
M5	.874	.974		
M6	2.916	1.012		
M7	.414	1.044		
M8	.390	1.132		
M9	.764	1.382		
M10	.764	1.500		
M11	1.146	.626		
N1	2.974	.056	SEE SECTION E-E	4
N2	1.221	.228		
N3	3.336	1.130		
N4	1.179	1.258		
P1	.668	.594	SEE SECTION C-C	1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.186 R
M10
M9
E E
D D
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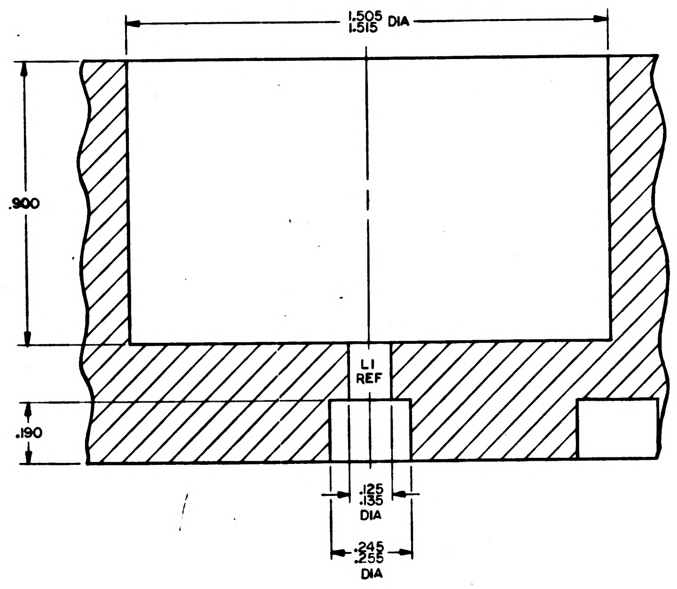
A12 A13 B2 M8 K1
H2 H4 H3 M7 A11 M5 A10 M4
B1 H1 A8 A9 D2 B3
A7 C P1 C M11 M3 A5
G1 A6 C2 D1
B J1 B M2 C1 E1 N2
F F
L1
M6 N3
F2 F1
N1
1.370
1.185
X A1 A2 A4 M1 A3
.258
.125
.178
NO. 2 (.086)–56UNC–2B THRU
SEE NOTE 4
45°
Y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REF
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DIA
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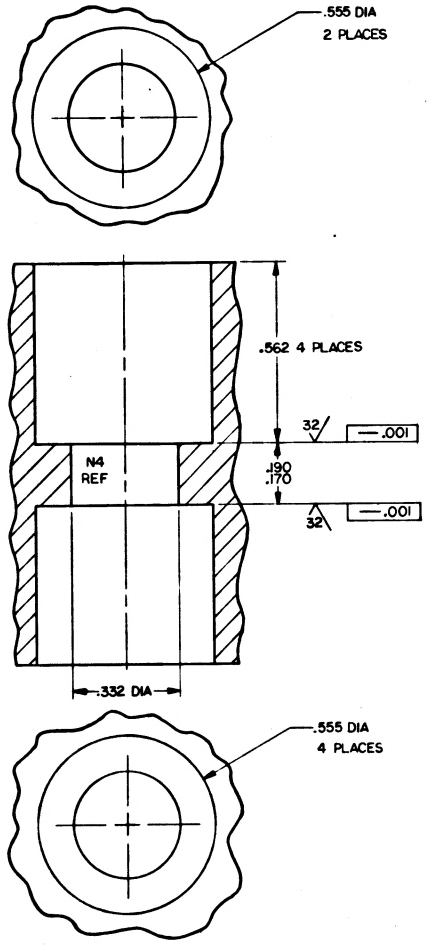
DIA

SECTION F–F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2 PLACES
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.170
N4
REF
—.001
32
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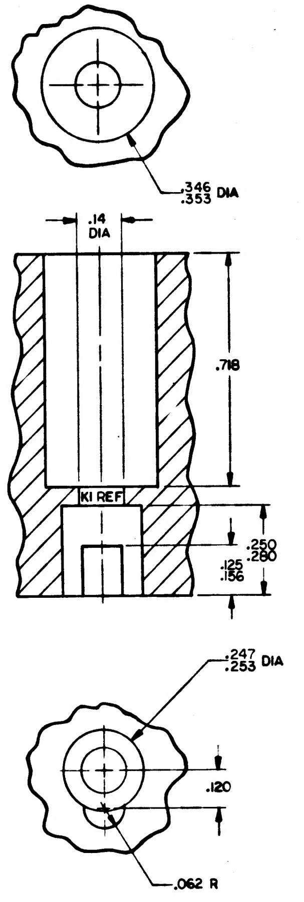
.555 DIA
4 PLACES

SECTION E–E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DIA
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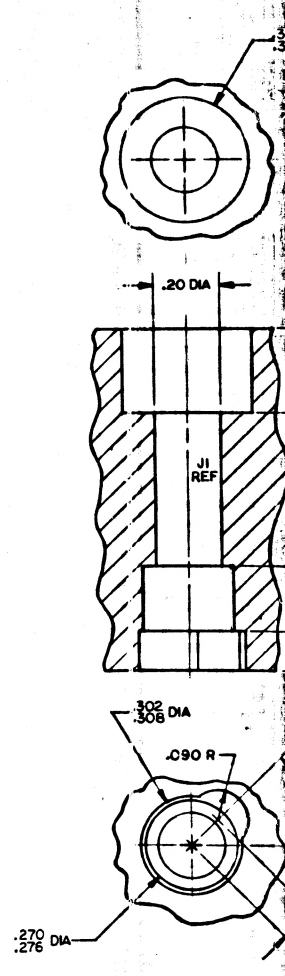
.247
.253 DIA
.120
.062 R

SECTION D–D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J1
REF
.302
.308 DIA
.090 R
.270
.276 DIA

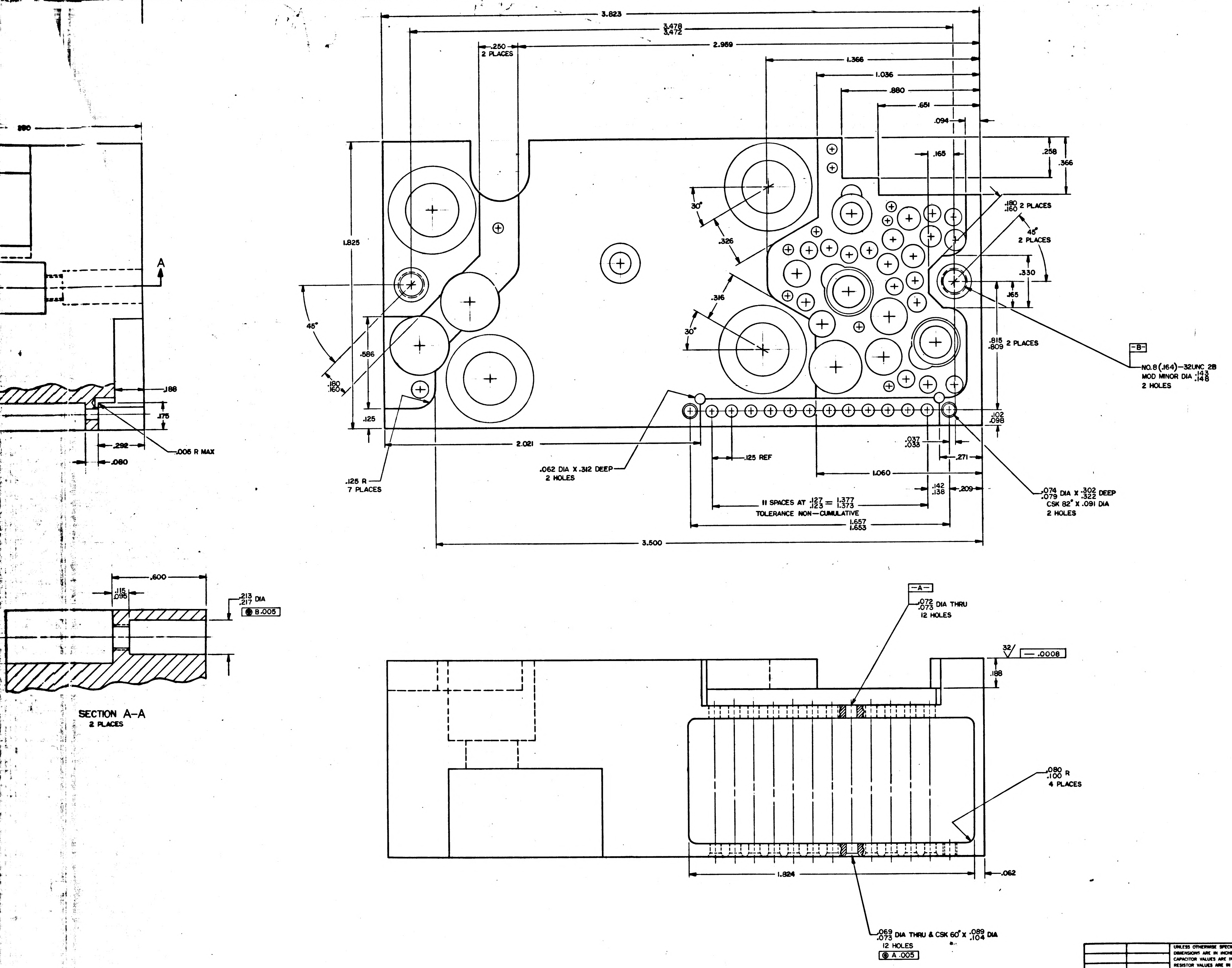
SECTION B–B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A—T5 PER QQ—M—31, TEMP 5
3. FINISH: ANODIZE PER MIL—M—45202 TYPE I, CLASS C
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
7. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
9. APPLY A COATING OF ADHESIVE PER ND1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.250 FROM THE MOUNTING SURFACE

3H

REVISIONS 17831						
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED



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D
C
B
A
3.823
3.478
3.472
.250
2 PLACES
2.959
1.366
1.036
.880
.651
.094
.165
.258
.366
.180
.160 2 PLACES
45°
2 PLACES
.330
.165
.815
.809 2 PLACES
-B-
NO.8 (.164)-32UNC 2B
MOD MINOR DIA .143 .148
2 HOLES
.102
.098
.037
.033
.271
.142
.138
.209
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
1.825
30°
.326
.316
30°
45°
.586
.180
.160
.125
2.021
.062 DIA X .312 DEEP
2 HOLES
.125 R
7 PLACES
.125 REF
1.060
11 SPACES AT .127 .123 = 1.377 1.373
TOLERANCE NON-CUMULATIVE
1.657
1.653
3.500
880
A
.188
.175
.292
.080
.005 R MAX
.600
.115
.095
.213
.217 DIA
◎ B .005
SECTION A-A
2 PLACES
-A-
.072
.073 DIA THRU
12 HOLES
32
— .0008
.188
.080
.100 R
4 PLACES
1.824
.062
.069 .073 DIA THRU & CSK 60° X .089 .104 DIA
12 HOLES
◎ A .005

MASTER

2008159

2007107	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

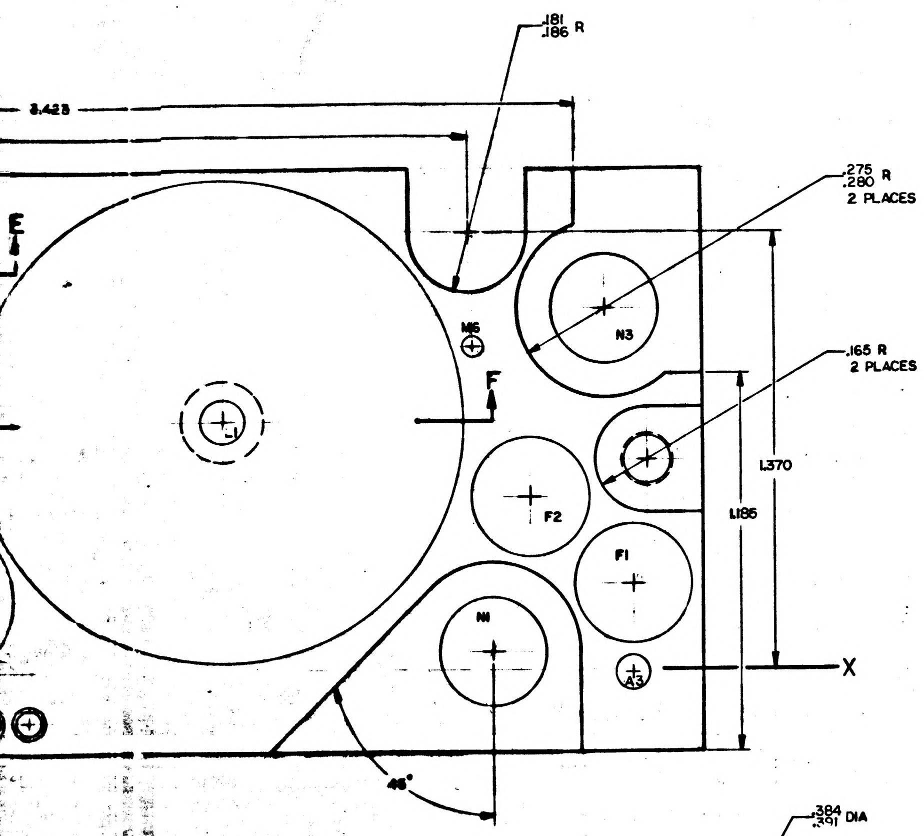
DRAWN	G Papia	27 Feb 65
CHECKED	R. [illegible]	[illegible]
APPROVED		
APPROVED	D. Tutt	3/4/65
APPROVED MIT	W Ryufen	[illegible]
APPROVED MSC	[illegible]	[illegible]
		DATE

HEATSINK
POWER SUPPLY -28VDC

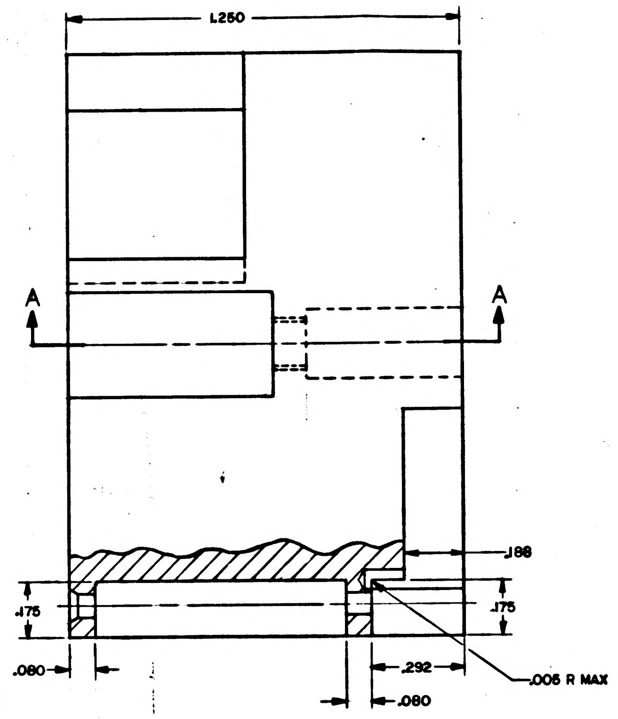
CODE IDENT NO.	SIZE	DRAWING NO.
—	J	2008159
SCALE 5/1		SHEET OF

2008159

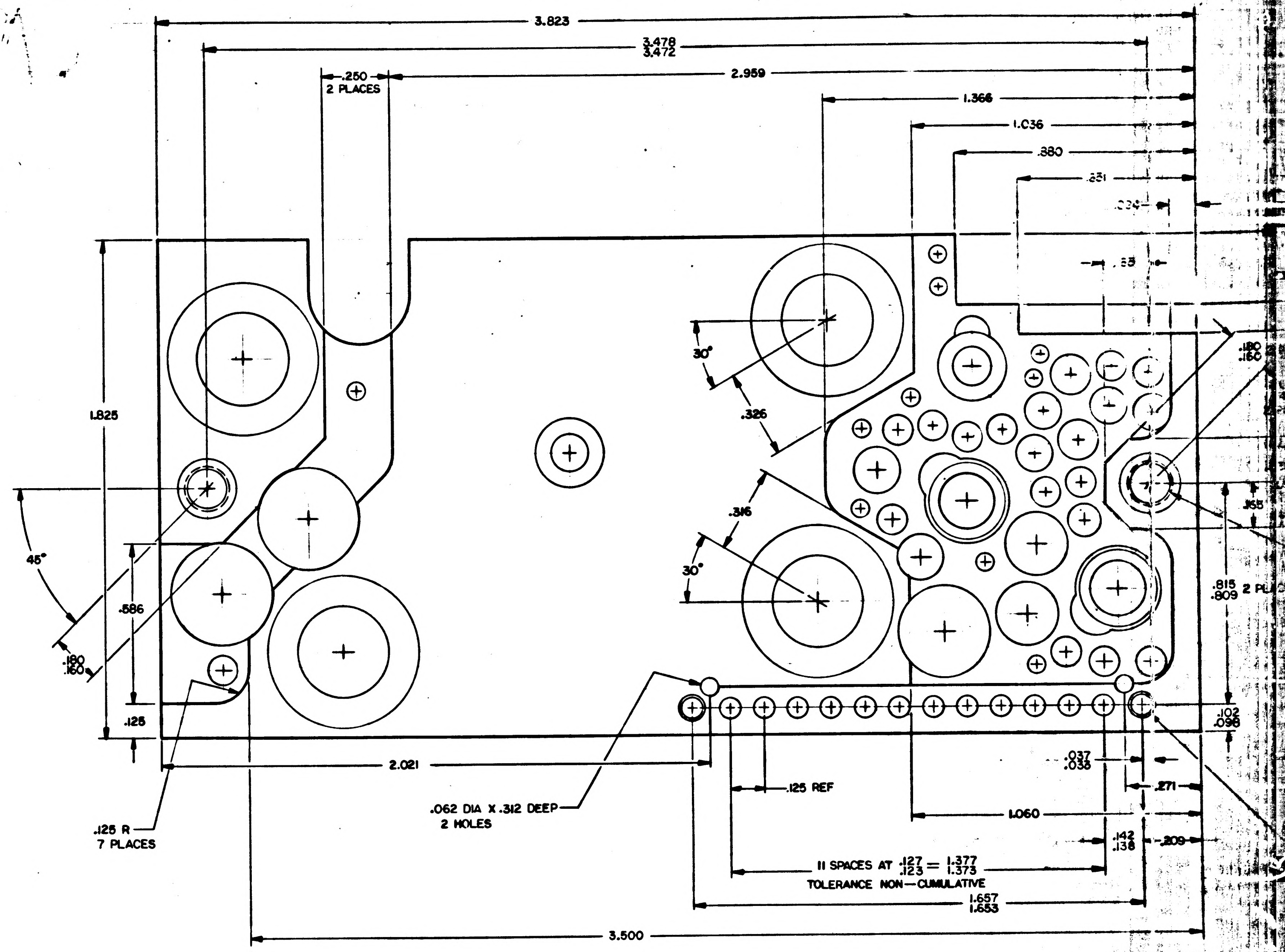
3H



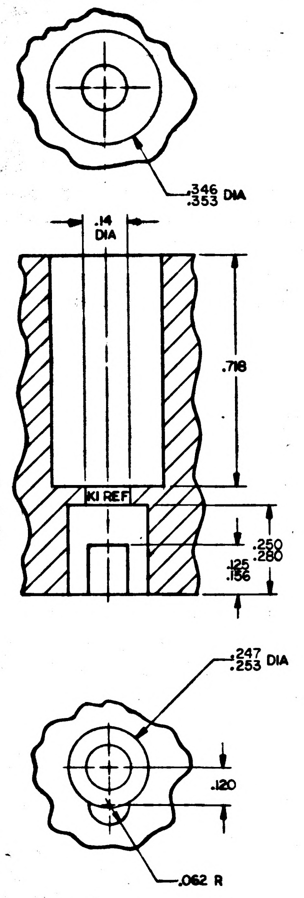
3.423
.181
.186 R
.275
.280 R
2 PLACES
.165 R
2 PLACES
M5
N3
F
F2
F1
N1
A3
1.370
1.185
X
45°
E
.585 DIA
2 PLACES



1.250
A
A
.188
.175
.175
.080
.292
.080
.005 R MAX

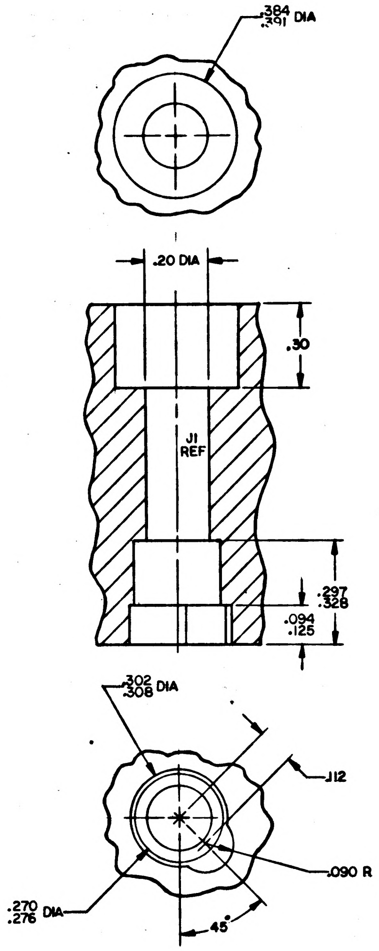


3.823
3.478
3.472
.250
2 PLACES
2.959
1.366
1.036
.880
.631
.334
.55
1.825
30°
.326
.316
30°
45°
.586
.180
.160
.125
.125 R
7 PLACES
2.021
.062 DIA X .312 DEEP
2 HOLES
.125 REF
11 SPACES AT .127
.123 = 1.377
1.373
TOLERANCE NON-CUMULATIVE
1.657
1.653
3.500
1.060
.037
.033
.271
.142
.138
.209
.102
.098
.815
.809 2 PL
.155
.180
.160



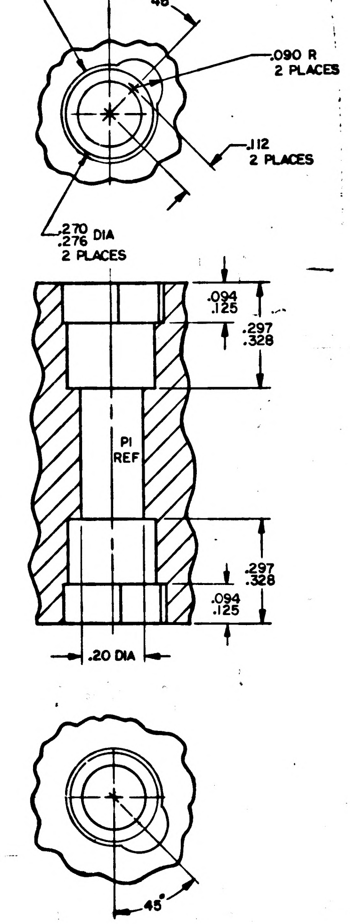
.346
.353 DIA
.14
DIA
.718
K1 REF
.250
.280
.125
.156
.247
.253 DIA
.120
.062 R

SECTION D-D



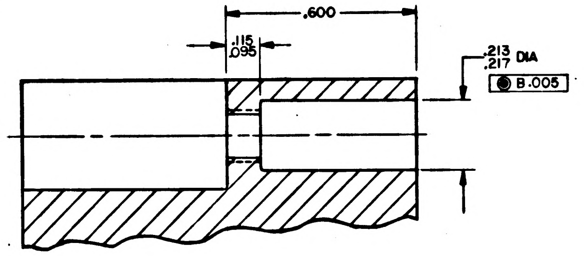
.384
.391 DIA
.20 DIA
.30
J1
REF
.297
.328
.094
.125
.302
.308 DIA
.112
.090 R
.270
.276 DIA
45°

SECTION B-B



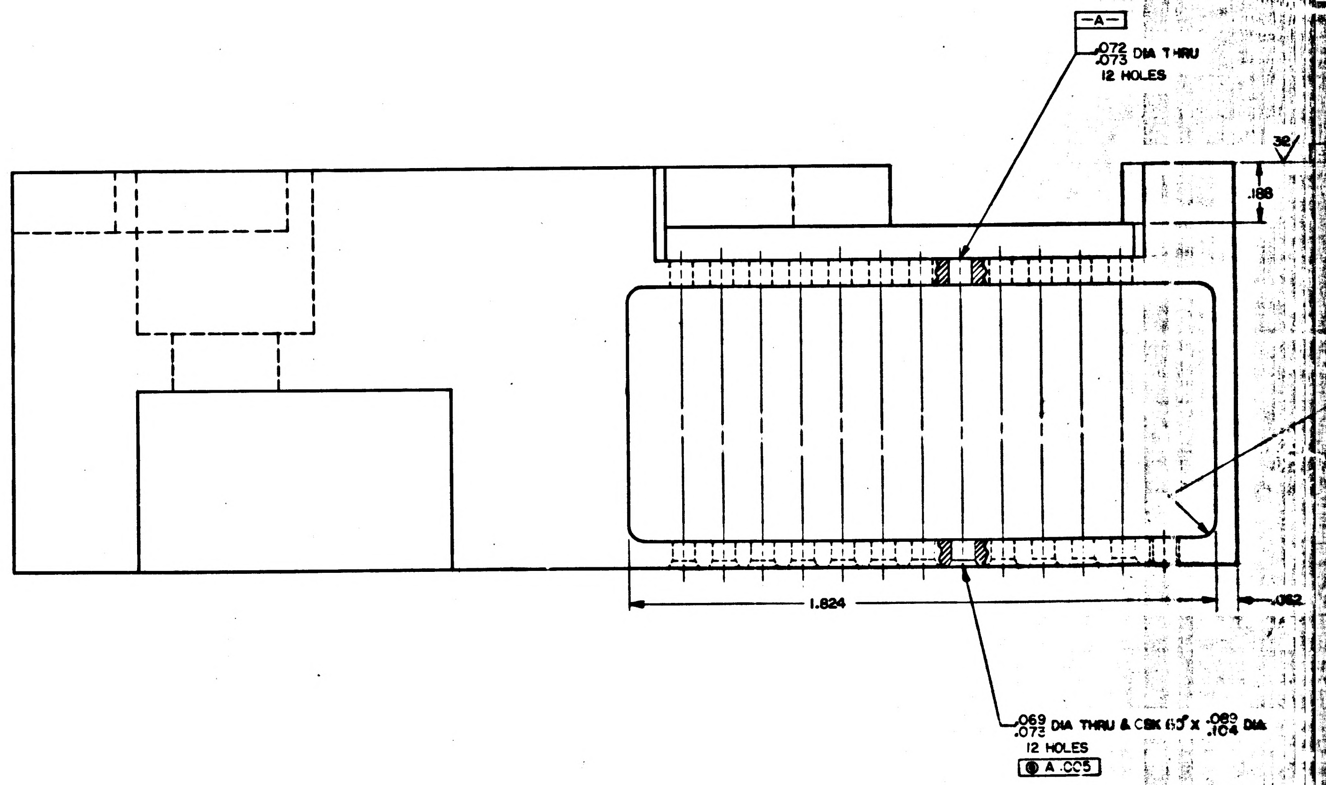
.302 DIA
.308
2 PLACES
45°
.090 R
2 PLACES
.112
2 PLACES
.270 DIA
.276
2 PLACES
.094
.125
.297
.328
P1
REF
.297
.328
.094
.125
.20 DIA
45°

SECTION C-C



.600
.115
.095
.213
.217 DIA
B .005

SECTION A-A
2 PLACES



-A-
.072
.073 DIA THRU
12 HOLES
.188
1.824
.062
.069
.072 DIA THRU & CBK 60° X .080
.104 DIA
12 HOLES
A .005

2008159

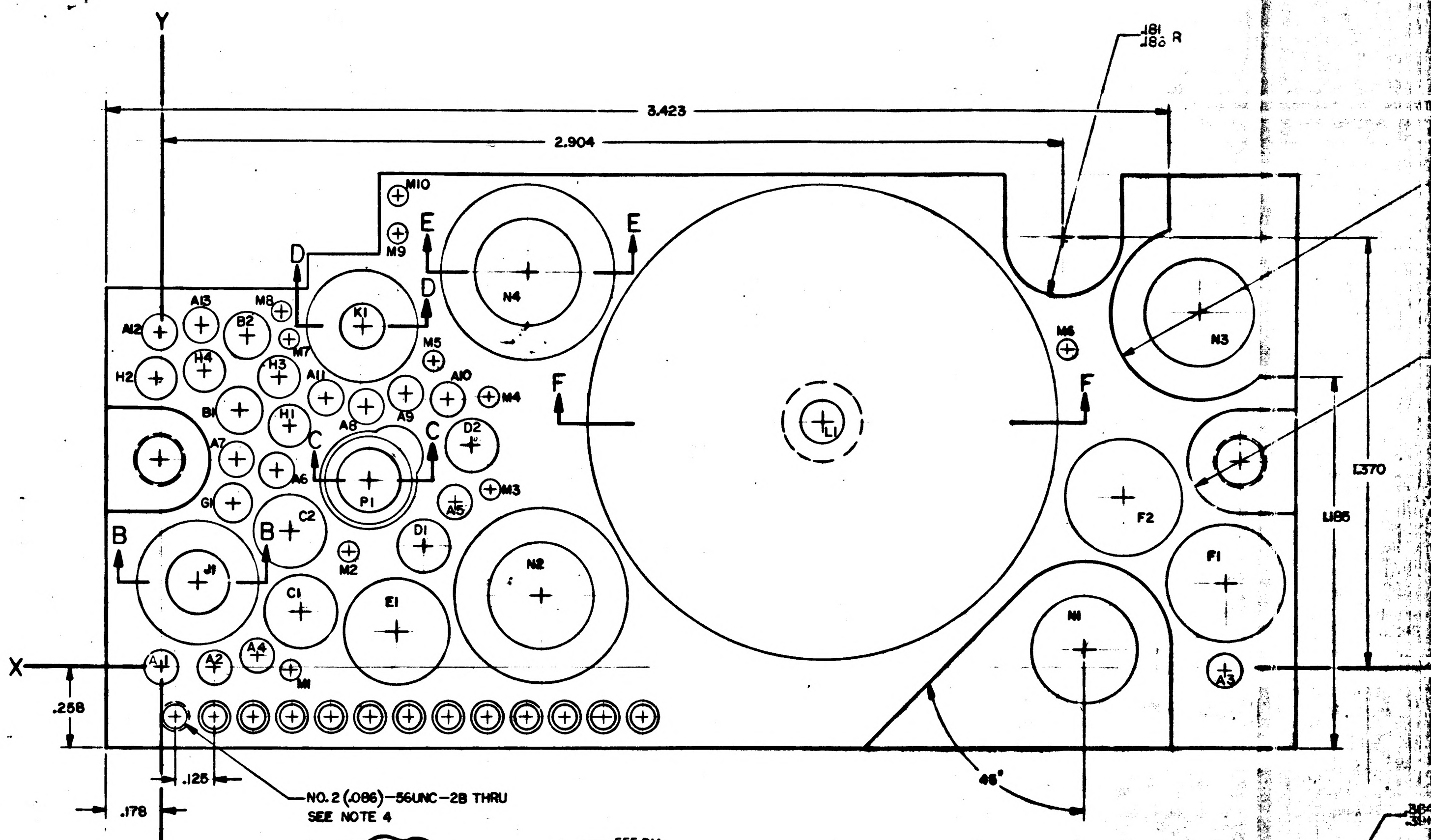
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	13
A2	.170	.000		
A3	3.420	—.008		
A4	.308	.037		
A5	.944	.526		
A6	.374	.626		
A7	.244	.662		
A8	.660	.830		
A9	.788	.872		
A10	.920	.853		
A11	.531	.856		
A12	—.004	1.063		
A13	.130	1.087		
B1	.254	.816	.146 .150	2
B2	.279	1.056		
C1	.448	.176	.227 .231	2
C2	.414	.434		
D1	.843	.386	.165 .169	2
D2	.998	.706		
E1	.756	.114	.330 .337	1
F1	3.422	.268	.366 .373	2
F2	3.096	.542		
G1	.232	.522	.112 .116	1
H1	.415	.768	.127 .131	4
H2	—.016	.918		
H3	.382	.924		
H4	.141	.943		
J1	.116	.268	SEE SECTION B-B	1
K1	.646	1.086	SEE SECTION D-D	1
L1	2.129	.782	SEE SECTION F-F	1
M1	.416	—.006	.058 .062	10
M2	.602	.366		
M3	1.058	.566		
M4	1.054	.860		
M5	.874	.974		
M6	2.916	1.012		
M7	.414	1.044		
M8	.390	1.132		
M9	.764	1.382		
M10	.764	1.500		
N1	2.974	.056	SEE SECTION E-E	4
N2	1.221	.228		
N3	3.336	1.130		
N4	1.179	1.258		
P1	.668	.594	SEE SECTION C-C	1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A—T5 PER QQ—M—31, TEMP 5
3. FINISH: ANODIZE PER MIL—M—45202 TYPE I, CLASS C
4. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
5. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
7. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

3H



Y
X
3.423
2.904
.181
.185 R
1.370
1.185
.258
.125
.178
45°
NO. 2 (.086)—56UNC—2B THRU
SEE NOTE 4
B
C
D
E
F
M10
M9
M8
M7
M6
M5
M4
M3
M2
M1
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
B1
B2
C1
C2
D1
D2
E1
F1
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H4
J1
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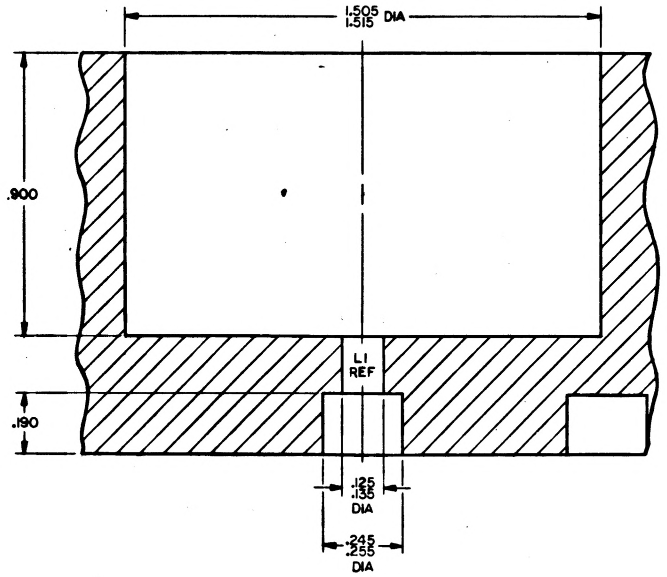
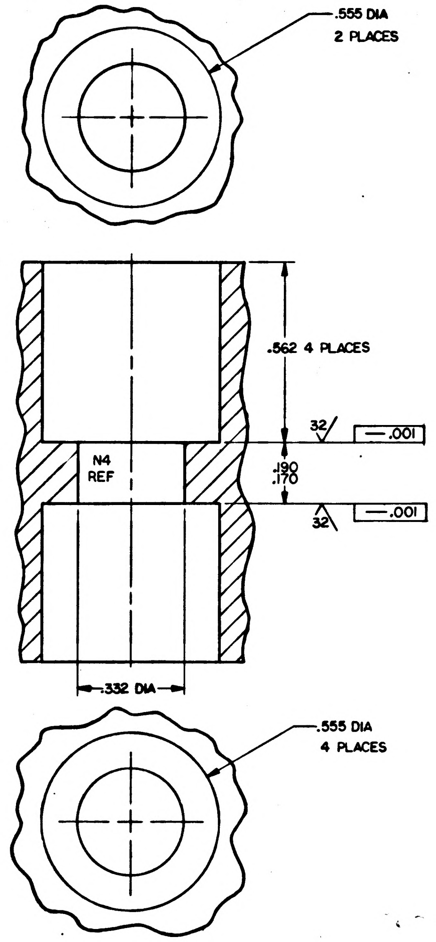
L1
N1
N2
N3
N4
P1



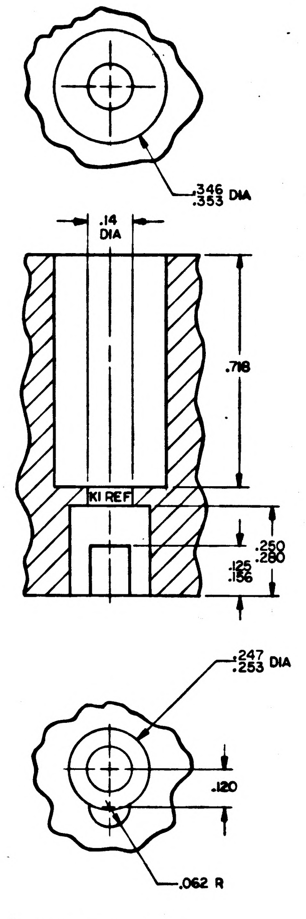
1.505
1.515 DIA
.900
.190
L1
REF
.125
.135
DIA
.245
.255
DIA

SECTION F-F



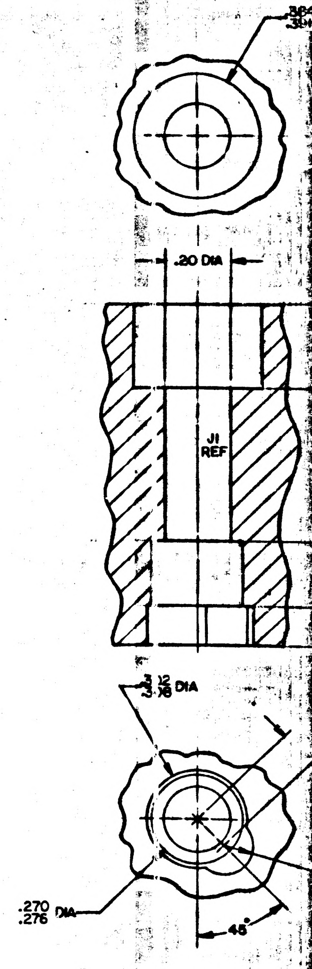
.555 DIA
2 PLACES
.562 4 PLACES
32
.001
.190
.170
N4
REF
.332 DIA
.555 DIA
4 PLACES

SECTION E-E



.346
.353 DIA
.14
DIA
.718
K1 REF
.250
.280
.125
.156
.247
.253 DIA
.120
.062 R

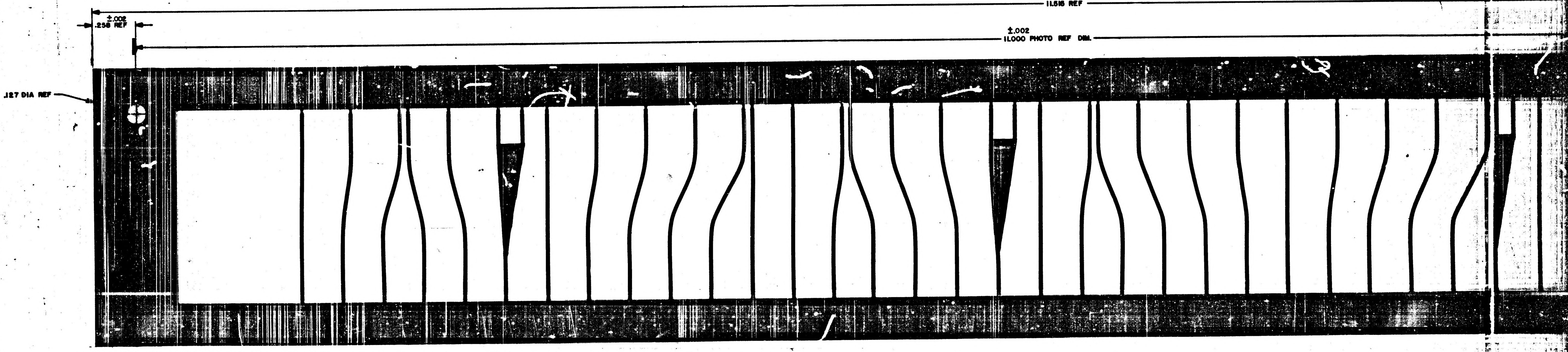
SECTION D-D



.564
.20 DIA
J1
REF
.312
.316 DIA
.270
.276 DIA
45°

SECTION B-B

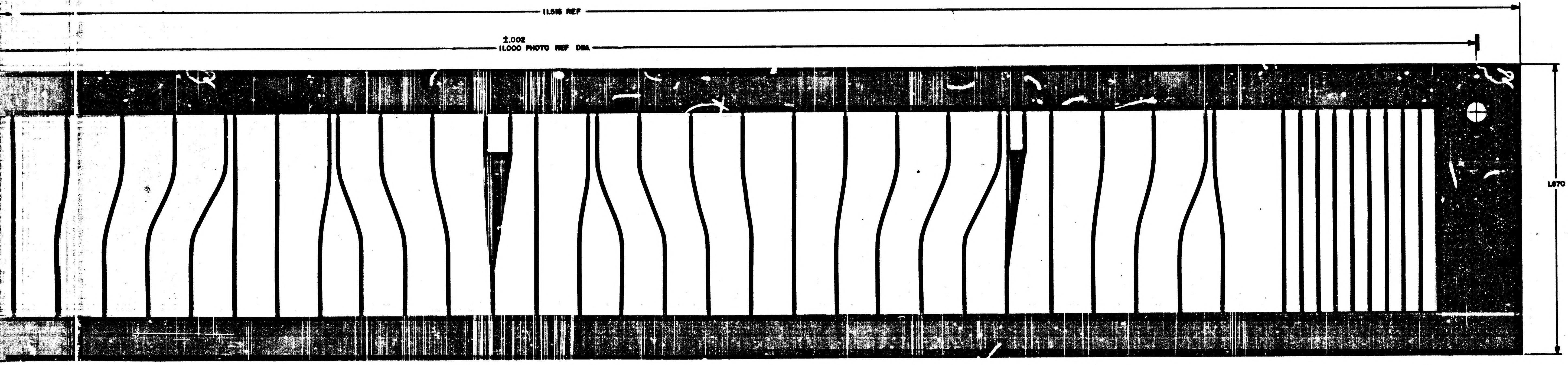
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.

REVISIONS 1725?

SYM	ZONE	DESCRIPTION	ER	CHK	DATE	APPROVED



REF:
DWG NO.2007085 FOR CONNECTOR B ASSEMBLY

2008160

(24)

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J.E. Welch
CHECKED
APPROVED R.V. Vaugh
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

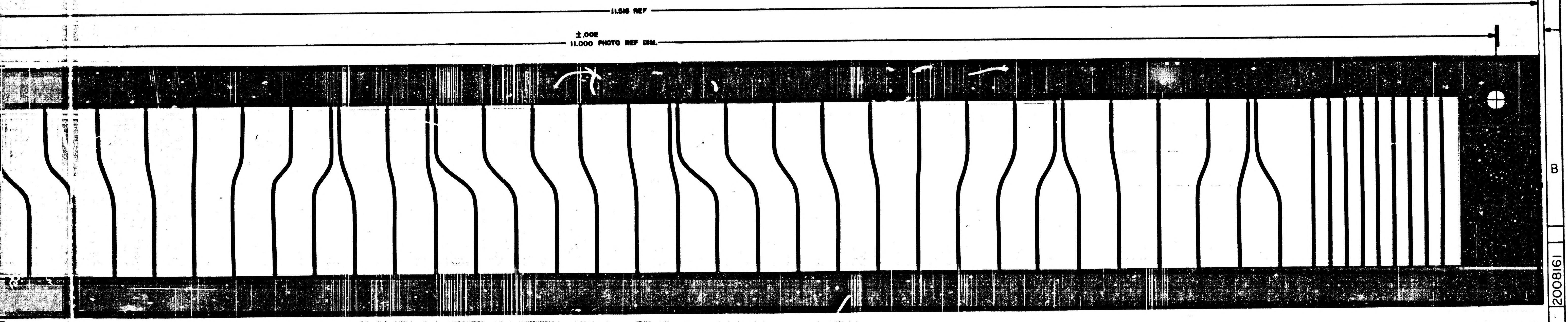
PHOTOGRAPHIC MASTER
CONNECTOR B, HEADER/MATRIX
CDU LOGIC MODULE

CODE IDENT NO. ——
SIZE J
DRAWING NO. 2008160
SCALE 5/1
SHEET 1 OF 1

MASTER

2008160

REVISIONS 7757						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



(AH)

REF:
DWG NO. 2007082 FOR CONNECTOR A ASSEMBLY

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	J. F. [illegible]	[illegible]
CHECKED		
APPROVED	[illegible]	[illegible]
APPROVED	[illegible]	3/24/65
APPROVED MIT	[illegible]	2/4/65
APPROVED MSC	[illegible]	2-2[illegible]
		DATE

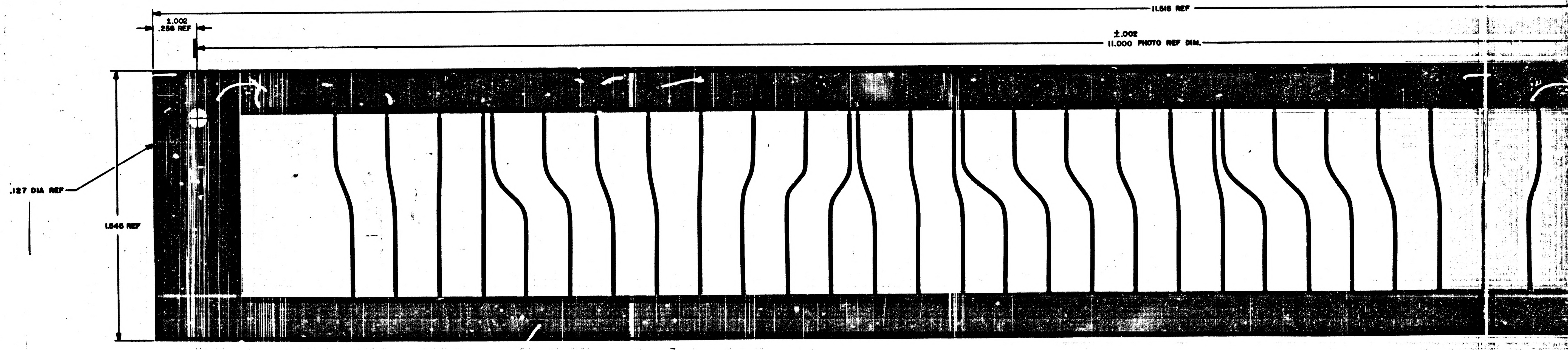
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
CONNECTOR A, HEADER/MATRIX
CDU LOGIC MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
—	J	2008161
SCALE 8/1		SHEET OF

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



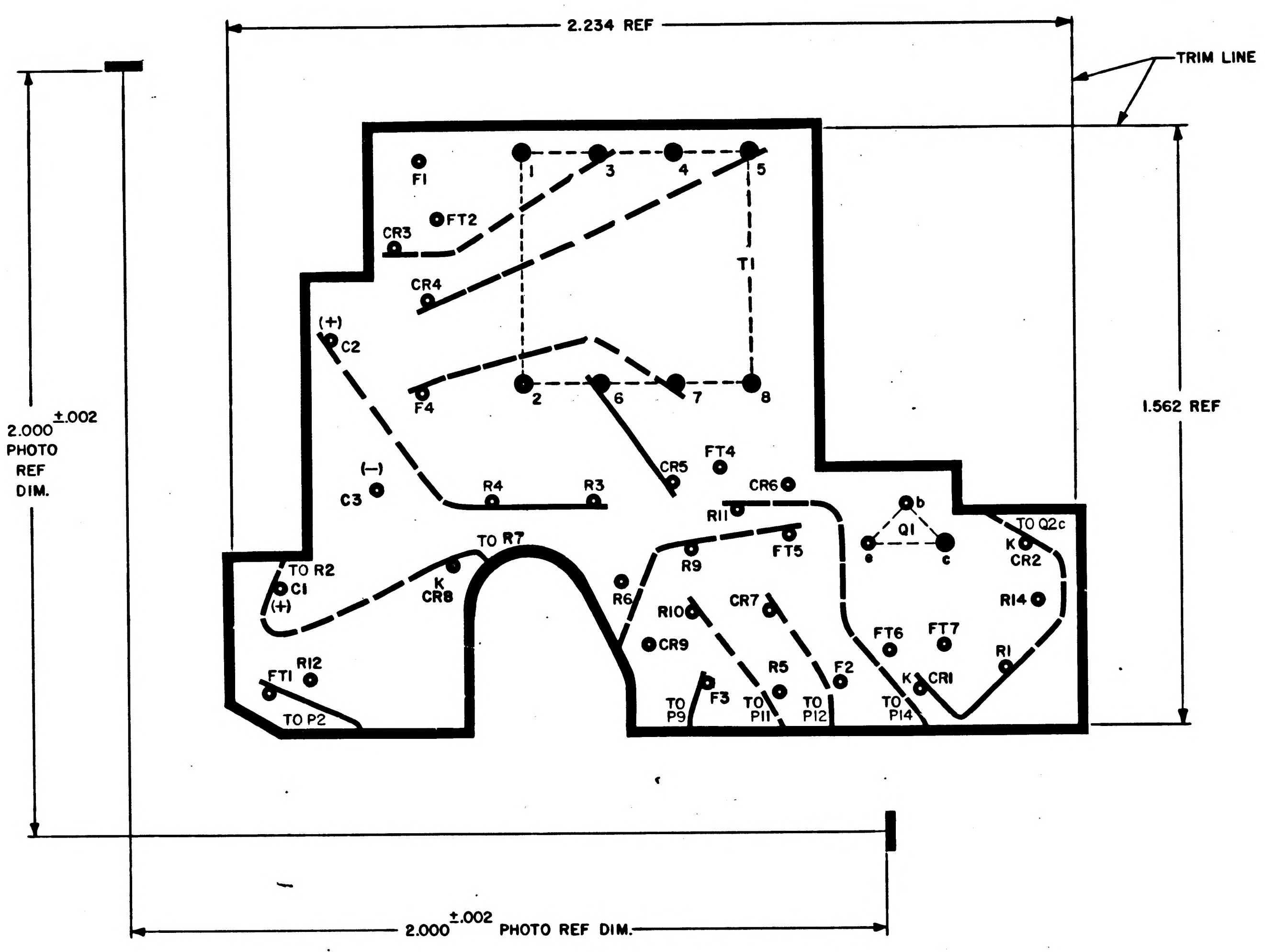
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18843

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20144		RL	21JUN66	


2.234 REF
TRIM LINE
1.562 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
F1
1
3
4
5
FT2
CR3
CR4
T1
(+)
C2
F4
2
6
7
8
FT4
CR5
(–)
C3
R4
R3
CR6
R11
b
Q1
e
c
TO Q2c
K
CR2
FT5
TO R7
TO R2
C1
(+)
K
CR8
R6
R9
R14
R10
CR7
CR9
FT6
FT7
R12
FT1
R5
F2
K
CR1
R1
F3
TO P2
TO P9
TO P11
TO P12
TO P14

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ⊙ .040/.050 DIA HOLE
8. ● .061/.065 DIA HOLE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007119	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±— ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Mahoney 16FEB65
CHECKED R. Lindsay 4MAY65
APPROVED R. Moser 4MAY65
APPROVED 5/4/65
APPROVED MIT W Kupfer 5/4/65
APPROVED MSC W J 5-4-61
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

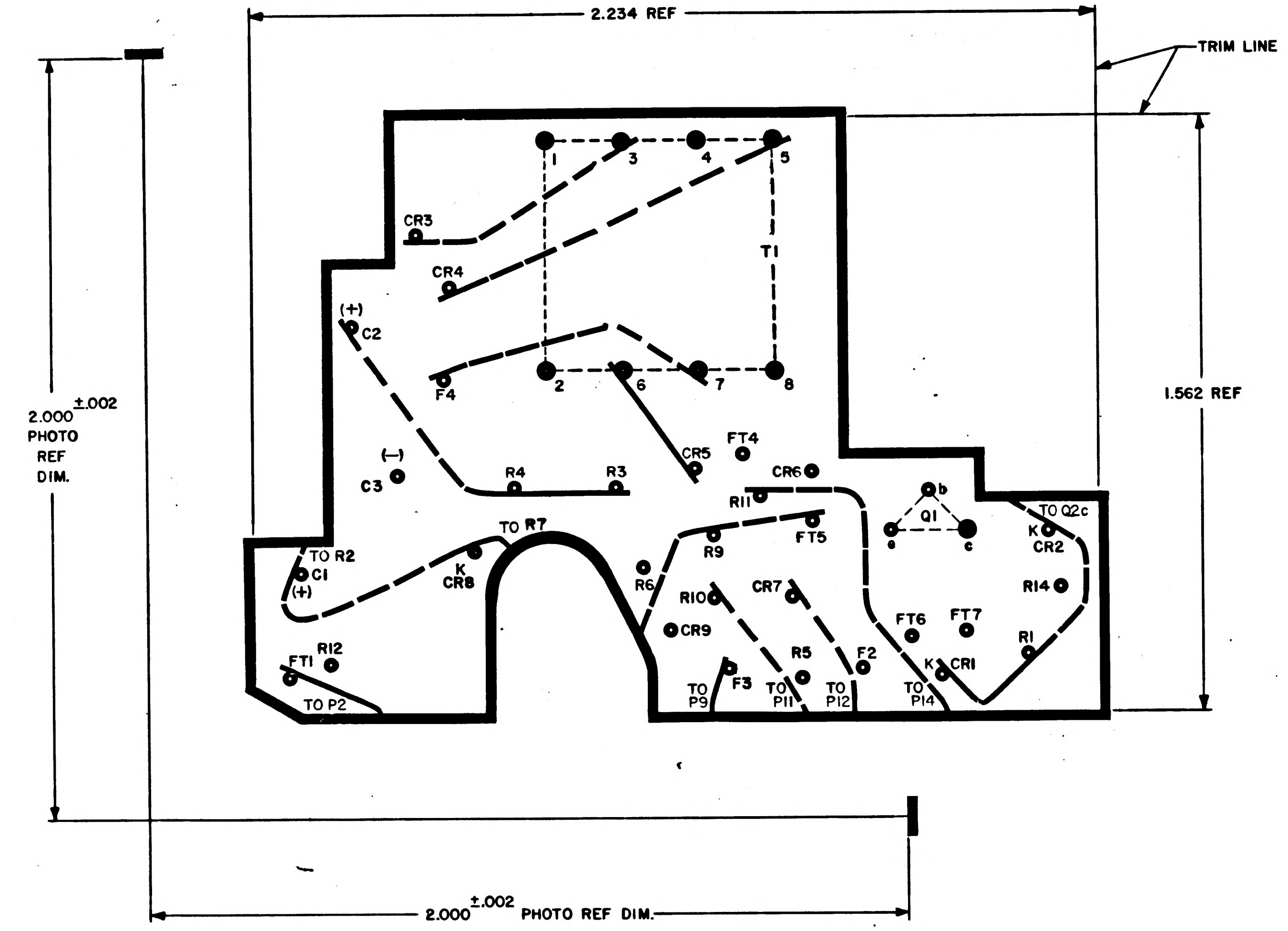
INSULATOR (TOP)
PHOTOGRAPHIC MASTER
POWER SUPPLY, SIGNAL CONDITIONER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008162
SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18843

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20144		RL	21JUN66	
B		REVISED PER TDRR 20419	H.F.T.		21 July 65	


2.234 REF
TRIM LINE
1.562 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
1
2
3
4
5
6
7
8
T1
CR3
CR4
(+)
C2
F4
(–)
C3
R4
R3
CR5
FT4
CR6
R11
FT5
b
Q1
e
c
TO Q2c
K
CR2
R14
TO R7
TO R2
C1
(+)
K
CR8
R6
R9
R10
CR7
CR9
FT6
FT7
R1
FT1
R12
TO P2
F3
R5
F2
K
CR1
TO P9
TO P11
TO P12
TO P14

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ○ .040/.050 DIA HOLE
8. ● .061/.065 DIA HOLE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007119	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Mahoney 16FEB65
CHECKED 4MAY65
APPROVED 4MAY65
APPROVED 5/4/65
APPROVED MIT 4/16/65
APPROVED MSC 5-4-61
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (TOP)
PHOTOGRAPHIC MASTER
POWER SUPPLY, SIGNAL CONDITIONER

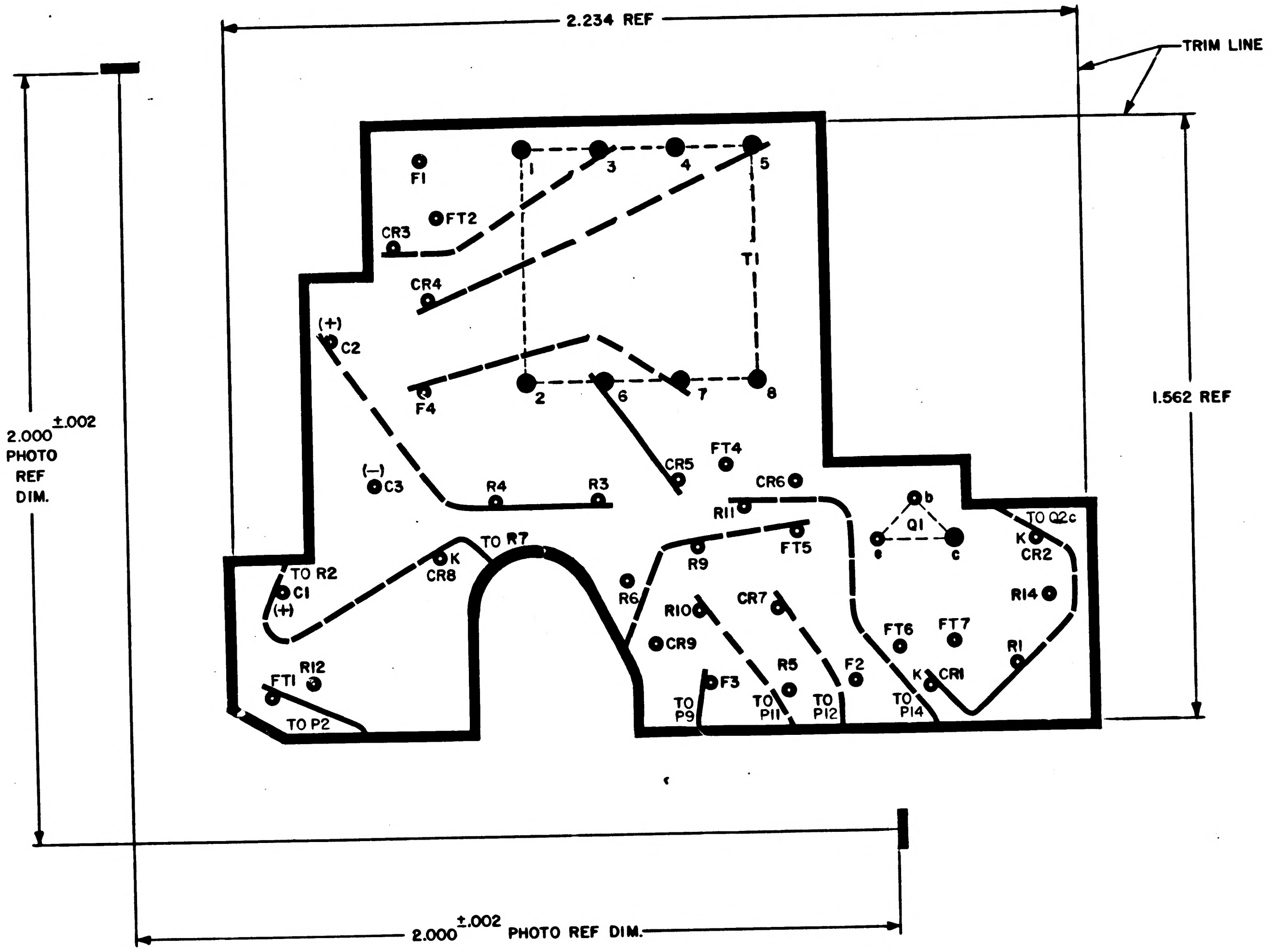
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008162
SCALE 5/1
SHEET 1 OF 1

2008162 B

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS 18843


2.234 REF
TRIM LINE
1.562 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
F1
1
3
4
5
CR3
FT2
CR4
T1
(+)
C2
F4
2
6
7
8
FT4
CR5
(–)
C3
R4
R3
CR6
R11
b
Q1
e
c
TO Q2c
K
CR2
TO R7
K
CR8
TO R2
C1
(+)
R6
R9
FT5
R10
CR7
R14
CR9
FT6
FT7
R1
R12
FT1
F3
R5
F2
K
CR1
TO P2
TO P9
TO P11
TO P12
TO P14

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ○ .040/.050 DIA HOLE
8. ● .061/.065 DIA HOLE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007119	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Mahoney	16 FEB 65
CHECKED	R. Lindau	4 MAY 65
APPROVED	R. Mosk	4 MAY 65
APPROVED		5/4/65
APPROVED MIT	W Kupfer	4/16/65
APPROVED MSC	W J	5-4-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (TOP) PHOTOGRAPHIC MASTER
POWER SUPPLY, SIGNAL CONDITIONER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008162

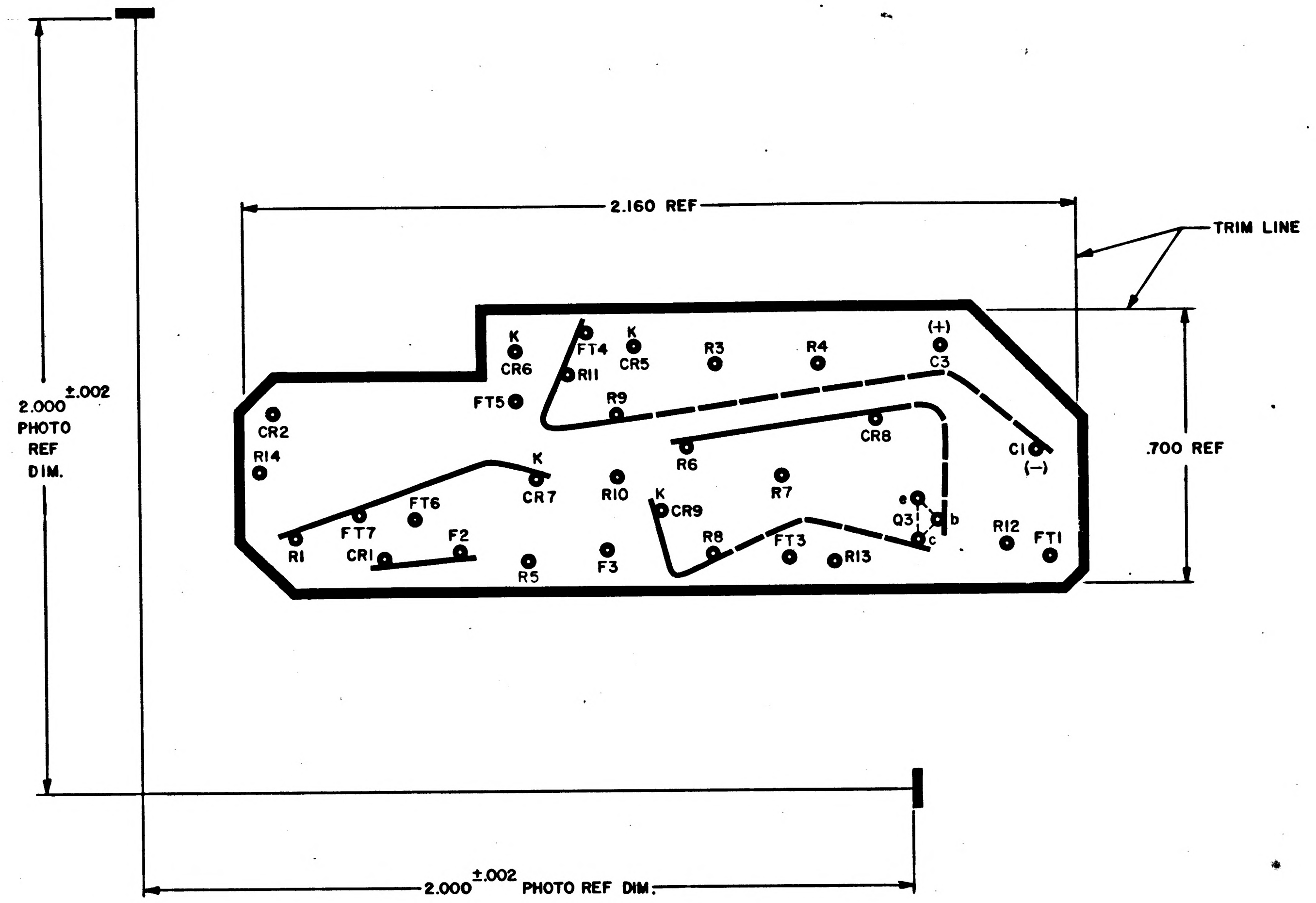
SCALE 5/1 SHEET 1 OF 1

2008162

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18843

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .040/.050 DIA HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007119	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Ed Mahoney	16 Feb 65
CHECKED	R. Lizotmi	4 MAY 65
APPROVED	RMoser	4 MAY 65
APPROVED	D. R. Test	5/4/65
APPROVED MIT	W. Crysler	4 May 65
APPROVED MSC	W. J. Lhi	5-4-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

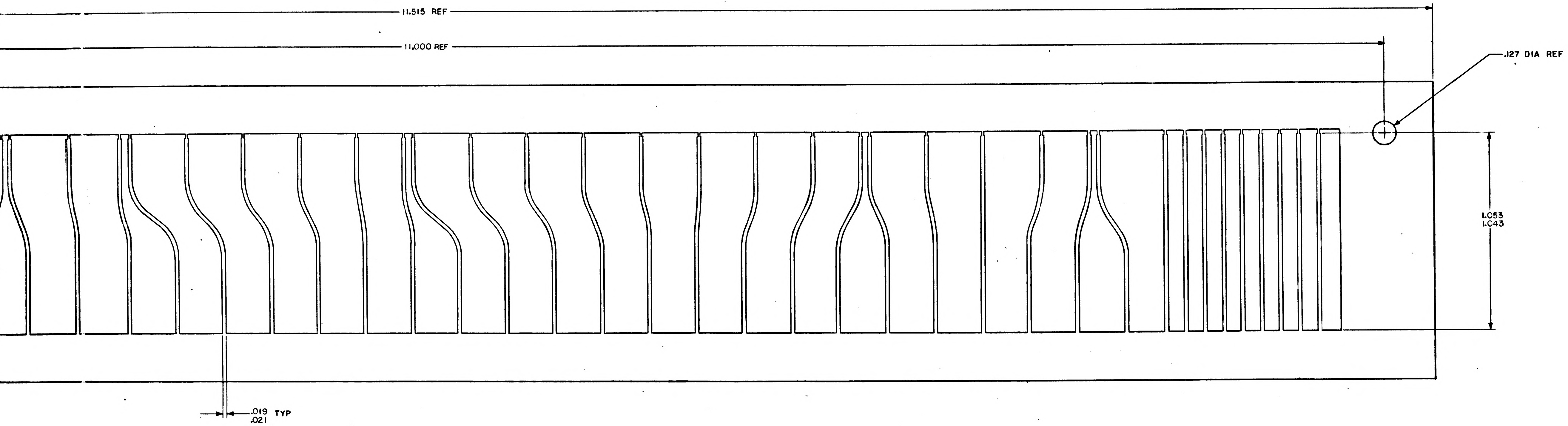
INSULATOR (BOTTOM) PHOTOGRAPHIC MASTER
POWER SUPPLY, SIGNAL CONDITIONER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008163

SCALE 5/1 — SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21762	LAL		30 65	WK

REVISIONS 17757



REF:
DWG. NO. 2008161 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007082	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN J.F. Walsh 18 Feb 65
CHECKED
APPROVED P.W. 22 Feb 65
APPROVED
APPROVED MIT W Kupfer 23 Feb 65
APPROVED MSC W.G. 2-23-65
DATE

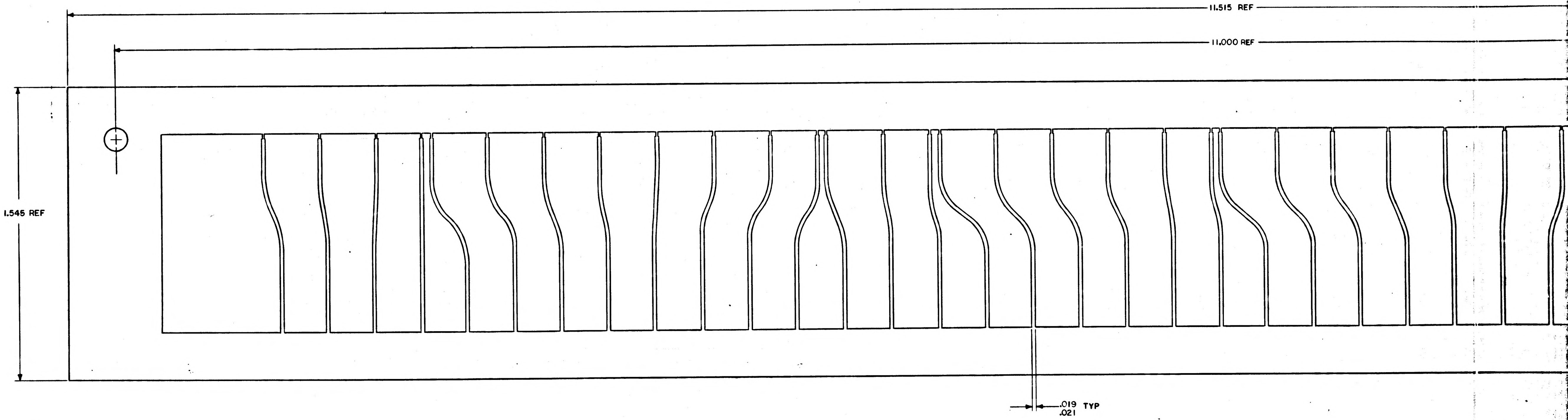
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR A
CDU LOGIC MODULE

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008164
SCALE 5/1
SHEET OF

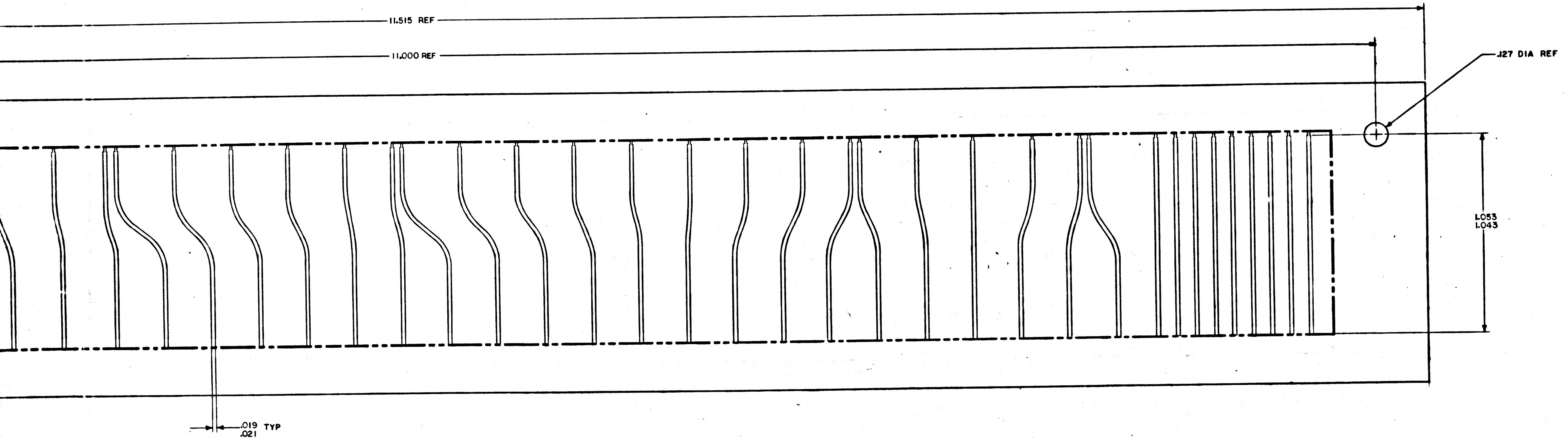
2008164 | A

NOTICE -- WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025 TEMP ANNEALED
3. IDENTIFY WITH PART NO. PER ND1002019
4. FINISH GOLD PLATE PER MIL-G-45204 TYPE I WITH THE FOLLOWING EXCEPTIONS: GOLD PLATE SHALL BE A MINIMUM OF 200 AND A MAXIMUM OF 300 MICRO INCHES PARAGRAPH 3.4 DOES NOT APPLY

REVISIONS 17757					
SYM	ZONE	DESCRIPTION	BR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21762	LAL		30 [illegible] 65	WK
B		REVISED PER TDRR 23439	A.A.		[illegible]	WK



REF:
DWG. NO. 2008161 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007082	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J.F. [illegible] 19 Feb 65
CHECKED
APPROVED [illegible]
APPROVED [illegible]
APPROVED MIT W Kupfer
APPROVED MSC [illegible] 2-23-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR A
CDU LOGIC MODULE

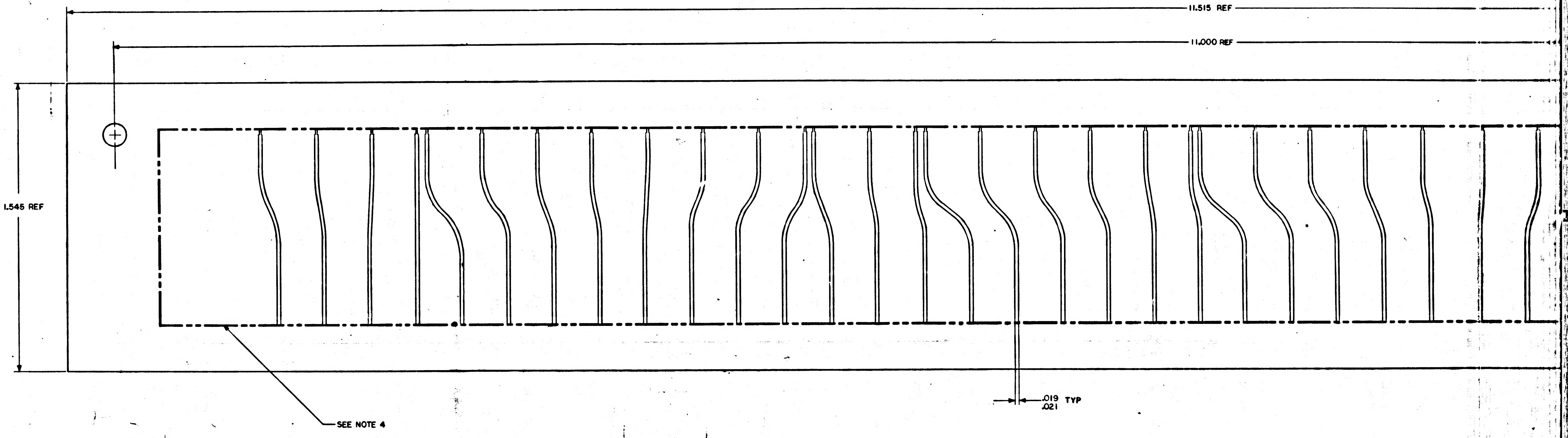
CODE IDENT NO. —
SIZE J
DRAWING NO. 2008164
SCALE 5/1
SHEET OF

MASTER

2008164 B

E2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

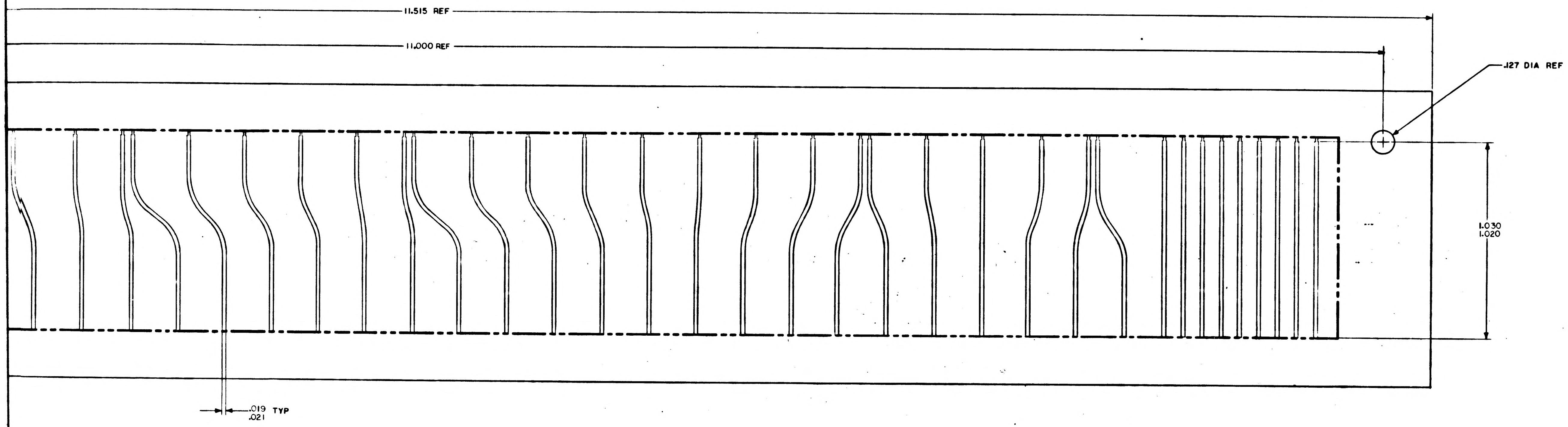


NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025 TEMP ANNEALED
3. IDENTIFY WITH PART NO. PER ND1002019
4. PLATE AREA BOUNDED BY PHANTOM LINES PER MIL-6-45204
   TYPE I, WITH THE FOLLOWING EXCEPTIONS:
   GOLD PLATE SHALL BE A MINIMUM OF 200 AND A MAXIMUM OF 300
   MICRO INCHES PARAGRAPH [illegible].4 DOES NOT APPLY
   FLASHING ALLOWABLE ON BORDER SURFACES
5. WORKMANSHIP: WHEN EXAMINED UNDER 10X MAGNIFICATION THE CONNECTOR SHALL BE FREE OF PIN HOLES. OTHER DEFECTS SUCH AS PITS, NICKS, OR RAGGED EDGES WHICH REDUCE THE WIDTH OF THE VERTICAL WIRES BY MORE THAN 10%, SHALL BE CAUSE FOR REJECTION.

REVISIONS 11757

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
A		REVISED PER TDRR 21762	LAL		30 [illegible]	
B		REVISED PER TDRR 23439	A.A.		[illegible]	
C		REVISED PER TDRR 24949			[illegible]	



REF:
DWG. NO. 2008161 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007082	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J.F. Walsh
CHECKED
APPROVED
APPROVED
APPROVED MIT W. Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR A
CDU LOGIC MODULE

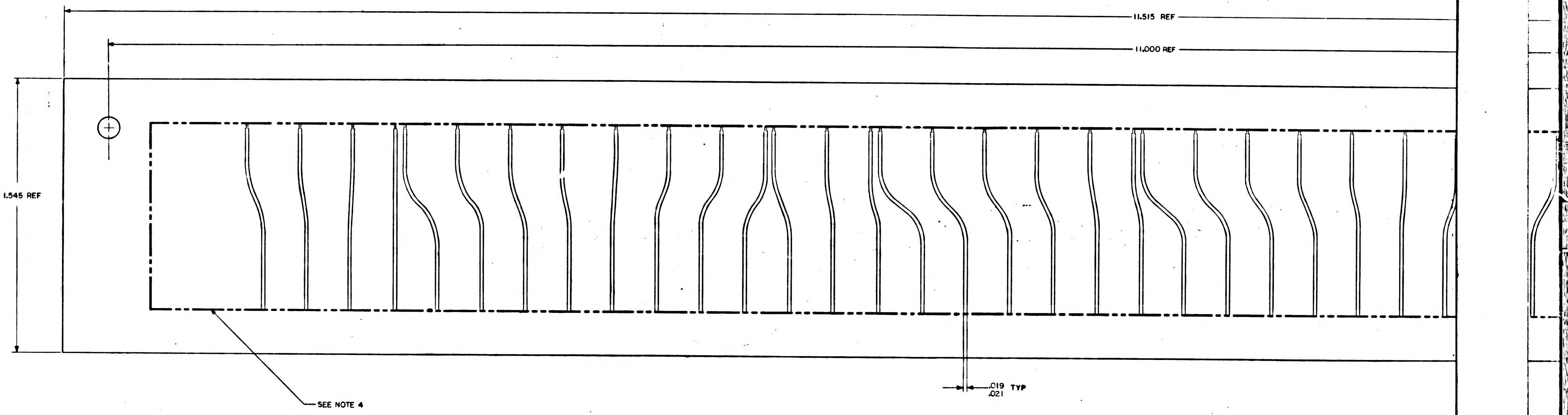
CODE IDENT NO. ——
SIZE J
DRAWING NO. 2008164
SCALE 5/1
SHEET OF

2008164 C

F 2/2

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



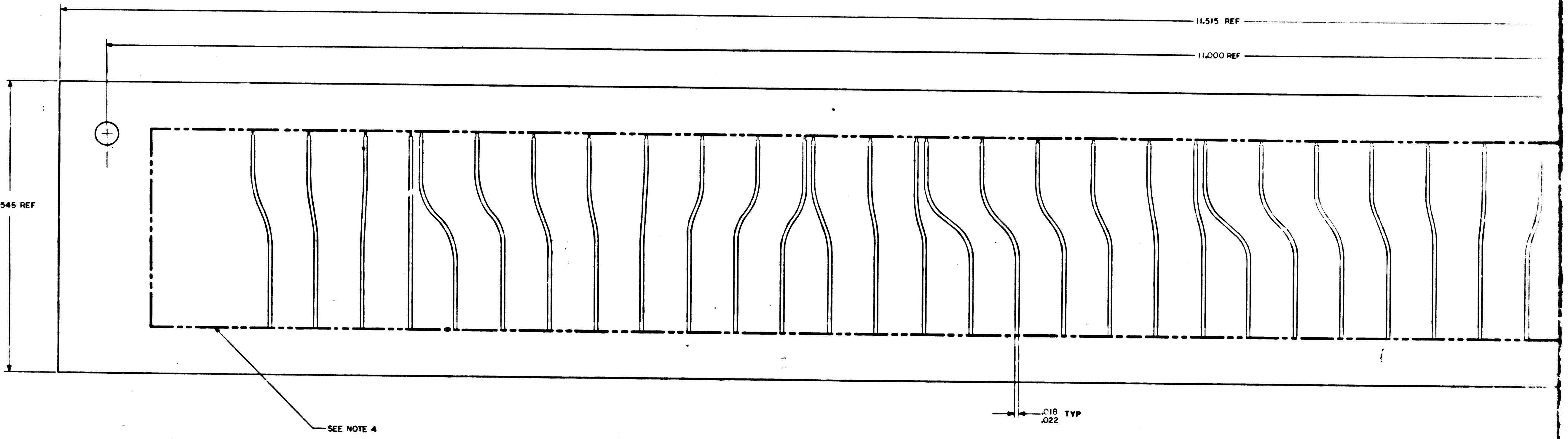
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025 TEMP ANNEALED
3. IDENTIFY WITH PART NO. PER [illegible]
4. PLATE AREA BOUNDED BY PHANTOM LINES PER MIL-6-45204 TYPE I, WITH THE FOLLOWING EXCEPTIONS:
   GOLD PLATE SHALL BE A MINIMUM OF 200 AND A MAXIMUM OF 300 MICRO INCHES PARAGRAPH 3.4 DOES NOT APPLY
   FLASHING ALLOWABLE ON BORDER SURFACES
5. WORKMANSHIP: WHEN EXAMINED UNDER 10X MAGNIFICATION THE CONNECTOR SHALL BE FREE OF PIN HOLES. OTHER DEFECTS SUCH AS PITS, NICKS, OR RAGGED EDGES WHICH REDUCE THE WIDTH OF THE VERTICAL WIRES BY MORE THAN 10% SHALL BE CAUSE FOR REJECTION.

2008164 C F1/2

C

4



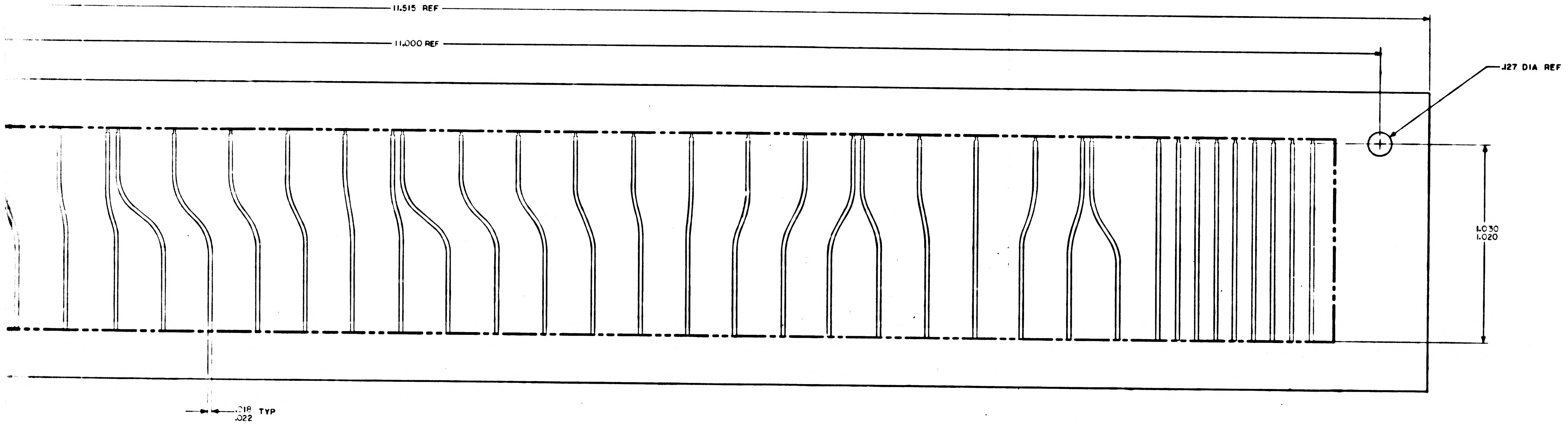
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025 TEMP ANNEALED
3. IDENTIFY WITH PART NO PER NDIC02019
4. PLATE AREA BOUNDED BY PHANTOM LINES PER MIL-G-45204 TYPE I. WITH THE FOLLOWING EXCEPTIONS
   GOLD PLATE SHALL BE A MINIMUM OF 200 AND A MAXIMUM OF 300 MICRO INCHES PARAGRAPH 3.4 DOES NOT APPLY
   FLASHING ALLOWABLE ON BORDER SURFACES
5. WORKMANSHIP WHEN EXAMINED UNDER 10X MAGNIFICATION THE CONNECTOR SHALL BE FREE OF PIN HOLES. OTHER DEFECTS SUCH AS PITS, NICKS, OR RAGGED EDGES WHICH REDUCE THE WIDTH OF THE VERTICAL WIRES BY MORE THAN 10% SHALL BE CAUSE FOR REJECTION.

2008164 D

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 2?762	[illegible]		[illegible]	
B		REVISED PER TDRR 23439	AA		[illegible]	
C		REVISED PER TDRR 24949	[illegible]		[illegible]	
D		REVISED PER TDRR 3?2?	[illegible]		[illegible]	



REF:
DWG. NO. 2008161 FOR PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007082	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN J.E. [illegible]
CHECKED
APPROVED P.M. [illegible]
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR A
CDU LOGIC MODULE

CODE IDENT NO —
SIZE J
DRAWING NO 2008164
SCALE 5/1
SHEET OF

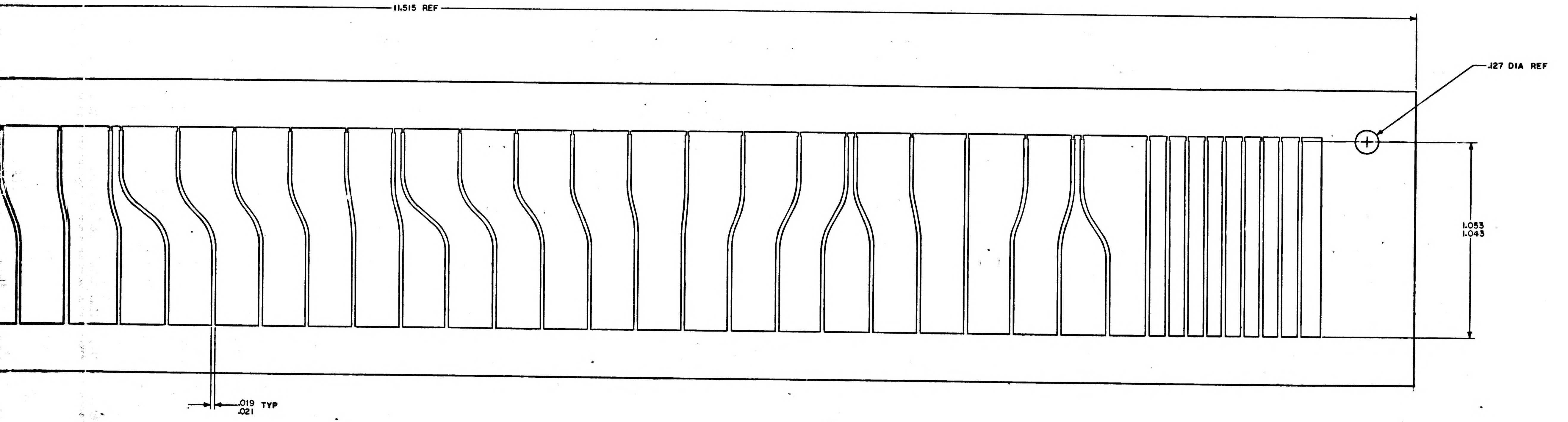
2008164 D

2008164 DF2/2

4 3 2 1

REVISIONS 17757

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED



REF:
DWG. NO. 2008161 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007082	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC 2-23-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

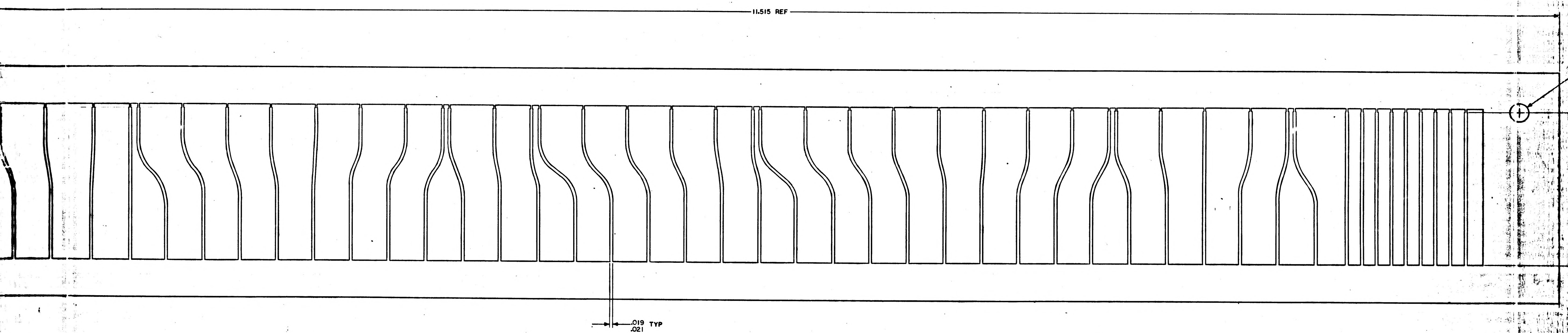
CONNECTOR A
CDU LOGIC MODULE

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008164
SCALE 5/1
SHEET 1 OF 1

MASTER

2008164

4 3 2

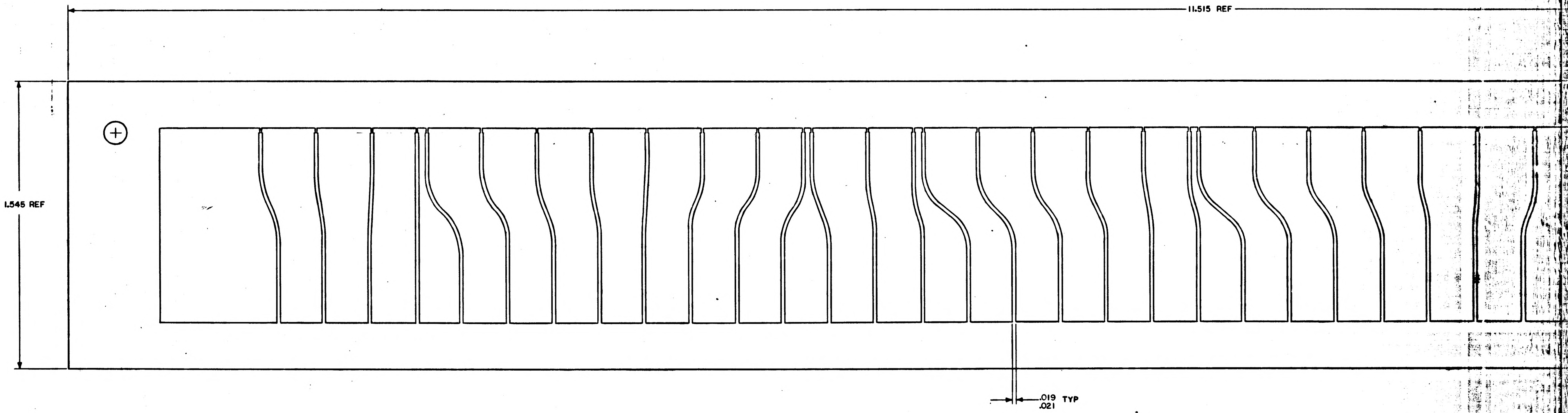

11.515 REF
.019
.021 TYP

MASTER

TC82	
NEXT ASSY	USED ON
APPLICATION	

2008164

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

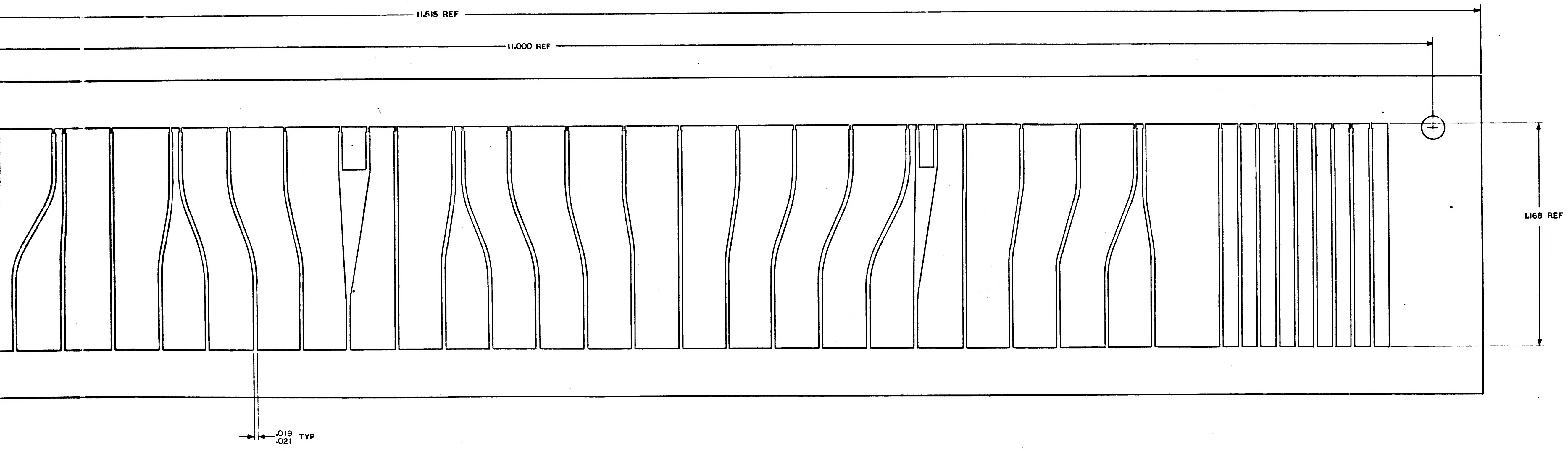


NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025
3. ETCH PART AS SHOWN PER ND
4. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21762				WK

REVISIONS 17757



REF:
DWG. NO. 2008160 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007083	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

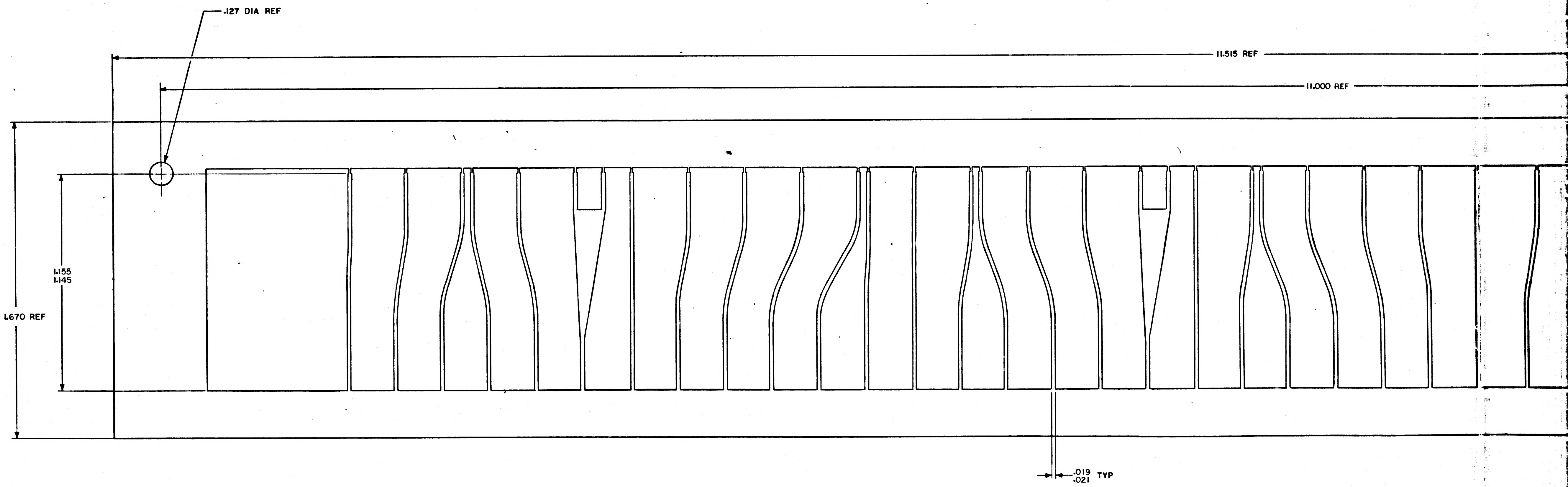
DRAWN J.F. Webb 18 Feb 65
CHECKED
APPROVED 22 Mar 65
APPROVED 3/23/65
APPROVED MIT 23 Mar 65
APPROVED MSC 3-23-65
DATE

CONNECTOR B
CDU LOGIC MODULE

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008165
SCALE 5/1
SHEET 1 OF 1

2008165 A

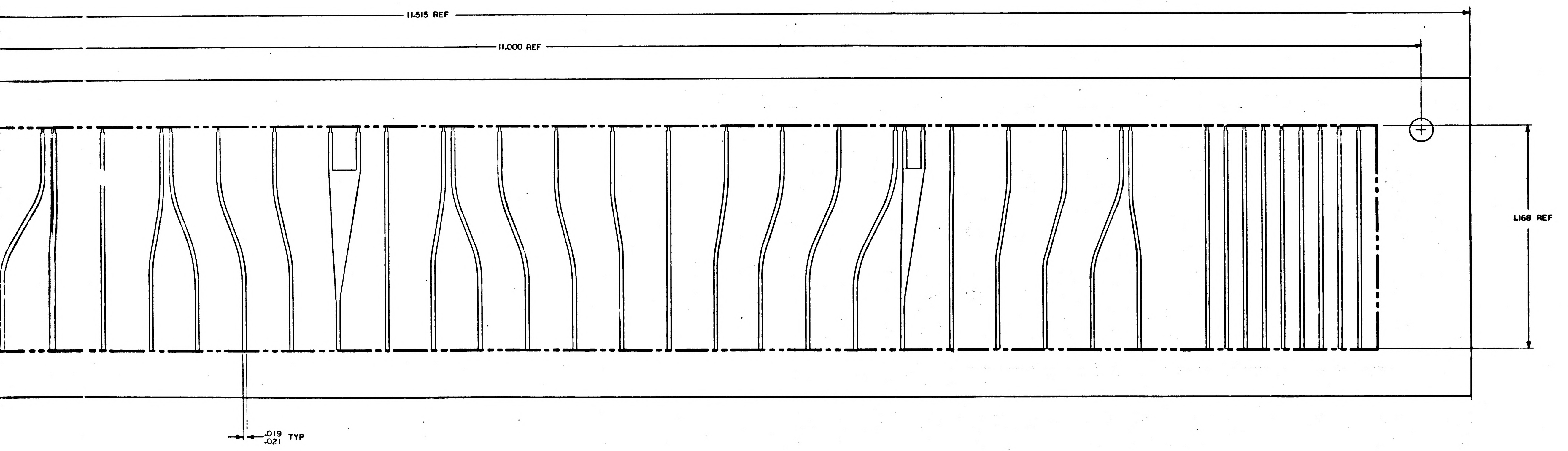
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025 TEMP ANNEALED
3 IDENTIFY WITH PART NO PER ND1002019
4 FINISH GOLD PLATE PER MIL-G-45204 TYPE I WITH THE FOLLOWING EXCEPTIONS:
GOLD PLATE SHALL BE A MINIMUN OF 200 AND A MAXIMUN OF 300 MICRO INCHES. ~~PARAGRAPH~~ 3.4 DOES NOT APPLY

REVISIONS 17757

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21762			30	
B		REVISED PER TDRR 23439				



REF:
DWG. NO. 2008160 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007083	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J.F. White
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR B
CDU LOGIC MODULE

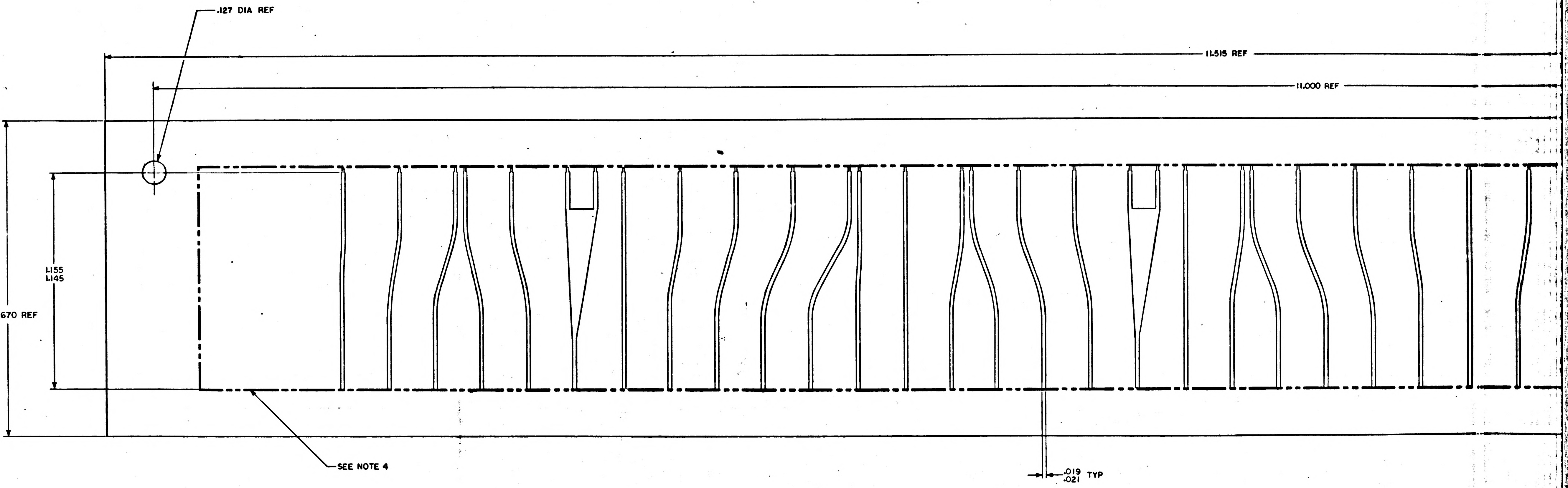
CODE IDENT NO. —
SIZE J
DRAWING NO. 2008165
SCALE 5/1
SHEET 1 OF

MASTER

2008165 B

E-2

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:

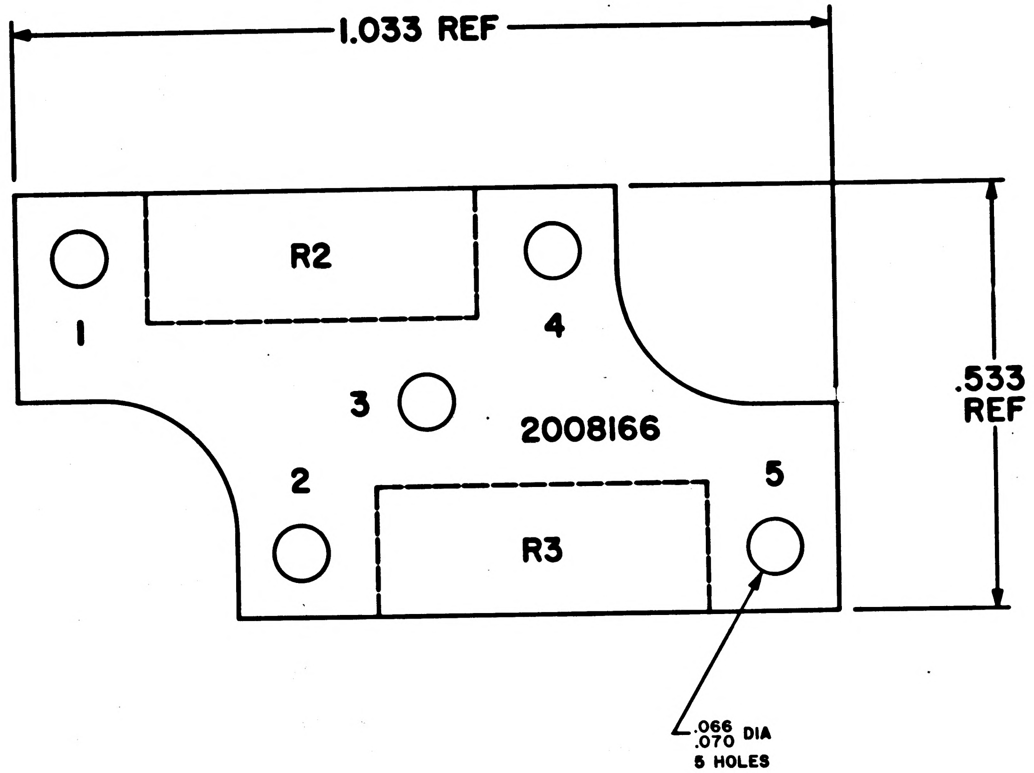
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .003 THICK NICKEL PER MIL-N-46025 TEMP ANNEALED
3 IDENTIFY WITH PART NO PER ND1002019
4. PLATE AREA BOUNDED BY PHANTOM LINES PER MIL-6-45204 TYPE I, WITH THE FOLLOWING EXCEPTIONS:
   GOLD PLATE SHALL BE A MINIMUN OF 200 AND A MAXIMUN OF 300 MICRO INCHES. PARAGRAPH 3.4 DOES NOT APPLY
   FLASHING ALLOWED ON BORDER SURFACES
5. WORKMANSHIP: WHEN EXAMINED UNDER 10X MAGNIFICATION THE CONNECTOR SHALL BE FREE OF PIN HOLES. OTHER DEFECTS SUCH AS PITS, NICKS, OR RAGGED EDGES WHICH REDUCE THE WIDTH OF THE VERTICAL WIRES BY MORE THAN 10% SHALL BE CAUSE FOR REJECTION.

2008165 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17272

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF: DRAWING NO. 2008167 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177, TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007170	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Ken Healy	1 MAR 65
CHECKED	R. Lizdenis	8 MAR 65
APPROVED	N. Sakelos	3/9/65
APPROVED	S.C. Smith	3/8/65
APPROVED MIT		3-9-65
APPROVED MSC		3/5/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
TEMP ALARM MODULE ASSY

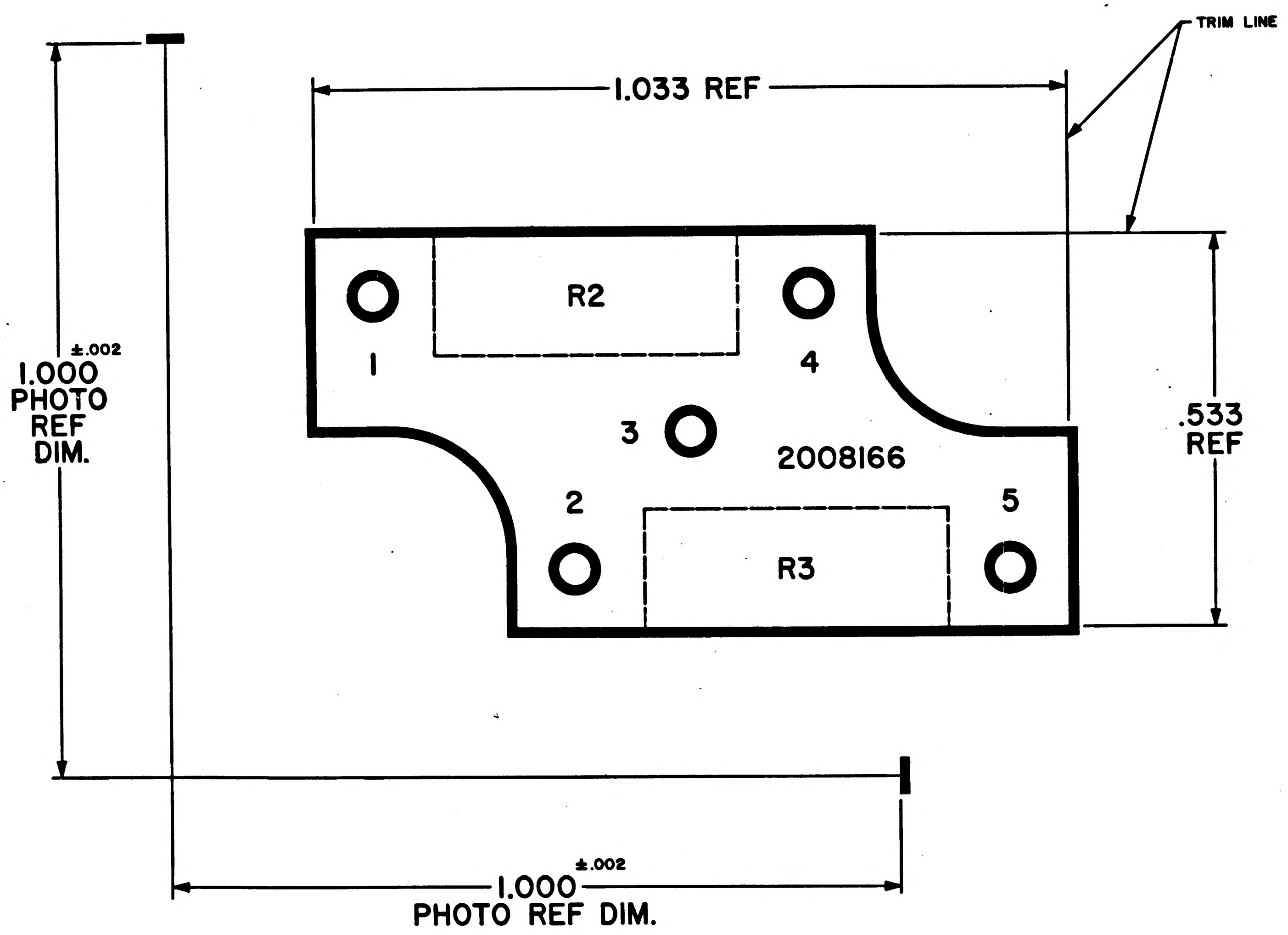
CODE IDENT NO.	SIZE	DRAWING NO.
—	D	2008166

SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17272

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.

3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Ken Healy	2 MAR 65
CHECKED	R. Lyndenis	8 MAR 65
APPROVED	N. Sakalas	3/9/65
APPROVED	L. C. Smith	3-8-65
APPROVED MIT	W. S. Mursley	3-9-65
APPROVED MSC	M. Holub	3/5/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD
TEMP ALARM MODULE ASSY

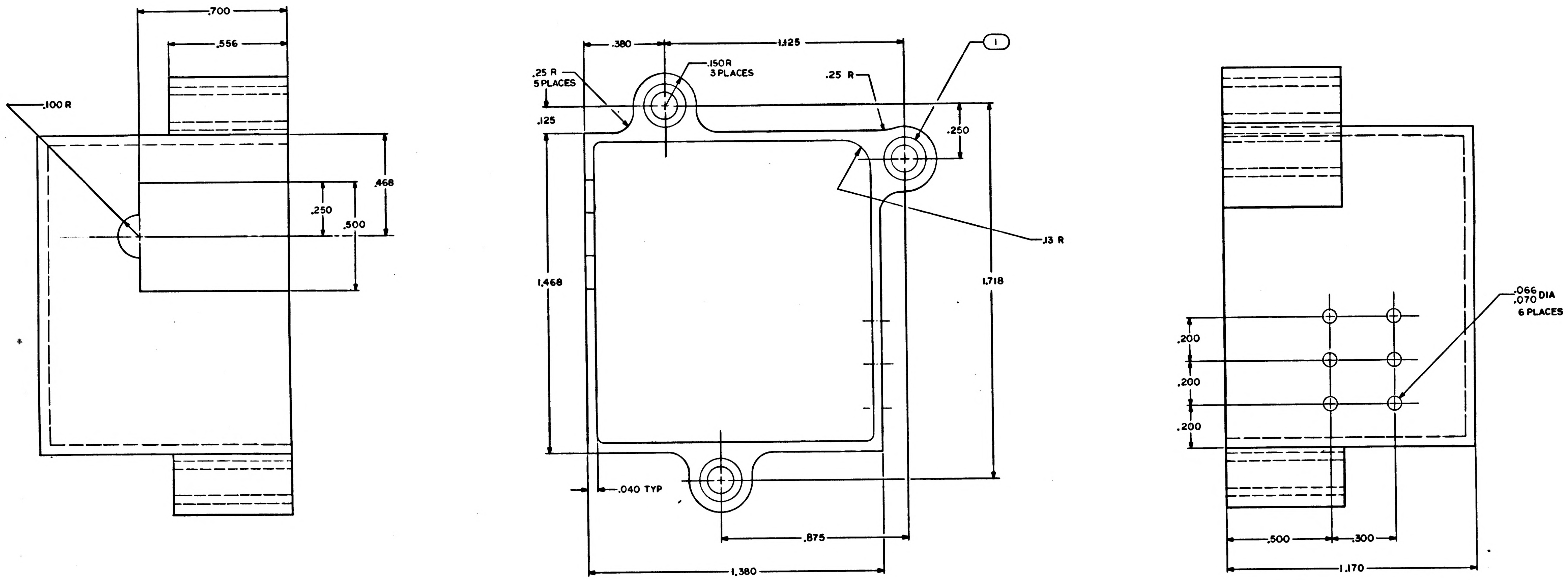
CODE IDENT NO.	SIZE	DRAWING NO.
—	D	2008167

SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17959

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18973		RL		



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .032 MAX
4. FINISH: 125√ OR BETTER OUTSIDE
   125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	W.F. Troy	3/2/65
CHECKED	R. Kaminsky	
APPROVED		3/29/65
APPROVED	L.C. Smith	3/29/65
APPROVED MIT	W. Kupfer	
APPROVED MSC		4-1-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOUSING
PRECISION RESOLVER ALIGNMENT

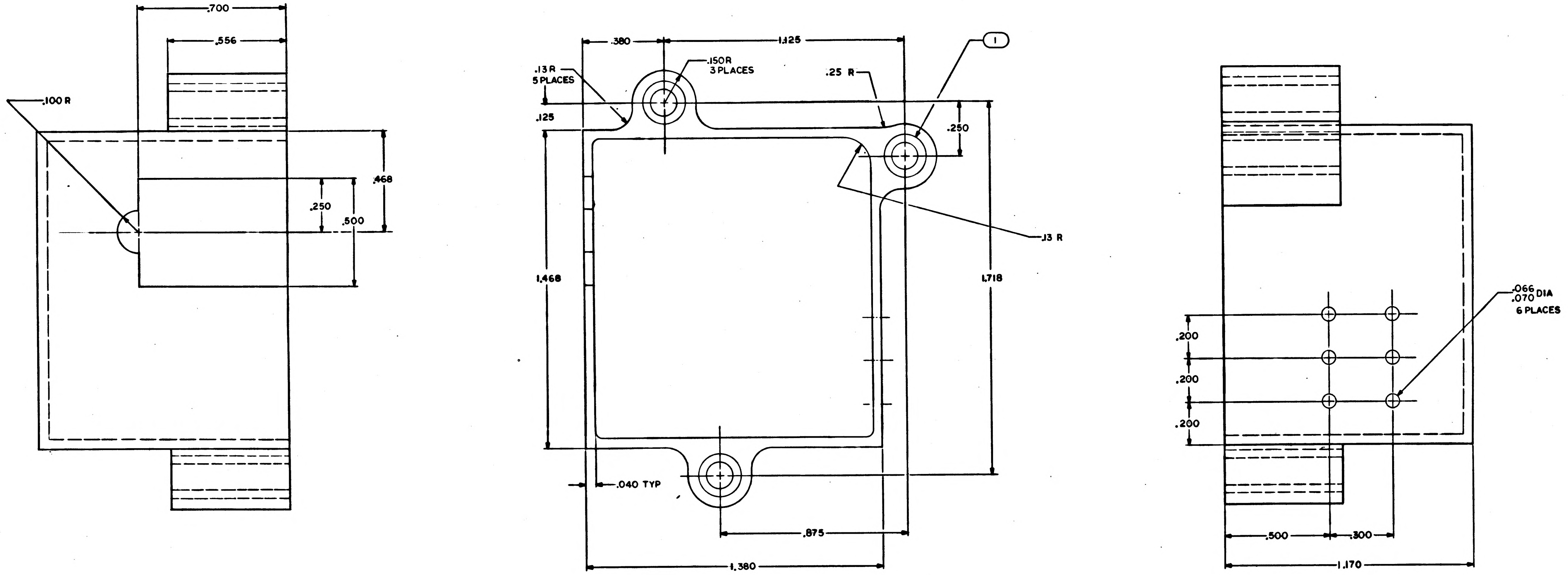
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008172

SCALE 5/1 SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17934

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18973				
B		REVISED PER TDRR 19164			27MAY65	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .032 MAX
4. FINISH: 125√ OR BETTER OUTSIDE
   125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	W. F. Troy	3/2/65
CHECKED		
APPROVED		3/29/65
APPROVED		3/29/65
APPROVED MIT		
APPROVED MSC		4-1-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

HOUSING
PRECISION RESOLVER ALIGNMENT

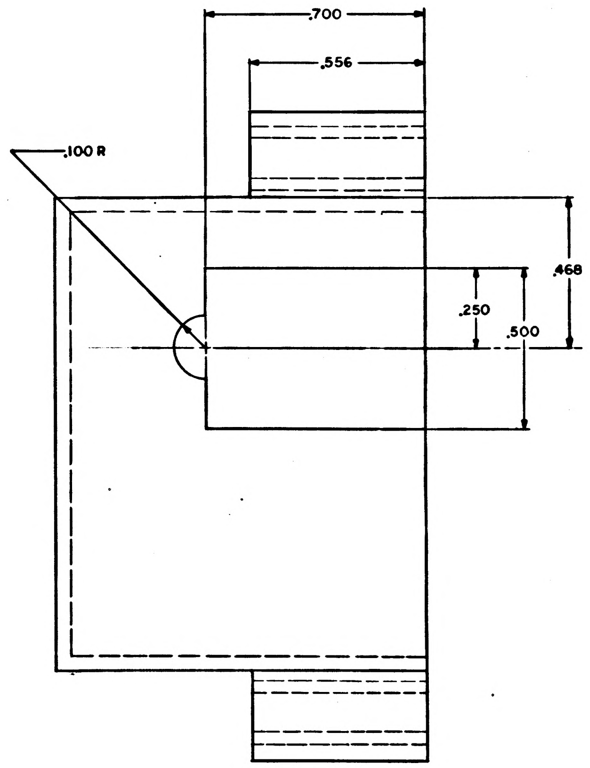
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008172

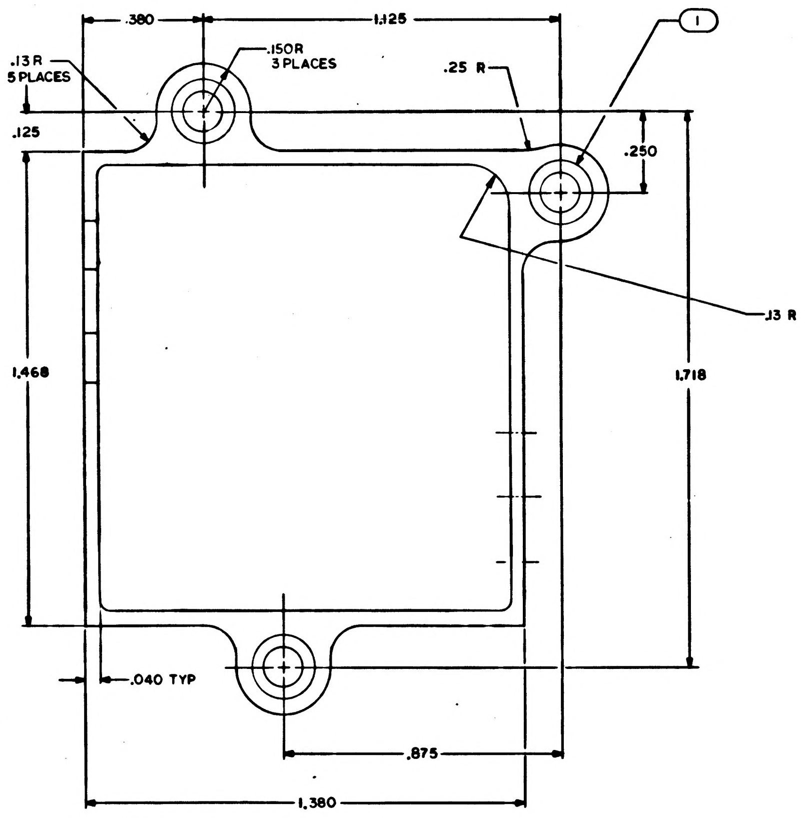
SCALE 5/1 SHEET 1 OF 1

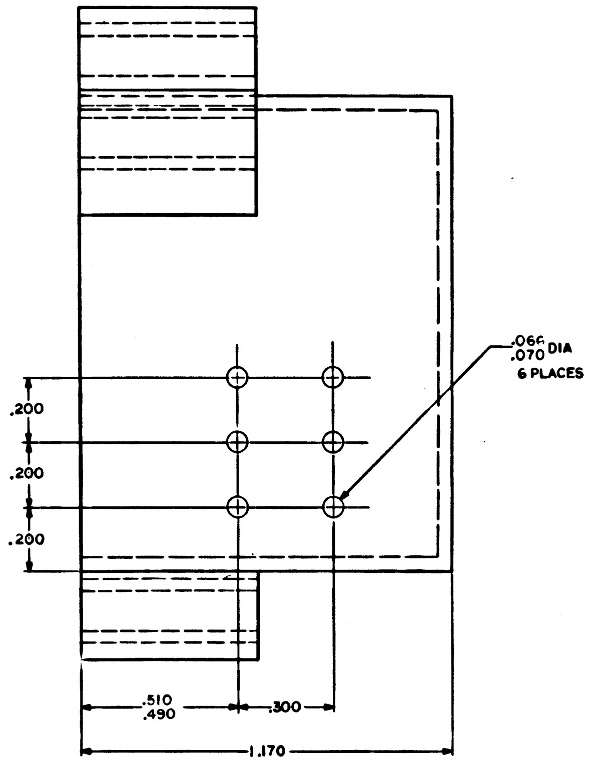
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17959

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18973			2 MAY 65	
B		REVISED PER TDRR 19164	JF		27 MAY 65	
C		REVISED PER TDRR 21740				







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .032 MAX
4. FINISH: $\overset{125}{\vee}$ OR BETTER OUTSIDE
   $\overset{125}{\vee}$ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015
9. USE OF INSPECTION FIXTURE DWG NO. TO BE USED FOR INSPECTING MTG HOLE DIMENSIONS OF HOUSING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. F. Troy 3/2/65
CHECKED 25 Mar 65
APPROVED 3/29/65
APPROVED C. C. Smith 3/29/65
APPROVED MIT
APPROVED MSC 4-1-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOUSING
PRECISION RESOLVER ALIGNMENT

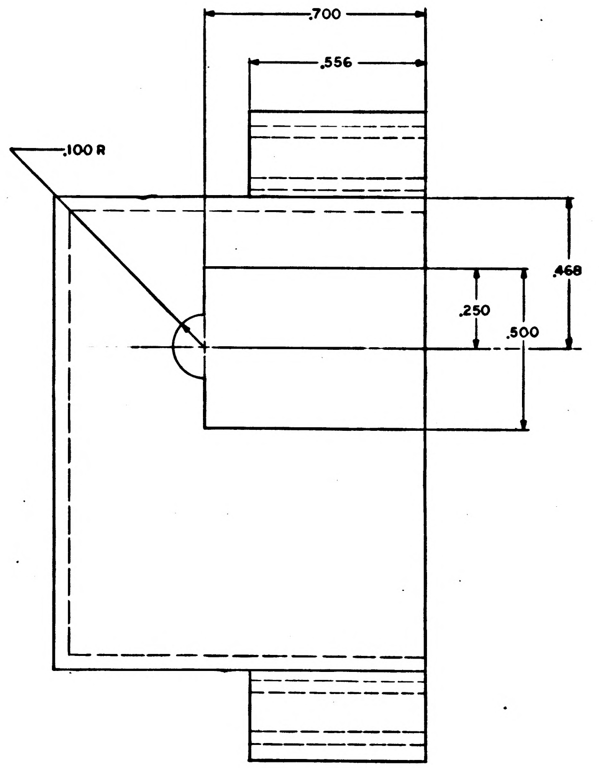
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008172
SCALE 5/1
SHEET 1 OF 1

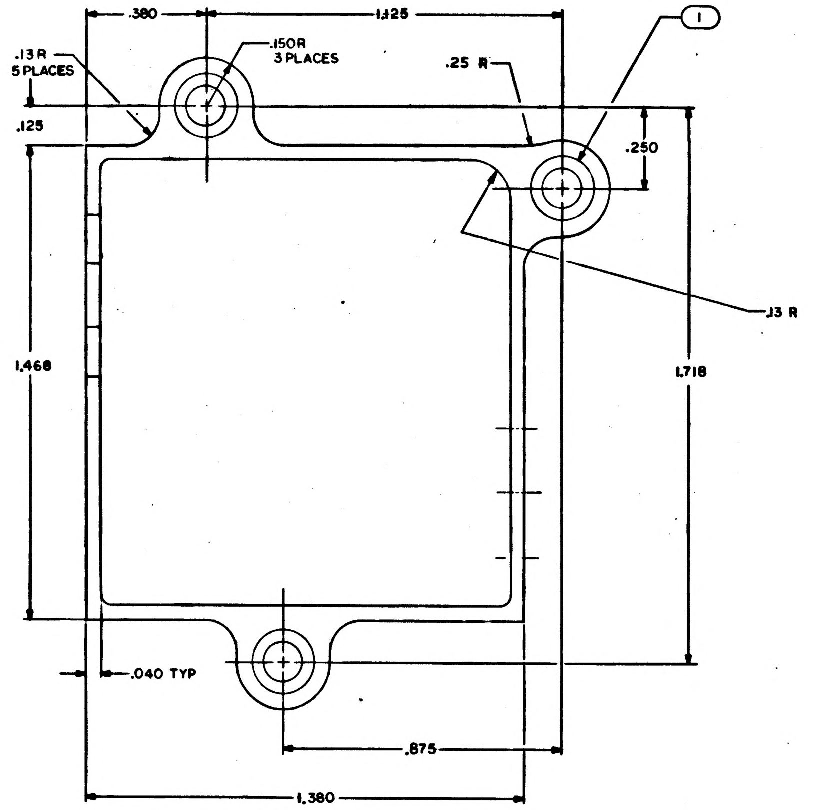
2008172 C

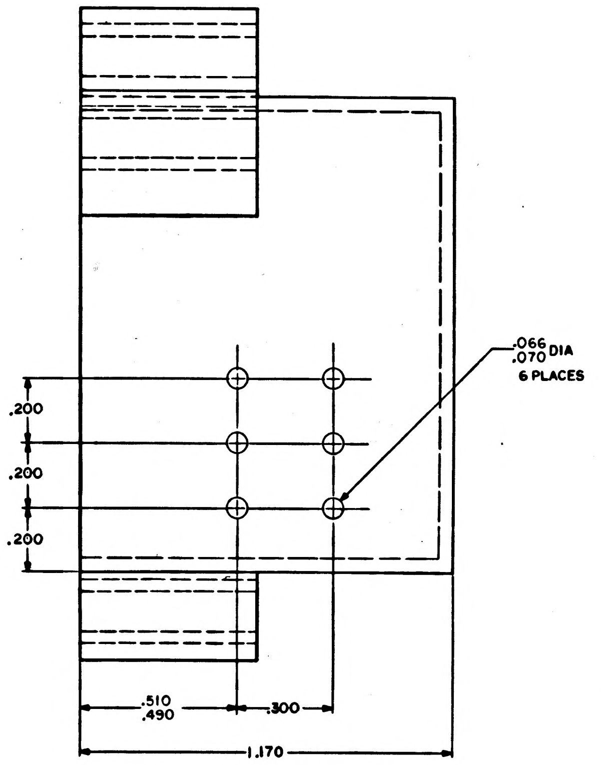
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17959

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18973			12 MAY 65	
B		REVISED PER TDRR 19164	JFW		27 MAY 65	
C		REVISED PER TDRR 21740			30 Aug 65	
D		REVISED PER TDRR 22187			8 Sep 65	







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .032 MAX
4. FINISH: 125√ OR BETTER OUTSIDE
   125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015
9. USE OF INSPECTION FIXTURE DWG NO. 2007086 TO BE USED FOR INSPECTING MTG HOLE DIMENSIONS OF HOUSING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W.F. Troy 3/2/65
CHECKED R.P. [illegible] 25 Mar 65
APPROVED [illegible] 3/29/65
APPROVED [illegible] 3/29/65
APPROVED MIT [illegible]
APPROVED MSC [illegible] 4-1-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

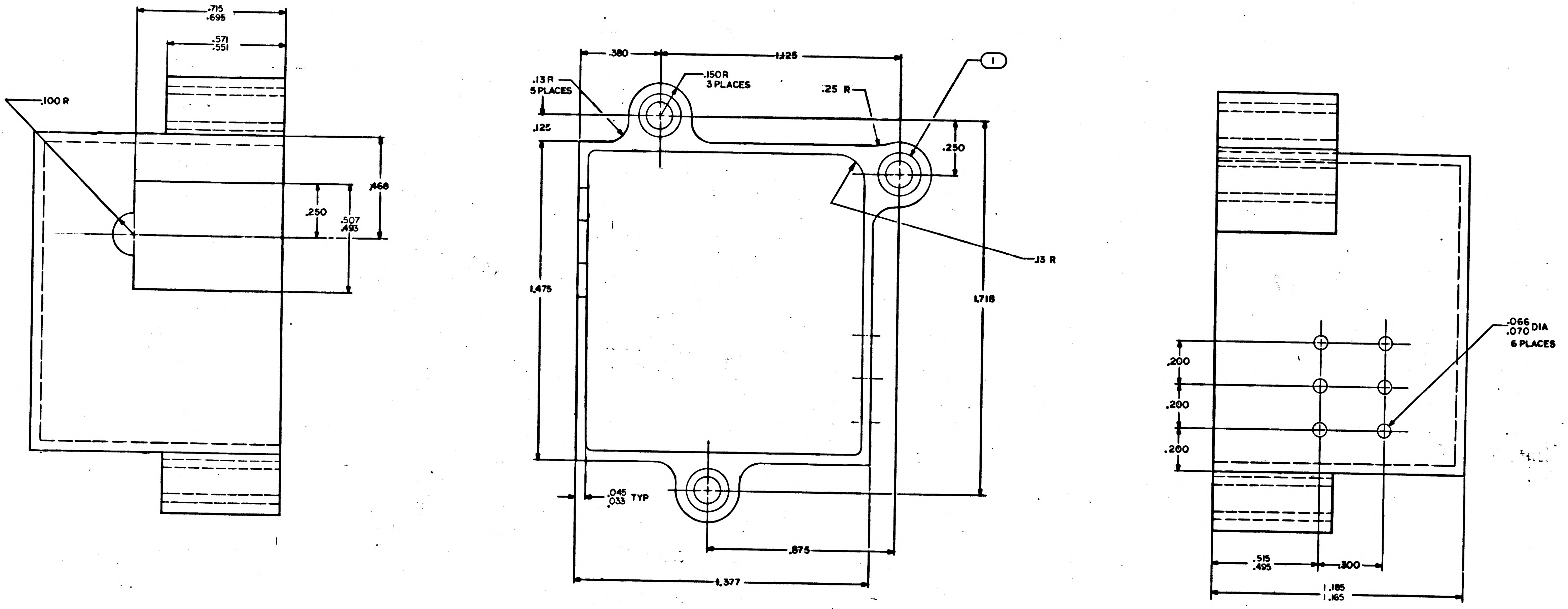
HOUSING
PRECISION RESOLVER ALIGNMENT

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008172
SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17959

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18973			[illegible]	
B		REVISED PER TDRR 19164			[illegible]	
C		PEVISED PER TDRR 21740			[illegible]	
D		REVISED PER TDRR 22187			[illegible]	
F		REVISED PER TDRR 23032			30 Oct [illegible]	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .032 MAX
4. FINISH: $\sqrt{}^{125}$ OR BETTER OUTSIDE
   $\sqrt{}^{125}$ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015
9. USE OF INSPECTION FIXTURE DWG NO.2007086 TO BE USED FOR INSPECTING MTG HOLE DIMENSIONS OF HOUSING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	W. F. Troy	3/2/65
CHECKED		
APPROVED		3/29/65
APPROVED		
APPROVED MIT		
APPROVED MSC		
		DATE

HOUSING
PRECISION RESOLVER ALIGNMENT

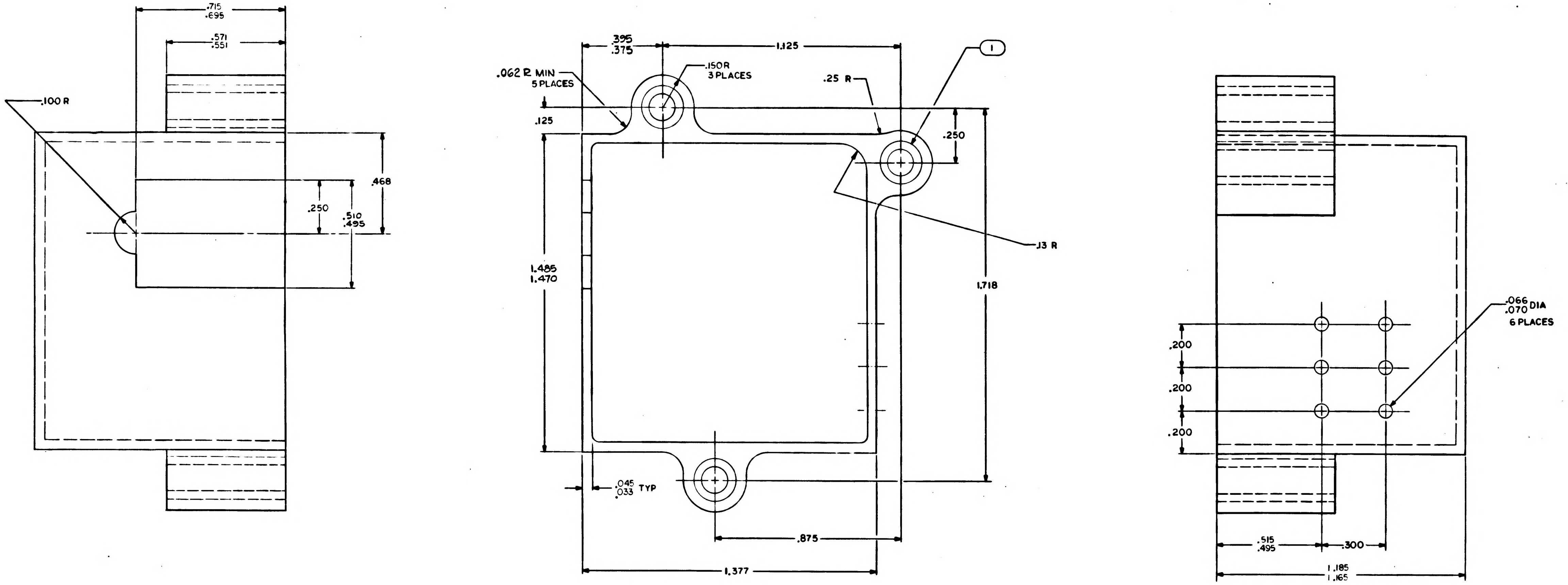
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008172

SCALE 5/1 SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17939

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18973			12 MAY 65	
B		REVISED PER TDRR 19'64			27 MAY 65	
C		REVISED PER TDRR 21740			[illegible]	
D		REVISED PER TDRR 22187			[illegible]	
E		REVISED PER TDRR 23032	JC		[illegible]	
F		REVISED PER TDRR 25545	HTO		[illegible]	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .032 MAX
4. FINISH: 125√ OR BETTER OUTSIDE
   125√ MOLDED FINISH OR EQUIVALENT TO VAPOR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH PART NO. PER ND1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015
9. USE OF INSPECTION FIXTURE DWG NO. 2007086 TO BE USED FOR INSPECTING MTG HOLE DIMENSIONS OF HOUSING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W F Troy 3/2/65
CHECKED [illegible]
APPROVED [illegible] 3/29/65
APPROVED L.C. Smith 3/29/65
APPROVED MIT W Kupfer
APPROVED MSC [illegible] 4-1-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

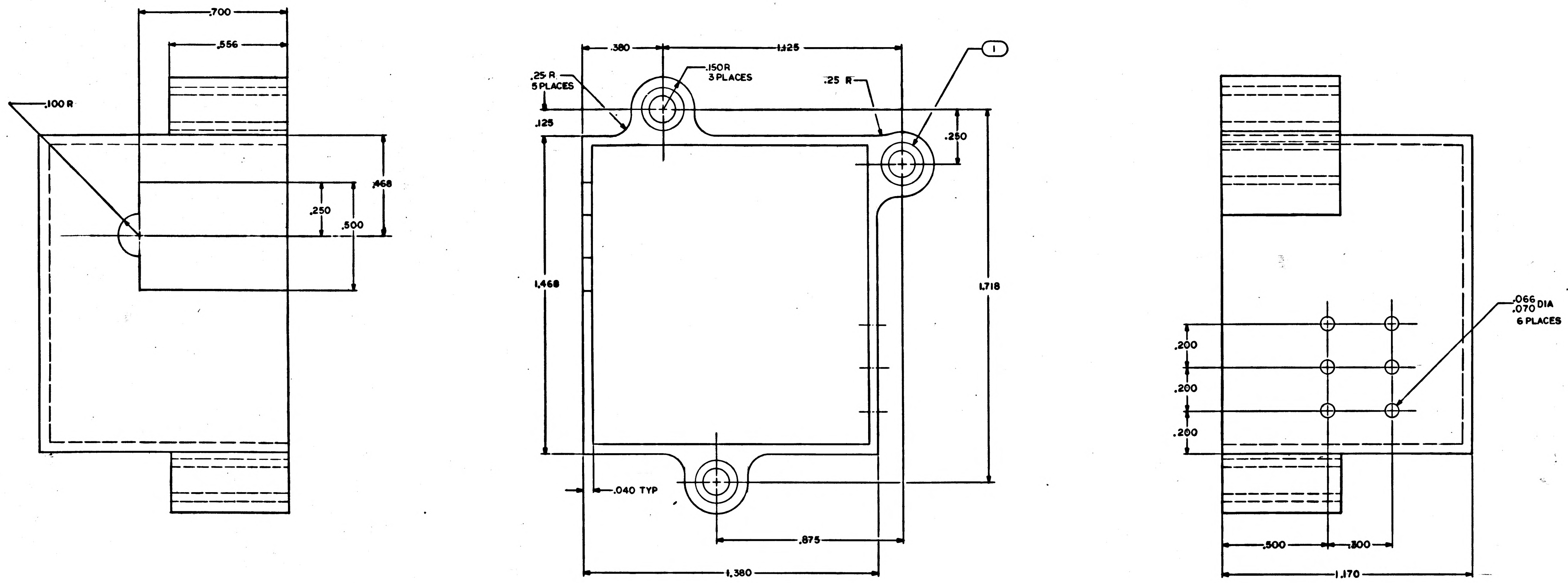
HOUSING
PRECISION RESOLVER ALIGNMENT

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008172
SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17959

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE PER MIL-M-14F TYPE SDG-F, BLACK
3. UNLESS OTHERWISE SPECIFIED INSIDE RADII .010 MAX
4. FINISH: 125√ OR BETTER OUTSIDE
   125√ MOLDED FINISH OR EQUIVALENT TO VAPAR BLAST INSIDE
5. AVOID USE OF SUCH MOLD RELEASE AS WOULD REDUCE THE COMPATIBILITY OF THE HOUSING WITH EPOXY RESINS
6. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
7. FIND NO. 1 TO BE FREE FROM FOREIGN MATTER
8. REMOVE BURRS AND SHARP EDGES .005/.015

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
3	2008139	FERRULE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007205	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	W.F. Troy	3/2/65
CHECKED		25 Mar 65
APPROVED		3/29/65
APPROVED		3/29/65
APPROVED MIT		
APPROVED MSC		4-1-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

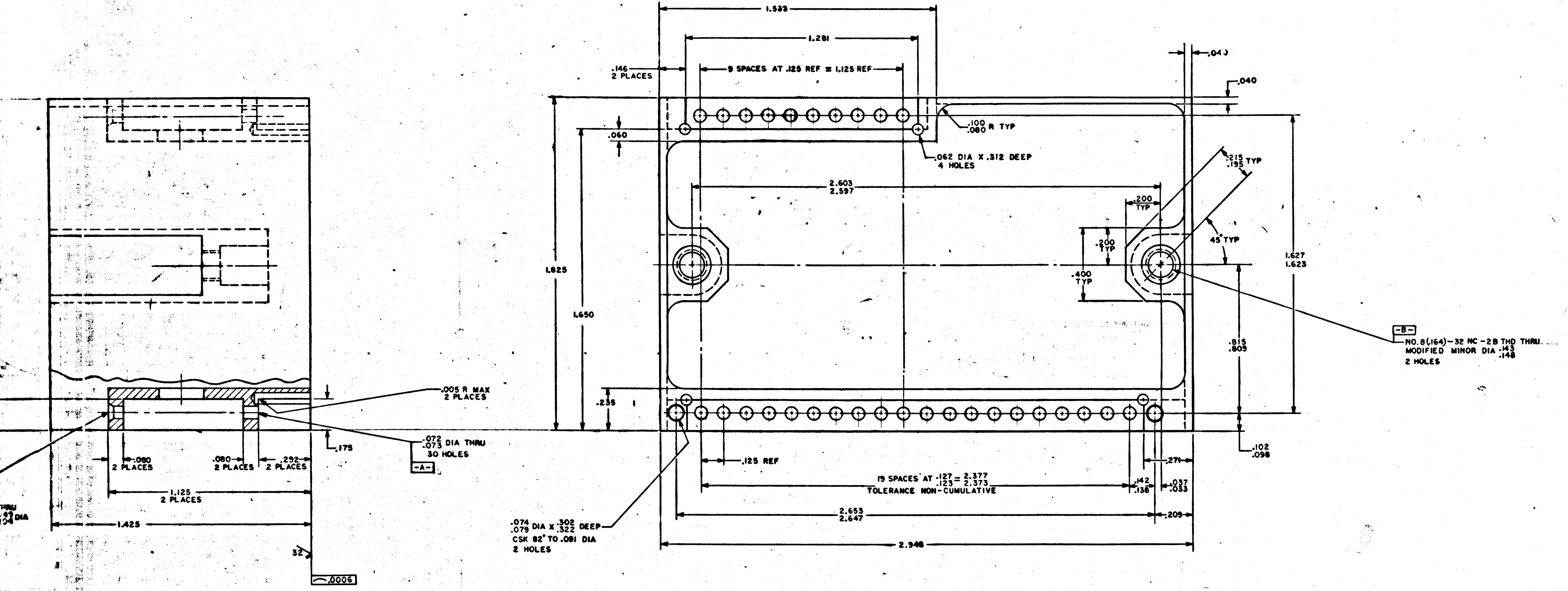
HOUSING
PRECISION RESOLVER ALIGNMENT

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008172

SCALE 5/1 SHEET 1 OF 1

2008172

REVISIONS 17833						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18297	EJH			



1.533
1.281
.146
2 PLACES
9 SPACES AT .125 REF = 1.125 REF
.043
.040
.060
.100
.080 R TYP
.062 DIA X .312 DEEP
4 HOLES
2.603
2.597
.215
.195 TYP
.200
TYP
.200
TYP
45° TYP
1.825
1.650
.400
TYP
1.627
1.623
-B-
NO. 8(.164)-32 NC-2B THD THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
.815
.805
.235
.102
.098
.125 REF
.271
19 SPACES AT .127 = 2.377
.123 = 2.373
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
2.653
2.647
.209
2.946
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.005 R MAX
2 PLACES
.072
.073 DIA THRU
30 HOLES
-A-
.175
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES
1.425
32
.0006

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007121	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

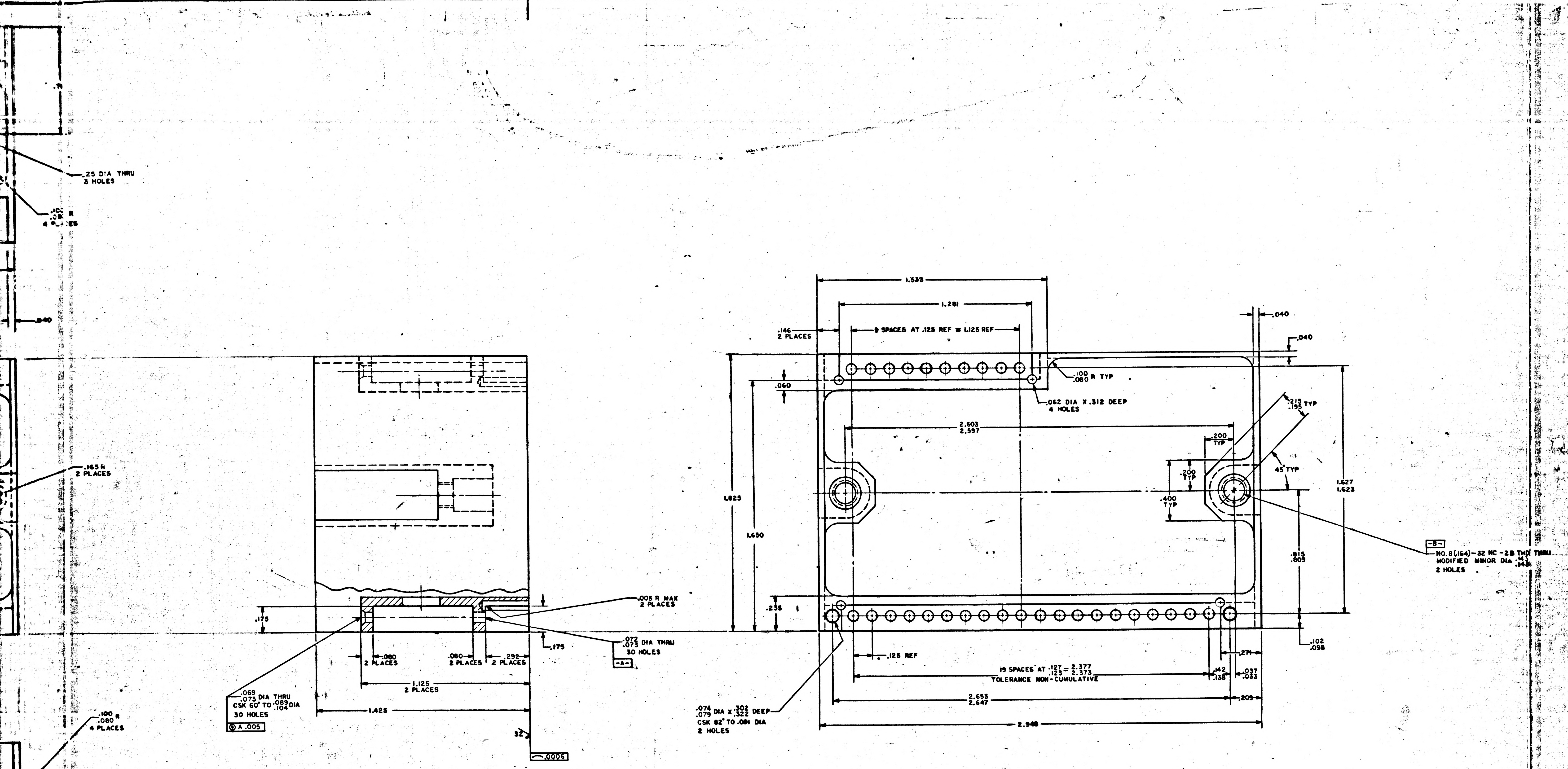
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED A. Lindstrom
APPROVED
APPROVED 3/23/65
APPROVED MIT
APPROVED MSC
DATE

FRAME
TWO SPEED SWITCH

CODE IDENT NO. 30230
SIZE J
DRAWING NO. 200817
SCALE 5/1
SHEET
OF



.25 DIA THRU
3 HOLES
.100 .080 R
4 PLACES
.040
.165 R
2 PLACES
.100 .080 R
4 PLACES
.25 DIA THRU
7 HOLES
.175
.005 R MAX
2 PLACES
.175
.072 .073 DIA THRU
30 HOLES
-A-
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES
1.425
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
30 HOLES
A .005
32
.0006
1.533
1.281
.146
2 PLACES
9 SPACES AT .125 REF = 1.125 REF
.040
.040
.100 .080 R TYP
.060
.062 DIA X .312 DEEP
4 HOLES
.215 .195 TYP
2.603 2.597
.200 TYP
.200 TYP
45° TYP
.400 TYP
1.825
1.650
1.627 1.623
-B-
NO. 8 (.164)-32 NC-2B THD THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.815 .809
.235
.102 .098
.125 REF
.271
19 SPACES AT .127 .123 = 2.377 2.373
TOLERANCE NON-CUMULATIVE
.142 .138
.037 .033
2.653 2.647
.209
2.948
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .081 DIA
2 HOLES

MASTER

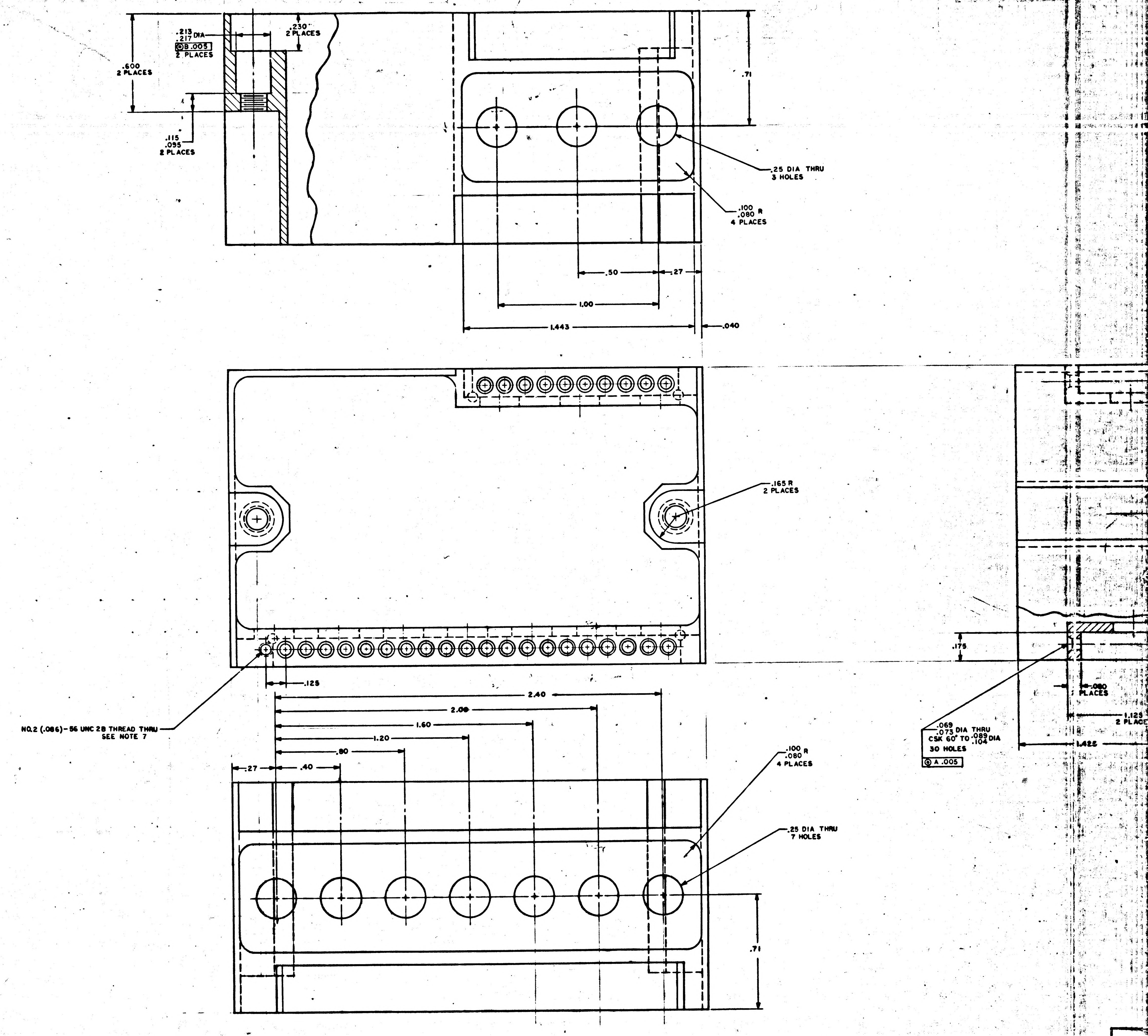
2007121	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XX ± .XXX ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2008174 A

[illegible]

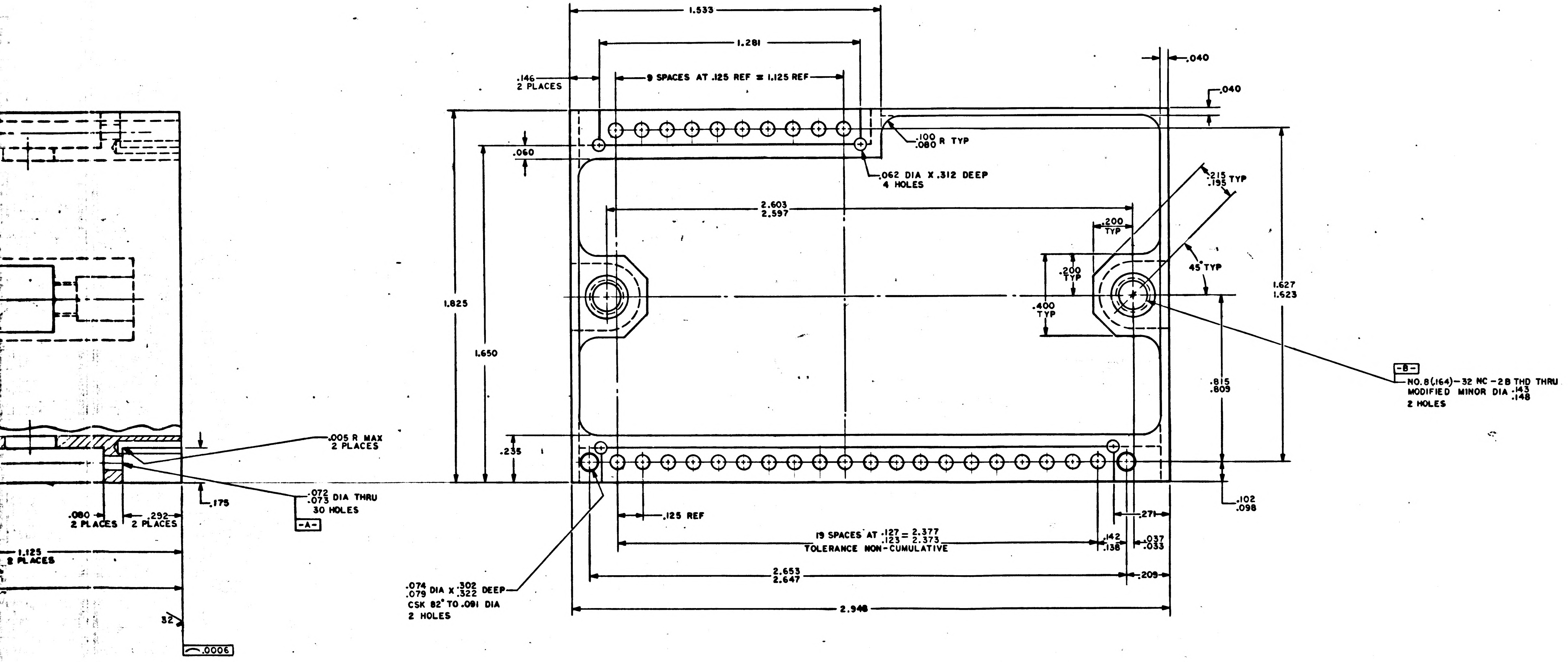

.600
2 PLACES
.213
.217 DIA
◎ B .005
2 PLACES
.230
2 PLACES
.115
.095
2 PLACES
.71
.25 DIA THRU
3 HOLES
.100
.080 R
4 PLACES
.50
.27
1.00
1.443
.040
.165 R
2 PLACES
.125
2.40
2.00
1.60
1.20
.80
.40
.27
NO.2 (.086)-56 UNC 2B THREAD THRU
SEE NOTE 7
.100
.080 R
4 PLACES
.25 DIA THRU
7 HOLES
.71
.175
.080
PLACES
1.125
2 PLACE
1.425
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
30 HOLES
◎ A .005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005 /.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

REVISIONS 7833

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



1.533
1.281
.146
2 PLACES
9 SPACES AT .125 REF = 1.125 REF
.060
.100
.080 R TYP
.062 DIA X .312 DEEP
4 HOLES
.040
.040
.215
.195 TYP
2.603
2.597
.200
TYP
.200
TYP
45° TYP
.400
TYP
1.825
1.650
1.627
1.623
-B-
NO. 8(.164)-32 NC-2B THD THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
.815
.809
.235
.005 R MAX
2 PLACES
.072
.073 DIA THRU
30 HOLES
-A-
.175
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES
32
.0006
.102
.098
.125 REF
.271
19 SPACES AT .127 = 2.377
.123 = 2.373
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
2.653
2.647
.209
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
2.948

2008174

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007121	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.02 XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED 3/23/65
APPROVED MIT
APPROVED MSC 3/24/65
DATE

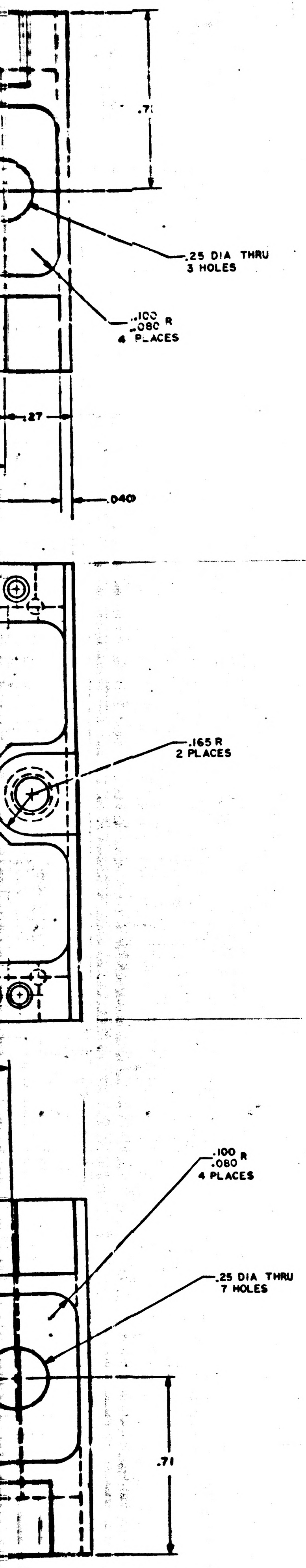
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

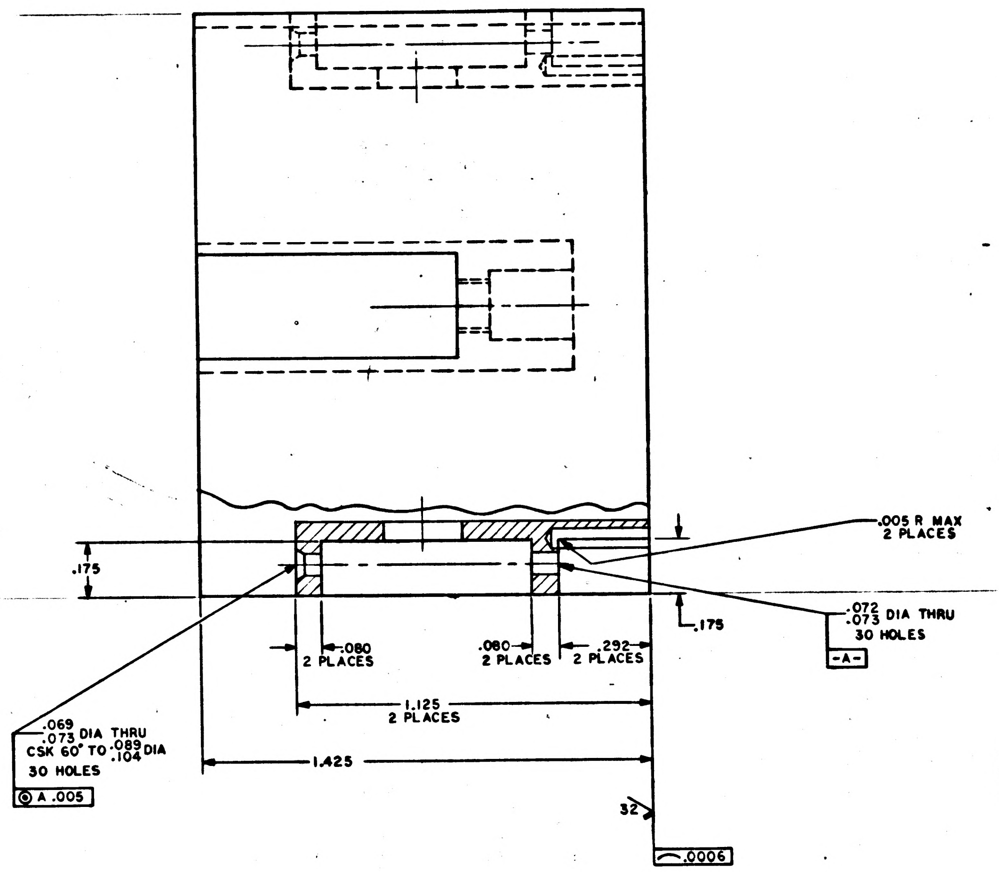
FRAME
TWO SPEED SWITCH

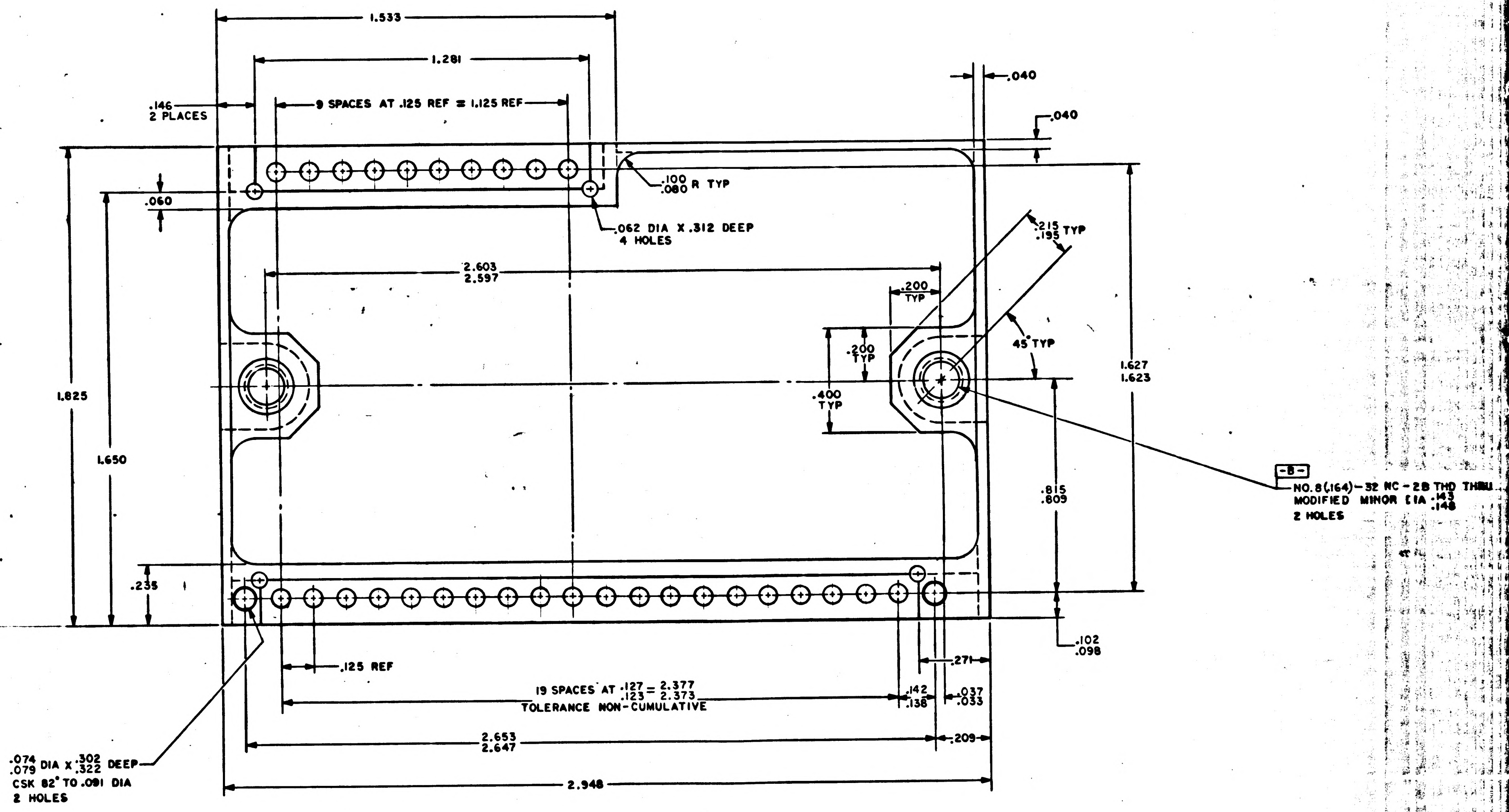
CODE IDENT NO. —
SIZE J
DRAWING NO. 2008174
SCALE 5/1
SHEET 1 OF 1

2008174

MASTER


.7
.25 DIA THRU
3 HOLES
.100
.080 R
4 PLACES
.27
.040
.165 R
2 PLACES
.100
.080 R
4 PLACES
.25 DIA THRU
7 HOLES
.71


.175
.005 R MAX
2 PLACES
.072
.073 DIA THRU
30 HOLES
-A-
.175
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES
.069
.073 DIA THRU
CSK 60° TO .089 .104 DIA
30 HOLES
◎ A .005
1.425
32
⌒.0006


1.533
1.281
.146
2 PLACES
9 SPACES AT .125 REF = 1.125 REF
.040
.040
.100
.080 R TYP
.060
.062 DIA X .312 DEEP
4 HOLES
.215
.195 TYP
2.603
2.597
.200
TYP
.200
TYP
45° TYP
1.825
1.650
.400
TYP
1.627
1.623
-B-
NO. 8(.164)-32 NC-2B THD THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.815
.809
.235
.102
.098
.125 REF
.271
19 SPACES AT .127 .123 = 2.377 2.373
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
2.653
2.647
.209
.074
.079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
2.948

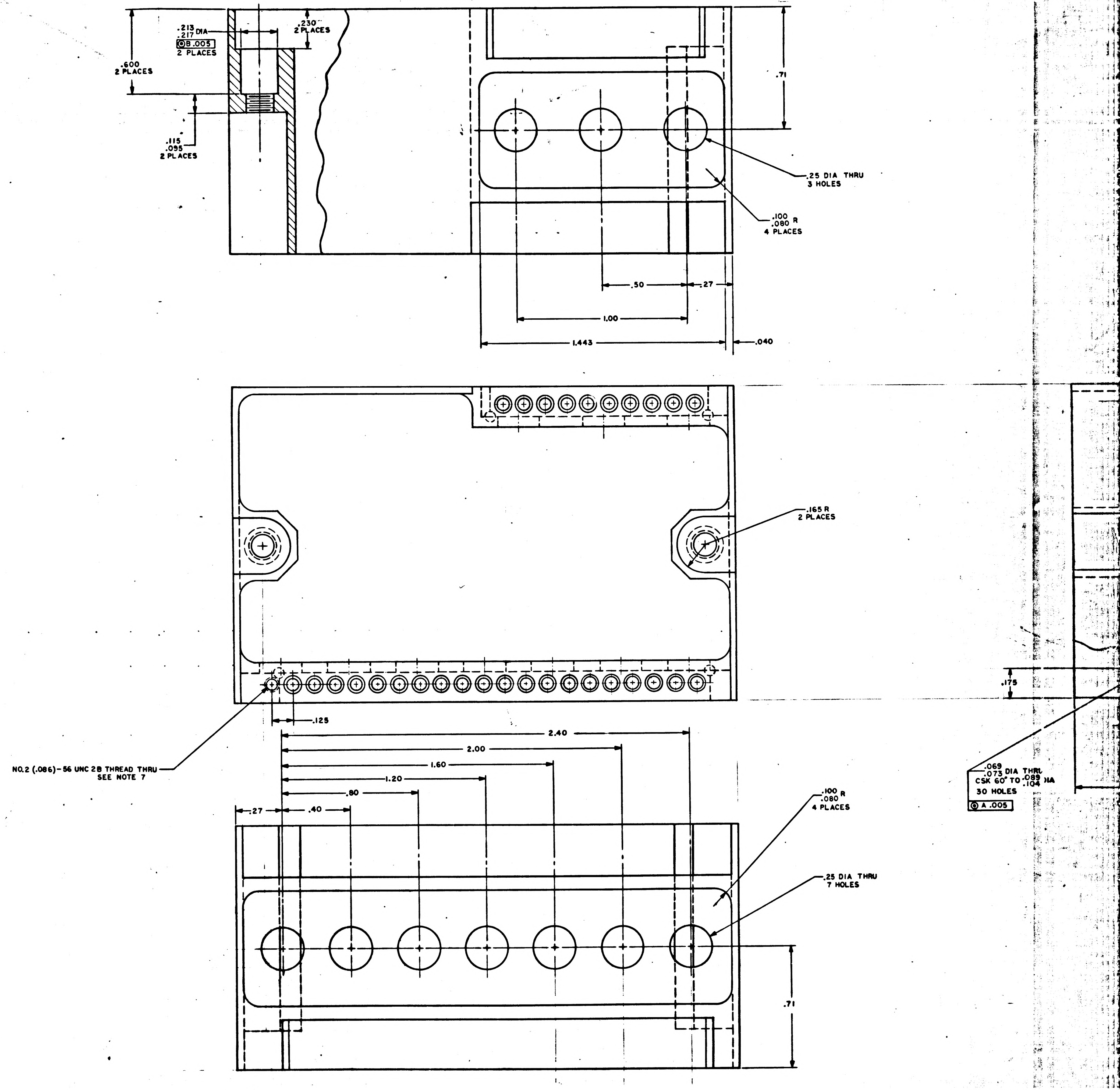
MASTER

2007121	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHER
DIMENSIONS AR
CAPACITOR VAL
RESISTOR
TOLERANCE
FRACTIONS
± —
DO NOT
MATERIAL
SEE NO

2008174

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

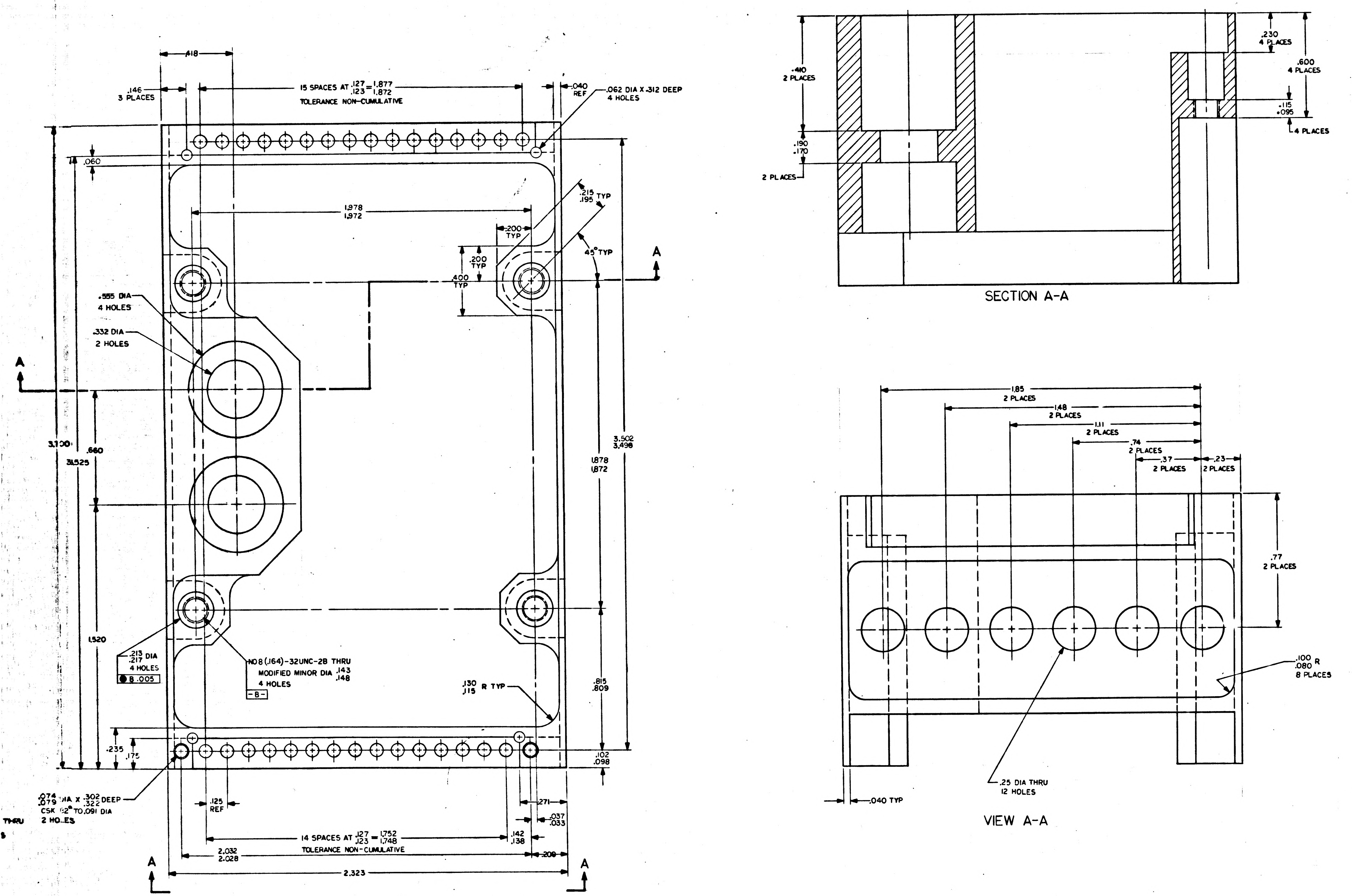

.213
.217 DIA
◎ B .005
2 PLACES
.230
2 PLACES
.600
2 PLACES
.115
.095
2 PLACES
.71
.25 DIA THRU
3 HOLES
.100
.080 R
4 PLACES
.50
.27
1.00
1.443
.040
.165 R
2 PLACES
.175
.125
NO.2 (.086)-56 UNC 2B THREAD THRU
SEE NOTE 7
2.40
2.00
1.60
1.20
.80
.40
.27
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
30 HOLES
◎ A .005
.100
.080 R
4 PLACES
.25 DIA THRU
7 HOLES
.71

NOTES :
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL : MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005 /.015
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
6. FINISH : ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

3H

2008174

REVISIONS 18112						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792				



.418
.146 3 PLACES
15 SPACES AT .127/.123 = 1.877/1.872
TOLERANCE NON-CUMULATIVE
.040 REF
.062 DIA X .312 DEEP 4 HOLES
.060
1.978/1.972
.215/.195 TYP
.200 TYP
.200 TYP
.400 TYP
45° TYP
A
.555 DIA 4 HOLES
.332 DIA 2 HOLES
3.100
3.1525
.660
3.502/3.498
1.878/1.872
1.520
.213/.217 DIA 4 HOLES
B .005
NO8 (.164)-32UNC-2B THRU MODIFIED MINOR DIA .143/.148 4 HOLES
-B-
.130/.115 R TYP
.815/.809
.102/.098
.235
.175
.074/.079 DIA X .302/.322 DEEP CSK 82° TO .091 DIA 2 HOLES
.125 REF
.271
.037/.033
14 SPACES AT .127/.123 = 1.752/1.748
TOLERANCE NON-CUMULATIVE
.142/.138
2.032/2.028
.209
2.323
.440 2 PLACES
.190/.170
2 PLACES
.230 4 PLACES
.600 4 PLACES
.115/.095
4 PLACES
SECTION A-A
1.85 2 PLACES
1.48 2 PLACES
1.11 2 PLACES
.74 2 PLACES
.37 2 PLACES
.23 2 PLACES
.77 2 PLACES
.100/.080 R 8 PLACES
.25 DIA THRU 12 HOLES
.040 TYP
VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION			FIND NO.
LIST OF MATERIALS					

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED 4/6/65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

FRAME
MOTOR DRIVE AMPLIFIER

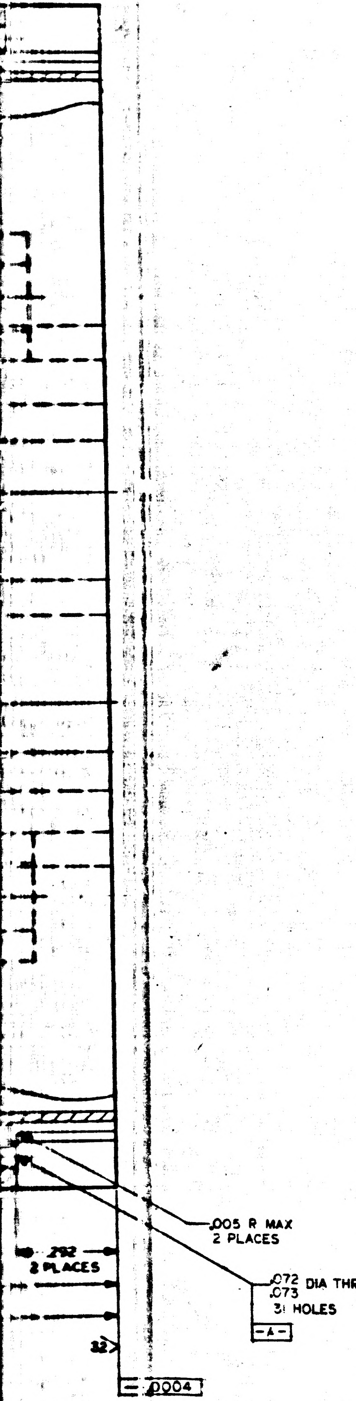
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008175
SCALE 5/1		SHEET 1 OF 1

2008175 A

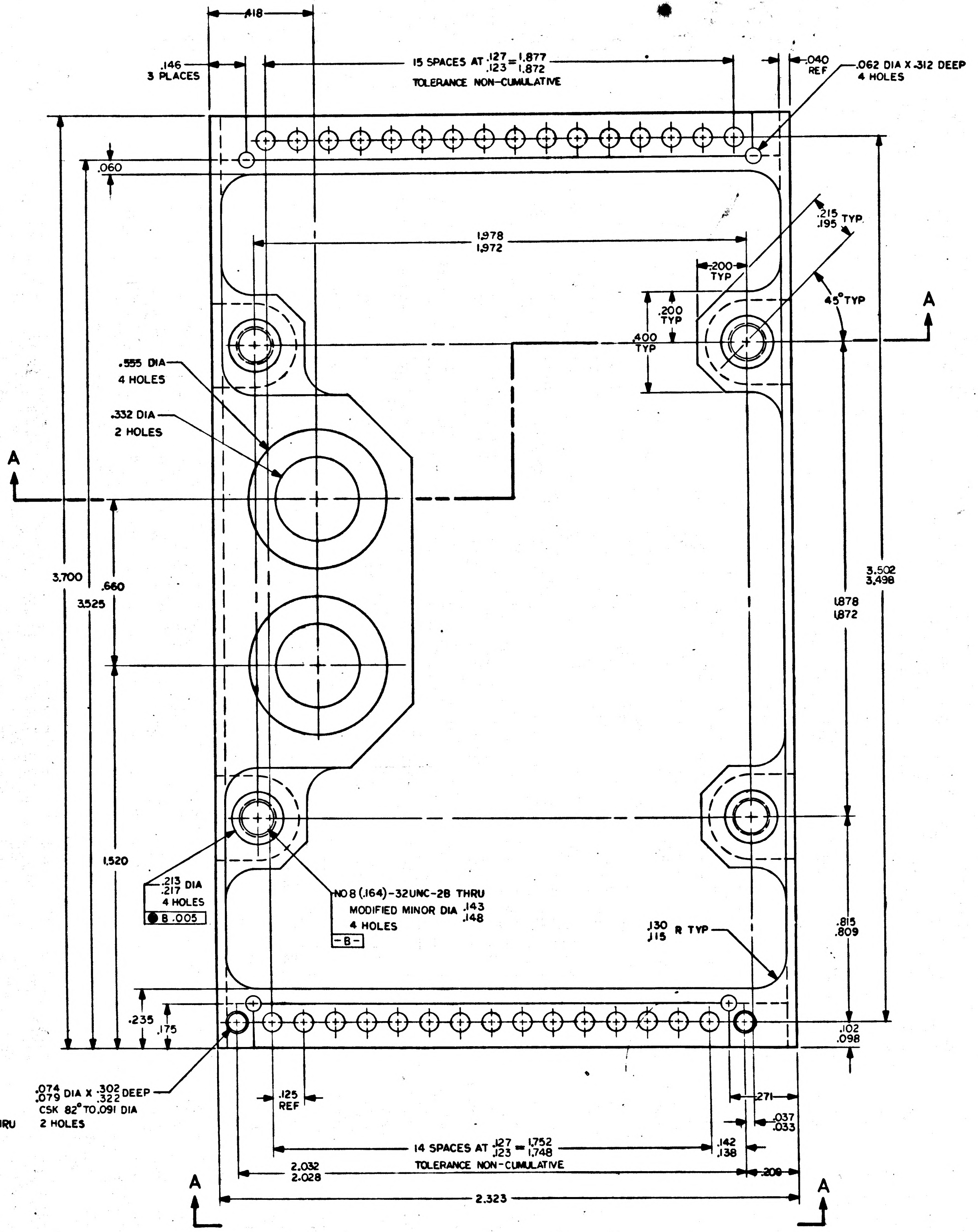
2008175 | A

314

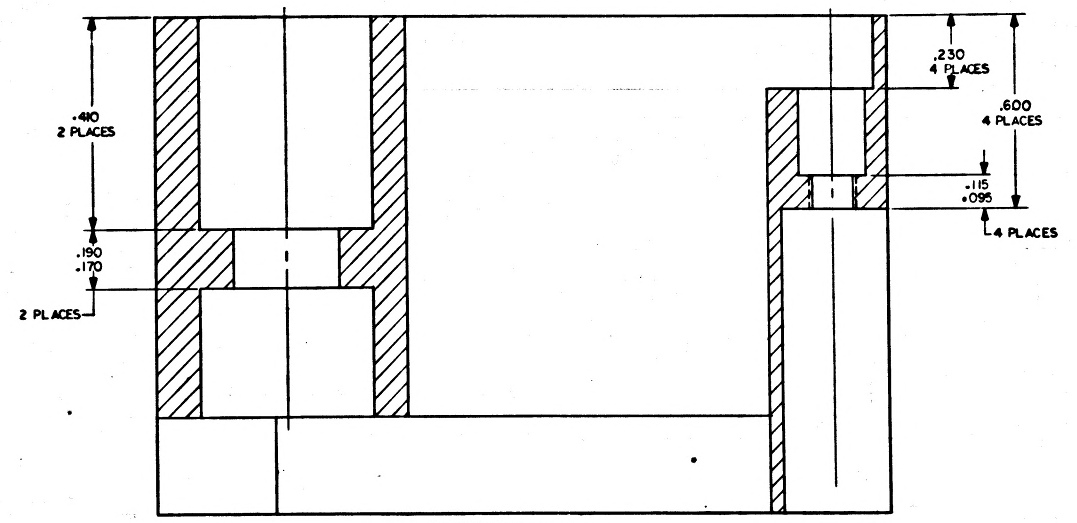
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792				



.005 R MAX
2 PLACES
.292
2 PLACES
.072 DIA THRU
.073
31 HOLES
-A-
32
.0004

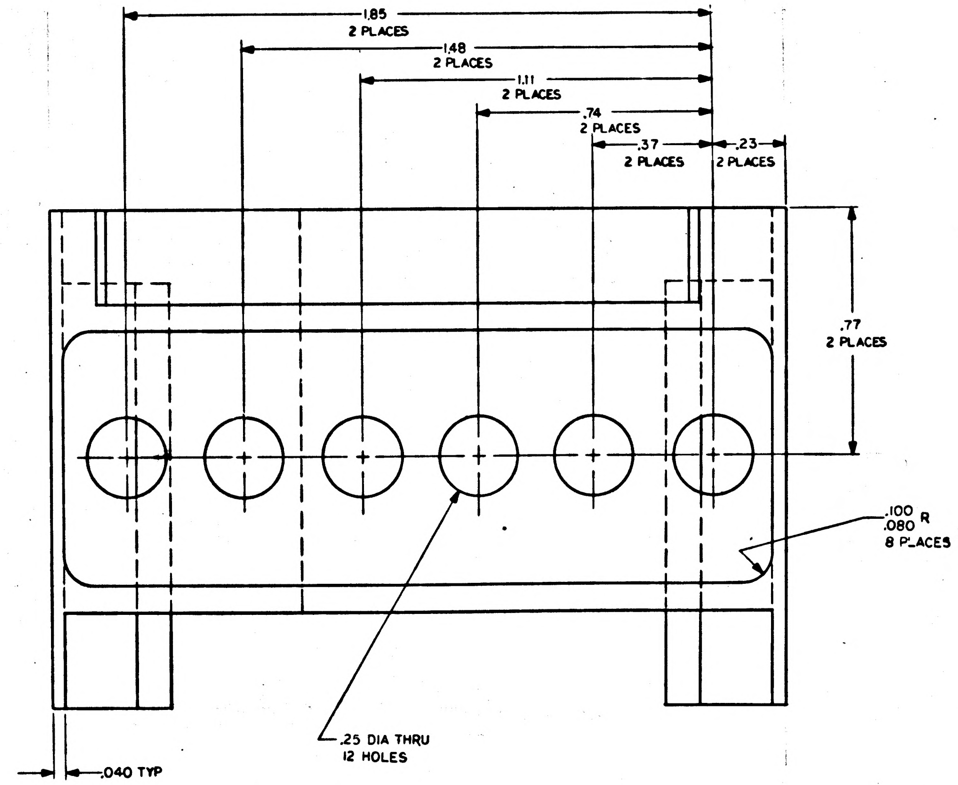


.418
.146
3 PLACES
15 SPACES AT .127/.123 = 1.877/1.872
TOLERANCE NON-CUMULATIVE
.040
REF
.062 DIA X .312 DEEP
4 HOLES
.060
1.978
1.972
.215
.195 TYP.
.200
TYP
.200
TYP
.400
TYP
45° TYP
A
.555 DIA
4 HOLES
.332 DIA
2 HOLES
3.700
3.525
.660
1.520
1.878
1.872
3.502
3.498
.213 DIA
.217
4 HOLES
⊕ B .005
NO 8 (.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143/.148
4 HOLES
-B-
.130
.115 R TYP
.815
.809
.235
.175
.102
.098
.074 DIA X .302 DEEP
.079 .322
CSK 82° TO .091 DIA
2 HOLES
.125
REF
.271
.037
.033
14 SPACES AT .127/.123 = 1.752/1.748
TOLERANCE NON-CUMULATIVE
.142
.138
2.032
2.028
.209
2.323
A
A



.410
2 PLACES
.190
.170
2 PLACES
.230
4 PLACES
.600
4 PLACES
.115
.095
4 PLACES

SECTION A-A



1.85
2 PLACES
1.48
2 PLACES
1.11
2 PLACES
.74
2 PLACES
.37
2 PLACES
.23
2 PLACES
.77
2 PLACES
.100
.080 R
8 PLACES
.25 DIA THRU
12 HOLES
.040 TYP

VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

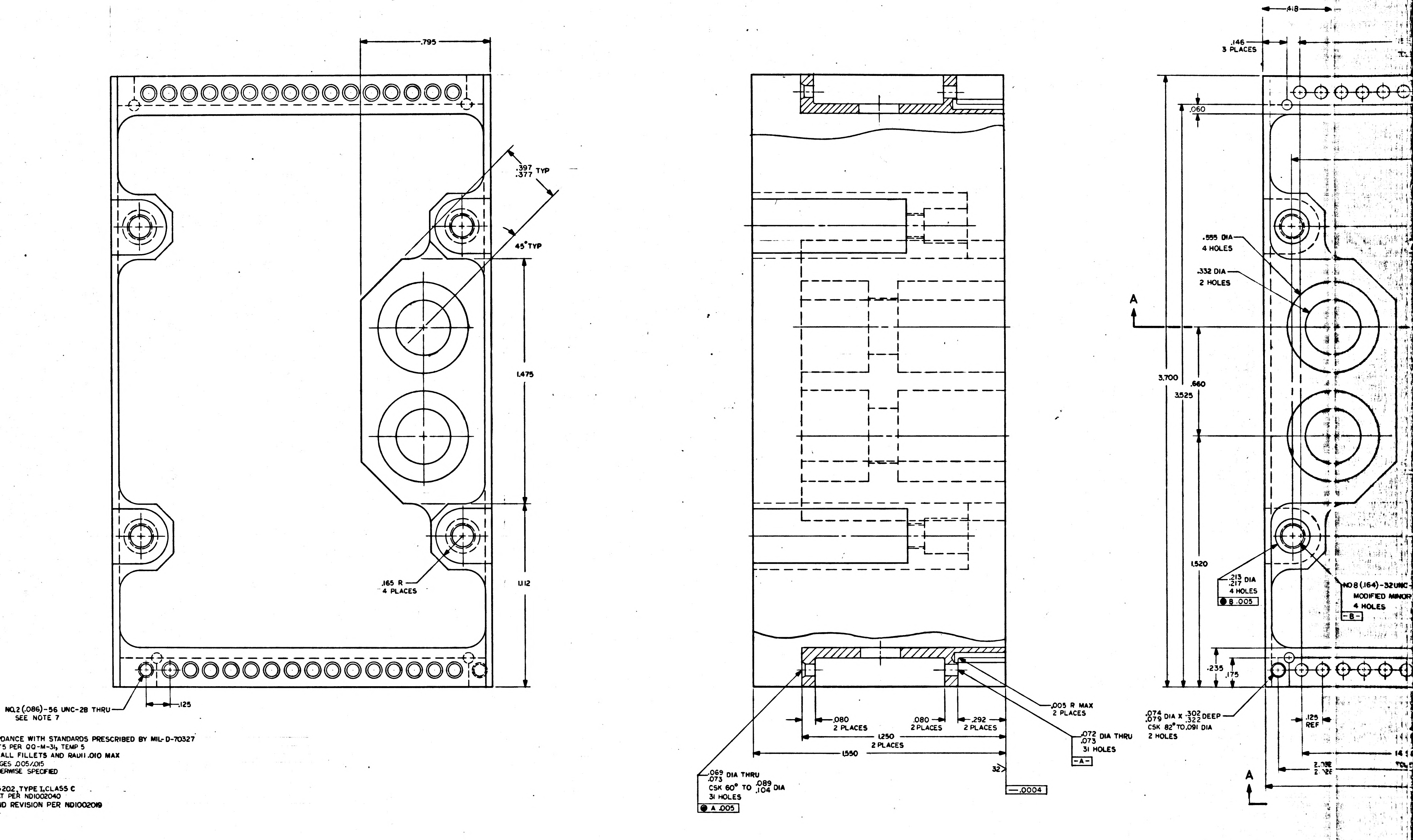
DRAWN
CHECKED
APPROVED 4/6/65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

FRAME
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008175
SCALE 5/1
SHEET 1 OF 1

2008175 A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.795
.397
.377 TYP
45° TYP
1.475
1.112
.165 R
4 PLACES
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
.005 R MAX
2 PLACES
.072
.073 DIA THRU
31 HOLES
-A-
32
.0004
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
31 HOLES
A .005
.418
.146
3 PLACES
.060
.555 DIA
4 HOLES
.332 DIA
2 HOLES
A
3.700
3.525
.660
1.520
.213
.217 DIA
4 HOLES
B .005
NO 8 (.164)-32UNC
MODIFIED MINOR
4 HOLES
-B-
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125
REF
A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED

6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

3/1

2008175	A

F-21

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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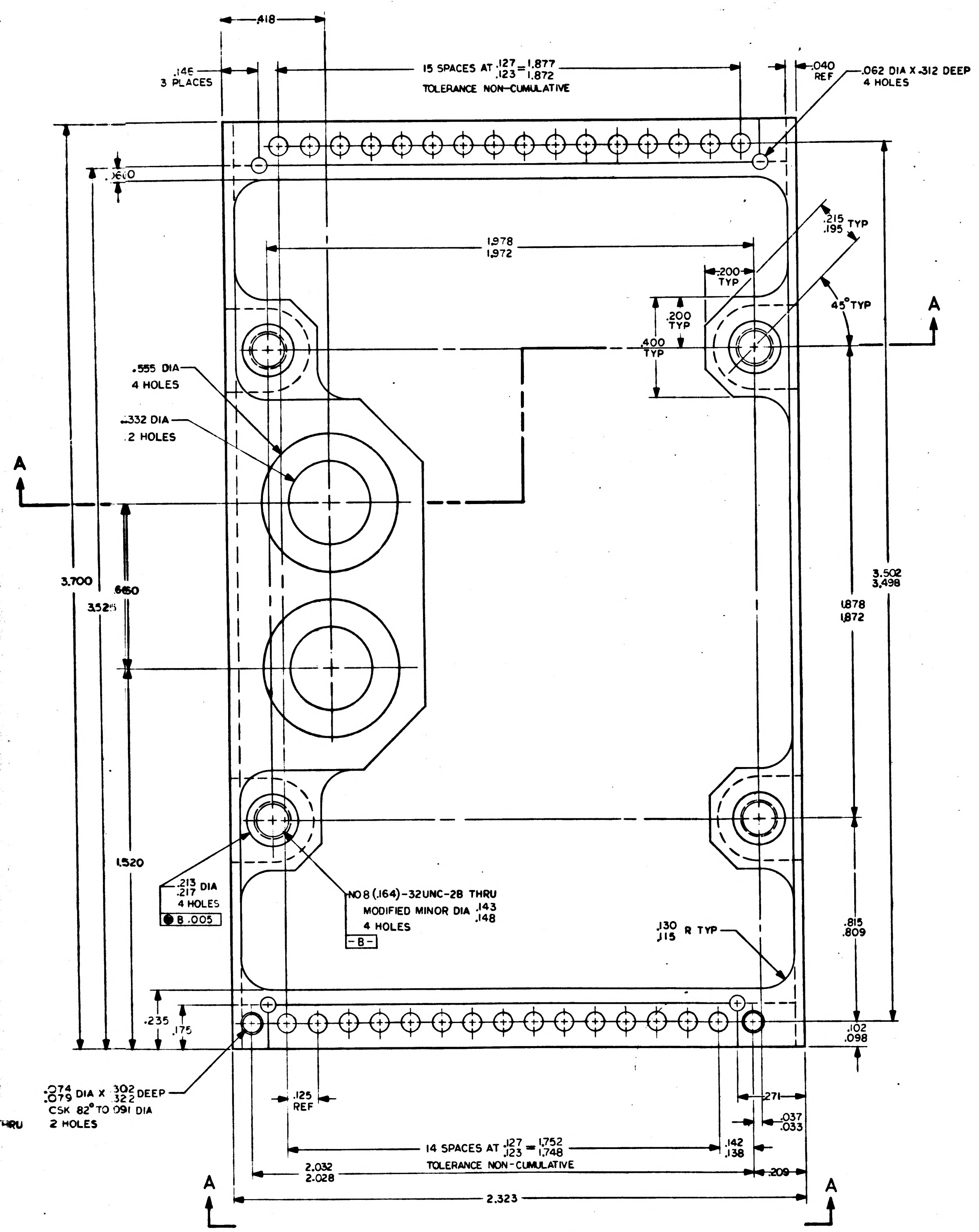
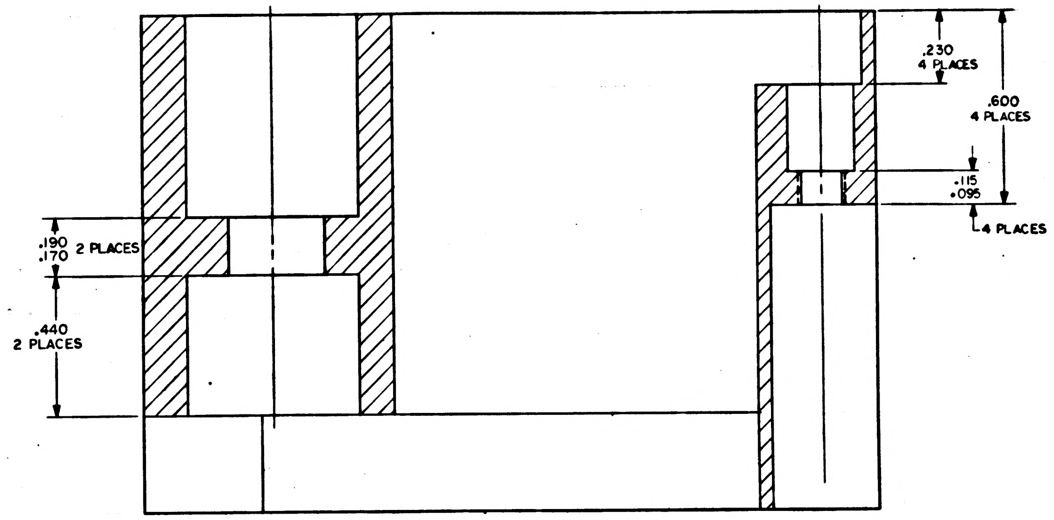
B		REVISED PER TDRR 19987				

REVISIONS 18112

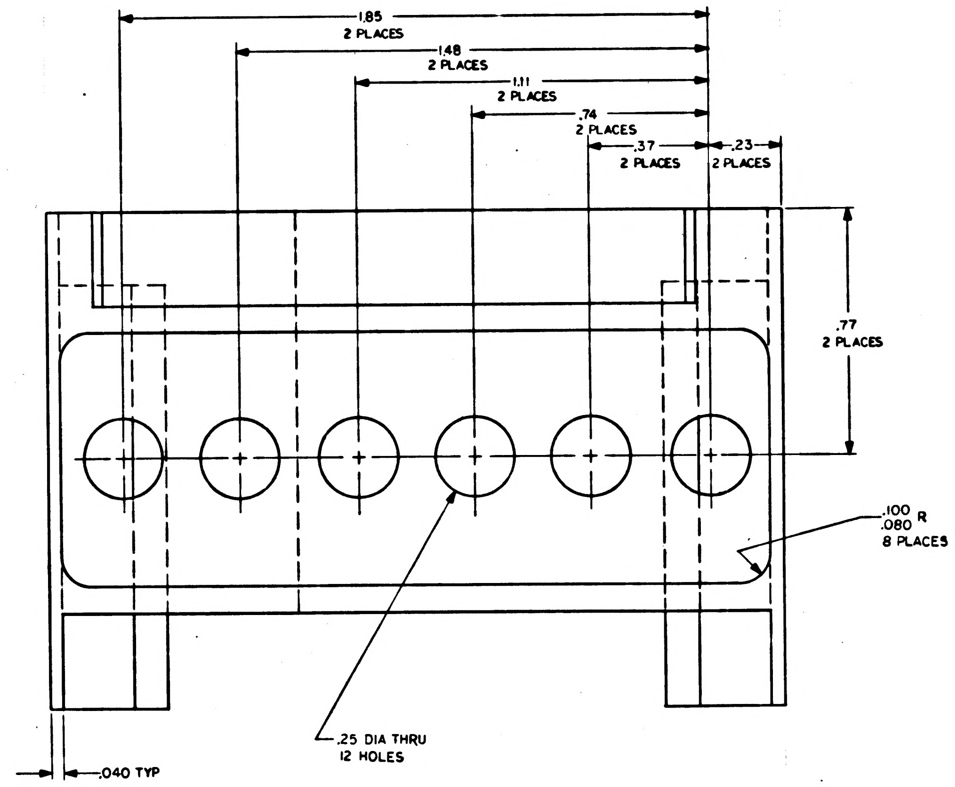


.418
.146
3 PLACES
15 SPACES AT .127/.123 = 1.877/1.872
TOLERANCE NON-CUMULATIVE
.040 REF
.062 DIA X .312 DEEP
4 HOLES
.360
1.978
1.972
.215
.195 TYP
.200 TYP
.200 TYP
.400 TYP
45° TYP
A
.555 DIA
4 HOLES
.332 DIA
2 HOLES
A
3.700
3.525
.650
3.502
3.498
1.878
1.872
1.520
.213
.217 DIA
4 HOLES
⊕ B .005
NO 8 (.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143/.148
4 HOLES
-B-
.130
.115 R TYP
.815
.809
.235
.175
.102
.098
.074/.079 DIA X .302/.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
THRU
.125 REF
.271
.037
.033
14 SPACES AT .127/.123 = 1.752/1.748
TOLERANCE NON-CUMULATIVE
.142
.138
2.032
2.028
.209
2.323
A
A



.230
4 PLACES
.600
4 PLACES
.115
.095
4 PLACES
.190
.170 2 PLACES
.440
2 PLACES

SECTION A-A



1.85
2 PLACES
1.48
2 PLACES
1.11
2 PLACES
.74
2 PLACES
.37
2 PLACES
.23
2 PLACES
.77
2 PLACES
.100 R
.080
8 PLACES
.25 DIA THRU
12 HOLES
.040 TYP

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED 4/6/65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
MOTOR DRIVE AMPLIFIER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008175

SCALE 5/1 SHEET OF

2008175 B

MASTER

F3

34

REVISIONS 18772						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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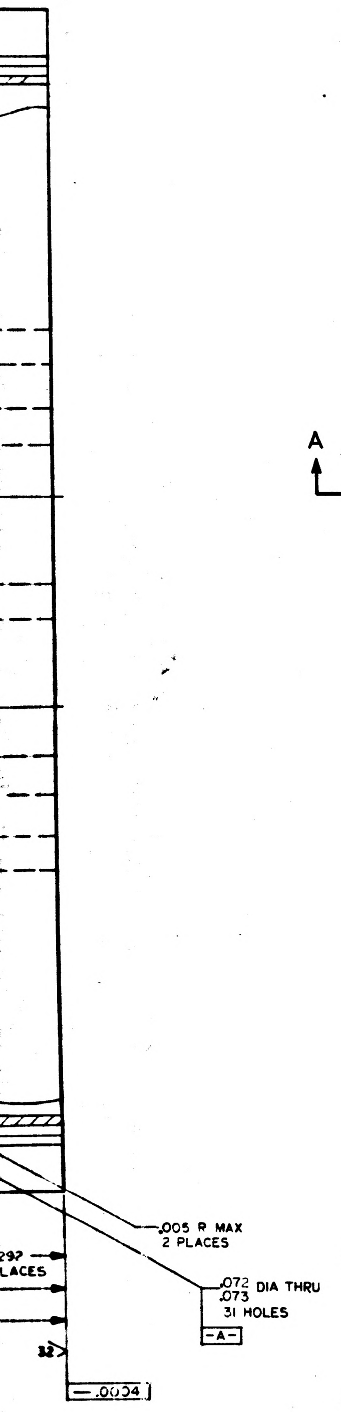
B		REVISED PER TDRR 19987				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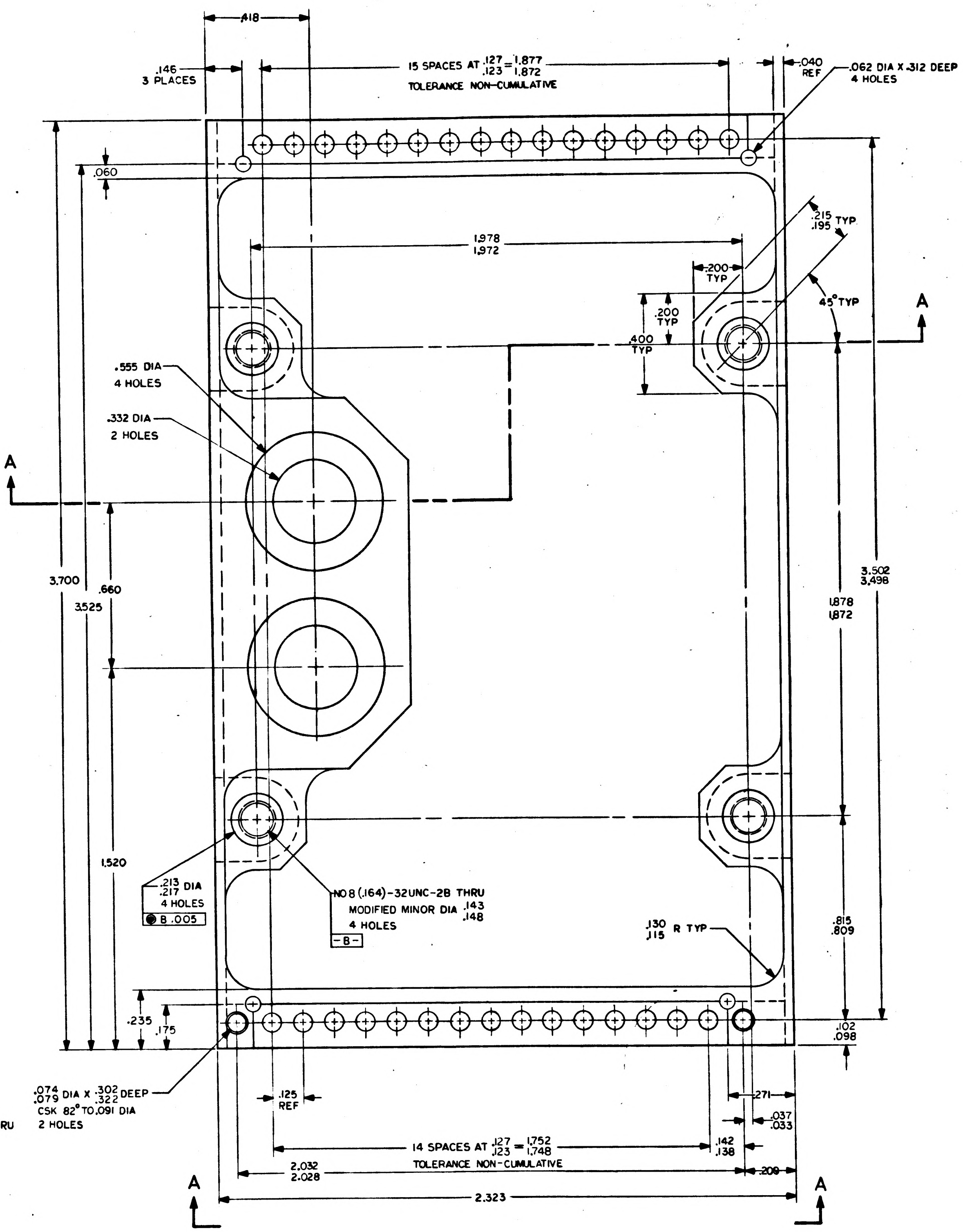
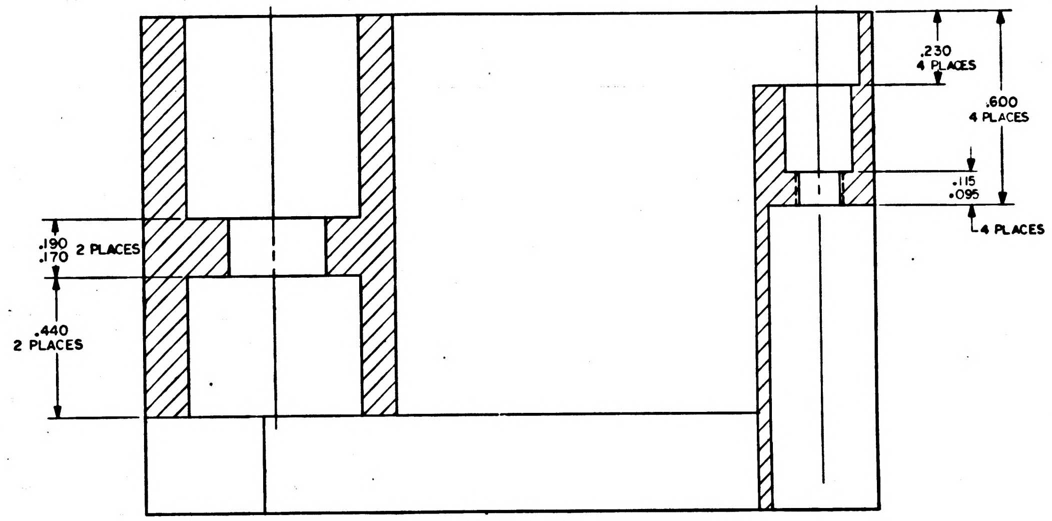
LACES
.005 R MAX
2 PLACES
.072 .073 DIA THRU
31 HOLES
-A-
32
— .0004


.418
.146 3 PLACES
15 SPACES AT .127 .123 = 1.877 1.872
TOLERANCE NON-CUMULATIVE
.040 REF
.062 DIA X .312 DEEP
4 HOLES
.060
1.978 1.972
.215 .195 TYP
.200 TYP
.200 TYP
.400 TYP
45° TYP
A
.555 DIA
4 HOLES
.332 DIA
2 HOLES
A
3.700
3.525
.660
3.502 3.498
1.878 1.872
1.520
.213 .217 DIA
4 HOLES
B .005
NO 8 (.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143 .148
4 HOLES
-B-
.130 .115 R TYP
.815 .809
.235
.175
.102 .098
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125 REF
.271
.037 .033
14 SPACES AT .127 .123 = 1.752 1.748
TOLERANCE NON-CUMULATIVE
.142 .138
2.032 2.028
.209
2.323
A
A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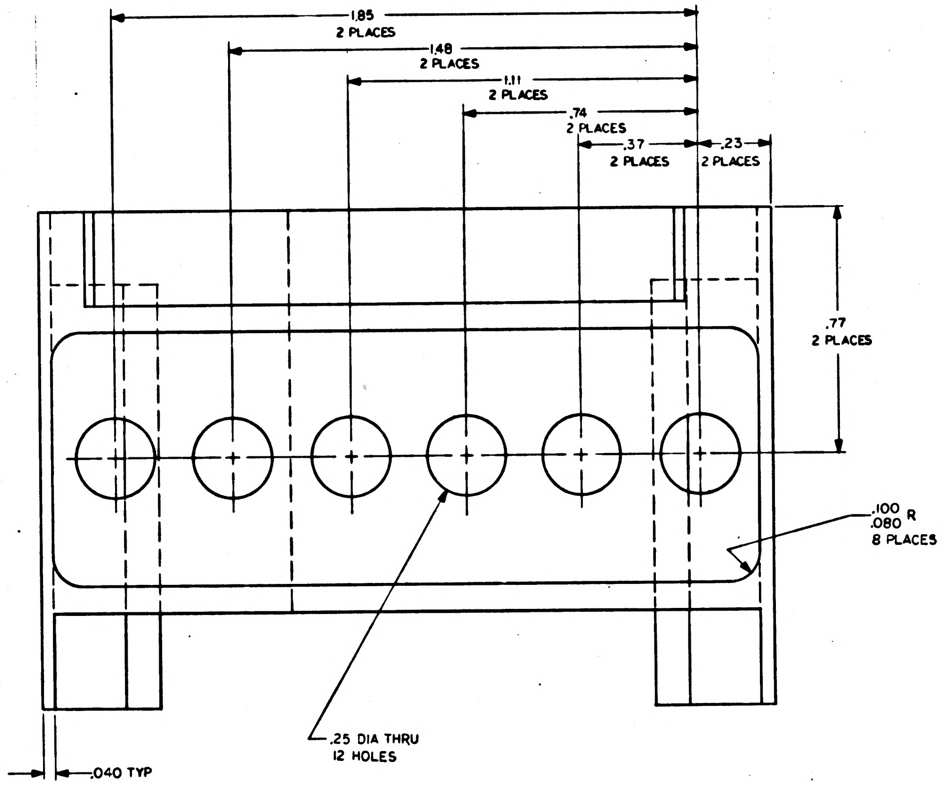
4 PLACES
.600
4 PLACES
.115 .095
4 PLACES
.190 .170 2 PLACES
.440
2 PLACES

SECTION A-A


1.85
2 PLACES
1.48
2 PLACES
1.11
2 PLACES
.74
2 PLACES
.37
2 PLACES
.23
2 PLACES
.77
2 PLACES
.100 .080 R
8 PLACES
.25 DIA THRU
12 HOLES
.040 TYP

VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007118	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

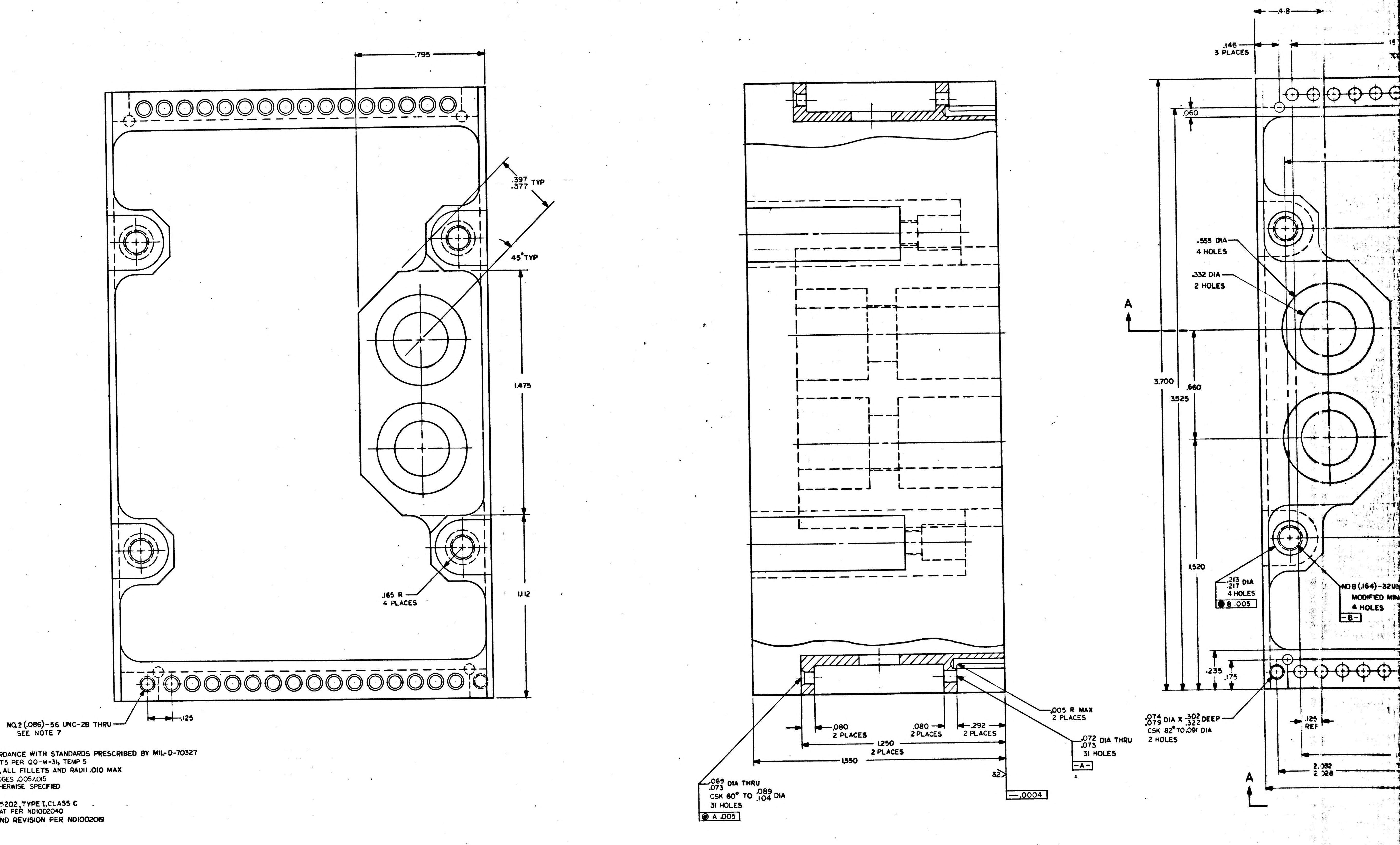
FRAME
MOTOR DRIVE AMPLIFIER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008175

SCALE 5/1
SHEET 1 OF

2008175	B

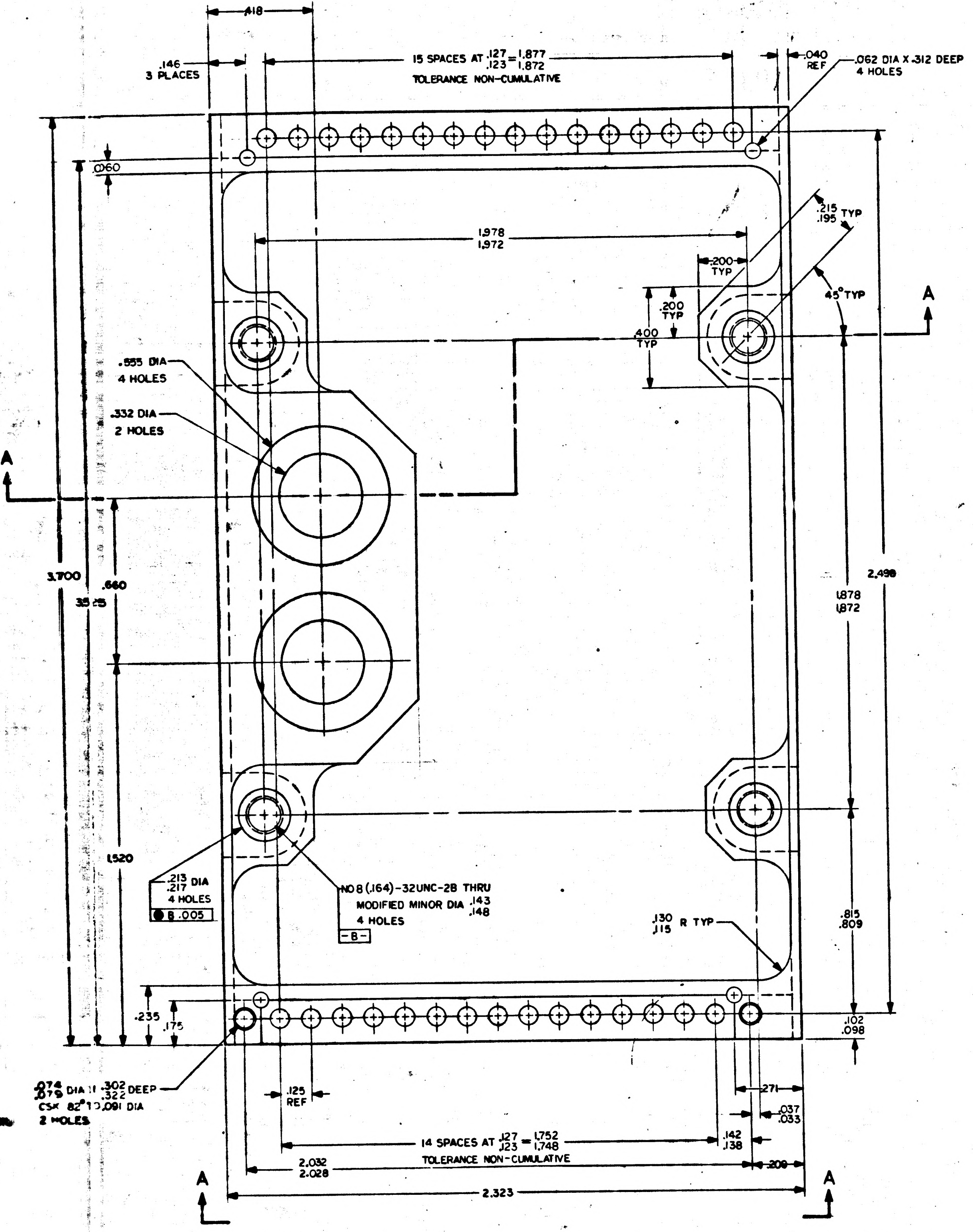
E2


.795
.397
.377 TYP
45° TYP
1.475
1.112
.165 R
4 PLACES
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125
.005 R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
32
.072
.073 DIA THRU
31 HOLES
-A-
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
31 HOLES
◉ A .005
— .0004
.418
.146
3 PLACES
.060
.555 DIA
4 HOLES
.332 DIA
2 HOLES
A
3.700
3.525
.660
1.520
.213
.217 DIA
4 HOLES
● B .005
NO 8 (.164)-32UN
MODIFIED MIN
4 HOLES
-B-
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125
REF
2.032
2.028
A

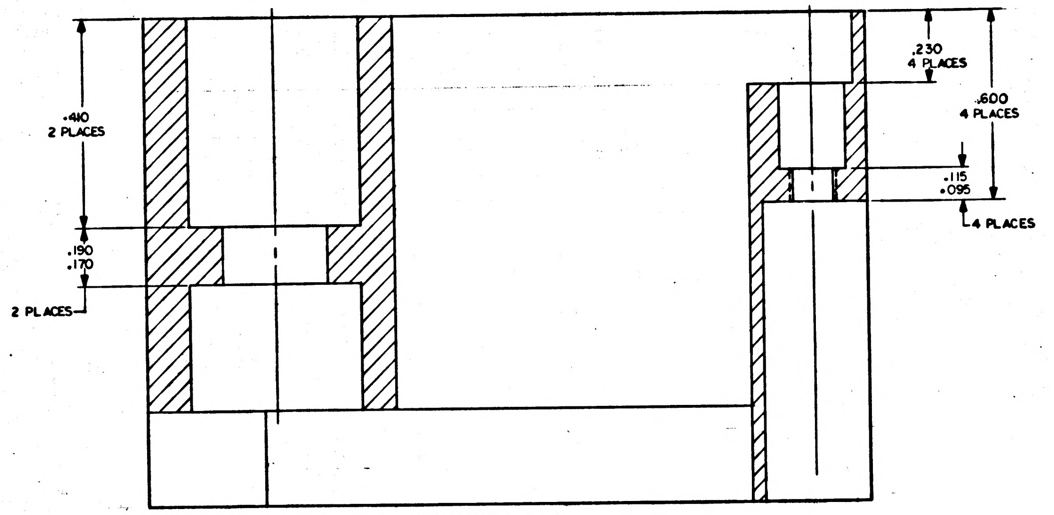
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

2008175	B

SYM	ZONE	REVISIONS DESCRIPTION	BY	CHK	DATE	APPROVED
		18112				



.418
.146 3 PLACES
15 SPACES AT .127/.123 = 1.877/1.872 TOLERANCE NON-CUMULATIVE
.040 REF
.062 DIA X .312 DEEP 4 HOLES
.060
1.978/1.972
.215/.195 TYP
.200 TYP
.200 TYP
.400 TYP
45° TYP
A
.555 DIA 4 HOLES
.332 DIA 2 HOLES
A
3.700
.660
1.878/1.872
2.498
1.520
.213/.217 DIA 4 HOLES
B .005
NO 8 (.164)-32UNC-2B THRU MODIFIED MINOR DIA .143/.148 4 HOLES
-B-
.130/.115 R TYP
.815/.809
.235
.175
.102/.098
.074/.079 DIA .302/.322 DEEP CSK 82° TO .091 DIA 2 HOLES
.125 REF
.271
.037/.033
14 SPACES AT .127/.123 = 1.752/1.748 TOLERANCE NON-CUMULATIVE
.142/.138
2.032/2.028
.209
A
A
2.323



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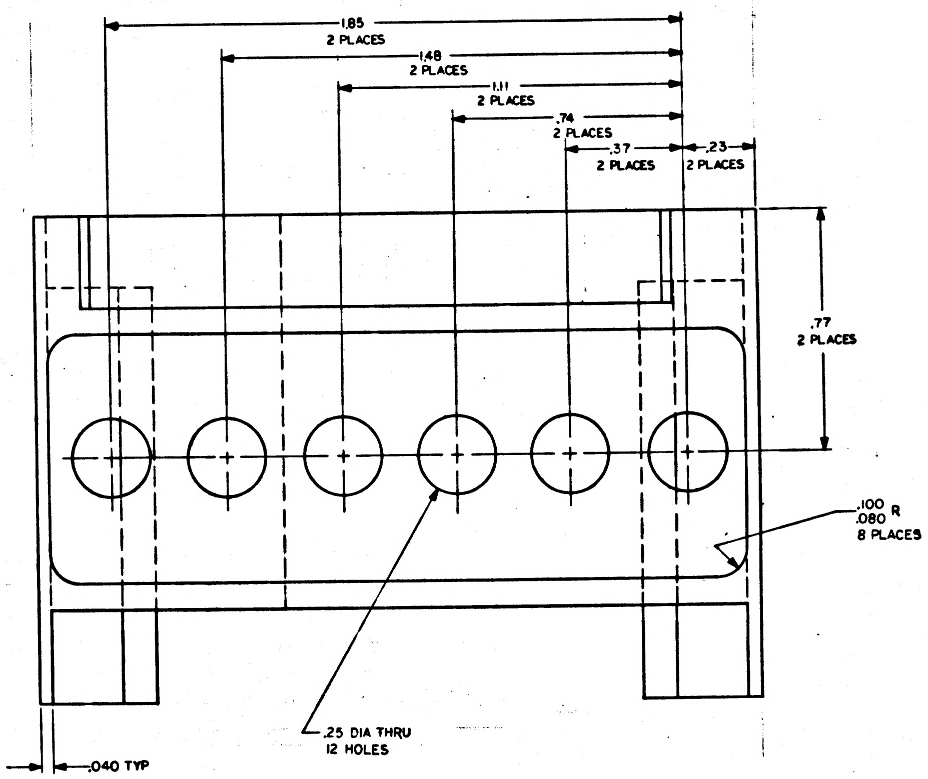
.190/.170
2 PLACES
.230 4 PLACES
.600 4 PLACES
.115/.095
4 PLACES

SECTION A-A



1.85 2 PLACES
1.48 2 PLACES
1.11 2 PLACES
.74 2 PLACES
.37 2 PLACES
.23 2 PLACES
.77 2 PLACES
.100/.080 R 8 PLACES
.25 DIA THRU 12 HOLES
.040 TYP

VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
2007118	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XX ±.02 .XXX ±.005 ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED 4/6/65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

FRAME
MOTOR DRIVE AMPLIFIER

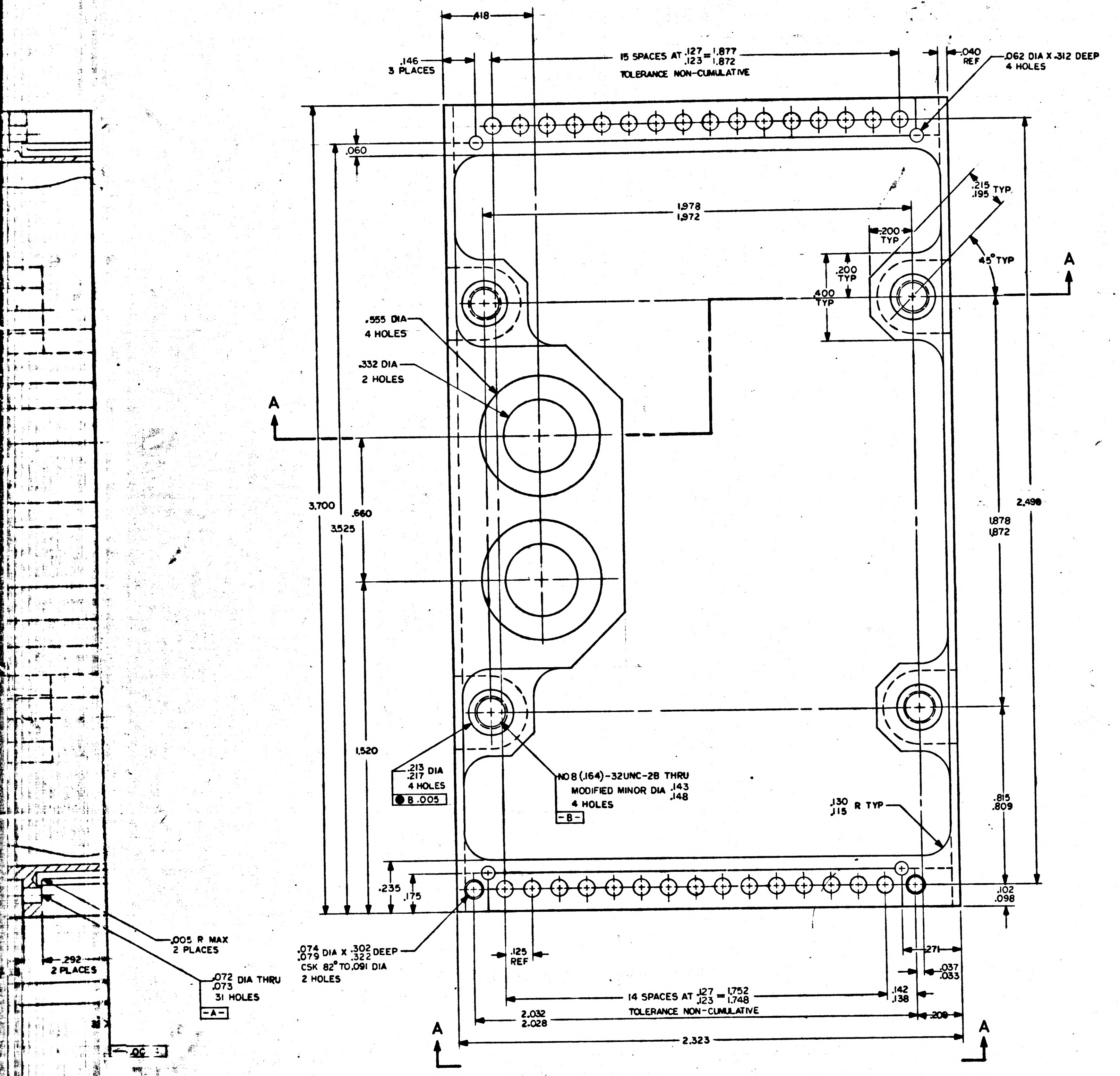
CODE IDENT NO. —
SIZE J
DRAWING NO. 2008175
SCALE 5/1
SHEET 1 OF 1

2008175

2008175

F-3

SYM	ZONE	REVISIONS DESCRIPTION	DR	CHK	DATE	APPROVED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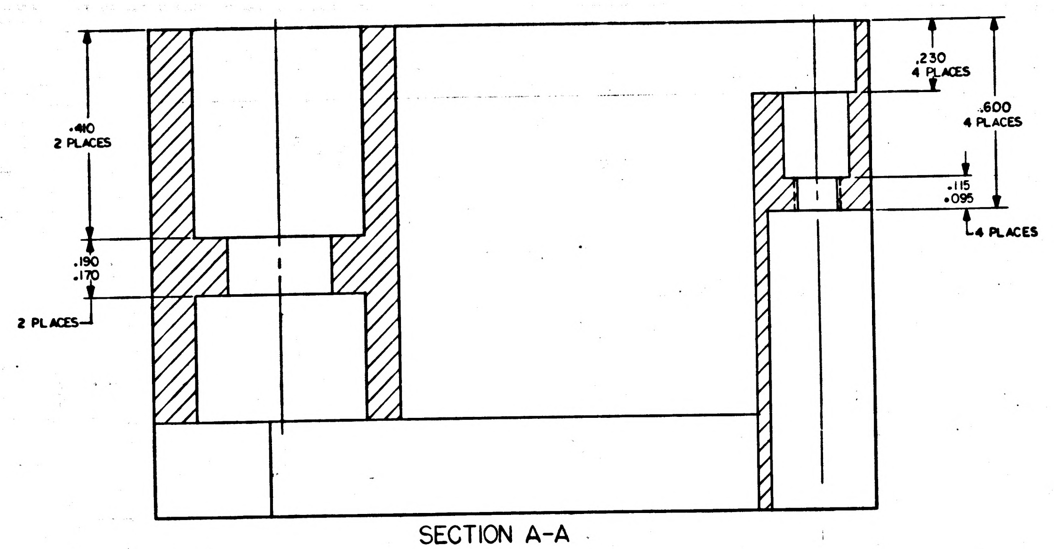
.146
3 PLACES
15 SPACES AT .127/.123 = 1.877/1.872
TOLERANCE NON-CUMULATIVE
.040
REF
.062 DIA X .312 DEEP
4 HOLES
.060
1.978
1.972
.215
.195 TYP.
.200
TYP
.200
TYP
.400
TYP
45° TYP
A
.555 DIA
4 HOLES
.332 DIA
2 HOLES
A
3.700
3.525
.660
1.878
1.872
2.498
1.520
.213
.217 DIA
4 HOLES
● B .005
NO 8 (.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143/.148
4 HOLES
-B-
.130
.115 R TYP
.815
.809
.235
.175
.102
.098
.005 R MAX
2 PLACES
.292
2 PLACES
.072
.073 DIA THRU
31 HOLES
-A-
.074
.079 DIA X .302/.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125
REF
.271
.037
.033
14 SPACES AT .127/.123 = 1.752/1.748
TOLERANCE NON-CUMULATIVE
.142
.138
2.032
2.028
.209
2.323
A
A


.410
2 PLACES
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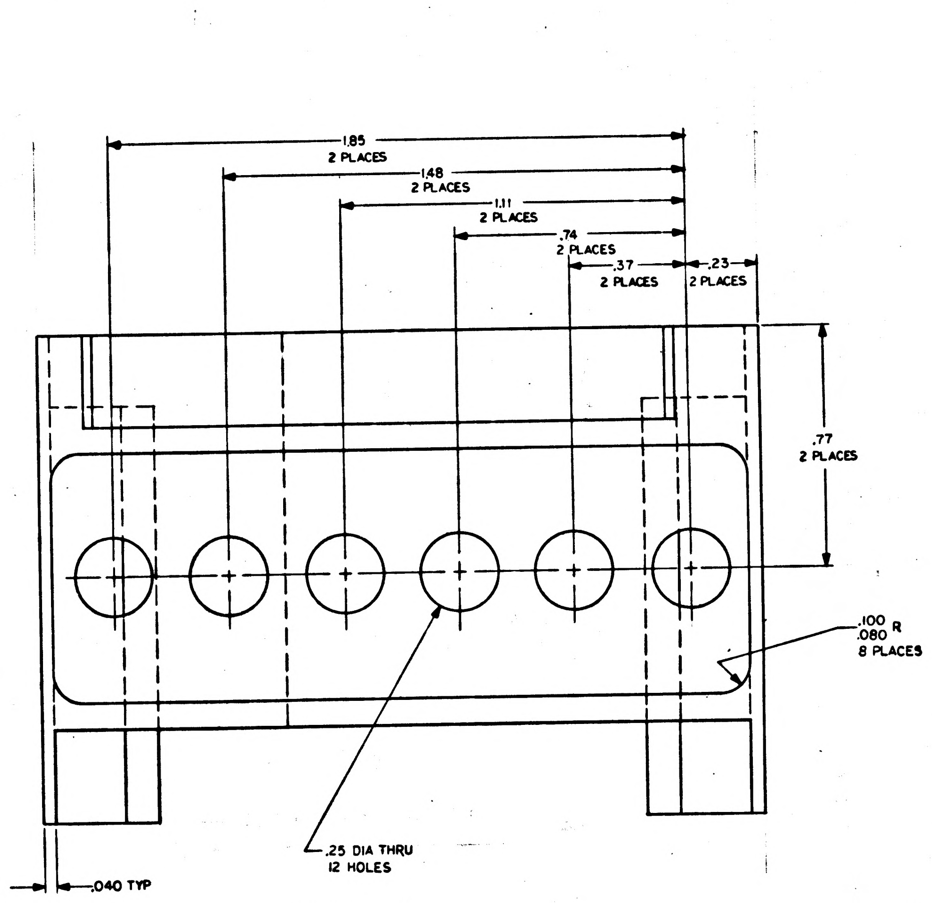
2 PLACES
.230
4 PLACES
.600
4 PLACES
.115
.095
4 PLACES

SECTION A-A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2 PLACES
1.11
2 PLACES
.74
2 PLACES
.37
2 PLACES
.23
2 PLACES
.77
2 PLACES
.100
.080 R
8 PLACES
.25 DIA THRU
12 HOLES
.040 TYP

VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XX ± .02 .XXX ± .005 ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED Rimmer 4/6/65
APPROVED
APPROVED MIT W. Cuyler
APPROVED MSC W. J. Rhine
DATE

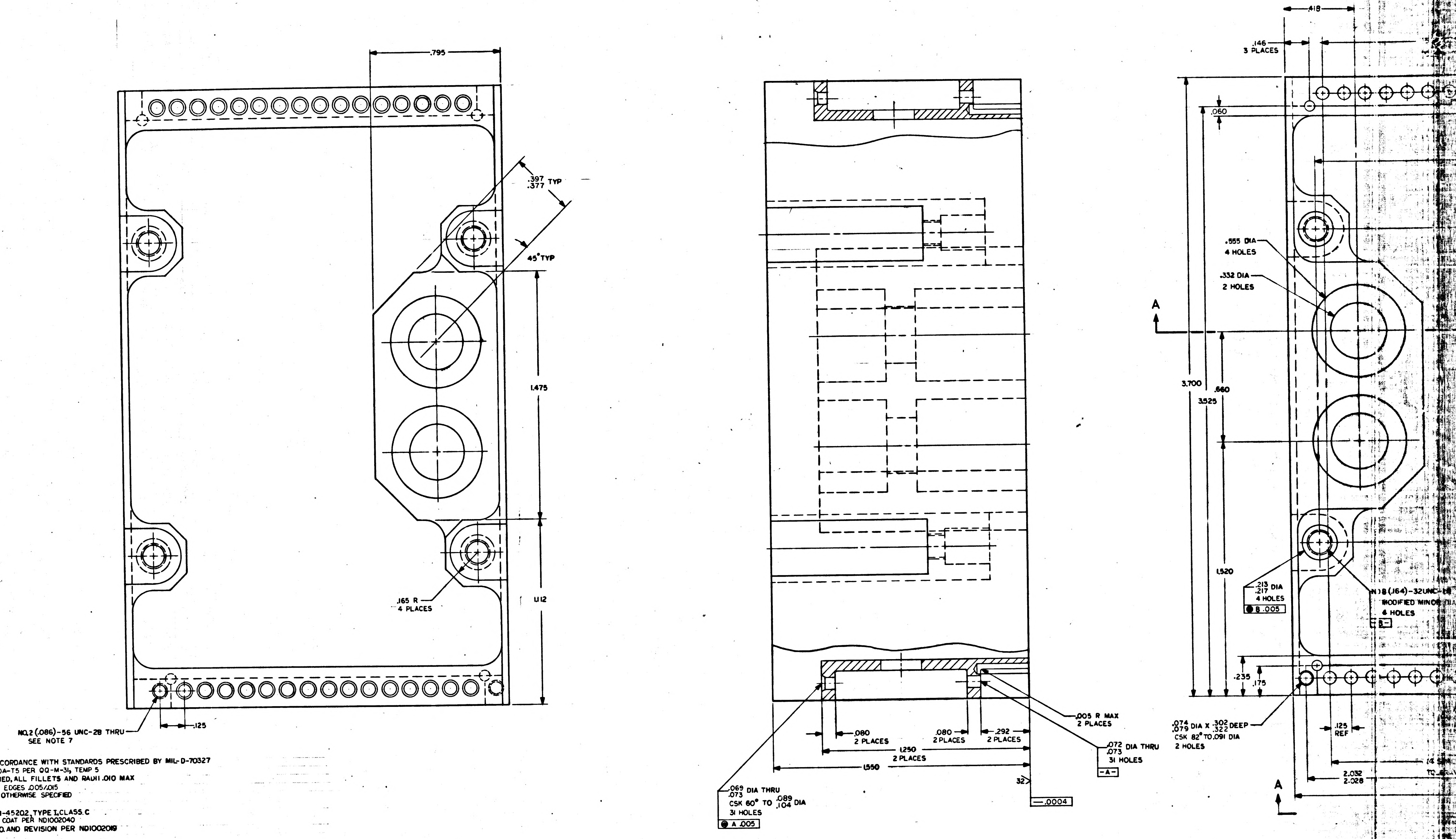
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008175
SCALE 5/1
SHEET 1 OF 1

2008175

F2


.795
.397
.377 TYP
45° TYP
1.475
1.112
.165 R
4 PLACES
.125
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
.005 R MAX
2 PLACES
.072
.073 DIA THRU
31 HOLES
-A-
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
31 HOLES
A .005
32
.0004
.418
.146
3 PLACES
.060
.555 DIA
4 HOLES
.332 DIA
2 HOLES
A
3.700
3.525
.660
1.520
.213
.217 DIA
4 HOLES
B .005
NO 8 (.164)-32UNC-
MODIFIED MINOR DIA
4 HOLES
-B-
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.125
REF
2.032
2.028
A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

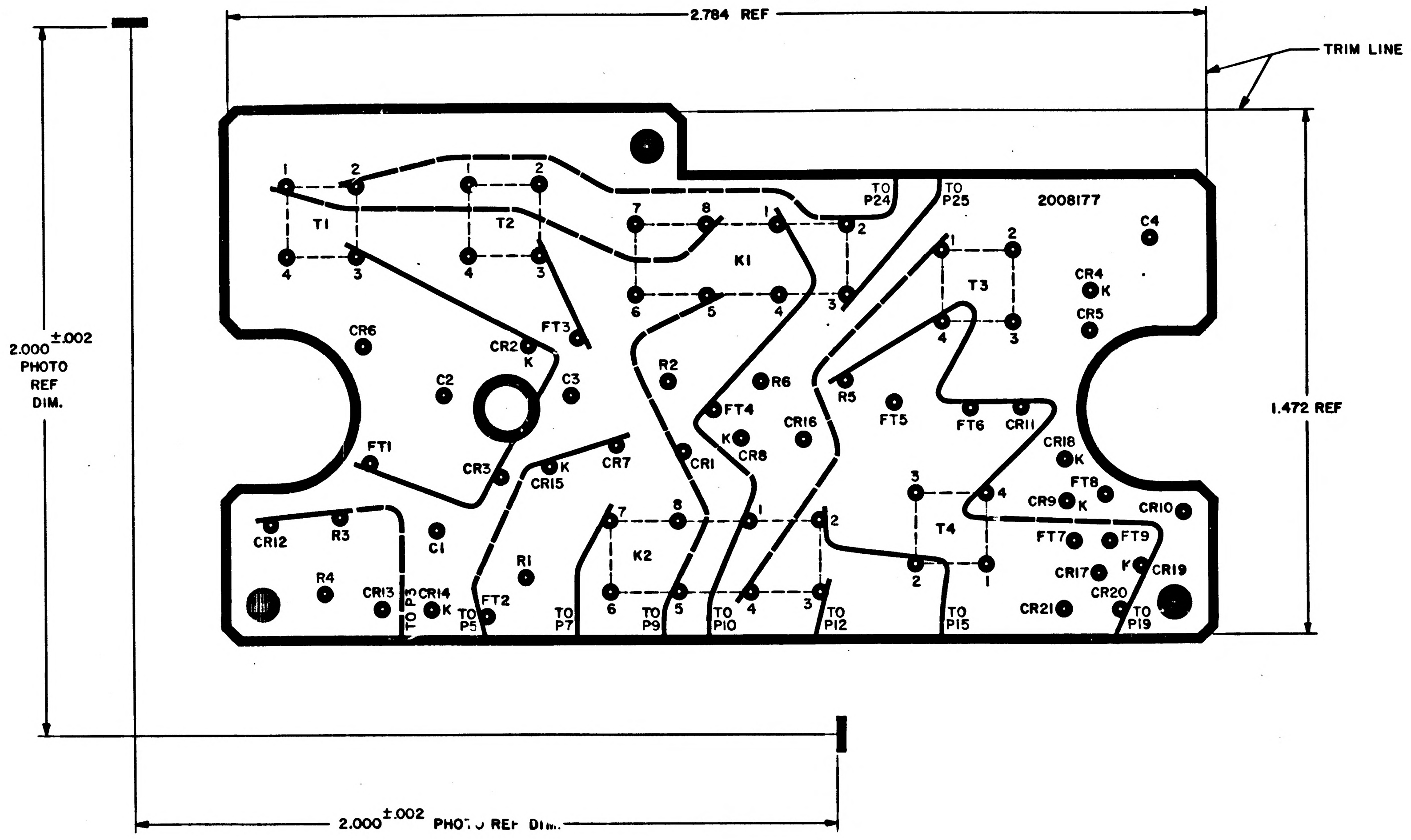
3H

2008175

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17833

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.784 REF
TRIM LINE
2.000 ±.002 PHOTO REF DIM.
1.472 REF
2.000 ±.002 PHOTO REF DIM.
2008177
T1
T2
T3
T4
K1
K2
TO P24
TO P25
TO P3
TO P5
TO P7
TO P9
TO P10
TO P12
TO P15
TO P19
C1
C2
C3
C4
R1
R2
R3
R4
R5
R6
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
CR17
CR18
CR19
CR20
CR21
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9
K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L Krahn	17 MAR 65
CHECKED	A. Lindstrom	22 Mar 65
APPROVED	RMmer	22 MARCH 65
APPROVED	D.R. Test	3/23/65
APPROVED MIT		24 Mar 65
APPROVED MSC		3/29/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

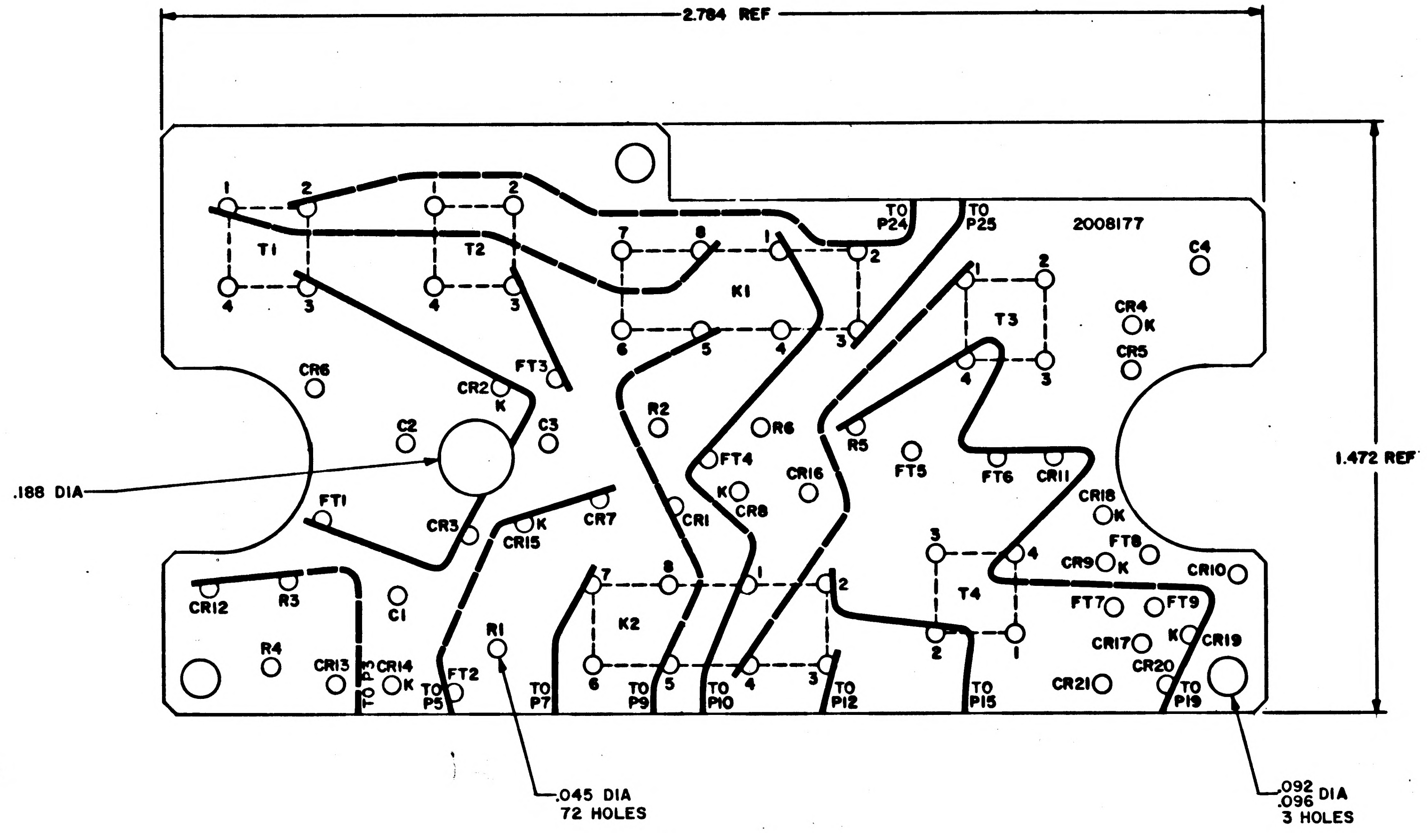
PHOTOGRAPHIC MASTER
WIRING BOARD (TOP)
TWO SPEED SWITCH

CODE IDENT NO. —
SIZE D
DRAWING NO. 2008176
SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17833

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21463	JC	[illegible]	[illegible]	WK


2.784 REF
1.472 REF
.188 DIA
.045 DIA
72 HOLES
.092
.096 DIA
3 HOLES
2008177
T1
T2
T3
T4
K1
K2
1
2
3
4
5
6
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8
TO P24
TO P25
TO P3
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TO P10
TO P12
TO P15
TO P19
C1
C2
C3
C4
R1
R2
R3
R4
R5
R6
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
CR17
CR18
CR19
CR20
CR21
K
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9

REF DRAWING:
2008176 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. HEAVY BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ± .005 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	L. Krahn	17 MAR 65
CHECKED	A. Lindstrom	22 Mar 65
APPROVED	[illegible]	22 March 65
APPROVED	[illegible]	3/23/65
APPROVED MIT	W. Kupfer	24 Mar 65
APPROVED MSC	[illegible]	4-4/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (TOP)
TWO SPEED SWITCH

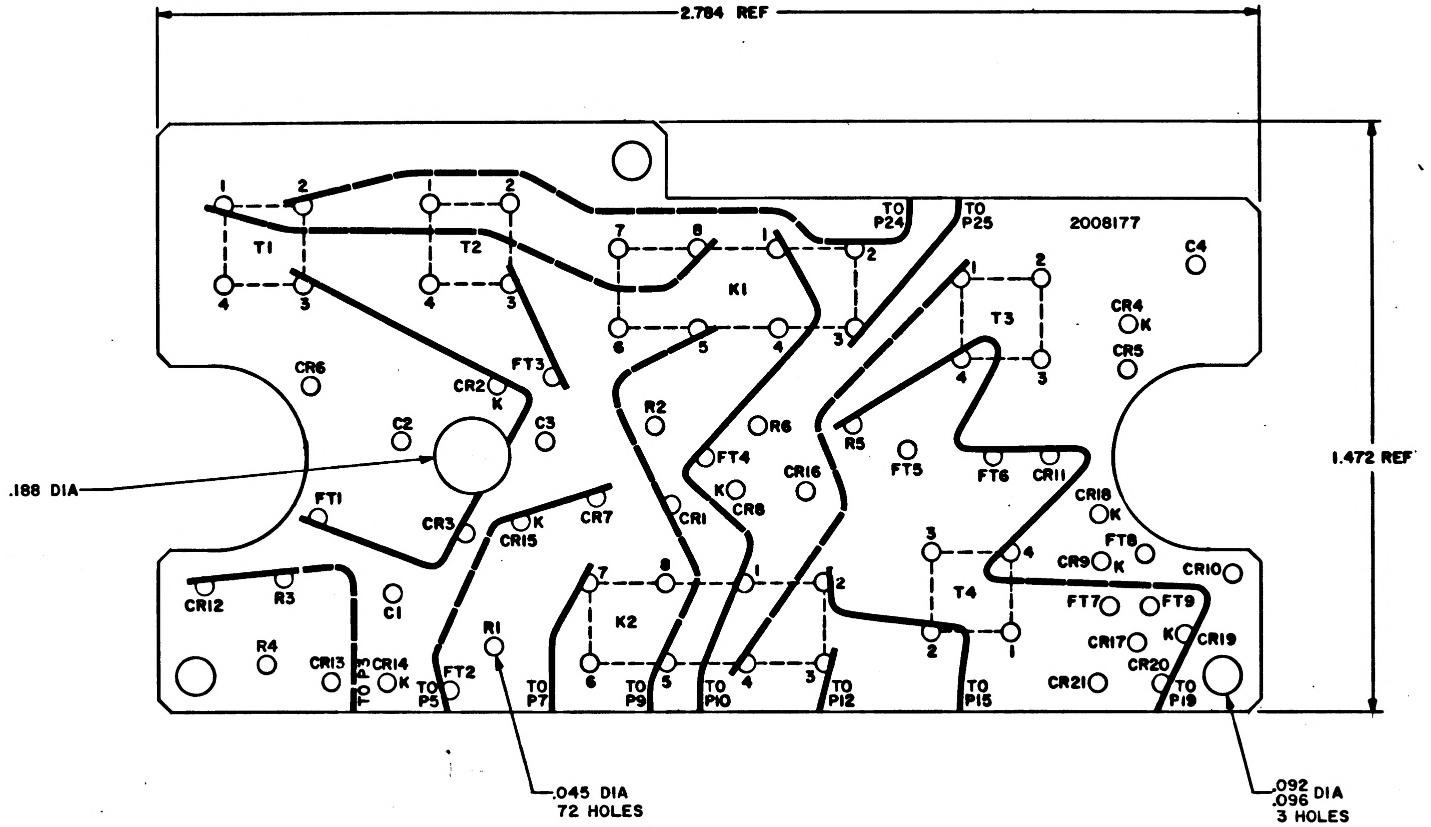
CODE IDENT NO.	SIZE	DRAWING NO.
—	D	2008177
SCALE 5/1	—	SHEET 1 OF 1

2008177 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17833

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.784 REF
1.472 REF
2008177
.188 DIA
.045 DIA
72 HOLES
.092
.096 DIA
3 HOLES
T1
T2
T3
T4
K1
K2
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TO P24
TO P25
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C1
C2
C3
C4
CR1
CR2
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CR4
CR5
CR6
CR7
CR8
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CR10
CR11
CR12
CR13
CR14
CR15
CR16
CR17
CR18
CR19
CR20
CR21
K
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9
R1
R2
R3
R4
R5
R6

REF DRAWING:
2008176 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	L Krahn	19 MAR 65
CHECKED	A. Lindstrom	22 Mar 65
APPROVED	RMay	22 MARCH 65
APPROVED	D.R. Stet	3/23/65
APPROVED MIT	W Kupfer	24 Mar 65
APPROVED MSC		3/-4/65

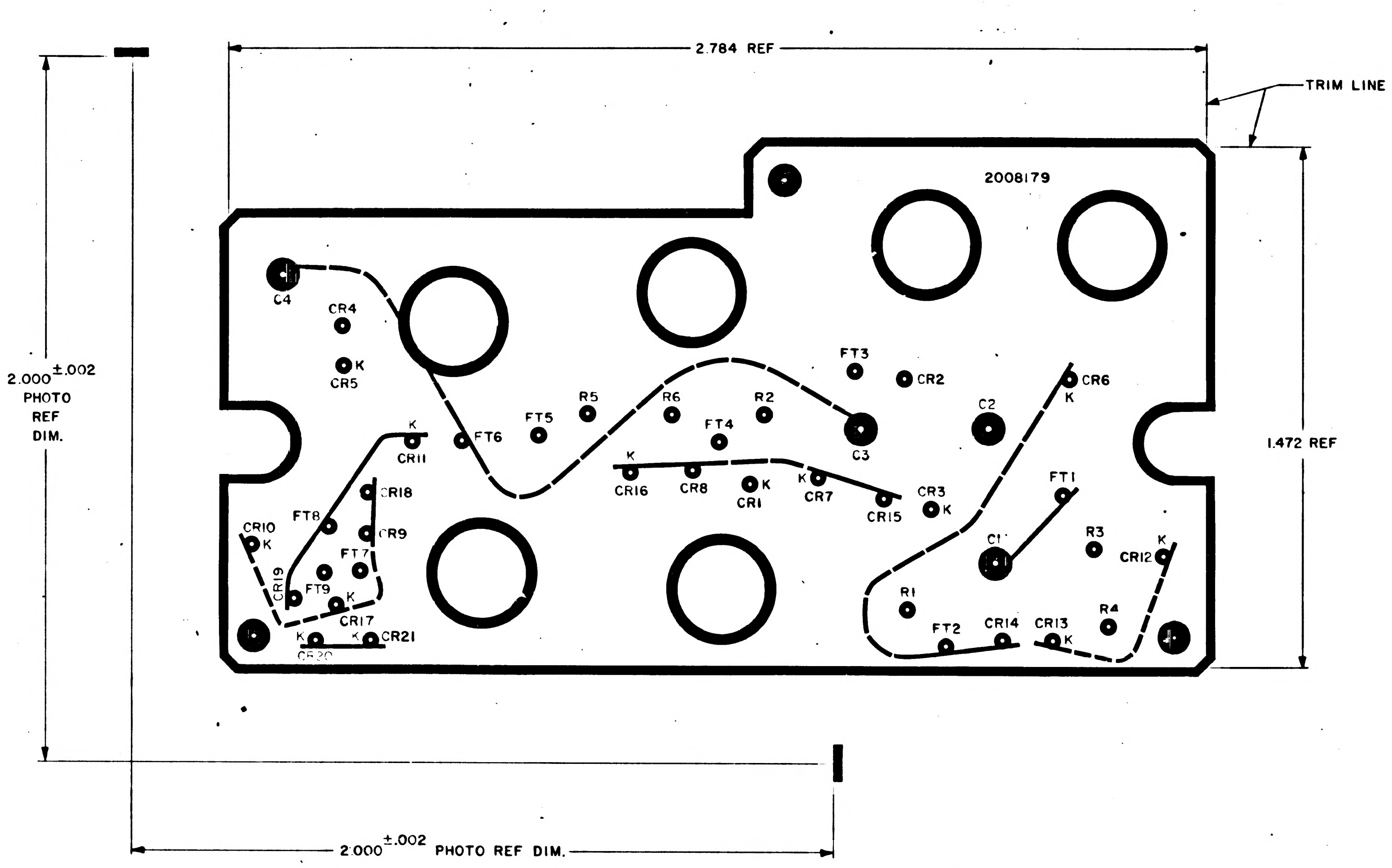
WIRING BOARD (TOP)
TWO SPEED SWITCH

CODE IDENT NO. —
SIZE D
DRAWING NO. 2008177
SCALE 5/1
—
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17433

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25508	A.N.		31 JAN 66	


2.784 REF
TRIM LINE
2008179
C4
CR4
K
CR5
R5
R6
R2
FT3
CR2
CR6
K
C2
FT6
FT5
FT4
C3
K
CR11
K
CR16
CR8
K
CR1
K
CR7
CR15
CR3
K
FT1
CR18
FT8
CR9
CR10
K
FT7
CR19
FT9
K
CR17
K
K
CR21
CR20
C1
R3
K
CR12
R1
FT2
CR14
CR13
K
R4
1.472 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN L Krohn 17 MAR 65
CHECKED A. Lindstrom 22 Mar 65
APPROVED 22 MAR 65
APPROVED 3/23/65
APPROVED MIT 24 Mar 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD (BOTTOM)
TWO SPEED SWITCH

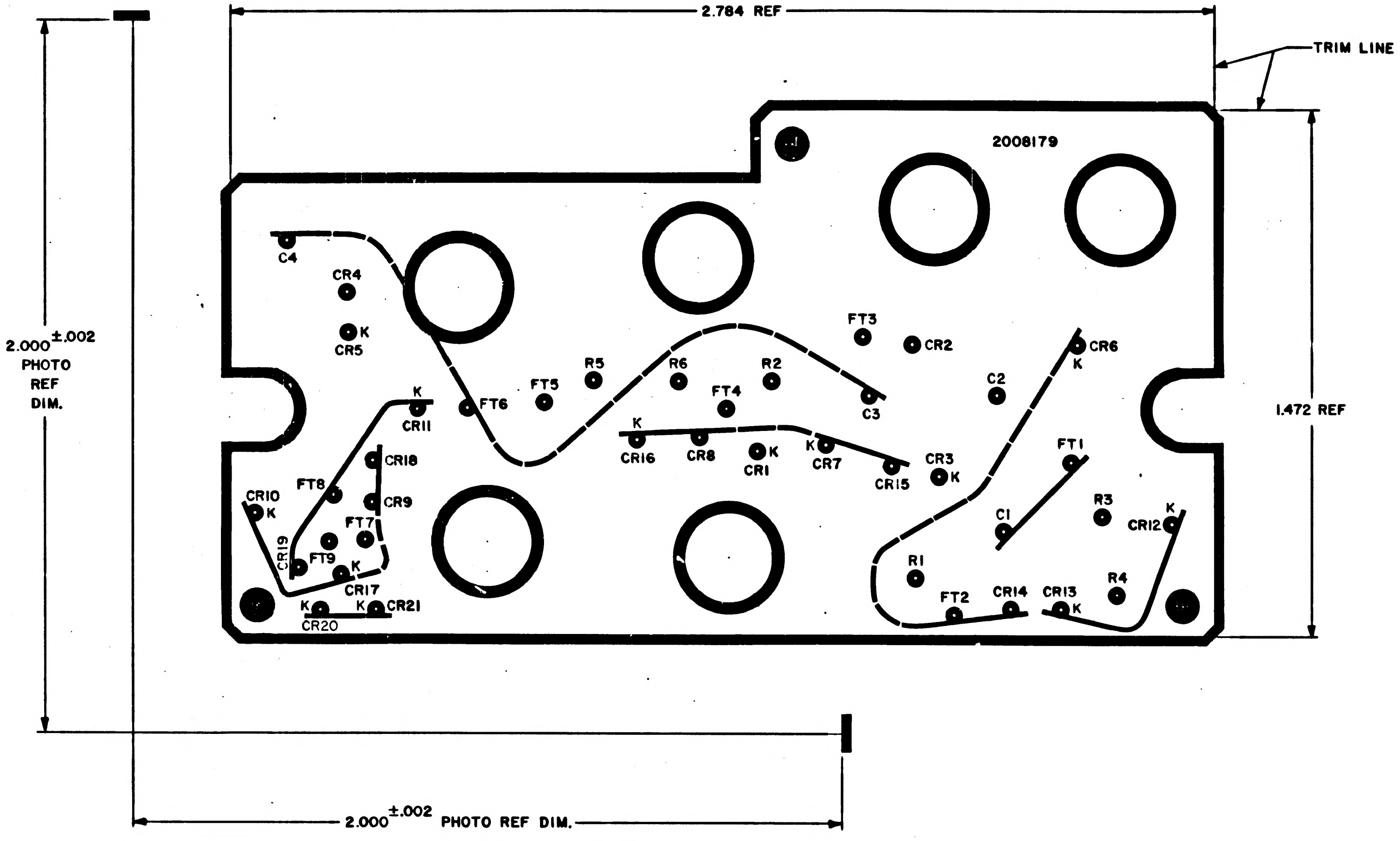
CODE IDENT NO —
SIZE D
DRAWING NO 2008178
SCALE 5/1
SHEET 1 OF 1

2008178 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17833

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.784 REF
TRIM LINE
2008179
2.000 ±.002 PHOTO REF DIM.
1.472 REF
2.000 ±.002 PHOTO REF DIM.
C4
CR4
K
CR5
CR11
K
FT6
FT5
R5
R6
FT4
R2
FT3
CR2
C3
C2
CR6
K
CR18
FT8
CR9
CR10
K
FT7
CR19
FT9
K
CR17
K
CR20
K
CR21
K
CR16
CR8
K
CR1
K
CR7
CR15
CR3
K
FT1
C1
R3
CR12
K
R1
FT2
CR14
CR13
K
R4

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L Krahn	17 MAR 65
CHECKED	A. Lindstrom	22 Mar 65
APPROVED		22 MARCH 65
APPROVED		3/23/65
APPROVED MIT		24 Mar 65
APPROVED MSC		3/29/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

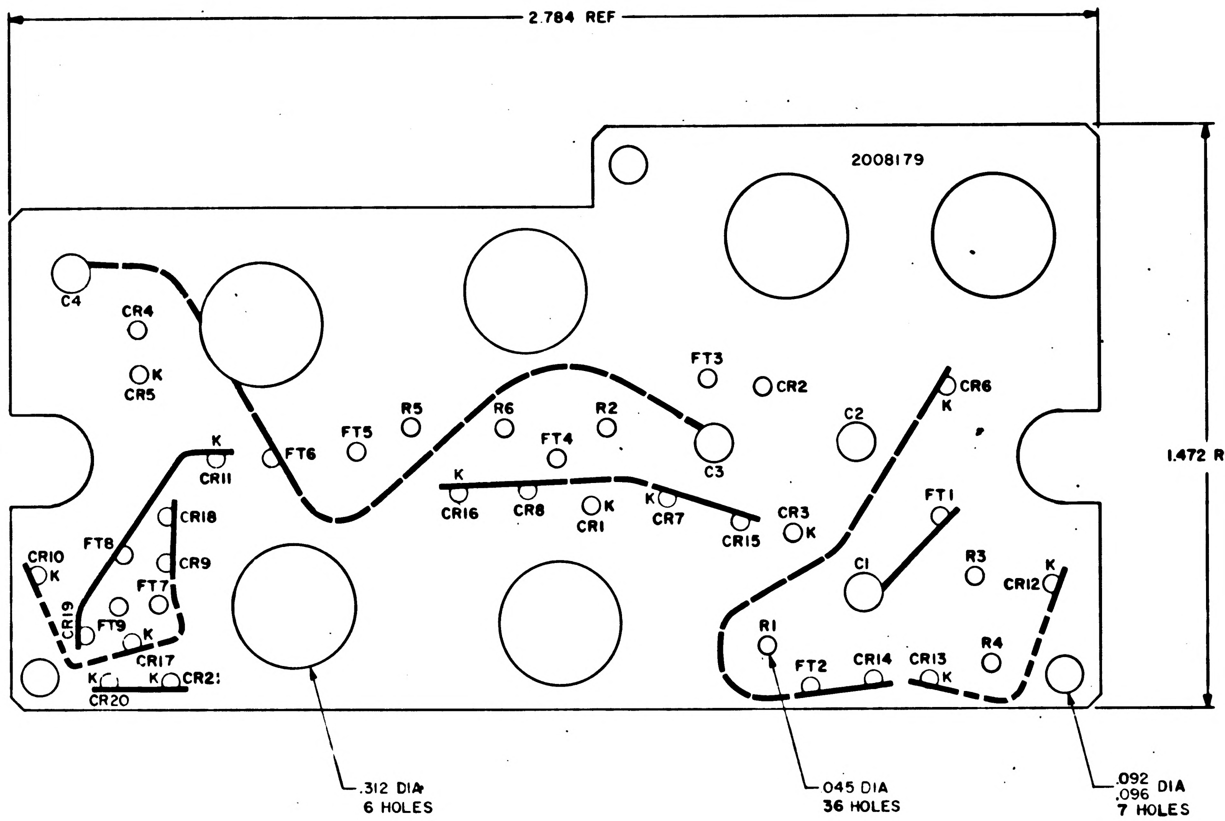
PHOTOGRAPHIC MASTER
WIRING BOARD (BOTTOM)
TWO SPEED SWITCH

CODE IDENT NO.	SIZE	DRAWING NO.
—	D	2008178
SCALE 5/1	—	SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1783

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25508	A.N.		31JAN66	



2.784 REF
2008179
1.472 REF
C4
CR4
K
CR5
K
CR11
FT6
FT5
R5
R6
FT4
R2
FT3
CR2
C3
C2
CR6
K
FT1
CR18
CR9
FT8
CR10
K
FT7
CR19
FT9
K
CR17
K
K
CR21
CR20
K
CR16
CR8
K
CR1
K
CR7
CR15
CR3
K
C1
R3
K
CR12
R1
FT2
CR14
CR13
K
R4
.312 DIA
6 HOLES
.045 DIA
36 HOLES
.092
.096 DIA
7 HOLES

REF DRAWING:
2008178 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007121	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	L Krahn	17 MAR 65
CHECKED	A Lindstrom	22 Mar 65
APPROVED		22 March
APPROVED		
APPROVED MIT		24 Mar
APPROVED MSC		
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (BOTTOM)
TWO SPEED SWITCH

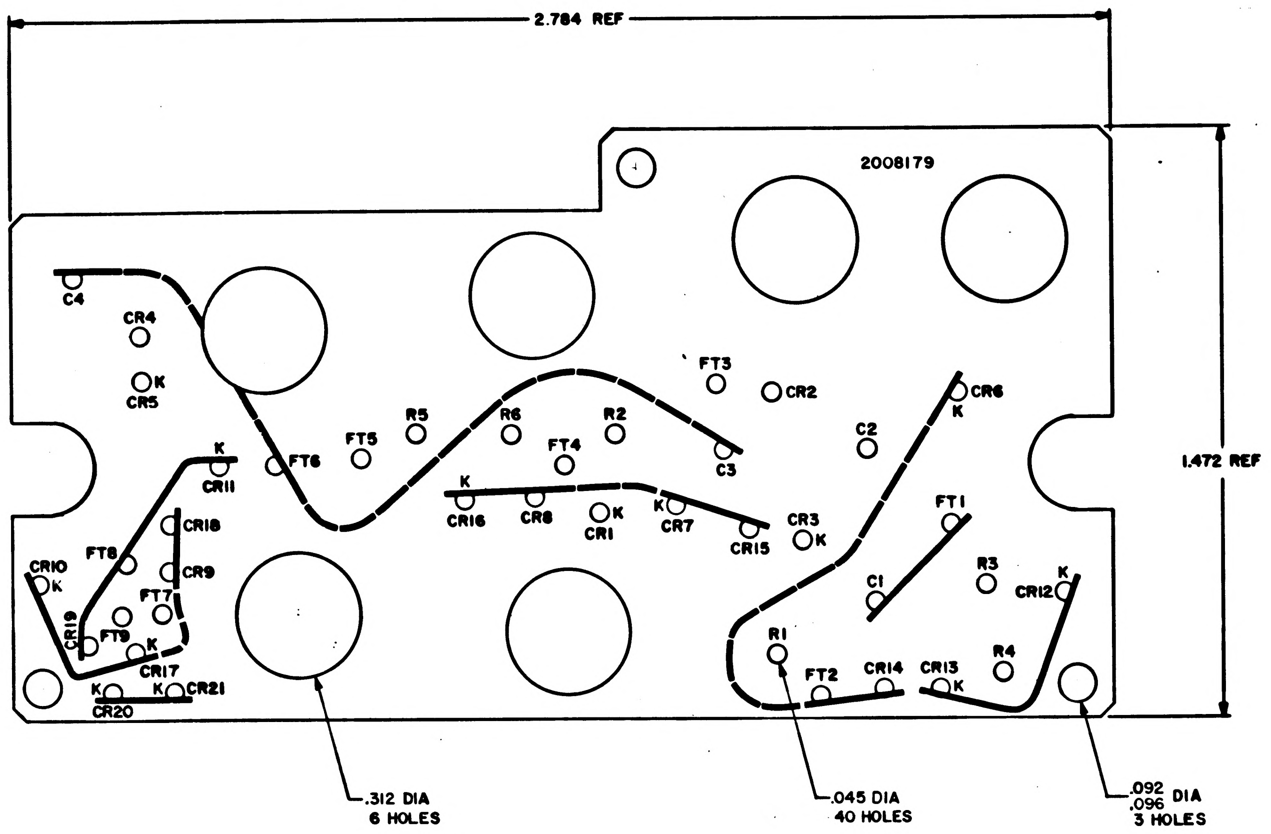
CODE IDENT NO	SIZE	DRAWING NO
—	D	2008179
SCALE 5/1	—	SHEET 1 OF 1

2008179 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17833

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.784 REF
2008179
C4
CR4
K
CR5
CR11
K
FT6
FT5
R5
R6
FT4
R2
FT3
CR2
C3
C2
CR6
K
1.472 REF
CR18
CR9
CR10
K
FT8
FT7
CR19
FT9
K
CR17
K
CR20
K
CR21
K
CR16
CR8
K
CR1
K
CR7
CR15
CR3
K
FT1
C1
R3
K
CR12
R1
FT2
CR14
CR13
K
R4
.312 DIA
6 HOLES
.045 DIA
40 HOLES
.092
.096 DIA
3 HOLES

REF DRAWING:
2008178 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

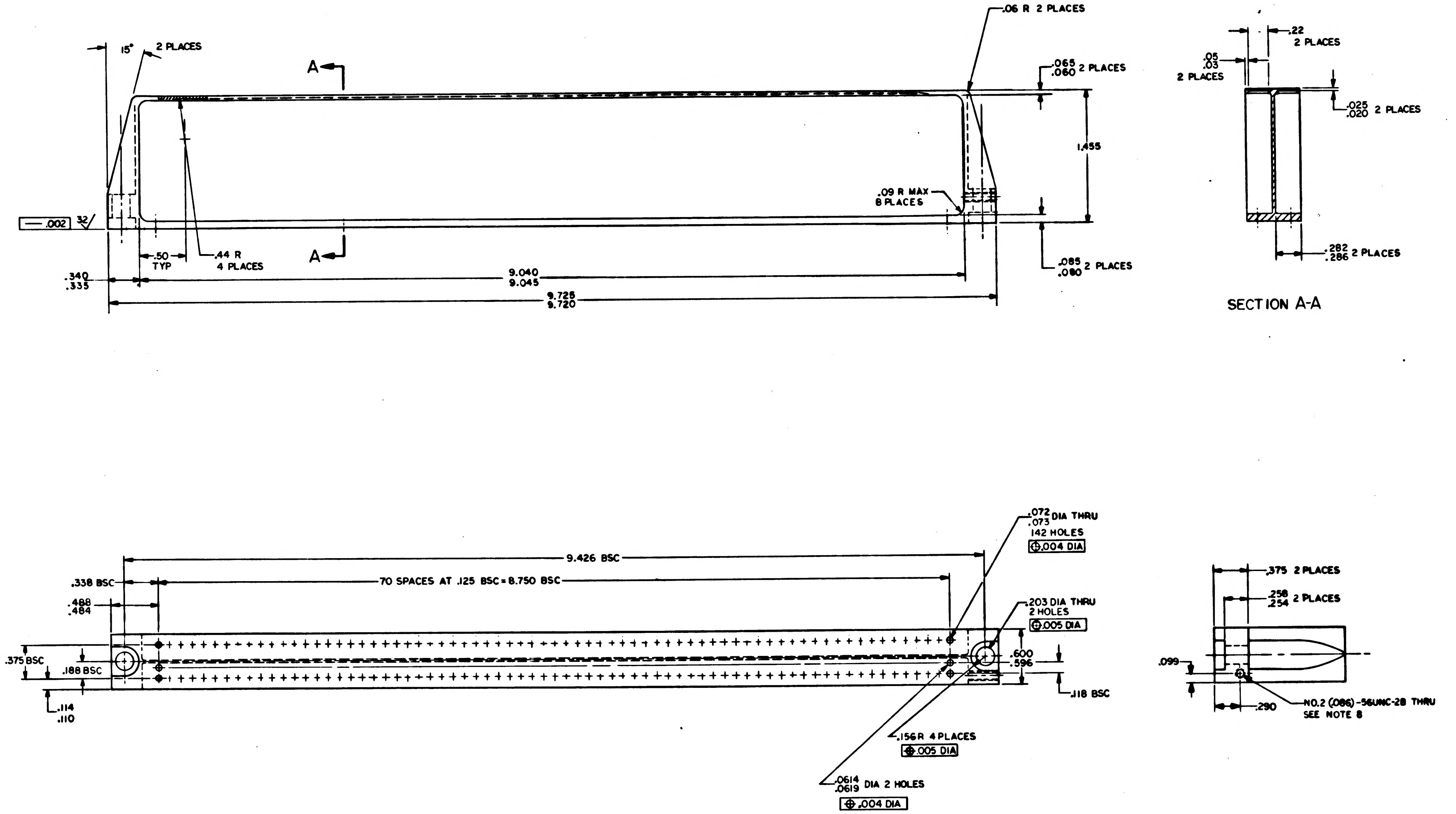
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	L. Krahn	17 MAR 65
CHECKED	A. Lindstrom	22 Mar 65
APPROVED	Cusser	22 March 65
APPROVED	D.R. Test	3/24/65
APPROVED MIT	W. Cooper	24 Mar 65
APPROVED MSC		3/29/65
		DATE

WIRING BOARD (BOTTOM)
TWO SPEED SWITCH

CODE IDENT NO. —
SIZE D
DRAWING NO. 2008179
SCALE 5/1
SHEET 1 OF 1


15°
2 PLACES
A
.06 R 2 PLACES
.065
.060 2 PLACES
1.455
.09 R MAX
8 PLACES
.002
32
.50
TYP
.44 R
4 PLACES
.340
.335
9.040
9.045
9.726
9.720
.085
.080 2 PLACES
.22
2 PLACES
.05
.03
2 PLACES
.025
.020 2 PLACES
.282
.286 2 PLACES
SECTION A-A
9.426 BSC
.338 BSC
.488
.484
70 SPACES AT .125 BSC=8.750 BSC
.072
.073 DIA THRU
142 HOLES
.004 DIA
.203 DIA THRU
2 HOLES
.005 DIA
.375 BSC
.188 BSC
.600
.596
.114
.110
.118 BSC
.156R 4 PLACES
.005 DIA
.0614
.0619 DIA 2 HOLES
.004 DIA
.375 2 PLACES
.256
.254 2 PLACES
.099
.290
NO.2 (.086)-56UNC-2B THRU
SEE NOTE 8

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. ALL INSIDE RADII .015/.005 UNLESS OTHERWISE SPECIFIED
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007069	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX±.005 .XX±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
—
FINAL FINISH
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A J Papia DATE 16 Mar 65
CHECKED
APPROVAL R W Woodard 22 Mar 65
APPROVAL A. R. Frost 3/22/65
NASA APPROVAL 3-23-65
MIT APPROVAL W Kupfer 23 Mar 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

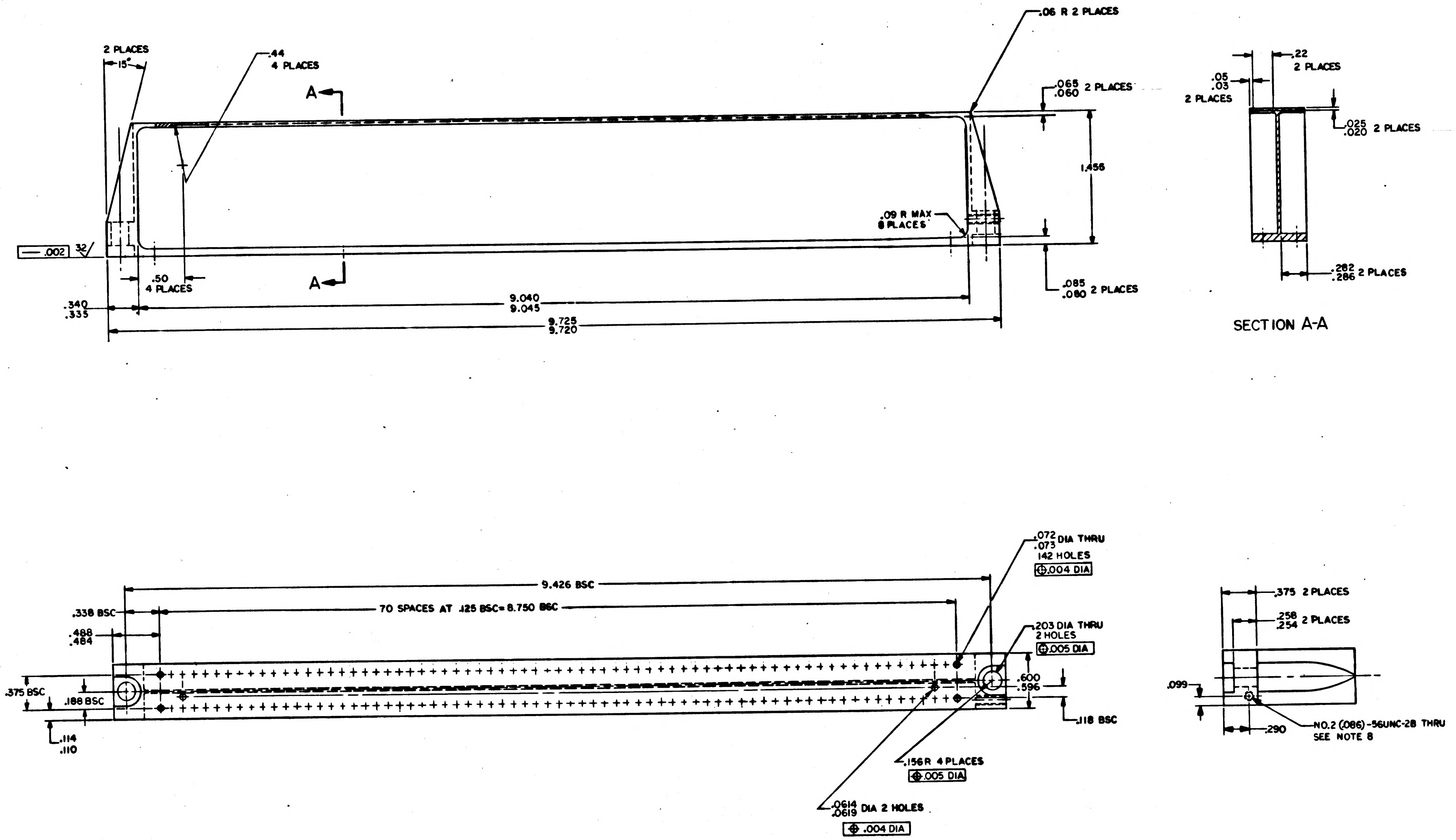
HEADER
READ COUNTER
CDU LOGIC MODULE

CODE IDENT NO. — SIZE E NASA DRAWING NO 2008180
SCALE 2/1 WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL


2 PLACES
15°
.44
4 PLACES
A
A
.06 R 2 PLACES
.065
.060 2 PLACES
1.456
.09 R MAX
8 PLACES
.002
32
.50
4 PLACES
.340
.335
9.040
9.045
9.725
9.720
.085
.080 2 PLACES
.22
2 PLACES
.05
.03
2 PLACES
.025
.020 2 PLACES
.282
.286 2 PLACES
SECTION A-A
9.426 BSC
.338 BSC
70 SPACES AT .125 BSC=8.750 BSC
.488
.484
.375 BSC
.188 BSC
.114
.110
.072
.073 DIA THRU
142 HOLES
.004 DIA
.203 DIA THRU
2 HOLES
.005 DIA
.600
.596
.118 BSC
.156R 4 PLACES
.005 DIA
.0614
.0619 DIA 2 HOLES
.004 DIA
.375 2 PLACES
.258
.254 2 PLACES
.099
.290
NO.2 (.086)-56UNC-2B THRU
SEE NOTE 8

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. ALL INSIDE RADII .015/.005 UNLESS OTHERWISE SPECIFIED
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007067	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .01 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN [illegible] DATE [illegible]
CHECKED
APPROVAL R F Vaughn 22 MAR 65
APPROVAL D. R. Test 3/22/65
NASA APPROVAL 3-23-65
MIT APPROVAL 23 Mar 65

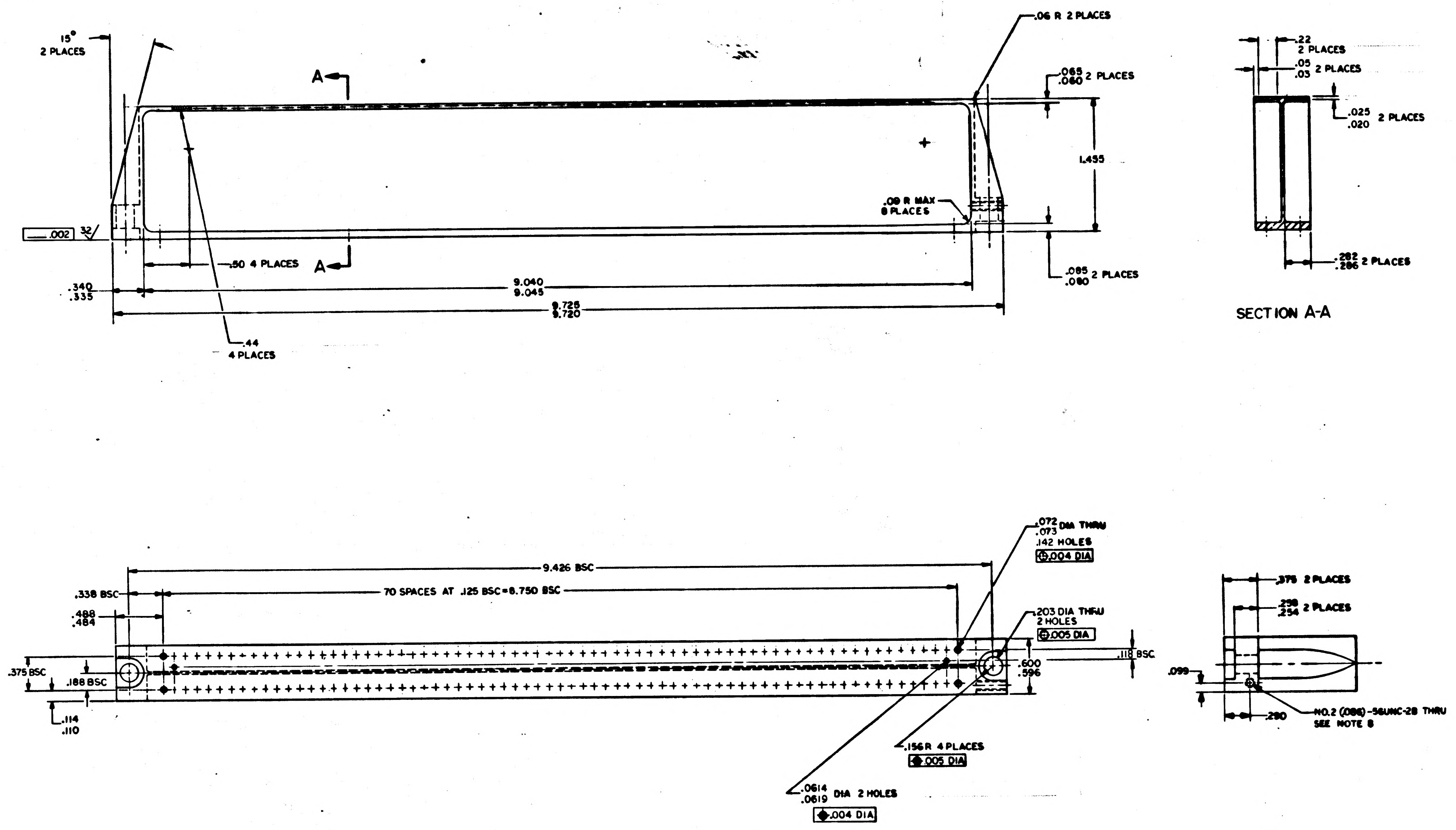
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
ERROR ANGLE COUNTER
CDU LOGIC MODULE

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008181
SCALE 2/1
WT —
SHEET 1 OF 1

2008181

MASTER


15°
2 PLACES
A
.06 R 2 PLACES
.065
.060 2 PLACES
1.455
.09 R MAX
8 PLACES
.002
32
.50 4 PLACES
.085
.080 2 PLACES
.340
.335
9.040
9.045
9.726
9.720
.44
4 PLACES
.22
2 PLACES
.05
.03 2 PLACES
.025
.020 2 PLACES
.282
.286 2 PLACES
SECTION A-A
9.426 BSC
.338 BSC
70 SPACES AT .125 BSC=8.750 BSC
.488
.484
.375 BSC
.188 BSC
.114
.110
.072
.073 DIA THRU
.142 HOLES
⊕.004 DIA
.203 DIA THRU
2 HOLES
⊕.005 DIA
.118 BSC
.600
.596
.156R 4 PLACES
⊕.005 DIA
.0614
.0619 DIA 2 HOLES
⊕.004 DIA
.375 2 PLACES
.258
.254 2 PLACES
.099
.290
NO.2 (.086)-56UNC-2B THRU
SEE NOTE 8

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
5. ALL INSIDE RADII .015/.005 UNLESS OTHERWISE SPECIFIED
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007068	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±30'
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
—
FINAL FINISH
SEE NOTE 3

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Ed Powers DATE 7 Mar 65
CHECKED
APPROVAL R.W. [illegible] 3/22/65
APPROVAL [illegible] 3/22/65
NASA APPROVAL W J Rhine 03-23-65
MIT APPROVAL [illegible] 23 Mar 65

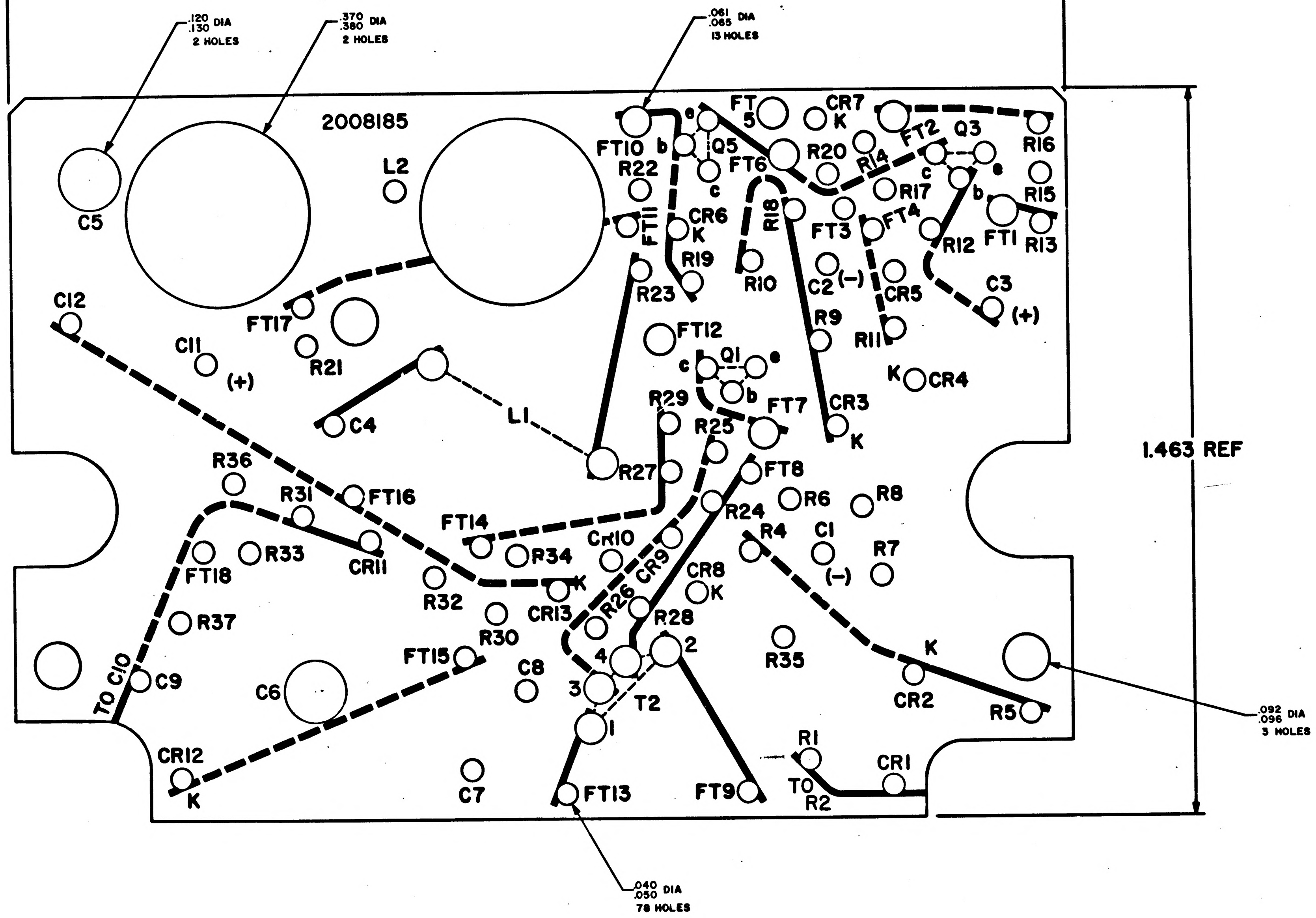
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
DIGITAL MODE
CDU LOGIC MODULE

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008182
SCALE 2/1
WT —
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS ,8110						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.156 REF
.120 .130 DIA 2 HOLES
.370 .380 DIA 2 HOLES
.061 .065 DIA 13 HOLES
2008185
C5
L2
FT10
b
e
Q5
c
FT 5
CR7
K
FT6
R20
R14
FT2
Q3
c
e
b
R16
R15
R13
FT1
R22
FT11
CR6
K
R19
R18
R10
FT3
R17
FT4
R12
C3
(+)
C2
(–)
CR5
R11
R23
FT17
R21
C12
C11
(+)
C4
L1
FT12
Q1
c
e
b
R9
CR4
K
R29
R25
FT7
CR3
K
R27
FT8
R6
R8
1.463 REF
R36
R31
FT16
FT14
CR10
R24
R4
C1
(–)
R7
FT18
R33
CR11
R34
K
R32
CR13
R26
CR9
CR8
K
R28
R37
R30
FT15
C8
4
2
3
T2
1
R35
K
CR2
R5
TO C10
C9
C6
.092 .096 DIA 3 HOLES
CR12
K
C7
FT13
FT9
R1
TO R2
CR1
.040 .050 DIA 78 HOLES

REF: DRAWING NO. 2008186 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177, TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007112	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 25 Ag 65
CHECKED 6 Aug 65
APPROVED 5 Aug 65
APPROVED 4/6/65
APPROVED MIT 6 Aug 65
APPROVED MSC 4 Aug 65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

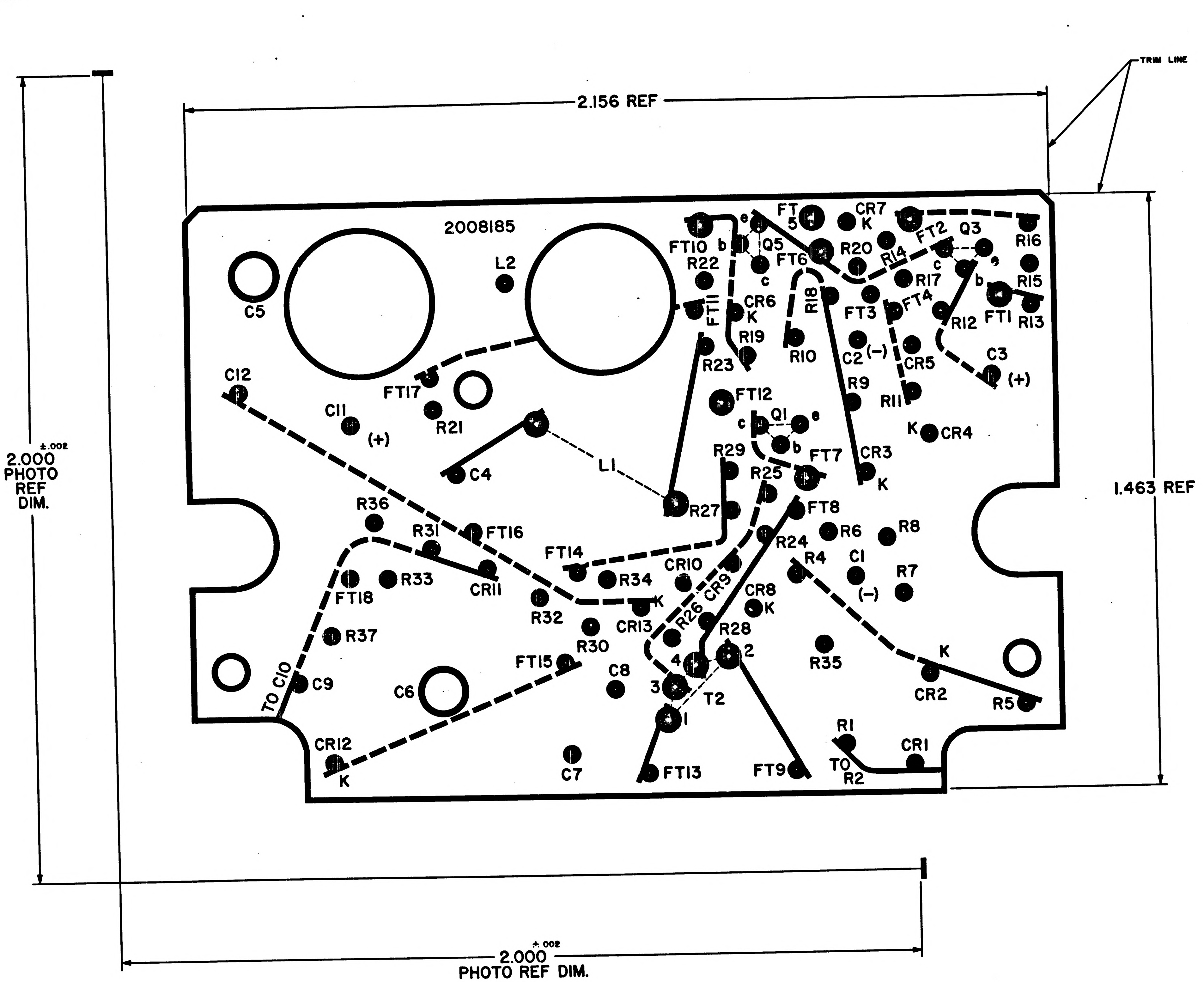
WIRING BOARD, BOTTOM
AAC FILTER & MVB, 800 CPS

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008185
SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18110

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TRIM LINE
2.156 REF
2008185
C5
L2
FT10
b
e
Q5
c
FT
5
CR7
K
R20
FT6
FT2
Q3
R16
R22
R14
c
e
R17
b
R15
FT11
CR6
K
R18
FT3
FT4
R12
FT1
R13
R19
R10
C2
(−)
CR5
C3
(+)
R23
FT17
C12
FT12
R9
R11
C11
(+)
R21
c
Q1
e
b
K
CR4
C4
L1
R29
R25
FT7
CR3
K
R27
FT8
R36
R31
FT16
R24
R6
R8
FT14
CR10
R4
C1
R7
FT18
R33
CR11
R34
CR9
CR8
K
(−)
K
R32
CRI3
R26
K
R37
R30
R28
2
R35
K
FT15
4
C8
CR2
R5
TO C10
C9
C6
3
T2
1
R1
CR12
CR1
TO
R2
K
C7
FT13
FT9
±.002
2.000
PHOTO
REF
DIM.
1.463 REF
±.002
2.000
PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ken Healy	19 MAR 63
CHECKED		5 APR 65
APPROVED		5 APR 65
APPROVED		4/5/65
APPROVED MIT		14 Apr 65
APPROVED MSC		4-6-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD, BOTTOM
AAC FILTER & MVB, 800 CPS

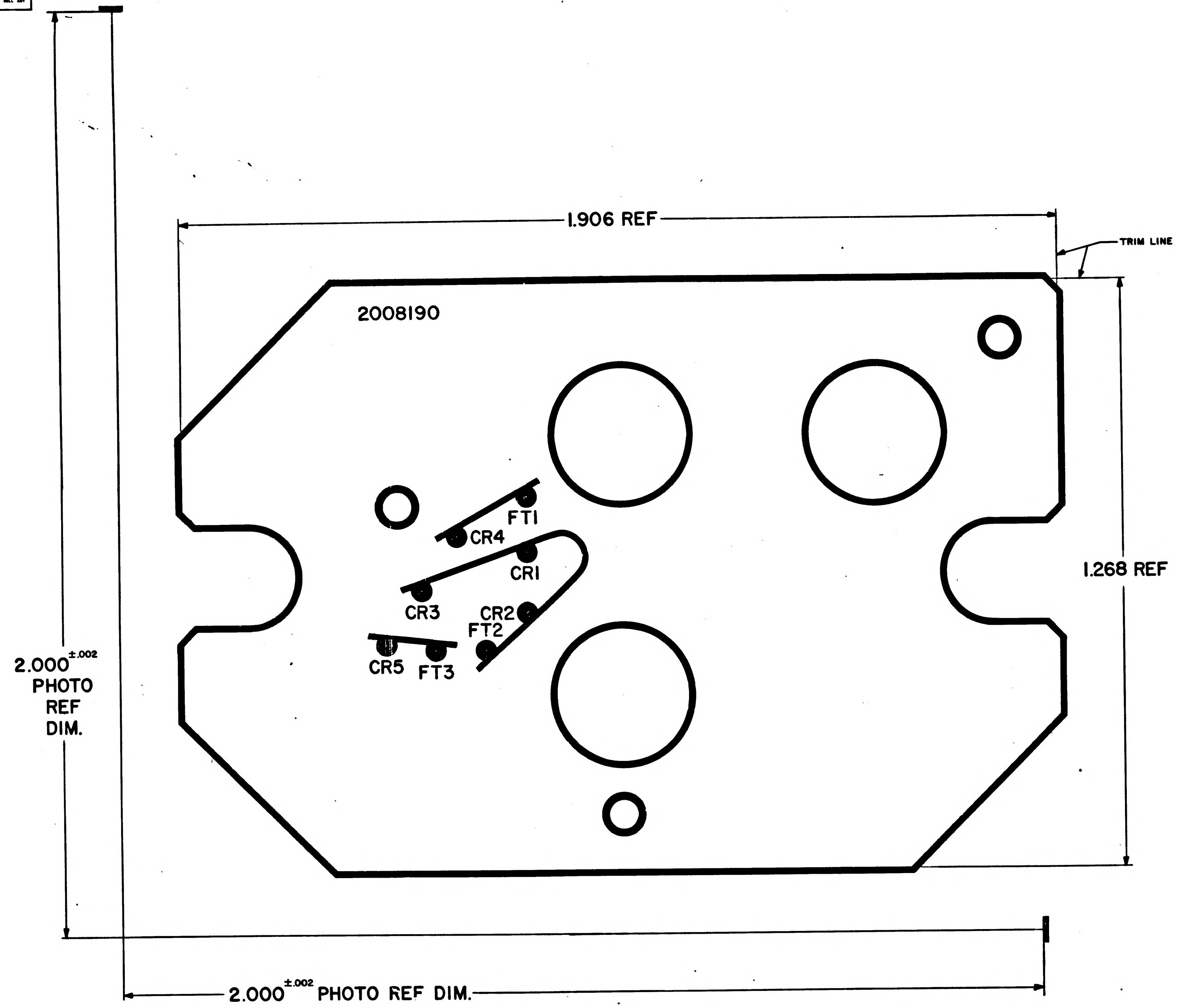
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008186

SCALE 10/1 SHEET 1 OF 1

2008186

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS -35E						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L Krahn	19 MAR 65
CHECKED	[illegible]	[illegible]
APPROVED	[illegible]	[illegible] 65
APPROVED	[illegible]	3/29/65
APPROVED MIT	[illegible]	[illegible]
APPROVED MSC	W J [illegible]	4-1-65
		DATE

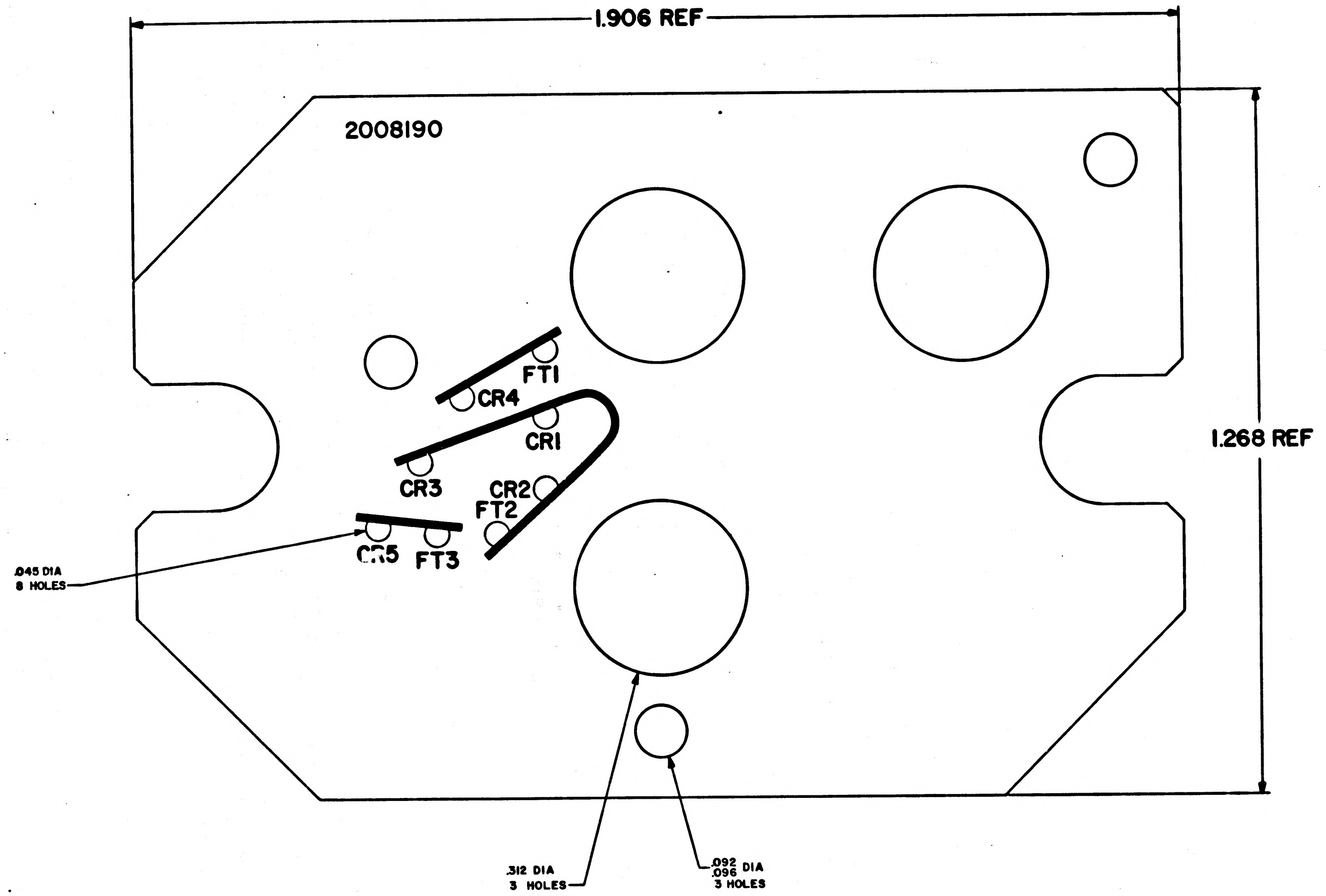
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD (BOTTOM)
SCT MODING

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008189
SCALE 10/1	—	SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17958						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DRAWING:
2008189 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007128	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

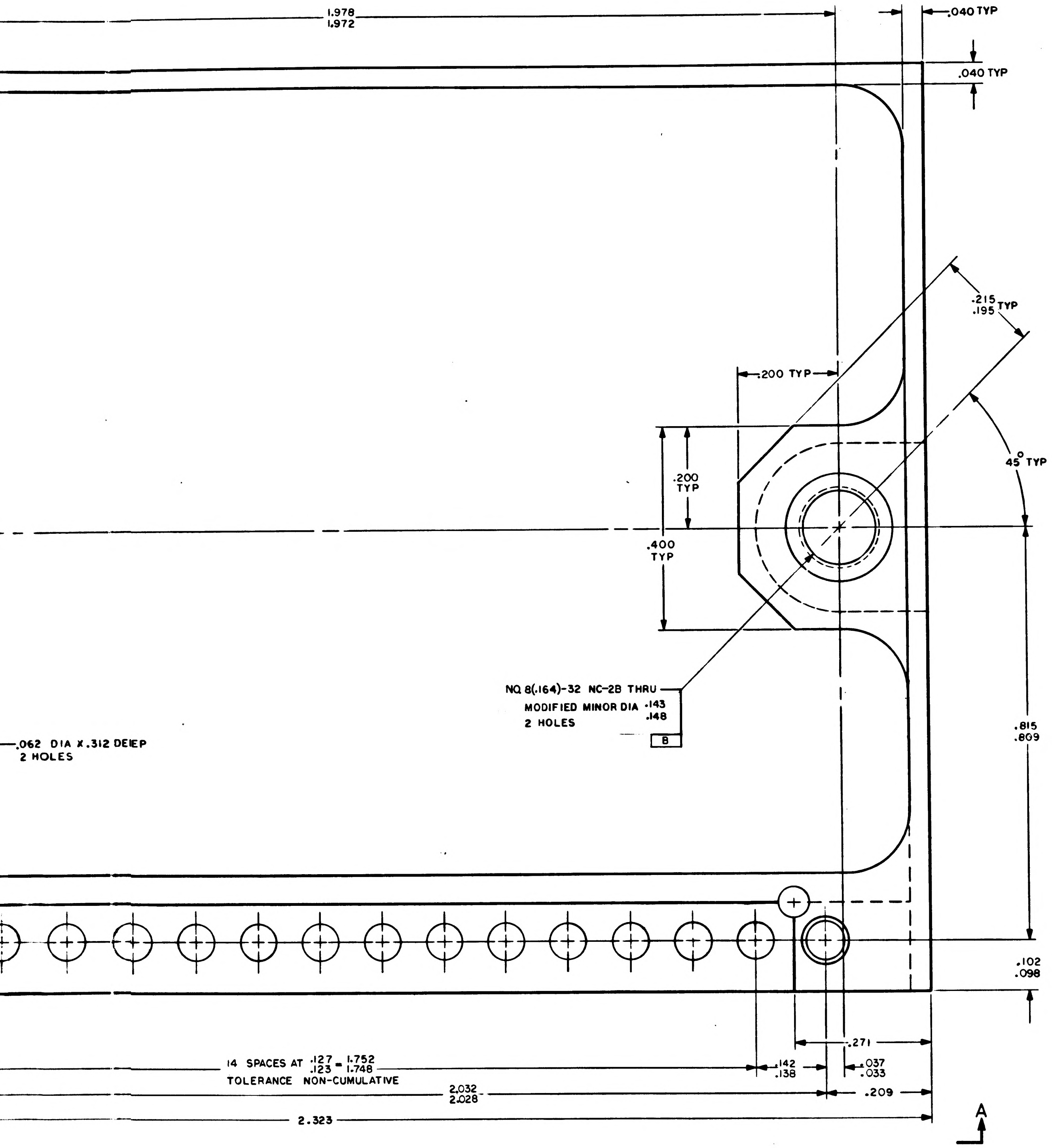
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	L Kraln	65
CHECKED		
APPROVED		26 MARCH 65
APPROVED		3/29/65
APPROVED MIT		1 Apr 65
APPROVED MSC		4-1-65
		DATE

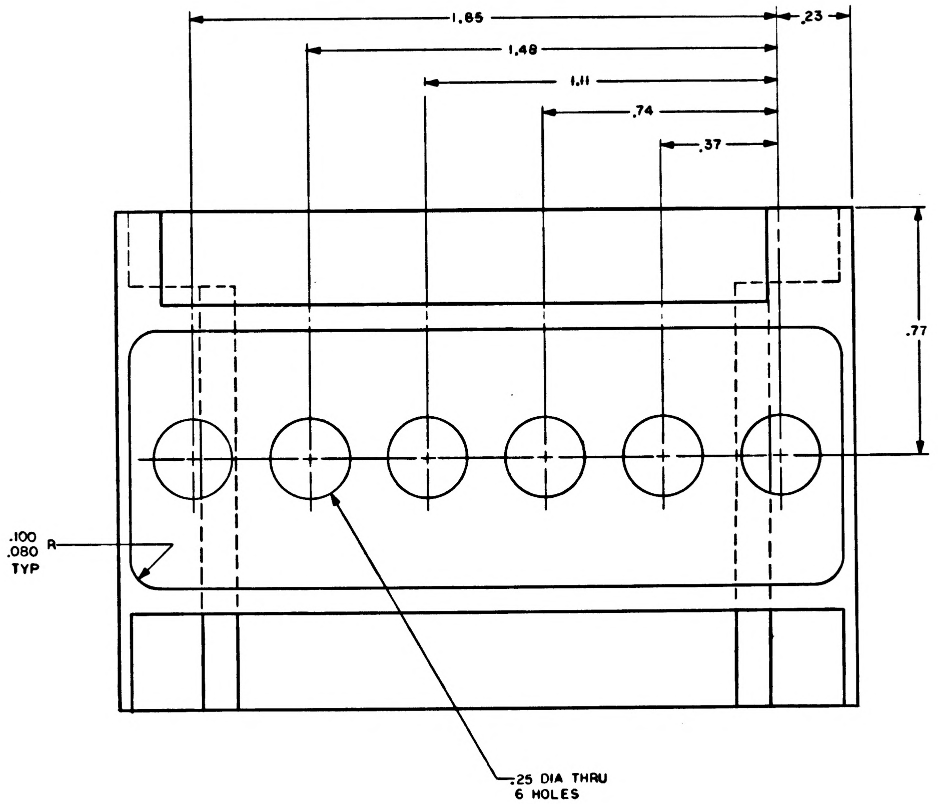
WIRING BOARD BOTTOM
SCT MODING

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008190
SCALE 10/1	—	SHEET 1 OF 1

REVISIONS 18110						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18602				WK



1.978
1.972
.040 TYP
.040 TYP
.215
.195 TYP
.200 TYP
45° TYP
.200
TYP
.400
TYP
NO. 8(.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
B
.062 DIA X .312 DEEP
2 HOLES
.815
.809
.102
.098
.271
14 SPACES AT .127 = 1.752
.123 = 1.748
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
2.032
2.028
.209
2.323
A



1.85
.23
1.48
1.11
.74
.37
.77
.100
.080 R
TYP
.25 DIA THRU
6 HOLES

VIEW A-A
SCALE 5/1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007112	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
AAC FILTER & MULTIVIBRATOR
800 CPS

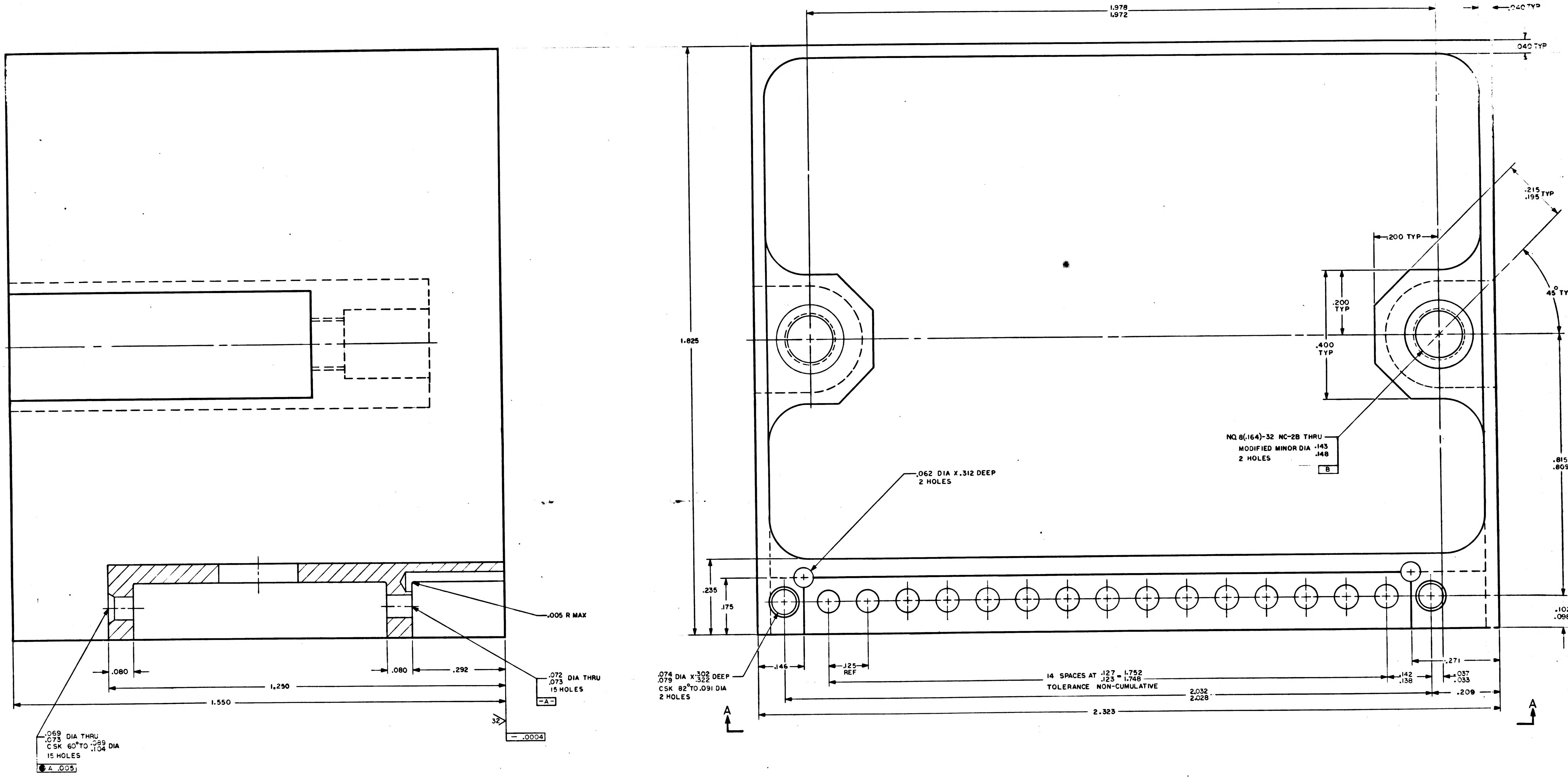
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008191

SCALE 10/1 SHEET 1 OF 1

2008191	A

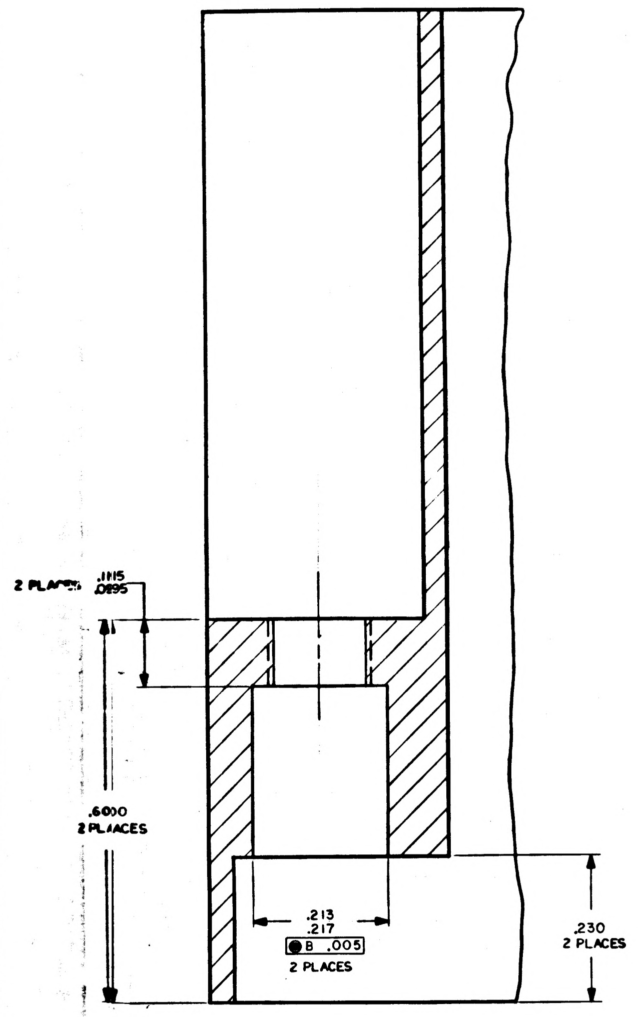
2008191 A

E3

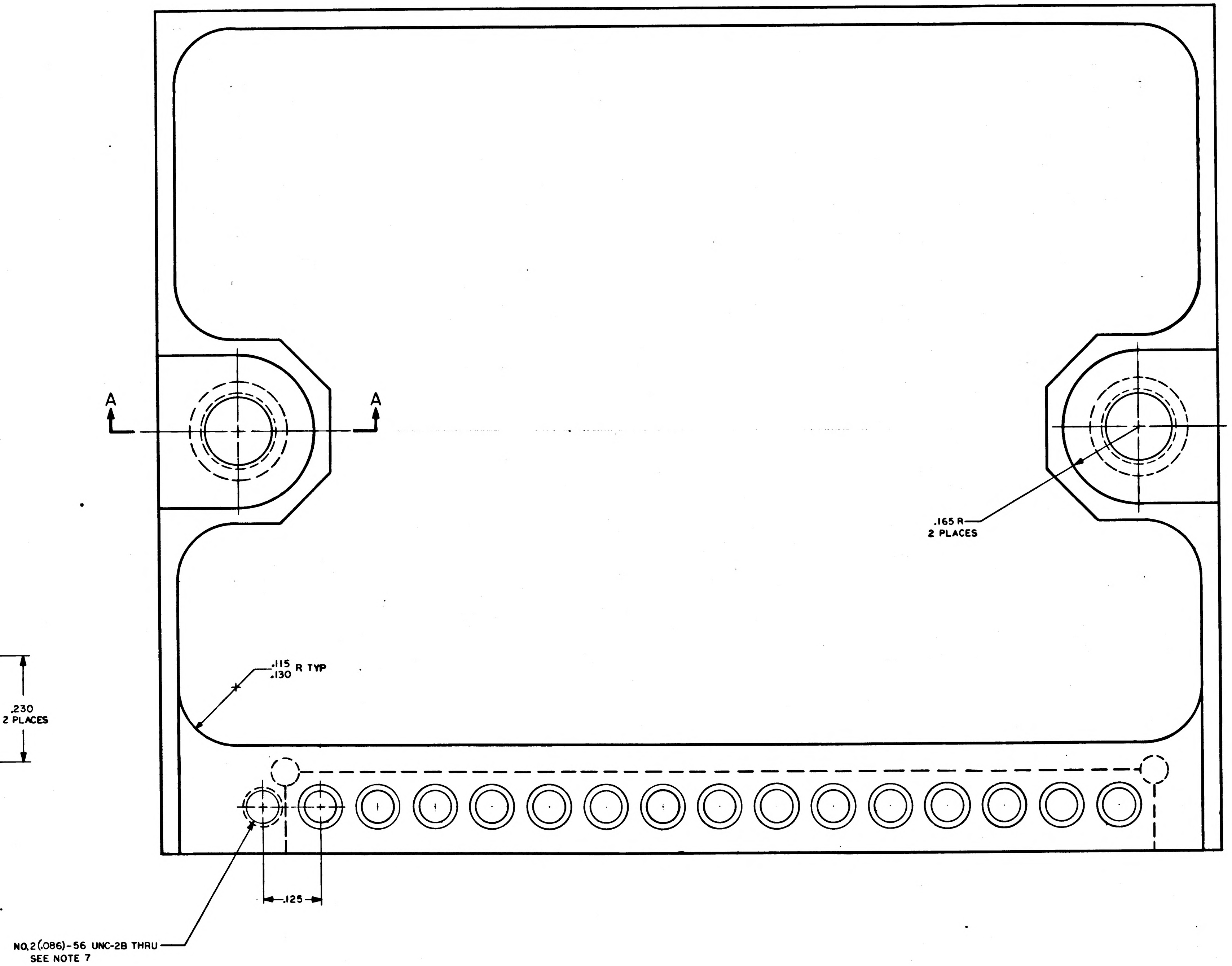

1.978
1.972
.040 TYP
.040 TYP
.215
.195 TYP
.200 TYP
45° TY
.200
TYP
.400
TYP
1.825
NO. 8(.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
B
.815
.809
.062 DIA X .312 DEEP
2 HOLES
.235
.175
.102
.098
.005 R MAX
.080
.080
.292
1.250
1.550
.072
.073 DIA THRU
15 HOLES
-A-
32
— .0004
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
15 HOLES
A .005
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.146
.125
REF
14 SPACES AT .127
.123 = 1.752
1.748
TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
2.032
2.028
.209
2.323
A
A

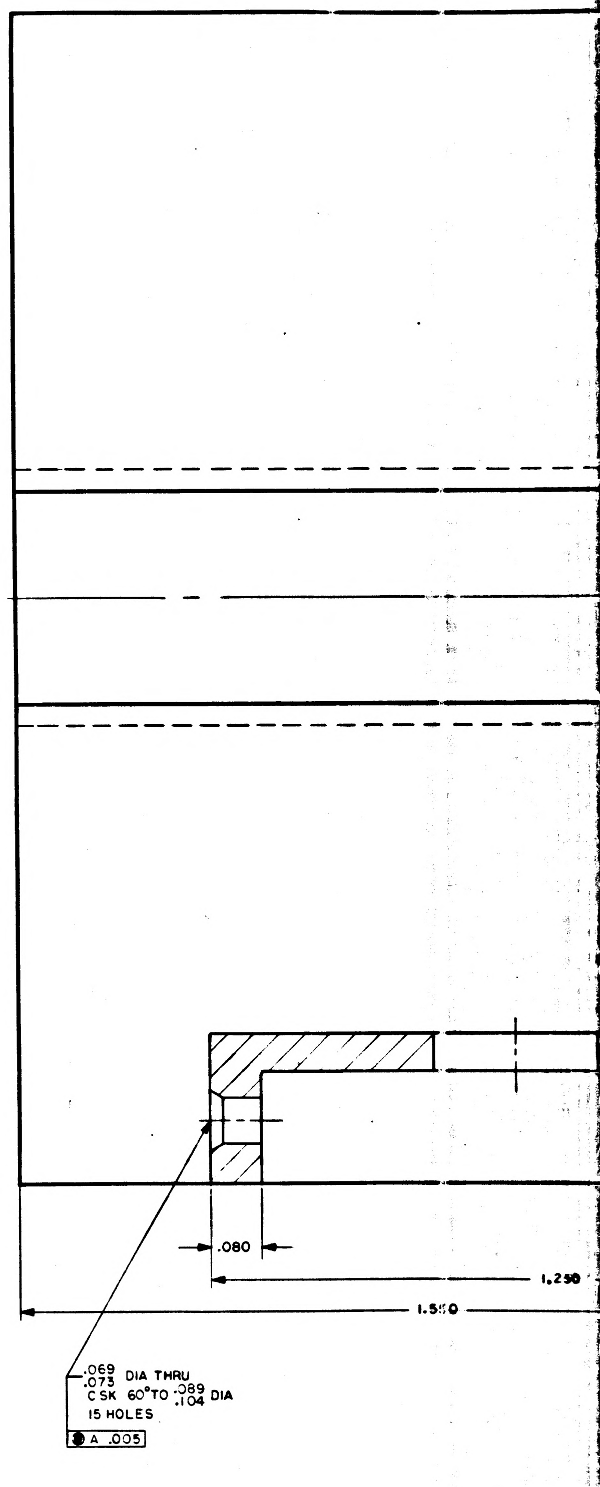
2008191 A

[illegible] DRAWINGS, SPECIFICATIONS, OR OTHER DATA [illegible] OTHER THAN IN CONNECTION WITH A DEFINITELY [illegible] OPERATION, THE UNITED STATES GOV- [illegible] RESPONSIBILITY NOR ANY OBLIGATION WHATSO- [illegible] GOVERNMENT MAY HAVE FORMULATED [illegible] THE SAID DRAWINGS, SPECIFICATIONS [illegible] BY IMPLICATION OR OTHERWISE AS IN [illegible] OR ANY OTHER PERSON OR CORPORATION [illegible] TO MANUFACTURE, USE, OR SELL [illegible] IN ANY WAY BE RELATED THERETO.


2 PLACES .1115 .0895
.6000 2 PLACES
.213 .217
B .005
2 PLACES
.230 2 PLACES

PARTIAL SECTION A-A

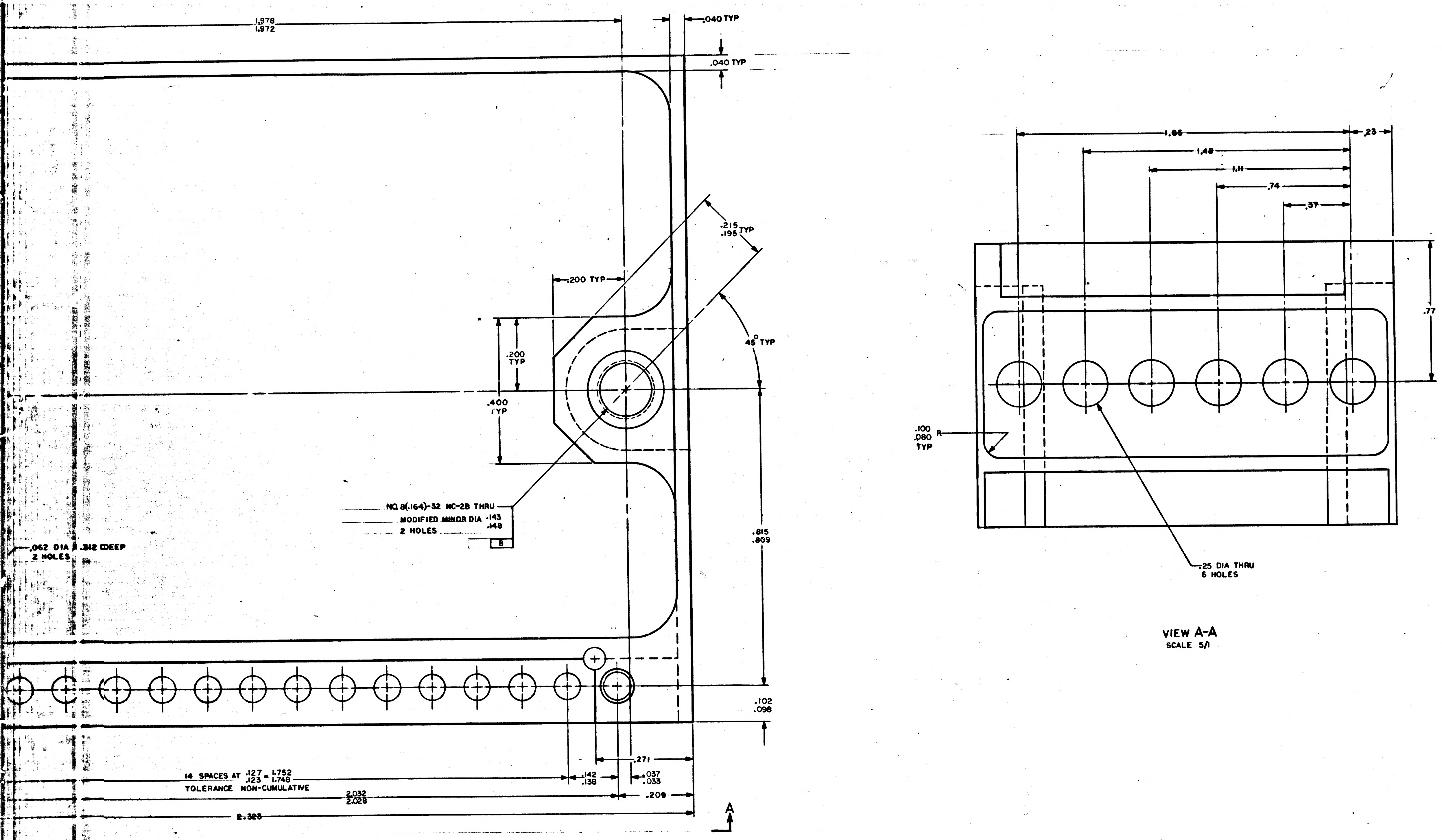

A
A
.165 R
2 PLACES
.115 .130 R TYP
.125
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7


.080
1.250
1.550
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
15 HOLES
A .005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. MATERIAL: MAGNESIUM ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND BREAK EDGES .005/.015
5. ALL SURFACES 125 UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL—M—45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE - COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

2008191	A


1.978
1.972
.040 TYP
.040 TYP
.215
.195 TYP
.200 TYP
45° TYP
.200
TYP
.400
TYP
NO. 8(.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
B
.062 DIA × .312 DEEP
2 HOLES
.815
.809
.102
.098
14 SPACES AT .127 = 1.752
.123 = 1.748
TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
2.032
2.028
.209
2.323
A
1.85
1.48
1.11
.74
.37
.23
.77
.100
.080 R
TYP
.25 DIA THRU
6 HOLES

VIEW A-A
SCALE 5/1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007112	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XX ± .02 .XXX ± .005 ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] [illegible]
CHECKED [illegible] [illegible]
APPROVED [illegible] [illegible]
APPROVED [illegible] [illegible]
APPROVED MIT [illegible] [illegible]
APPROVED MSC [illegible] [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
AAC FILTER & MULTIVIBRATOR
800 CPS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008191
SCALE 10/1
SHEET 1 OF 1

3#

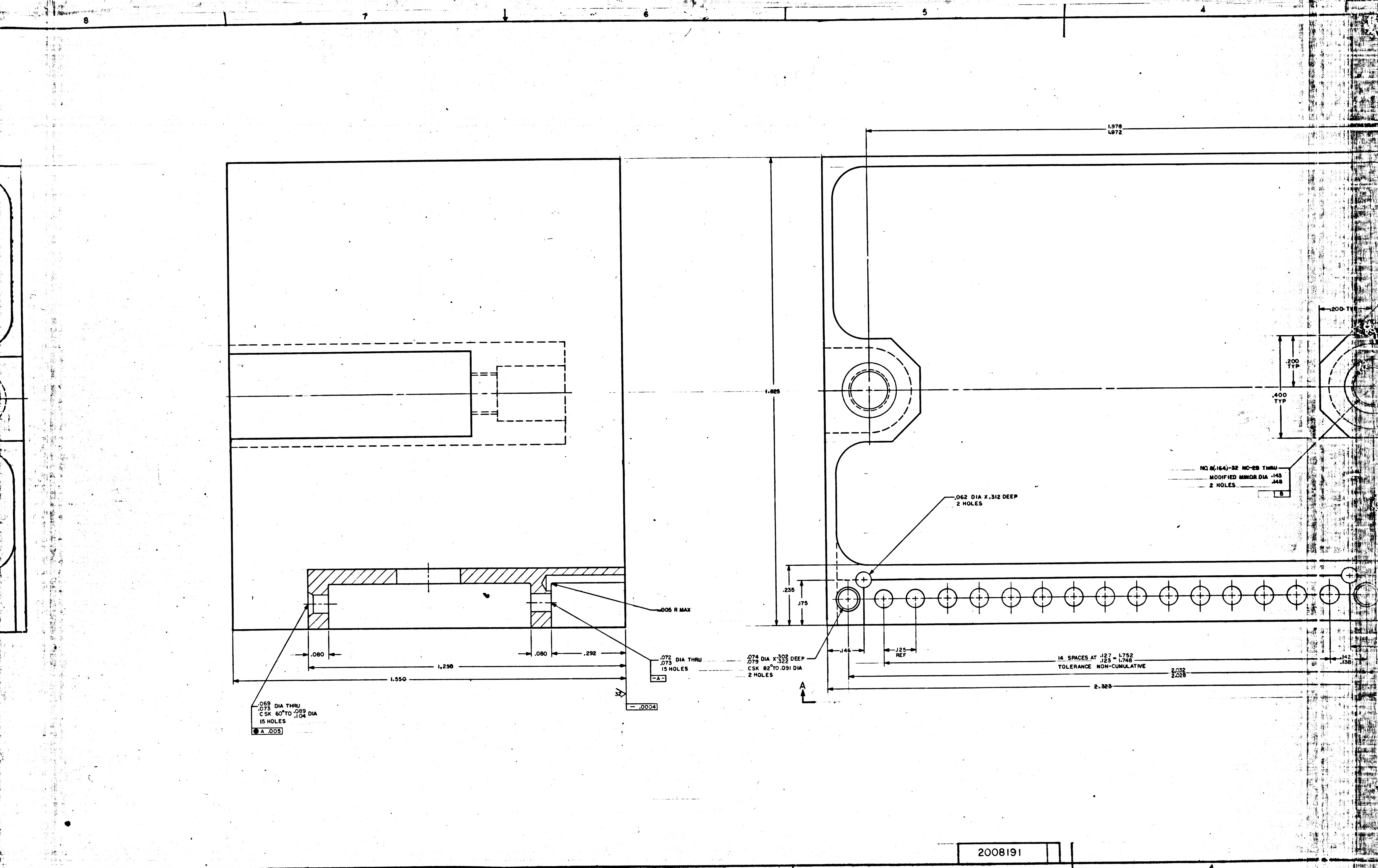
2008191

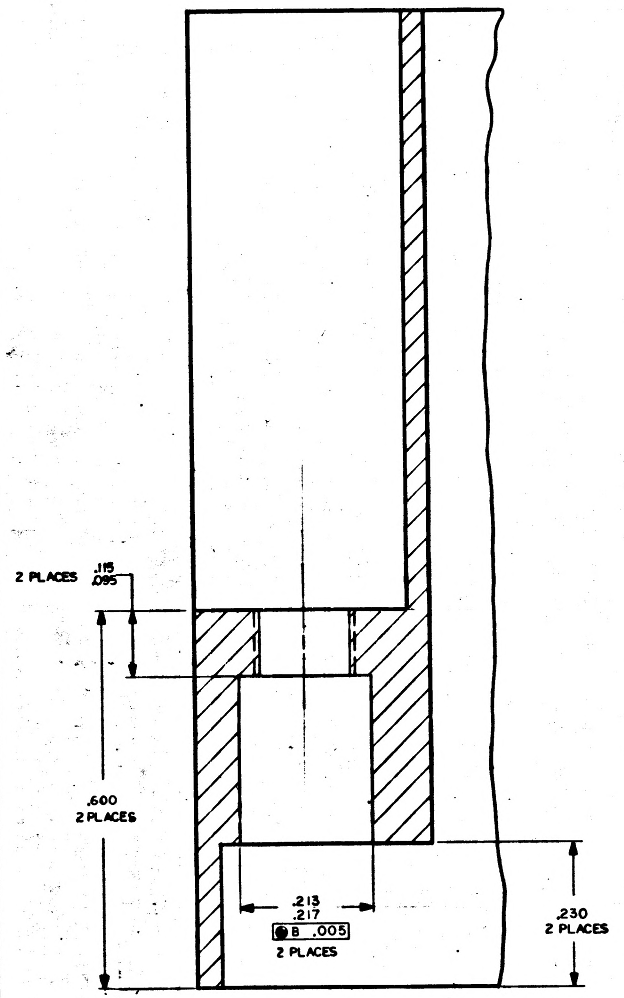
2008191

2008191

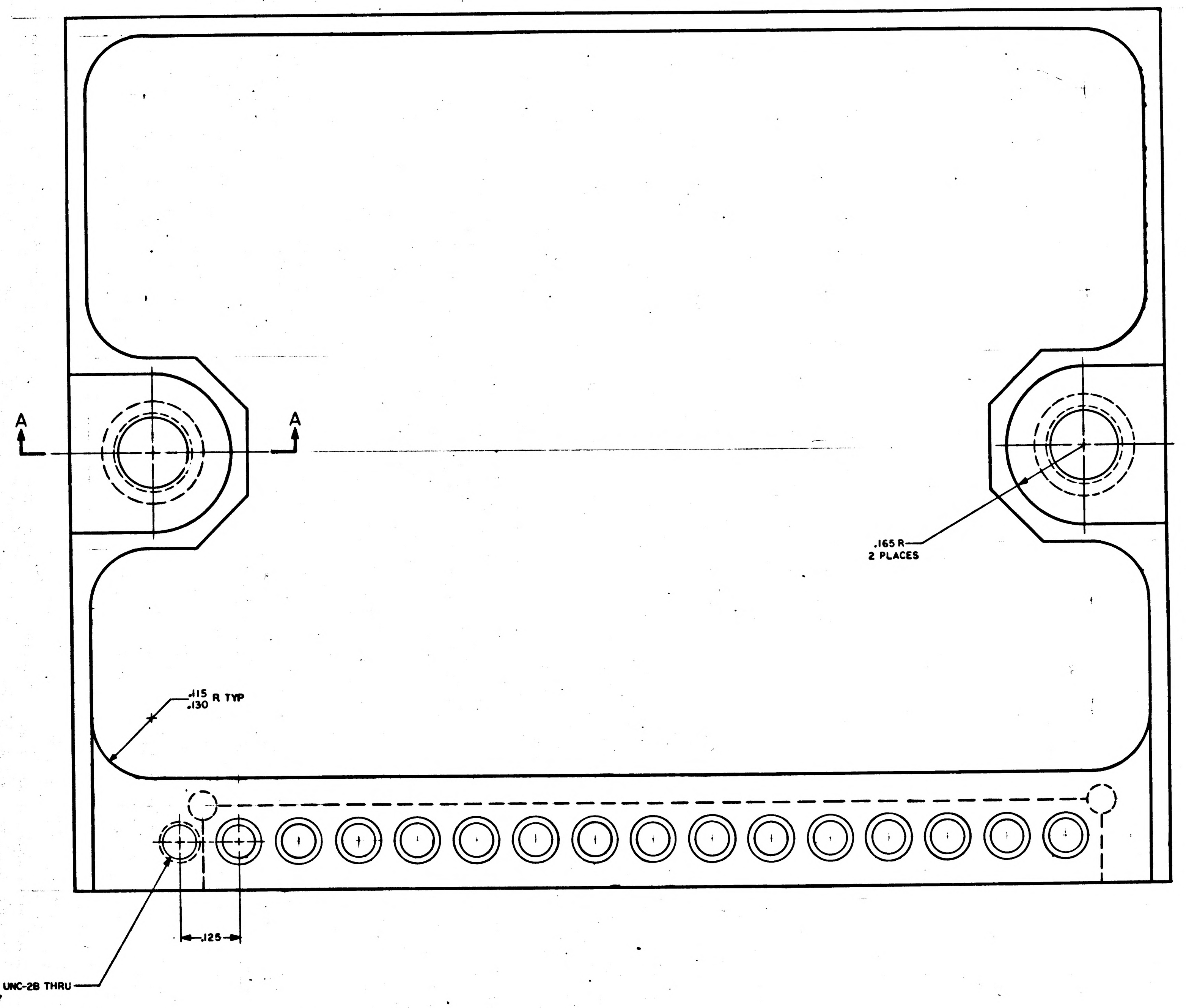
REVISIONS

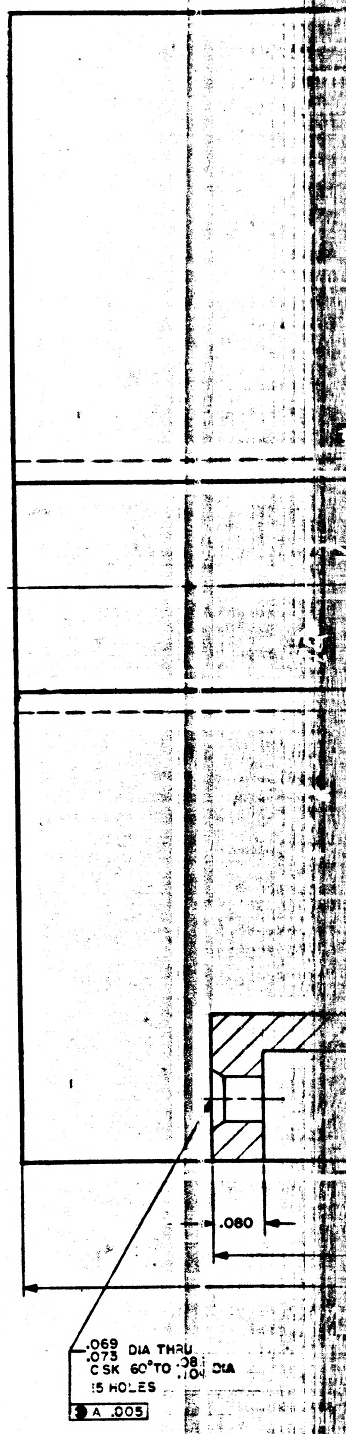
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


8
7
6
5
4
1.978
1.972
1.825
.200 TYP
.400 TYP
.200 TYP
NO. 8(.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
B
.062 DIA X .312 DEEP
2 HOLES
.005 R MAX
.235
.175
.080
.080
.292
1.250
1.550
.072 .073 DIA THRU
15 HOLES
-A-
32
— .0004
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
15 HOLES
● A .005
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
A
.146
.125 REF
14 SPACES AT .127 .123 = 1.752 1.748
TOLERANCE NON-CUMULATIVE
.142 .138
2.032 2.028
2.323


2 PLACES .115
.095
.600
2 PLACES
.213
.217
B .005
2 PLACES
.230
2 PLACES

PARTIAL SECTION A-A


A
A
.165 R
2 PLACES
.115
.130 R TYP
.125
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7


.080
.069
.073 DIA THRU
CSK 60° TO .081
.104 DIA
15 HOLES
A .005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. MATERIAL: MAGNESIUM ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND BREAK EDGES .005/.015
5. ALL SURFACES 125 UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL—M—45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

2008191

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS 17958						
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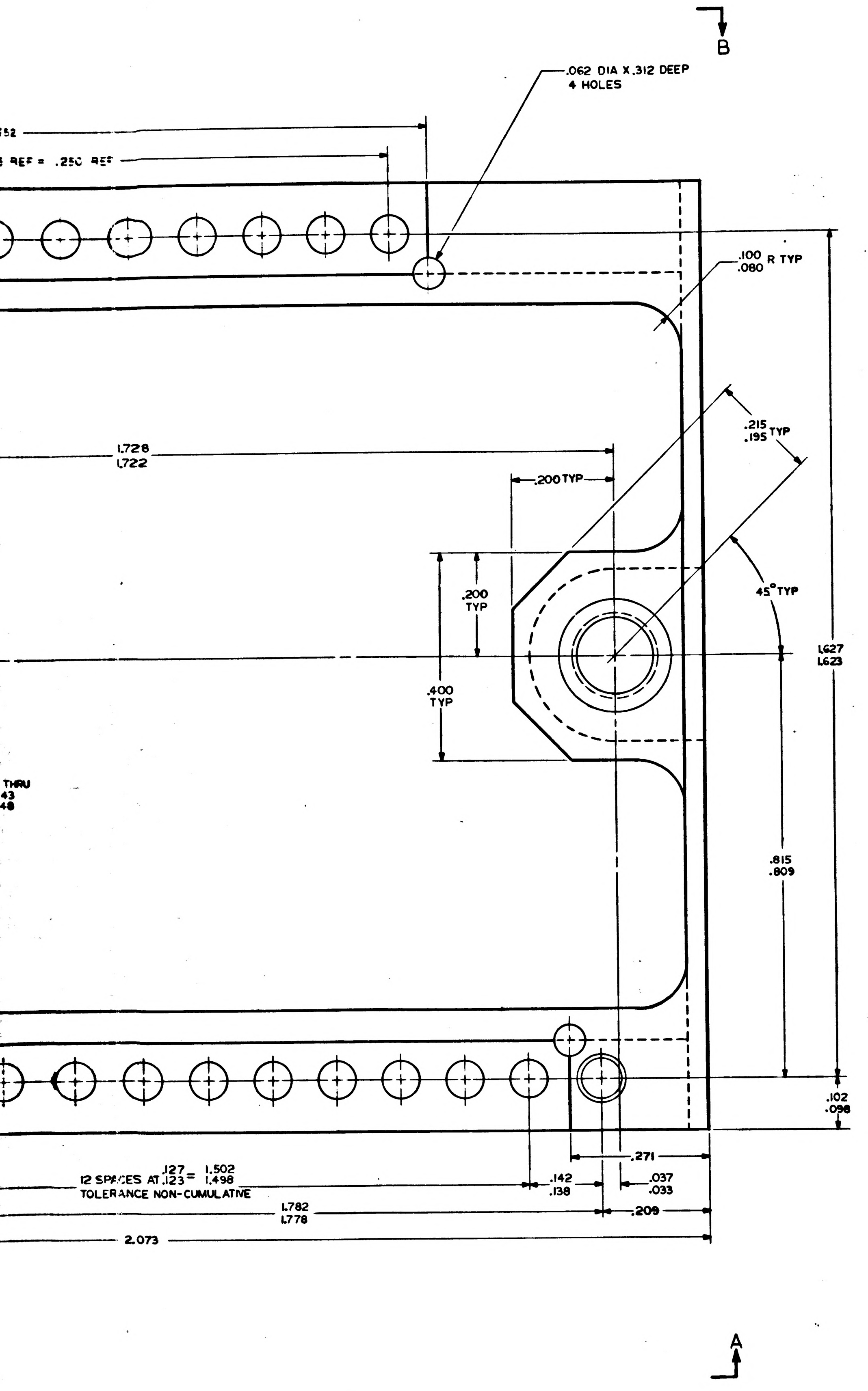
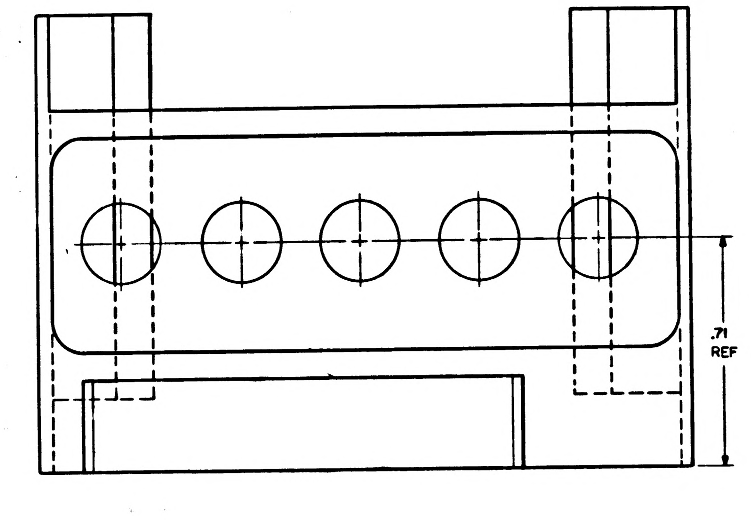
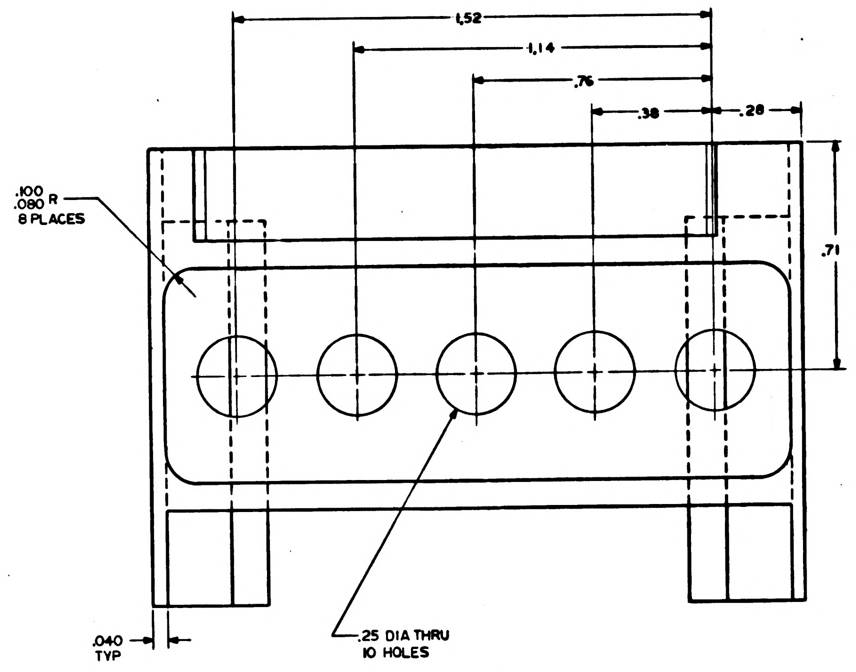


B
.062 DIA X .312 DEEP
4 HOLES
52
REF = .250 REF
.100
.080 R TYP
1.728
1.722
.200 TYP
.215
.195 TYP
45° TYP
.200
TYP
.400
TYP
1.627
1.623
THRU
43
48
.815
.809
.102
.098
.271
12 SPACES AT .127/.123 = 1.502/1.498
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
1.782
1.778
.209
2.073
A



VIEW B-B
SCALE 5/1



1.52
1.14
.76
.38
.28
.100
.080 R
8 PLACES
.71
.040
TYP
.25 DIA THRU
10 HOLES

VIEW A-A
SCALE 5/1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007128	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.02 XXX ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Crowley 17 MAR 65
CHECKED
APPROVED
APPROVED 3/29/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

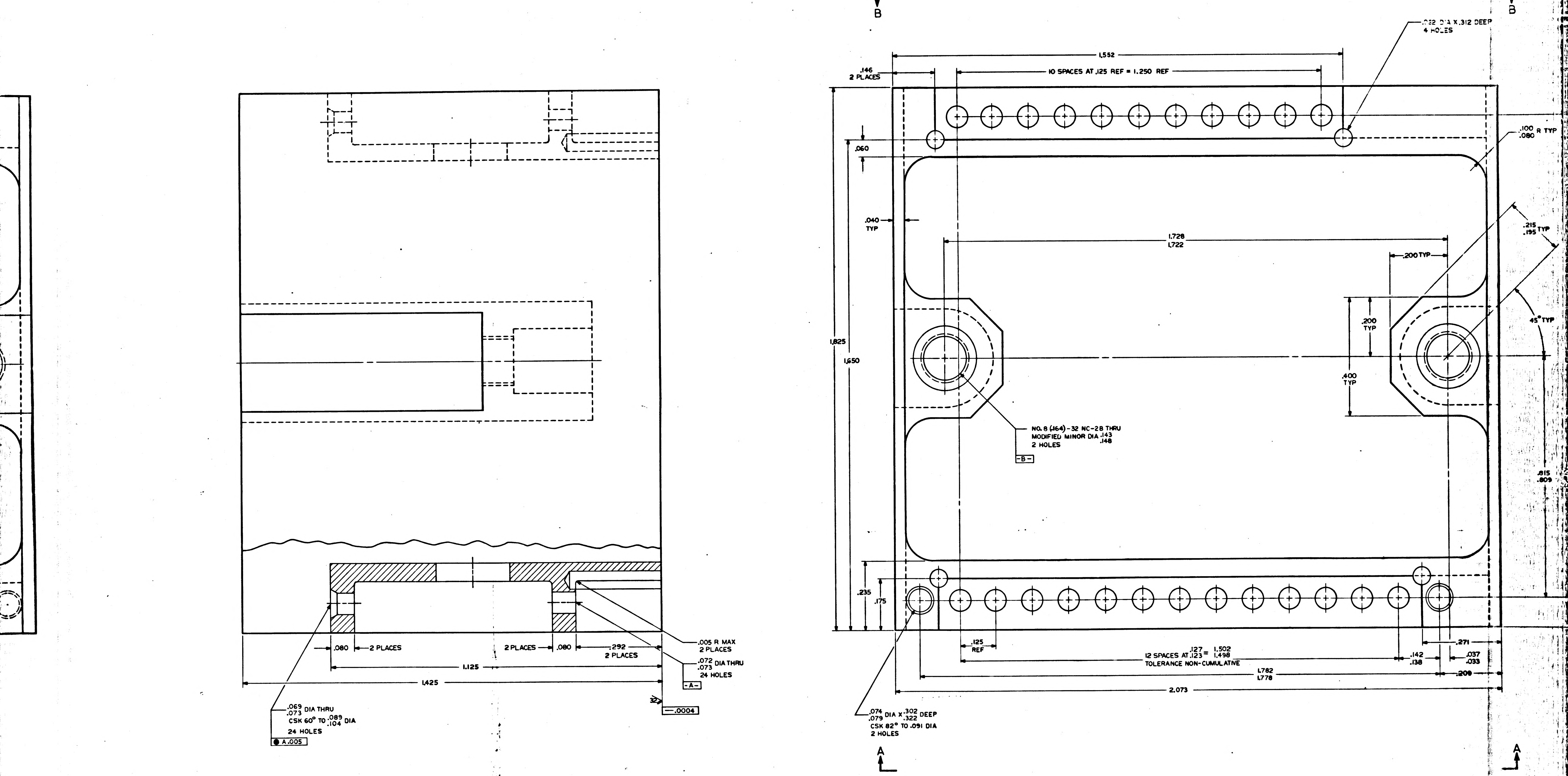
FRAME
SCT MODING

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008193
SCALE 10/1
SHEET 1 OF 1

2008193 A

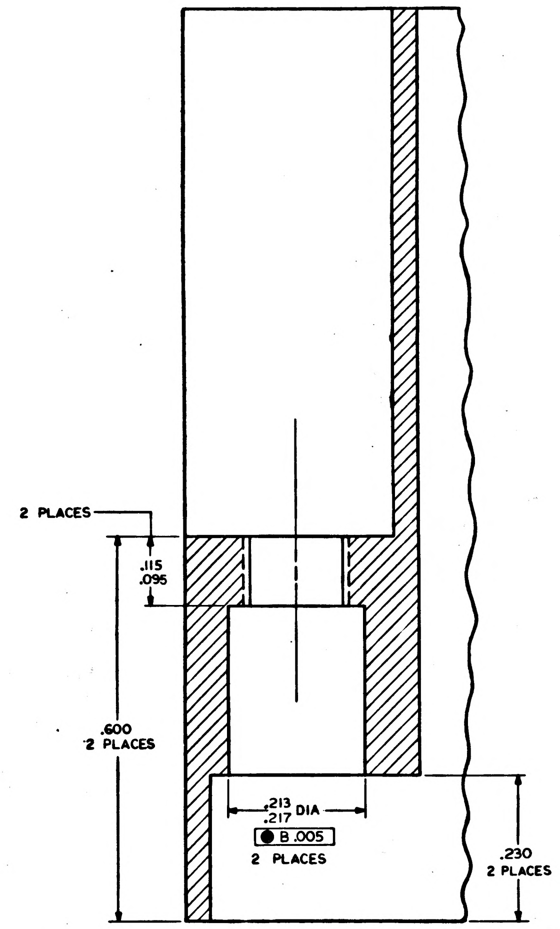
3

F-3

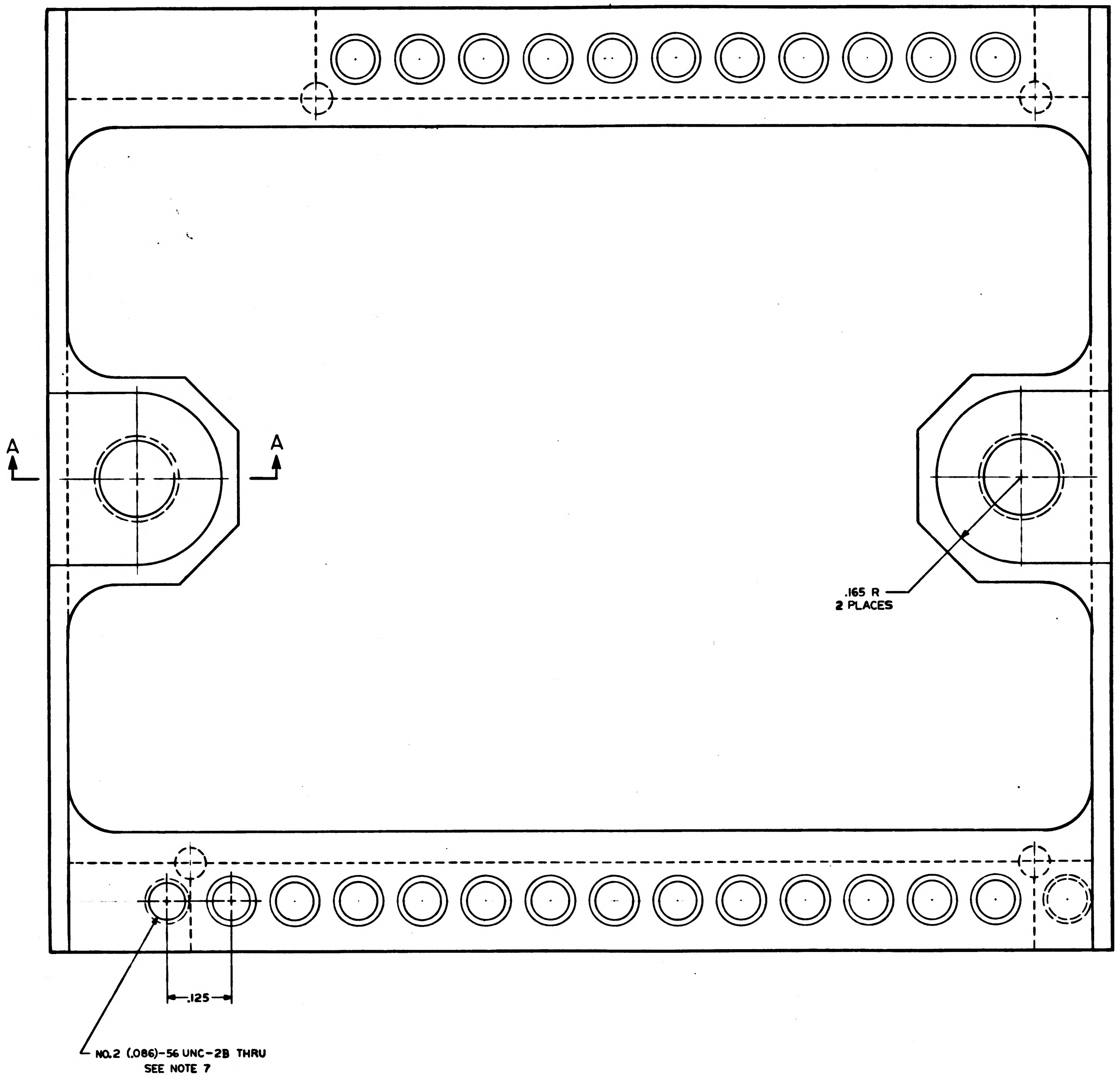

.080
2 PLACES
2 PLACES
.080
.292
2 PLACES
1.125
1.425
.005 R MAX
2 PLACES
.072
.073 DIA THRU
24 HOLES
-A-
32
—.0004
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
24 HOLES
● A.005
B
B
.062 DIA X .312 DEEP
4 HOLES
1.552
.146
2 PLACES
10 SPACES AT .125 REF = 1.250 REF
.100
.080 R TYP
.060
.040
TYP
1.728
1.722
.200 TYP
.215
.195 TYP
45° TYP
1.825
1.650
.200
TYP
.400
TYP
NO. 8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
-B-
.815
.809
.235
.175
.125
REF
12 SPACES AT .127
.123 = 1.502
1.498
TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
1.782
1.778
.209
2.073
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
A
A

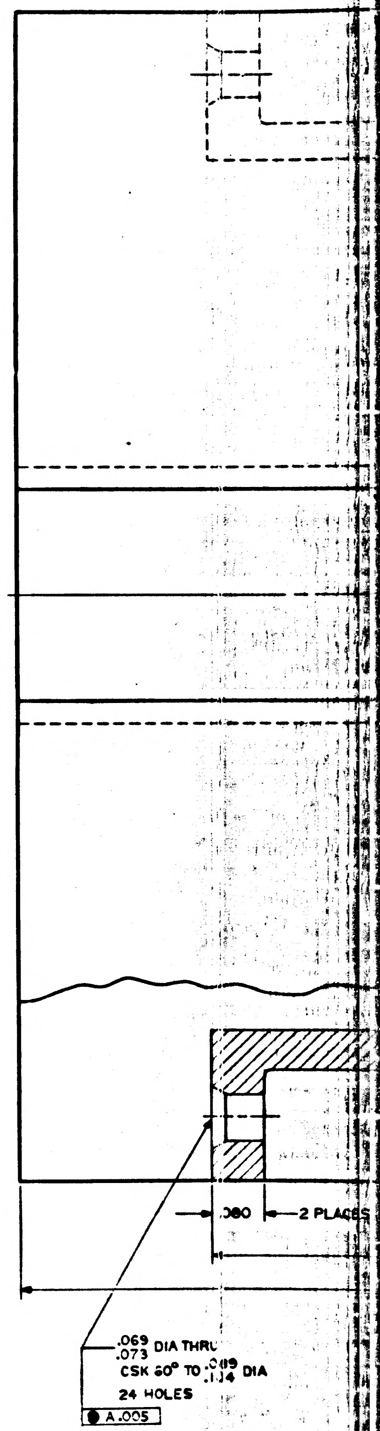
2008193 | A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


2 PLACES
.115
.095
.600
2 PLACES
.213
.217 DIA
● B .005
2 PLACES
.230
2 PLACES

PARTIAL SECTION A-A

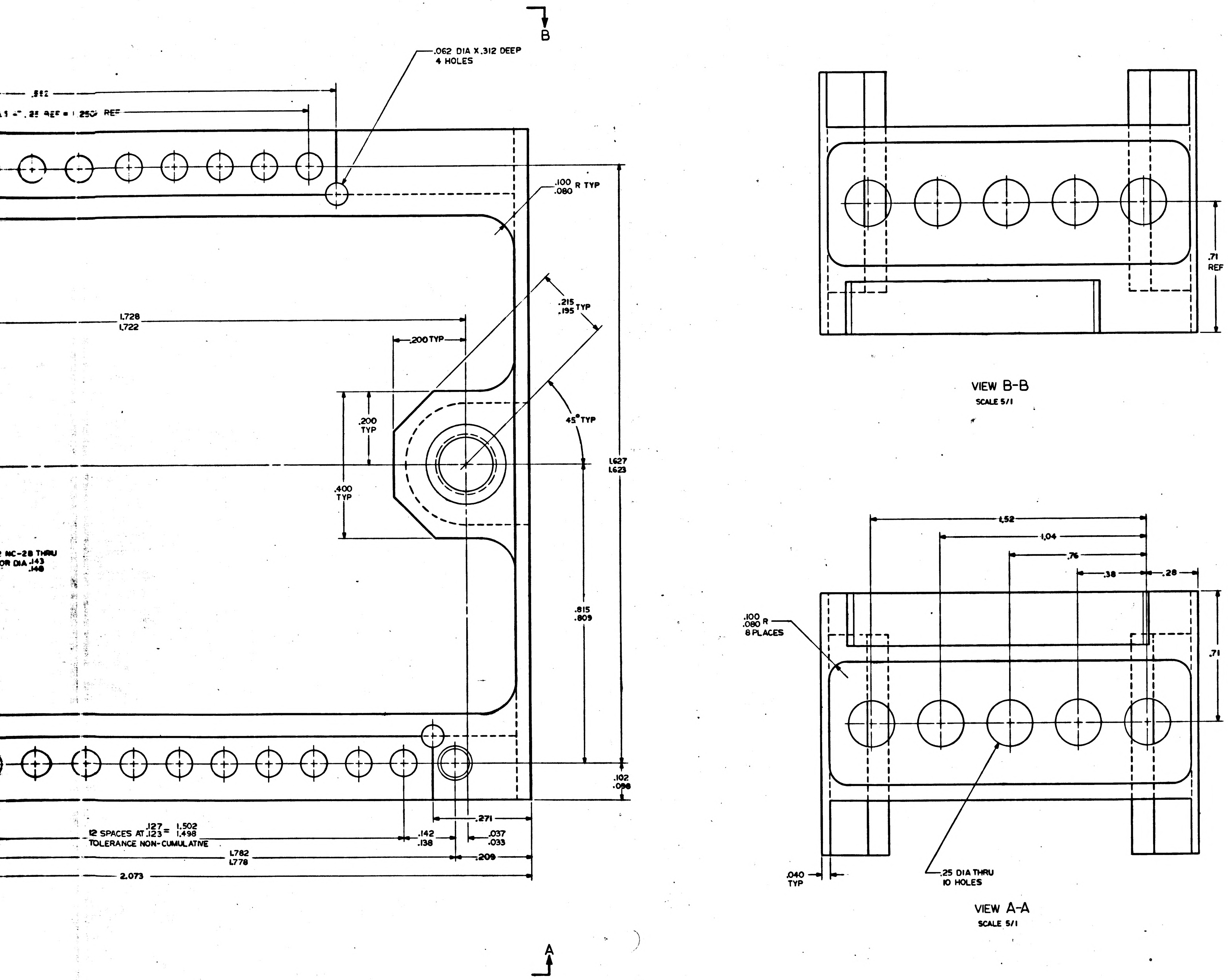

A
A
.165 R
2 PLACES
.125
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7


.080
2 PLACES
.069
.073 DIA THRU
CSK 60° TO .089
.114 DIA
24 HOLES
● A .005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{}^{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISIONS				


B
.062 DIA X .312 DEEP
4 HOLES
.882
.25 REF = 1.250 REF
.100
.080 R TYP
1.728
1.722
.200 TYP
.215
.195 TYP
45° TYP
.200
TYP
.400
TYP
1.627
1.623
NC-28 THRU
OR DIA .143
.148
.815
.809
.102
.098
.271
12 SPACES AT .127
.123 = 1.502
1.498
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
1.782
1.778
.209
2.073
A
.71
REF
VIEW B-B
SCALE 5/1
1.52
1.04
.76
.38
.28
.100
.080 R
8 PLACES
.71
.040
TYP
.25 DIA THRU
10 HOLES
VIEW A-A
SCALE 5/1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007128	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.02 .XXX ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Crowley 17 MAR 65
CHECKED 26 Mar 65
APPROVED 26 Mar 65
APPROVED 3/29/65
APPROVED MIT
APPROVED MSC 4-1-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

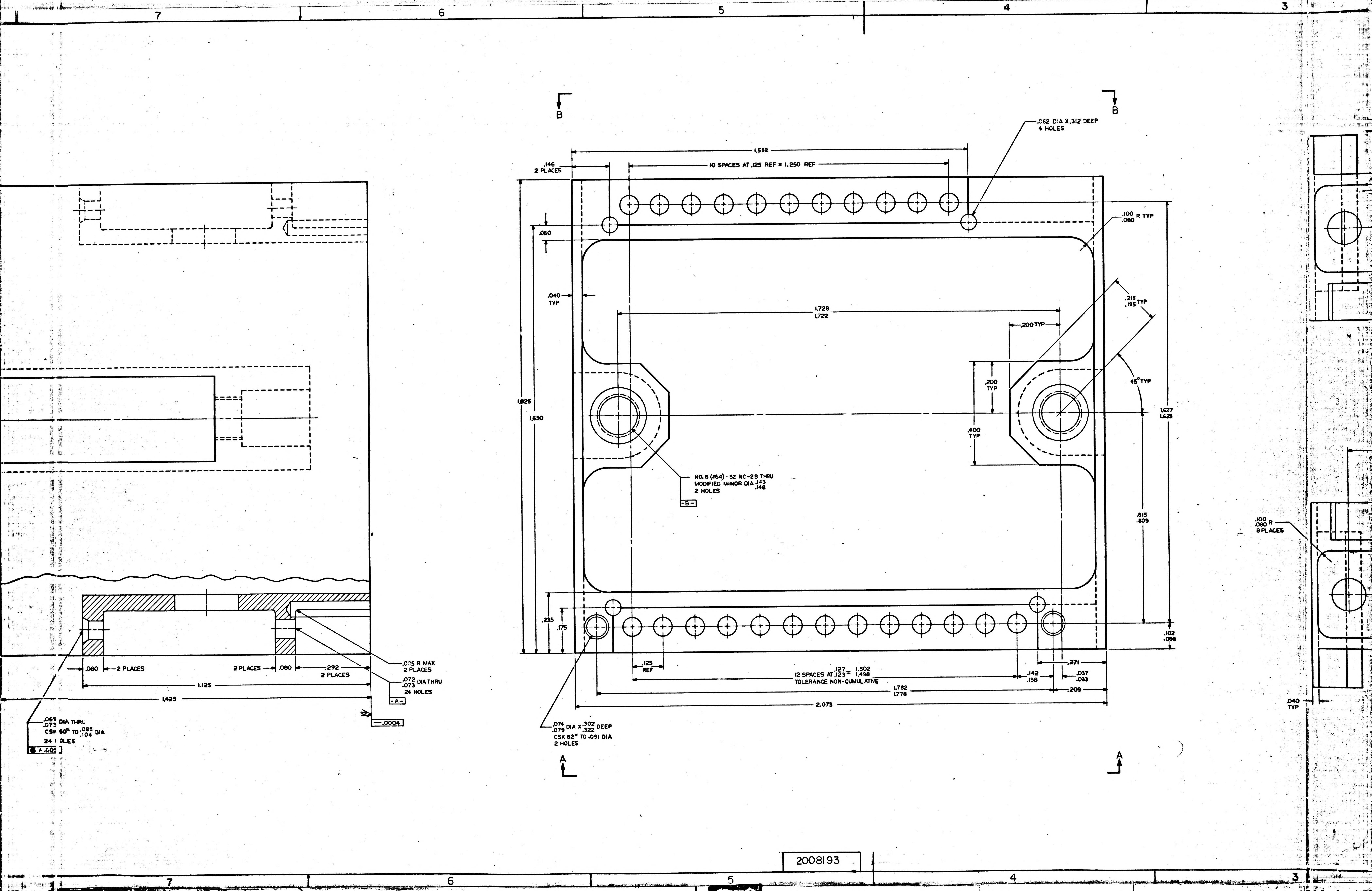
FRAME
SCT MODING

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008193
SCALE 10/1
SHEET 1 OF 1

2008193

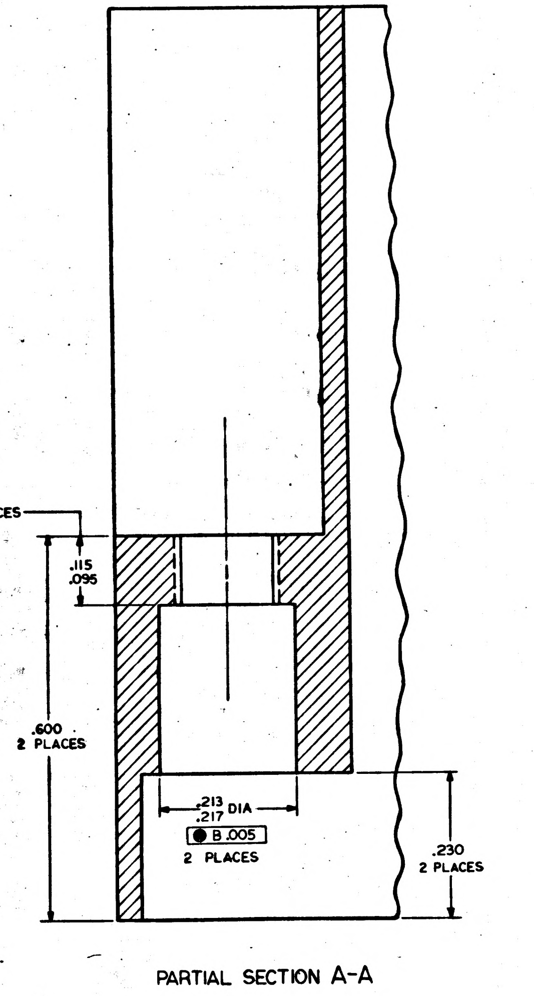
2008193

E-3

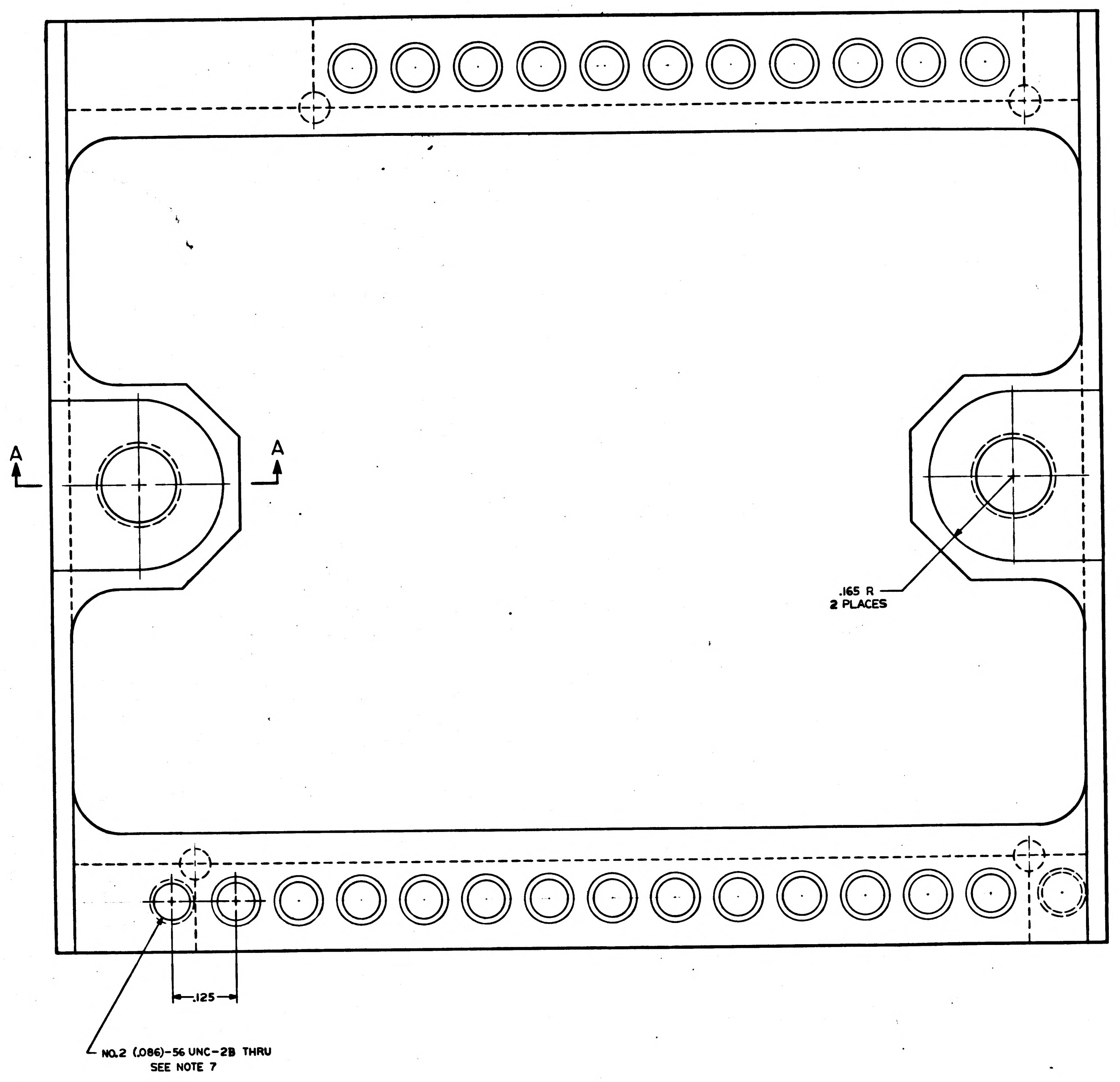
7
6
5
4
3
B
B
.062 DIA X .312 DEEP
4 HOLES
1.552
.146
2 PLACES
10 SPACES AT .125 REF = 1.250 REF
.100
.080 R TYP
.060
.040
TYP
1.728
1.722
.215
.195 TYP
.200 TYP
.200
TYP
45° TYP
1.825
1.650
1.627
1.623
.400
TYP
NO. 8 (.164) - 32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
-B-
.815
.809
.235
.175
.102
.098
.125
REF
12 SPACES AT .127
.123 = 1.502
1.498
TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
1.782
1.778
.209
2.073
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
A
A
.080
2 PLACES
2 PLACES
.080
.292
2 PLACES
1.125
1.425
.005 R MAX
2 PLACES
.072
.073 DIA THRU
24 HOLES
-A-
32
—.0004
.069
.073 DIA THRU
CSK 60° TO .085
.104 DIA
24 HOLES
A .005
.100
.080 R
8 PLACES
.040
TYP

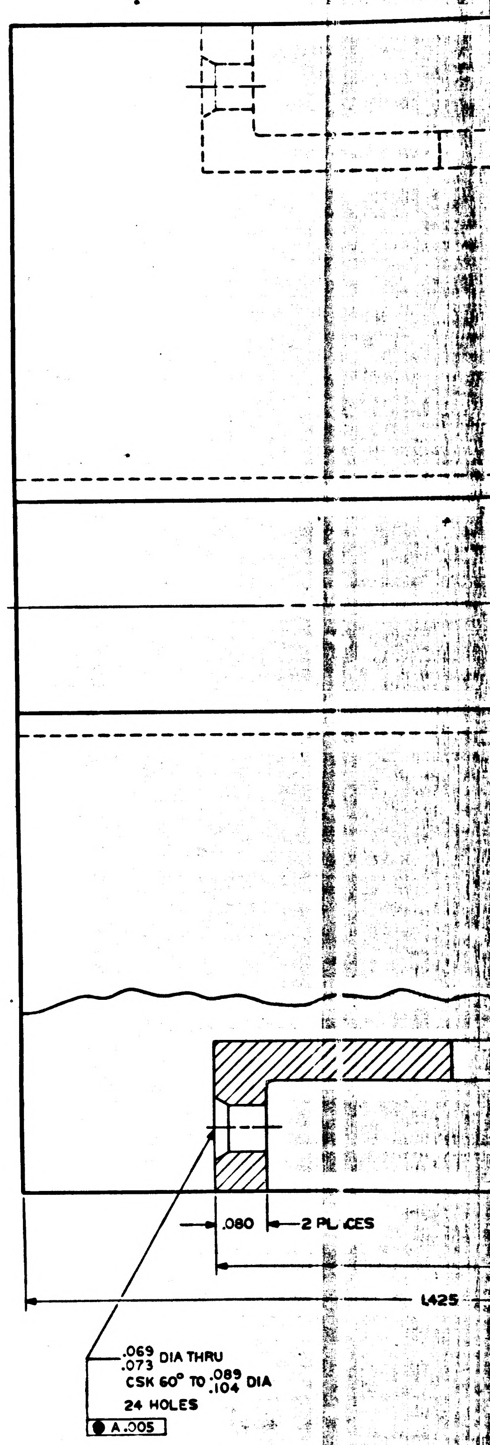
2008193

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


2 PLACES
.115
.095
.600
2 PLACES
.213
.217 DIA
● B .005
2 PLACES
.230
2 PLACES

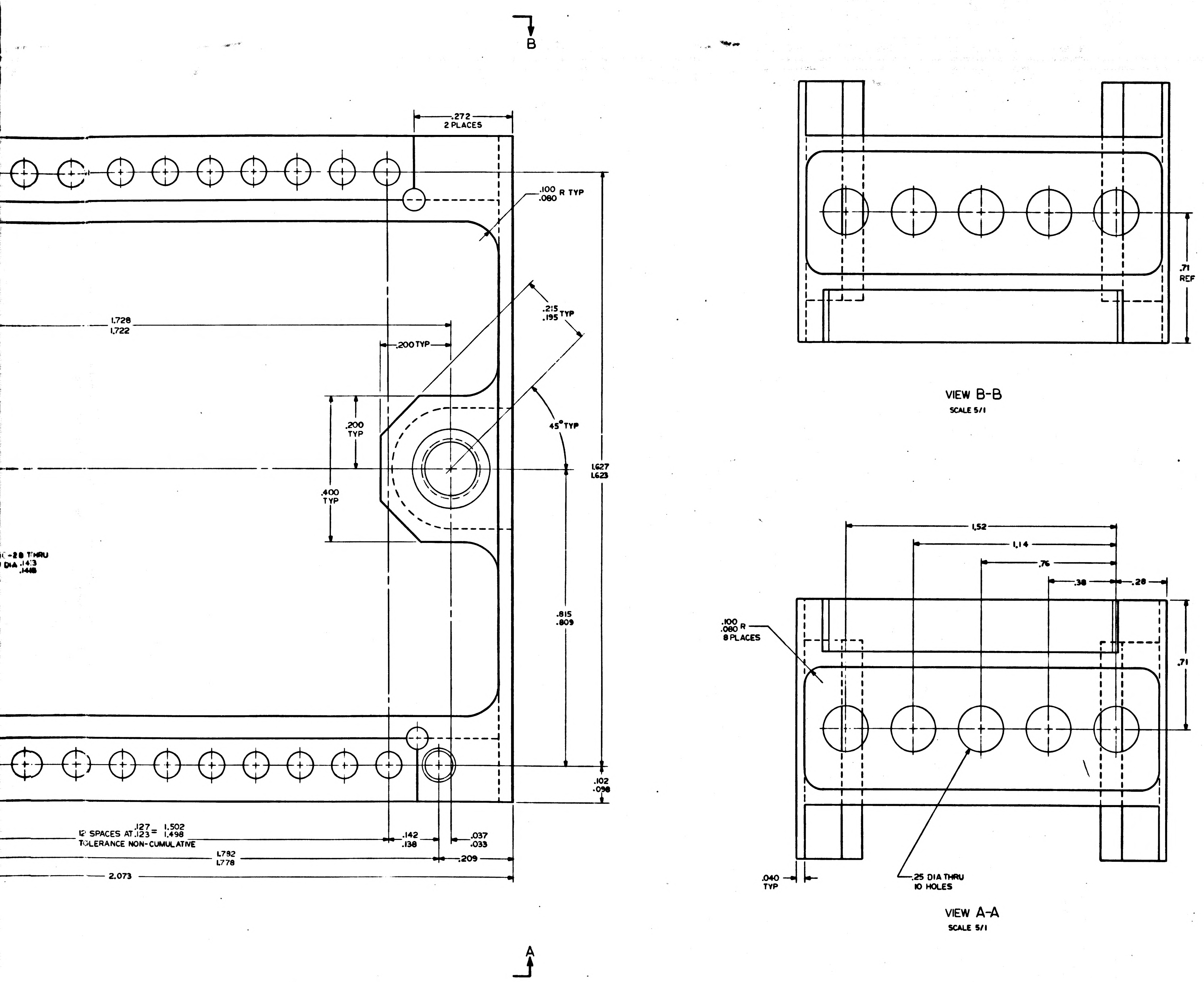
PARTIAL SECTION A-A


A
A
.165 R
2 PLACES
.125
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7


.080
2 PLACES
1.425
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
24 HOLES
● A .005

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE.COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS 22753						



B
A
.272
2 PLACES
.100
.080 R TYP
.215
.195 TYP
45° TYP
1.728
1.722
.200 TYP
.200
TYP
.400
TYP
1.627
1.623
.815
.809
.102
.098
-28 THRU
DIA .143
.1418
12 SPACES AT .127/.123 = 1.502/1.498
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
1.792
1.778
.209
2.073
.71
REF
1.52
1.14
.76
.38
.28
.71
.100
.080 R
8 PLACES
.040
TYP
.25 DIA THRU
10 HOLES

VIEW B-B
SCALE 5/1

VIEW A-A
SCALE 5/1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007117	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.02 .XXX ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN C. Johnson 18 Aug 65
CHECKED R. L. Kingsbury 2 Sept 65
APPROVED Rutzer 14 Sept 65
APPROVED 14 Sept 65
APPROVED W. Kupfer
MIT
NOT REQUIRED PER LETTER
PP7-65-612
MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

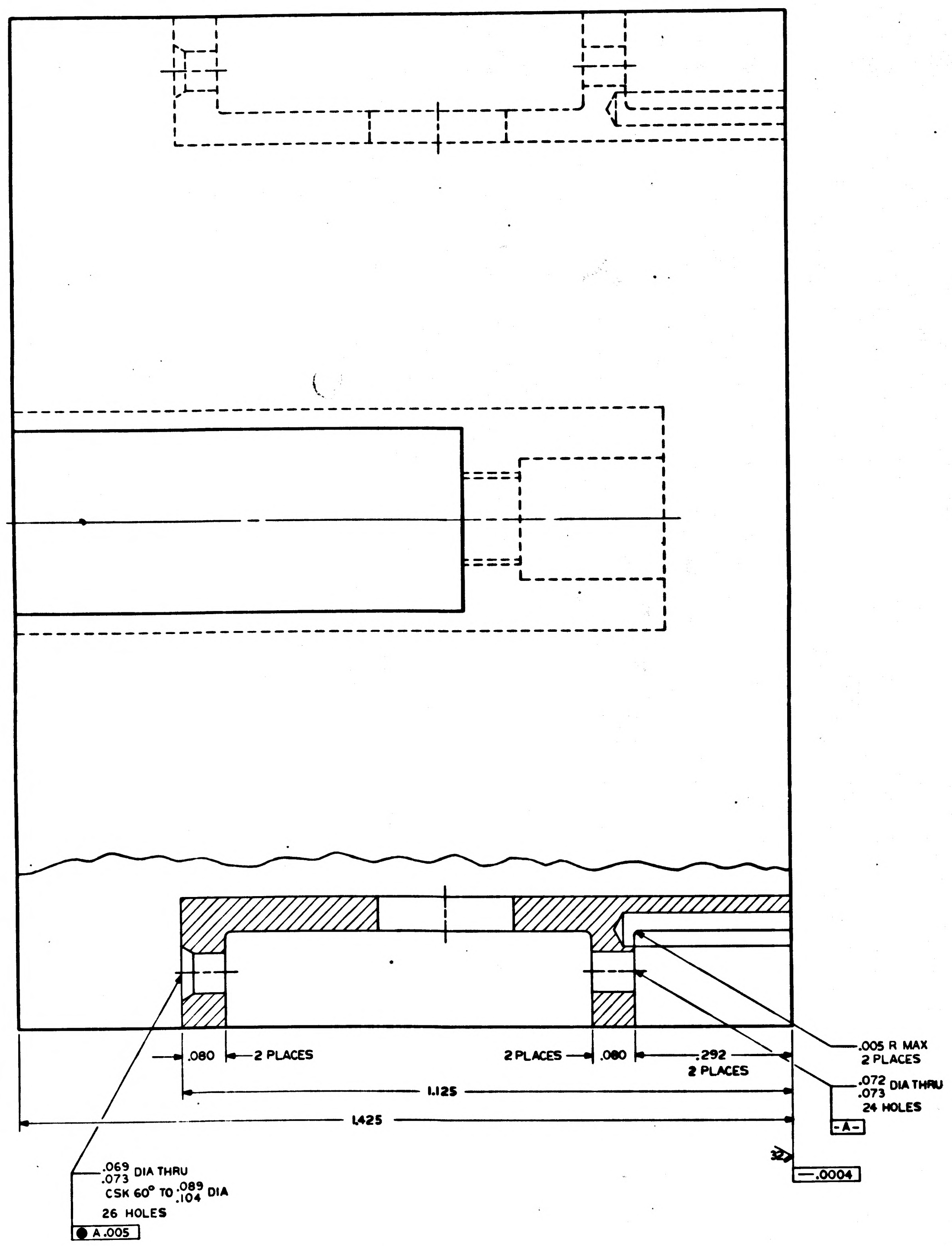
FRAME
IMU AUXILIARY

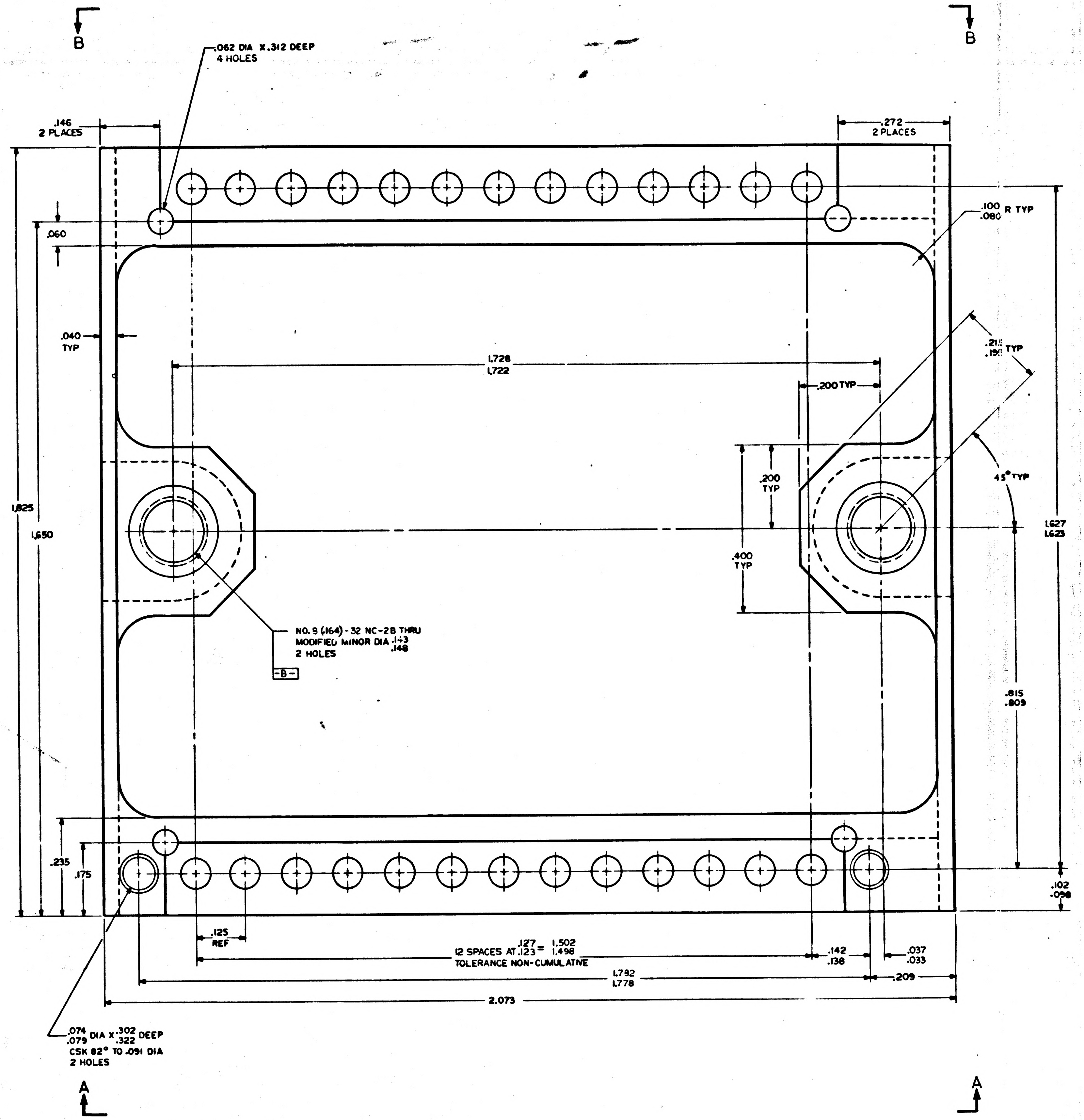
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008194
SCALE 10/1
SHEET 1 OF 1

2008194

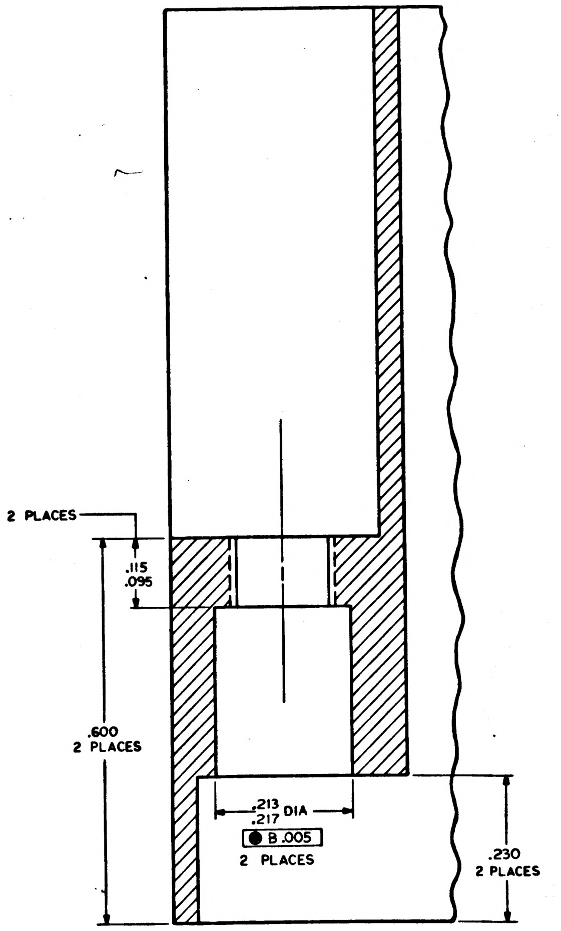
2008194

3H

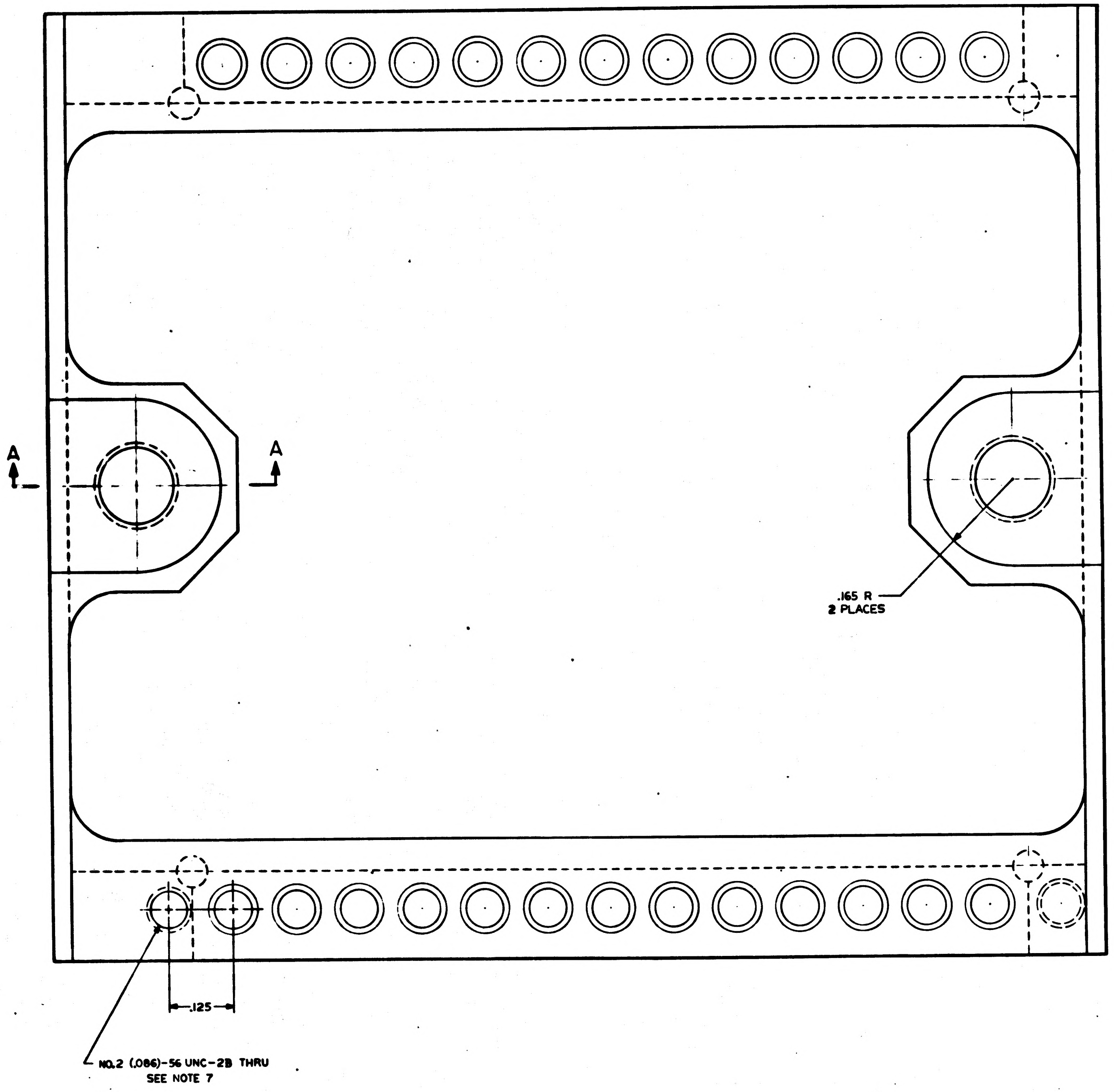

.080
2 PLACES
2 PLACES
.080
.292
2 PLACES
1.125
1.425
.005 R MAX
2 PLACES
.072 .073 DIA THRU
24 HOLES
-A-
32
—.0004
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
26 HOLES
● A .005

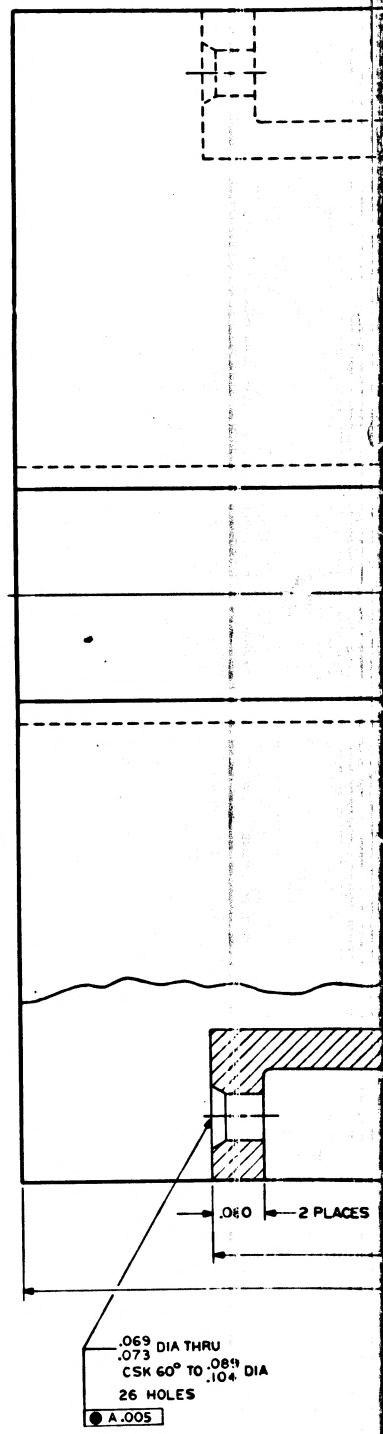

B
B
.062 DIA X .312 DEEP
4 HOLES
.146
2 PLACES
.272
2 PLACES
.060
.100 .080 R TYP
.040
TYP
1.728
1.722
.200 TYP
.215 .195 TYP
45° TYP
1.825
1.650
.200
TYP
.400
TYP
1.627
1.623
NO. 8 (.164) - 32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
-B-
.815
.809
.235
.175
.102
.098
.125
REF
12 SPACES AT .127 .123 = 1.502 1.498
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
1.782
1.778
.209
2.073
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
A
A

2008194


2 PLACES
.115
.095
.600
2 PLACES
.213
.217 DIA
B .005
2 PLACES
.230
2 PLACES

PARTIAL SECTION A-A


A
A
.165 R
2 PLACES
.125
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7

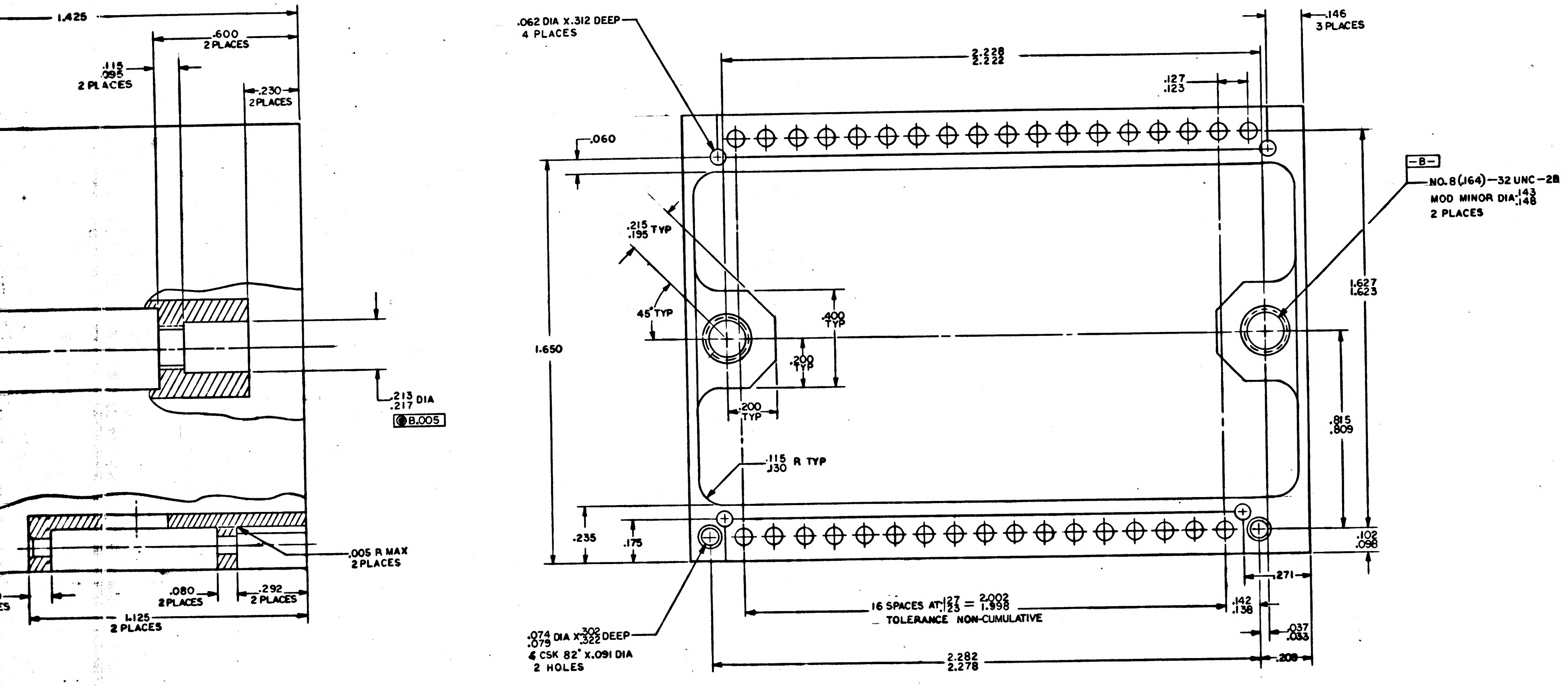

.080
2 PLACES
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
26 HOLES
A .005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE.COAT PER ND 1002040
8. IDENTIFY WITH PART NO. PER ND 1002019

2008194

SYM	ZONE	REVISIONS 1E287 DESCRIPTION	DR	CHK	DATE	APPROVED



1.425
.600
2 PLACES
.115
.095
2 PLACES
.230
2 PLACES
.213
.217 DIA
B .005
.005 R MAX
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES
.062 DIA X .312 DEEP
4 PLACES
2.228
2.222
.146
3 PLACES
.127
.123
.060
B
NO. 8 (.164)—32 UNC—2B
MOD MINOR DIA .143 .148
2 PLACES
.215
.195 TYP
45° TYP
.400
TYP
.200
TYP
1.650
1.627
1.623
.200
TYP
.815
.809
.115
.130 R TYP
.235
.175
.102
.098
.271
16 SPACES AT .127 .123 = 2.002 1.998
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.033
.074
.079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
2.282
2.278
.208

D

C

B

A

2008195

3-K

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007126	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

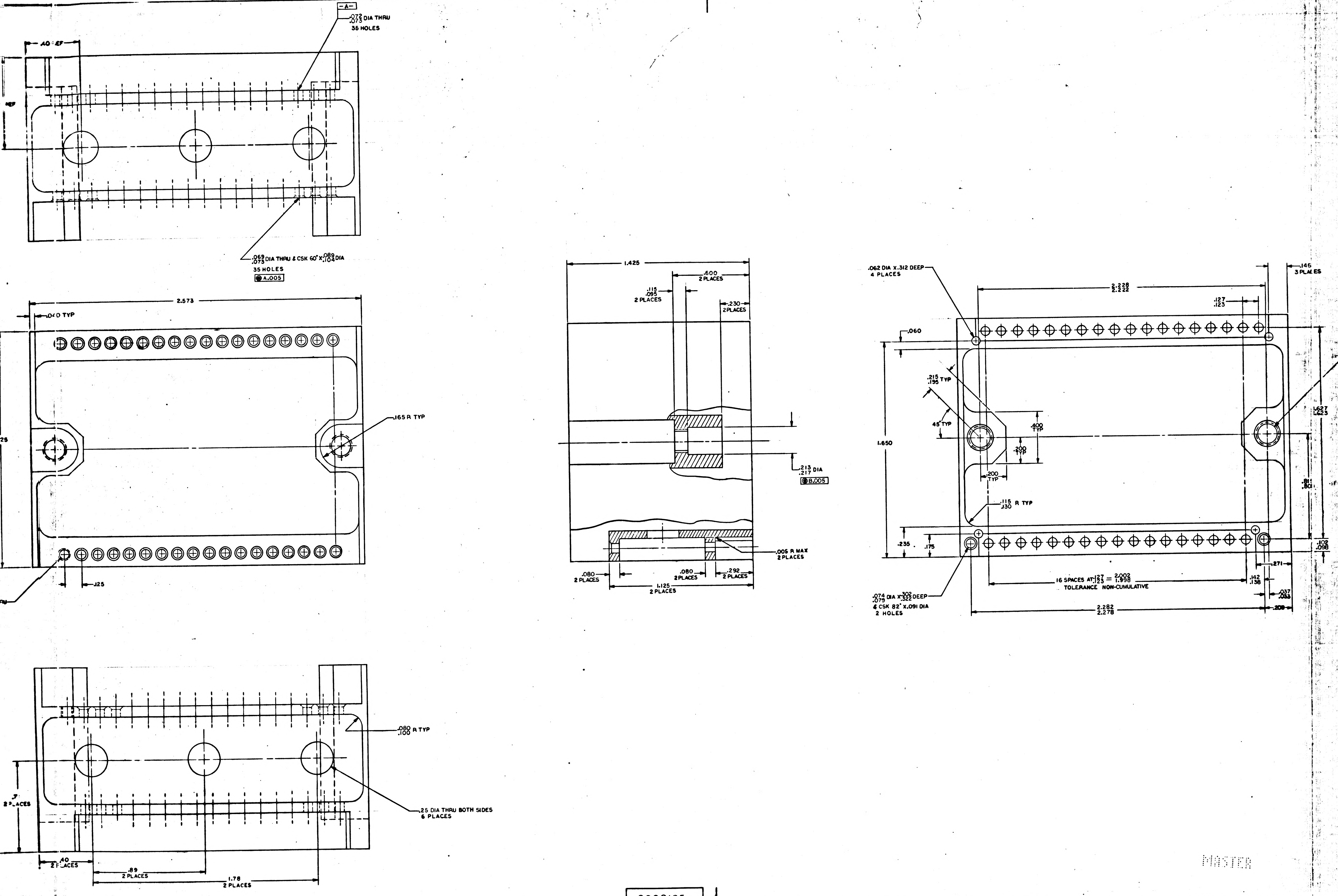
DRAWN
CHECKED 7 APR 65
APPROVED 8 APR 65
APPROVED
APPROVED MIT W. Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
OPTICS AUTOMATIC OPERATE RELAY

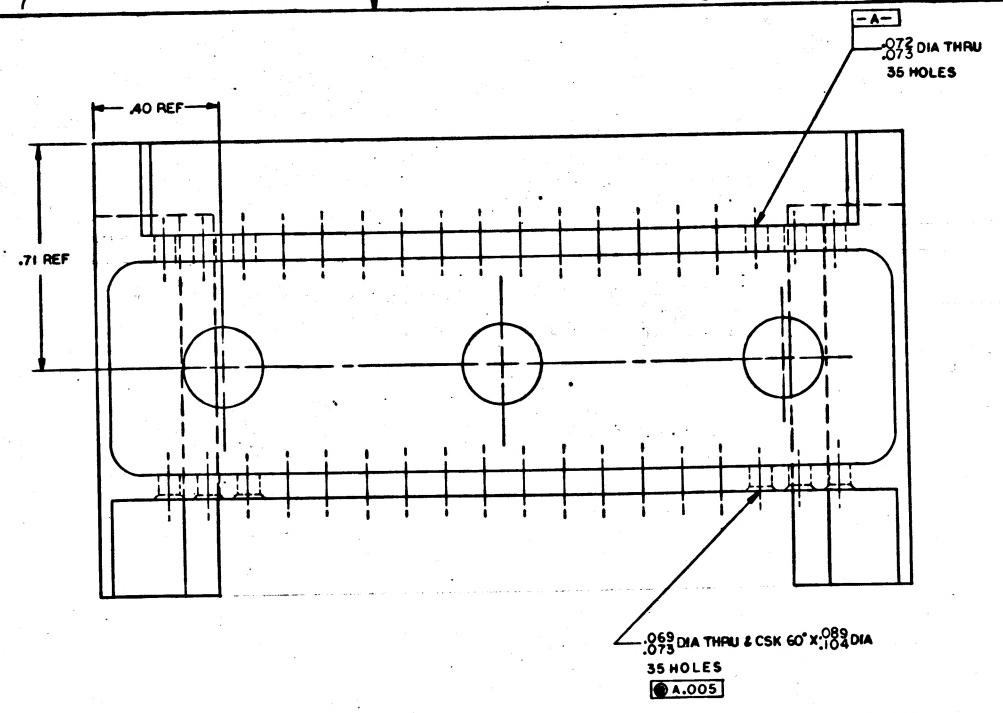
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008195
SCALE 5/1
SHEET 1 OF 1

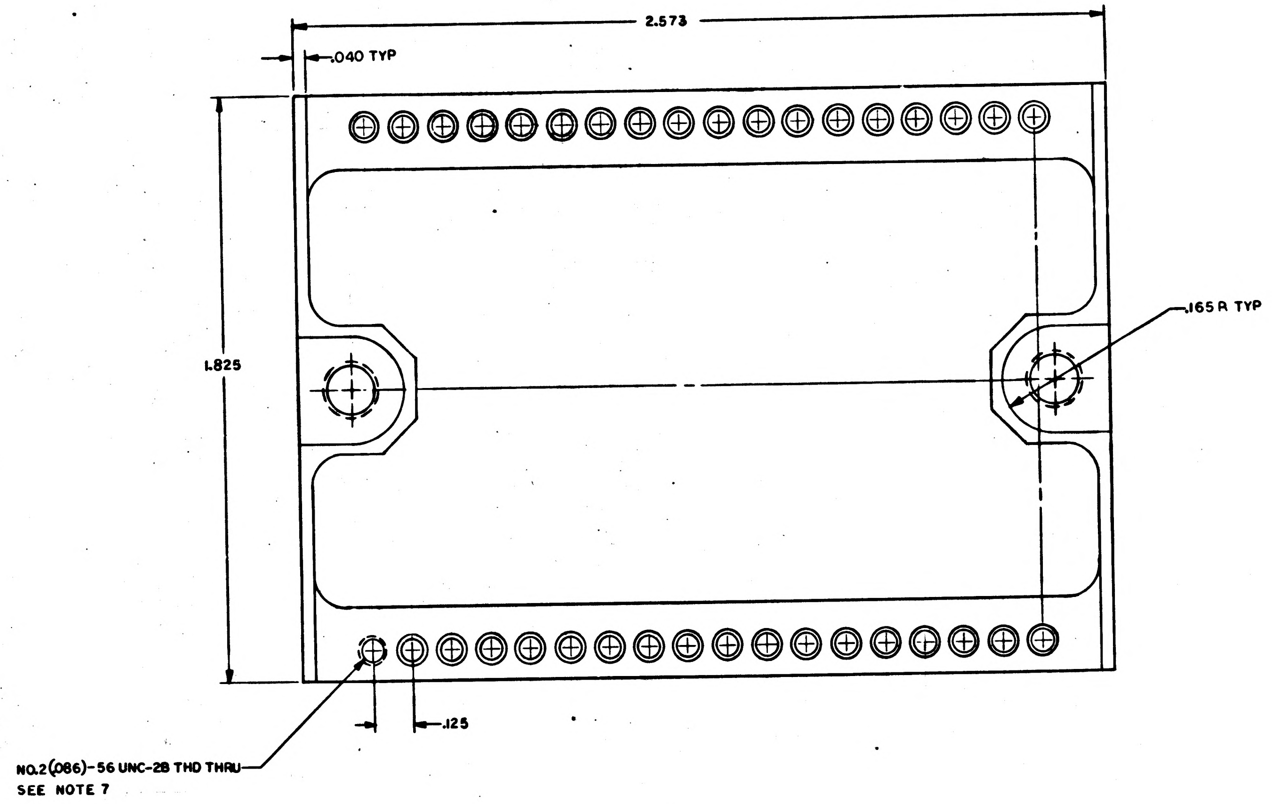
2008195

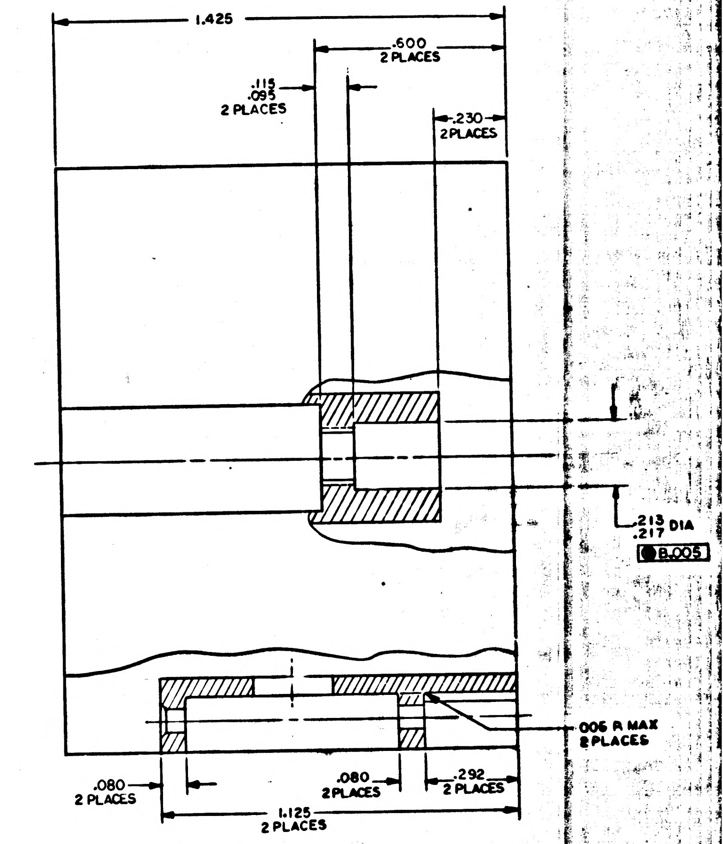

-A-
.072 .073 DIA THRU
35 HOLES
.40 REF
REF
.069 .073 DIA THRU & CSK 60° X .089 .104 DIA
35 HOLES
⊚ A.005
2.573
.040 TYP
.165 R TYP
.125
.080 .100 R TYP
.25 DIA THRU BOTH SIDES
6 PLACES
2 PLACES
.40
2 PLACES
.89
2 PLACES
1.78
2 PLACES
1.425
.600
2 PLACES
.115 .095
2 PLACES
.230
2 PLACES
.213 .217 DIA
⊚ B.005
.005 R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES
.062 DIA X .312 DEEP
4 PLACES
2.228 2.222
.127 .123
.146
3 PLACES
-B-
.060
.215 .195 TYP
45° TYP
.400 TYP
.200 TYP
.200 TYP
1.650
1.627 1.623
.115 .130 R TYP
.235
.175
.102 .098
.271
16 SPACES AT .127 .123 = 2.002 1.998
TOLERANCE NON-CUMULATIVE
.142 .138
.037 .033
.208
.074 .079 DIA X .302 .322 DEEP
& CSK 82° X .091 DIA
2 HOLES
2.282 2.278
MASTER

2008195

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

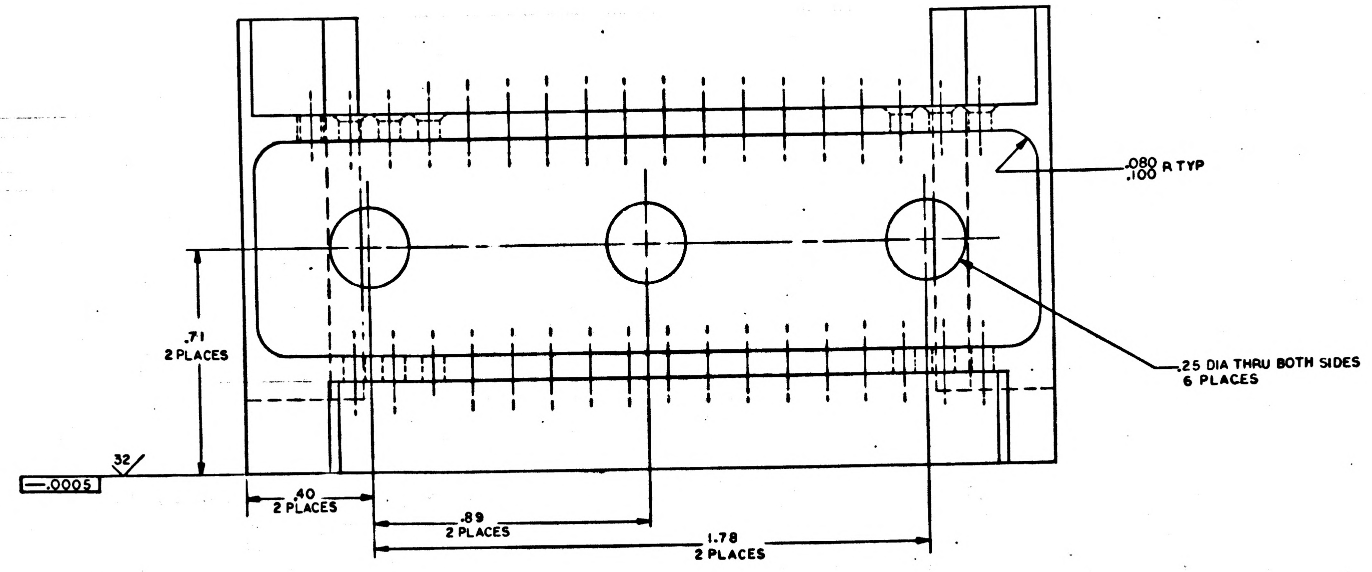

-A-
.072 .073 DIA THRU
35 HOLES
.40 REF
.71 REF
.069 .073 DIA THRU & CSK 60° X .089 .104 DIA
35 HOLES
⊕ A .005


2.573
.040 TYP
1.825
.165 R TYP
.125
NO.2(.086)-56 UNC-2B THD THRU
SEE NOTE 7


1.425
.600
2 PLACES
.115 .095
2 PLACES
.230
2 PLACES
.213 .217 DIA
⊕ B .005
.006 R MAX
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.125
2 PLACES

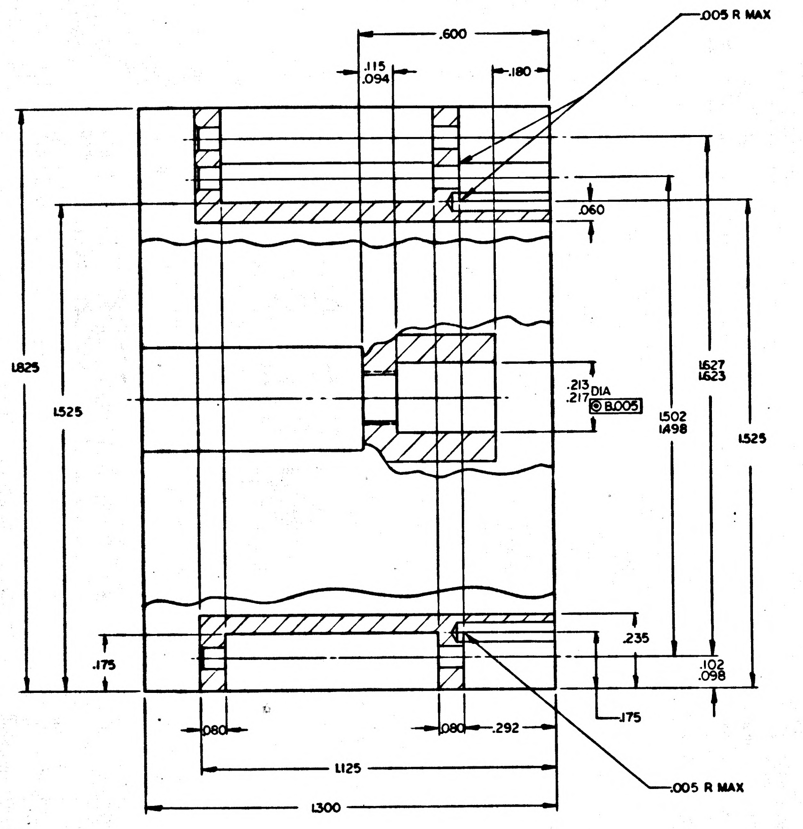
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. REMOVE BURRS AND BREAK EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
6. ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

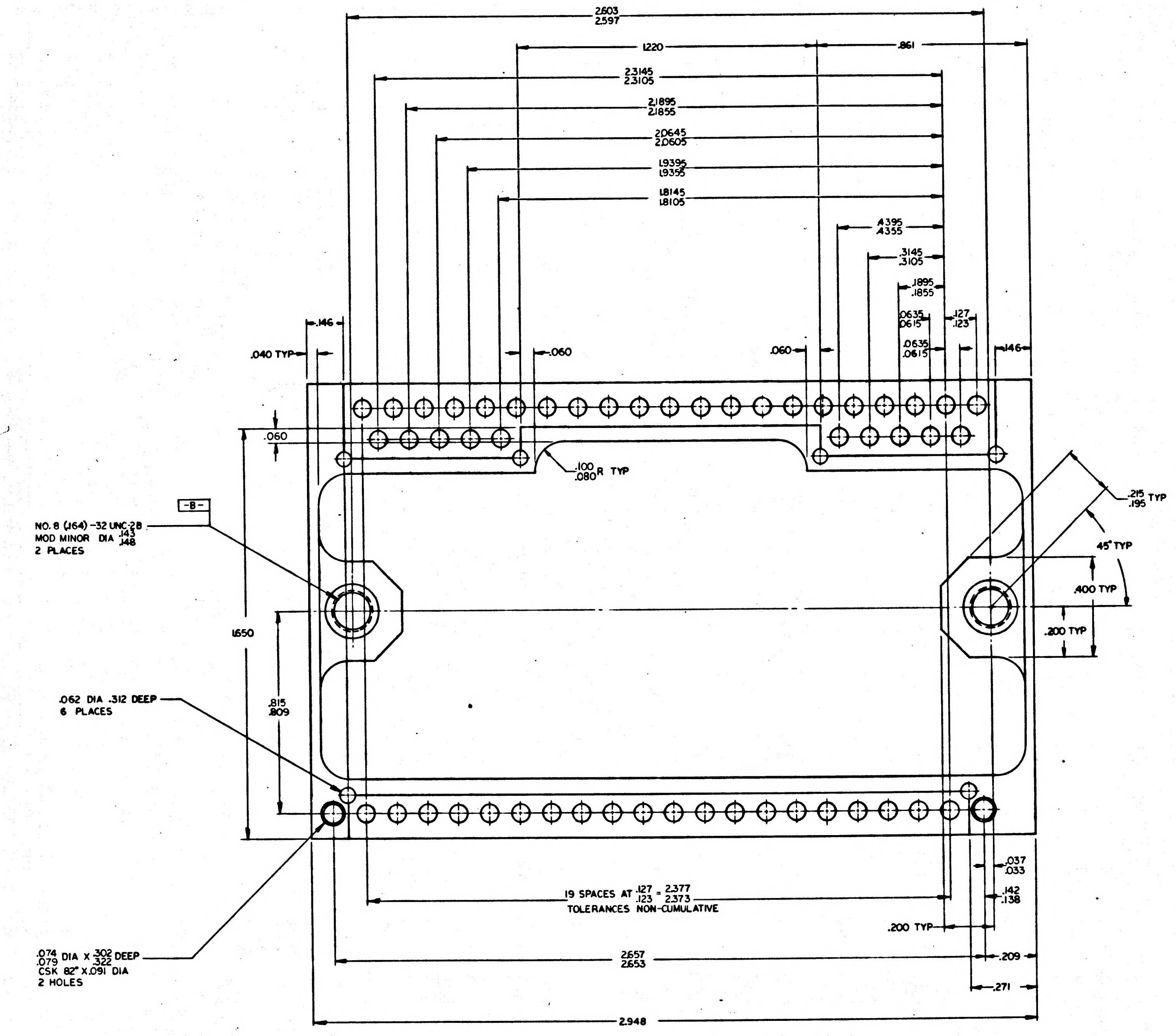

.080 .100 R TYP
.71
2 PLACES
.25 DIA THRU BOTH SIDES
6 PLACES
32
— .0005
.40
2 PLACES
.89
2 PLACES
1.78
2 PLACES

2008195

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



.600
.115
.094
.180
.005 R MAX
.060
1.825
1.525
.213
.217 DIA
B .005
1.502
1.498
1.627
1.623
1.525
.235
.102
.098
.175
.175
.080
.080
.292
1.125
1.300
.005 R MAX



2.603
2.597
1.220
.861
2.3145
2.3105
2.1895
2.1855
2.0645
2.0605
1.9395
1.9355
1.8145
1.8105
.4395
.4355
.3145
.3105
.1895
.1855
.0635
.0615
.127
.123
.0635
.0615
.146
.040 TYP
.060
.060
.146
.060
.100
.080 R TYP
-B-
NO. 8 (.164) -32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.215
.195 TYP
45° TYP
.400 TYP
.200 TYP
1.650
.815
.809
.062 DIA .312 DEEP
6 PLACES
.037
.033
.142
.138
19 SPACES AT .127/.123 = 2.377/2.373
TOLERANCES NON-CUMULATIVE
.200 TYP
2.657
2.653
.209
.271
.074/.079 DIA X .302/.322 DEEP
CSK 82° X .091 DIA
2 HOLES
2.948

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

2007123	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± 1/64 DECIMALS .XXX ±.005 .XX ±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	W. Monroe	24 MAR 65
CHECKED	R. Lisotacci	2-14-65
APPROVED		
APPROVED	R. A. Foot	5/3/65
APPROVED MIT		4 May 65
APPROVED MSC		5-4-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

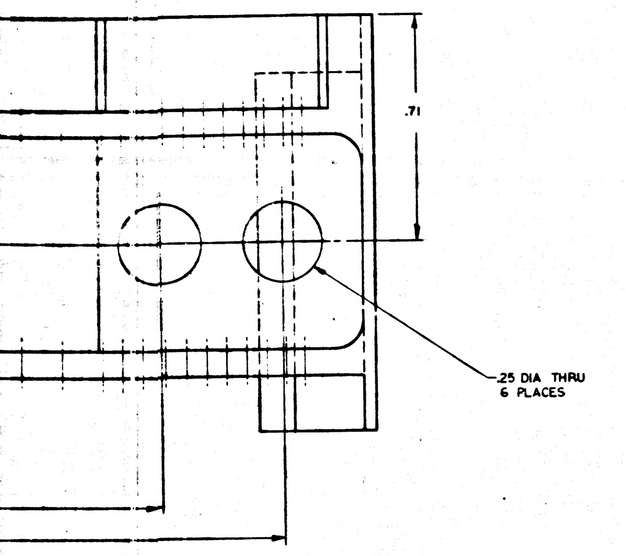
FRAME,
RELAY ASSY

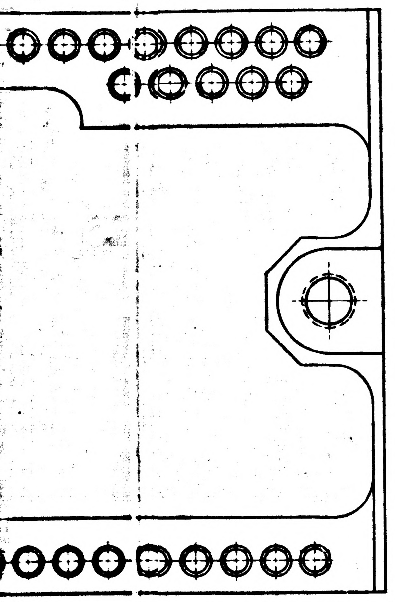
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008196
SCALE 5/1		SHEET 1 OF

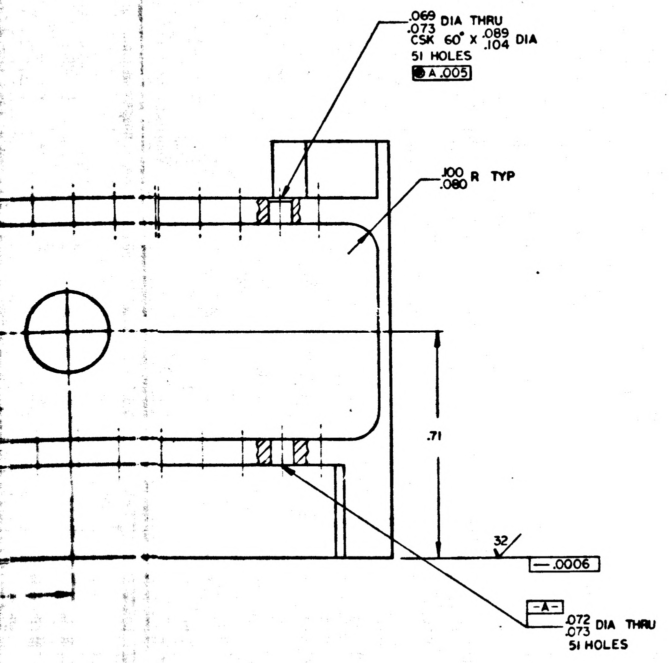
2008196

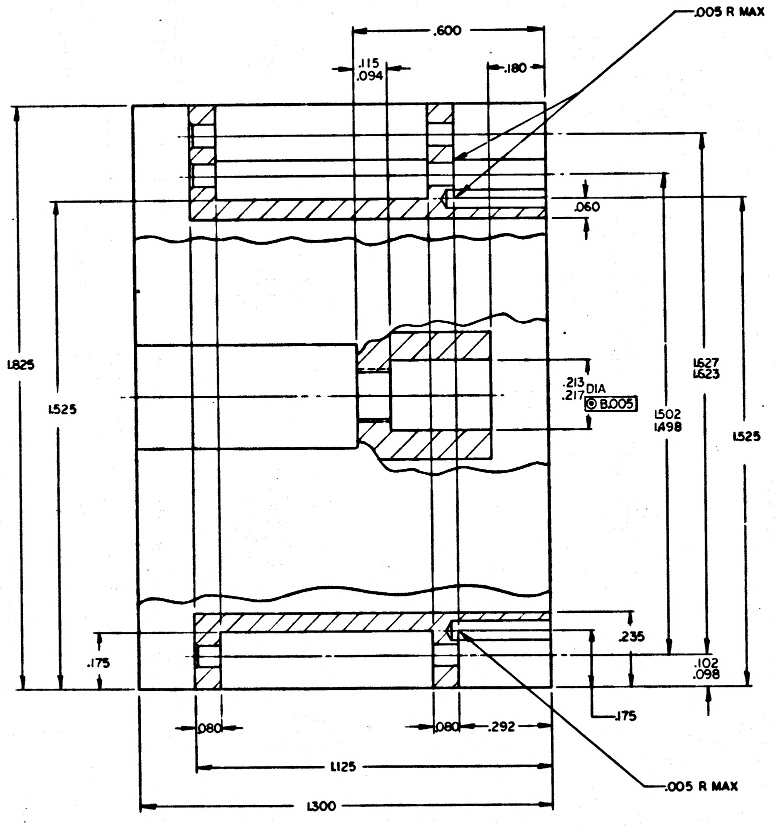
2008196 3H

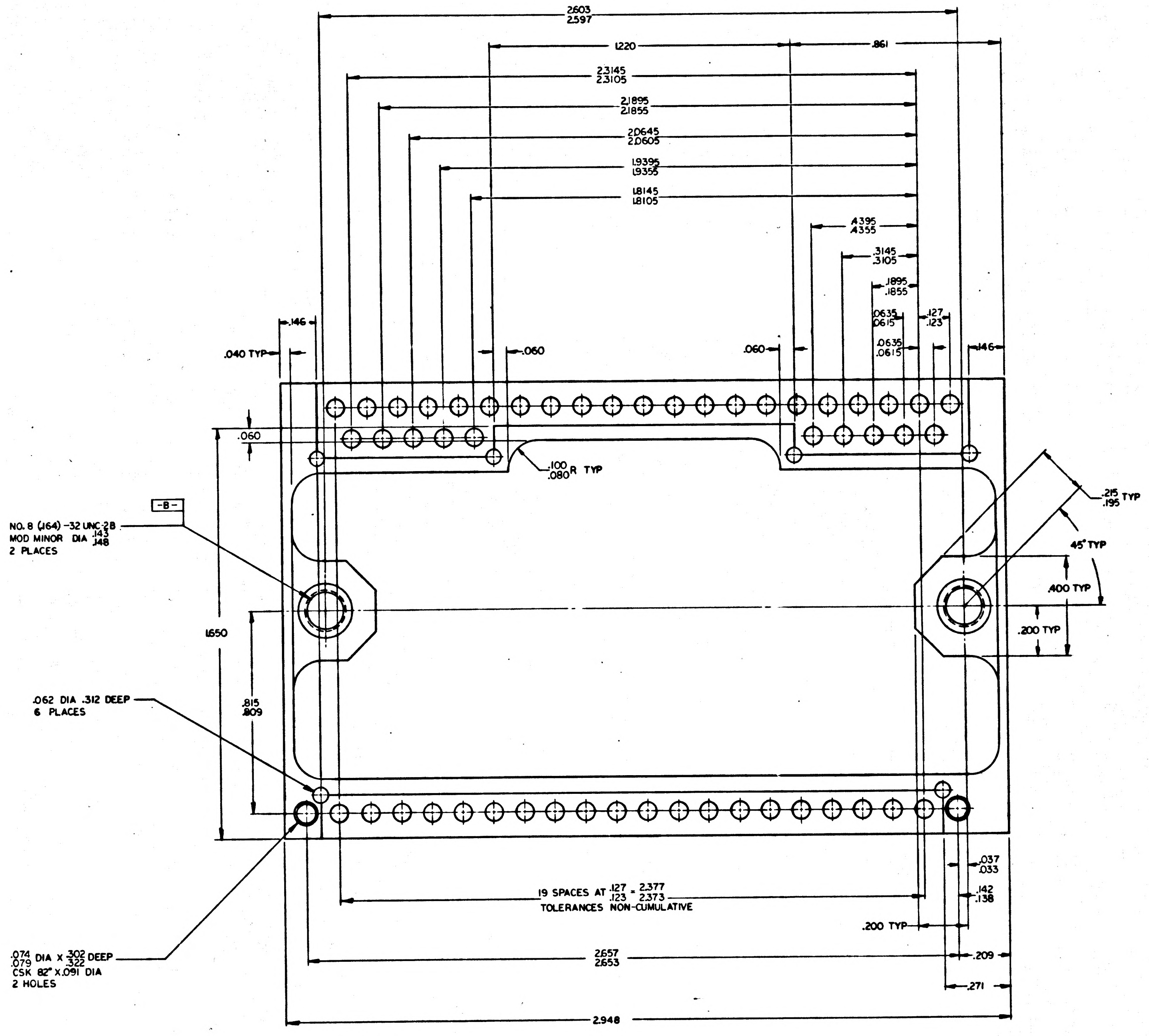
F-3


.71
.25 DIA THRU
6 PLACES




.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
51 HOLES
⊕ A .005
.100 .080 R TYP
.71
32
— .0006
-A-
.072 .073 DIA THRU
51 HOLES


.005 R MAX
.600
.115 .094
.180
.060
1.825
1.525
.213 .217 DIA
⊕ B .005
1.627 1.623
1.502 1.498
1.525
.175
.235
.102 .098
.080
.080
.292
.175
1.125
1.300
.005 R MAX


2.603 2.597
1.220
.861
2.3145 2.3105
2.1895 2.1855
2.0645 2.0605
1.9395 1.9355
1.8145 1.8105
.4395 .4355
.3145 .3105
.1895 .1855
.0635 .0615
.127 .123
.0635 .0615
.146
.040 TYP
.060
.060
.146
.060
.100 .080 R TYP
-B-
NO. 8 (.164) -32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
1.650
.215 .195 TYP
45° TYP
.400 TYP
.200 TYP
.062 DIA .312 DEEP
6 PLACES
.815 .809
.037 .033
.142 .138
19 SPACES AT .127 .123 = 2.377 2.373
TOLERANCES NON-CUMULATIVE
.200 TYP
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
2.657 2.653
.209
.271
2.948

2007123

NEXT ASSY | USED ON

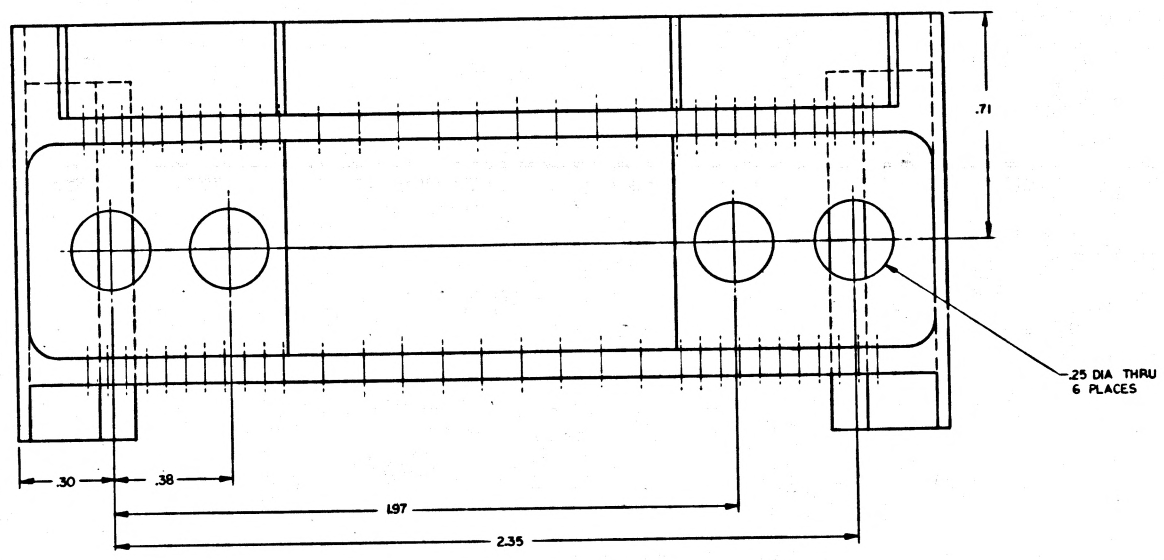
APPLICATION

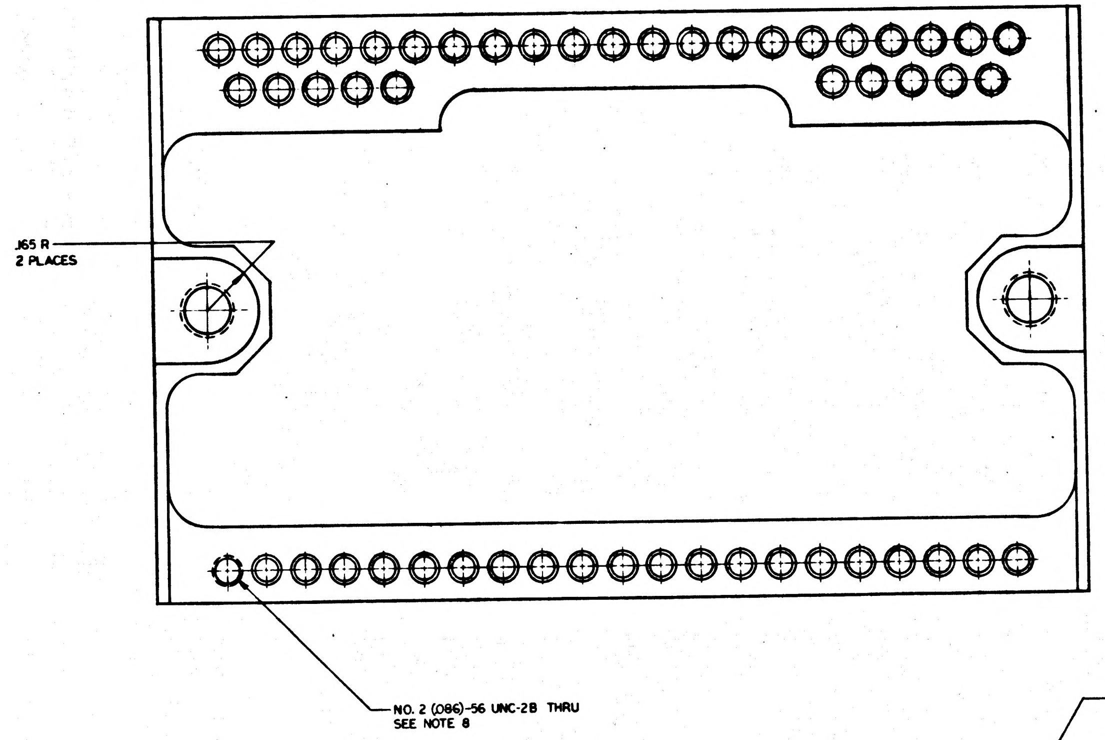
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANG
± .XXX ± .005
.XX ± .02
DO NOT SCALE THIS DRAWING

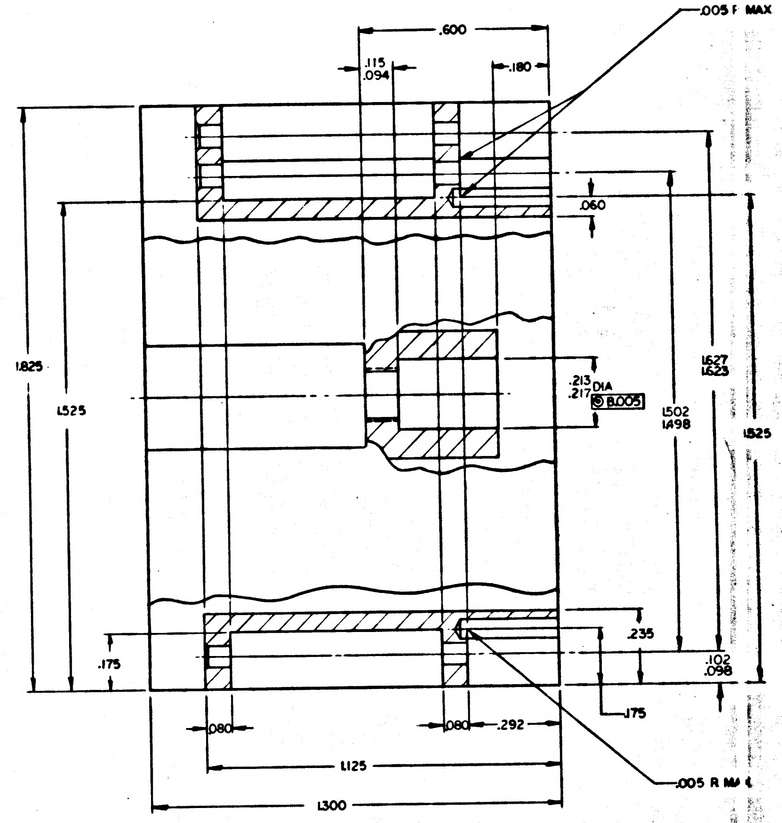
MATERIAL
SEE NOTE 2

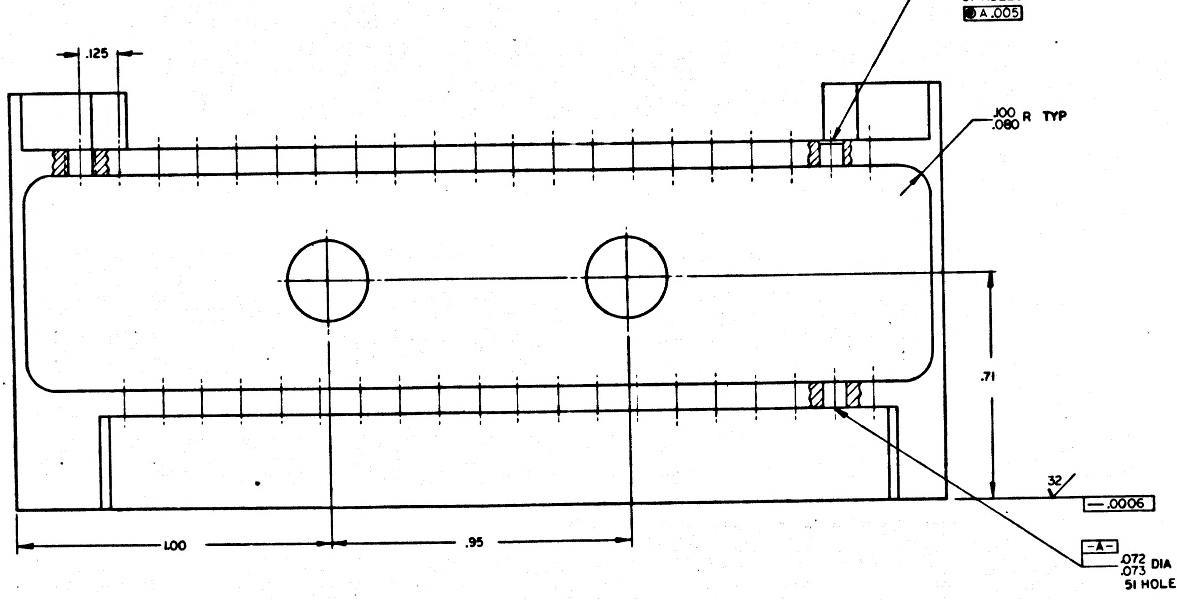
2008196

E-2


.71
.25 DIA THRU
6 PLACES
.30
.38
1.97
2.35


.165 R
2 PLACES
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 8


.005 R MAX
.600
.115
.094
.180
.060
1.825
1.525
.213
.217 DIA
⊚ B .005
1.627
1.623
1.502
1.498
1.525
.235
.175
.102
.098
.175
.080
.080
.292
1.125
1.300
.005 R MAX


.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
51 HOLES
● A .005
.125
.100
.080 R TYP
.71
32
— .0006
-A-
.072
.073 DIA THRU
51 HOLES
1.00
.95

NOTES:

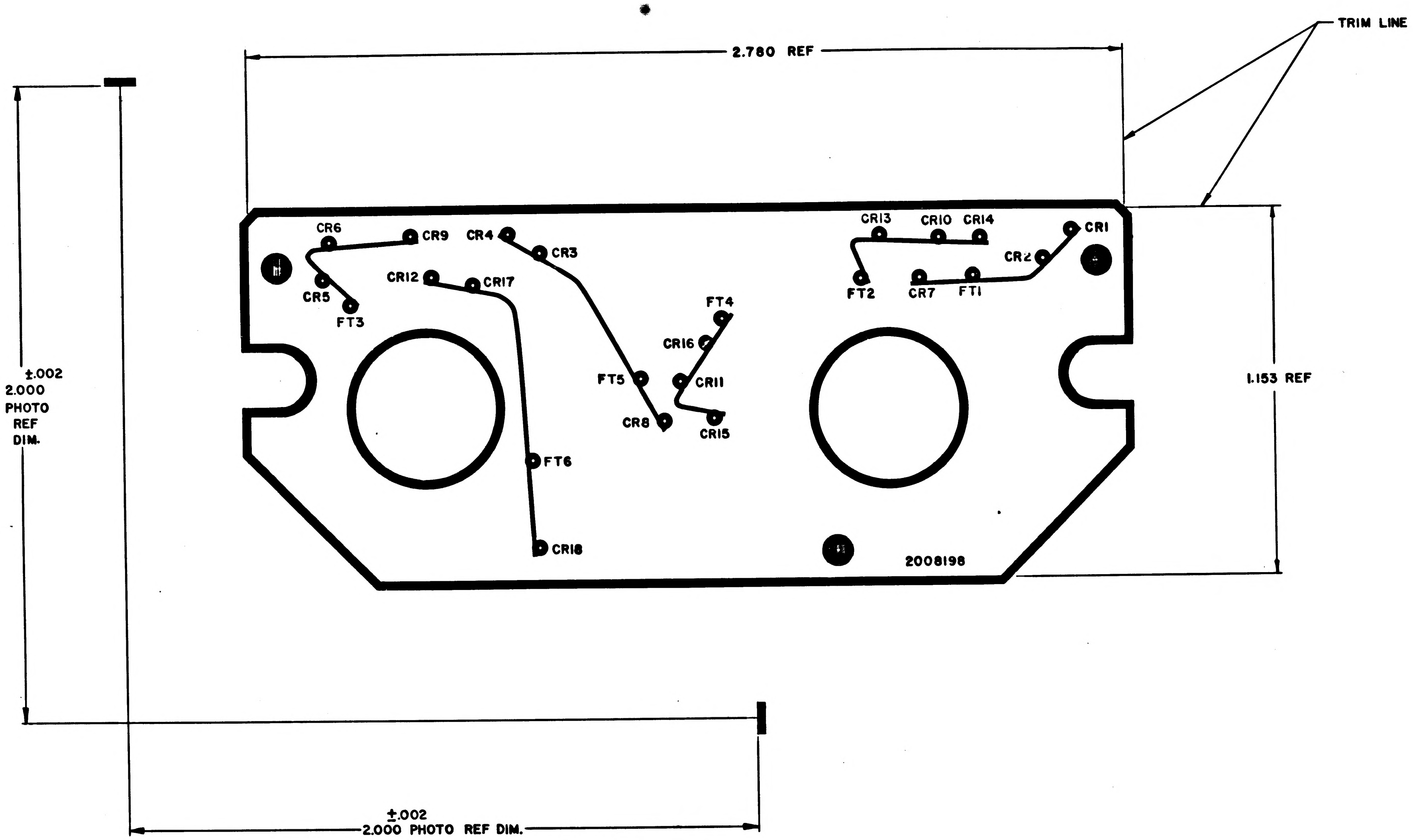
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C.
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

2008196

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18788

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. Munson 30 MAR65
CHECKED 21APR65
APPROVED
APPROVED 5/3/65
APPROVED MIT 4 May 65
APPROVED MSC 5-4-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM
RELAY ASSY

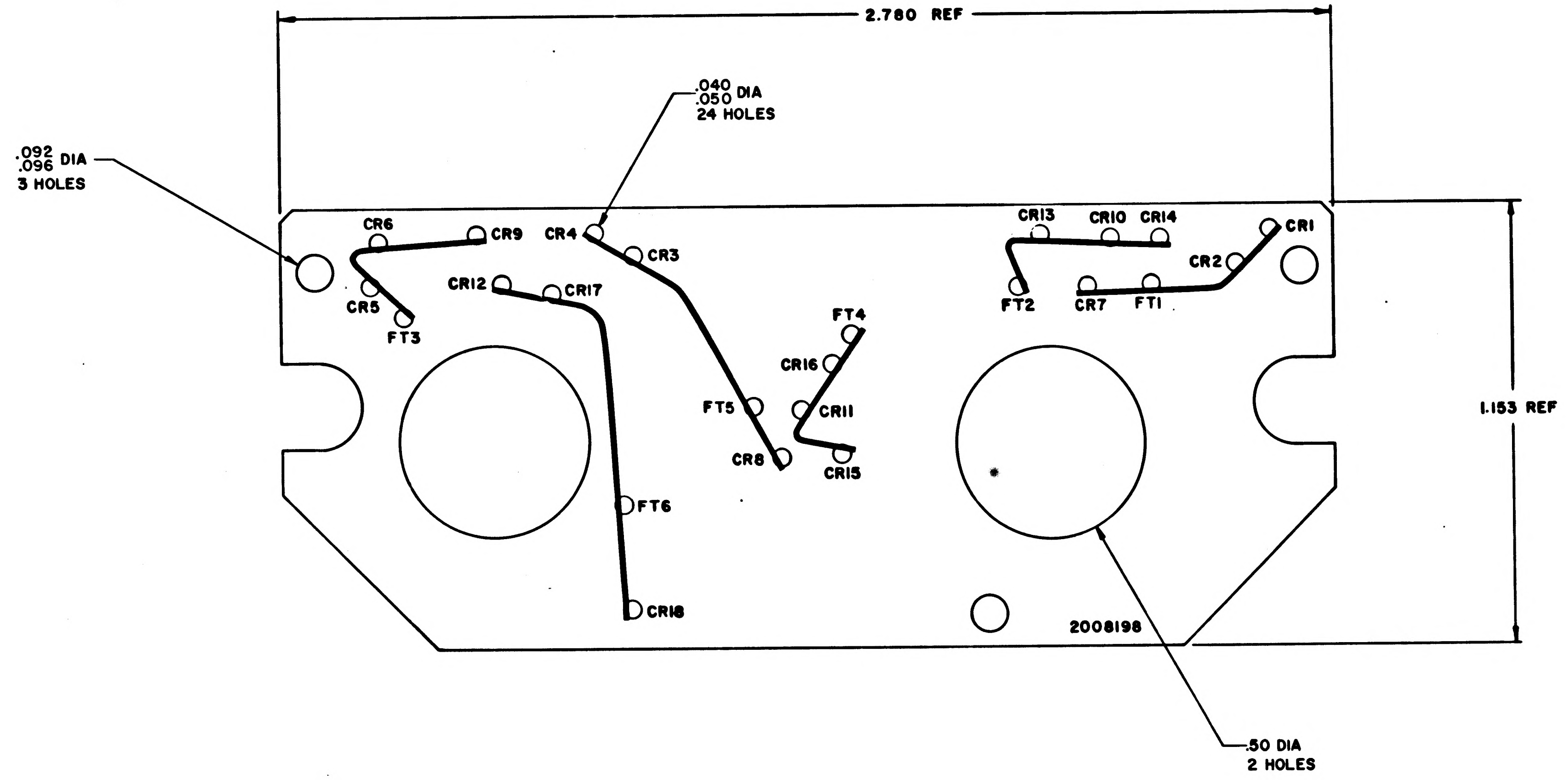
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008197
SCALE 5/1
SHEET 1 OF 1

2008197

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18788

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DRAWING:
NO. 2008197 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007123	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE. MASS.

DRAWN W. Munson 30 MAR 65
CHECKED R. Listerni 1 APR 65
APPROVED
APPROVED D. B. Tait 5/3/65
APPROVED MIT W. Kaufler 4 MAY 65
APPROVED MSC W. J. Rhine 5-4-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

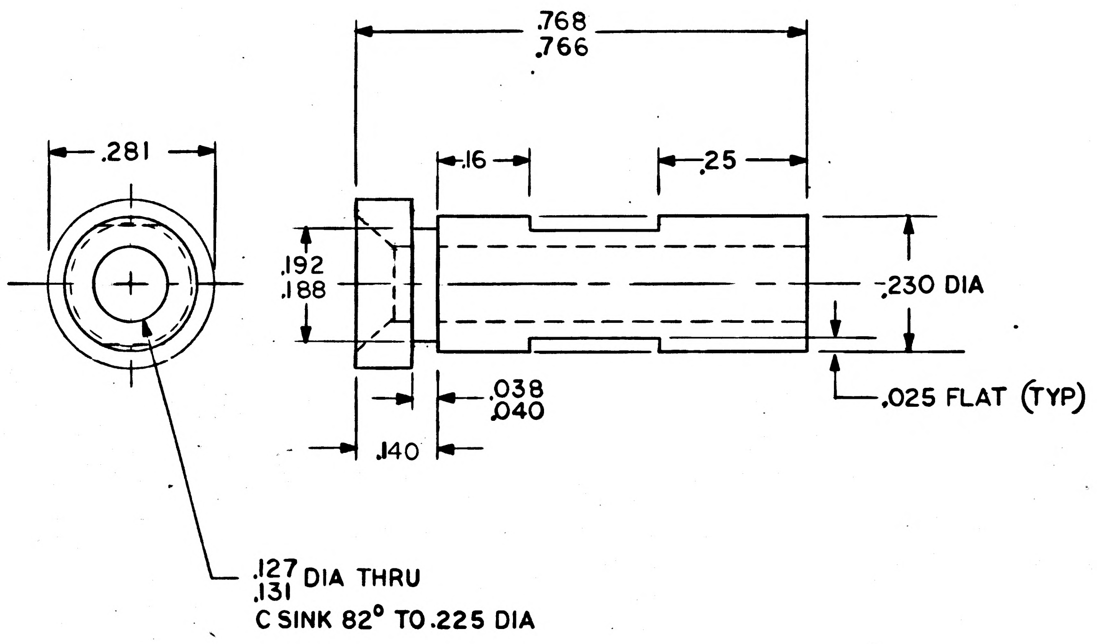
WIRING BOARD BOTTOM
RELAY ASSY

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008198
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14998	JFW	RPK	18 DEC 64	



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II, DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125√
6. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007031	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —
DECIMALS .XXX±.005 .XX±.02
ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	A. Addario Jr.	1 SEPT 64
CHECKED	R.P. Kingsbury	21 SEP 64
APPROVED		22 SEP 64
APPROVED	S. C. Smith	9/22/64
APPROVED MIT		22 Sep 64
APPROVED MSC	W J Rhine	9-22-64

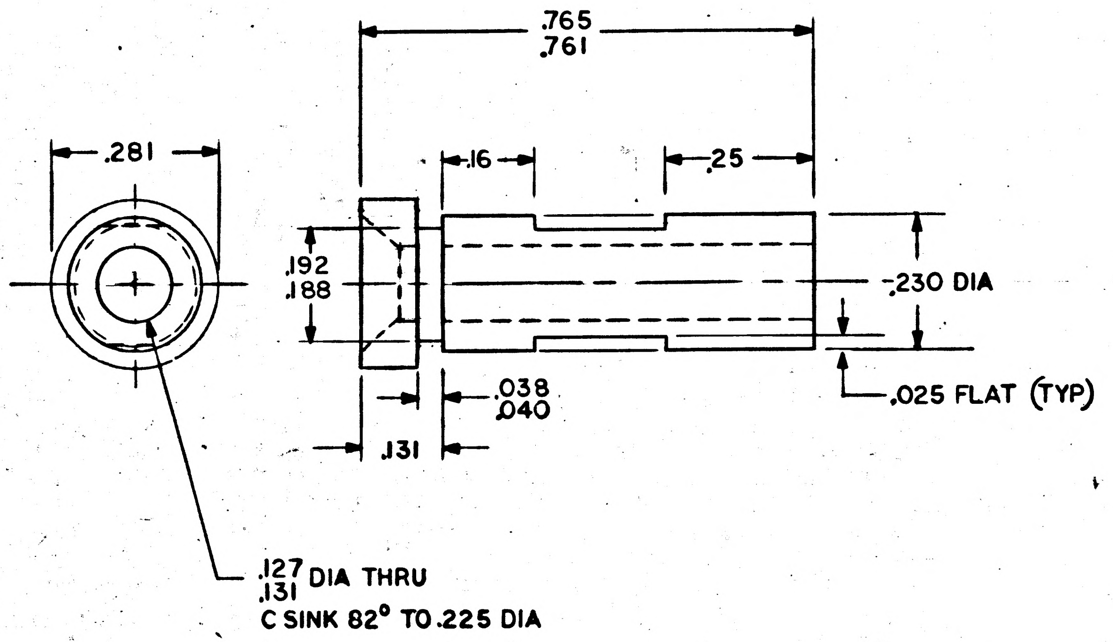
SPACER SLEEVE
(PHOTOMETER)

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008200
SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II, DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125✓
6. IDENTIFY PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

2007031	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	A. Addario Jr.	1 SEPT 64
CHECKED	R.P. Kingsbury	21 Sep 64
APPROVED		22 Sep 64
APPROVED	S.C. Smith	9/22/64
APPROVED MIT		22 Sep 64
APPROVED MSC	W J Rhine	9-22-64

SPACER SLEEVE
(PHOTOMETER)

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008200

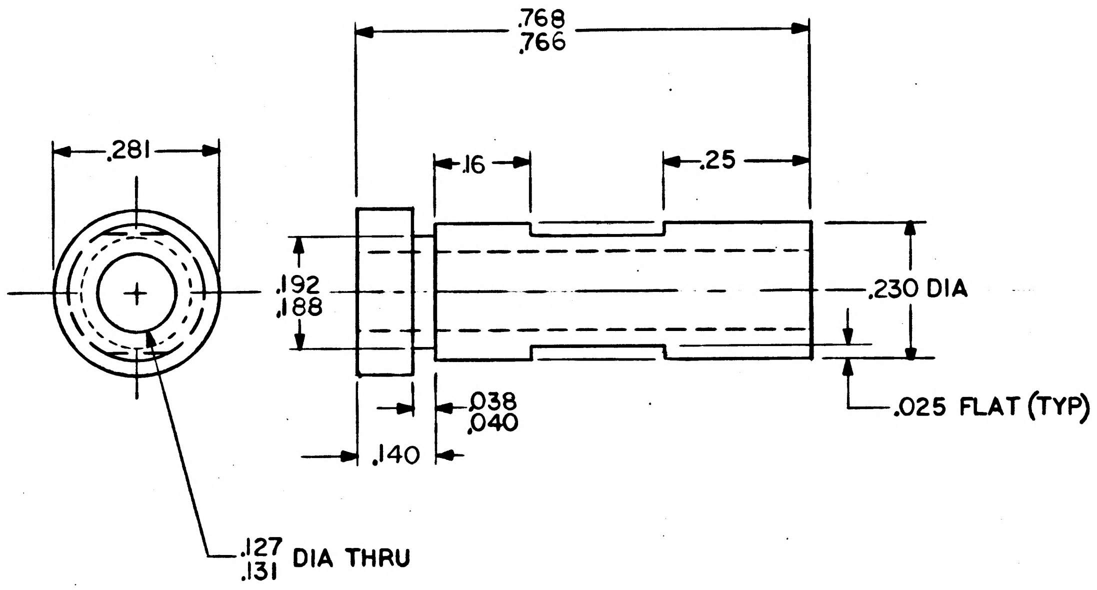
SCALE 5/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14998	JFW	RPK	18DEC64	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II, DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125√
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007032	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	A. Addario Jr.	1 SEPT 64
CHECKED	R. P. King, Tuey	21 SEP 64
APPROVED	R. Krane	22 Sep 64
APPROVED	S. C. Smith	9/22/64
APPROVED MIT	W. Kupfer	22 Sep 64
APPROVED MSC	W. J. Rhine	9-22-64

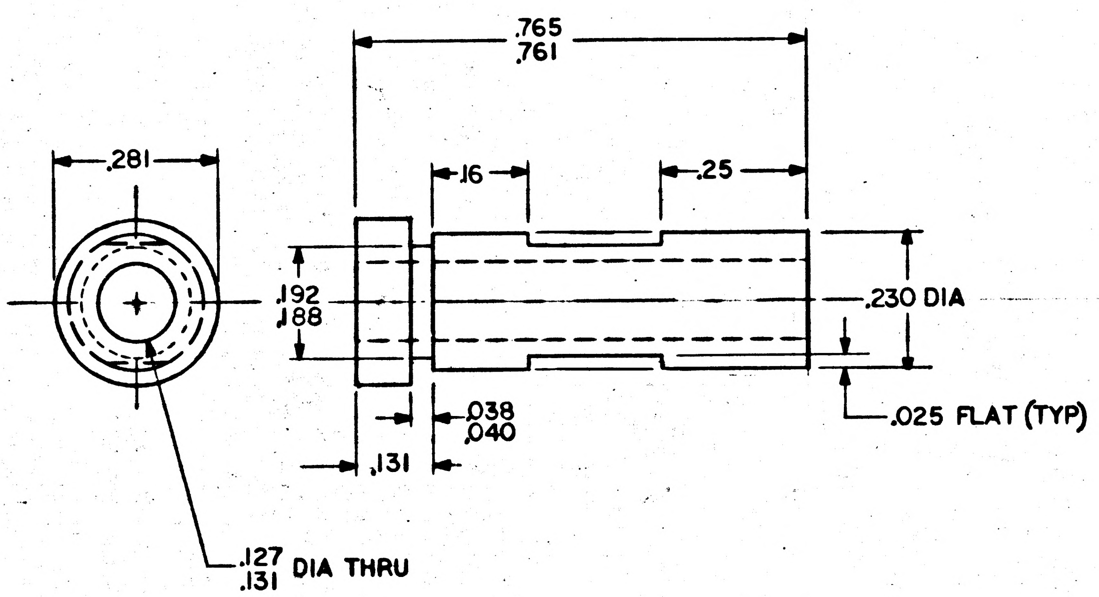
SPACER SLEEVE
(TRACKER)

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008201
SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II, DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125√
6. IDENTIFY PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2007032	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	E. Addario Jr.	1 SEPT 64
CHECKED	C.P. King Tsuey	21 SEP 64
APPROVED	A. Krane	22 Sep 64
APPROVED	S.C. Smith	9/22/64
APPROVED MIT	W. Trageser	22 Sep 64
APPROVED MSC	W.J. Rhine	9-22-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SPACER SLEEVE
(TRACKER)

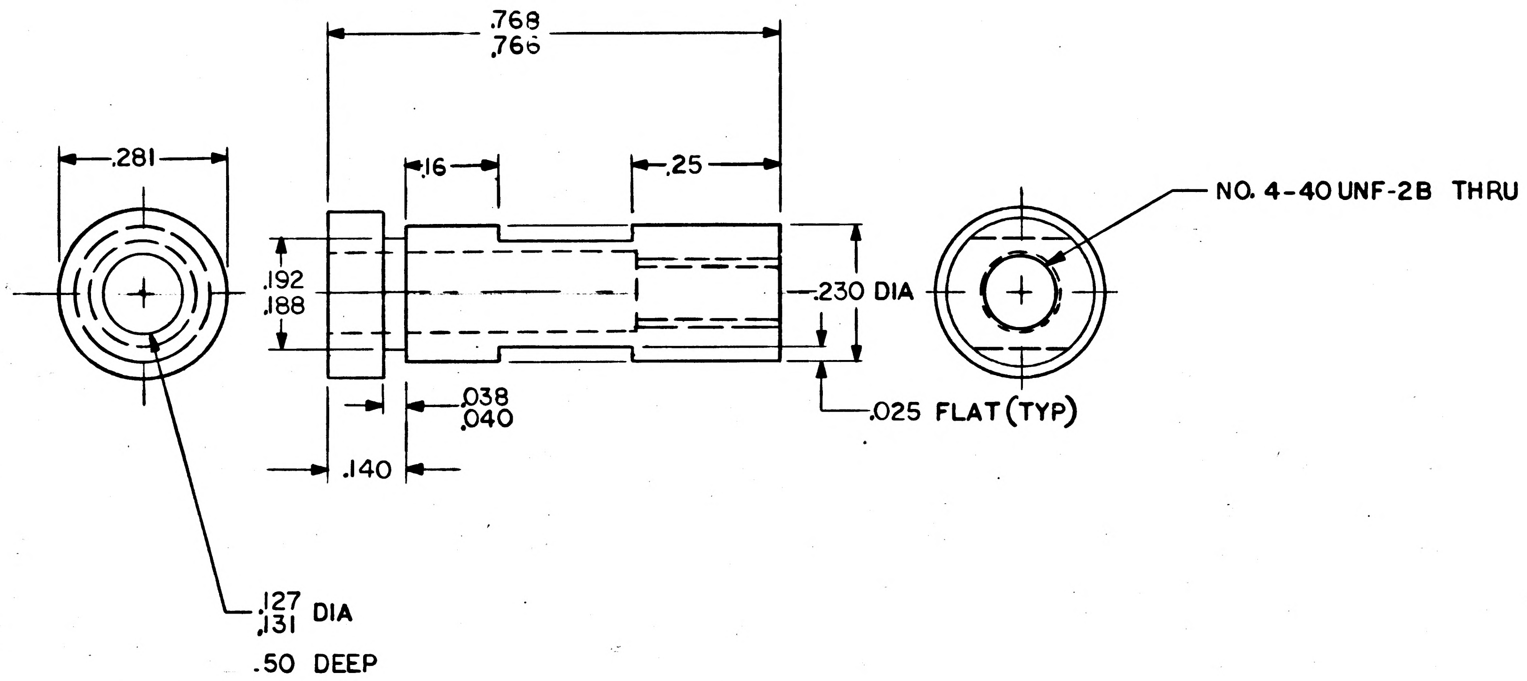
CODE IDENT NO.	SIZE	DRAWING NO.
——	C	2008201
SCALE 5/1		SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14998	JFW	RPK	18 DEC 64	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II, DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125√
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007032	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Addario Jr. 1 SEPT 64
CHECKED R.P. King Perry 21 SEP 64
APPROVED Kr 22 SEP 64
APPROVED L.C. Smith 9/22/64
APPROVED MIT W. Kupfer 22 Sep 64
APPROVED MSC W. J. Rhine 9-22-64
DATE

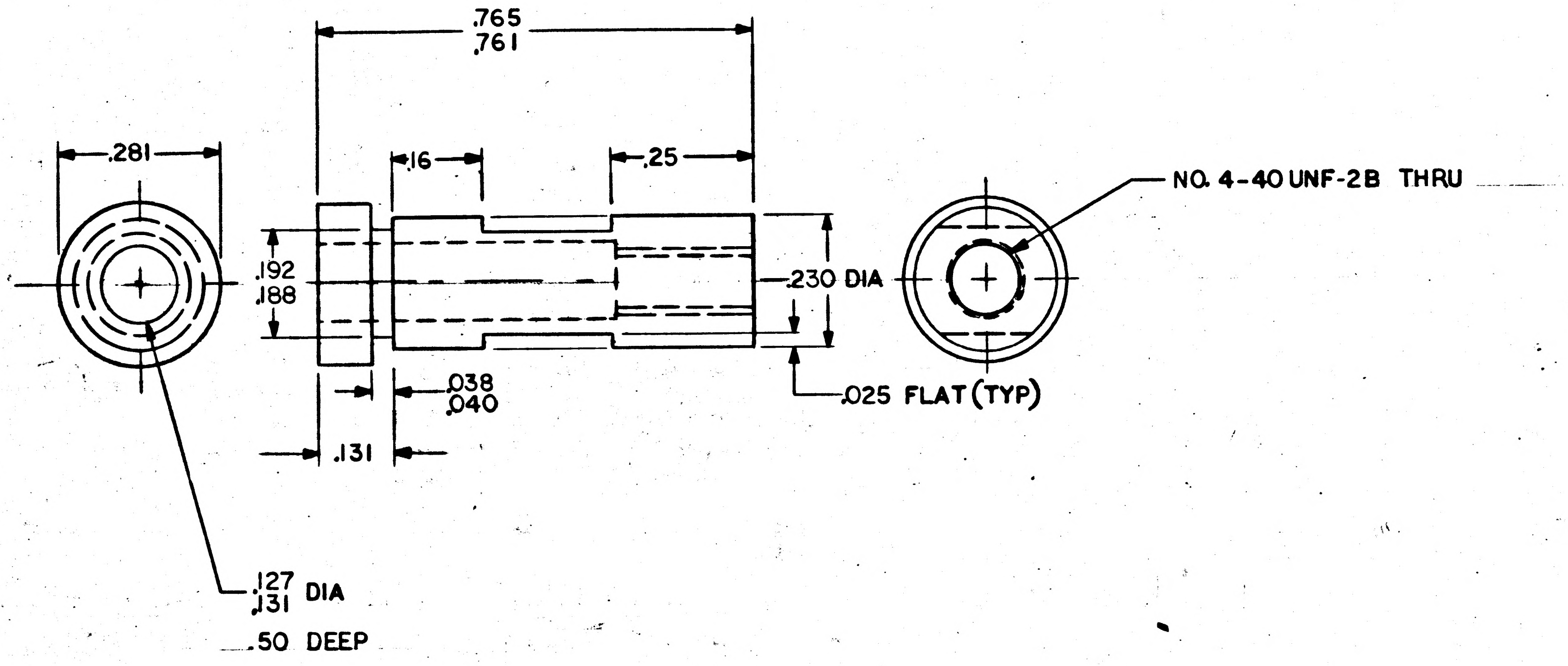
SPACER SLEEVE
THREADED
(TRACKER)

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008202
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II, DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125✓
6. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

2007032	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	A. Aldorio Jr.	1 SEPT 64
CHECKED		21 SEP 64
APPROVED		22 Sep 64
APPROVED	A. C. Smith	9/22/64
APPROVED MIT		22 Sep 64
APPROVED MSC	W. J. Rhine	9-22-64
		DATE

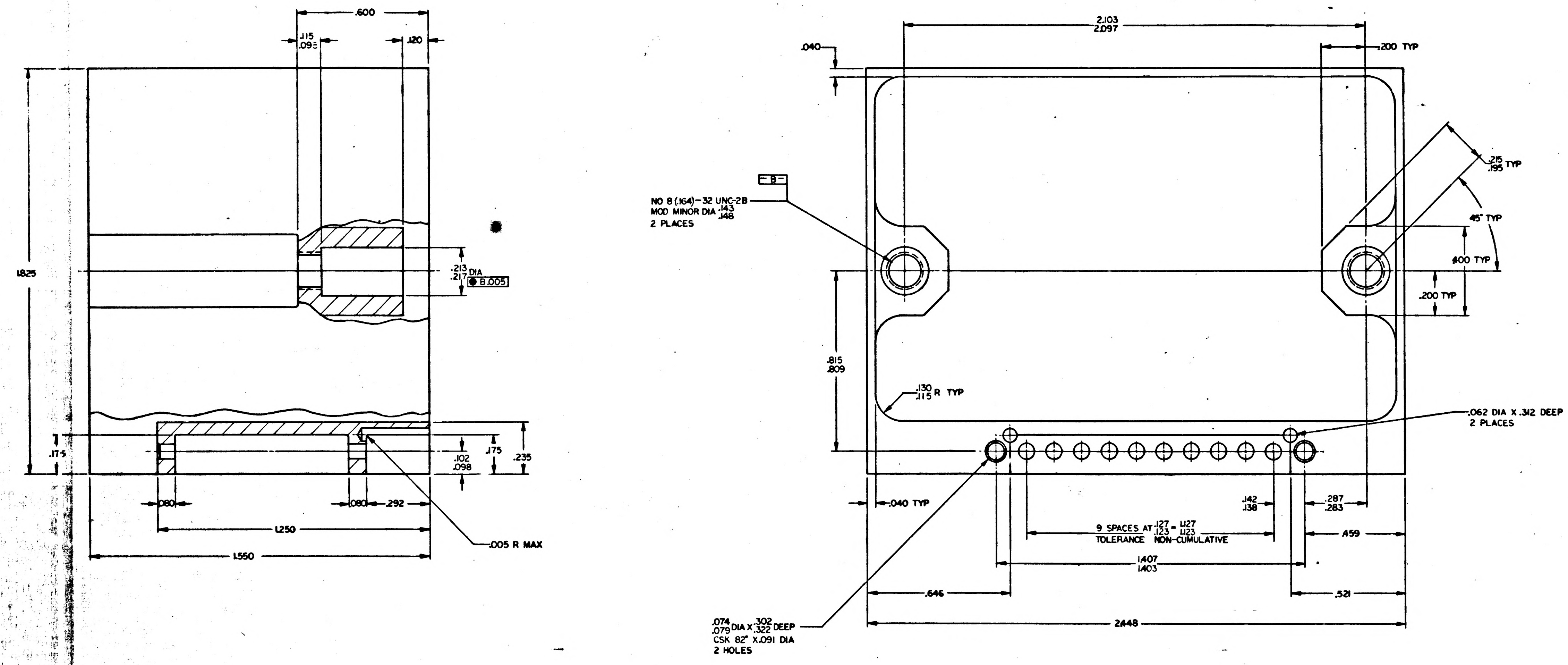
SPACER SLEEVE THREADED
(TRACKER)

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008202
SCALE 5/1
SHEET 1 OF 1

2008202

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS 18926						
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED


.600
.115
.095
.120
1.825
.213
.217 DIA
● B .005
.175
.175
.102
.098
.235
.080
.080
.292
1.250
1.550
.005 R MAX
2.103
2.097
.040
.200 TYP
-B-
NO 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.215
.195 TYP
45° TYP
.400 TYP
.200 TYP
.815
.809
.130
.115 R TYP
.062 DIA X .312 DEEP
2 PLACES
.040 TYP
.142
.138
.287
.283
9 SPACES AT .127 .123 = 1.127 1.123
TOLERANCE NON-CUMULATIVE
.459
1.407
1.403
.646
.521
2.448
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES

3++

2008205

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007132	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —/— DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1/2
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Munson 21 APR 65
CHECKED Bonarrigo 7 May 65
APPROVED E. Sudak 7 May 65
APPROVED D. G. Fort 5/10/65
APPROVED MIT 5 May 65
APPROVED MSC 5/14/65
DATE

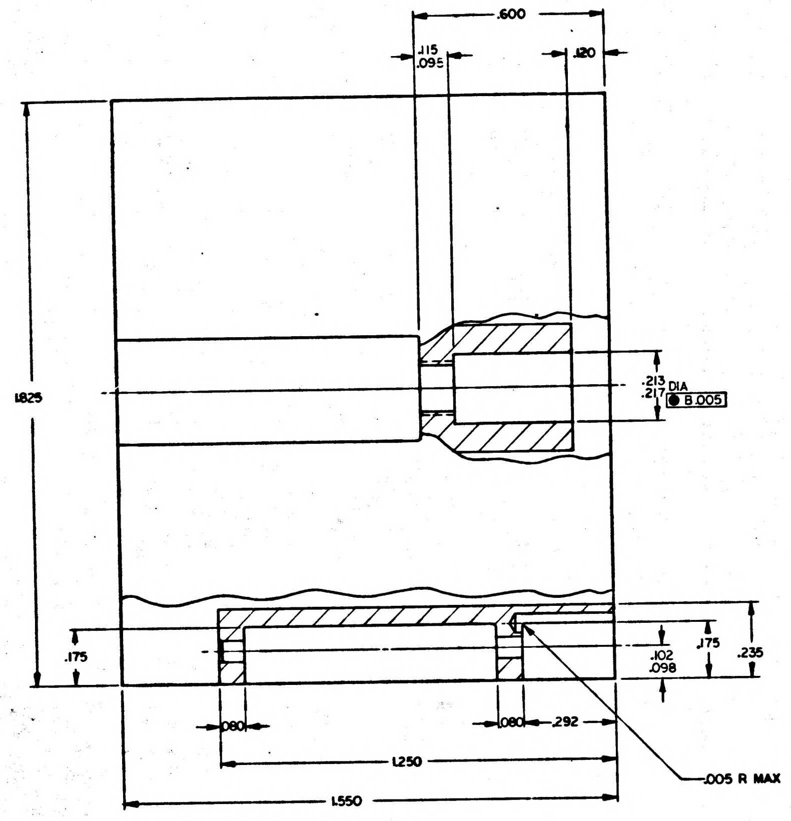
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

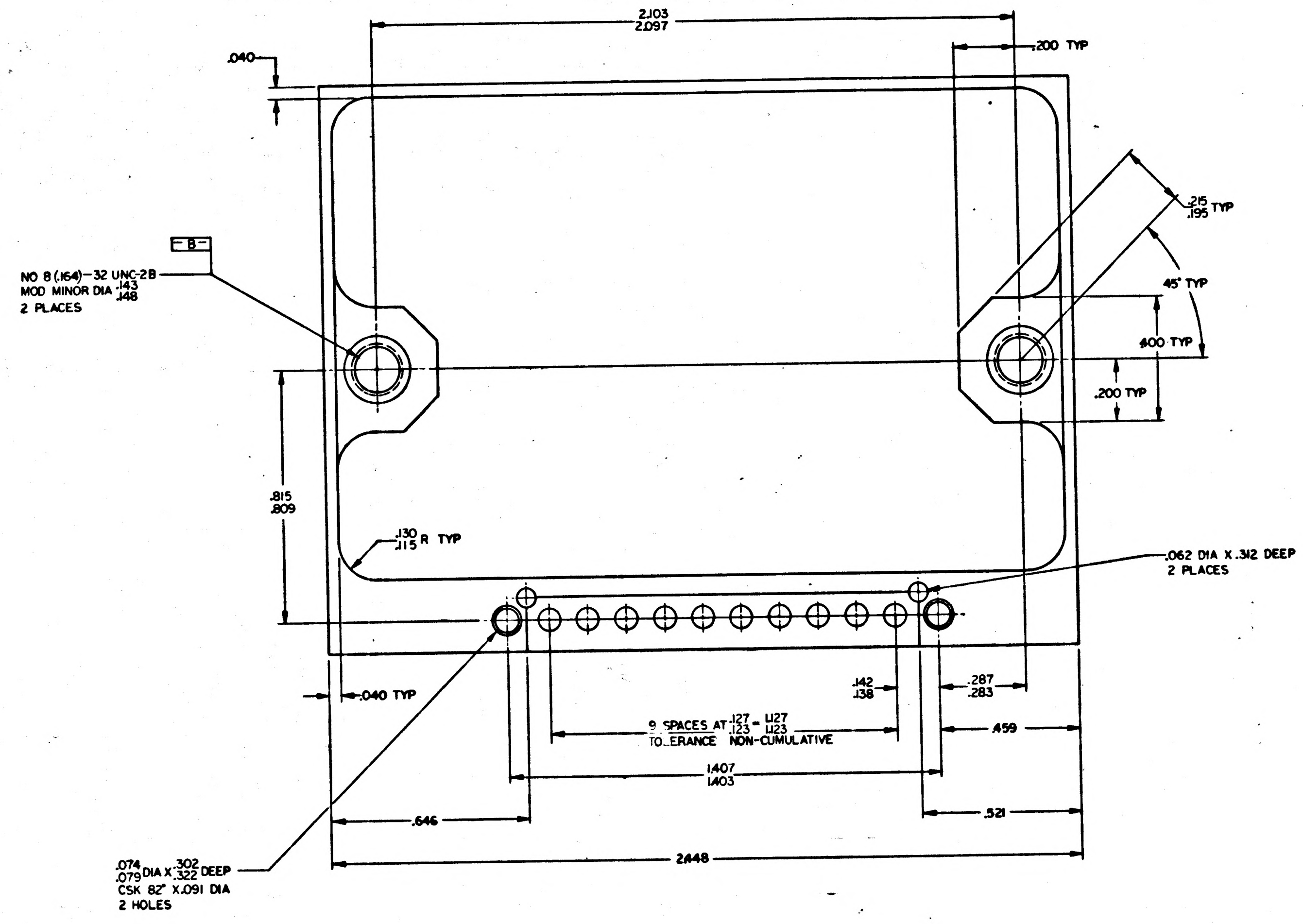
FRAME,
IMU LOAD COMPENSATION
MODULE

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008205
SCALE 5/1
SHEET 1 OF 1

2008205

REVISIONS 18926						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.600
.115
.095
.120
1.825
.213
.217 DIA
● B .005
.175
.102
.098
.175
.235
.080
.080
.292
1.250
1.550
.005 R MAX


2.103
2.097
.200 TYP
.040
-B-
NO 8 (.164)–32 UNC-2B
MOD MINOR DIA .143 .148
2 PLACES
.215
.195 TYP
45° TYP
.400 TYP
.200 TYP
.815
.809
.130
.115 R TYP
.062 DIA X .312 DEEP
2 PLACES
.040 TYP
.142
.138
.287
.283
9 SPACES AT .127 .123 = 1.127 1.123
TOLERANCE NON-CUMULATIVE
.459
1.407
1.403
.646
.521
2.448
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007132	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —/— DECIMALS XXX ± .005 XX ± .02 ANGLES ± 1°/2
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Munson 21 APR 65
CHECKED Bongarrigo 7 May 65
APPROVED 7 May 65
APPROVED 5/10/65
APPROVED MIT 11 May 65
APPROVED MSC 5/14/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME,
IMU LOAD COMPENSATION
MODULE

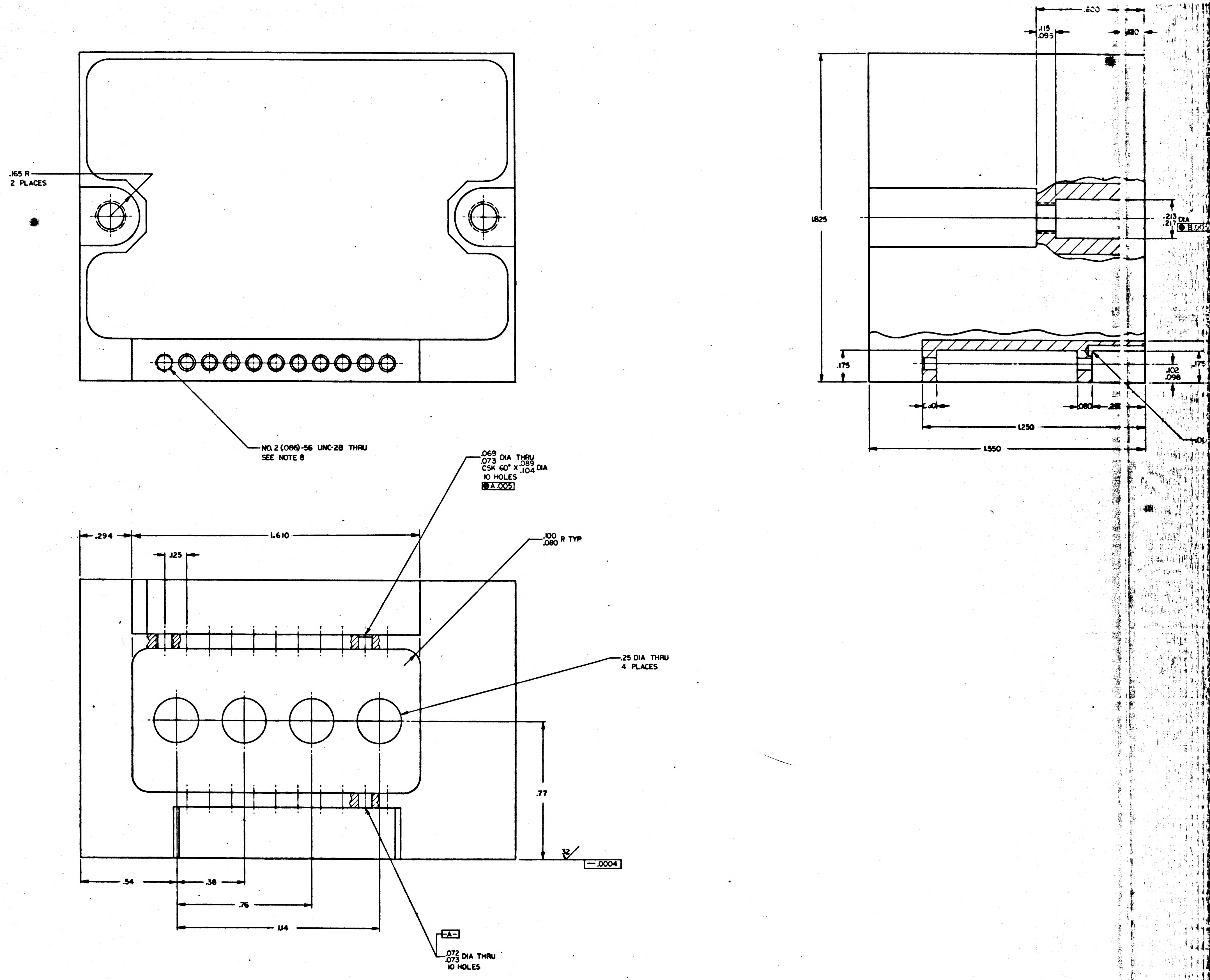
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008205
SCALE 5/1
SHEET 1 OF 1

MASTER

2008205

34

[illegible]


.165 R
2 PLACES
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 8
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
10 HOLES
● A .005
.100
.080 R TYP
.25 DIA THRU
4 PLACES
.294
1.610
.125
.77
32
— .0004
.54
.38
.76
1.14
-A-
.072
.073 DIA THRU
10 HOLES
.800
.115
.095
.120
1.825
.213
.217 DIA
● B .00
.175
.102
.098
.175
.080
.080
1.250
1.550

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

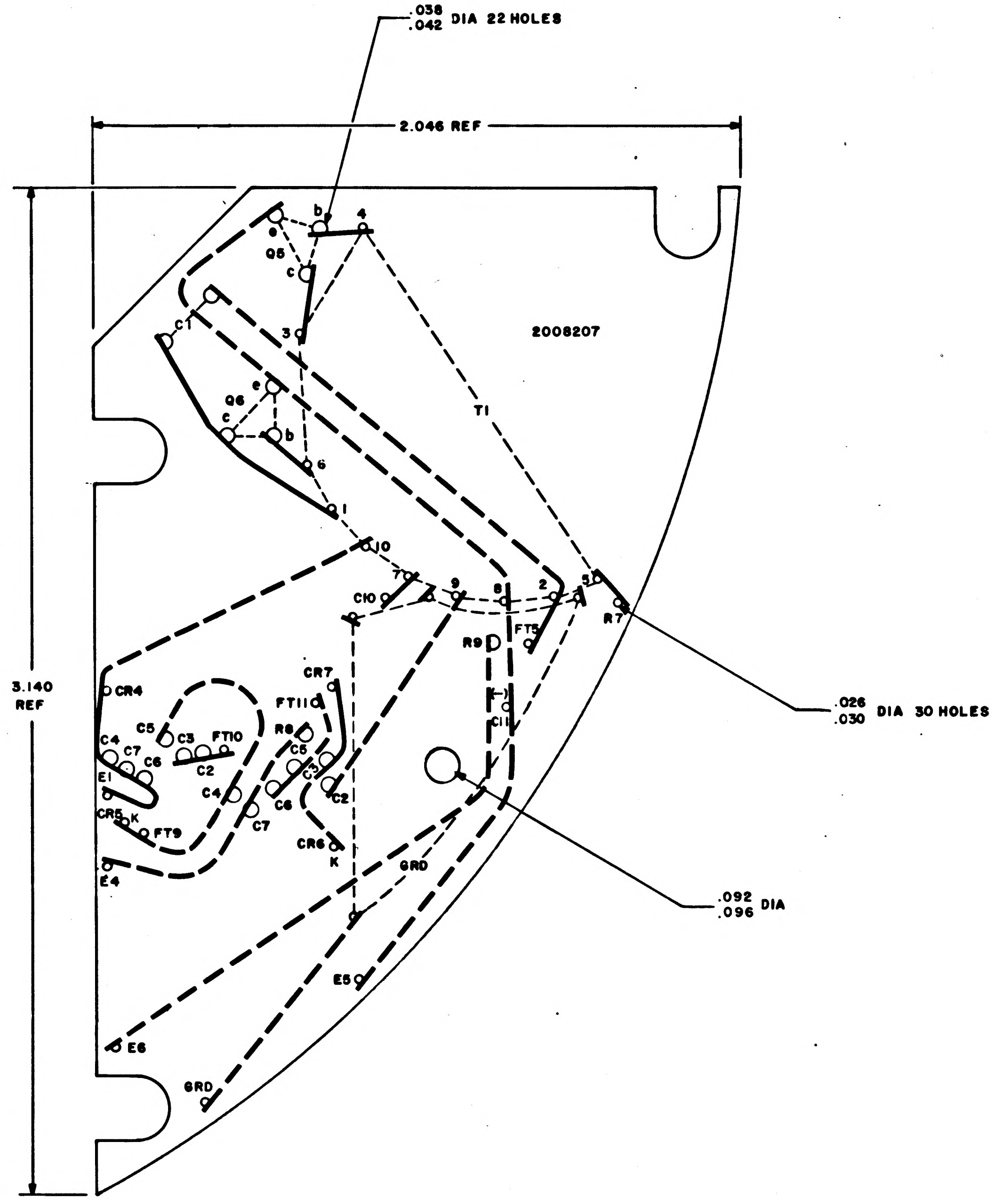
3H

2008205

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1-2-8-7

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14984				4



.038
.042 DIA 22 HOLES
2.046 REF
2008207
3.140
REF
.026
.030 DIA 30 HOLES
.092
.096 DIA
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b
4
Q5
c
3
C1
Q6
e
c
b
6
1
T1
10
7
9
8
2
5
C10
R7
R9
FT5
(-)
C11
CR7
CR4
FT11
C5
C3
FT10
R8
C4
C7
C6
C2
E1
C5
C3
C4
C6
C2
C7
CR5
K
FT9
CR6
K
E4
GRD
E5
E6
GRD

REF DRAWING
DWG NO. 2008233 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD OR PHOTOGRAPY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007033	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

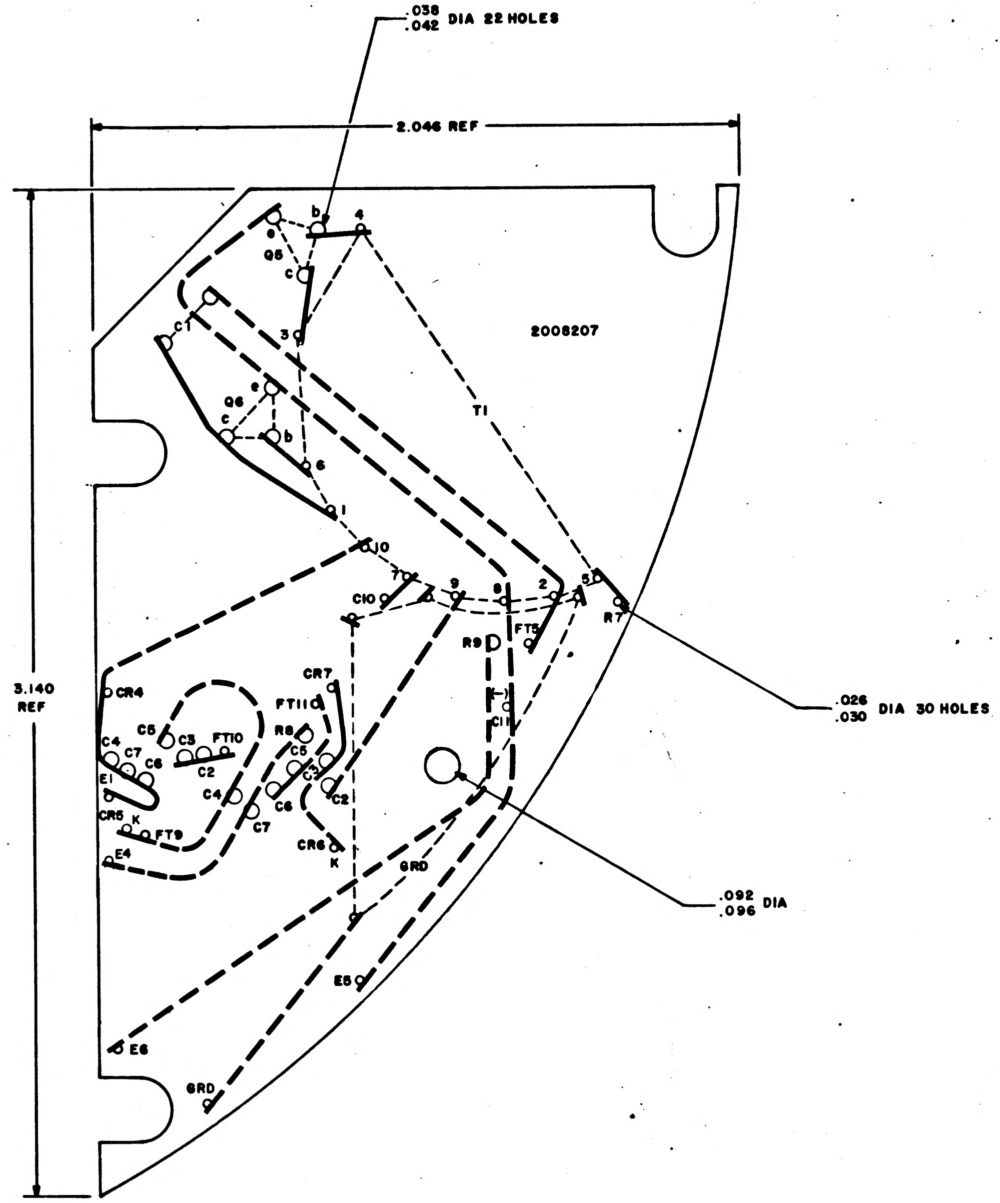
DRAWN Bonarrigo 9/18/64
CHECKED 21 Sep 64
APPROVED 22 Sep 64
APPROVED A.C. Smith 9/22/64
APPROVED MIT 22 ... 64
APPROVED MSC 9-22-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
HV POWER SUPPLY - PHOTOMETER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008207
SCALE 8/1
SHEET 1 OF 1

REVISIONS 12817						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14984				
B		REVISED PER TDRR 16128	JFW		5FEB65	


.038
.042 DIA 22 HOLES
2.046 REF
3.140 REF
2008207
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C4
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E1
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K
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E4
CR7
FT11
R8
C5
C3
C4
C6
C2
C7
CR6
K
GRD
E5
E6
GRD
.026
.030 DIA 30 HOLES
.092
.096 DIA

REF DRAWING
DWG NO. 2008233 PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD OR PHOTOGRAPY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007033	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9/18/64
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD

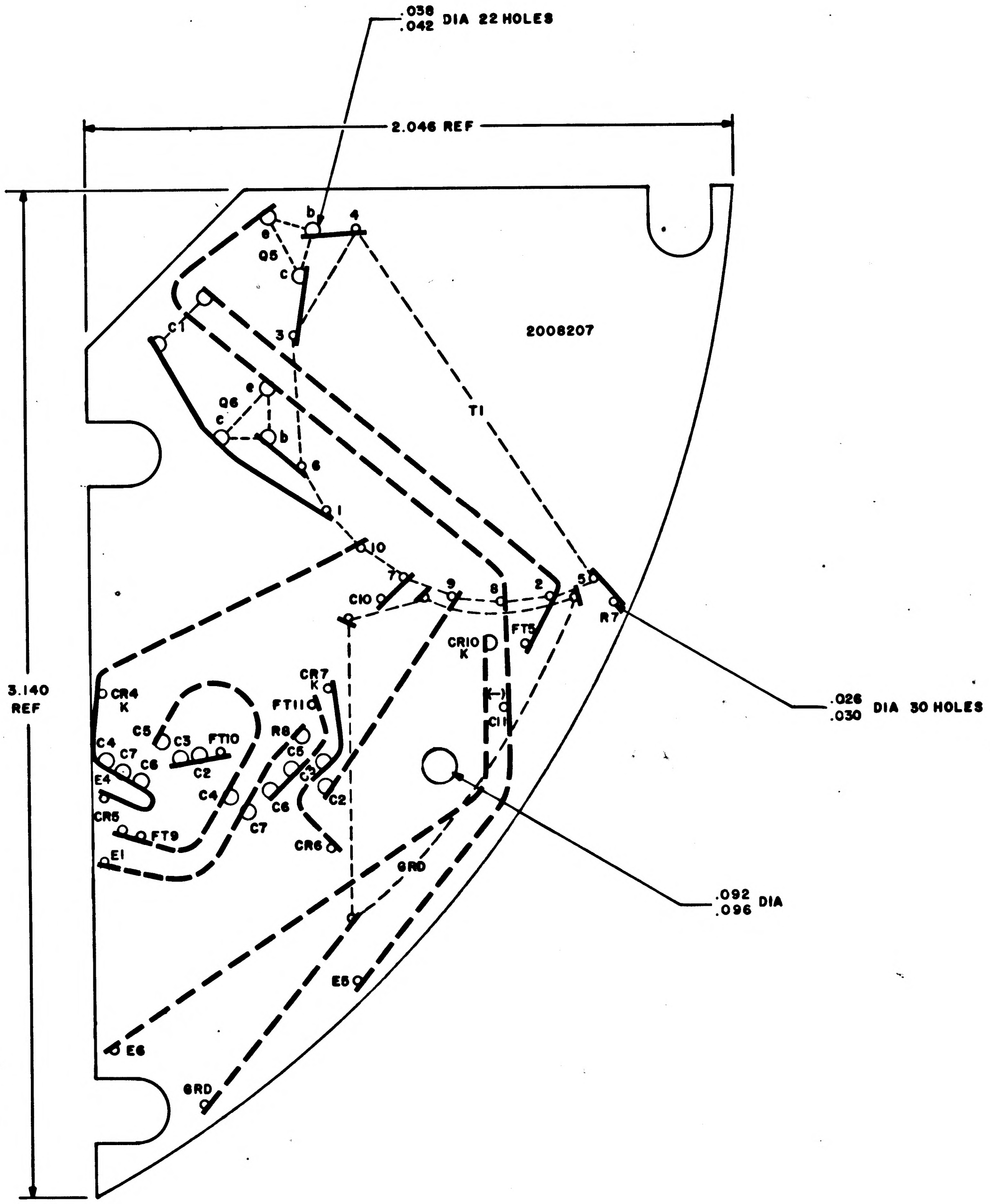
HV POWER SUPPLY-PHOTOMETER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008207
SCALE 8/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1287

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14984	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 16128	JFW	AK	5 FEB 65	[illegible]
C		REVISED PER TDRR 20152	[illegible]	RL	21 JUNE 65	[illegible]


.038
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REF
2008207
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.092
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REF DRAWING
DWG NO. 2008233 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD OR PHOTOGRAPY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007033	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

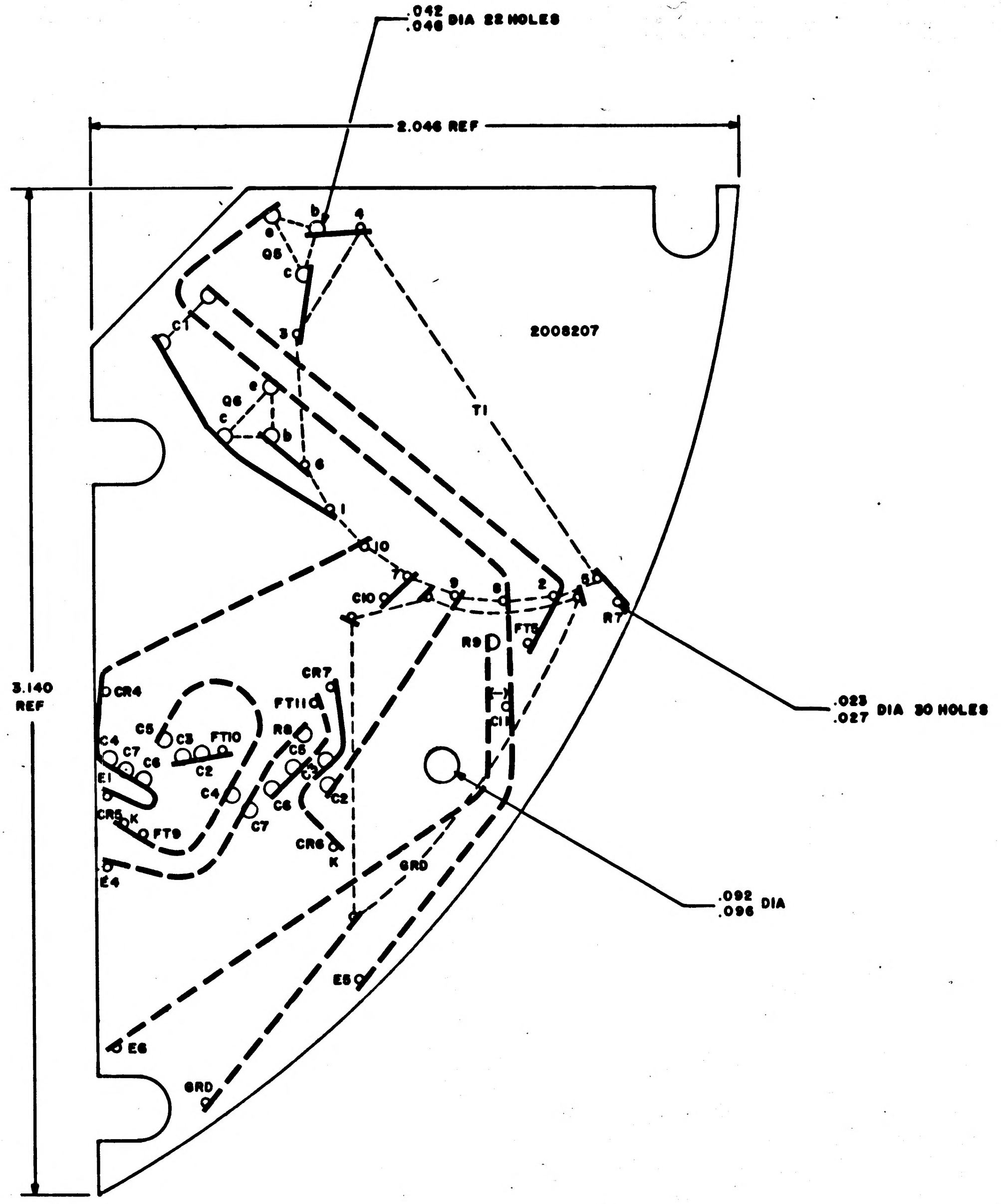
DRAWN Bonerrigo 9/18/64
CHECKED [illegible] 2 Sept 64
APPROVED [illegible] 22 Sep 64
APPROVED L.C. Smith 9/22/64
APPROVED MIT [illegible] 22 Sept 64
APPROVED MSC [illegible] 9-22-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
HV POWER SUPPLY - PHOTOMETER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008207
SCALE 8/1
SHEET 1 OF 1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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REF DRAWING
DWG NO. 2008233 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD OR PHOTOGRAPY PER ND 1002133
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QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007033	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9/18/64
CHECKED
APPROVED 22 SEP
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

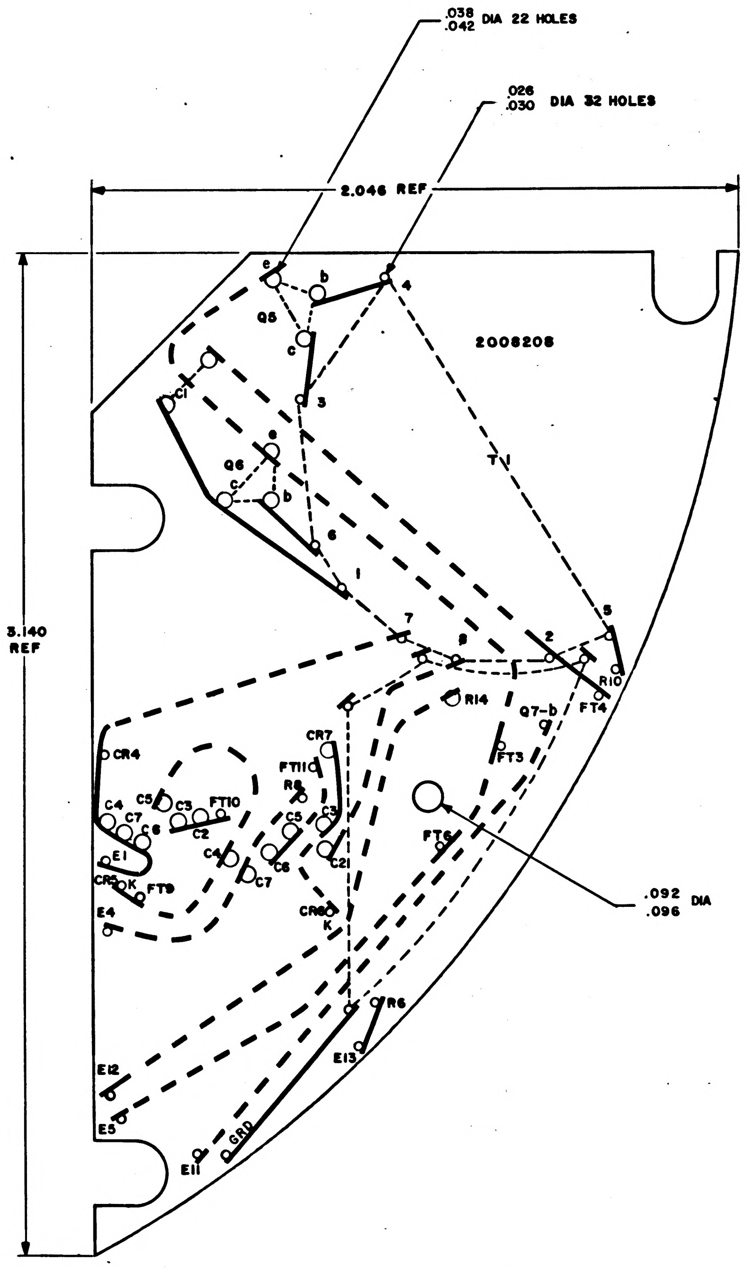
WIRING BOARD
HV POWER SUPPLY–PHOTOMETER

CODE IDENT NO. | SIZE E | DRAWING NO. 2008207
SCALE | SHEET

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14984				



.038
.042 DIA 22 HOLES
.026
.030 DIA 32 HOLES
2.046 REF
3.140 REF
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CR4
CR7
FT11
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C4
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CR5
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.092
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E11
GRD

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:

DRAWING NO. 2008234 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007034	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED L.C. Smith
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

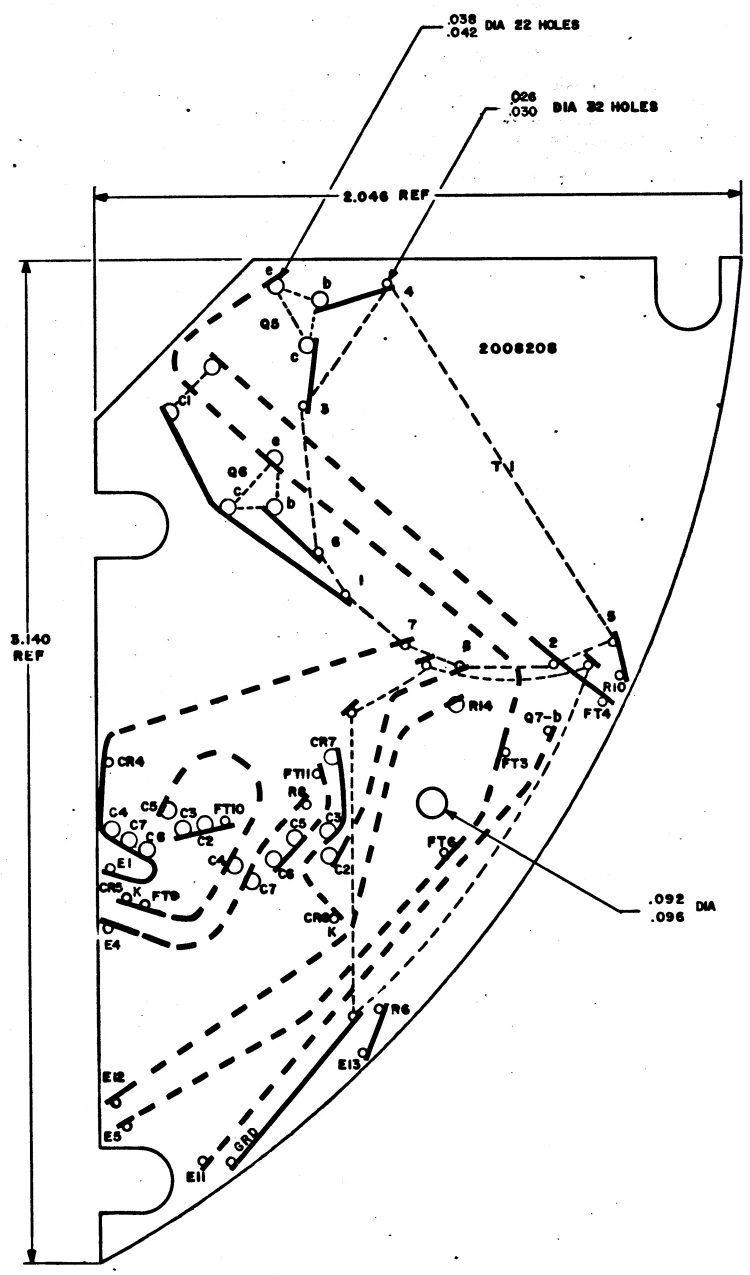
WIRING BOARD
HV POWER SUPPLY-TRACKER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008208
SCALE 5/1
SHEET 1 OF 1

NOTICE: IF U. S. GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 128

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14984				
B		REVISED PER TDRR 16128	WD		5 FEB 65	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.042 DIA 22 HOLES
.026
.030 DIA 32 HOLES
2.046 REF
3.140
REF
2008208
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R10
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Q7-b
CR7
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CR4
FT11
R8
C5
C3
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C2
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C21
FT6
E1
CR5
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FT9
CR8
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.092
.096 DIA
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E13
E12
E5
E11
GRD

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:
DRAWING NO. 2008234 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007034	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED L. C. Smith
APPROVED MIT 23 Sep 64
APPROVED MSC 9-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
HV POWER SUPPLY-TRACKER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008208
SCALE 5/1
SHEET 1 OF 1

2008208 B

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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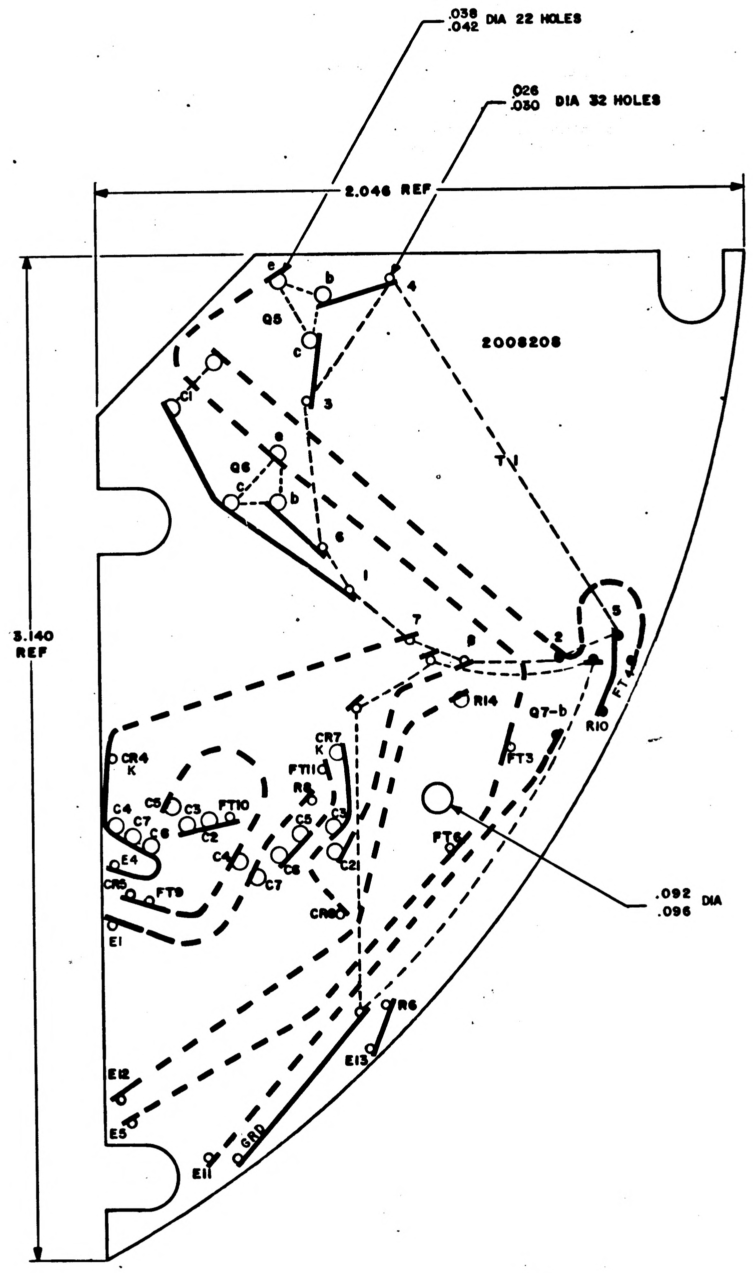
B		REVISED PER TDRR 16128			5F3365	
C		REVISED PER TDRR 20151			2 JUNE	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2.046 REF
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REF DWG:
DRAWING NO. 2008234 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007034	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

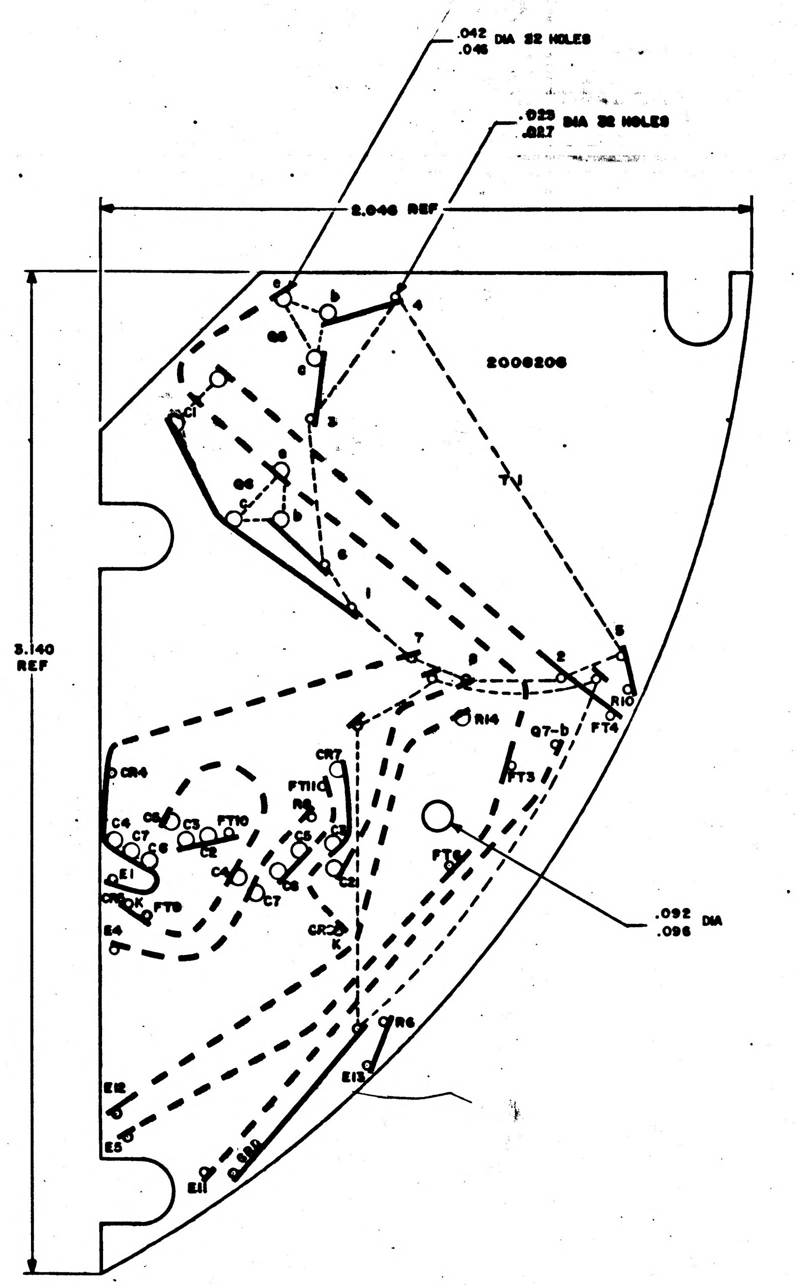
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED L.C. Smith
APPROVED MIT 25 May 64
APPROVED MSC 9-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
HV POWER SUPPLY-TRACKER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008208
SCALE 5/1
SHEET 1 OF 1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.046 DIA 32 HOLES
.023
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2.046 REF
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2008206
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CR7
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C8
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.092
.096 DIA
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E5
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CR10

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:
DRAWING NO. 2008204 PHOTOGRAPHIC MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2

2007034	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB

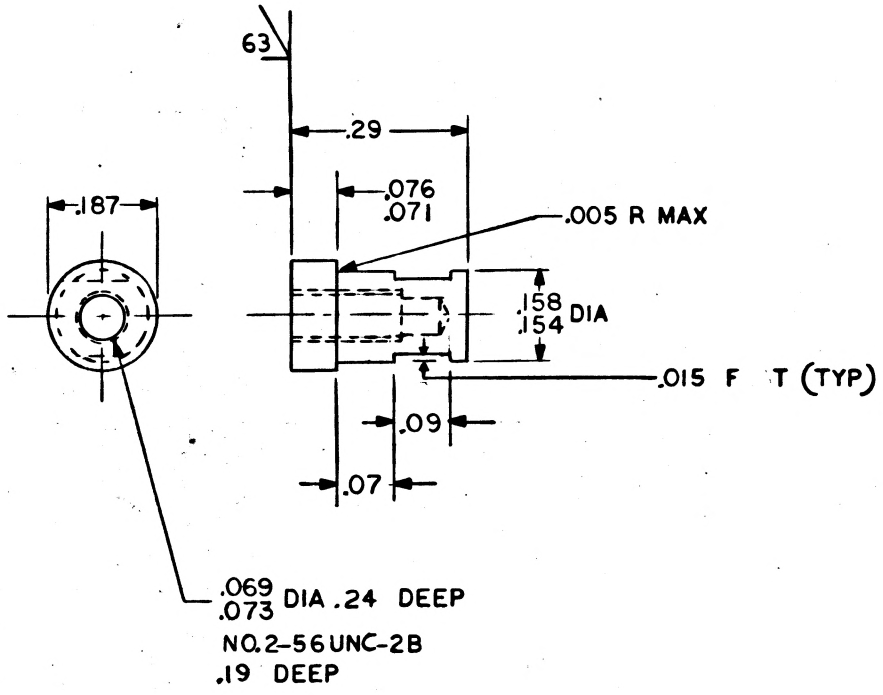
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14997	J.F.W.	RAK	18 DEC 64	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED CLEAR
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125/ UNLESS OTHERWISE SPECIFIED
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007036	
2007035	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	A. Addario Jr.	1 SEPT 64
CHECKED	R.P. Kingsbury	21 Sep 64
APPROVED		22 Sep 64
APPROVED	L.C. Smith	9/22/64
APPROVED MIT		22 Sep 64
APPROVED MSC	W J Rhine	9-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, THREADED

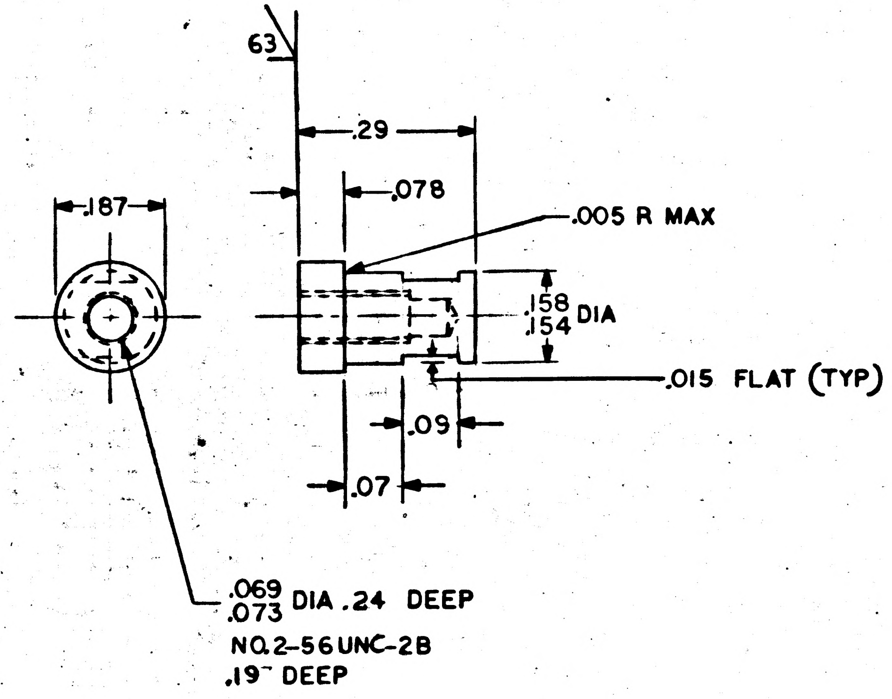
CODE IDENT NO.	SIZE	DRAWING NO.
	C	2008209

SCALE 5/1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: CRES PER QQ-S-763, CLASS 303, COND A
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4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. SURFACE QUALITY: 125/ UNLESS OTHERWISE SPECIFIED
6. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007036	
2007035	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS — DECIMALS XXX ±.005 XX ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2.

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	A. Addario Jr.	1 SEPT 64
CHECKED	R. L. King	21 Sep 64
APPROVED	A. Klane	22 Sep 64
APPROVED	L. C. Smith	9/22/64
APPROVED MIT	W. Hopper	22 Sep 64
APPROVED MSC	W. J. Rhine	9-22-64

INSERT, THREADED

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008209

SCALE 5/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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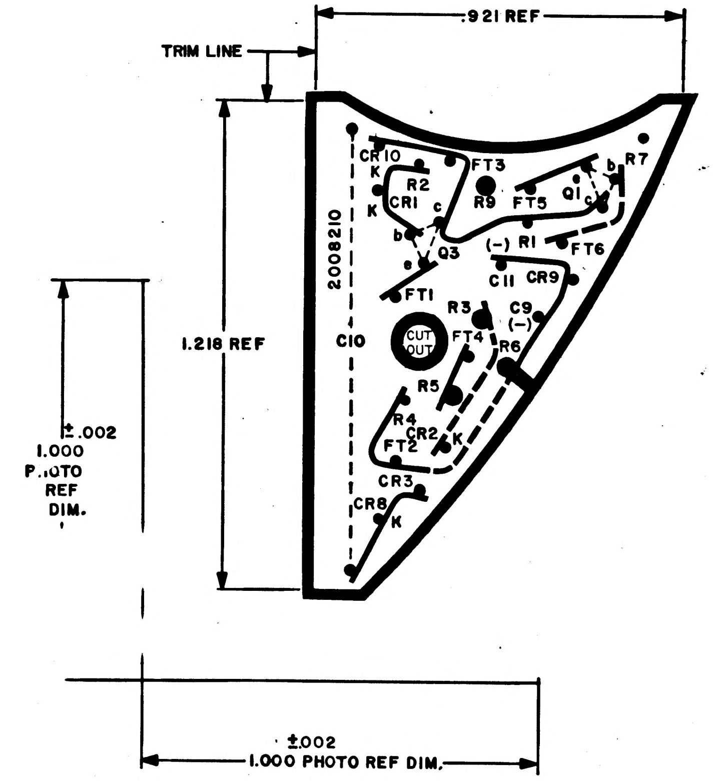
REVISIONS 12f17

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	16 Dec 64	W.R.



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATL: FILM .006 /.008 THICK PER L-F-340, TYPE IB, CLASS 2 STYLE IA
6. ● .026 /.030 DIA
7. ● .038 /.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007035	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 3 Sept 1964
CHECKED R.P. Kingsbury 21 Sep 64
APPROVAL 22 Sep 64
APPROVAL S.C. Smith 9/22/64
NASA APPROVAL 22 Sept 64 9-22-64
MIT APPROVAL W J

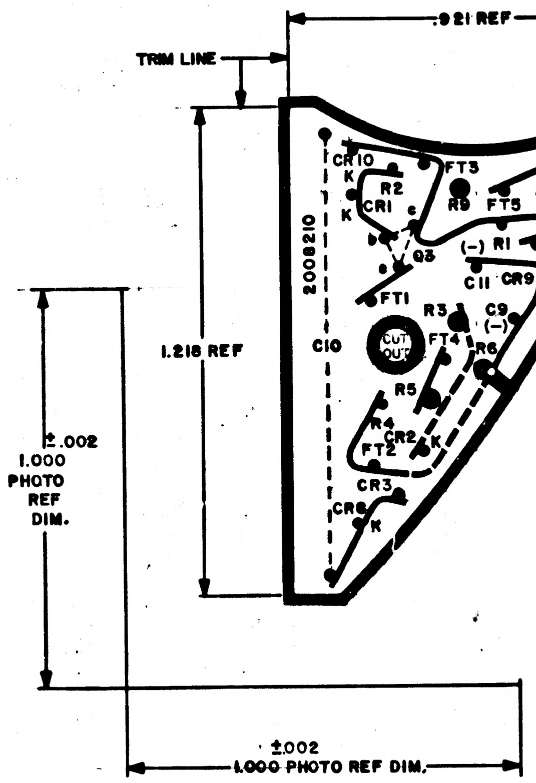
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP
PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008210
SCALE 5/1
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12717			
SYM	DESCRIPTION	DATE	APPROVAL



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6. • .023/.027 DIA PUNCH
7. ● .042/.046 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

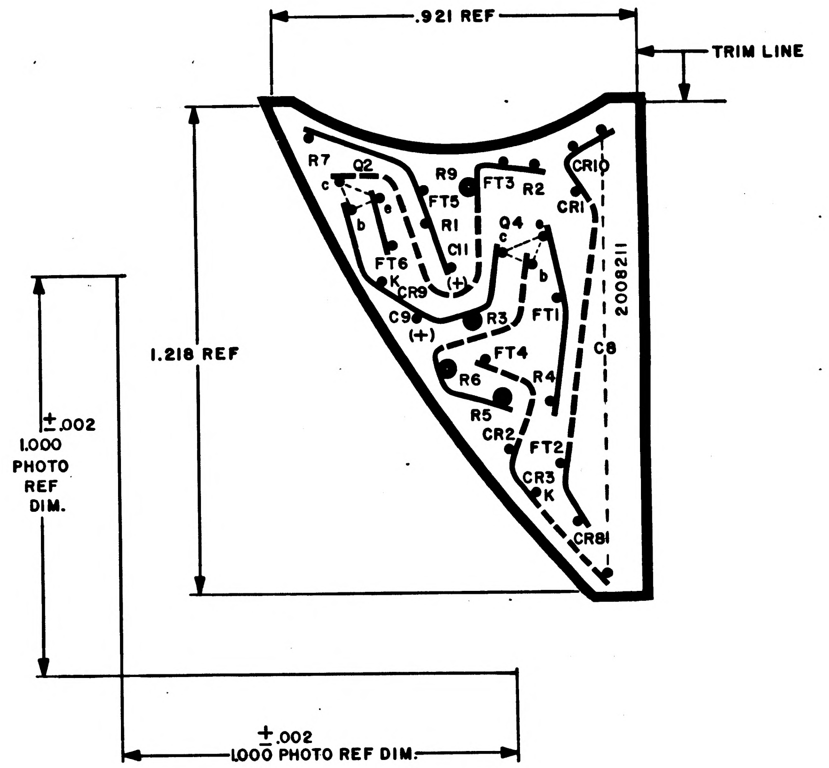
2007035		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	MIT INSTRUMENTATION LAB Cambridge, Mass. DWG. NO. CONTRACT	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	DO NOT SCALE THIS DRAWING	DRAWN Gary Bell DATE 3 Sept 1969	INSULATOR, TOP PHOTOGRAPHIC MASTER POWER SUPPLY PHOTOMETER
APPLICATION		MATERIAL SEE NOTE 5	CHECKED R.P. Kingsbury 21 Sept 69	
		HEAT TREATMENT	APPROVAL 22 Sep 69	
		FINAL FINISH	APPROVAL S.C. Smith 9/22/69	CODE IDENT NO. — SIZE D NASA DRAWING NO. 2008210
			NASA APPROVAL 22 Sept 69 9-22-69	
			MIT APPROVAL W. J.	SCALE 5/1 WT SHEET 1 OF 1

2008210

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	21DEC64	



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MASTER

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LIST OF MATERIALS

NEXT ASSY	USED ON
2007035	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN Tony Bald DATE 9 SEPT 1964
CHECKED R.P. [illegible] 21 SEP 64
APPROVAL [illegible] 22 SEP 64
APPROVAL S.C. Smith 9/22/64
NASA APPROVAL [illegible] 22 Sep 64 9-22-64
MIT APPROVAL W.J. Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008211
SCALE 5/1
WT
SHEET 1 OF 1

2008211 A

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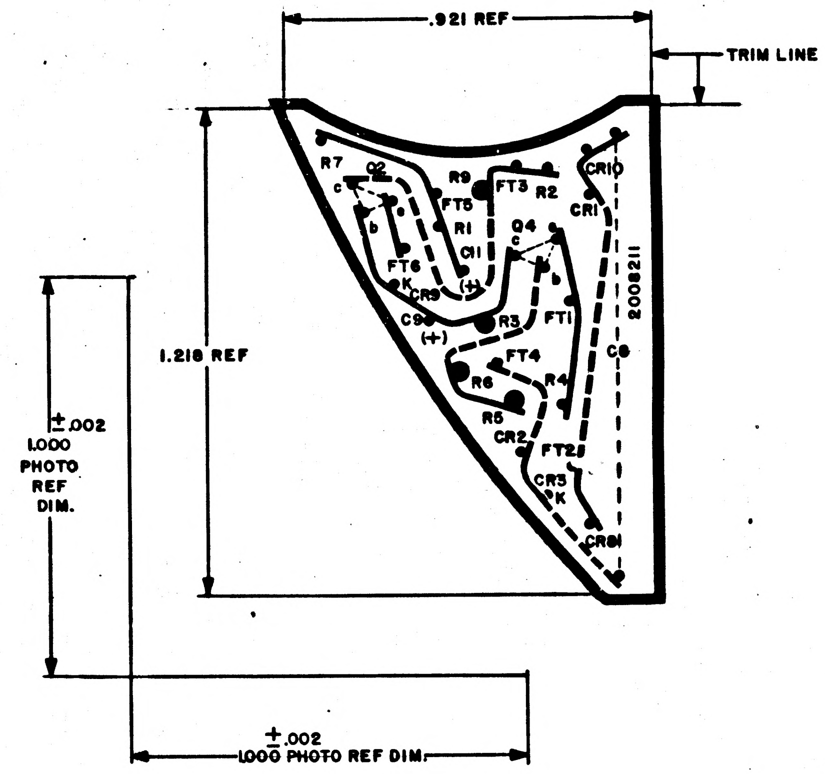

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6. • .023 / .027 DIA PUNCH
7. ● .042 / .046 DIA PUNCH

MASTER

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LIST OF MATERIALS

2007035	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE SEPT 18 64
CHECKED 21 SEP 64
APPROVAL 22 Sep 64
APPROVAL
NASA APPROVAL 9-22-64
MIT APPROVAL

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HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008211
SCALE 5/1
WT
SHEET 1 OF 1

2008211

INCHES
0 1 2

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REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
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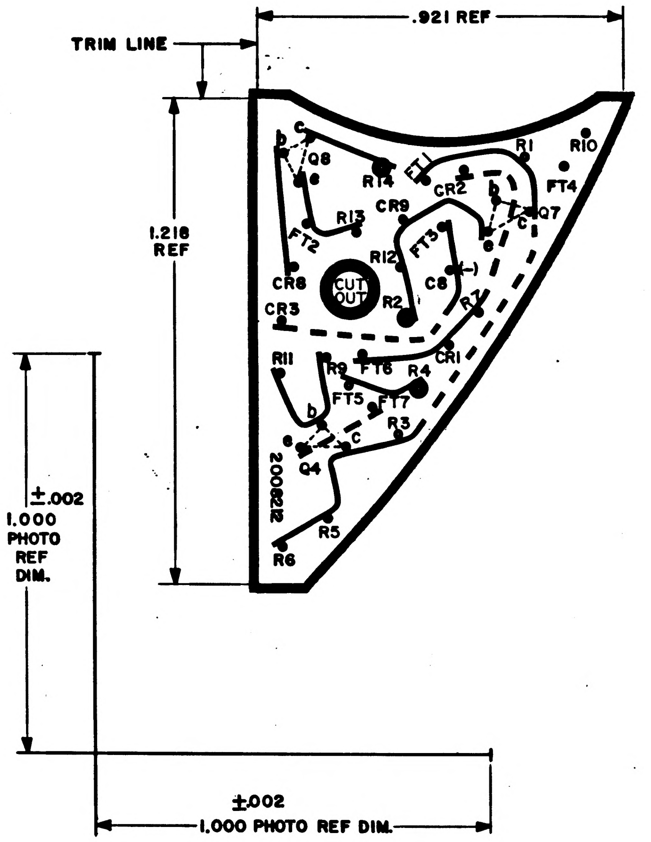

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6. • .026/.030 DIA
7. ● .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007036	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 9-16-64
CHECKED R. P. King 21 Sep 64
APPROVAL H. Crisp 22 Sep 64
APPROVAL S. C. Smith 9/22/64
NASA APPROVAL 22 Sep 64 9-22-64
MIT APPROVAL W. J. Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP PHOTOGRAPHIC MASTER

POWER SUPPLY TRACKER

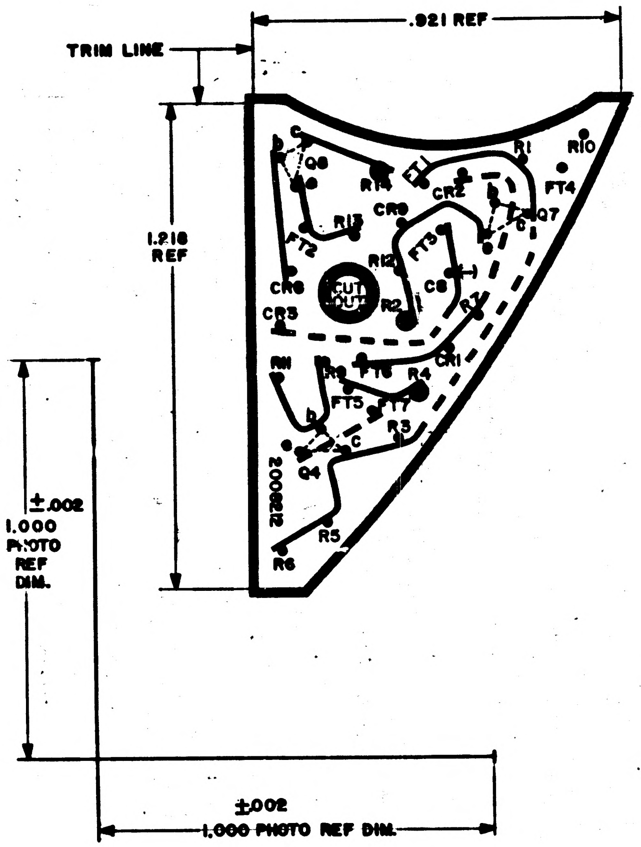
CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008212

SCALE 5/1 WT SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL



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6. • .023/.027 DIA PUNCH
7. ● .042/.046 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007036	

APPLICATION

UNLESS OTHERWISE SPECIFIED
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DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

HEAT TREATMENT

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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN DATE 9-16-64
CHECKED 21 Sep 64
APPROVAL 22 Sep 64
APPROVAL S. C. Smith 9/22/64
NASA APPROVAL 9-22-64
MIT APPROVAL W. J. R

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP PHOTOGRAPHIC MASTER

POWER SUPPLY TRACKER

CODE IDENT NO. ——
SIZE D
NASA DRAWING NO. 2008212
SCALE 5/1
WT
SHEET 1 OF 1

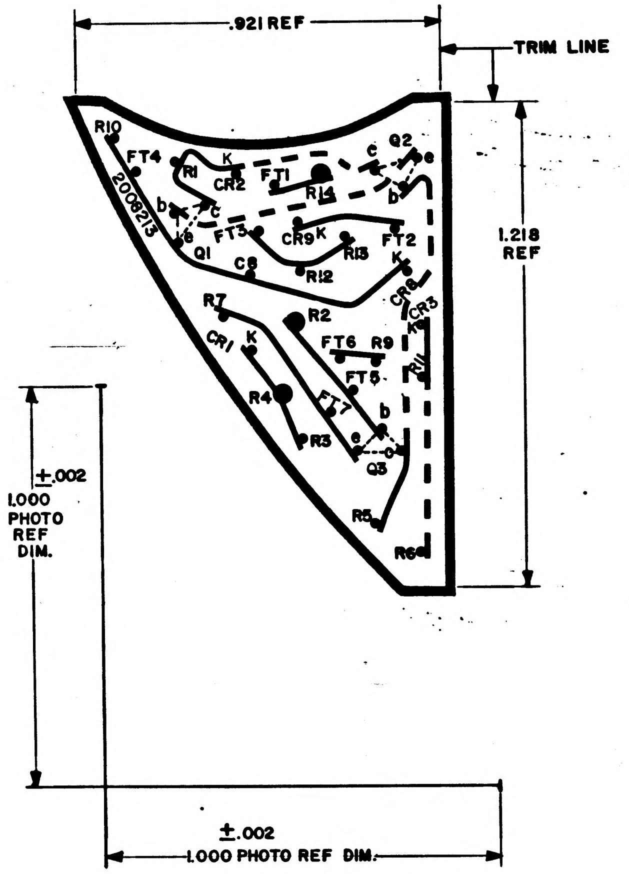
INCHES
0 1 2

2008212

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	21 Dec 64	WJR



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6. ● .026/.030 DIA
7. ⬤ .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
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APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±. ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 9-16-64
CHECKED 21 Sep 64
APPROVAL H Kyle 22 Sep 64
APPROVAL S. C. Smith 9/23/64
NASA APPROVAL 9-22-64
MIT APPROVAL W J Rhine

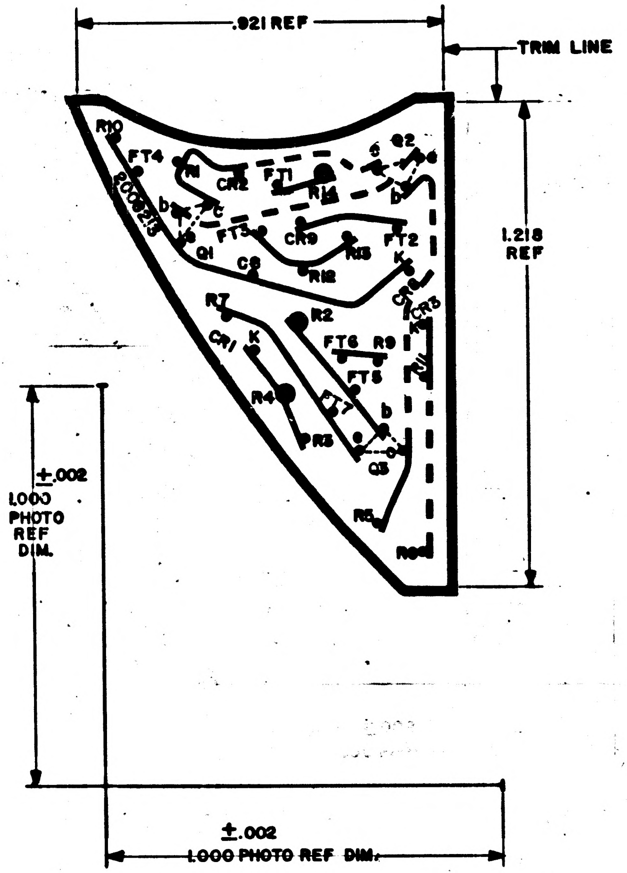
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM PHOTOGRAPHIC MASTER
POWER SUPPLY TRACKER

CODE IDENT NO. ——— SIZE D NASA DRAWING NO. 2008213
SCALE 8/1 WT SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817			
SYM	DESCRIPTION	DATE	APPROVAL



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MASTER

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NEXT ASSY	USED ON
APPLICATION	

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MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 9-16-64
CHECKED 21 Sep 64
APPROVAL 22 Sep 64
APPROVAL 9/23/64
NASA APPROVAL 9-28-64
MIT APPROVAL W J

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
POWER SUPPLY TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008213
SCALE 5/1
WT
SHEET 1 OF 1

2008213

INCHES

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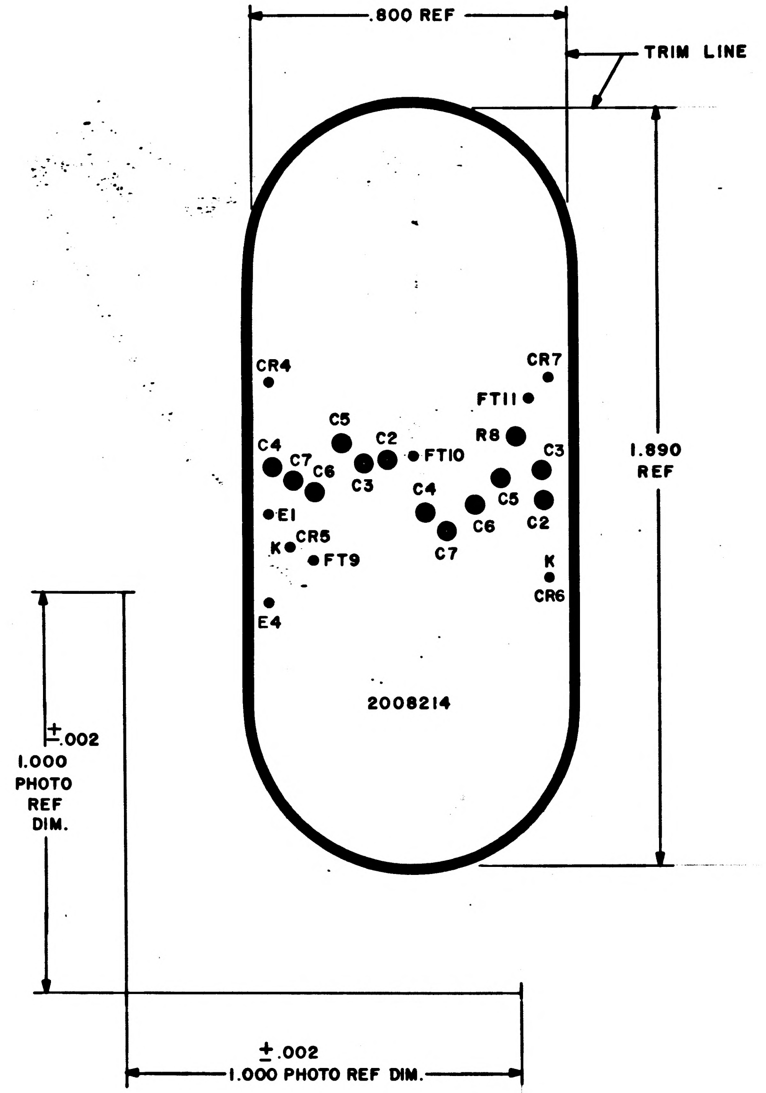
REVISIONS 12F17

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	[illegible] 64	WR



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MASTER

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LIST OF MATERIALS

NEXT ASSY	USED ON
2007037	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bonarrigo DATE Sept 16 1964
CHECKED R.P. Kingsbury 21 Sep 64
APPROVAL [illegible] 28 SEP 64
APPROVAL S. C. Smith 9/22/64
NASA APPROVAL W. [illegible] 22/64
MIT APPROVAL W. J. Rhine 9-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER-TRACKER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008214

SCALE 5/1 WT SHEET 1 OF 1

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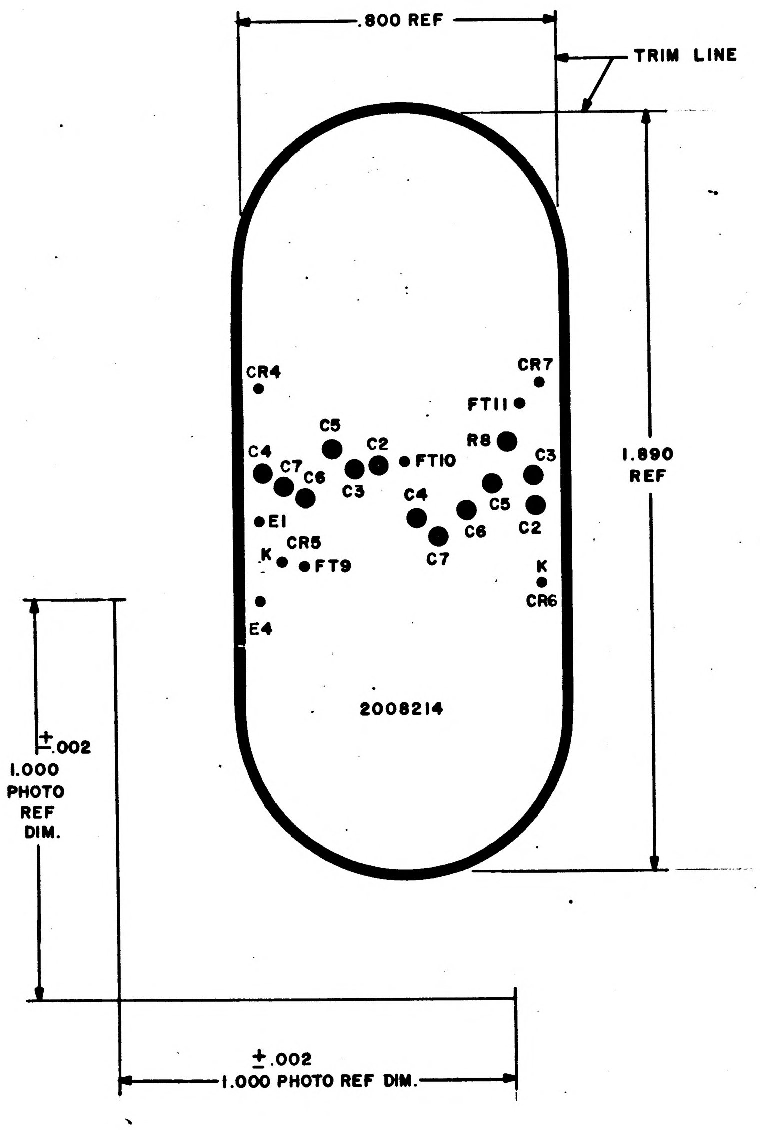
REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	21DEC64	WR
B	REVISED PER TDRR 16128	5FEB65	WR



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5. MATL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. • .026/.030 DIA
7. ● .038/.042 DIA

MASTER

2007037	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Bonarrigo DATE Sept 16 1964
CHECKED L.P. Kingsbury 21Sep64
APPROVAL 23 SEP 64
APPROVAL S. C. Smith 9/22/64
NASA APPROVAL 22 9-22-64
MIT APPROVAL W. J. Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP PHOTOGRAPHIC MASTER

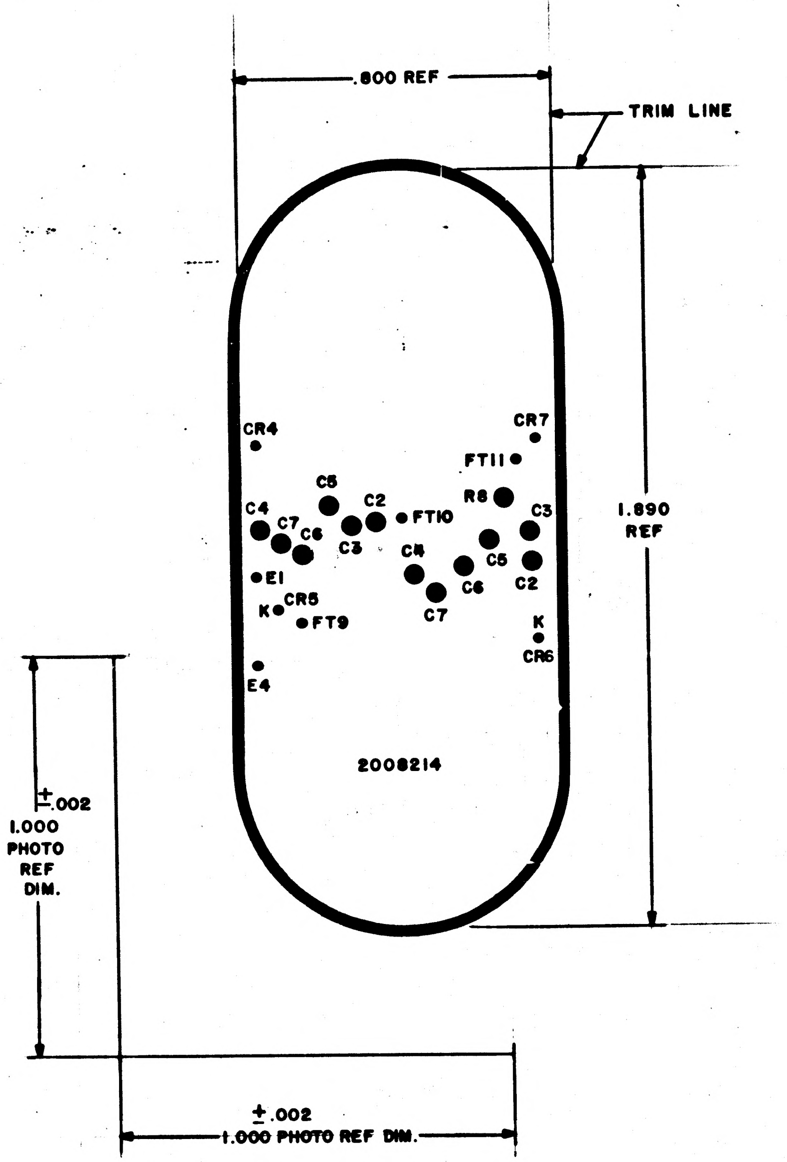
POWER SUPPLY PHOTOMETER-TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008214
SCALE 5/1
WT
SHEET 1 OF 1

2008214 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 12817			



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .023/.027 DIA PUNCH
7. ⬤ .042/.046 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007037	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bonacci DATE Sept 15 1964
CHECKED R.P. Kunig 21 Sept 64
APPROVAL 28 Sep 64
APPROVAL A. C. 9/28/64
NASA APPROVAL 9-22-64
MIT APPROVAL W. J. Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP
PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER - TRACKER

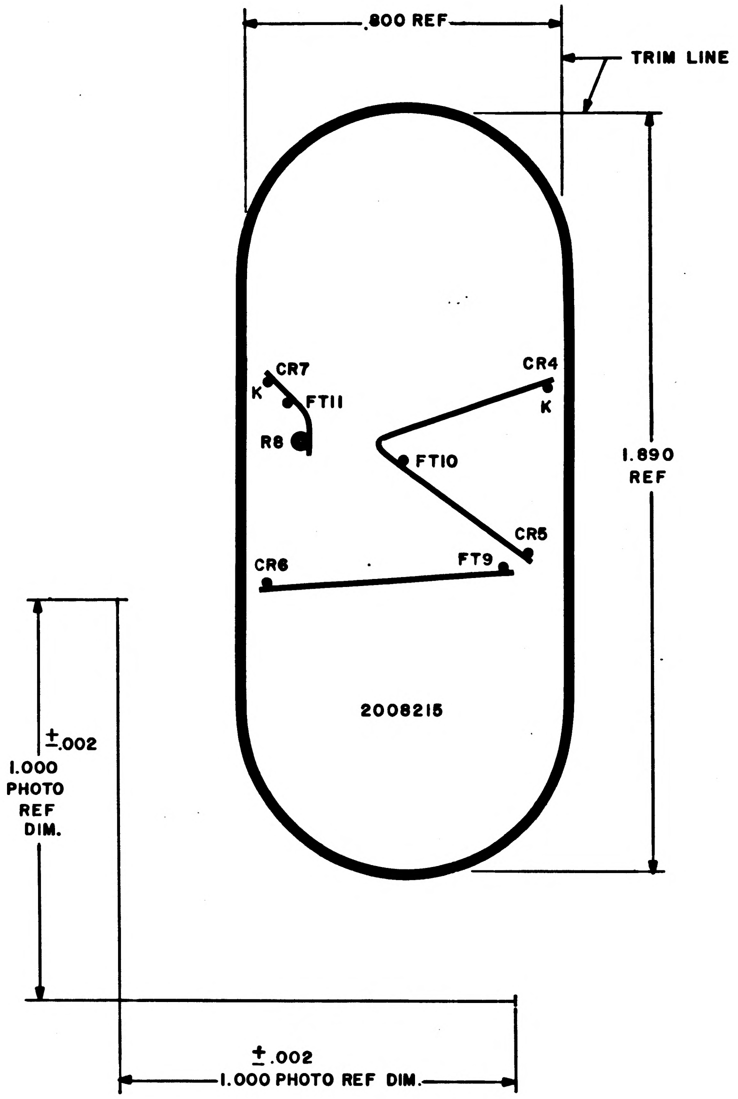
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008214
SCALE 5/1
WT
SHEET 1 OF 1

2008214

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	12 Dec 64	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. • .026/.030 DIA
7. ● .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007037	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bonarrigo DATE Sept 16 1964
CHECKED R.P. Kingsbury 21 Sep 64
APPROVAL [illegible] 21 Sep 64
APPROVAL S.C. Smith 9/22/64
NASA APPROVAL W. Kupfer 22 Sep 64
9-22-64
MIT APPROVAL W.J. Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

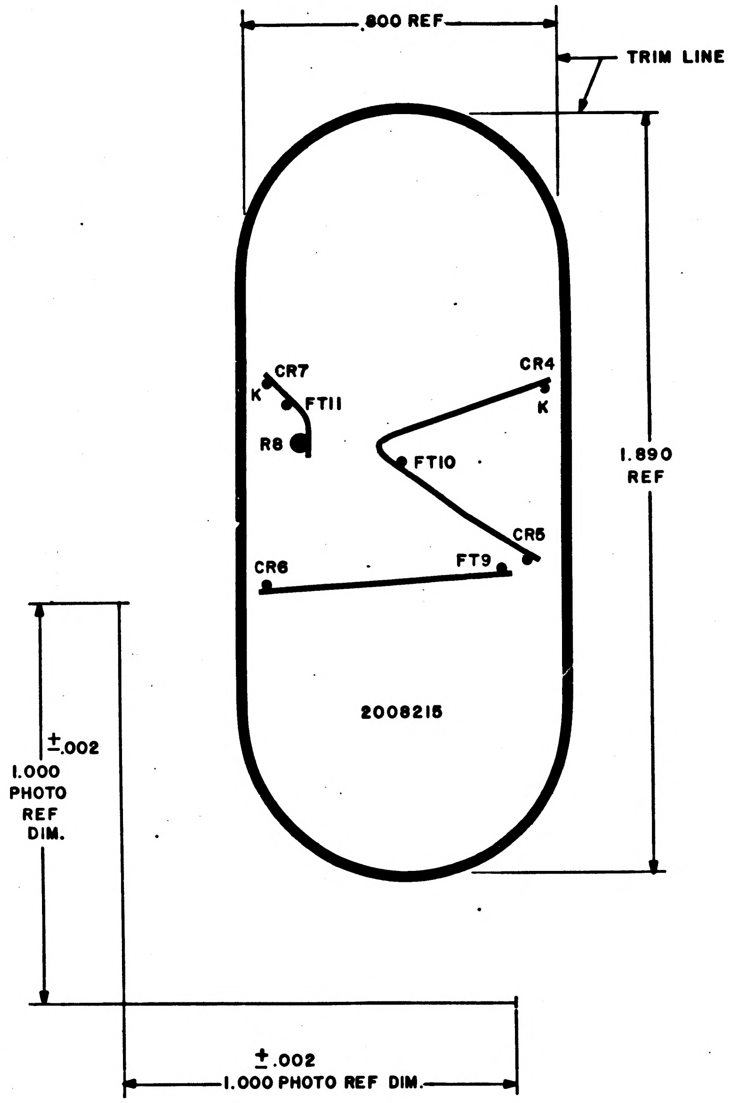
INSULATOR, BOTTOM PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER-TRACKER

CODE IDENT NO. — SIZE D NASA DRAWING NO. 2008215
SCALE 5/1 WT SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14988	12 DEC 64	WR
B	REVISED PER TDRR 16128	5FEB65	WR



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .026/.030 DIA
7. ● .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007037	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN Bonarrigo DATE Sept 16 1964
CHECKED R.P. Kingsbury 21 Sept 64
APPROVAL [illegible] 23 Sep 64
APPROVAL L.C. Smith 9/23/64
NASA APPROVAL W Kupfer 22 Sep 64
9-23-64
MIT APPROVAL W J Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

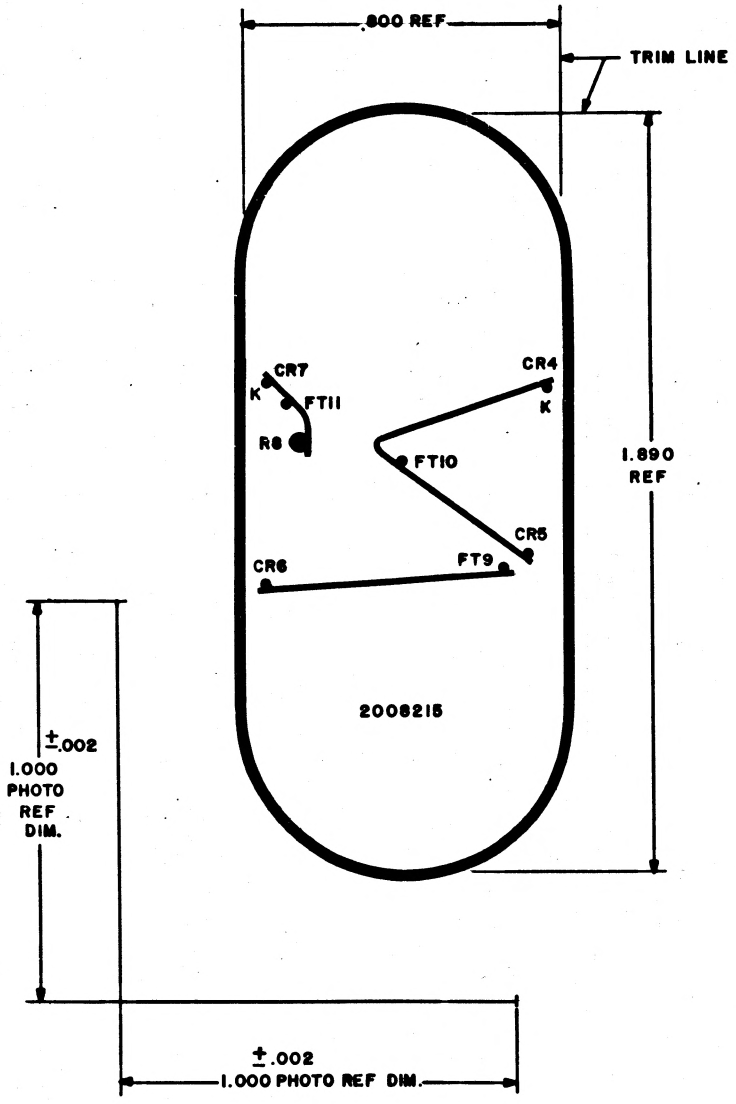
INSULATOR, BOTTOM PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER-TRACKER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008215

SCALE 5/1
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATL: FILM .006/.008 THICK PER L-F-340, TYPE II, CLASS 2, STYLE IA
6. ● .023/.027 DIA PUNCH
7. ● .042/.046 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007037	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Benerdo DATE 3 Sep 1964
CHECKED R.L. King 21 Sep 64
APPROVAL 3 Sep 64
APPROVAL L.C. Smith 9/22/64
NASA APPROVAL 22 Sep
9-22-64
MIT APPROVAL W. J. Rhine

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
POWER SUPPLY PHOTOMETER-TRACKER

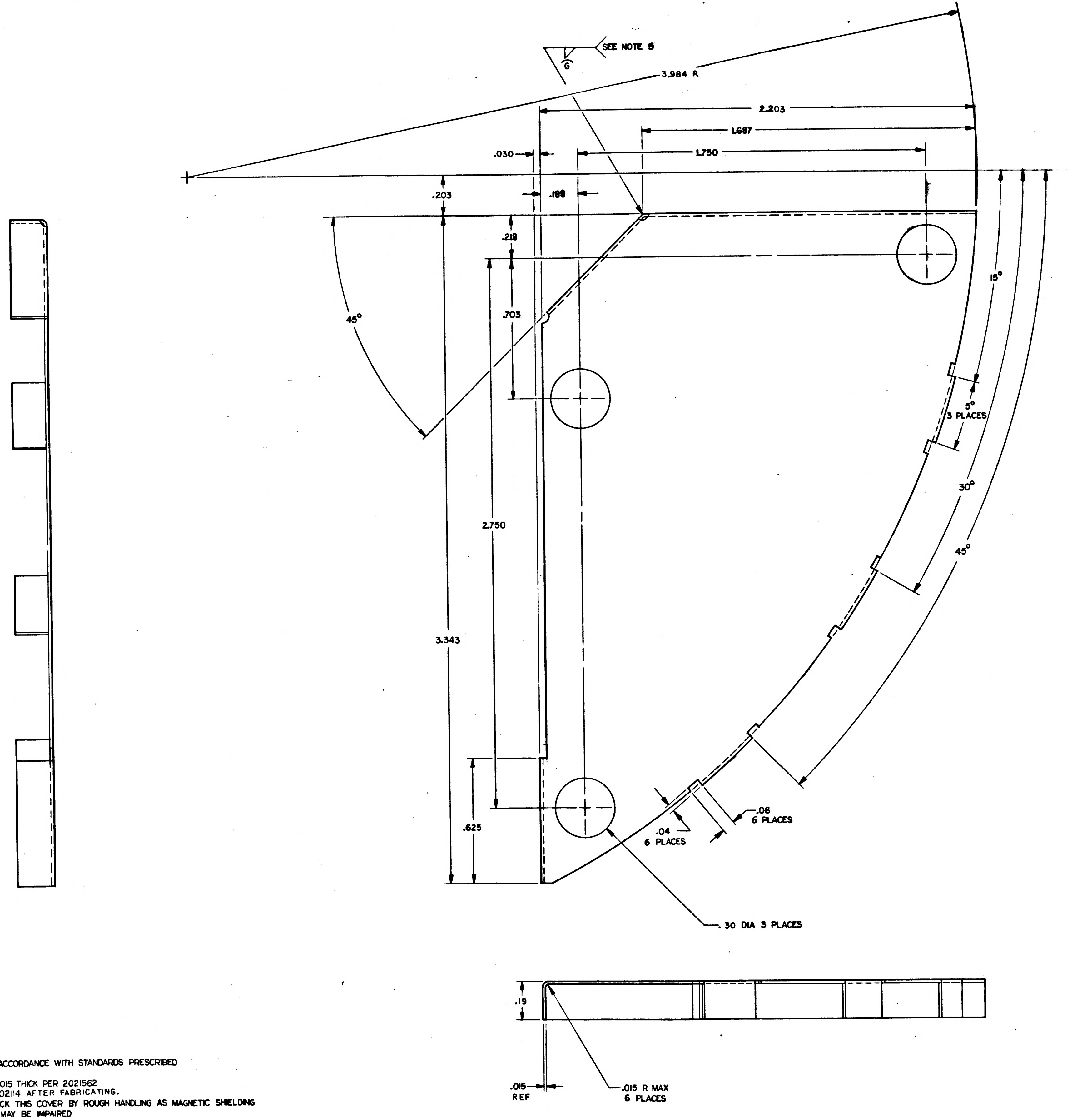
CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008215
SCALE 5/1	WT	SHEET 1 OF 1

INCHES
0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14986	[illegible]	WR



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: "MU METAL" .015 THICK PER 2021562
3. HEAT TREAT PER ND1002114 AFTER FABRICATING.
4. WARNING: DO NOT SHOCK THIS COVER BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
5. BRAZE PER MIL-B-7883
6. DO NOT EXCEED 1300°F IN ANY BRAZING OPERATION
7. REMOVE BURRS AND BREAK SHARP EDGES .010 MAX
8. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
1007030	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS XXX ±.005 XX ±.02
ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT SEE NOTE 3
FINAL FINISH SEE NOTE 8

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN B J Papa DATE 9 Jul 64
CHECKED [illegible]
APPROVAL [illegible] Aug 64
APPROVAL S. C. Smith [illegible]
NASA APPROVAL W J Rhine 9-22-64
MIT APPROVAL [illegible] 22 Aug 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

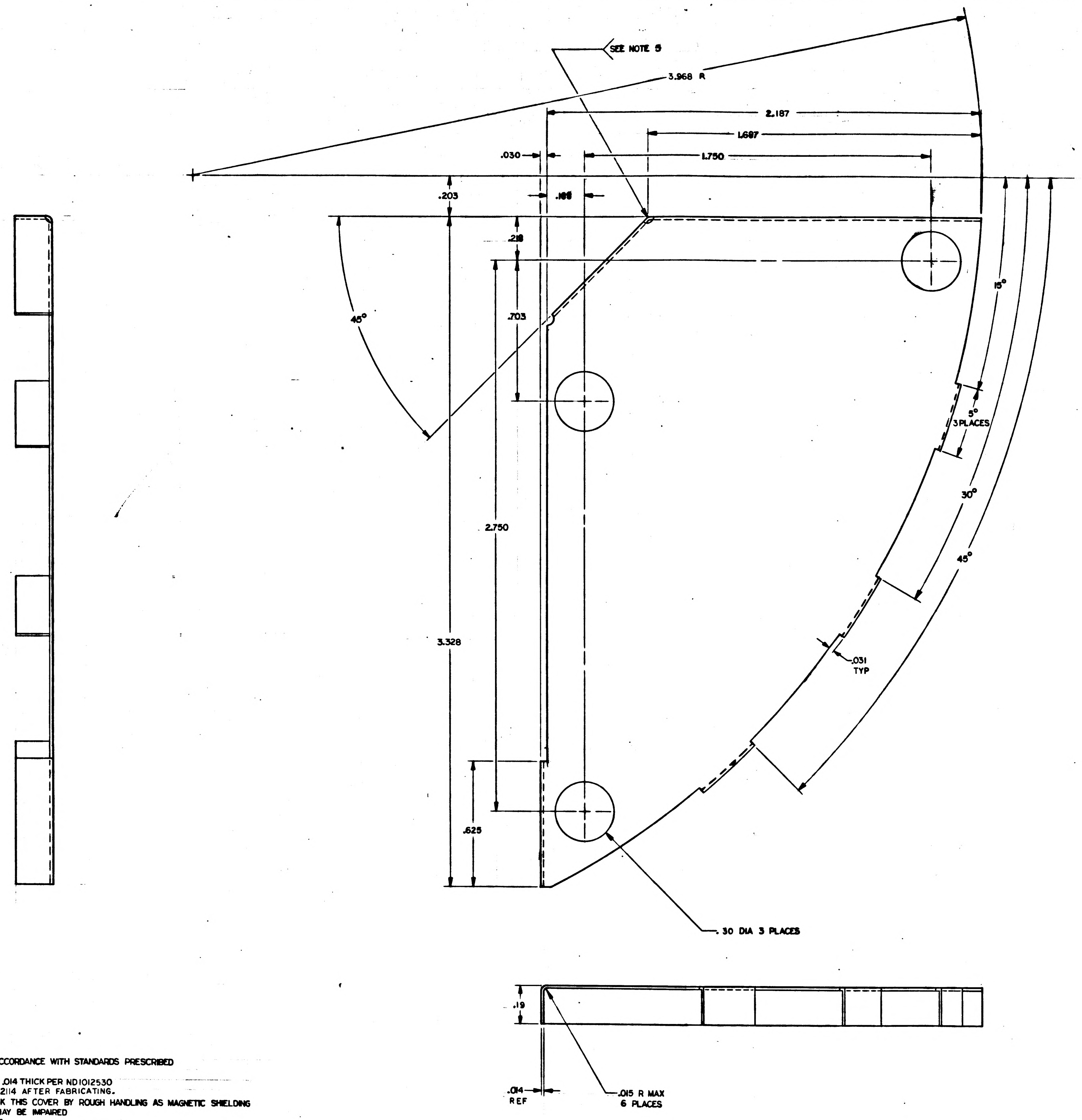
COVER, MAGNETIC SHIELDING
PWR SUP PHOTOMETER - TRACKER

CODE IDENT NO —
SIZE E
NASA DRAWING NO. 2008216
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14986	[illegible]	WK
B	REVISED PER TDRR 18125	APR 65	WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL : NICKEL ALLOY .014 THICK PER ND1012530
3. HEAT TREAT PER ND1002114 AFTER FABRICATING.
4. WARNING: DO NOT SHOCK THIS COVER BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
5. BRAZE PER MIL-B-7883
6. DO NOT EXCEED 1300°F IN ANY BRAZING OPERATION
7. REMOVE BURRS AND BREAK SHARP EDGES .010 MAX
8. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
1007030	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX ±.02 ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
HEAT TREATMENT SEE NOTE 3
FINAL FINISH SEE NOTE 8

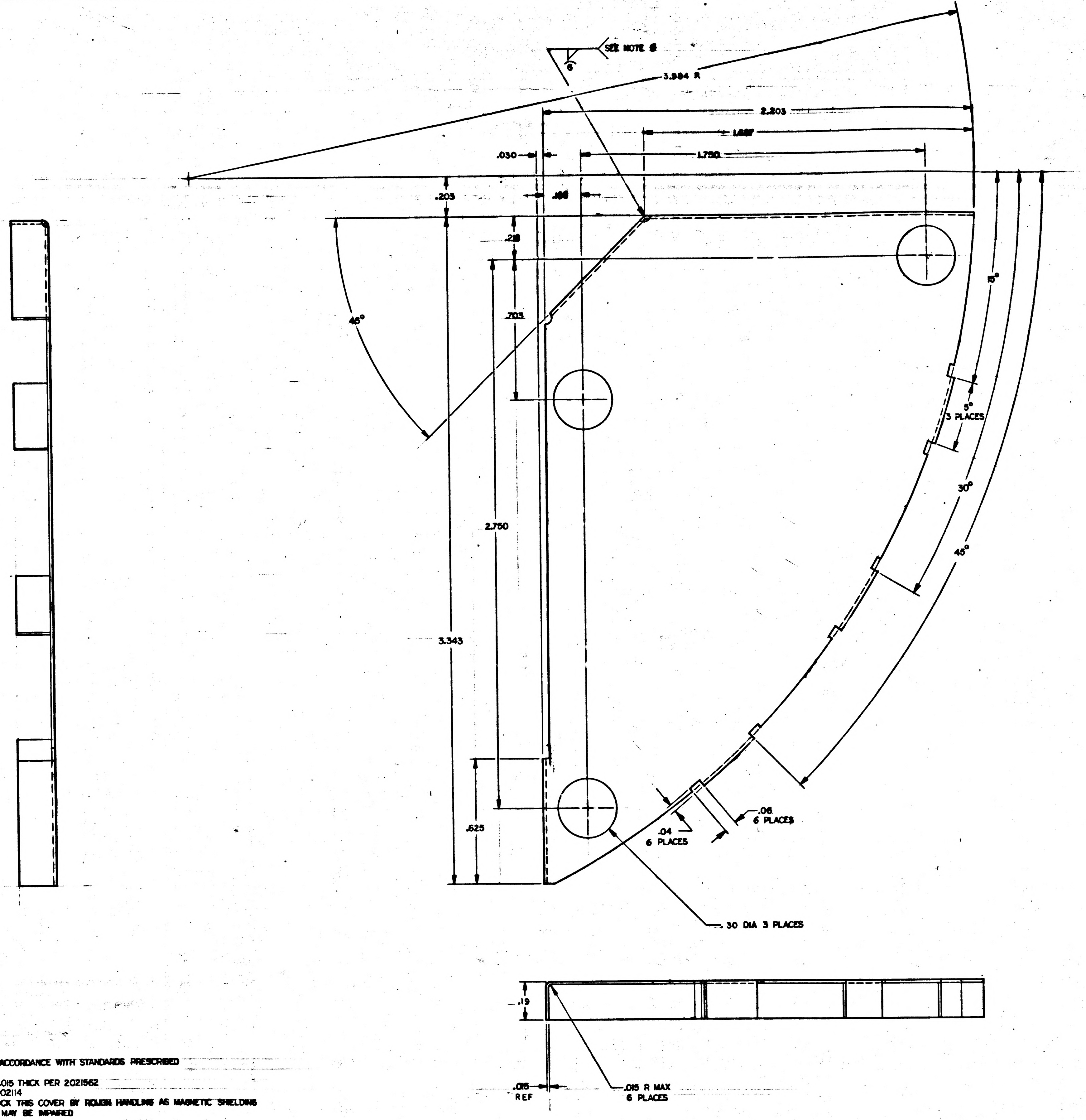
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT

DRAWN B J Papia DATE 9 Sep 64
CHECKED [illegible]
APPROVAL [illegible] 9 Sep 64
APPROVAL L C Smith [illegible]
NASA APPROVAL W J Rhine 09-22-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, MAGNETIC SHIELDING
PWR SUP PHOTOMETER - TRACKER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2008216
SCALE 5/1
WT ———
SHEET 1 OF 1


SEE NOTE 5
6
3.984 R
2.203
1.687
1.750
.030
.203
.188
.218
.703
45°
2.750
3.343
.625
15°
5°
3 PLACES
30°
45°
.06
6 PLACES
.04
6 PLACES
.30 DIA 3 PLACES
.19
.015
REF
.015 R MAX
6 PLACES

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: "MU METAL" .015 THICK PER 2021562
3. HEAT TREAT PER ND 1002114
4. WARNING: DO NOT SHOCK THIS COVER BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
5. BRAZE PER MIL-B-7883
6. DO NOT EXCEED 1300°F IN ANY BRAZING OPERATION
7. REMOVE BURRS AND BREAK SHARP EDGES .010 MAX
8. FINISH: PAINT PER MIL-E-15090 TYPE III
9. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

1007030	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX ±.02 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT SEE NOTE 3
FINAL FINISH SEE NOTE 8

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL W. J. Rhine 9-22-64
MIT APPROVAL W. Kupfer 22 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

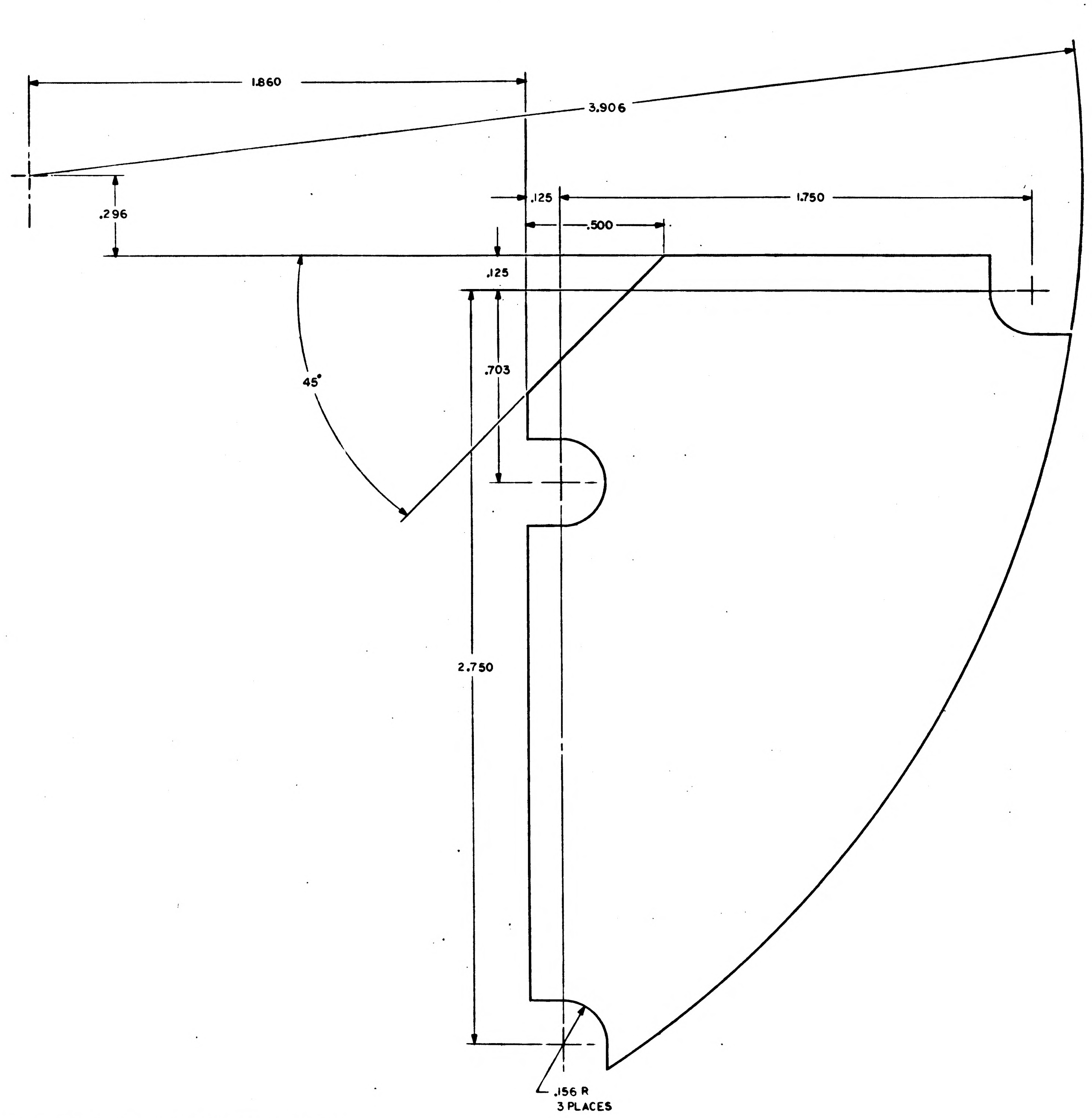
COVER, MAGNETIC SHIELDING PWR SUP PHOTOMETER - TRACKER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008216
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACED WITH CHANGE BY REV B PER TDRR 14328	11/17/64	LK WK



1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: INSULATION, ELECTRICAL .0075 THICK PER MIL-I-631 TYPE G
3. IDENTIFY PER ND 1002019

Ⓐ REPLACED WITH CHANGE BY REV B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007042	
2007038	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN [illegible] DATE 9-18-64
CHECKED R.P. [illegible] 21 Sep 64
APPROVAL [illegible] 21 Sep 64
APPROVAL [illegible]
NASA APPROVAL W.J. [illegible] 9-22-64
MIT APPROVAL W. Kupfer 23 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR
PHOTOMETER — TRACKER

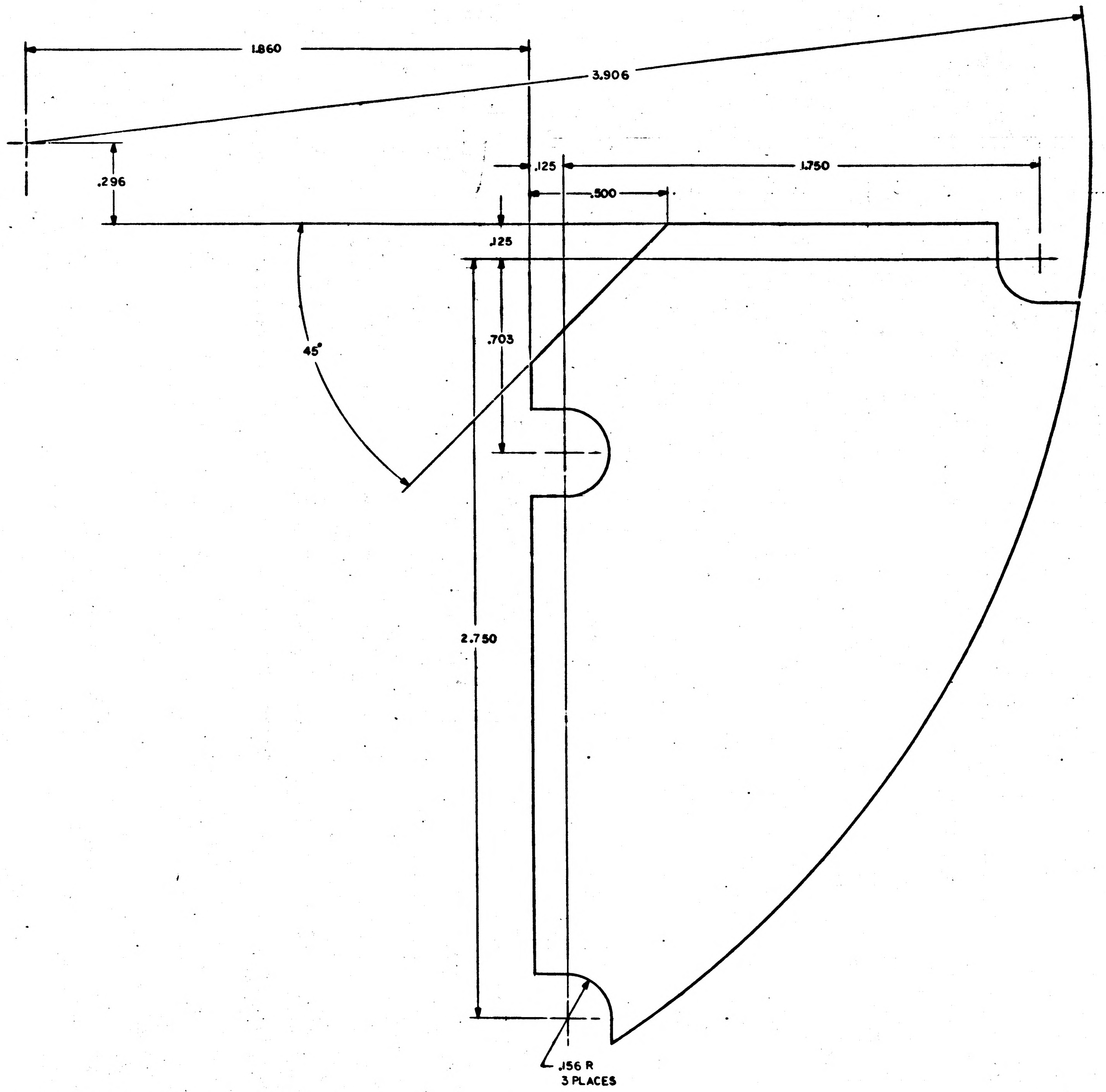
CODE IDENT NO. —— SIZE E NASA DRAWING NO. 2008217
SCALE 5/1 WT SHEET 1 OF 1

PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	DESCRIPTION	DATE	APPROVAL



1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: INSULATION, ELECTRICAL .0075 THICK PER MIL-I-631 TYPE G
3. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007042	
20070[illegible]	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.010
ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 9-15-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL W. J. R[illegible] 9-22-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

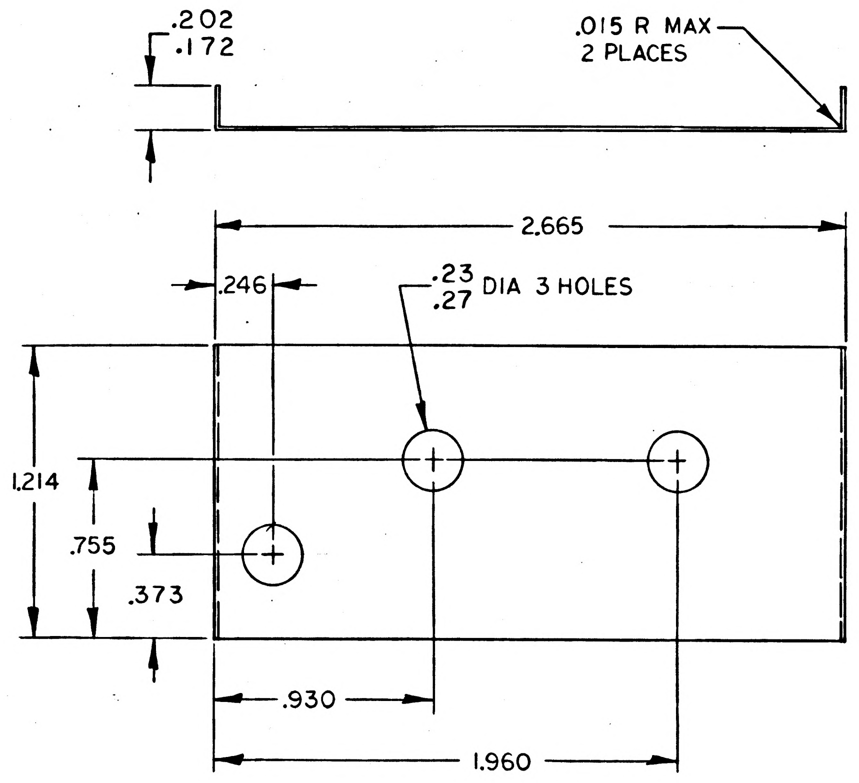
INSULATOR
PHOTOMETER — TRACKER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2008217
SCALE 5/1
WT
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14974		RPK	18 DEC 64	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MU METAL .015 THICK PER 2021562.
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY PER ND 1002019
5. DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
6. HEAT TREAT PER ND 1002114 AFTER FABRICATING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007023	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E.W. Johansen 15SEP64
CHECKED R.P. Kingsbury 25SEP64
APPROVED H. Krane 28 Sep 64
APPROVED A. C. Smith 9/28/64
APPROVED MIT W Wrigley 30 Sep 64
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
TUNING FORK

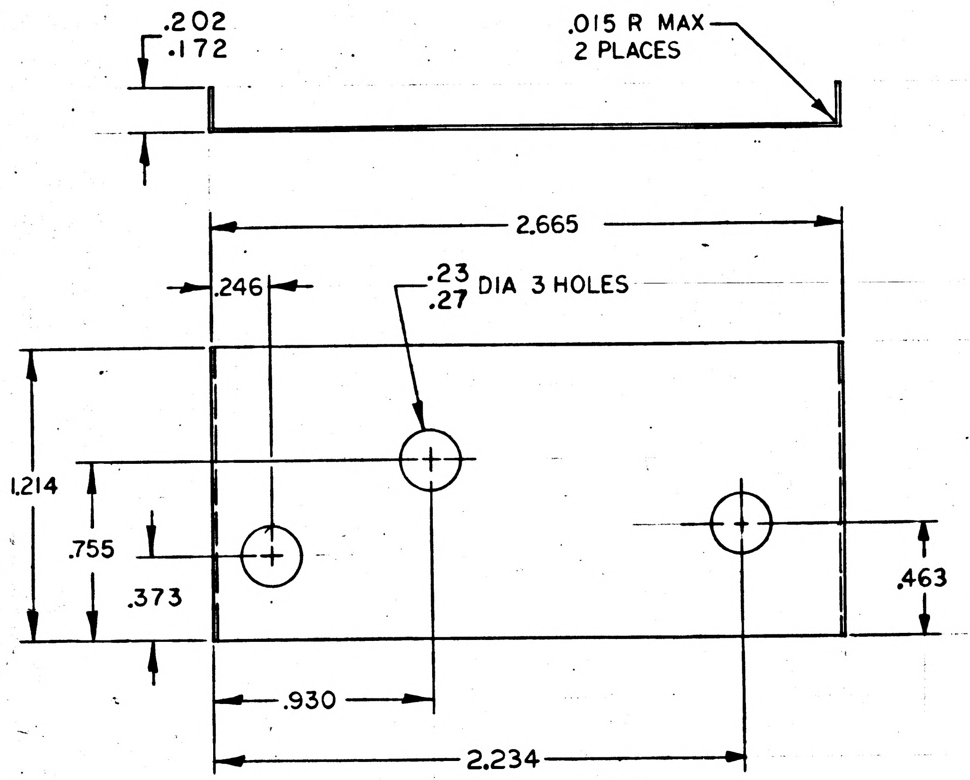
CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008218
SCALE 2/1
SHEET 1 OF 1

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14974		EHK	18 DEC 64	WR
B		REVISED PER TDRR 16397	L.S.B.	RL	7/9/65	WR



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MU METAL .015 THICK PER 2021562
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY PER ND1002019
5. DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
6. HEAT TREAT PER ND 1002114 AFTER FABRICATING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007023	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	E W Johansen	15SEP64
CHECKED	R. P. Kingsbury	25SEP64
APPROVED	H. Krane	28 SEP 64
APPROVED	A. C. Smith	9/28/64
APPROVED MIT	W Toepfer	30 Sep 64
APPROVED MSC		DATE

COVER
TUNING FORK

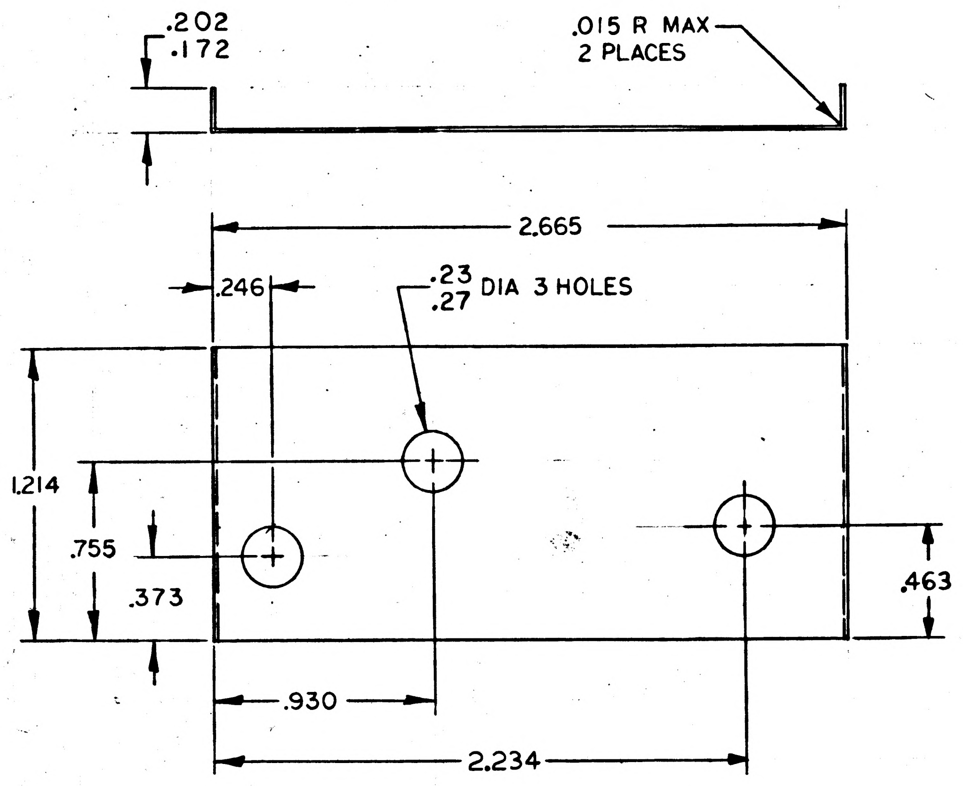
CODE IDENT NO.	SIZE	DRAWING NO.
——	C	2008218
SCALE 2/1		SHEET 1 OF 1

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14974			18 DEC 64	WR
B		REVISED PER TDRR 16397	L.S.B.		3/9/65	WR
C		REVISED PER TDRR 17482			22 MAR 65	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: NICKEL ALLOY .014 THICK PER 1012530
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY PER ND1002019
5. DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
6. HEAT TREAT PER ND 1002114 AFTER FABRICATING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007023	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
— SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E W Johansen 15SEP64
CHECKED 25SEP64
APPROVED H. Krane 28 SEP 64
APPROVED A. C. Smith 9/28/64
APPROVED MIT 30Sep64
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

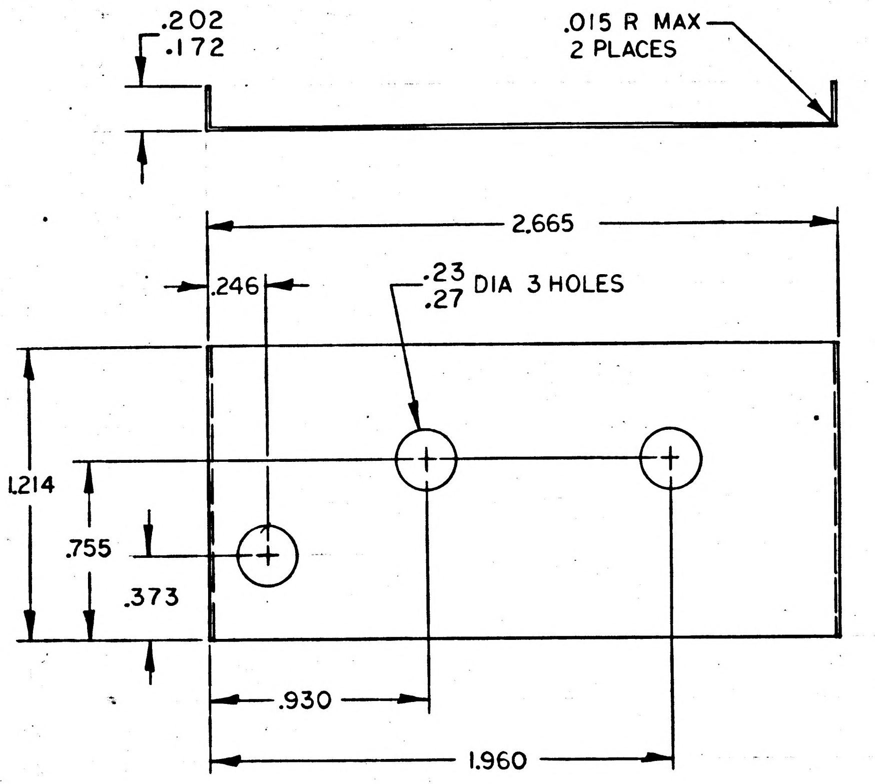
COVER
TUNING FORK

CODE IDENT NO. —
SIZE C
DRAWING NO. 2008218
SCALE 2/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MU METAL .015 THICK PER 2021562
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY PER ND1002019
5. DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED
6. HEAT TREAT PER ND 1002114
7. PAINT PER MIL-E-15090 TYPE III

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007023	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E W Johansen 15SEP64
CHECKED 25SEP64
APPROVED H. Krane 28 SEP 64
APPROVED 9/28/64
APPROVED MIT 30 Sep 64
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
TUNING FORK

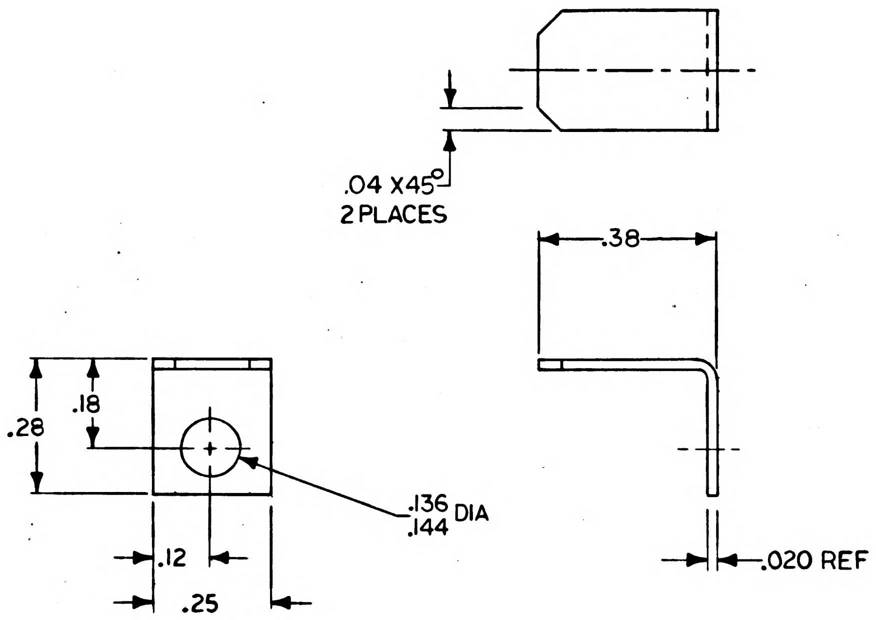
CODE IDENT NO. —
SIZE C
DRAWING NO. 2008218
SCALE 2/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX.
3. MATL: "MU METAL" .020 THK PER 2021562
4. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007027	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS — DECIMALS .XXX±.01 — ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 16SEP64
CHECKED 13OCT64
APPROVED 13 Oct 64
APPROVED 10-13-64
APPROVED MIT 10/21/64
APPROVED MSC W J Rhine 10-21-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, MOUNTING
(COVER)

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008220
SCALE 4/1
SHEET 1 OF 1

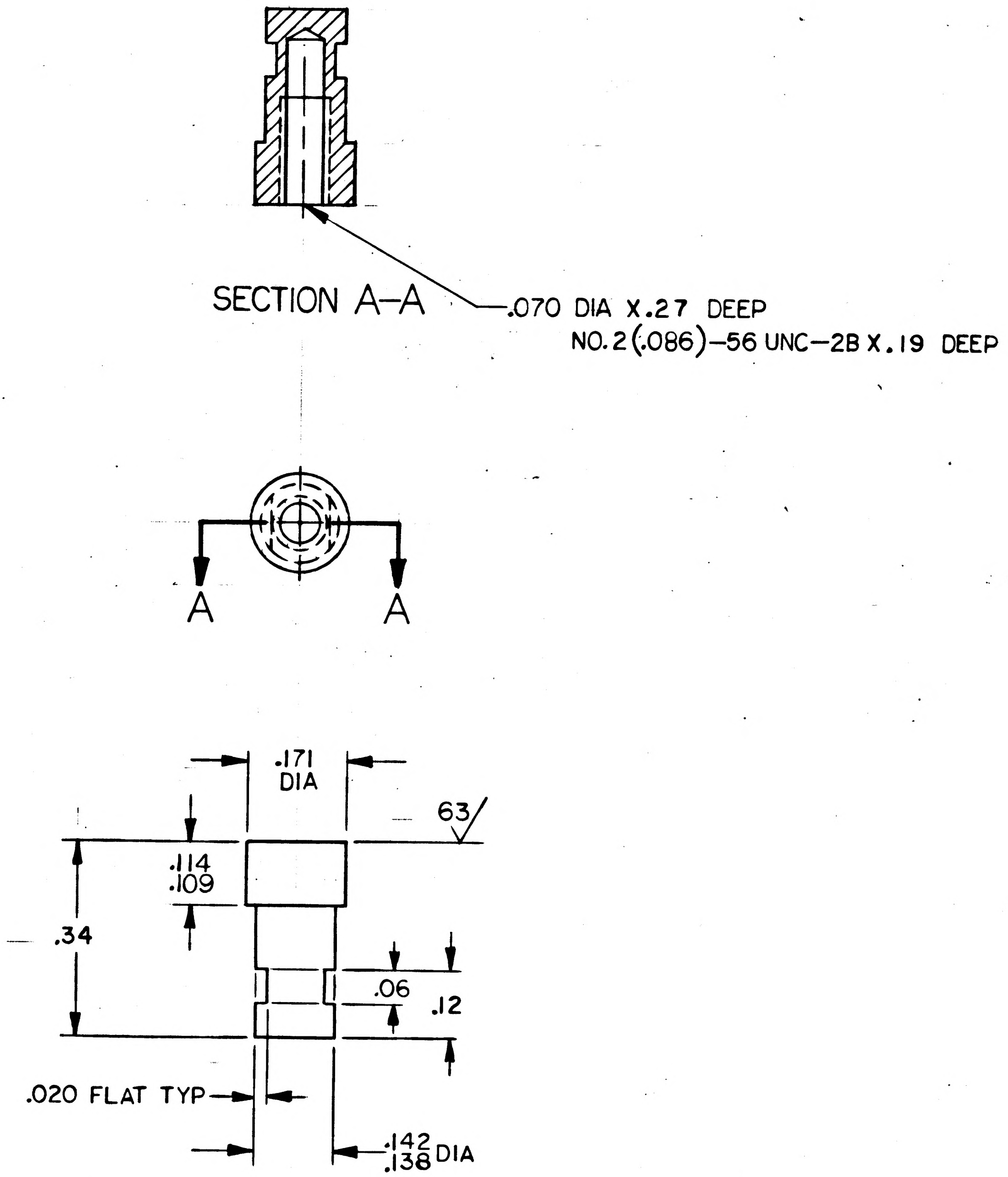
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15032	LK		2 DEC 64	WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED CLEAR
3. REMOVE BURRS AND BREAK SHARP EDGES .005 TO .015
4. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
5. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007047	
2007021	
2007022	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX±.005 .XX±.02 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
AL ALY 6061-T6
QQ-A-250/11

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN C.J. Papia 16 Sept 64
CHECKED 15 Sept 64
APPROVED 28 Sep 64
APPROVED L.C. Smith 28 Sept 64
APPROVED MIT 30 Sept 64
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

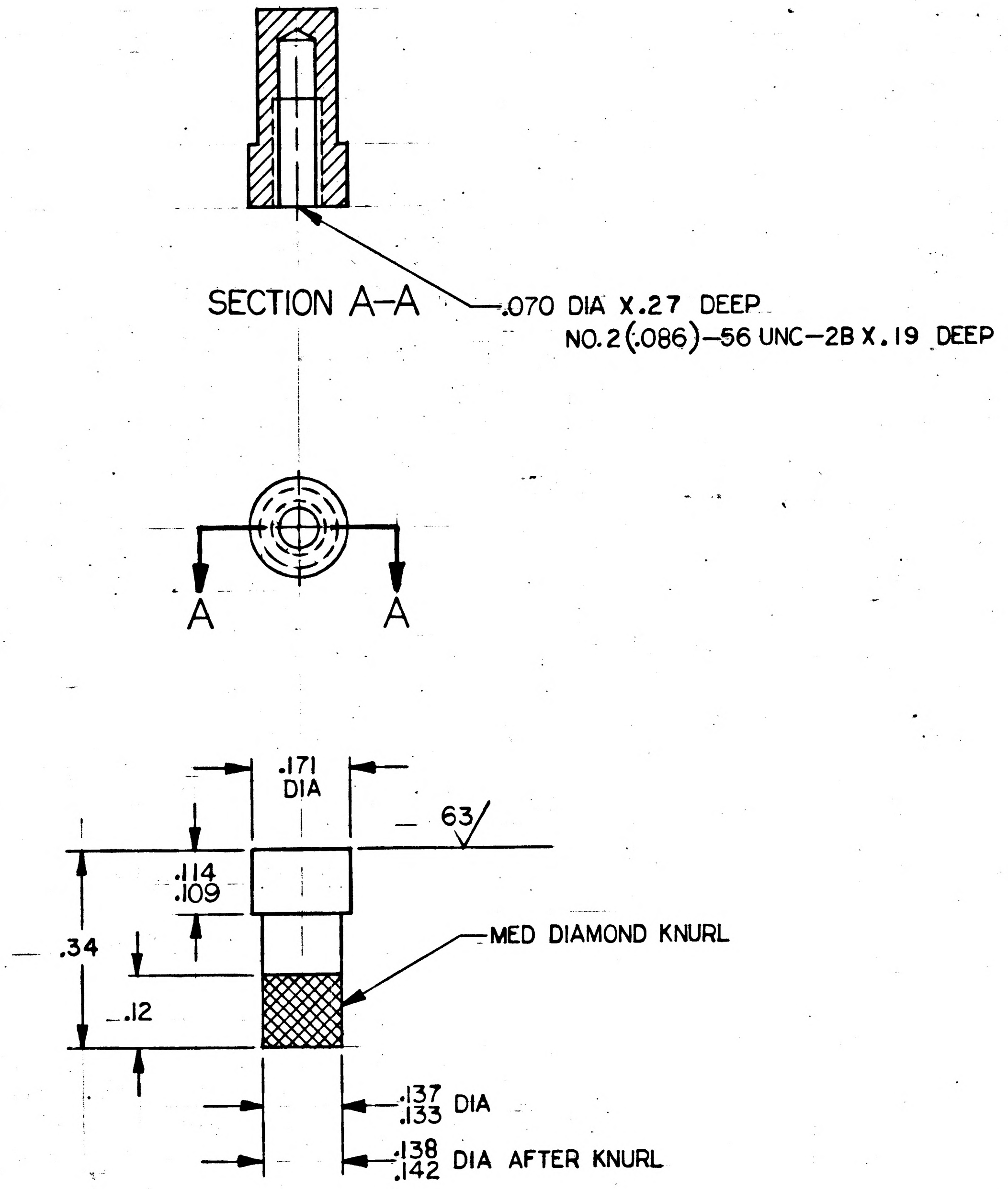
BUSHING, THREADED

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008221
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. FINISH: PASSIVATE PER MIL-F-14072, E300
3. REMOVE BURRS AND BREAK SHARP EDGES .005 TO .015
4. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
5. IDENTIFY PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007021	
2007022	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX±.005 .XX±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
CRES PER QQ-S-763, CLASS 303, COND A

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	C J Papia	16 Sep 64
CHECKED	[illegible]	25 Sep 64
APPROVED	[illegible]	28 SEP 64
APPROVED	A. C. Smith	28 Sep 64
APPROVED MIT	[illegible]	30 Sep 64
APPROVED MSC	[illegible]	DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BUSHING, THREADED

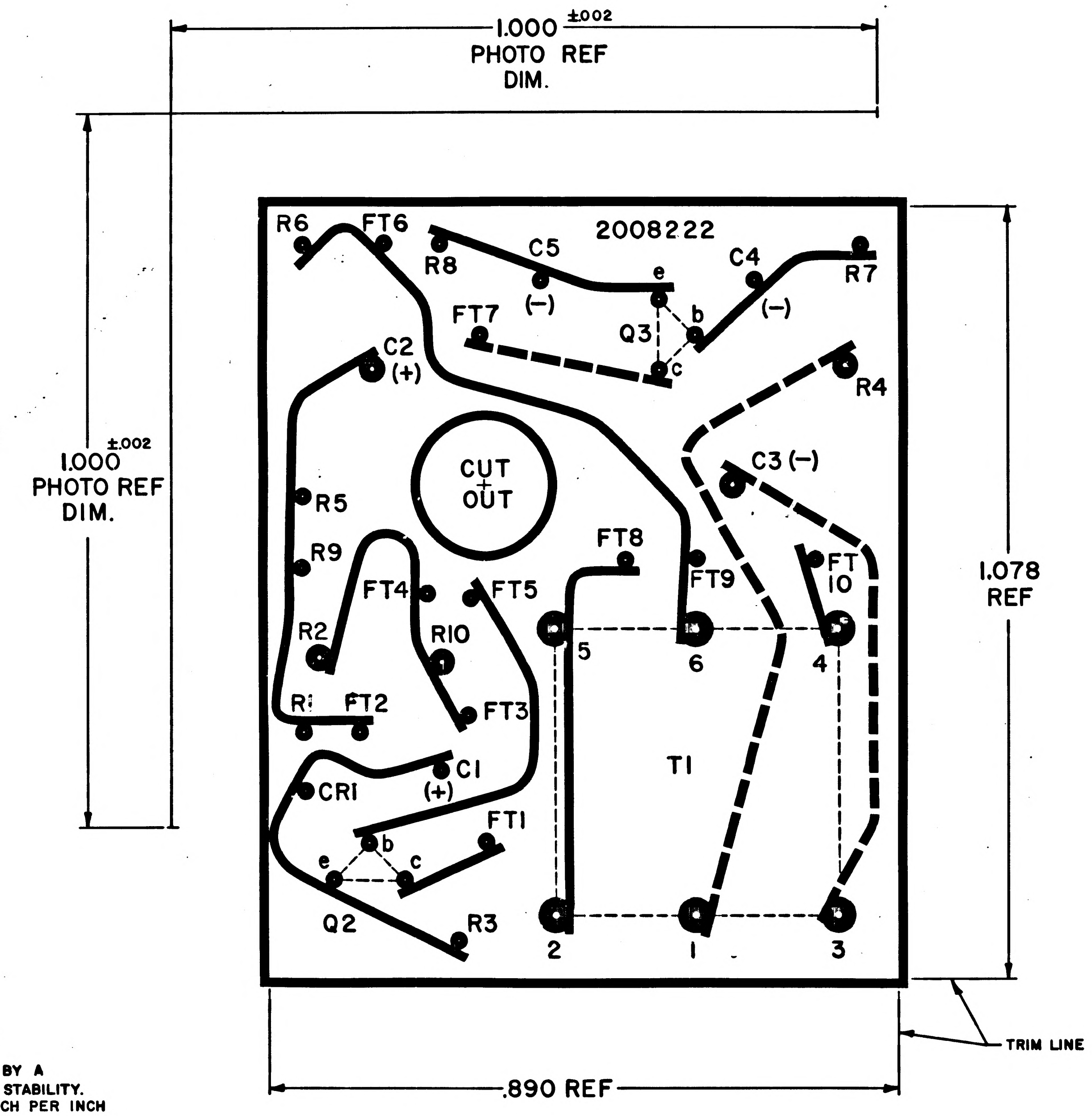
CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008221

SCALE 5/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14975		



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL. FILM .006/.008 THICK PER L-F-340, TYPE 1B, CLASS 2, STYLE 1A
6. ● .026/.030 DIA
7. ● .038/.042 DIA
8. ● .061/.065 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007022	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN E W Johnson DATE 17SEP64
CHECKED 25Sep64
APPROVAL 28SEP64
APPROVAL 9/28/64
NASA APPROVAL
MIT APPROVAL 30Sep64

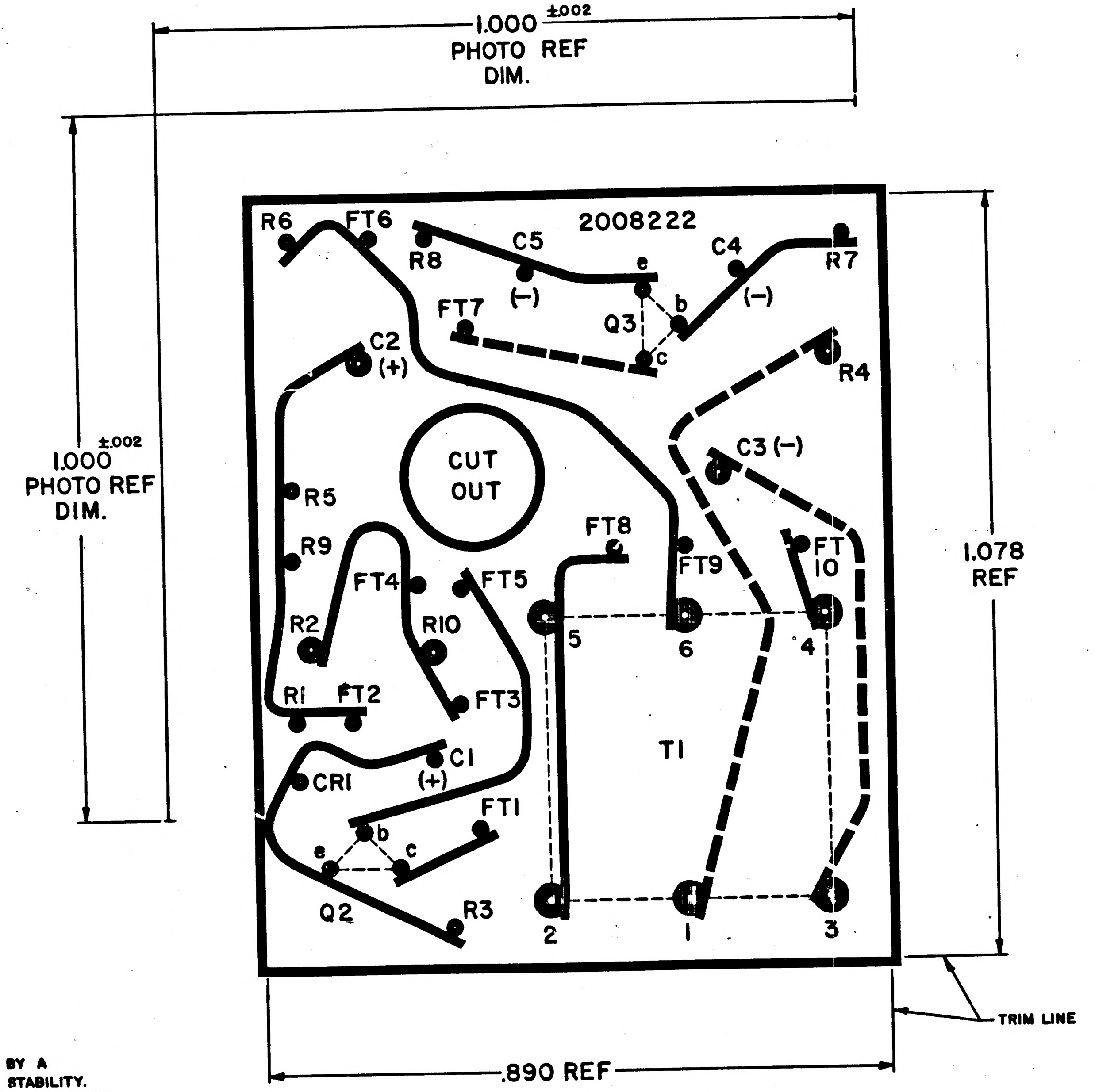
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP PHOTOGRAPHIC MASTER
TUNING FORK, TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008222
SCALE 10/1
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .023/.027 DIA PUNCH
7. ● .042/.046 DIA PUNCH
8. ● .061/.065 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007022	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 25 Sep 64
APPROVAL [illegible] 28 Sep 64
APPROVAL [illegible] 9/28/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 30 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR TOP
PHOTOGRAPHIC MASTER
TUNING FORK, TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008222
SCALE 10/1
WT
SHEET 1 OF 1

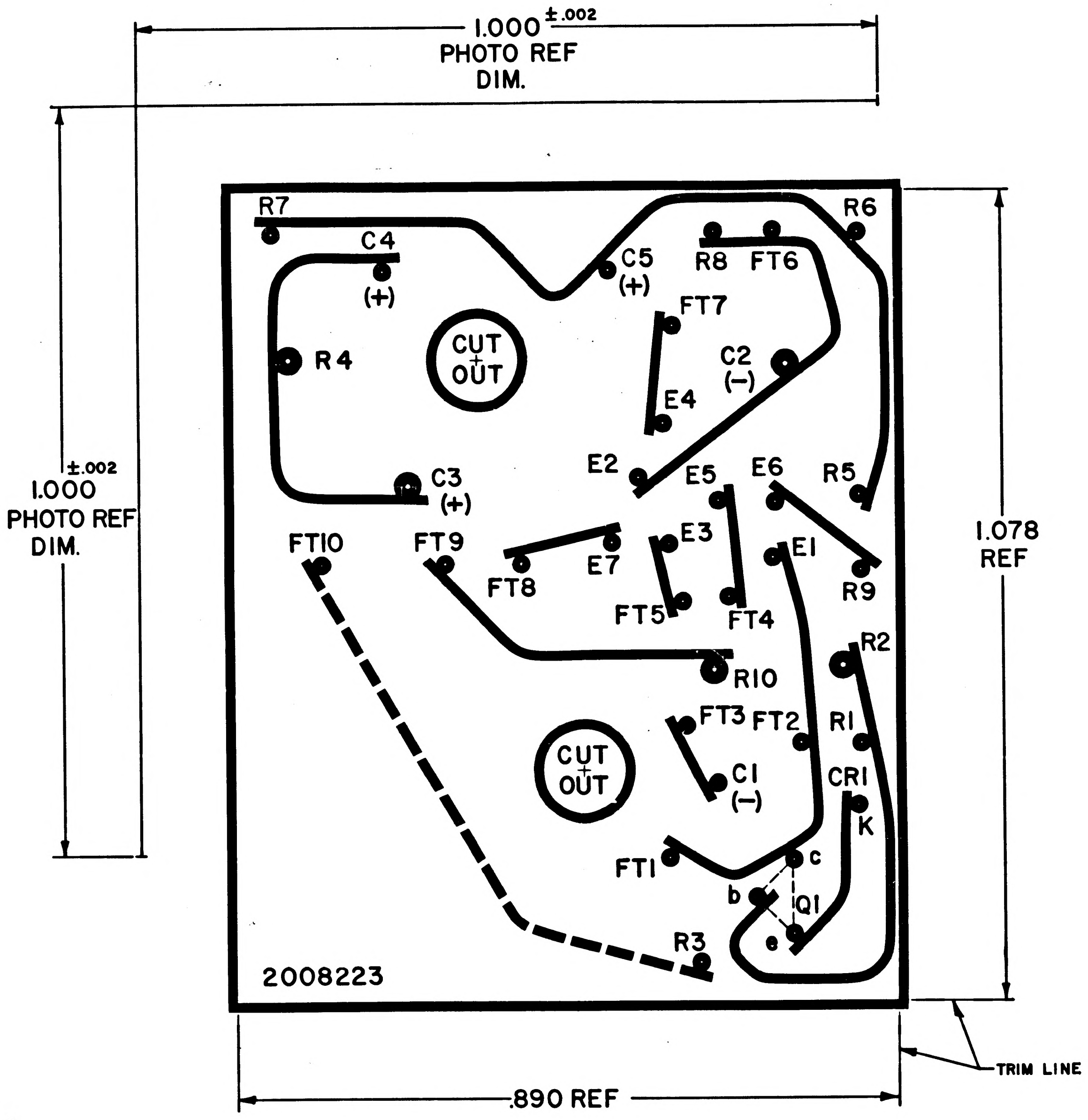
INCHES
0 1 2

2008222

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14975	18 Dec 64	BJP ERK WA



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .026/.030 DIA
7. ◉ .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007022	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO.
CONTRACT
DRAWN E.W. Johnson DATE 17 SEP 64
CHECKED R.P. Kingsbury 25 Sep 64
APPROVAL 28 Sep 64
APPROVAL P.C. Smith 9/29/64
NASA APPROVAL
MIT APPROVAL 30 Sep 64

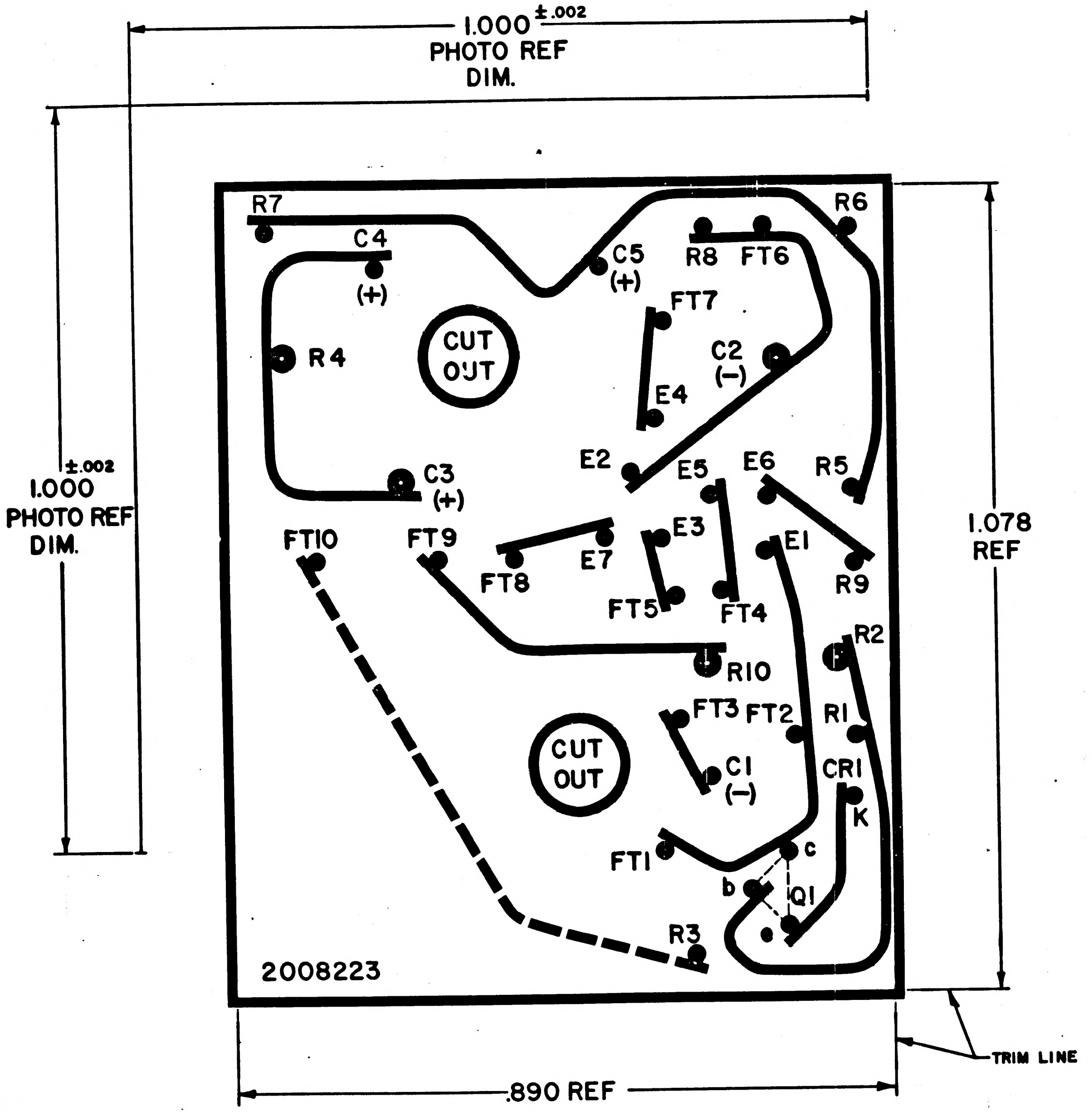
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM
PHOTOGRAPHIC MASTER
TUNING FORK, TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008223
SCALE 10/1
WT
SHEET 1 OF 1

REVISIONS 13134			
SYM	DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .023/.027 DIA PUNCH
7. ● .042/.046 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007022	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN E W [illegible] DATE 7/29/64
CHECKED [illegible]
APPROVAL [illegible] 28 Sep 64
APPROVAL [illegible] 8/28/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 30 July 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR BOTTOM PHOTOGRAPHIC MASTER
TUNING FORK, TRACKER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008223

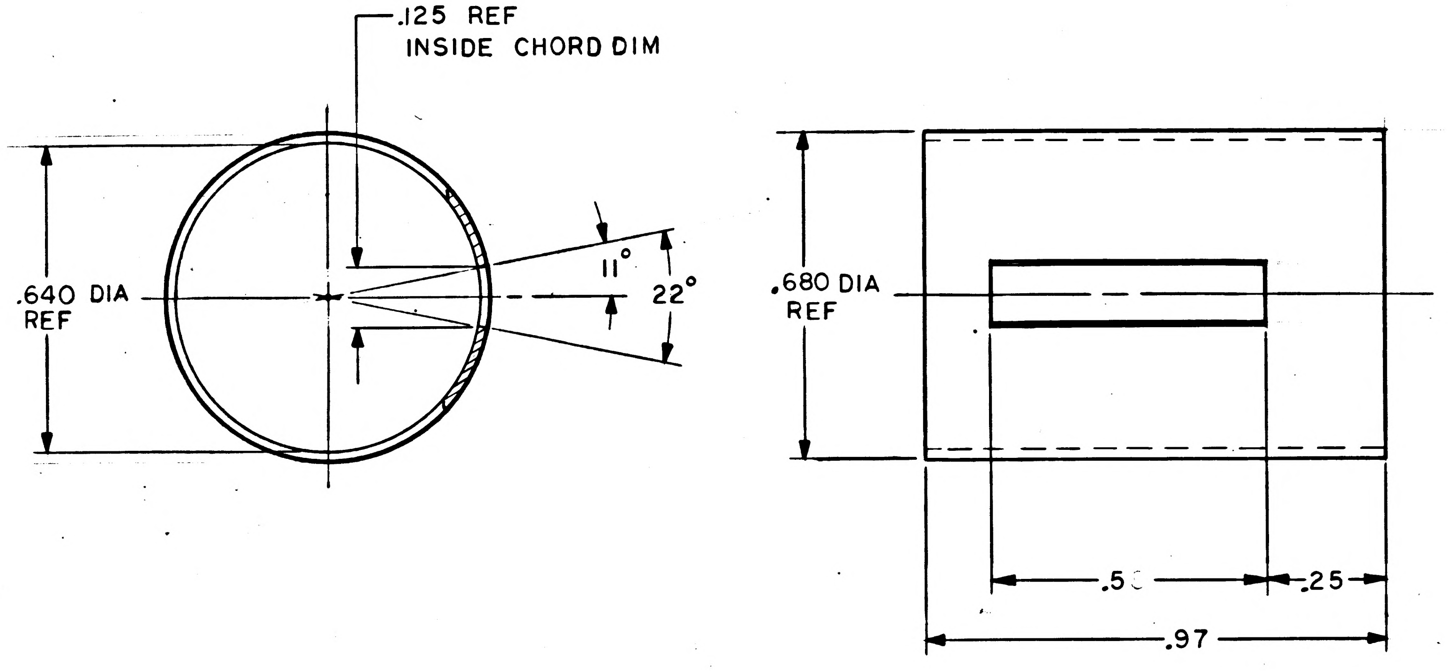
SCALE 10/1 WT SHEET 1 OF 1

INCHES 0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
3. MATERIAL: LAMINATED PLASTIC TUBE PER ND 1010692-202
4. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007053	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —
DECIMALS .XXX ±.005 .XX ±.01
ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tony Bell 9/16/64
CHECKED R.P. Kingsbury 7 OCT 64
APPROVED Crane 13 Oct 64
APPROVED S. C. Smith 10-13-64
APPROVED MIT
APPROVED MSC W J Rhine 10-21-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TUBING INSULATION

CODE IDENT NO. —
SIZE C
DRAWING NO. 2008227
SCALE 4/1
SHEET 1 OF 1

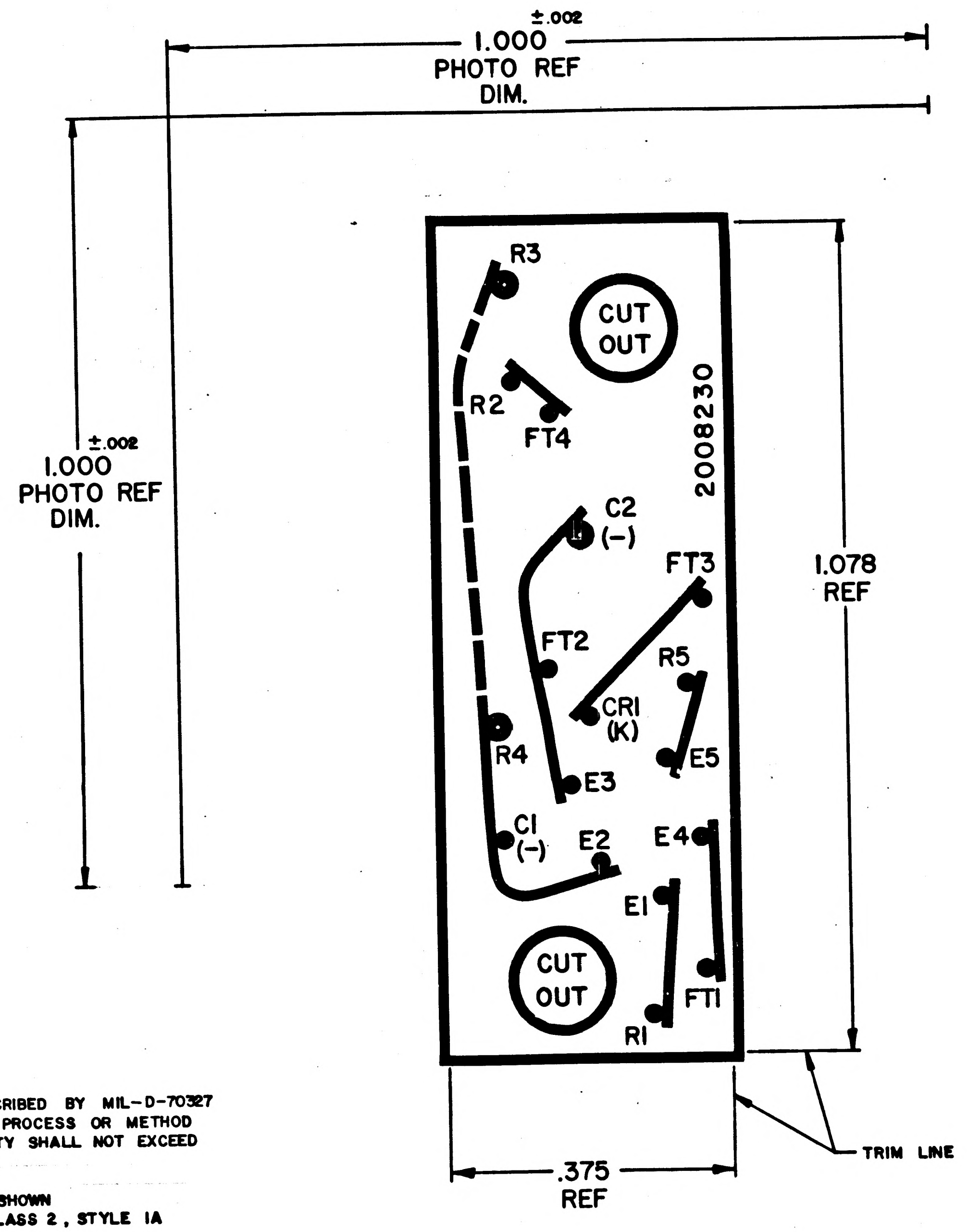
2008227

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13134			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .023/.027 DIA PUNCH
7. ● .042/.046 DIA PUNCH

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007021	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE
CHECKED 25 Sept
APPROVAL 28 Sep 64
APPROVAL S.C. Smith
NASA APPROVAL
MIT APPROVAL 30 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
TUNING FORK, PHOTOMETER

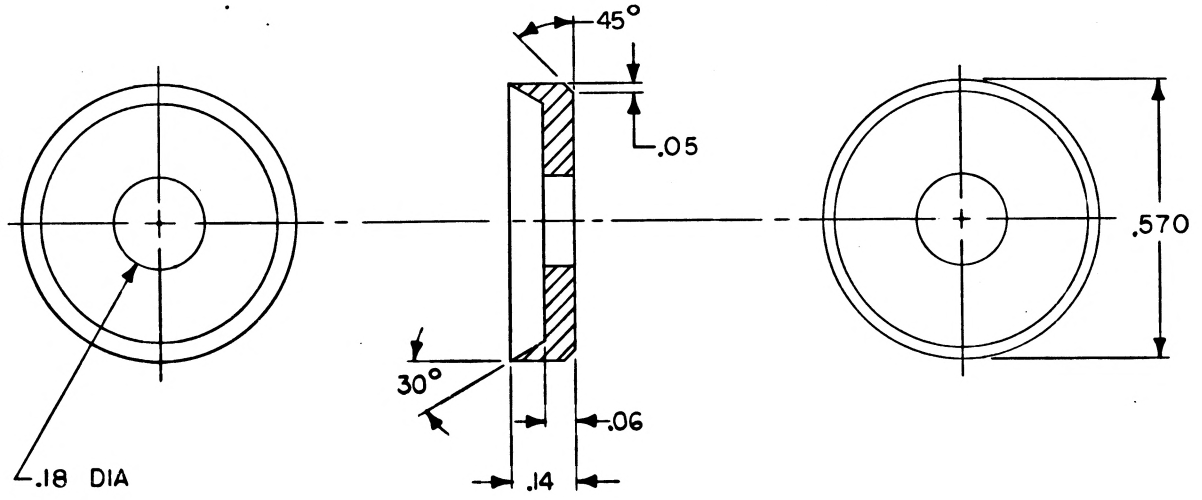
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008230
SCALE 10/1
WT —
SHEET 1 OF 1

2008230

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET PER MIL-P-22242 TYPE II
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007058	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ±.005 .XX ±.01 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Tom Hillson	18 SEP 64
CHECKED	R. P. Kingsbury	7 Oct 64
APPROVED		13 Oct 64
APPROVED	S. C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CUSHION

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008232

SCALE 4/1 SHEET 1 OF 1

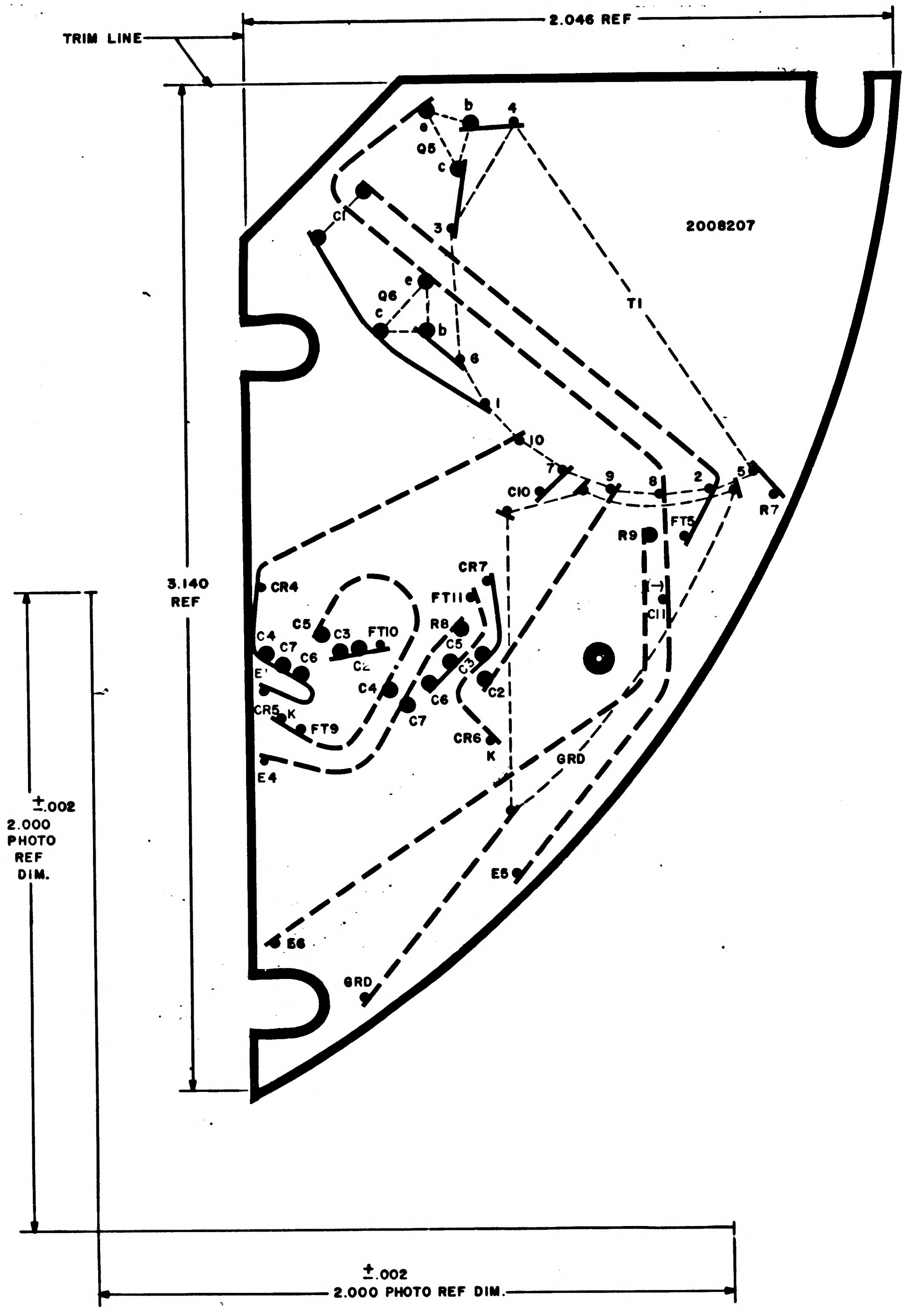
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12 P. 7

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14983				


TRIM LINE
2.046 REF
3.140 REF
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.
2008207
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Q5
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C1
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Q6
c
b
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T1
10
7
9
8
2
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R7
C10
R9
FT5
CR7
FT11
(-)
C11
CR4
C5
C3
FT10
C4
C7
C6
C2
E1
R8
C5
C3
C4
C6
C2
C7
CR5
K
FT9
CR6
K
GRD
E4
E5
E6
GRD

REF DWG.:
WIRING BOARD-HV POWER SUPPLY-PHOTOMETER
DRAWING NO. 2008207

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Bonarrigo 9/18/64
CHECKED
APPROVED 22 SEP 64
APPROVED S. C. Smith 9/22/64
APPROVED MIT 23 Sep 64
APPROVED MSC 9-22-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

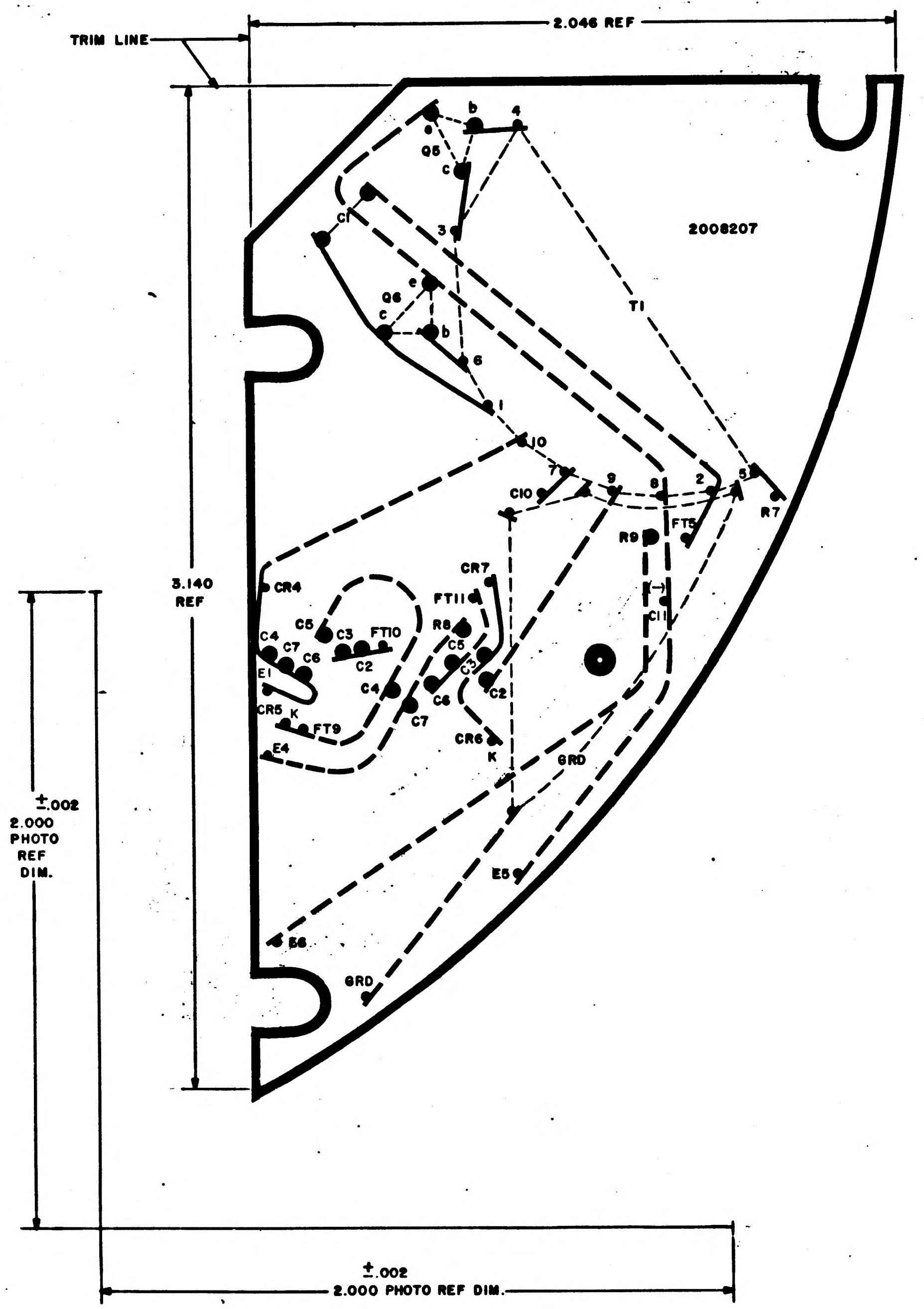
PHOTOGRAPHIC MASTER
WIRING BOARD
HV POWER SUPPLY-PHOTOMETER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008233
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14983			18Dec64	
B		REVISED PER TDRR 16128	JFW	RL	5FEB65	



REF DWG.:
WIRING BOARD-HV POWER SUPPLY-PHOTOMETER
DRAWING NO. 2008207

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Bonarrigo	9/18/64
CHECKED		
APPROVED		22Sep64
APPROVED	S. C. Smith	9/22/64
APPROVED MIT		22Sep64
APPROVED MSC	W. J.	9-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD
HV POWER SUPPLY-PHOTOMETER

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008233

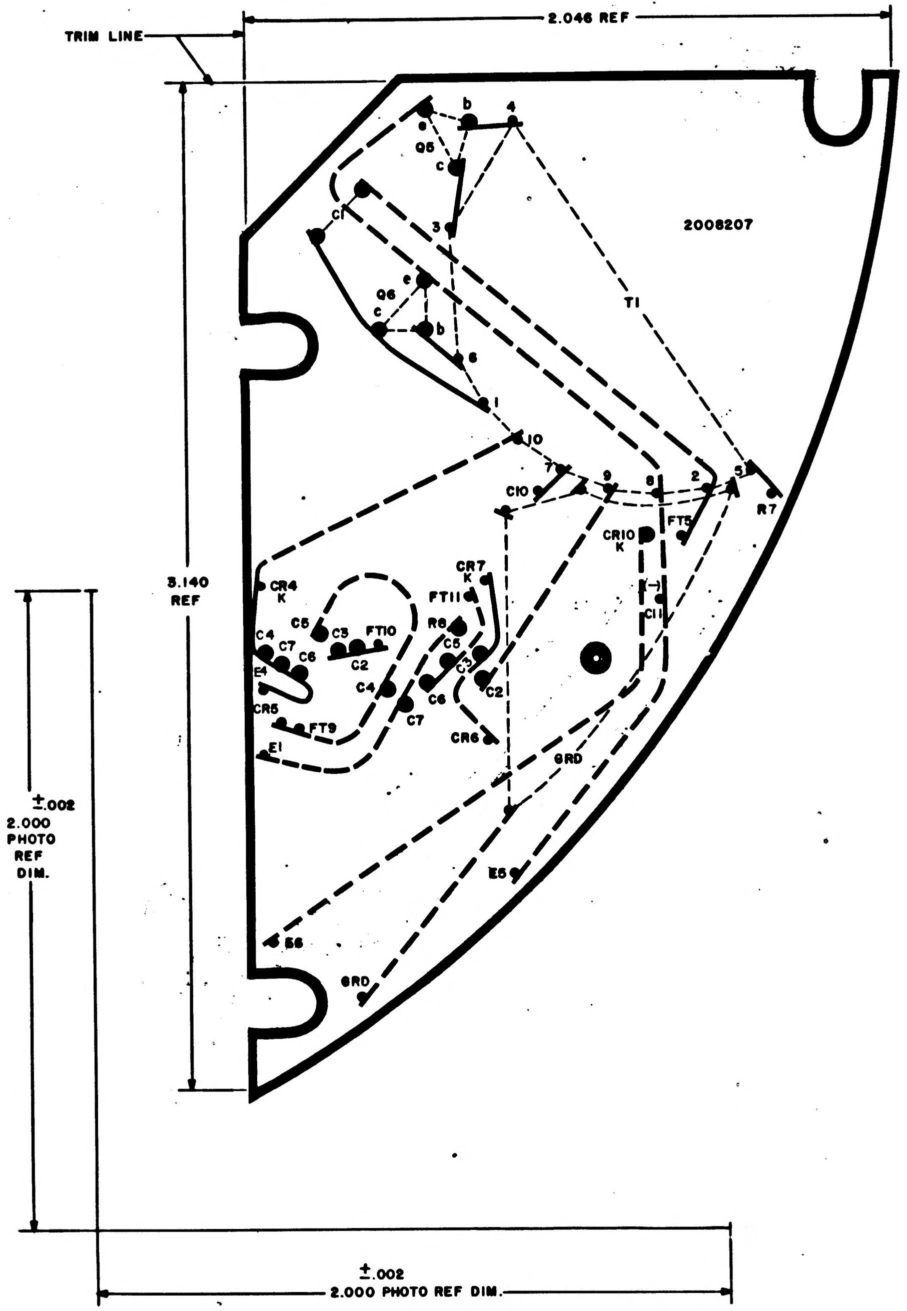
SCALE 5/1 SHEET 1 OF 1

2008233 B

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14983			18OCT64	
B		REVISED PER TDRR IC 28	TFW	RL	5FEB65	
C		REVISED PER TDRR 20152		RL	11JUN65	



REF DWG.:
WIRING BOARD-HV POWER SUPPLY-PHOTOMETER
DRAWING NO. 2008207

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Bonarrigo 9/18/64
CHECKED
APPROVED 22 Sep 64
APPROVED T. C. Smith
APPROVED MIT 22 Sep 64
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

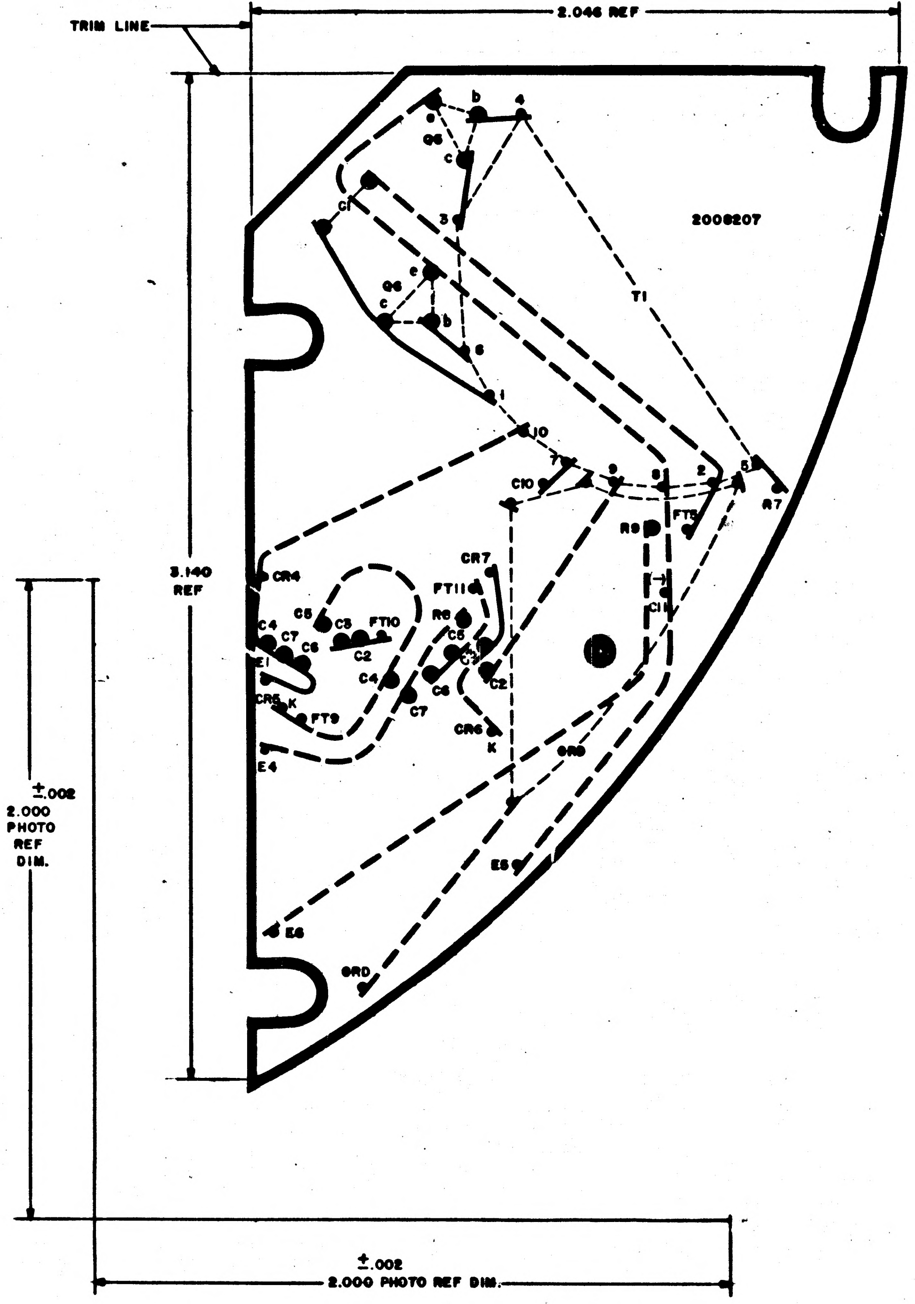
PHOTOGRAPHIC MASTER
WIRING BOARD
HV POWER SUPPLY-PHOTOMETER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008233
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TRIM LINE
2.046 REF
2008207
3.140 REF
±.002
2.000 PHOTO REF DIM.
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CR4
FT11
C5
C3
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R6
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C4
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CR5
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C7
CR6
K
GRD
E4
E5
E6
GRD

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Bonarrigo 9/1964
CHECKED
APPROVED 22 Sep 64
APPROVED S.C. Smith
APPROVED MIT 2 Oct 64
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD

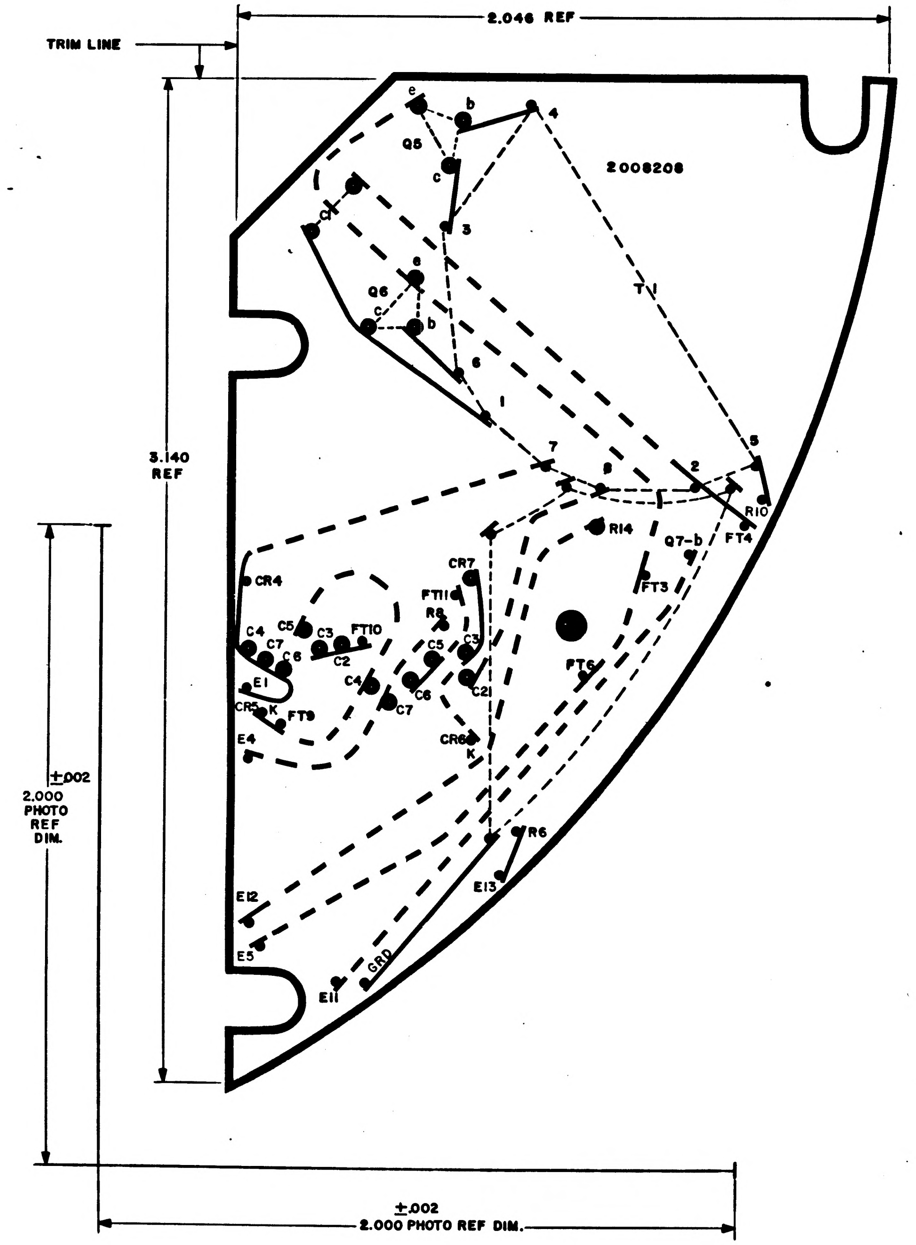
HV POWER SUPPLY-PHOTOMETER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008233
SCALE 2/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14982				


2.046 REF
TRIM LINE
3.140 REF
2008208
e
b
4
Q5
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3
Q6
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b
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T1
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R10
FT4
R14
Q7-b
FT3
CR7
FT11
R8
CR4
C4
C5
C3
FT10
C7
C6
C2
C5
C3
E1
C4
C6
C2
FT6
CR5
K
FT9
C7
E4
CR6
K
R6
E13
E12
E5
GRD
E11
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.

REF DWG:
WIRING BOARD-HV POWER SUPPLY-TRACKER
DRAWING NO. 2008208

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH.
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

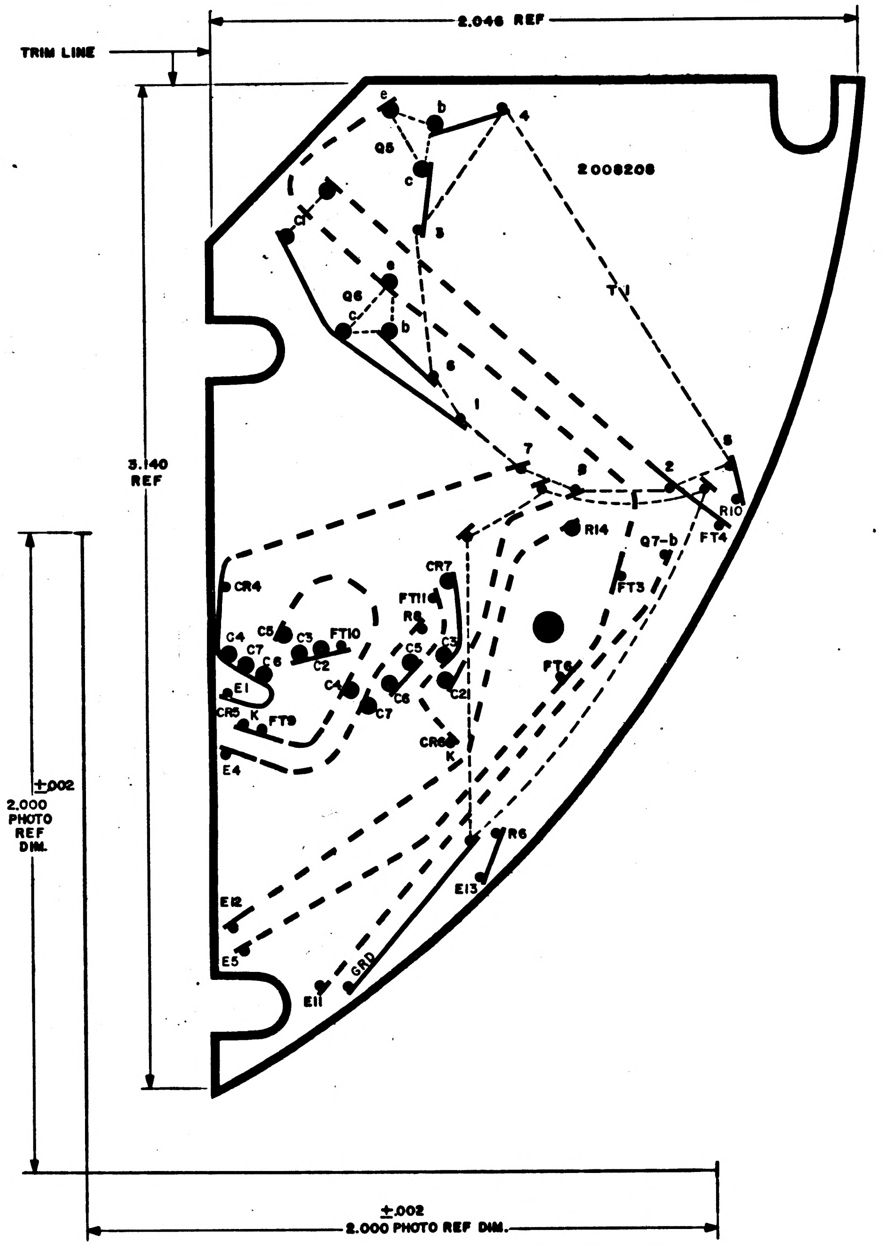
PHOTOGRAPHIC MASTER
WIRING BOARD
HV POWER SUPPLY-TRACKER

CODE IDENT NO. | SIZE E | DRAWING NO. 2008234
SCALE 5/1 | SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12 of 17

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14982				WK
B		REVISED PER TDRR 16128	JFW		5FEB65	


TRIM LINE
2.046 REF
3.140 REF
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.
2008208
e
b
4
Q5
c
C1
3
e
Q6
c
b
6
1
T1
7
8
2
5
R10
FT4
R14
Q7-b
FT3
CR7
CR4
FT11
R8
C5
C3
FT10
C4
C7
C6
C2
C5
C3
C4
C8
C2
C7
FT6
E1
CR5
K
FT9
E4
CR6
K
R6
E13
E12
E5
GRD
E11

REF DWG:
WIRING BOARD-HV POWER SUPPLY-TRACKER
DRAWING NO. 2008208

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH.
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN		9-16-64
CHECKED		
APPROVED		
APPROVED		
APPROVED MIT	W Kupfer	22 Sep 64
APPROVED MSC		9-22-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

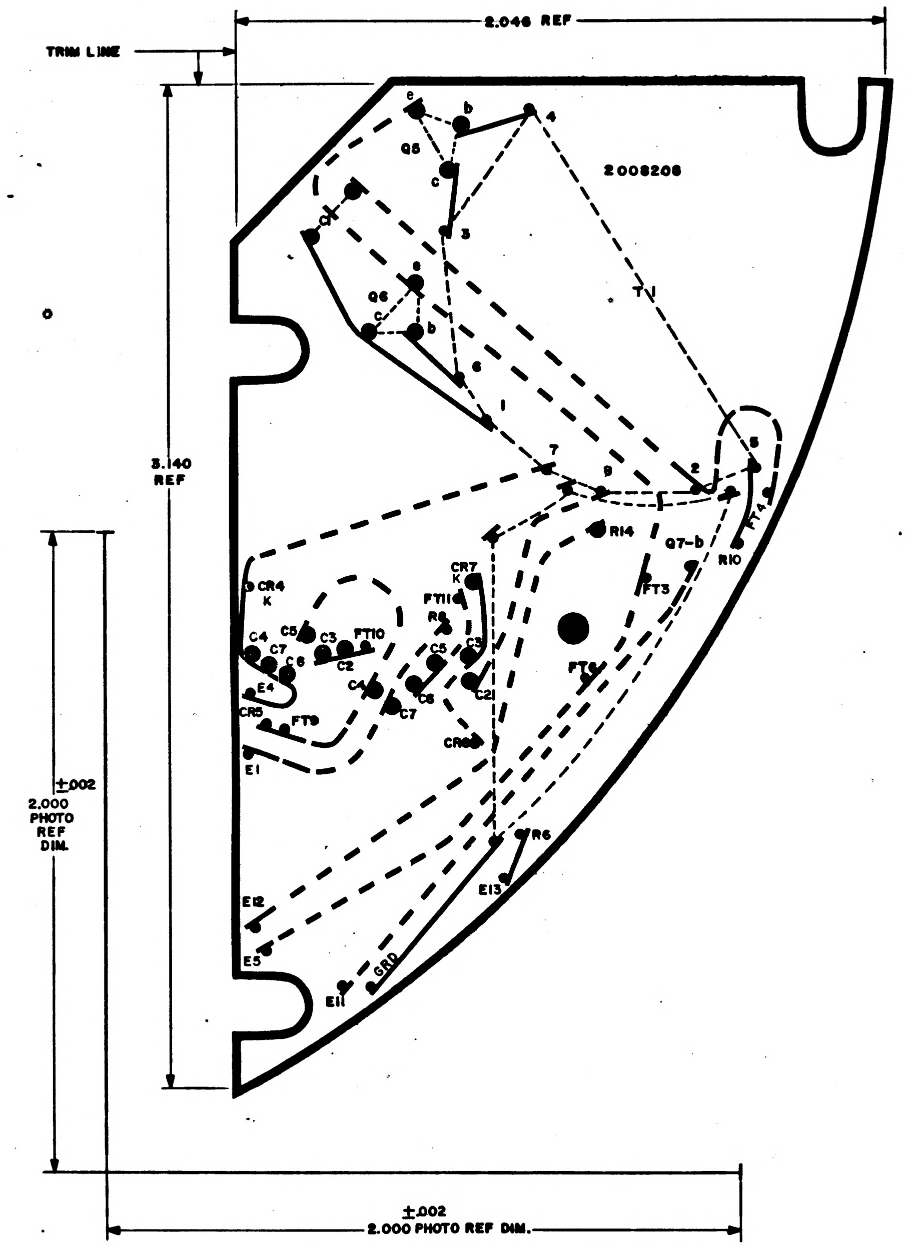
PHOTOGRAPHIC MASTER
WIRING BOARD
HV POWER SUPPLY-TRACKER

CODE IDENT NO.	SIZE	DRAWING NO.
	E	2008234
SCALE 5/1		SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14982				WK
B		REVISED PER TDRR 16128	JFW		5FEB65	
C		REVISED PER TDRR 20151			21JUN65	


2.046 REF
TRIM LINE
3.140 REF
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.
2008208
e
b
4
Q5
c
3
Q6
e
c
b
6
1
T1
7
8
2
5
R14
Q7-b
R10
FT4
CR4 K
CR7 K
FT11
R8
FT3
C4
C5
C3
FT10
C7
C8
C2
C5
C3
E4
C4
C6
C21
FT6
C7
CR5
FT9
CR6
E1
R6
E13
E12
E5
GRD
E11

REF DWG:
WIRING BOARD-HV POWER SUPPLY-TRACKER
DRAWING NO. 2008208

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH.
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9-15-64
CHECKED
APPROVED
APPROVED

APPROVED MIT W Kupfer 23Sep64
APPROVED MSC 9-22-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD

HV POWER SUPPLY-TRACKER

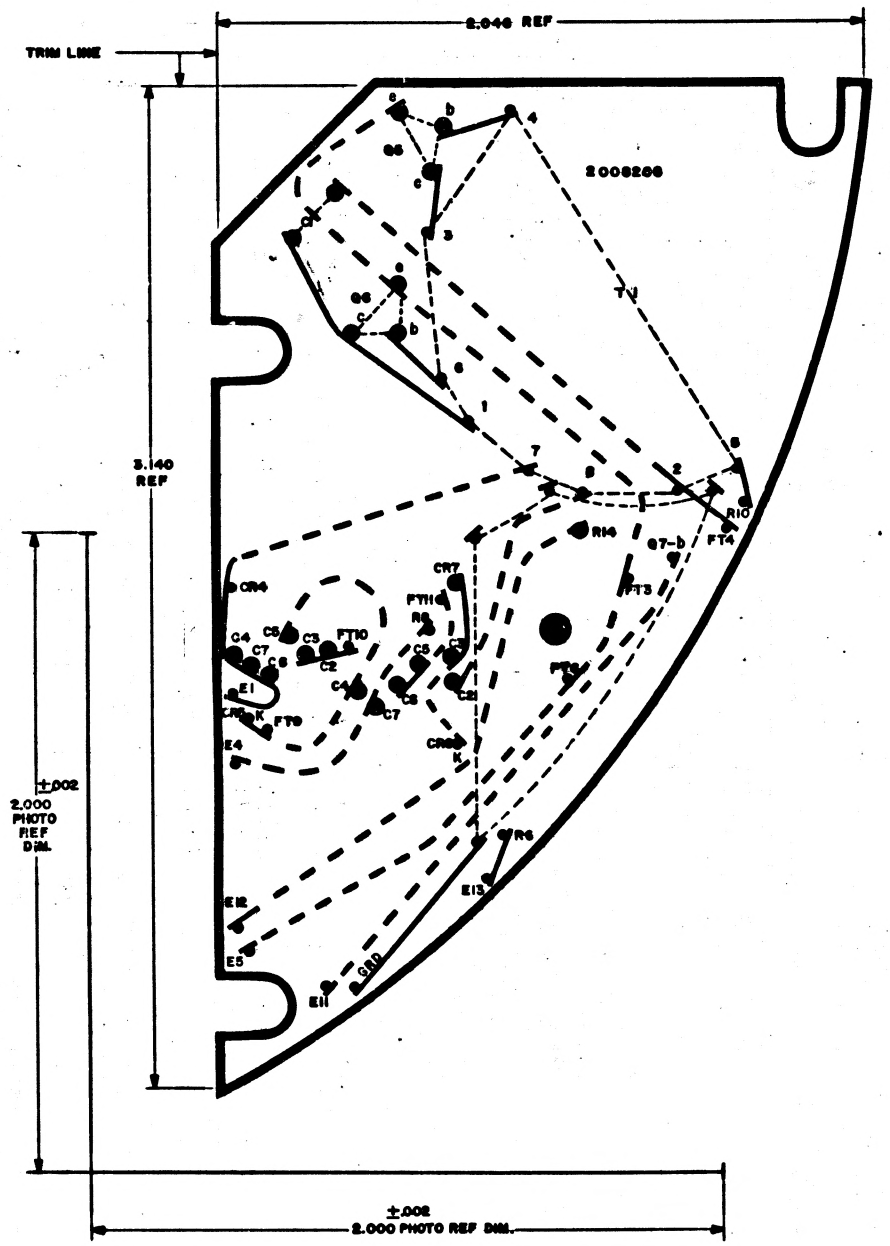
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008234

SCALE 5/1
SHEET 1 OF 1

2008234 C

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS


TRIM LINE
2.046 REF
3.140 REF
2008268
Q5
Q6
T1
a
b
c
1
2
3
4
5
6
7
8
R10
R14
FT4
Q7-b
CR7
FT3
FT11
R8
CR4
C4
C5
C3
FT10
C7
C6
C2
C5
C3
C4
C8
C2
C7
E1
CR5
K
FT9
E4
CR6
K
FT2
R6
E13
E12
E5
GRD
E11
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH.
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9-16-64
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD
HV POWER SUPPLY-TRACKER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2C08234
SCALE 5/1
SHEET 1 OF 1

REVISIONS 17835

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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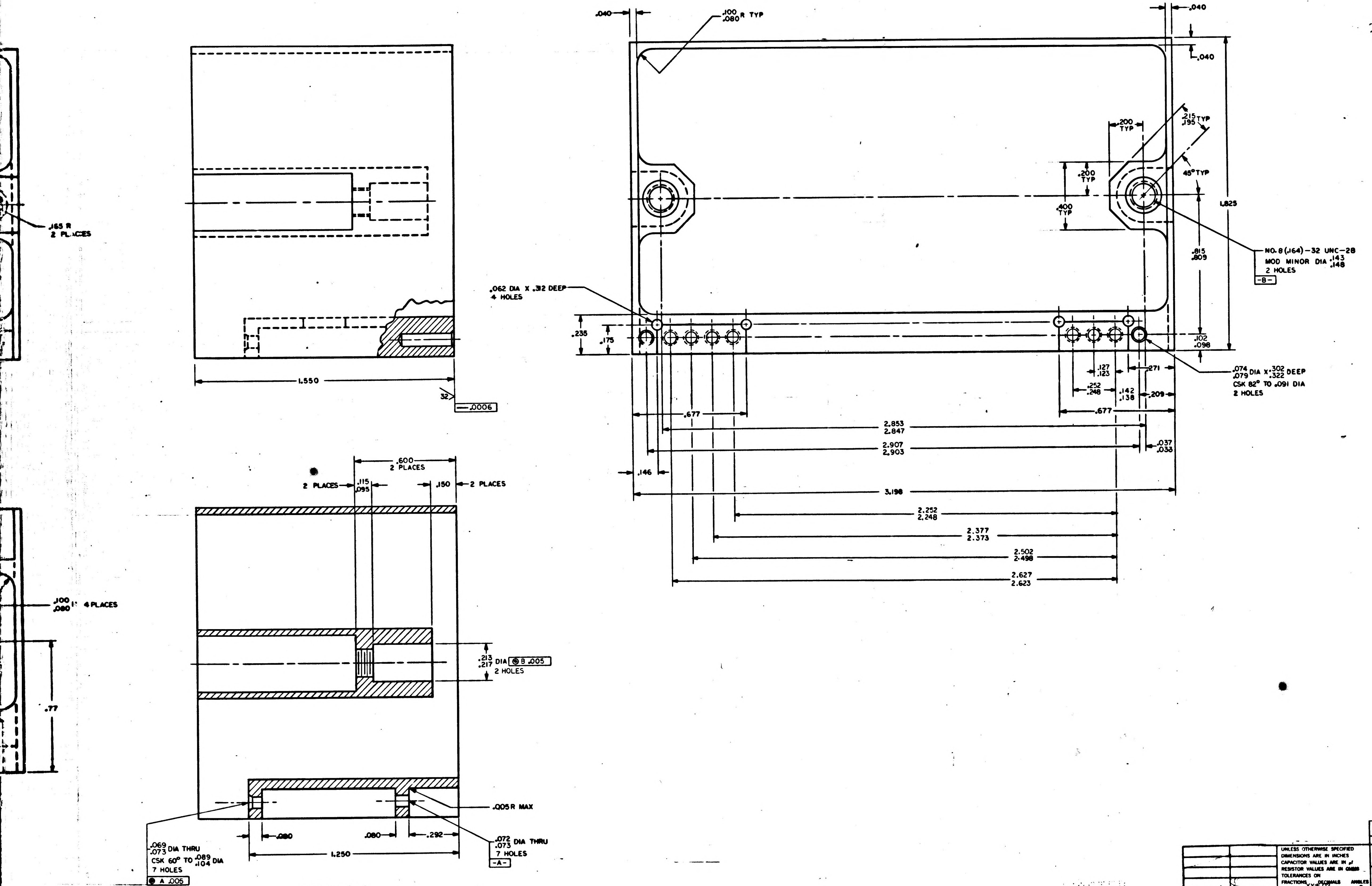

.165 R
2 PLACES
.100 .080 R 4 PLACES
.77
1.550
32
.0006
.040
.100 .080 R TYP
.040
.040
.200 TYP
.215 .195 TYP
45° TYP
.200 TYP
.400 TYP
1.825
NO. 8 (.164)-32 UNC-2B
MOD MINOR DIA .143 .148
2 HOLES
-B-
.815 .809
.062 DIA X .312 DEEP
4 HOLES
.235
.175
.102 .098
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.127 .123
.271
.252 .248
.142 .138
.209
.677
.677
2.853 2.847
2.907 2.903
.037 .033
.146
3.198
2.252 2.248
2.377 2.373
2.502 2.498
2.627 2.623
.600 2 PLACES
2 PLACES
.115 .095
.150
2 PLACES
.213 .217 DIA B .005
2 HOLES
.005R MAX
.080
.080
.292
1.250
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
7 HOLES
A .005
.072 .073 DIA THRU
7 HOLES
-A-

SECTION A-A

2007120	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN E.G. Gross 1 MAR 65
CHECKED R.P. Kumpa 1 MAR 65
APPROVED R. Kunde 22 MAR 65
APPROVED D.R. Test 3/23/65
APPROVED MIT W. Kupfer 3/4/65
APPROVED MSC 3/4/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
OPTICS LOAD COMPENSATION

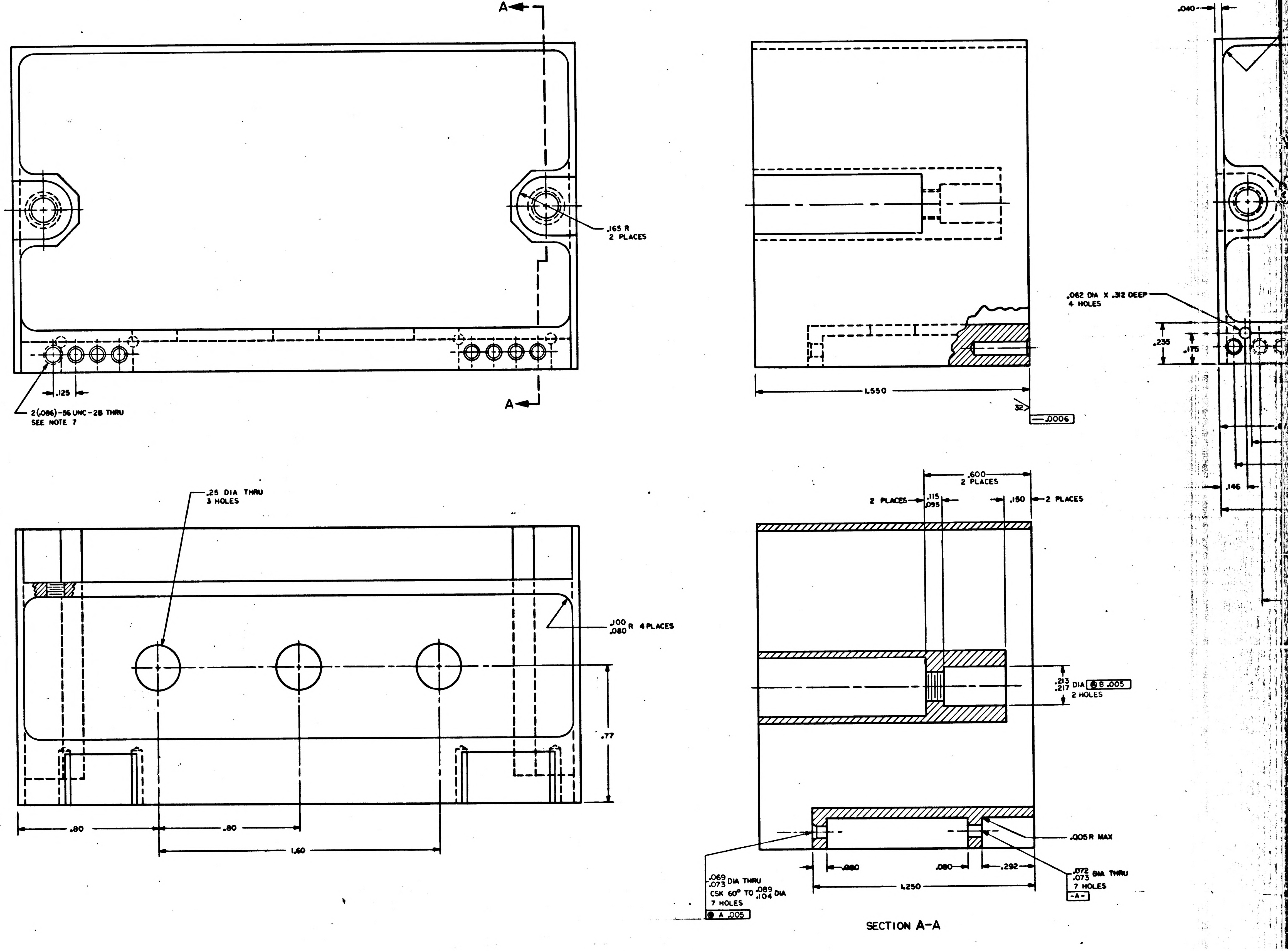
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008235
SCALE 5/1
SHEET OF 1

2008235 A

MASTER

F-2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

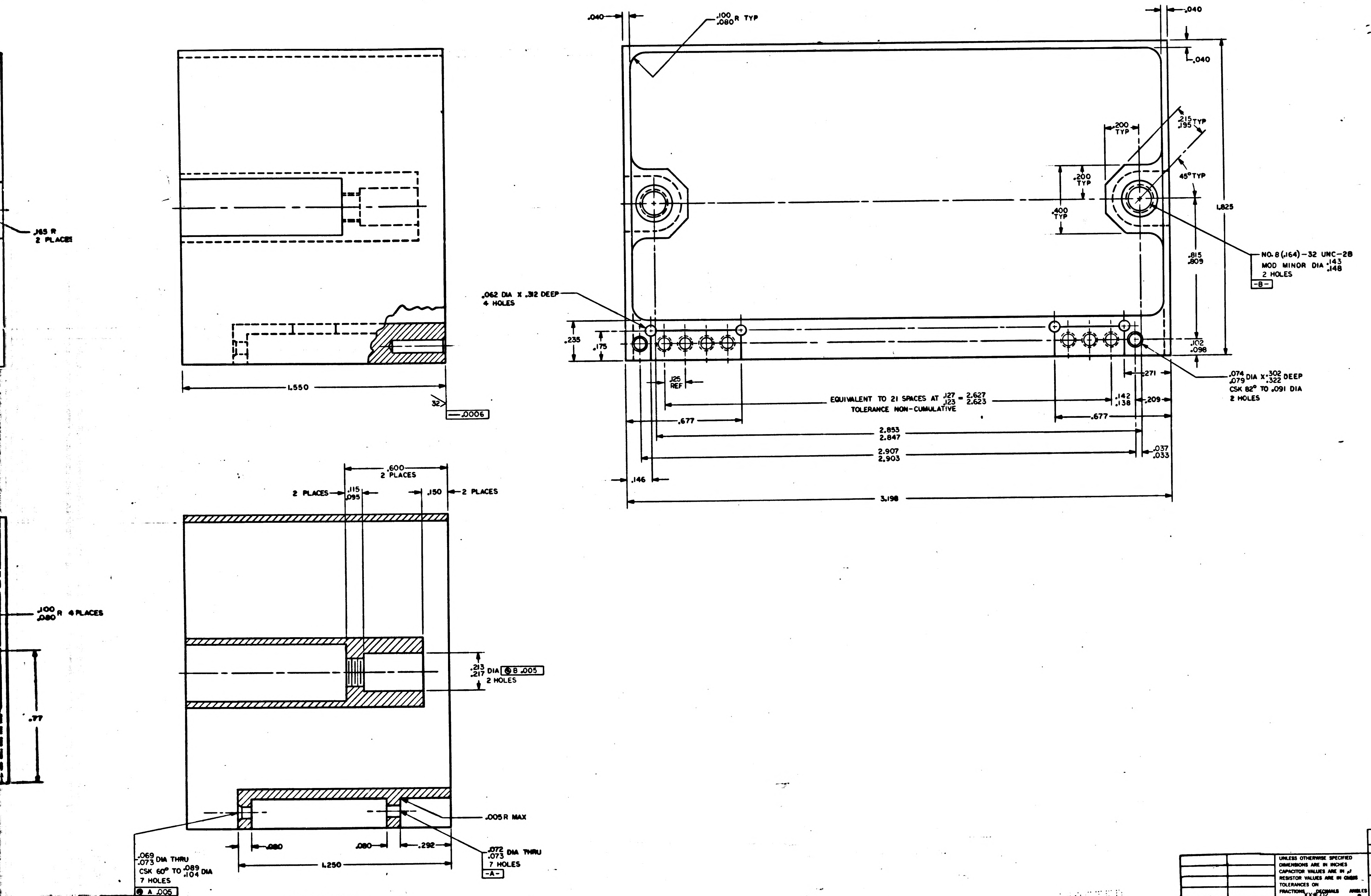

A
A
.165 R
2 PLACES
.125
2(.086)-56 UNC-2B THRU
SEE NOTE 7
.040
.062 DIA X .312 DEEP
4 HOLES
.235
.175
.146
1.550
32
—.0006
.25 DIA THRU
3 HOLES
.100
.080 R 4 PLACES
.77
.80
.80
1.60
.600
2 PLACES
2 PLACES
.115
.095
.150
2 PLACES
.213
.217 DIA ⊚ B .005
2 HOLES
.005 R MAX
.080
.080
.292
1.250
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
7 HOLES
⊚ A .005
.072
.073 DIA THRU
7 HOLES
-A-

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010R MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

REVISIONS 17835						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.165 R
2 PLACES
.100 .080 R 4 PLACES
.77
1.550
32
.0006
.040
.100 .080 R TYP
.040
.040
.200 TYP
.215 .195 TYP
45° TYP
.200 TYP
.400 TYP
1.825
.815 .809
.102 .098
NO. 8 (.164) – 32 UNC – 2B
MOD MINOR DIA .143 .148
2 HOLES
-B-
.062 DIA X .312 DEEP
4 HOLES
.235
.175
.125 REF
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.271
EQUIVALENT TO 21 SPACES AT .127 .123 = 2.627 2.623
TOLERANCE NON-CUMULATIVE
.142 .138
.209
.677
.677
2.853 2.847
2.907 2.903
.037 .033
.146
3.198
.600
2 PLACES
2 PLACES
.115 .095
.150
2 PLACES
.213 .217 DIA ⓂB .005
2 HOLES
.005 R MAX
.080
.080
.292
1.250
.069 .073 DIA THRU
CSK 60° TO .089 .104 DIA
7 HOLES
Ⓜ A .005
.072 .073 DIA THRU
7 HOLES
-A-

SECTION A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007120	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN E.J. Gross 1 Mar 65
CHECKED
APPROVED March 65
APPROVED D.R. Ford
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

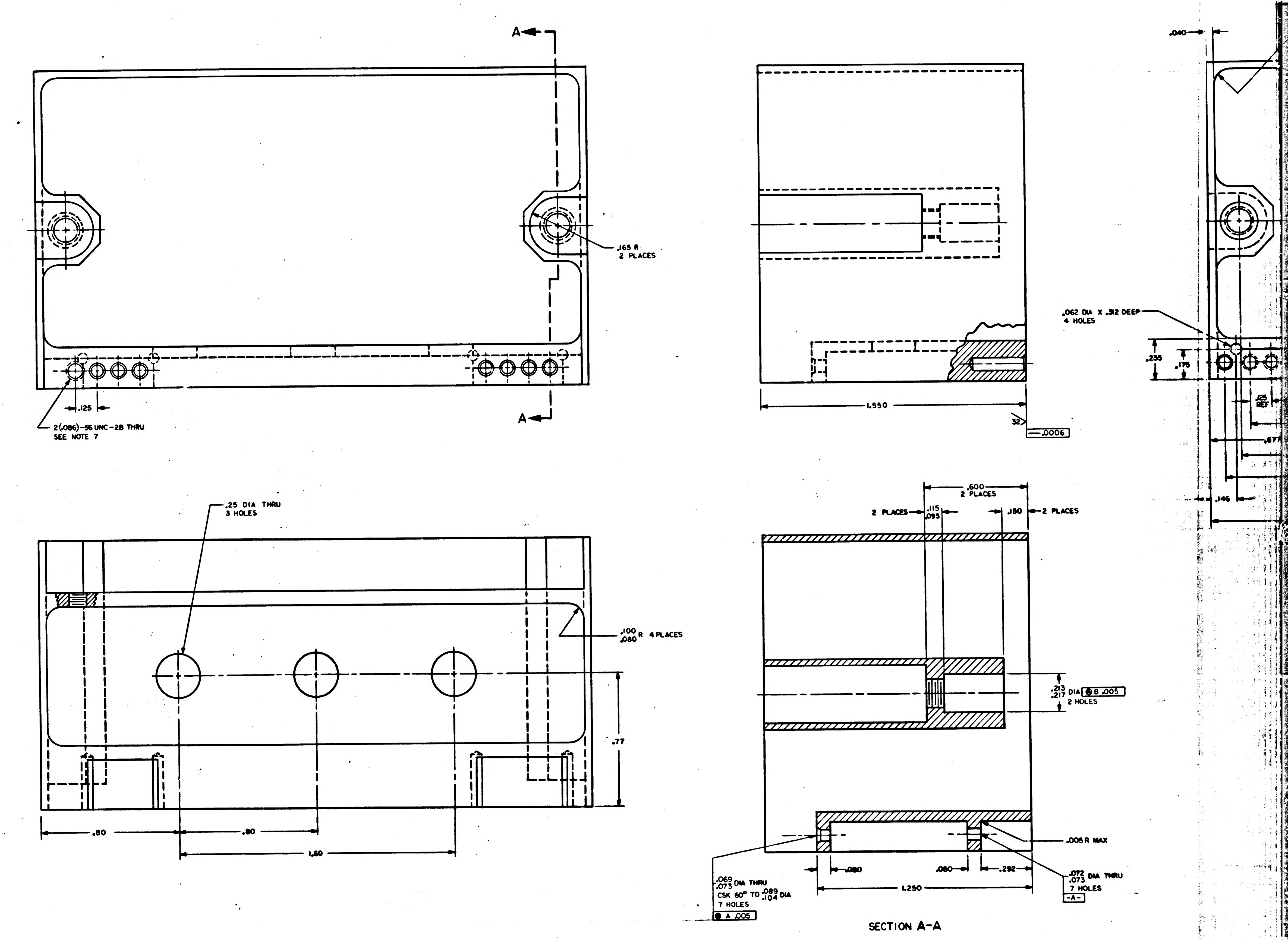
FRAME
OPTICS LOAD COMPENSATION

CODE IDENT NO. —
SIZE J
DRAWING NO. 2008235
SCALE 5/1
SHEET 1 OF 1

2008235

2008235

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


A
A
.165 R
2 PLACES
.125
2(.086)-56 UNC-2B THRU
SEE NOTE 7
1.550
32
.0006
.040
.062 DIA X .312 DEEP
4 HOLES
.235
.175
.125
REF
.677
.146
.25 DIA THRU
3 HOLES
.100
.080 R 4 PLACES
.77
.80
.80
1.60
.600
2 PLACES
2 PLACES
.115
.095
.150
2 PLACES
.213
.217 DIA ◎ B .005
2 HOLES
.005 R MAX
.080
.080
.292
1.250
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
7 HOLES
◎ A .005
.072
.073 DIA THRU
7 HOLES
-A-
SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010R MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

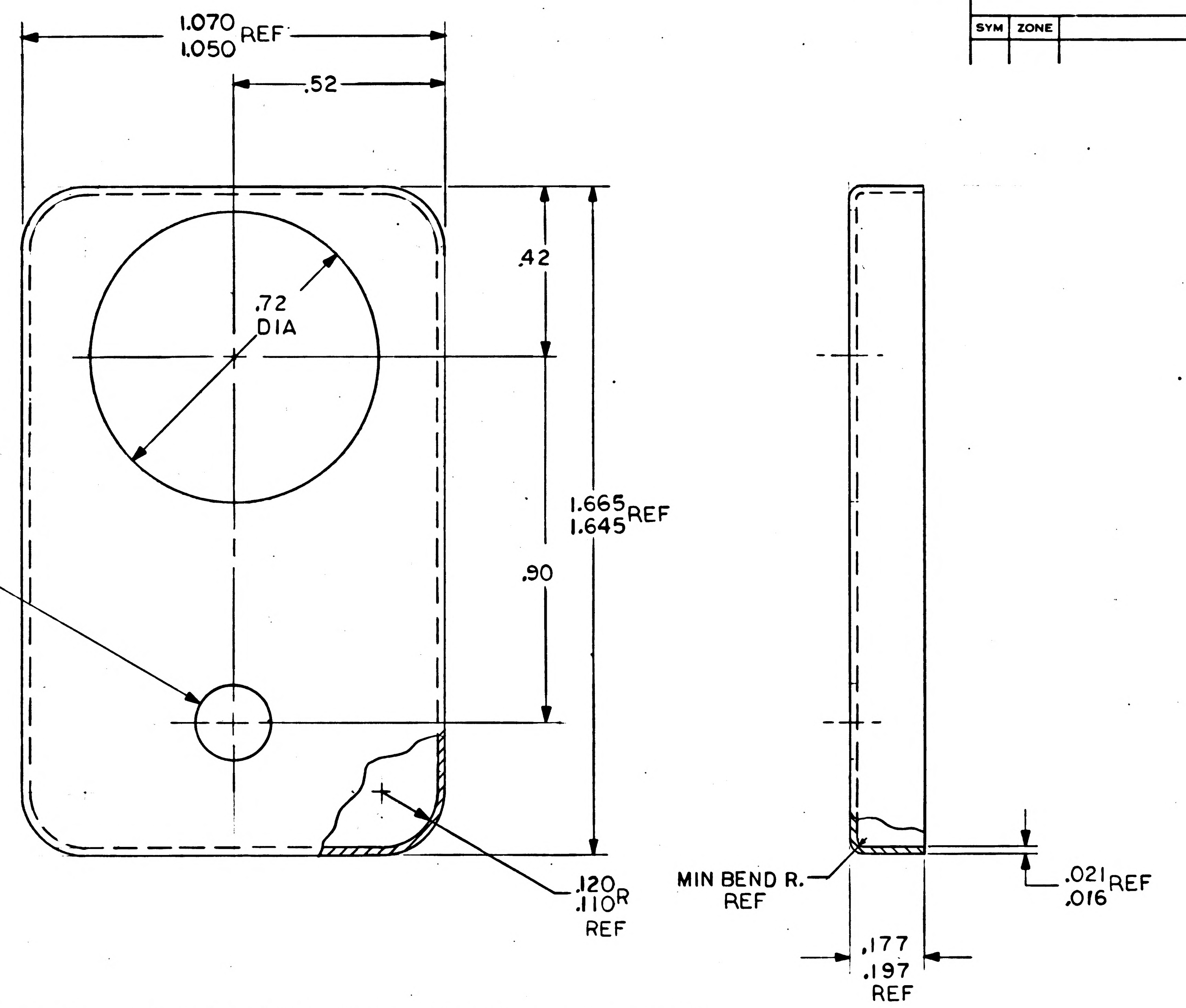
24

2008235

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAKE FROM 1010691-9
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY PER ND 1002019
5. WARNING: DO NOT SHOCK THIS ASSEMBLY BY ROUGH HANDLING, AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007027	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.01 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Tony Bell	9/17/64
CHECKED	R.L. Kingsbury	13 OCT 64
APPROVED	K Crane	13 Oct 64
APPROVED	L.C. Smith	15 Oct 64
APPROVED MIT		10/ /64
APPROVED MSC	W.J. Rhine	10-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008236

SCALE 4/1 — SHEET 1 OF 1

MASTER

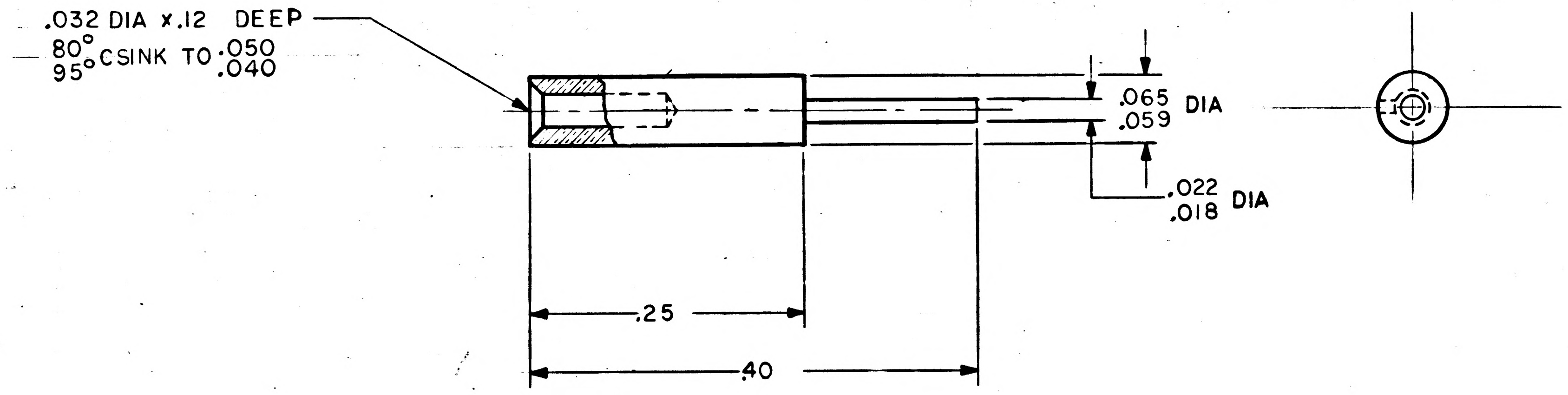
2008236

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /2817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14990		[illegible]	15Dec64	WR



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: BERYLIUM COPPER PER QQ-C-530 COND, 1/4H
3. HEAT TREAT TO ROCKWELL C38 MIN.
4. GOLD PLATE IN ACCORDANCE WITH MIL-G-45204 TYPE II CLASS I (COPPER STRIKE)
5. UNLESS OTHERWISE SPECIFIED 125 ✓ ALL OVER
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
7. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007039	
2007041	
2007052	
2007048	

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Tony Bell	9/18/64
CHECKED	R. P. Kingsbury	21Sep64
APPROVED	H Klane	22Sep64
APPROVED	L. C. Smith	9/23/64
APPROVED MIT	W Kupfer 22	Sep64
APPROVED MSC	W J Rhine	9-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONTACT, ELECTRICAL (PIN)

CODE IDENT NO.
SIZE C
DRAWING NO. 2008237
SCALE 10/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /2817

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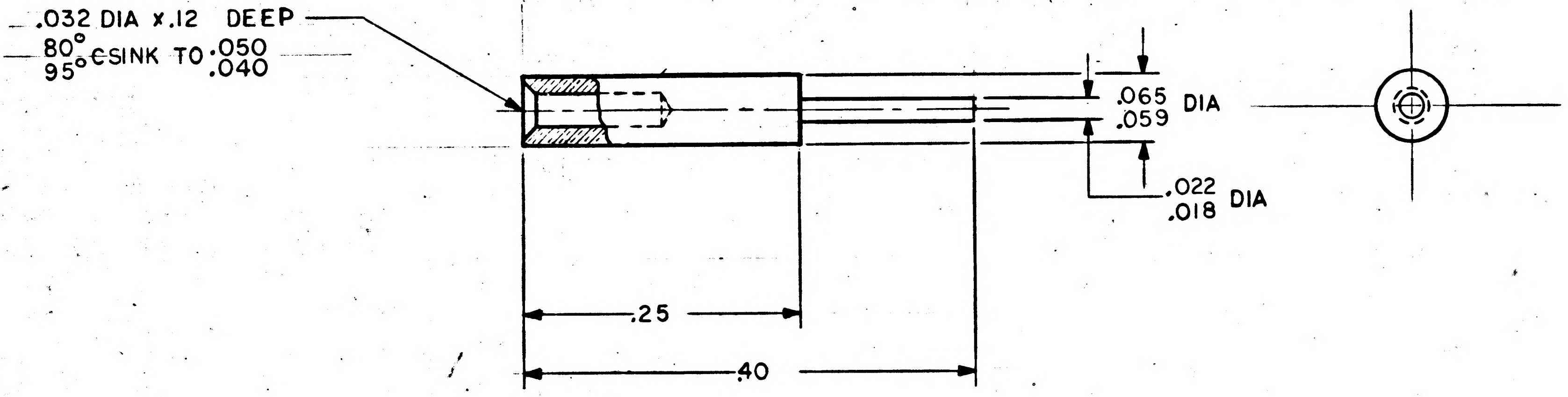
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14990			15Dec64	WR
B		REVISED PER TDRR 17483		RL	22MAR65	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: BERYLIUM COPPER PER QQ-C-530 COND, 1/4H
3. HEAT TREAT TO ROCKWELL C38 MIN.
4. GOLD PLATE IN ACCORDANCE WITH MIL-G-45204 TYPE II CLASS I (COPPER STRIKE)
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
7. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2007039	
2007041	
2007052	
2007048	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	Tony Bell	9/19/64
CHECKED	R.P. Kingsbury	21Sep64
APPROVED		22Sep64
APPROVED	L.C. Smith	9/23/64
APPROVED MIT		22 Sep64
APPROVED MSC	W J Rhine	9-22-64

CONTACT, ELECTRICAL (PIN)

CODE IDENT NO.	SIZE	DRAWING NO.
	C	2008237

SCALE 10/1 SHEET 1 OF 1

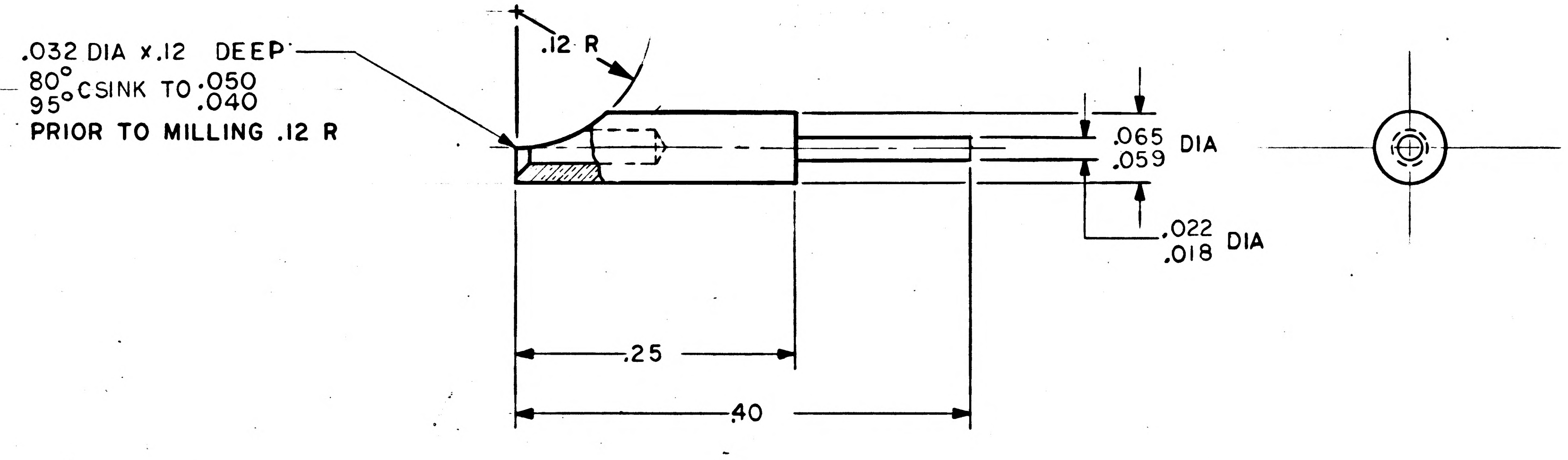
2008237 D

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /2817

(M)

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14990		RK	18DEC64	WK
B		REVISED PER TDRR 17483	BJP	RL	22MAR65	WK
C		REVISED PER TDRR 21128	KCH	RK	29JUL65	WK



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: BERYLLIUM COPPER PER QQ-C-530 COND, 1/4H
3. HEAT TREAT TO ROCKWELL C38 MIN.
4. GOLD PLATE IN ACCORDANCE WITH MIL-G-45204 TYPE II CLASS I (COPPER STRIKE)
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
7. IDENTIFY PER ND 1002019

MASTER

NEXT ASSY	USED ON
2007039	
2007041	
2007052	
2007048	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Tony Bell	9/18/64
CHECKED	R.P. Kingsbury	21SEP64
APPROVED	H Klane	22SEP64
APPROVED	S.C. Smith	9/23/64
APPROVED MIT	W Kupfer	22Sep64
APPROVED MSC	W J Rhine	9-22-64
		DATE

CONTACT, ELECTRICAL (PIN)

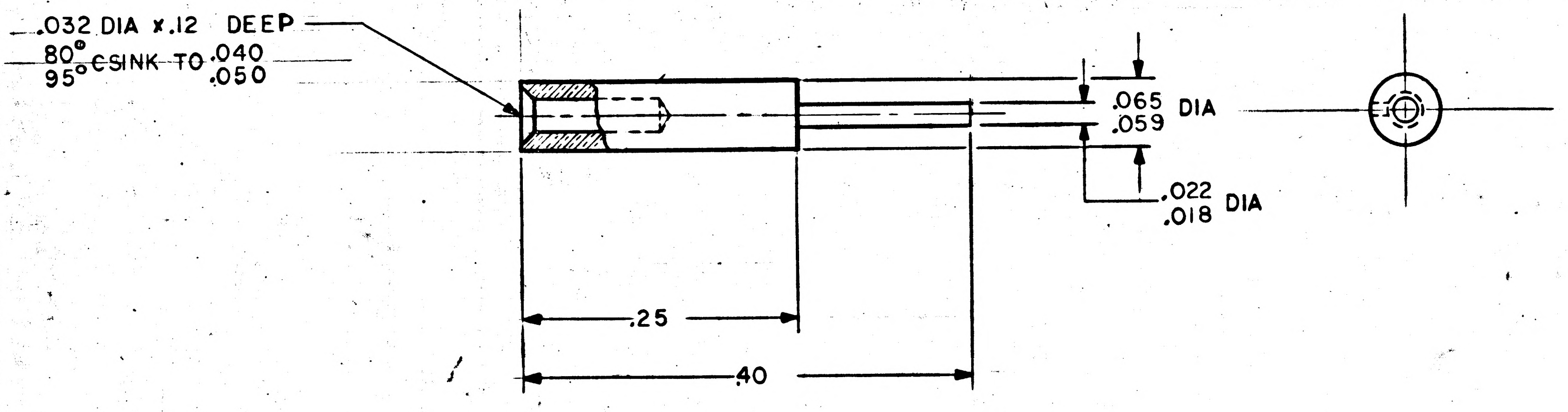
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008237
SCALE 10/1		SHEET 1 OF 1

2008237 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 12817

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: BERYLIUM COPPER PER QQ-C-530 COND, 1/4H
3. HEAT TREAT TO ROCKWELL C38 MIN.
4. GOLD PLATE IN ACCORDANCE WITH MIL-G-45204 TYPE II CLASS I (COPPER STRIKE)
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
7. IDENTIFY PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007041	
2007039	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02	± —

DO NOT SCALE THIS DRAWING

MATERIAL

SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Tony Bell	9/18/64
CHECKED	R. Kingsbury	21Sep64
APPROVED	H. Klaus	22Sep64
APPROVED	L.C. Smith	9/23/64
APPROVED MIT	W Kupfer	22 Sep 64
APPROVED MSC	WJ Rhine	9-22-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONTACT, ELECTRICAL (PIN)

CODE IDENT NO.	SIZE	DRAWING NO.
	C	2008237

SCALE 10/1

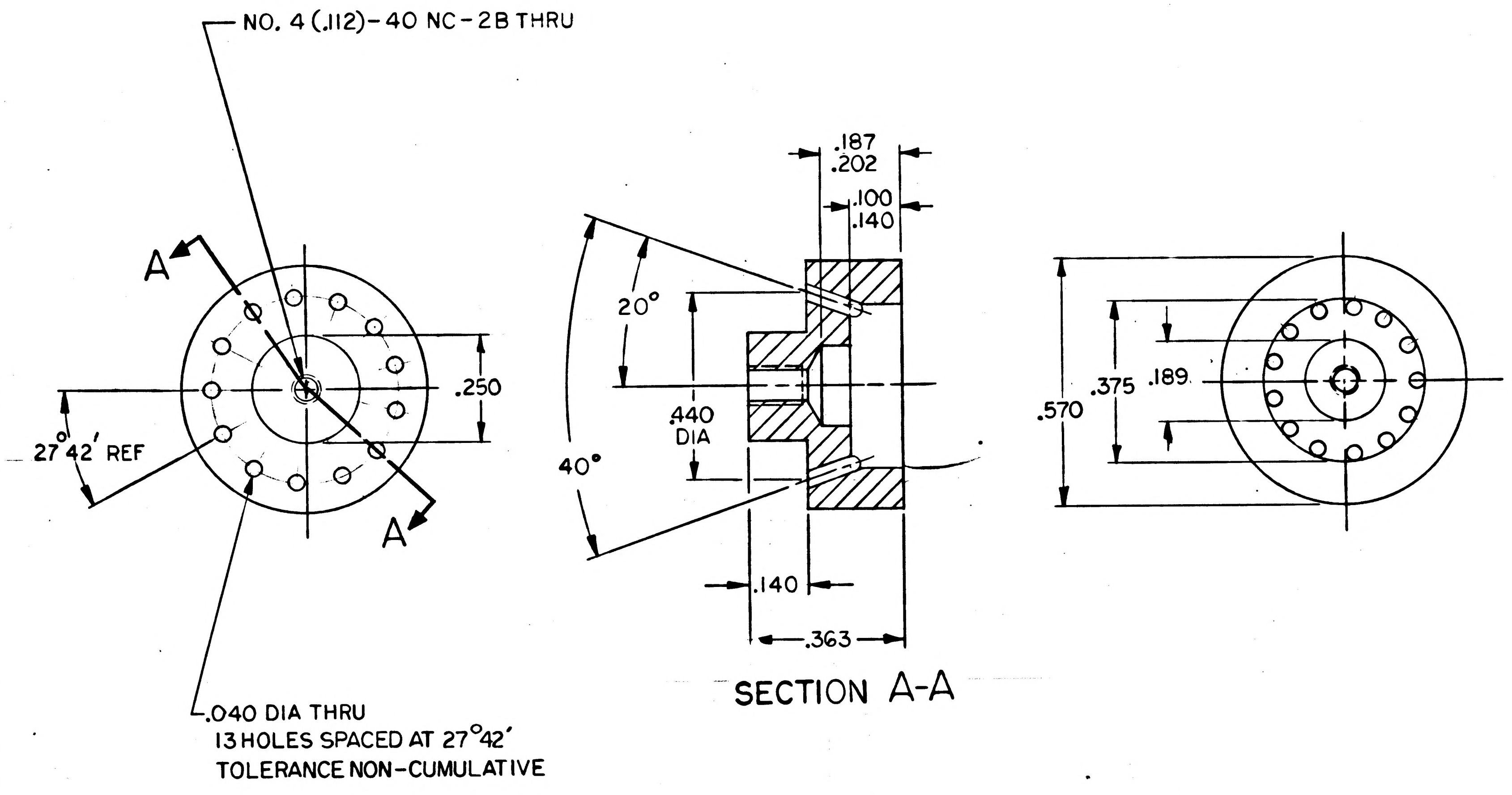
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: LAMINATED PLASTIC ROD PER ND 1010692-20
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. IDENTIFY PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007058	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XXX±.005 ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powers	17Sept64
CHECKED	C. Kingsbury	8Oct64
APPROVED	Krone	13Oct64
APPROVED	S.C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10-27-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, TUBE

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008239
SCALE 4/1	—	SHEET 1 OF 1

MASTER

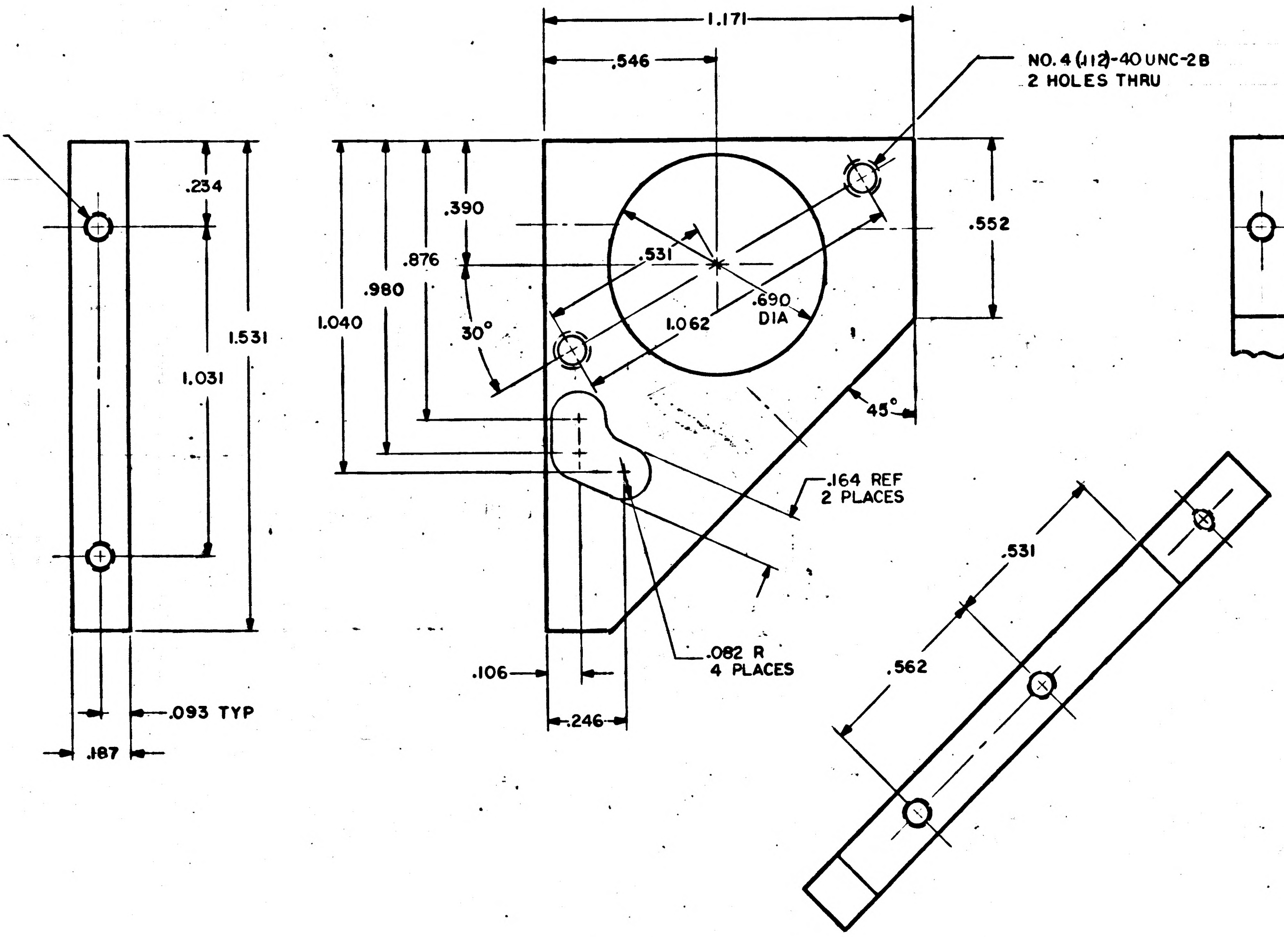
2008239

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16127	6FEB65	WK


1.171
.546
NO. 4 (.112)-40 UNC-2B
2 HOLES THRU
NO.2(.086)-56 UNC 2B
X .187 DEEP
5 HOLES
.234
1.531
1.031
.390
.876
.980
1.040
.531
.690
DIA
1.062
30°
.552
45°
.164 REF
2 PLACES
.082 R
4 PLACES
.106
.246
.093 TYP
.187
.281
.531
.562

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 2024-T4 PER QQ-A-250/4
3. IDENTIFY PER NO 1002019
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ~~CLEAR~~ ANODIZE PER MIL-A-8625 TYPE II

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007055	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS XXX ±.005
ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN Tony Bell DATE 9/21/64
CHECKED R. Humphrey 7 Oct 64
APPROVAL 13 Oct 64
APPROVAL S. C. Smith 10-13-64
NASA APPROVAL W. J. Rhine 1/21/65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

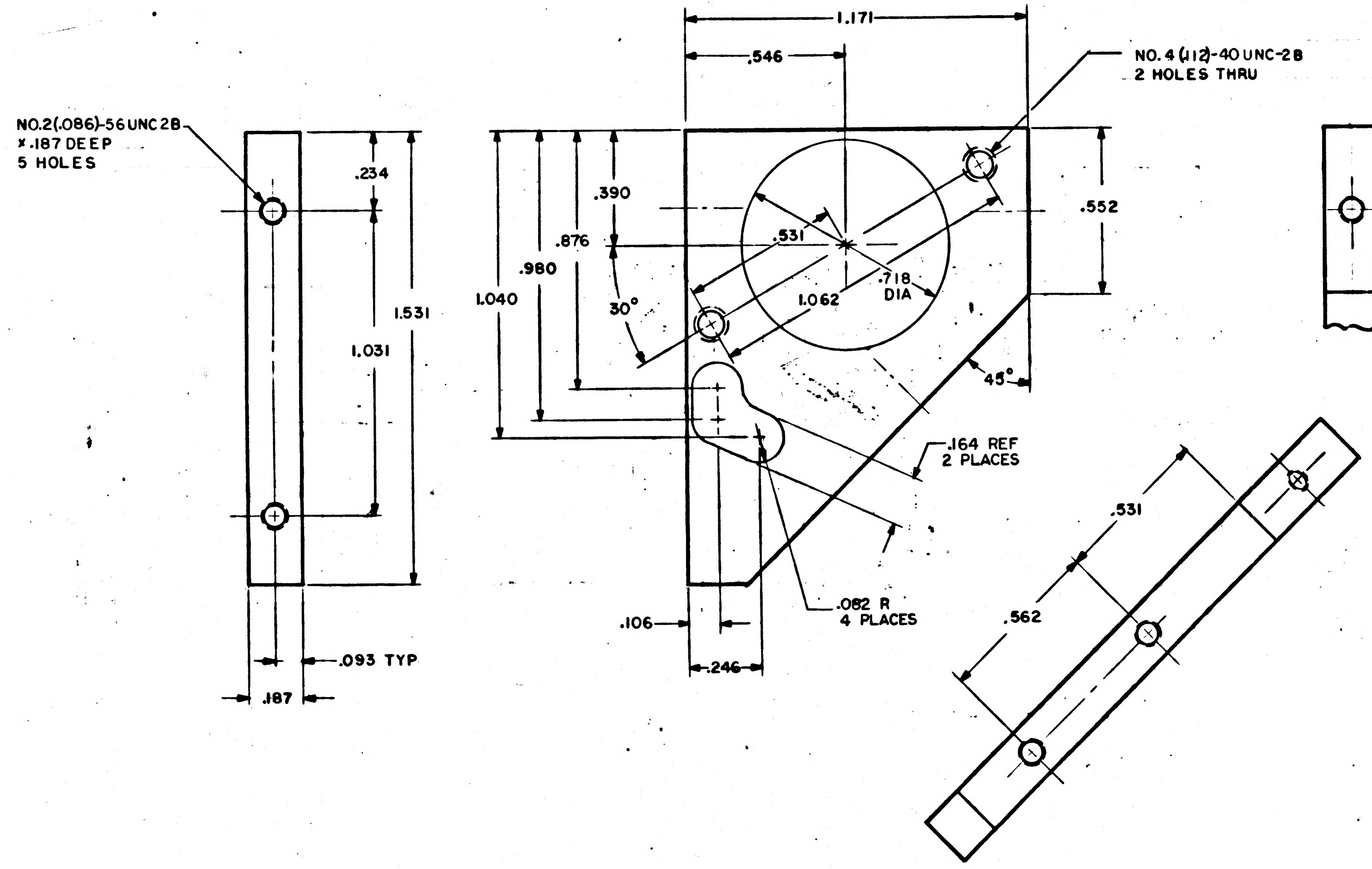
COVER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008241
SCALE 4/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16127	8FEB65	WK
B	REVISED PER TDRR 19702	27MAY65	



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 2024-T4 PER QQ-A-250/4
3. IDENTIFY PER ND 1002019.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ~~CLEAR~~ ANODIZE PER MIL-A-8625 TYPE II

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007055	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT ——

FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Tom Bell DATE 9/21/64
CHECKED 7 Oct 64
APPROVAL 13 Oct 64
APPROVAL S. C. Smith 10-13-64
NASA APPROVAL 10/21/64
MIT APPROVAL

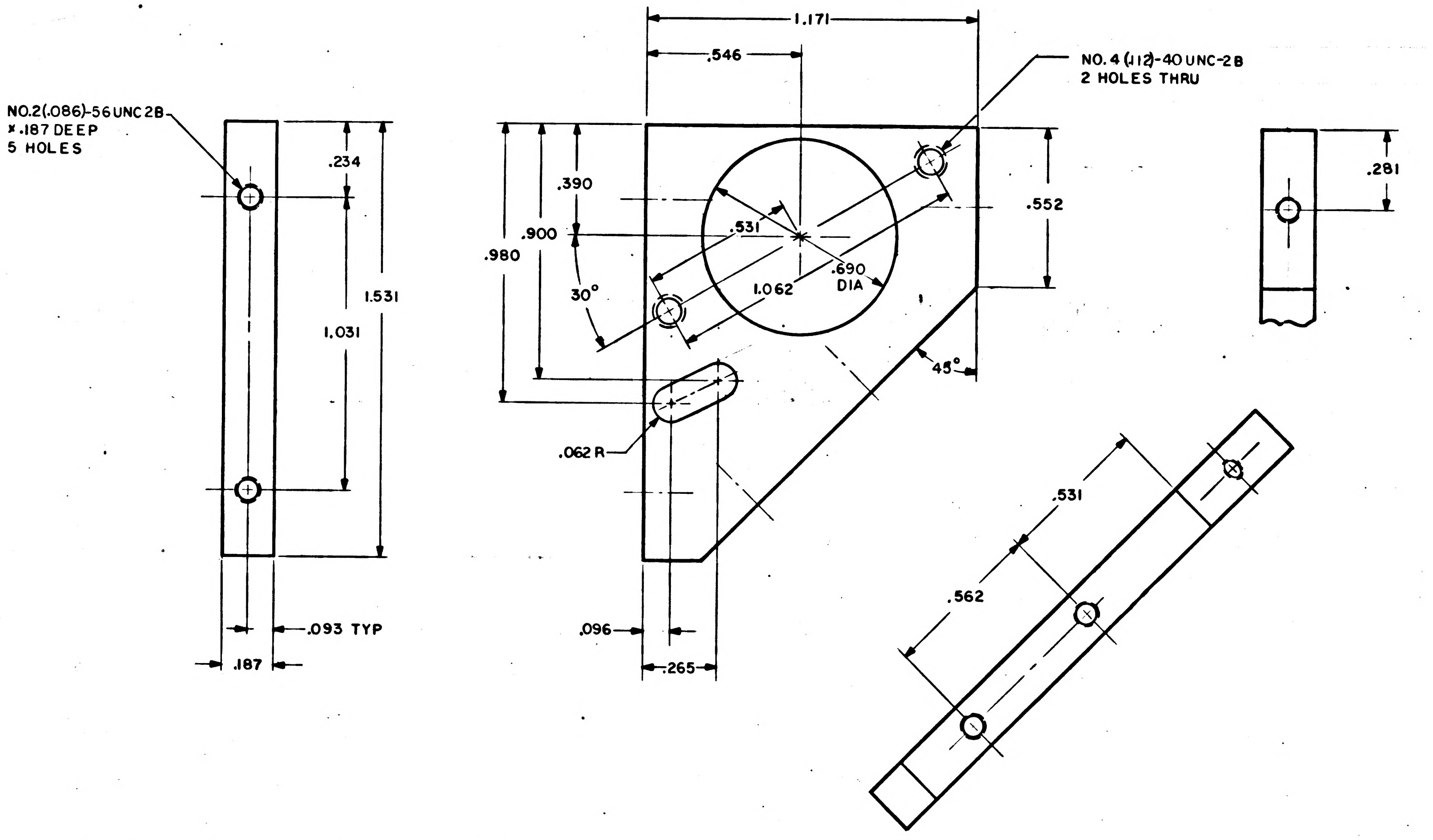
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008241
SCALE 4/1
WT ——
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 2024-T4 PER QQ-A-250/4
3. ~~IDENTIFY PER ND 1002019~~
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. CLEAR ANODIZE PER MIL-A-8625 TYPE II

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007055	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Gary Bell DATE 9/21/64
CHECKED 7 Oct 64
APPROVAL 13 Oct 64
APPROVAL S. C. Smith 10-13-64
NASA APPROVAL W J Rhine 10-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008241

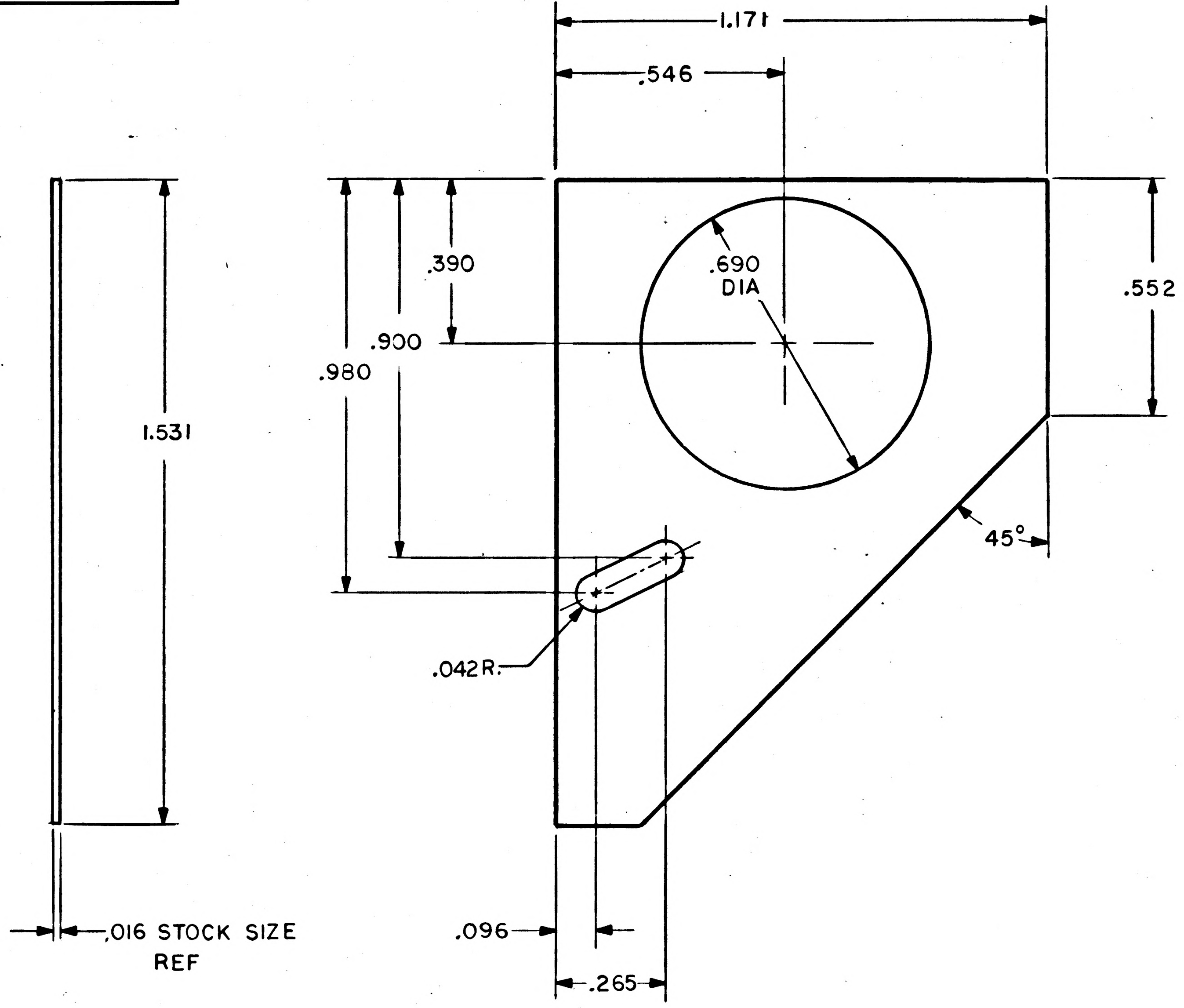
SCALE 4/1 WT — SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14957		RPK	18Dec64	WR



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: "MUMETAL" .016 THK PER 2021562
3. HEAT TREAT PER ND 1002114 AFTER FABRICATING
4. WARNING: DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING QUALITIES MAY BE IMPAIRED
5. IDENTIFY PER ND1002019
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007055	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— XXX±.005 ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN		9/21/64
CHECKED		7Oct64
APPROVED		13Oct64
APPROVED	S.C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10-21-64

PLATE, MAGNETIC SHIELDING

CODE IDENT NO.	SIZE	DRAWING NO.
——	C	2008242

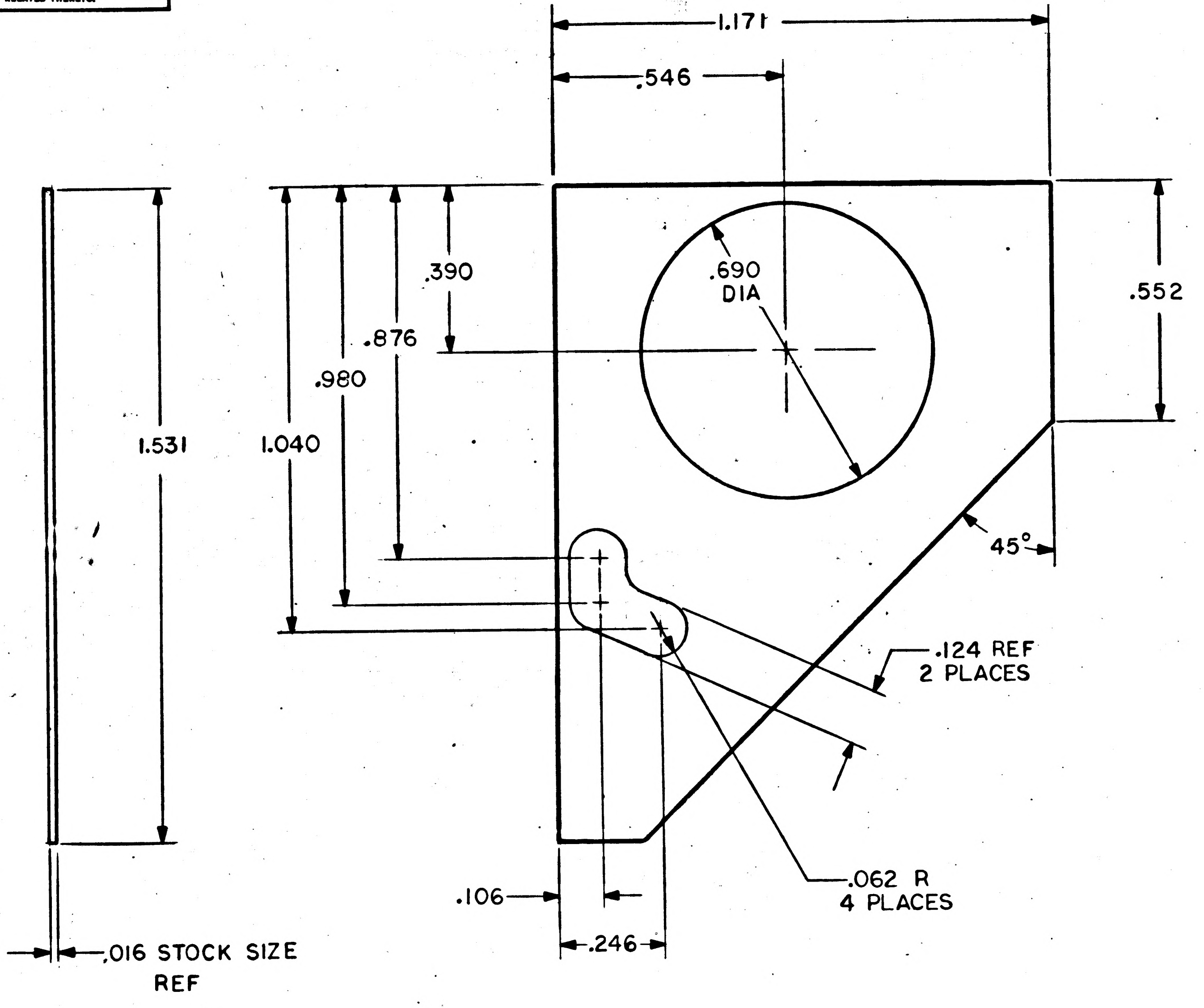
SCALE 4/1 —— SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14957		RPK	18 DEC 64	WR
B		REVISED PER TDRR 16127	JFW	RL	8FEB65	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: "MUMETAL" .016 THK PER 2021562
3. HEAT TREAT PER ND 1002114 AFTER FABRICATING
4. WARNING: DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING QUALITIES MAY BE IMPAIRED
5. IDENTIFY PER ND1002019
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007055	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS XXX±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9/21/64
CHECKED R.P. Langelier 7 OCT 64
APPROVED 13 OCT 64
APPROVED 10-13-64
APPROVED MIT 10/21/64
APPROVED MSC W J Rhine 10-21-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MAGNETIC SHIELDING

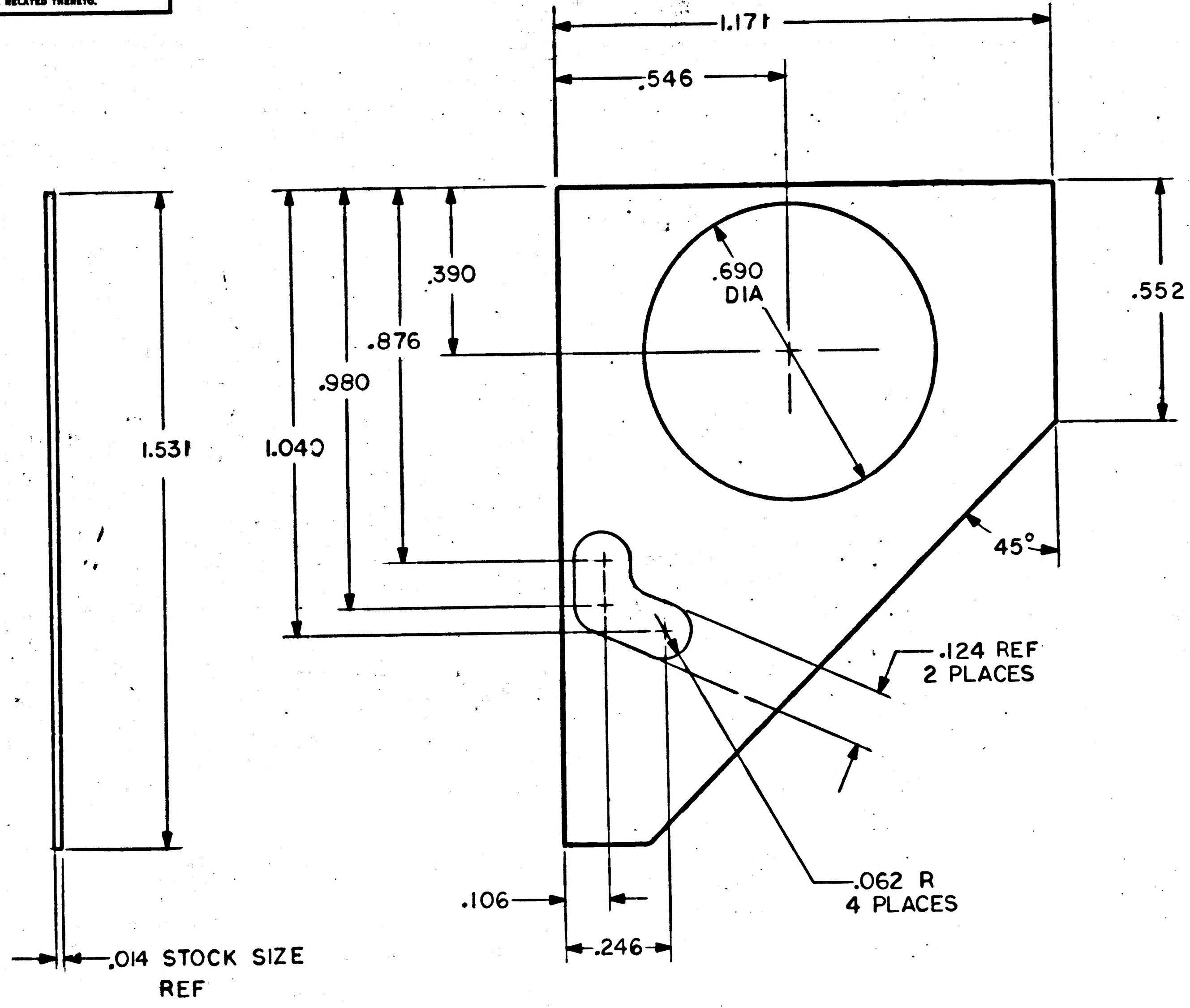
CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008242
SCALE 4/1
SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14957			18DEC64	WK
B		REVISED PER TDRR 16127	JFW	RL	8FEB65	WK
C		REVISED PER TDRR 17482		RL	22MAR65	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: NICKEL ALLOY .014 THK PER 1012530
3. HEAT TREAT PER ND 1002114 AFTER FABRICATING
4. WARNING: DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING QUALITIES MAY BE IMPAIRED
5. IDENTIFY PER ND1002019
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX

MASTER

2007055	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS XXX±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN 9/21/64
CHECKED 7OCT64
APPROVED 13OCT64
APPROVED S.C. Smith 10-13-64
APPROVED MIT
APPROVED MSC W J Rhine 10-21-64
DATE

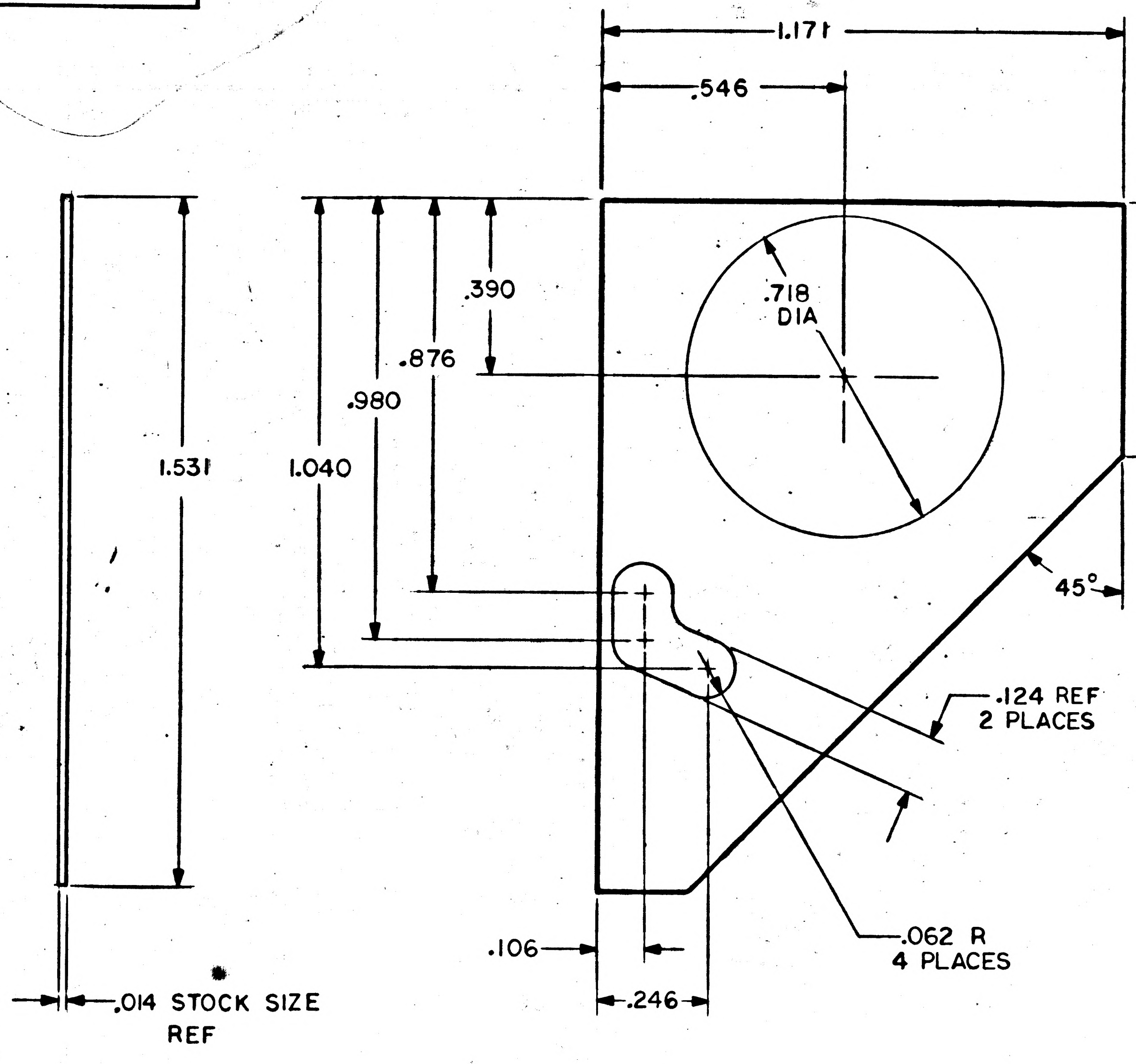
PLATE, MAGNETIC SHIELDING

CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008242
SCALE 4/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14957		RPK	18DEC64	WK
B		REVISED PER TDRR 16127	JFW	RL	8FEB65	WK
C		REVISED PER TDRR 17482		RL	22MAR65	WK
D		REVISED PER TDRR 19702	JFW		27MAY65	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY ~~MIL~~-D-70327
2. MATERIAL: NICKEL ALLOY .014 THK PER 1012530
3. HEAT TREAT PER ND 1002114 AFTER FABRICATING
4. WARNING: DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING QUALITIES MAY BE IMPAIRED
5. IDENTIFY PER ND1002019
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007055	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS XXX±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN 9/21/64
CHECKED 7OCT64
APPROVED 13OCT64
APPROVED S.C. Smith 10-13-64
APPROVED MIT 10/21/64
APPROVED MSC W J Rhine 10-21-64
DATE

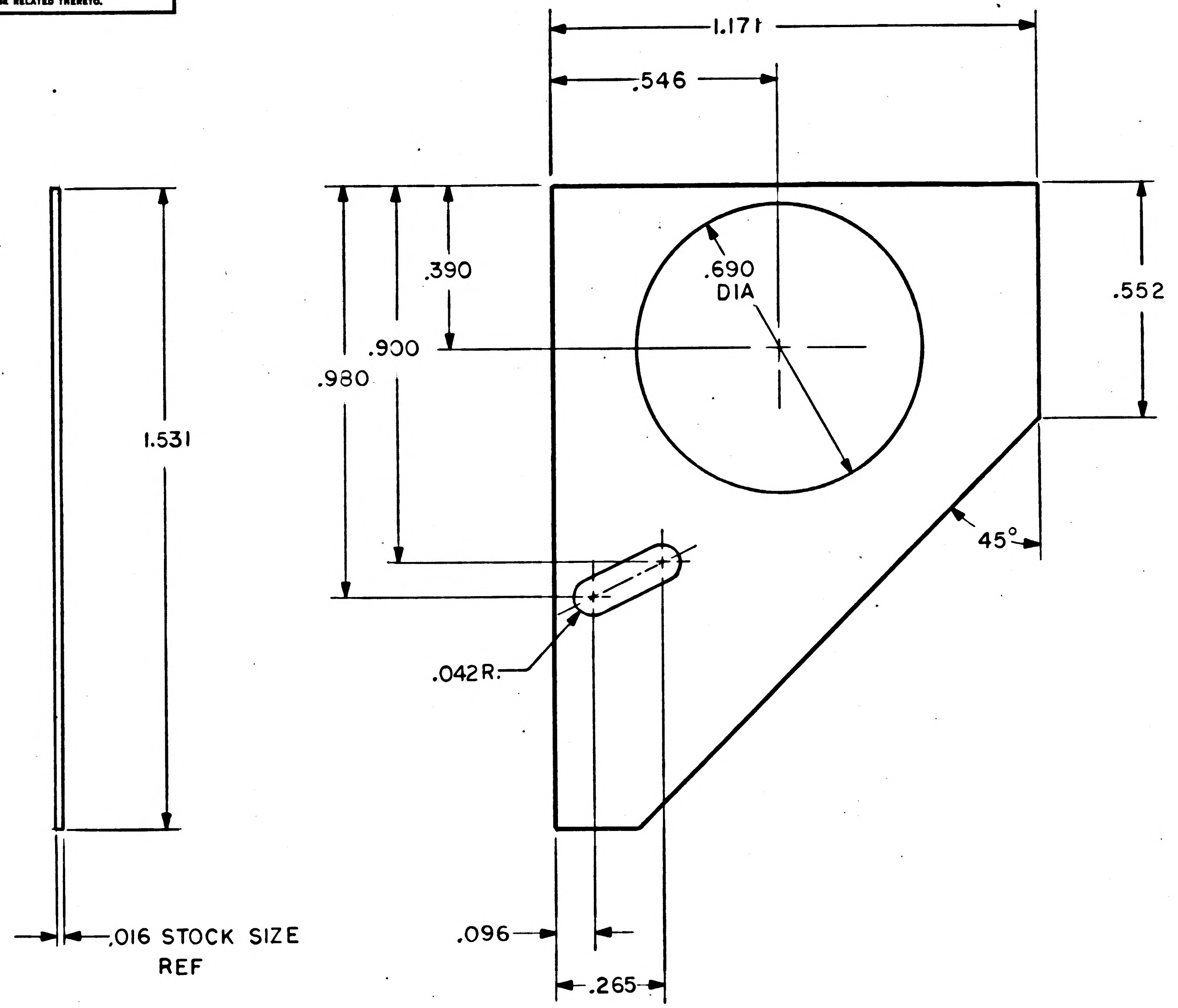
PLATE, MAGNETIC SHIELDING

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008242
SCALE 4/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: "MUMETAL" .016 THK PER 2021562
3. HEAT TREAT PER ND 1002114
4. WARNING: DO NOT SHOCK BY ROUGH HANDLING AS MAGNETIC SHIELDING QUALITIES MAY BE IMPAIRED
5. IDENTIFY PER ND1002019
6. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007055	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS XXX±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Tony Bell	9/21/64
CHECKED	L.P. Kingsbury	7 Oct 64
APPROVED	Krane	13 Oct 64
APPROVED	S.C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MAGNETIC SHIELDING

CODE IDENT NO.	SIZE	DRAWING NO.
——	C	2008242

SCALE 4/1
SHEET 1 OF 1

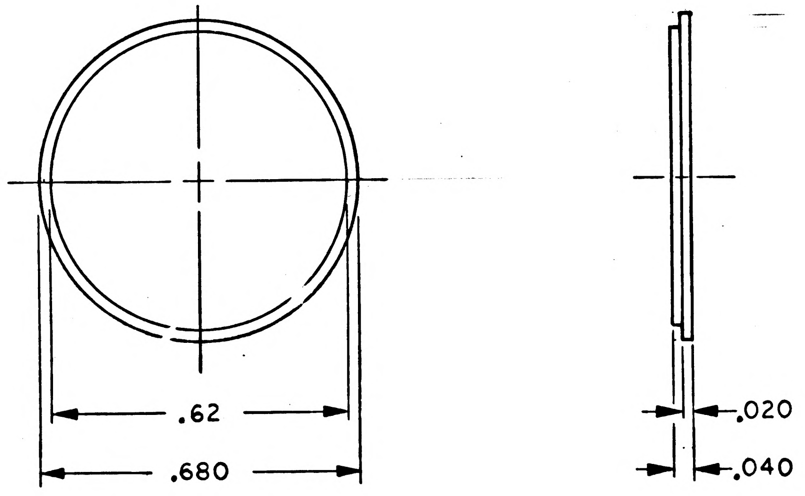
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: PLASTIC SHEET PER MIL-P-8177, TYPE GEE
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007053	
NEXT ASSY'	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.01 XXX±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	R.B. Hoguen	18SEP64
CHECKED	R.P. Kingsbury	7Oct64
APPROVED	Krane	13Oct64
APPROVED	S.C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10-21-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, INSULATION

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008243
SCALE 4/1	—	SHEET 1 OF 1

2008243

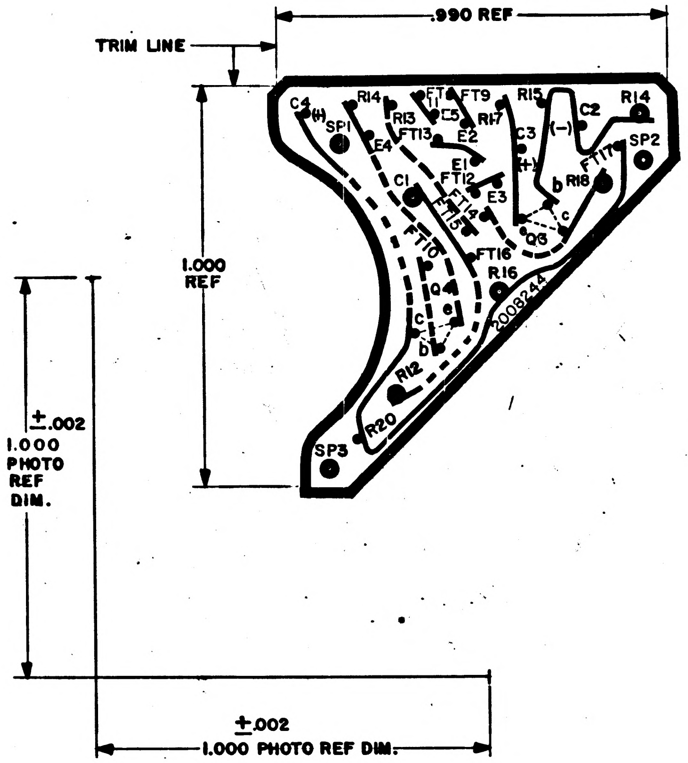
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16127	8FEB65	RS ch WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE I B, CLASS 2 STYLE 1A
6. • .026/.030 DIA
7. ● .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007044	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN [illegible] DATE 9-22-64
CHECKED R.P. Kingsbury 7 Oct 64
APPROVAL [illegible] 13 Oct 64
APPROVAL A.C. Smith 10-13-64
NASA APPROVAL W.J. Rhine 10-21-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
PREAMPLIFIER—TRACKER

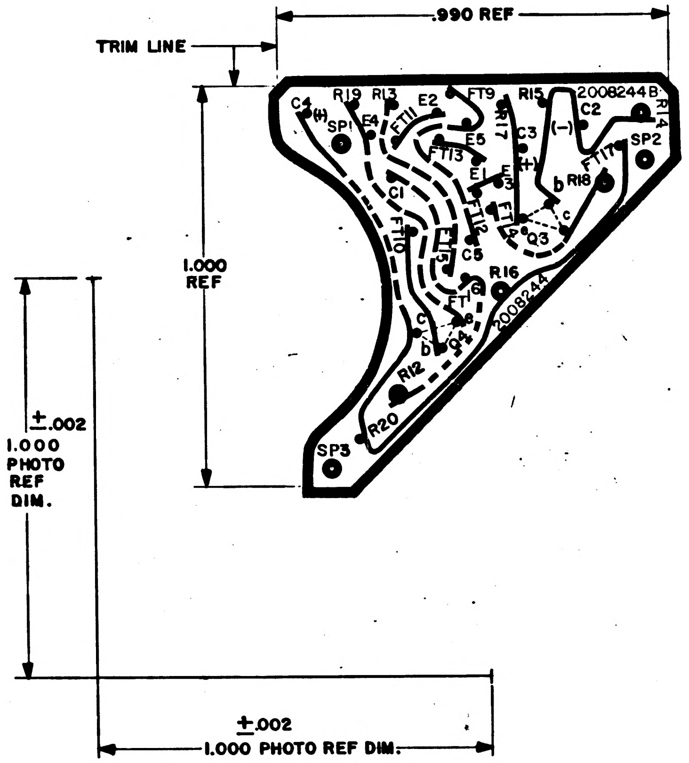
CODE IDENT NO. —— SIZE D NASA DRAWING NO. 2008244
SCALE 5/1 WT —— SHEET 1 OF 1

2008244 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16127	8FEB65	RTS CL WK
B	REVISED PER TDRR 20467	3AUG65	WK


.990 REF
TRIM LINE
1.000 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.
C4
(+)
SP1
R19
R13
E4
FT11
E2
FT9
R17
R15
2008244B
C2
R14
(−)
C3
(+)
E5
FT13
E1
E3
C1
FT12
FT14
b
R18
FT17
SP2
c
Q3
FT10
FT15
C5
R16
FT16
2008244
c
e
b
Q4
R12
R20
SP3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE I B, CLASS 2 STYLE I A
6. • .026/.030 DIA
7. ● .038/.042 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007044	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT ——
FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN P. Bell DATE 9-22-64
CHECKED R.P. Kingsbury 7Oct64
APPROVAL 13 Oct 64
APPROVAL A.C. Smith 10-13-64
NASA APPROVAL W. J. Rhine 10-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

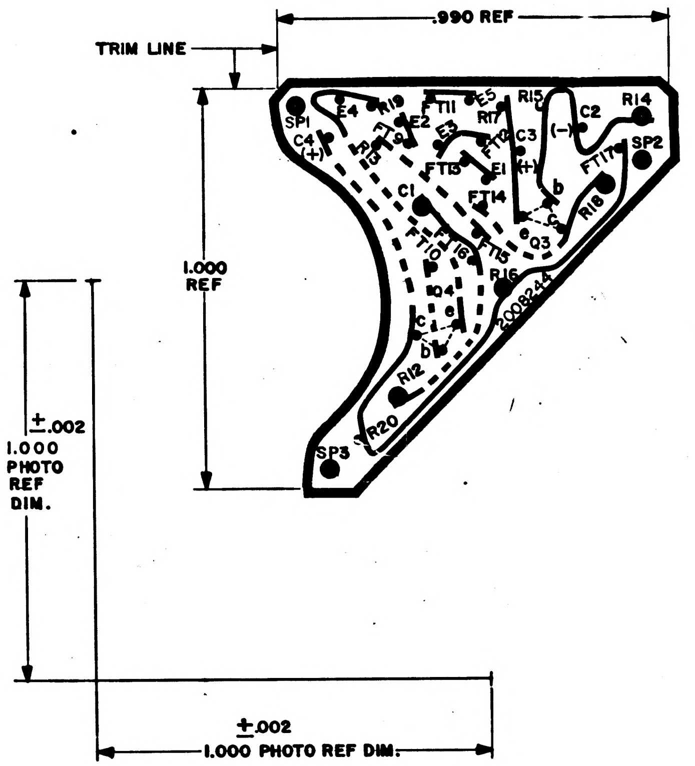
INSULATOR, BOTTOM PHOTOGRAPHIC MASTER

PREAMPLIFIER—TRACKER

CODE IDENT NO. —— SIZE D NASA DRAWING NO. 2008244
SCALE 5/1 WT —— SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE I B, CLASS 2 STYLE 1A
6. • .026/.030 DIA
7. ● .038/.042 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
2007044	
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN P. Dell DATE 9-22-64
CHECKED R.P. Kingsbury 7 Oct 64
APPROVAL 13 Oct 64
APPROVAL A.C. Smith 10-13-64
NASA APPROVAL W. J. Rhine 10-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM PHOTOGRAPHIC MASTER

PREAMPLIFER—TRACKER

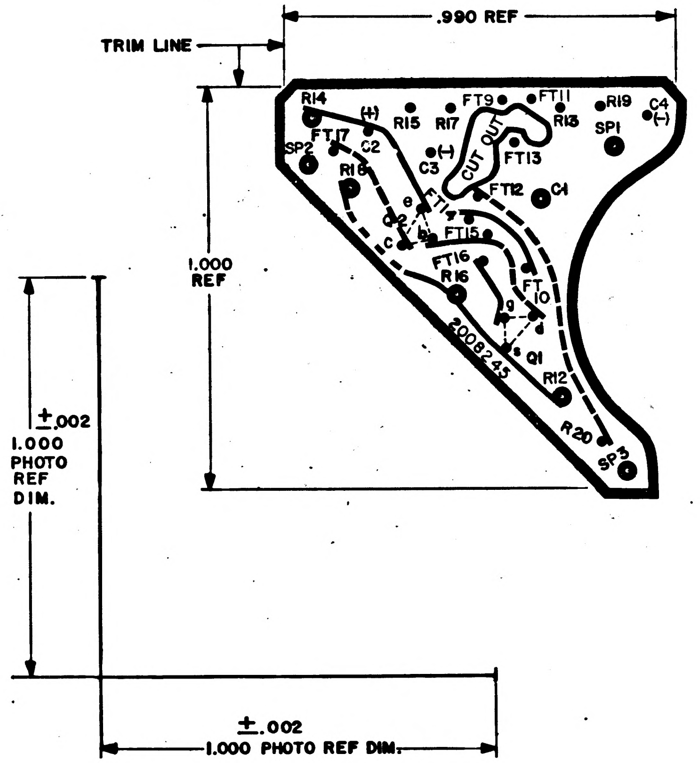
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008244
SCALE 5/1
WT —
SHEET 1 OF 1

INCHES
0 2"

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16127	8FEB65	RTS



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE I B, CLASS 2 STYLE 1A
6. ● .026/.030 DIA
7. ◉ .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007044	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 9-22-64
CHECKED R. L. Kingsbury 7Oct64
APPROVAL 13 OCT 64
APPROVAL L. C. Smith 10-13-64
NASA APPROVAL W J Rhine 10-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

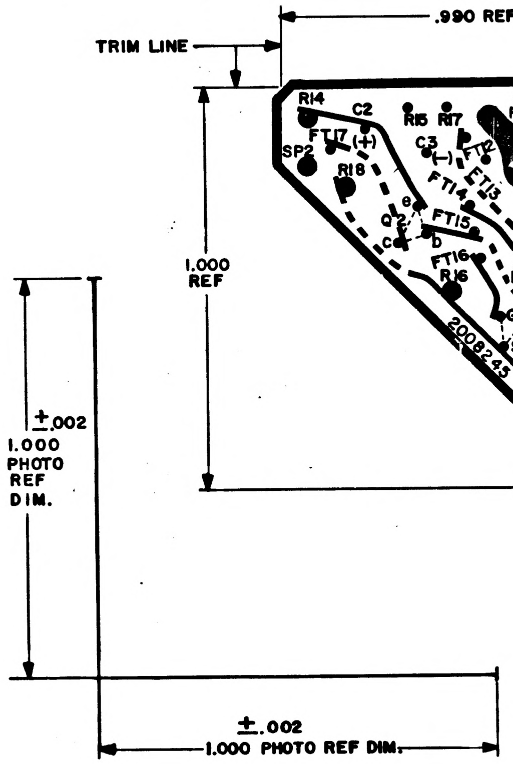
INSULATOR, TOP PHOTOGRAPHIC MASTER

PREAMPLIFIER—TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008245
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE I B, CLASS 2 STYLE 1A
6. ● .026/.030 DIA
7. ● .038/.042 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007044	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 9-22-64
CHECKED 7 OCT 64
APPROVAL 13 OCT 64
APPROVAL S. C. Smith 10-13-64
NASA APPROVAL W J Rhine 10-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP PHOTOGRAPHIC MASTER

PREAMPLIFIER—TRACKER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	D	2008245

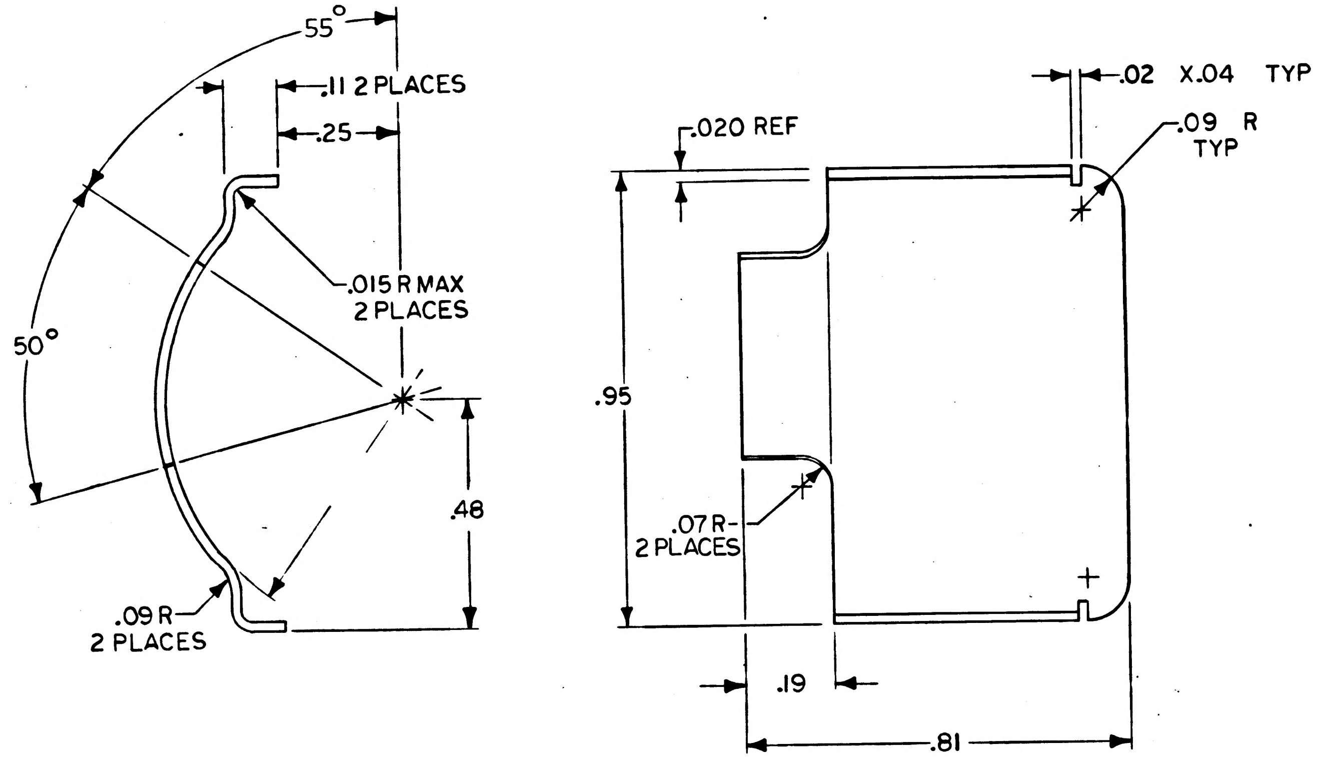
SCALE 5/1 WT SHEET 1 OF 1

4 3 2 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MU METAL .020 THICK PER 2021562
3. IDENTIFY PER ND1002019
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
5. WARNING: DO NOT SHOCK THIS ASSEMBLY BY ROUGH HANDLING, AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007054	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS — DECIMALS XXX±.01 — ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 23 SEP 64
CHECKED 13 OCT 64
APPROVED 13 OCT 64
APPROVED 10-13-64
APPROVED MIT
APPROVED MSC 10-21-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD

CODE IDENT NO. —
SIZE C
DRAWING NO. 2008248
SCALE 4/1
SHEET 1 OF 1

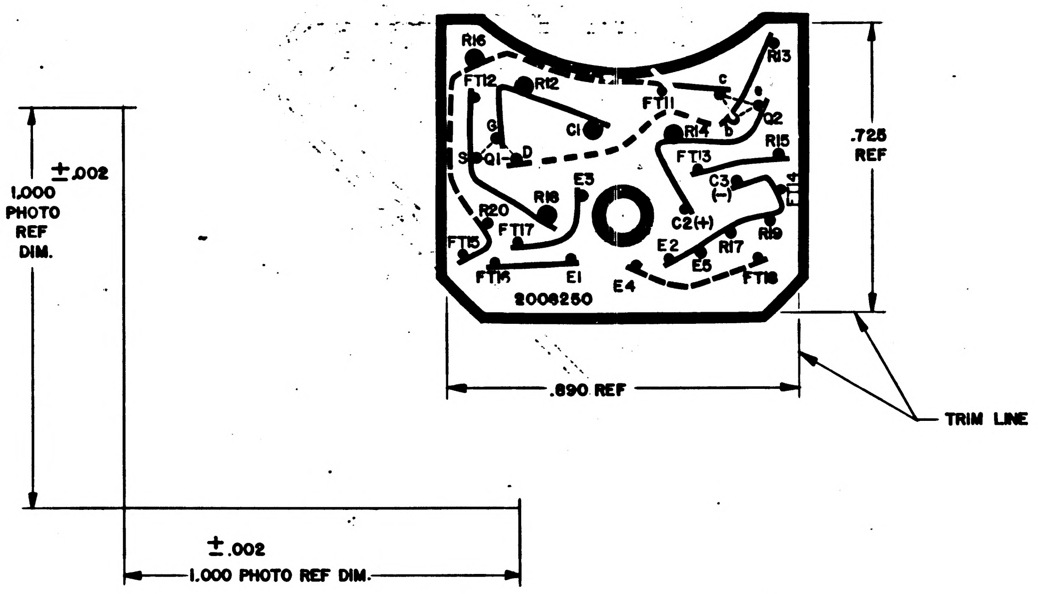
MASTER

4 3 2 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /3f3/			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16125	5 FEB 65	TM WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. • .026/.030 DIA
7. ● .038/.042 DIA
8. ◯ .144/.150 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007047	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN BJ Papia DATE 23 Sept 64
CHECKED R.F. Knysh 13 Oct 64
APPROVAL Krane 13 Oct 64
APPROVAL L. C. Smith 10-13-64
NASA APPROVAL W. J. Rhine 10-2 FEB 64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

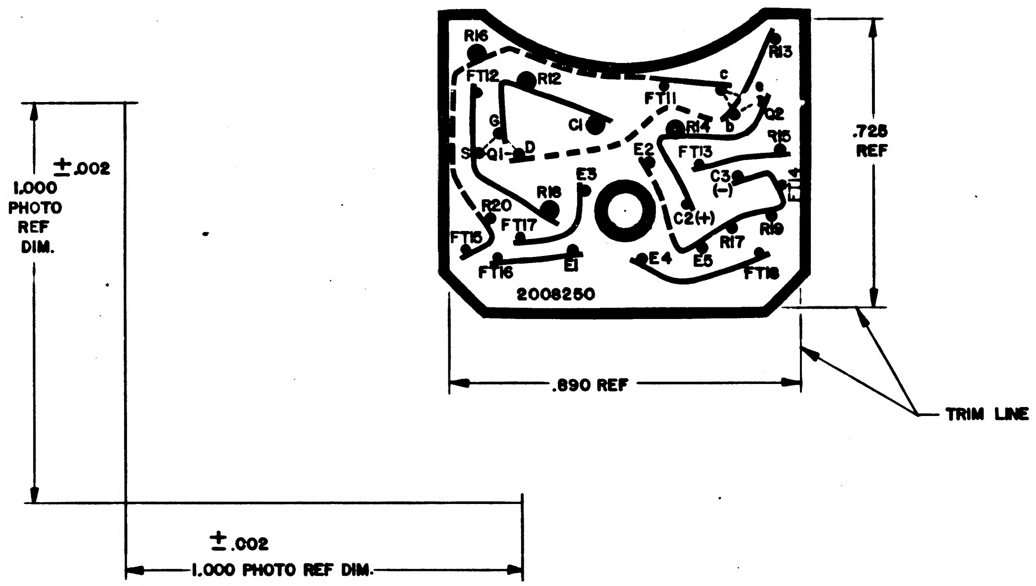
INSULATOR, BOTTOM
PHOTOGRAPHIC MASTER
PHOTOMETER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008250
SCALE 5/1	WT —	SHEET 1 OF 1

2008250 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1383			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. • .026/.030 DIA
7. ● .038/.042 DIA
8. ◯ .144/.150 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS. DWG. NO. CONTRACT	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
		MATERIAL SEE NOTE 5	DRAWN DATE 23 Sep 64 CHECKED 13 Oct 64 APPROVAL 13 OCT 64 APPROVAL 10-13-64	INSULATOR, BOTTOM PHOTOGRAPHIC MASTER PHOTOMETER
2007047		HEAT TREATMENT ——	NASA APPROVAL 10-26-64	CODE IDENT NO. —— SIZE D NASA DRAWING NO. 2008250
NEXT ASSY	USED ON	FINAL FINISH ——	MIT APPROVAL	SCALE 5/1 WT —— SHEET 1 OF 1
APPLICATION				

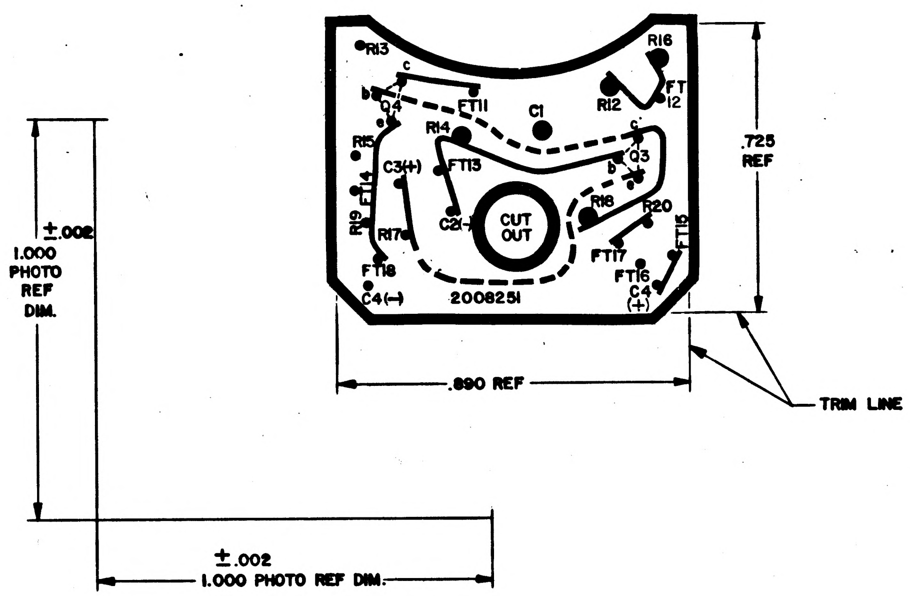
2008250

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 16125	5 Feb 65	WR



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATERIAL: FILM .006/.008 THICK PER L-F-340, TYPE I.B, CLASS 2, STYLE IA
6. ● .026/.030 DIA
7. ● .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007047	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN B.J. Papia DATE 24 Sep 64
CHECKED R.P. Kingsbury 13 Oct 64
APPROVAL 13 OCT 64
APPROVAL L.C. Smith 10-13-64
NASA APPROVAL W.J. Rhine 12-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

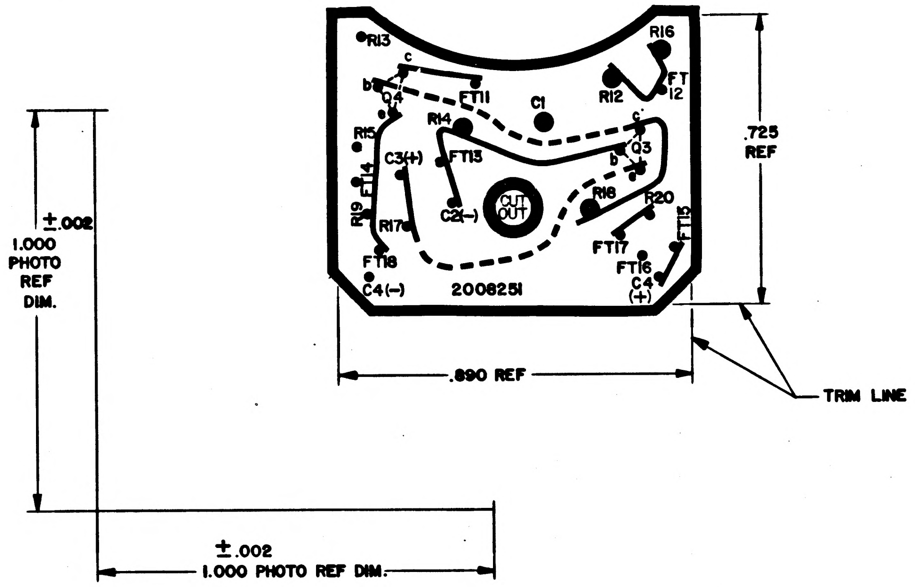
INSULATOR, TOP
PHOTOGRAPHIC MASTER
PHOTOMETER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	D	2008251
SCALE 5/1	WT —	SHEET 1 OF 1

2008251 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES
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6. ● .026/.030 DIA
7. ⬤ .038/.042 DIA

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007047	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±— DECIMALS ±— ANGLES ±—
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN B J Papia DATE 24 [illegible]
CHECKED R. P. Kingsbury 13 Oct 64
APPROVAL [illegible] 13 OCT 64
APPROVAL P. C. Smith 10-13-64
NASA APPROVAL W J Rhine [illegible]
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

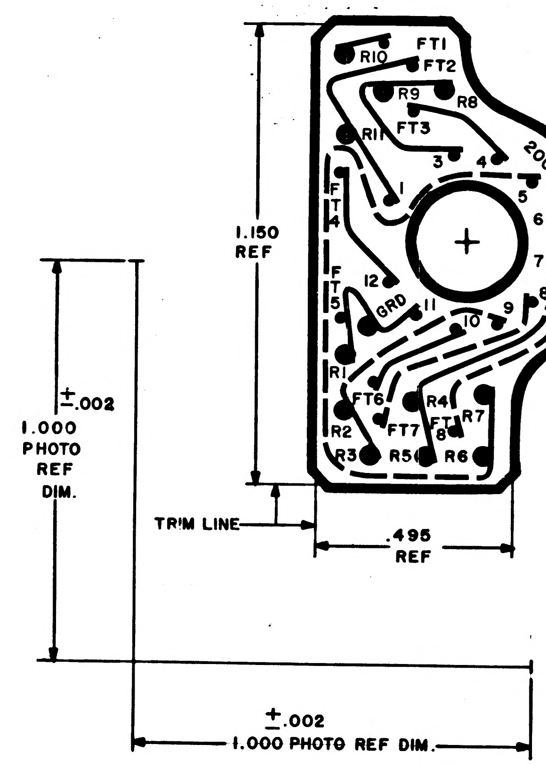
INSULATOR, TOP
PHOTOGRAPHIC MASTER
PHOTOMETER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008251
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14962	18DEC64	BJP RPK WK



REF DRAWING:
WIRING BOARD ASSEMBLY
DRAWING NO. 2007059

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bonarrigo DATE 28 Sept 64
CHECKED 7 OCT 64
APPROVAL 13 OCT 64
APPROVAL L. C. Smith 10-13-64
NASA APPROVAL W. J. Rhine 10-21-64
MIT APPROVAL 10/21/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

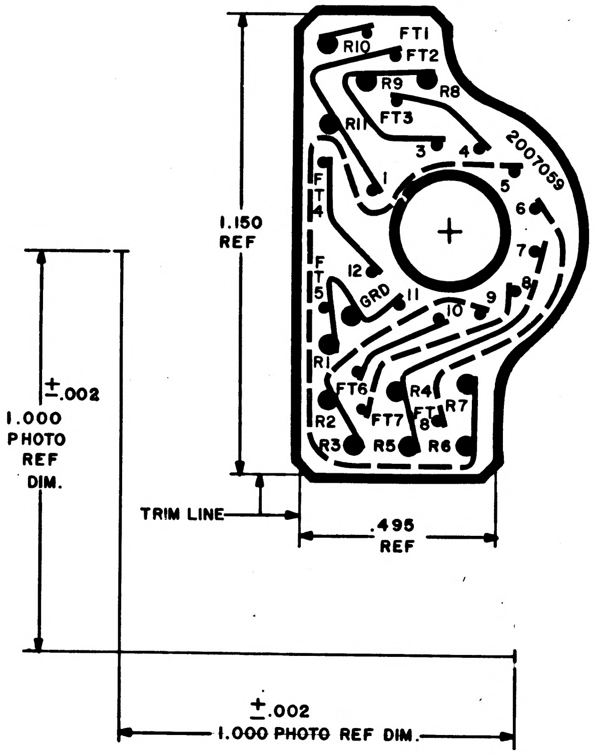
PHOTOGRAPHIC MASTER WIRING BOARD
PHOTODETECTOR TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008252
SCALE 5/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

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3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Bonarrigo DATE 30 Sept 64
CHECKED R.P. Kingsbury 7 Oct 64
APPROVAL H. Kraus 13 OCT 64
APPROVAL J. C. Smith 10-13-64
NASA APPROVAL W. J. Rhine 10-21-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD
PHOTODETECTOR TRACKER

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2008252
SCALE 5/1
WT —
SHEET 1 OF 1

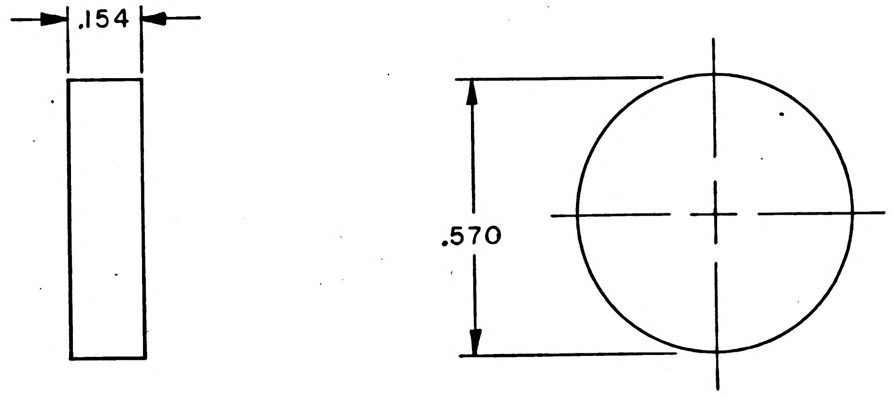
2008252

INCHES
0 1 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13830

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERAL: LAMINATED PLASTIC ROD PER ND 1010692-20
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007059	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XXX ± .005 ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R.C. Tyler 30 SEPT 64
CHECKED R.P. Kingsbury 7 OCT 64
APPROVED 13 OCT 64
APPROVED S.C. Smith 10-13-64
APPROVED MIT 10/21/64
APPROVED MSC W.J. Rhine 10-21-64
DATE

SPACER

CODE IDENT NO. —
SIZE C
DRAWING NO. 2008255
SCALE 4/1
SHEET 1 OF 1

MASTER

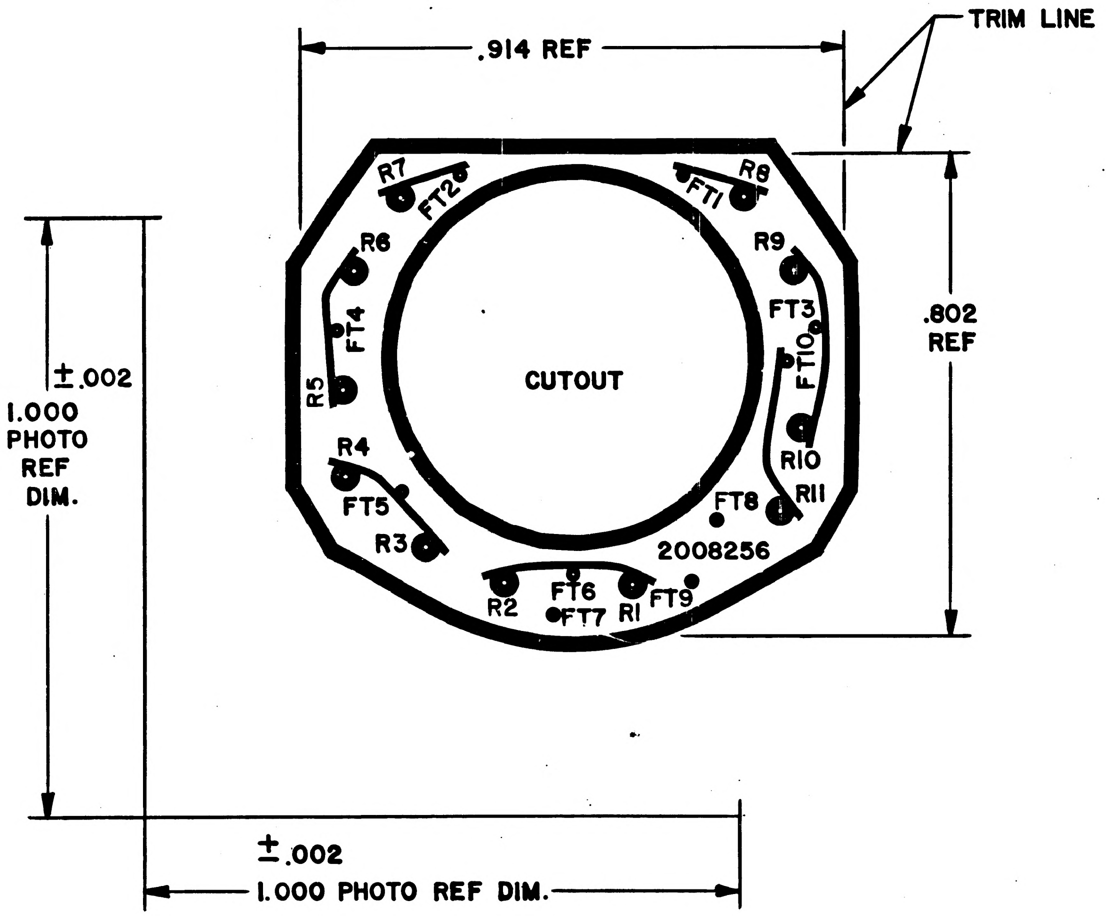
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2008255

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES

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2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. MATL: FILM .006/.008 THICK PER L-F-340, TYPE IB, CLASS 2, STYLE IA
6. ● .026/.030 DIA PUNCH
7. ● .038/.042 DIA PUNCH

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007046	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	B J Papia	5 Oct 64
CHECKED	R.P. Kingsbury	13 Oct 64
APPROVED	H Krane	13 Oct 64
APPROVED	L. C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR
PHOTOGRAPHIC MASTER
PHOTOMETER

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008256

SCALE 5/1 — SHEET 1 OF 1

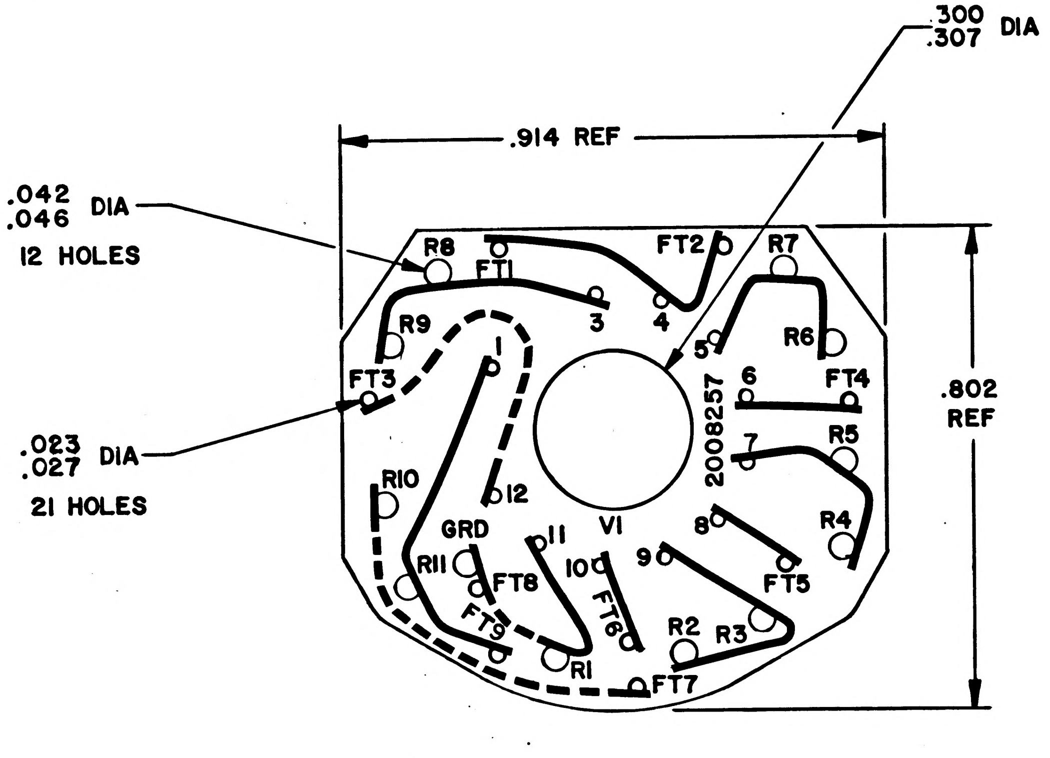
2008256

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13 of 31

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20472	KCH	A.W.L.	30 JUN 65	



REF DRAWING
DWG NO. 2008258 PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007046	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	BJPapia	6 Oct 64
CHECKED	R.P. Kingsbury	13 Oct 64
APPROVED		13 Oct 64
APPROVED	L.C. Smith	13 Oct '64
APPROVED MIT		10/4/64
APPROVED MSC	W J Rhine	10-21-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
PHOTOMETER

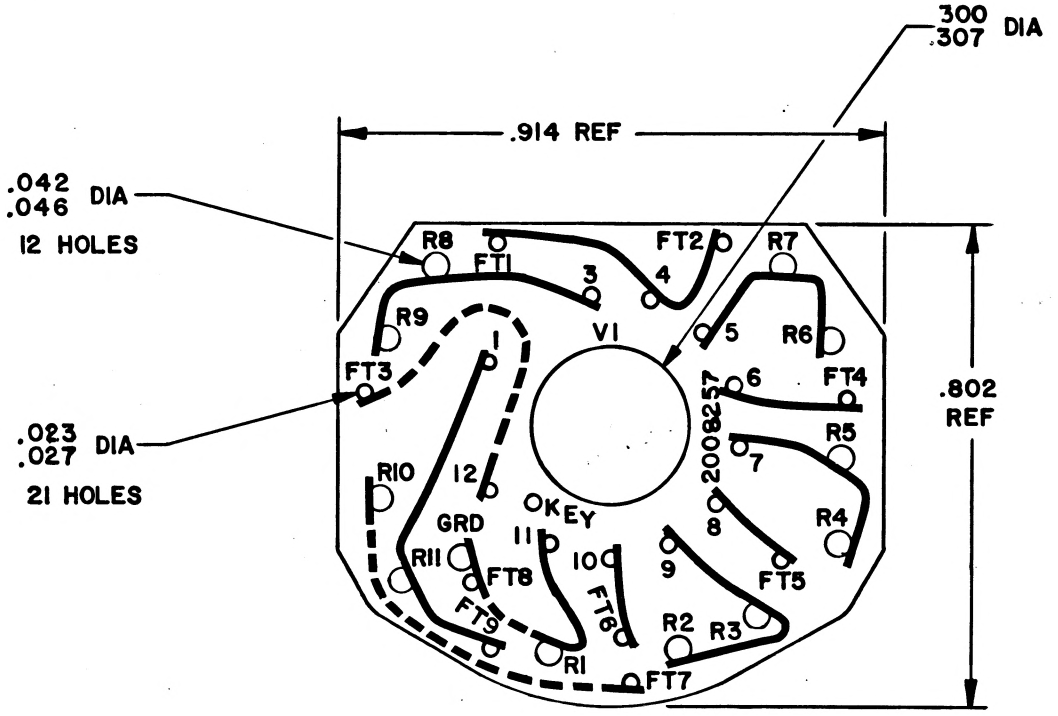
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008257
SCALE 5/1		SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13f 31

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20472	KCH	G.W.L.	30 JUN 65	WK
B		REVISED PER TDRR 20475	[illegible]	G.W.L.	21 Jul 65	WK



REF DRAWING
DWG NO. 2008258 PHOTOGRAPHIC MASTER

NOTES
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3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN BJ Papia 6 Oct 64
CHECKED R.P. Kingsbury 13 Oct 64
APPROVED [illegible] 13 Oct 64
APPROVED S.C. Smith 13 Oct '64
APPROVED MIT [illegible] 10/4/64
APPROVED MSC WJ Rhine 10/21/64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
PHOTOMETER

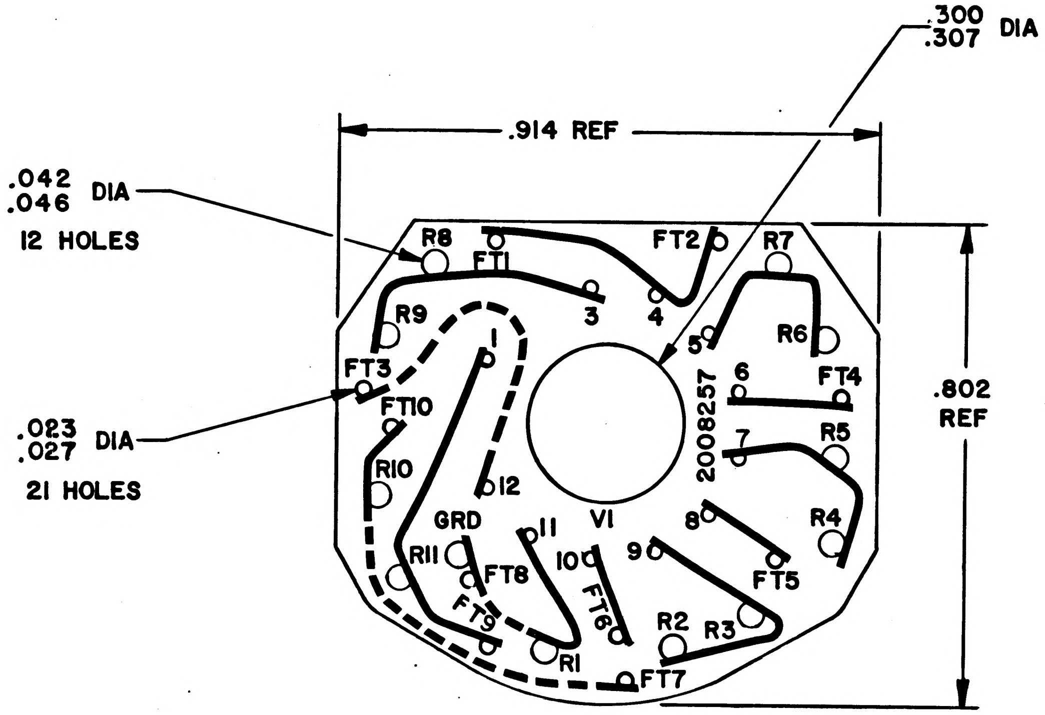
CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008257
SCALE 5/1
SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DRAWING
DWG NO. 2008258 PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007046	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN B J Papia 6 OCT 64
CHECKED R L Kingsbury 13 OCT 64
APPROVED 13 OCT 64
APPROVED S.C. Smith 13 Oct. '64
APPROVED MIT 10/4/64
APPROVED MSC W J Rhine 10/21/64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
PHOTOMETER

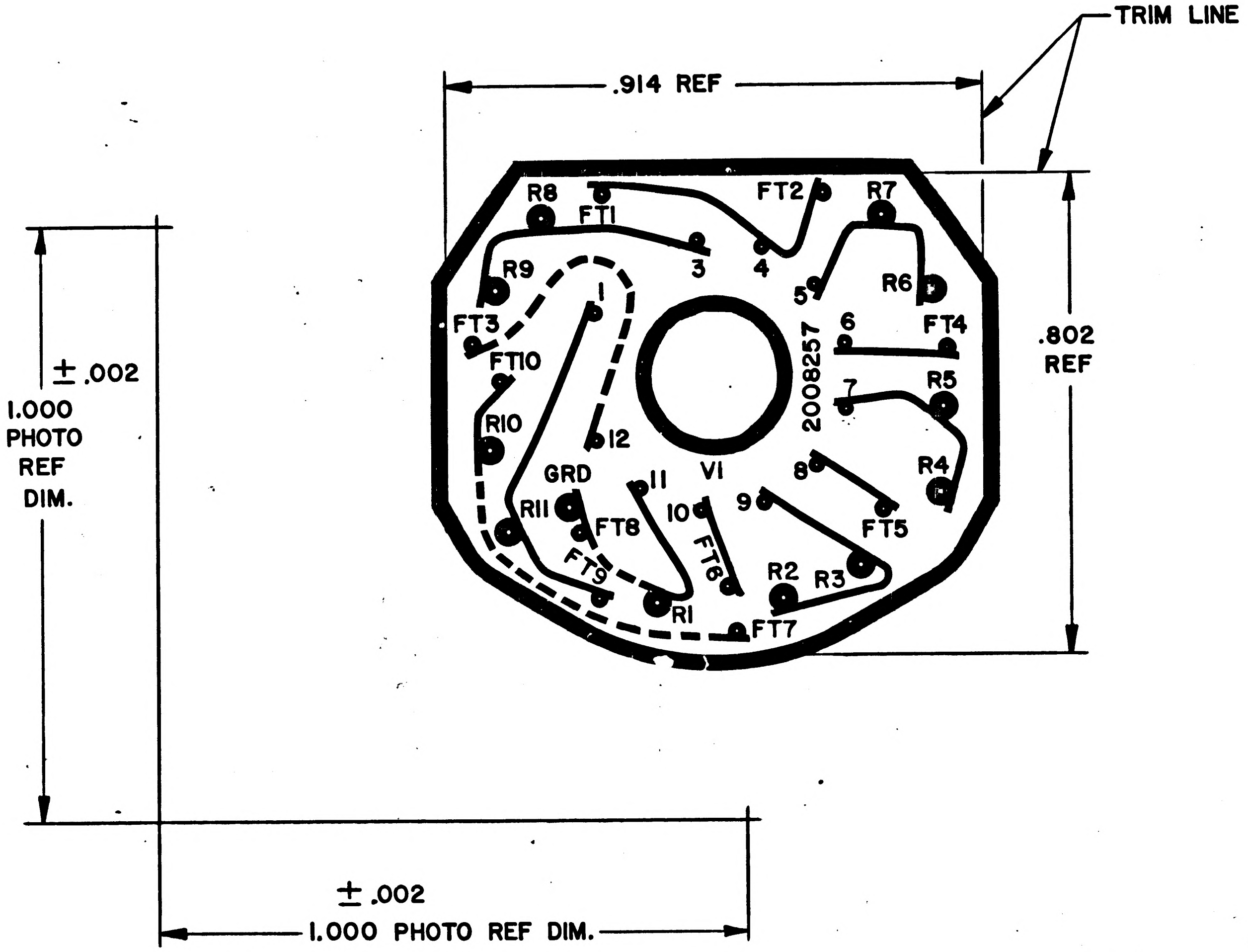
CODE IDENT NO. ——
SIZE C
DRAWING NO. 2008257
SCALE 5/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14961		PMK	15Dec64	WJR



REF DWG
WIRING BOARD-PHOTOMETER
DWG NO. 2008257

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL STABILITY SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN BJ Papia 6 OCT 64
CHECKED R.P. Kingsbury 13 OCT 64
APPROVED H Krane 13 OCT 64
APPROVED S.C. Smith 10-13-64
APPROVED MIT 10/21/64
APPROVED MSC W J Rhine 10-21-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD
PHOTOMETER

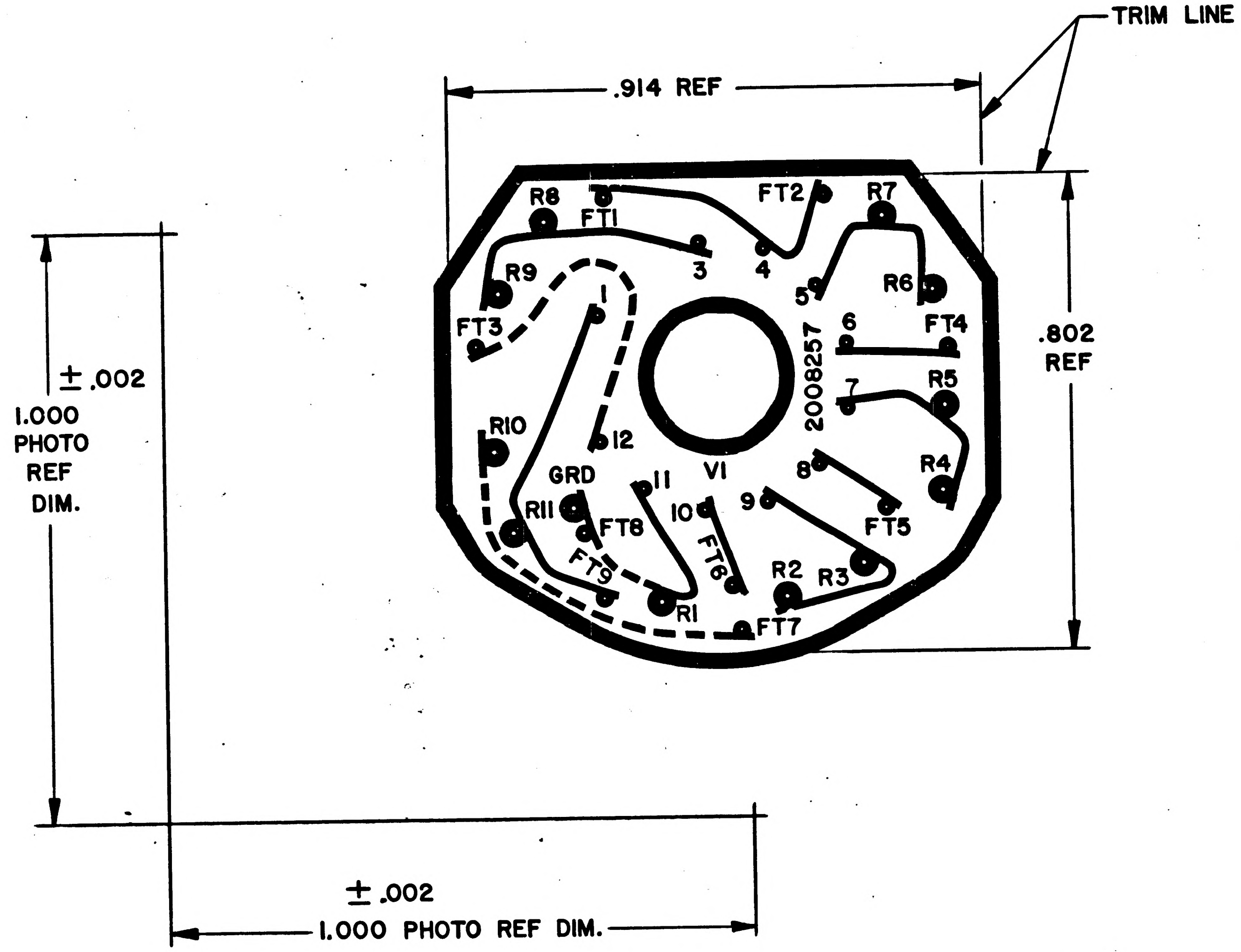
CODE IDENT NO. —
SIZE C
DRAWING NO. 2008258
SCALE 5/1
SHEET 1 OF 1

2008258 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 14961		RPK	18 Oct 64	WJ
B		REVISED PER TDRR 20472	KCH	G.W.L.	30 JUN 65	



REF DWG
WIRING BOARD-PHOTOMETER
DWG NO. 2008257

NOTES:

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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	B J Papia	6 Oct 64
CHECKED	R. P. Kingsbury	13 Oct 64
APPROVED	H Krane	13 OCT 64
APPROVED	A. C. Smith	10-13-64
APPROVED MIT		10/21/64
APPROVED MSC	W J Rhine	10/21/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD
PHOTOMETER

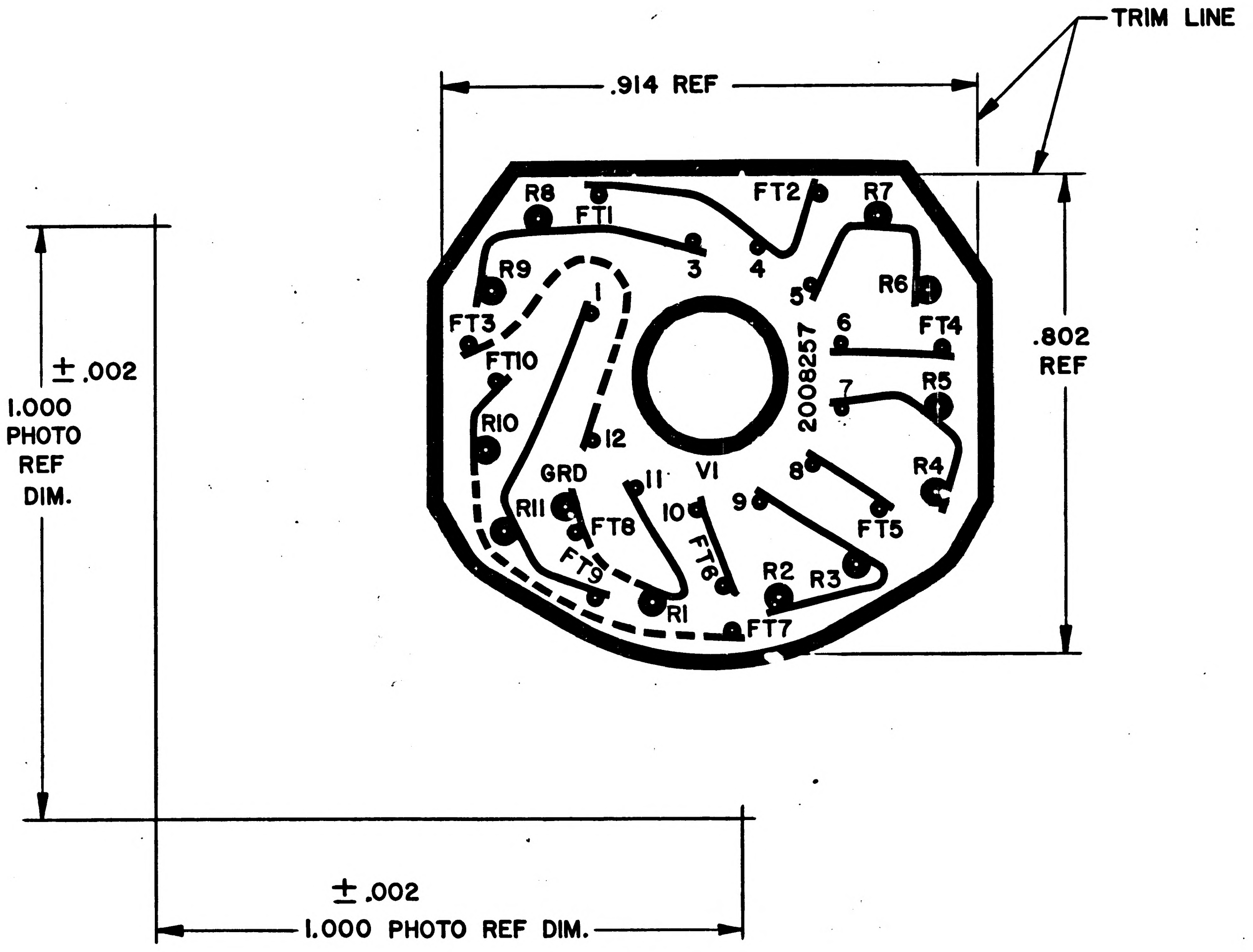
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008258
SCALE 5/1		SHEET 1 OF 1

2008258 B

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 13831

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

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QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

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NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
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MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	BJPapia	6 OCT 64
CHECKED	R.P. Kingsbury	13 OCT 64
APPROVED	H Krane	13 OCT 64
APPROVED	A.C. Smith	10-13-64
APPROVED MIT		10/13/64
APPROVED MSC	W J Rhine	10-21-64

PHOTOGRAPHIC MASTER WIRING BOARD PHOTOMETER

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2008258
SCALE 5/1	—	SHEET 1 OF 1

2008258

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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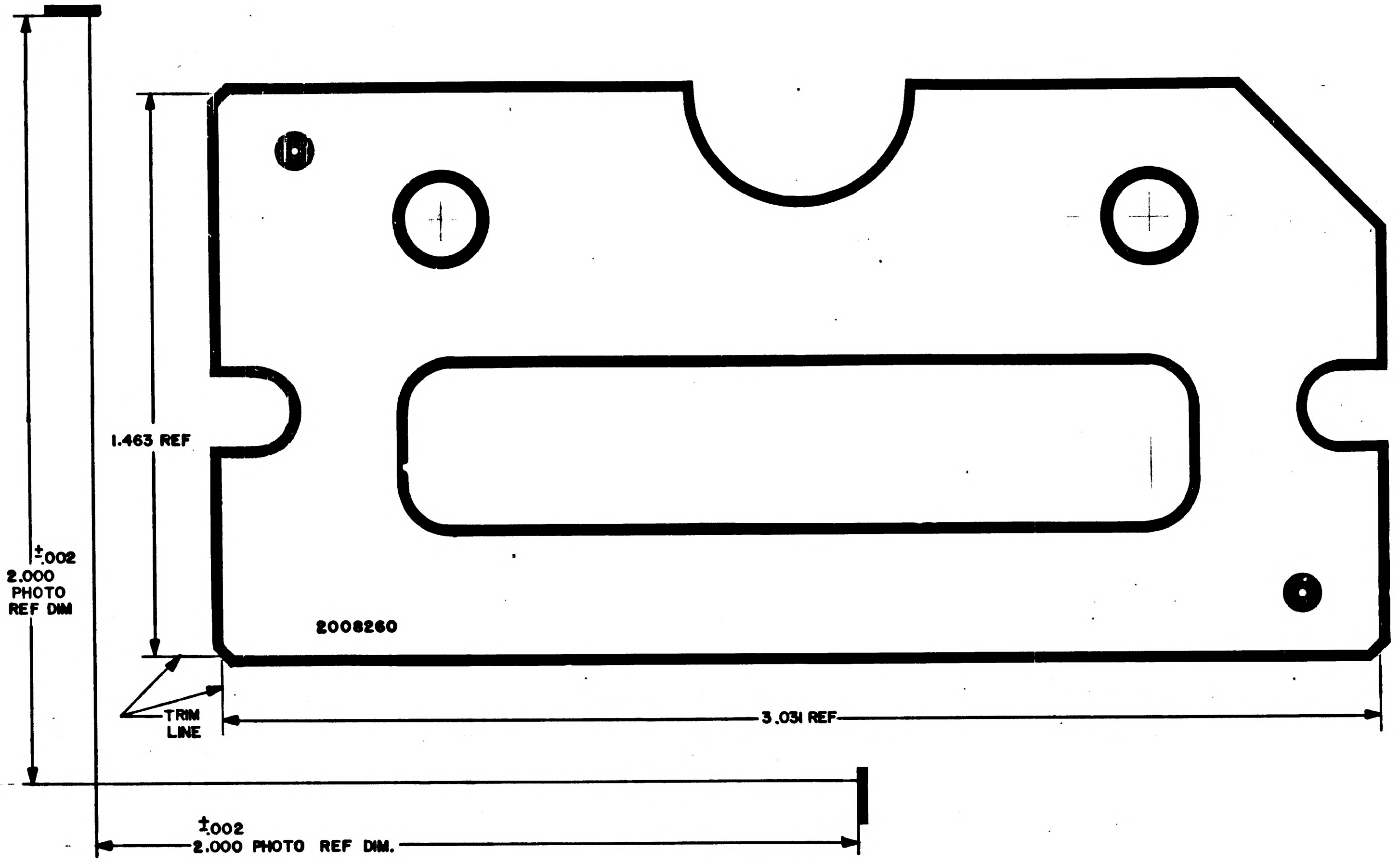
REVISIONS 17835

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
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4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN 1 MAR 65
CHECKED
APPROVED
APPROVED 3/23/65
APPROVED MIT
APPROVED MSC 3/24/65
DATE

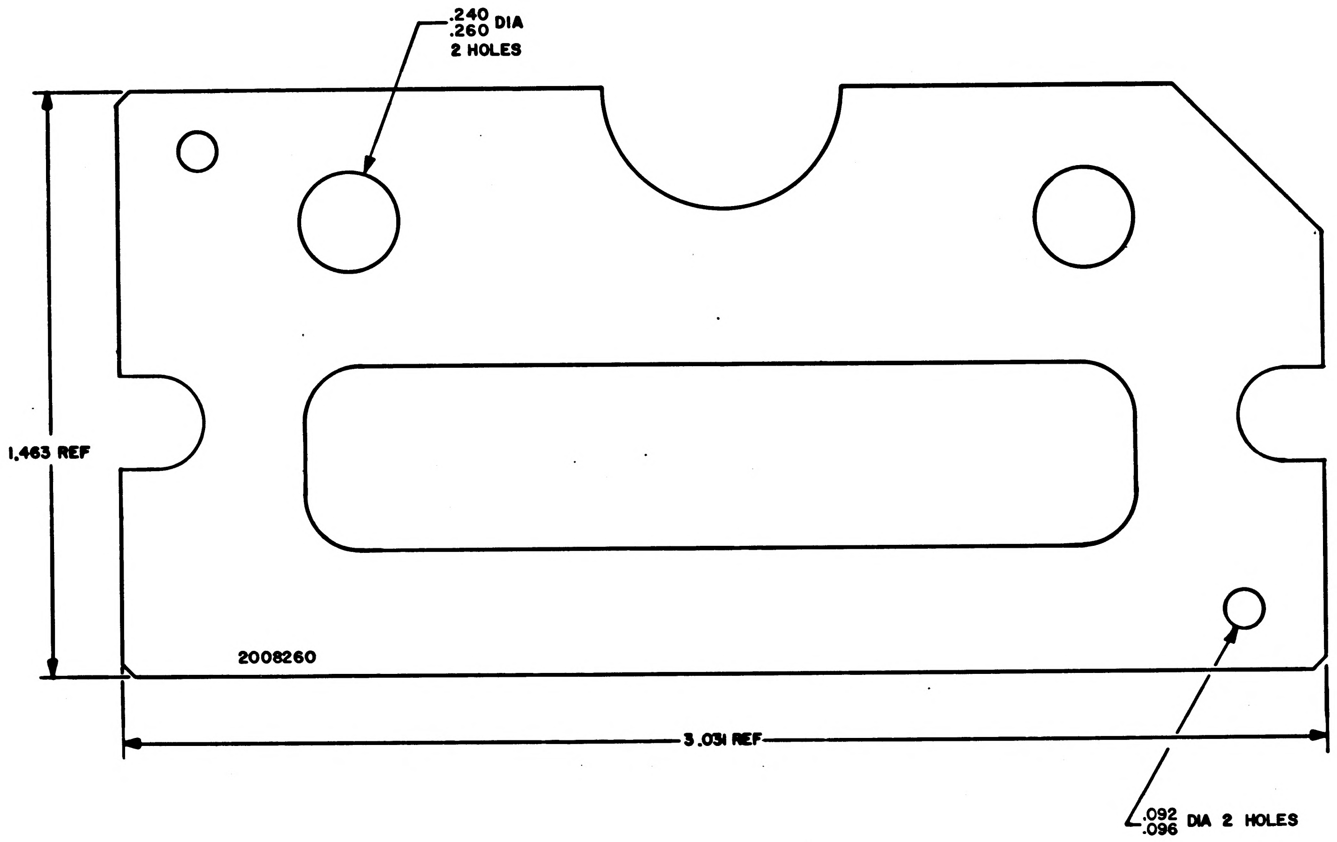
PHOTOGRAPHIC MASTER WIRING BOARD BOTTOM
OPTICS LOAD COMPENSATION

CODE IDENT NO. —
SIZE D
DRAWING NO. 2008259
SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17835

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

REF:
DWG NO. 2008259 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007120	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED 23 MARCH 65
APPROVED 3/23/65
APPROVED MIT 2/4/65
APPROVED MSC 3/24/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD BOTTOM
OPTICS LOAD COMPENSATION

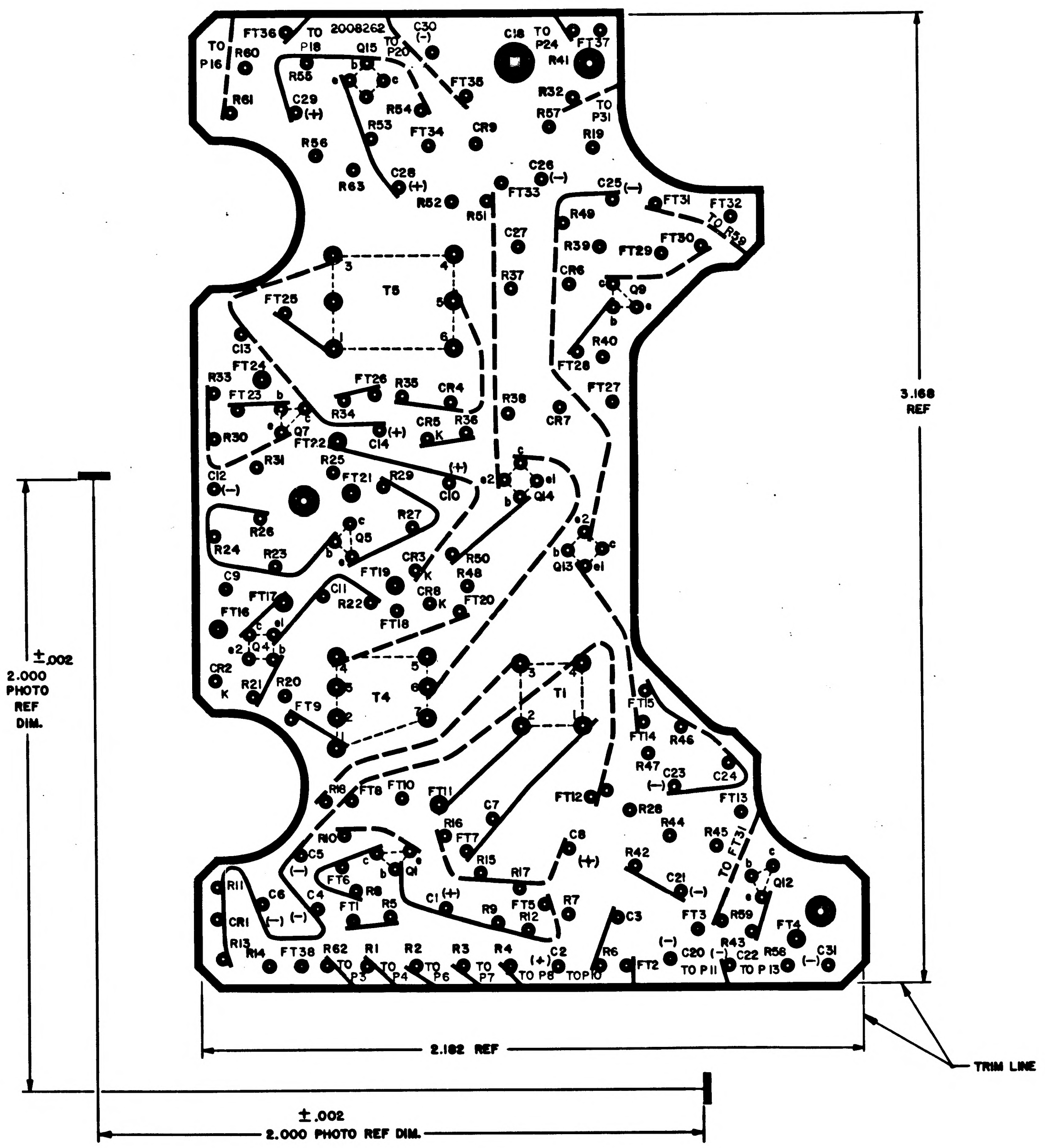
CODE IDENT NO. —
SIZE D
DRAWING NO. 2008260
SCALE 5/1
SHEET 1 OF 1

MASTER

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER TDRR 18792			10MAY65	



TO P16
R60
R61
FT36
TO P18
2008262
R55
Q15
b
e
c
TO P20
C30 (–)
C29 (+)
R54
R53
FT35
C18
TO P24
FT37
R41
R32
R57
TO P31
R19
FT34
CR9
R56
R63
C28 (+)
R52
R51
C26 (–)
FT33
C25 (–)
FT31
FT32
TO R59
R49
R39
FT29
FT30
C27
R37
CR6
Q9
c
b
e
T5
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FT25
C13
FT24
R33
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R30
FT22
FT26
R34
R35
CR4
C14 (+)
CR5
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R36
R38
CR7
R40
FT28
FT27
R31
C12 (–)
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FT21
R29
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Q14
R26
R24
R23
Q5
R27
CR3
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R50
R48
e2
b
c
Q13
e1
C9
FT19
FT17
C11
R22
CR8
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FT20
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FT18
Q4
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CR2
K
R21
R20
T4
FT9
T1
FT15
FT14
R46
R47
C23 (–)
C24
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FT8
FT10
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FT13
R28
R44
R45
C7
R16
FT7
R10
C5 (–)
C8 (+)
R42
TO FT31
Q1
R15
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C21 (–)
Q12
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C1 (+)
R9
FT5
R12
R7
C3
FT3
R59
FT4
CR1
(–) (–)
R13
R14
FT38
R62
R1
R2
R3
R4
(+) C2
R6
FT2
(–) C20 (–)
R43
C22
R58
(–) C31
TO P3
TO P4
TO P6
TO P7
TO P8
TO P10
TO P11
TO P13
3.168 REF
±.002 2.000 PHOTO REF DIM.
2.182 REF
TRIM LINE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED 4/6/65
APPROVED 4/6/65
APPROVED MIT
APPROVED MSC 4-6-65
DATE

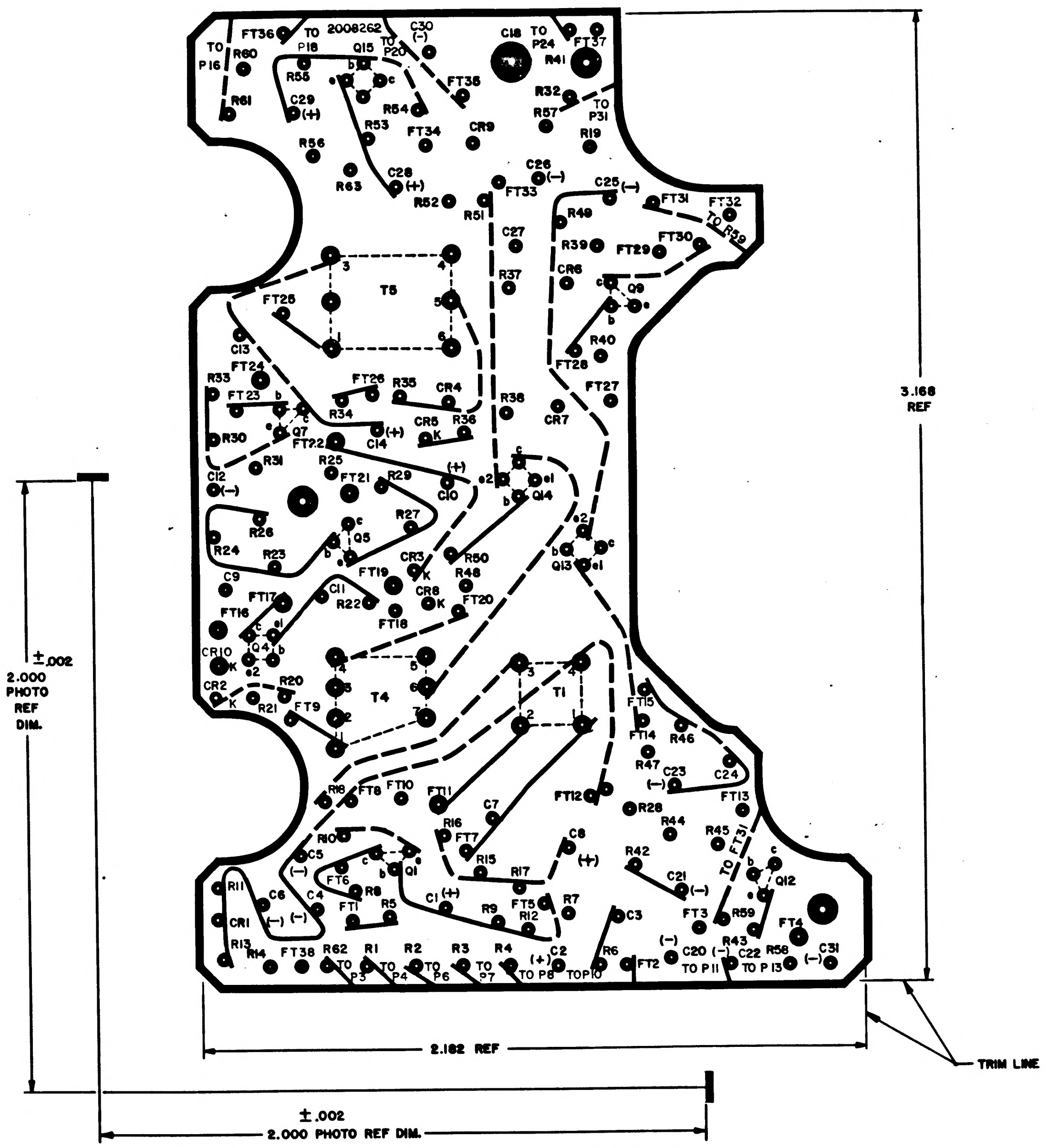
PHOTOGRAPHIC MASTER
WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008261
SCALE 5/1
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792			10 MAY 65	
B		REVISED PER TDRR 20675			12-4-65	



2008262
TO P16
FT36
TO P18
Q15
TO P20
C30 (−)
C18
TO P24
FT37
R60
R55
R41
R61
C29 (+)
R54
FT35
R32
R57
TO P31
R53
FT34
CR9
R19
R56
C28 (+)
C26 (−)
R63
R52
R51
FT33
C25 (−)
FT31
FT32
TO R59
R49
C27
R39
FT29
FT30
T5
R37
CR6
Q9
FT25
C13
R40
FT28
FT24
R33
FT23
FT26
R35
CR4
R38
FT27
CR7
Q7
R34
R30
FT22
C14 (+)
CR5
R36
R31
R25
C12 (−)
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R26
R27
Q5
R24
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CR3
R50
R48
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C9
FT17
C11
FT19
CR8
R22
FT20
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CR2
R21
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C4 (−)
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C1 (+)
R9
FT5
R12
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C3
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R59
FT4
CR1
R13
R14
FT38
R62
R1
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C2 (+)
R6
FT2
C20 (−)
R43
C22
R58
C31 (−)
TO P3
TO P4
TO P6
TO P7
TO P8
TO P10
TO P11
TO P13
3.168 REF
2.182 REF
TRIM LINE
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.

NOTES

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MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	B J Papa	5 Feb 65
CHECKED	R. P. Kingsbury	
APPROVED		4/6/65
APPROVED		4/6/65
APPROVED MIT		
APPROVED MSC		4-6-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

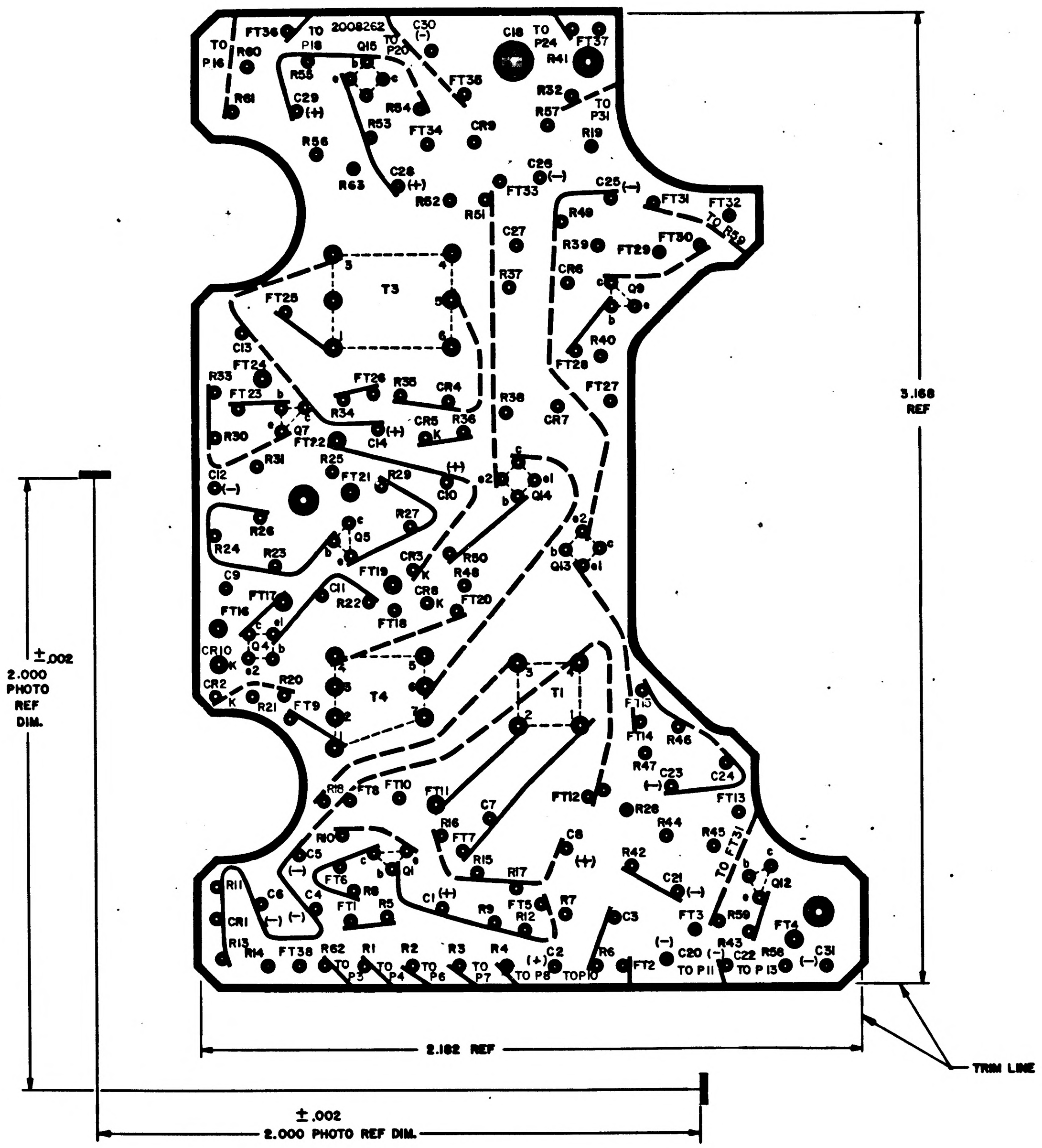
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008261
SCALE 5/1		SHEET 1 OF 1

2008261 B

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792		CAP		WR
B		REVISED PER TDRR 20675	E.G.	B	12-4-65	
C		REVISED PER TDRR 24557	WH	CPK	2 DEC 65	LK


2008262
TO P16
TO P18
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TO P24
TO P31
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TO F731
T1
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Q7
Q9
Q12
Q13
Q14
Q15
C18
R41
FT36
FT37
FT38
3.168 REF
2.000 PHOTO REF DIM.
±.002
2.182 REF
±.002
2.000 PHOTO REF DIM.
TRIM LINE

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL—D—70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED 4/6/65
APPROVED 4/6/65
APPROVED MIT
APPROVED MSC 4-6-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

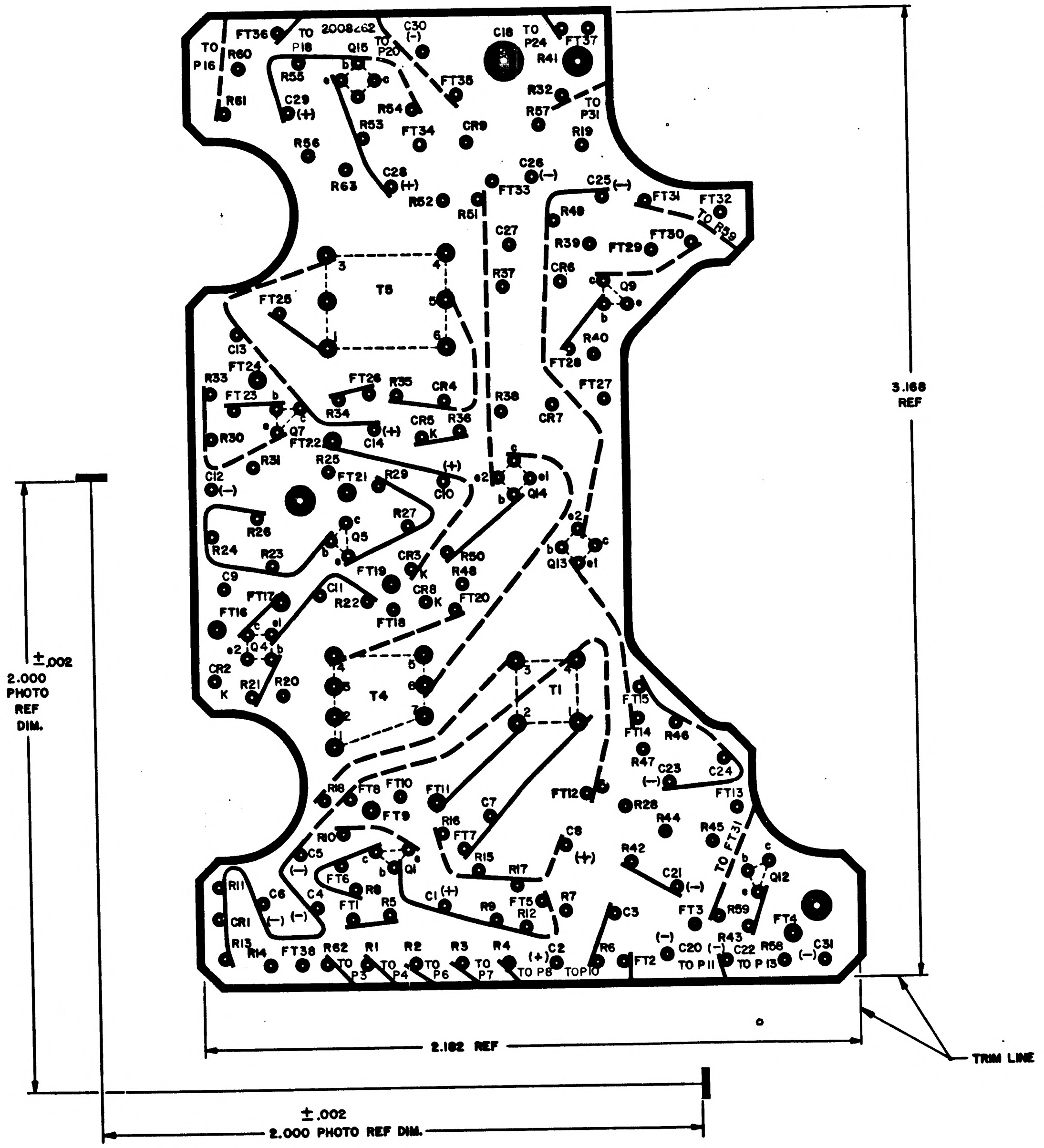
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008261

SCALE 5/1 SHEET 1 OF 1

2008261 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
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3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	A J Parra	5/26/65
CHECKED	R.P. Kingsbury	4/30/65
APPROVED	Russer	4/6/65
APPROVED	D.R. Test	4/6/65
APPROVED MIT	W. Kupfer	4/6/65
APPROVED MSC	W J	4-6-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008261

SCALE 5/1 SHEET 1 OF 1

2008261

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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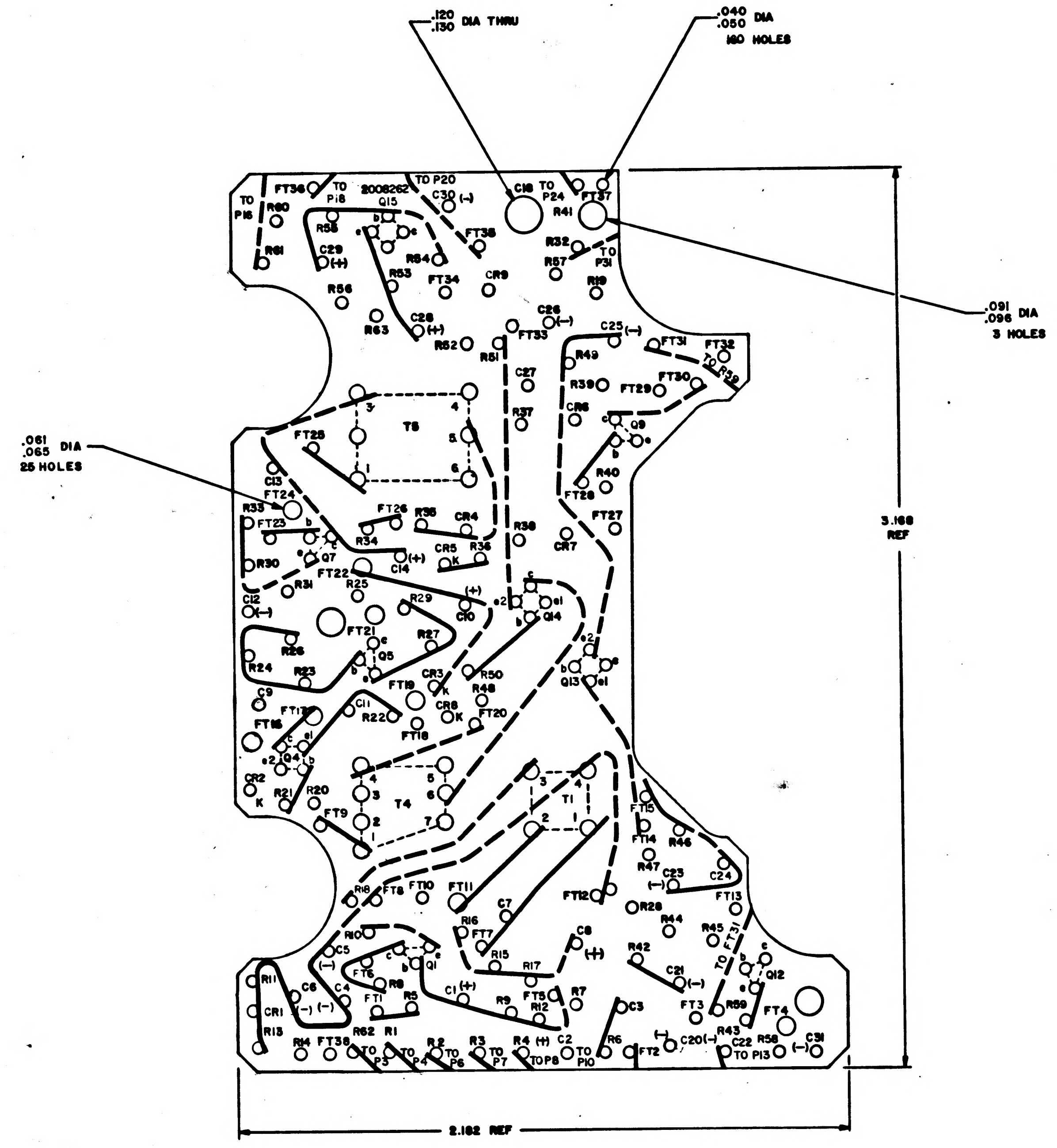

.120 .130 DIA THRU
.040 .050 DIA 180 HOLES
.091 .096 DIA 3 HOLES
.061 .065 DIA 25 HOLES
3.168 REF
2.182 REF
2008262
TO P16
TO P18
TO P20
TO P24
TO P31
TO P13
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Q1
C18
C30 (–)
C29 (+)
C28 (+)
C26 (–)
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C24
C23 (–)
C21 (–)
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C31 (–)
C14 (+)
C10 (+)
C12 (–)
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C6 (–)
C5 (–)
C4
C3
C2
C1 (+)
FT36
FT37
FT38
FT34
FT33
FT31
FT32
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FT1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL–P–18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DWG 2008261 FOR PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	AJRegan	
CHECKED		
APPROVED		4/6/65
APPROVED		4/6/65
APPROVED MIT	W. Kupfer	Apr 65
APPROVED MSC		4-6-65
		DATE

WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008262
SCALE 5/1
SHEET 1 OF 1

2008262 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 87.2						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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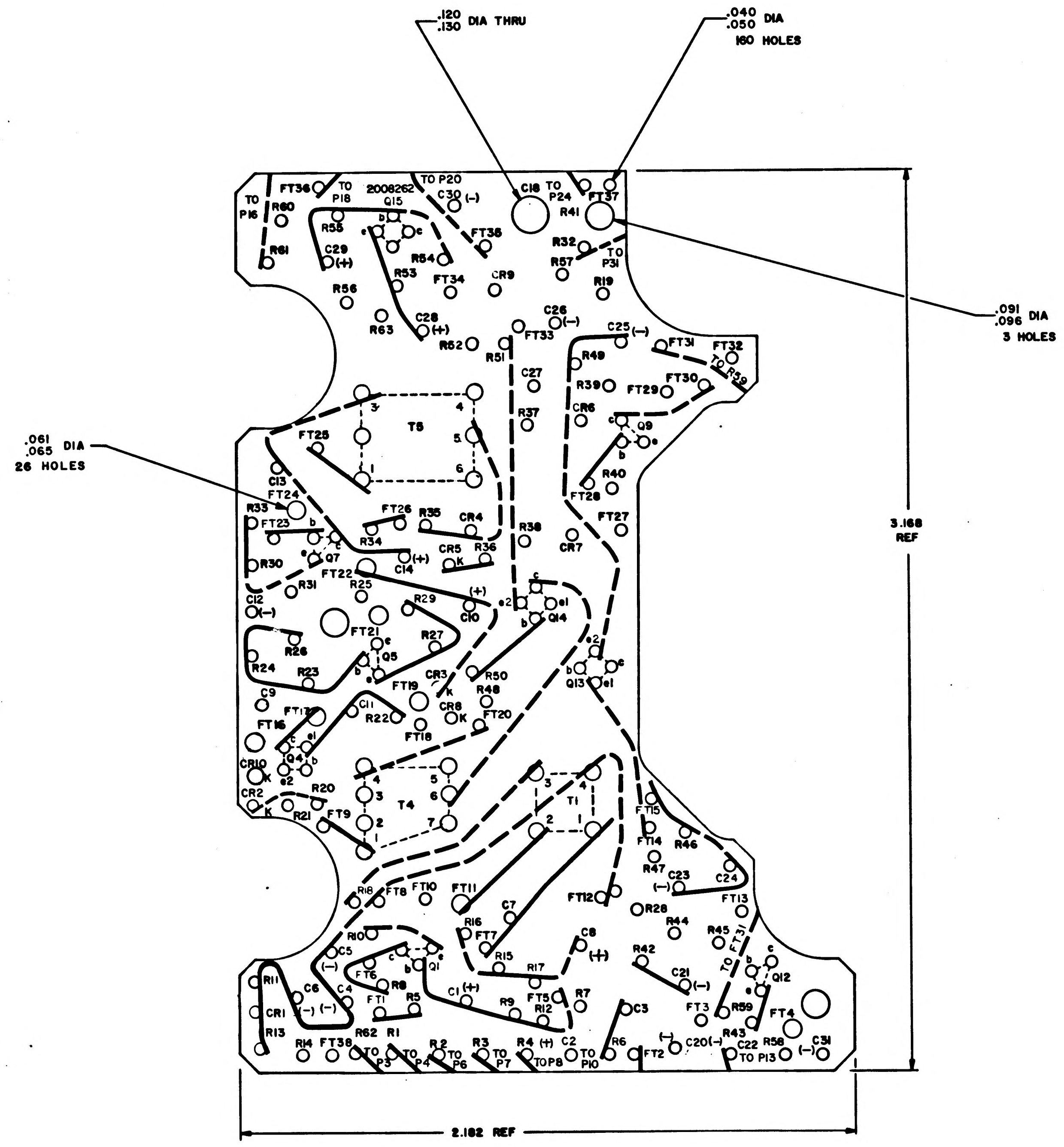
B		REVISED PER TDRR 20675	C.G.	S	12/4/65	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.050 DIA
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.091
.096 DIA
3 HOLES
.061
.065 DIA
26 HOLES
3.168
REF
2.182 REF
2008262
TO P16
TO P18
TO P20
TO P24
TO P31
TO R59
TO FT31
TO P3
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T5
T4
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C18
C30 (–)
C29 (+)
C28 (+)
C26 (–)
C25 (–)
C27
C13
C14 (+)
C12 (–)
C10 (+)
C9
C11
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C8 (+)
C5 (–)
C6 (–)
C4 (–)
C1 (+)
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C21 (–)
C20 (–)
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C23 (–)
C24
C31 (–)
CR9
CR6
CR7
CR4
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CR3
CR8
CR10
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CR1
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R62
R1
R2
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R4 (+)
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R44
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R46
R47
R43
R59
R58

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DWG 2008261 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

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MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 5MAR65
CHECKED 6Mar65
APPROVED 4/6/65
APPROVED 4/6/65
APPROVED MIT 4Apr65
APPROVED MSC 4-6-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

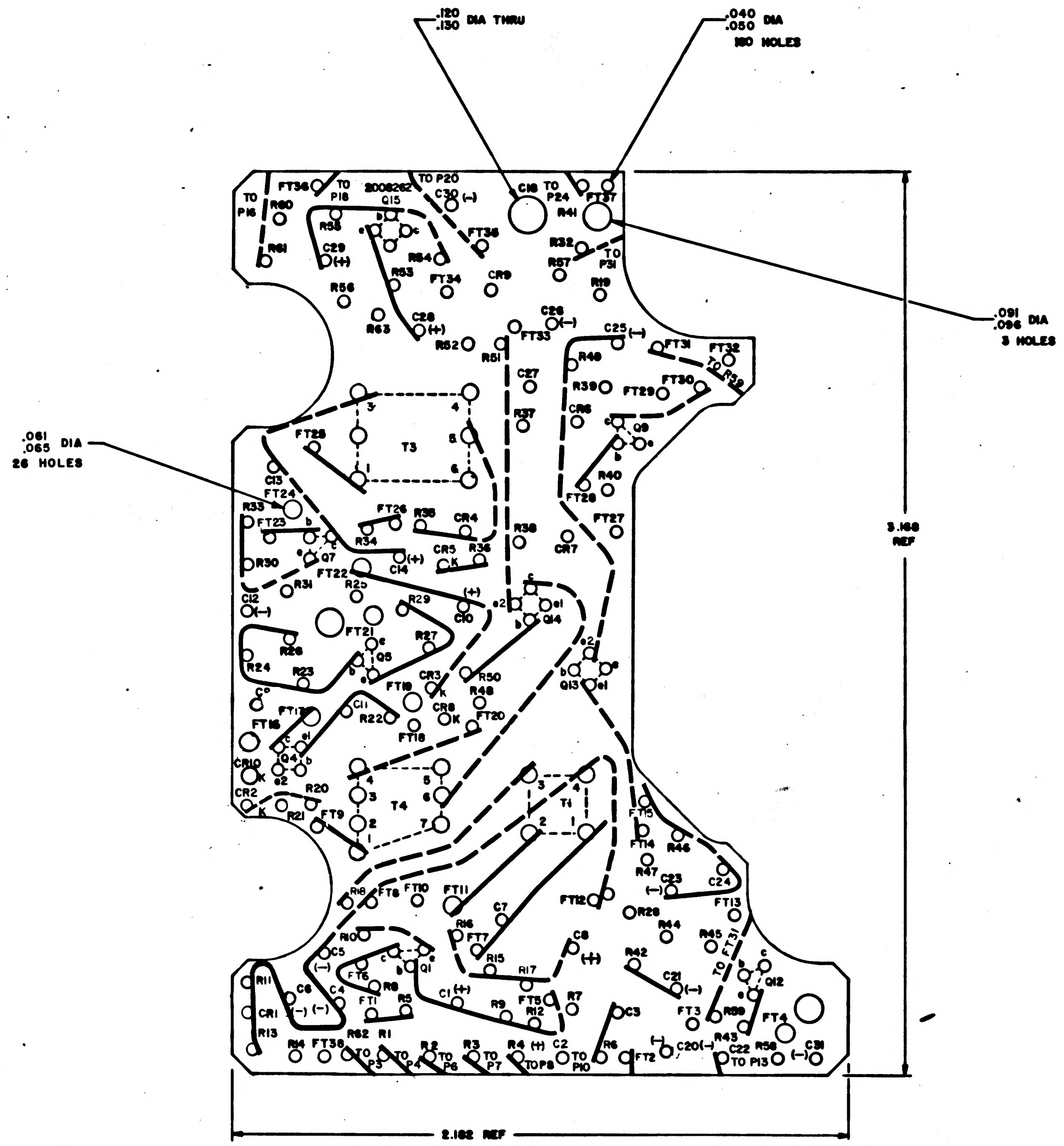
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008262
SCALE 5/1
SHEET 1 OF 1

2008262 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792			10MAY65	
B		REVISED PER TDRR 20675			18 Aug 65	
C		REVISED PER TDRR 24557			9 DEC 65	



.120 DIA THRU
.130
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.050
180 HOLES
.091 DIA
.096
3 HOLES
.061 DIA
.065
26 HOLES
3.168 REF
2.182 REF
2008262
TO P16
FT36
TO P18
TO P20
Q15
C30 (−)
C18
TO P24
FT37
R60
R58
R41
R61
C29 (+)
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FT35
R32
R57
TO P31
R53
FT34
CR9
R19
R56
R63
C28 (+)
R52
R51
FT33
C26 (−)
C25 (−)
FT31
FT32
TO R59
R49
C27
R39
FT29
FT30
T3
FT25
R37
CR6
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R40
FT28
C13
FT24
R33
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FT26
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CR5
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FT22
C14 (+)
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C12 (−)
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C10 (+)
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(−)
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R43
C22
TO P13
R58
(−)
C31

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DWG 2008261 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007118	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED 4/6/65
APPROVED 4/6/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

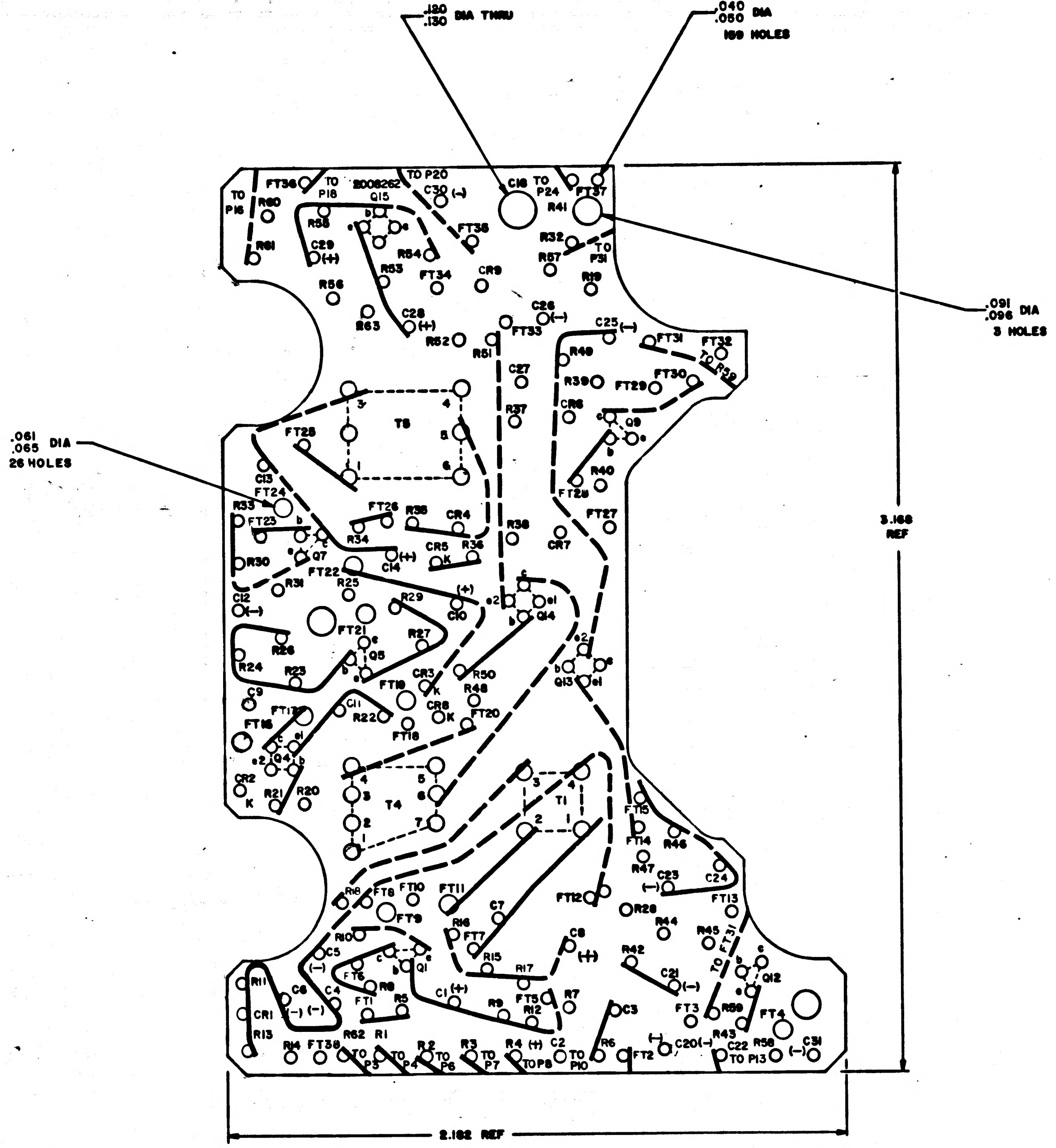
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008262

SCALE 5/1 SHEET 1 OF 1

2008262 C

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112						
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED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199 HOLES
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.065 DIA
26 HOLES
3.168
REF
2.182 REF
TO P16
FT36
TO P18
2008262
Q15
TO P20
C30 (–)
C18
TO P24
FT37
R41
R60
R61
R55
C29 (+)
R54
FT35
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R57
TO P31
R19
R56
R53
FT34
CR9
R63
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R52
R51
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FT33
C25 (–)
FT31
FT32
TO R59
R49
C27
R39
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FT30
T5
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CR6
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C12 (–)
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C31 (–)
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NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DWG 2008261 FOR PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

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CAPACITOR VALUES ARE IN µf
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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	A J Rogers	3 Feb 65
CHECKED		4 Apr 65
APPROVED		4/6/65
APPROVED		4/6/65
APPROVED MIT	W Kupfer	1 Apr 65
APPROVED MSC		4-6-65

WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2008262
SCALE 5/1		SHEET 1 OF 1

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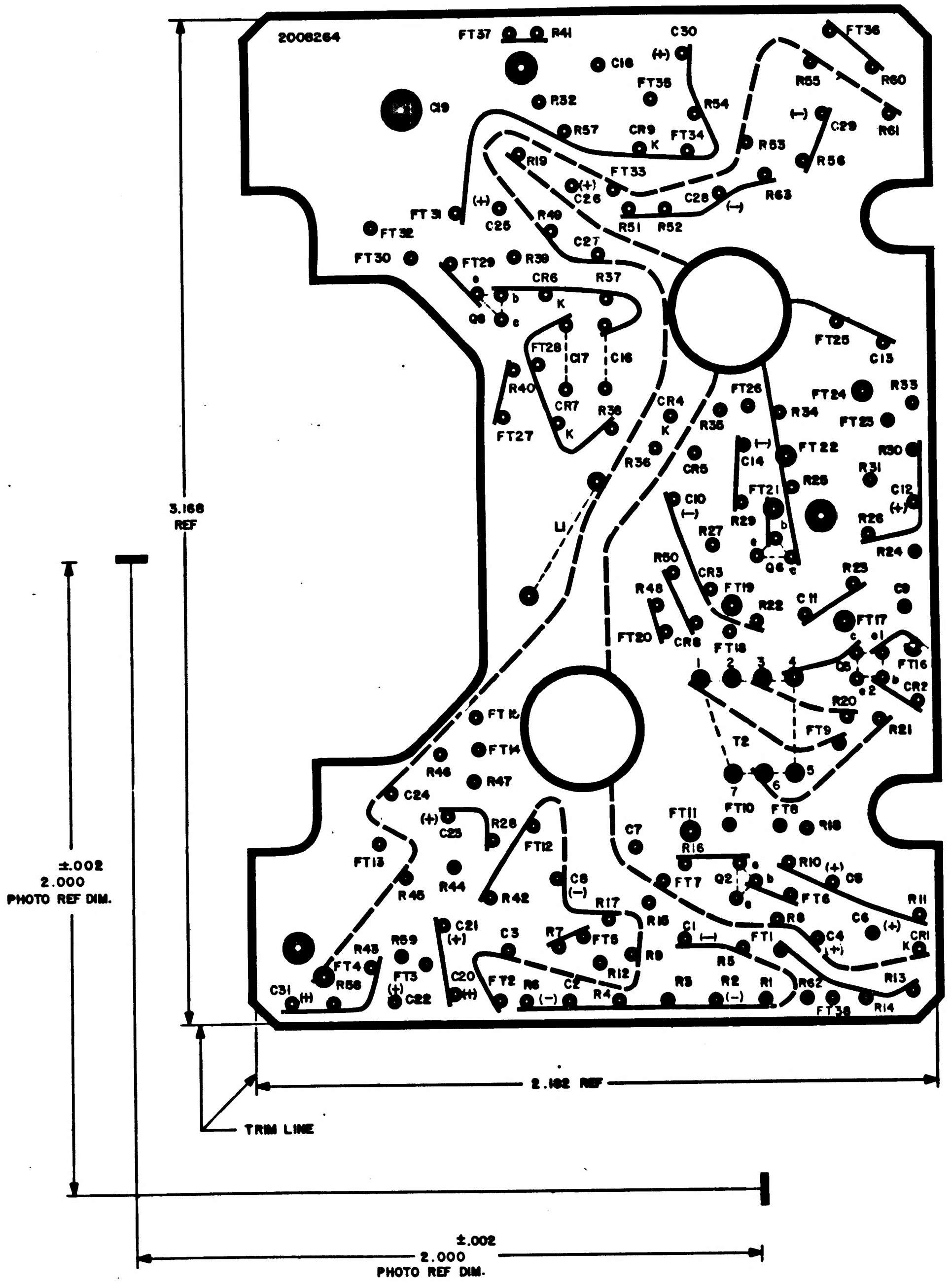
REVISIONS 8113

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792			10MAY65	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3.168 REF
±.002
2.000
PHOTO REF DIM.
2.182 REF
TRIM LINE
±.002
2.000
PHOTO REF DIM.

NOTES
1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4 CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007118	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J. Crosby 5 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008263
SCALE 8/1
SHEET 1 OF 1

2008263 A

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 8113

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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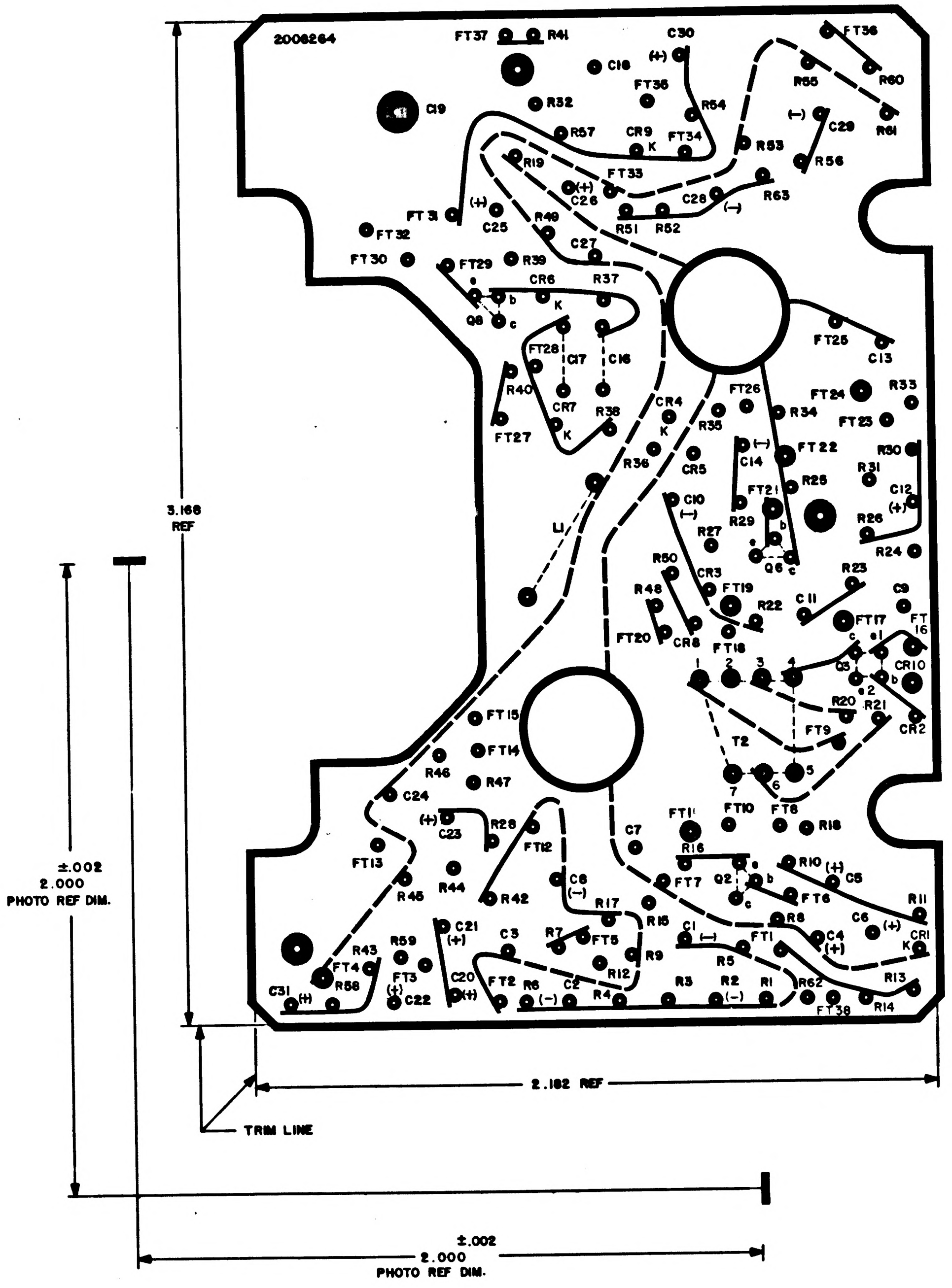
B		REVISED PER TDRR 20675			12 Jul 65	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FT38
R14
3.168 REF
±.002
2.000
PHOTO REF DIM.
2.182 REF
TRIM LINE
±.002
2.000
PHOTO REF DIM.

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Crowley 5 Mar 65
CHECKED P.P. Kingsbury
APPROVED 4/6/65
APPROVED 4/6/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

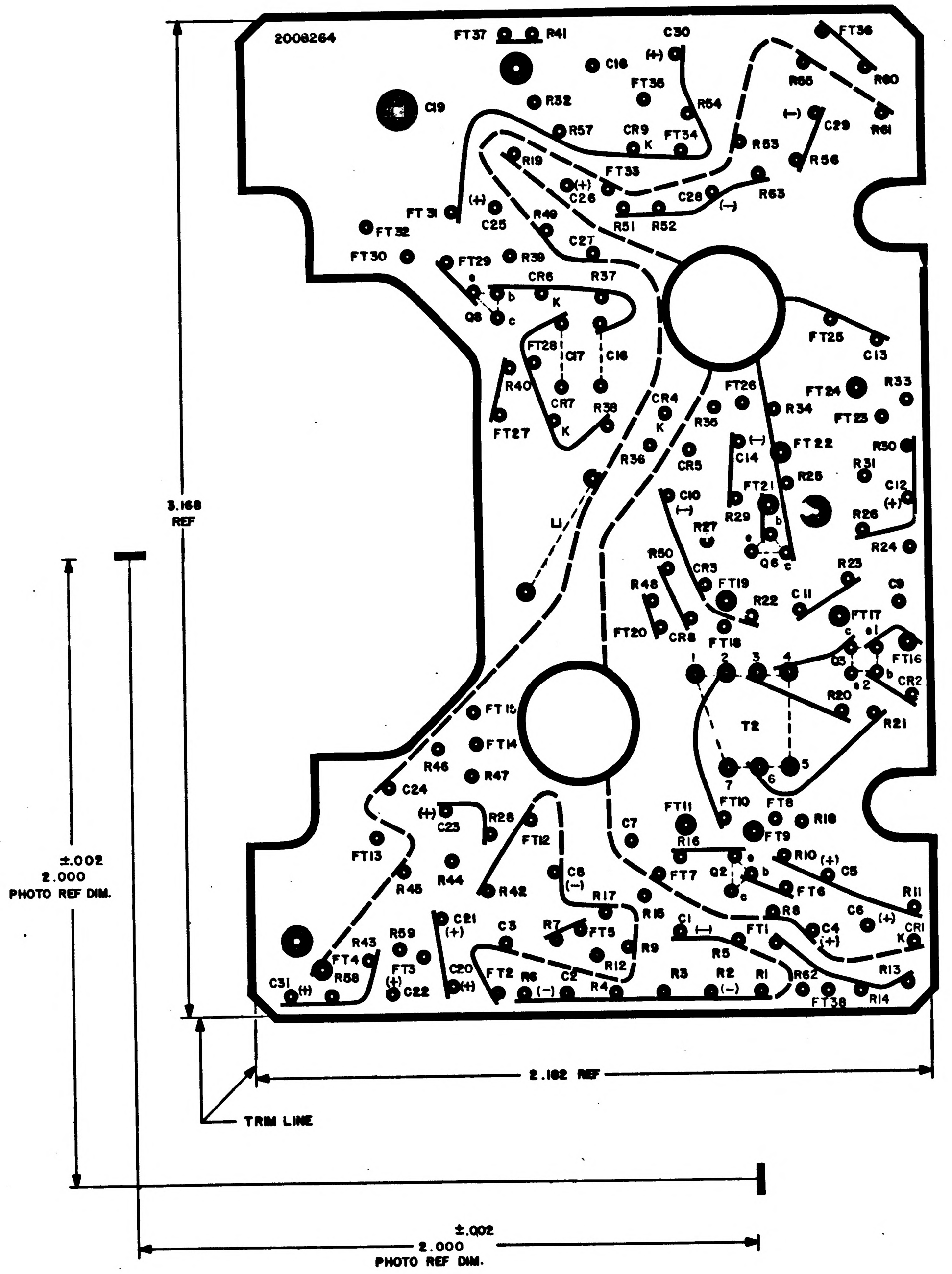
PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008263
SCALE 5/1
SHEET 1 OF 1

2008263 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						8112
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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FT37 R41 C30 (+) FT36 C16 C19 FT35 R32 R54 R65 R60 R57 CR9 K FT34 R53 (−) C29 R61 R56 R19 FT33 (+) C26 C28 (−) R63 FT31 (+) C25 R49 R51 R52 FT32 FT30 C27 FT29 R39 R37 e b CR6 K Q8 c FT28 C17 C16 FT25 C13 R40 CR7 R38 FT26 FT24 R33 CR4 K R34 FT23 FT27 K R35 R36 CR5 (−) C14 FT22 R30 R31 R25 FT21 C10 (−) C12 (+) L1 R29 R27 b R26 e Q6 c R24 R50 CR3 R23 R48 FT19 R22 C11 C9 FT17 FT20 CR8 FT18 c e1 1 2 3 4 Q3 FT16 b CR2 e2 R20 R21 FT15 T2 FT14 R46 R47 7 6 5 C24 FT10 FT8 R18 (+) C23 R28 FT11 C7 FT12 FT9 R16 FT13 Q2 e b R10 (+) C5 C8 (−) FT7 c FT6 R45 R44 R42 R17 R15 R8 C6 (+) R11 C1 (−) FT1 C4 (+) CR1 K R43 R59 C21 (+) C3 R7 FT5 R9 R5 FT4 R58 FT3 (+) C22 C20 (+) FT2 R6 (−) C2 R12 R4 R3 R2 (−) R1 R62 R13 C31 (+) FT38 R14
3.168 REF
2.162 REF
TRIM LINE
±.002
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PHOTO REF DIM.
±.002
2.000
PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J. Crowley 5 Mar 65
CHECKED P.P. [illegible] 4 Mar 65
APPROVED [illegible] 4/6/65
APPROVED D. R. [illegible] 4/6/65
APPROVED MIT [illegible] 4 Apr 65
APPROVED MSC W. J. [illegible] 4-6-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

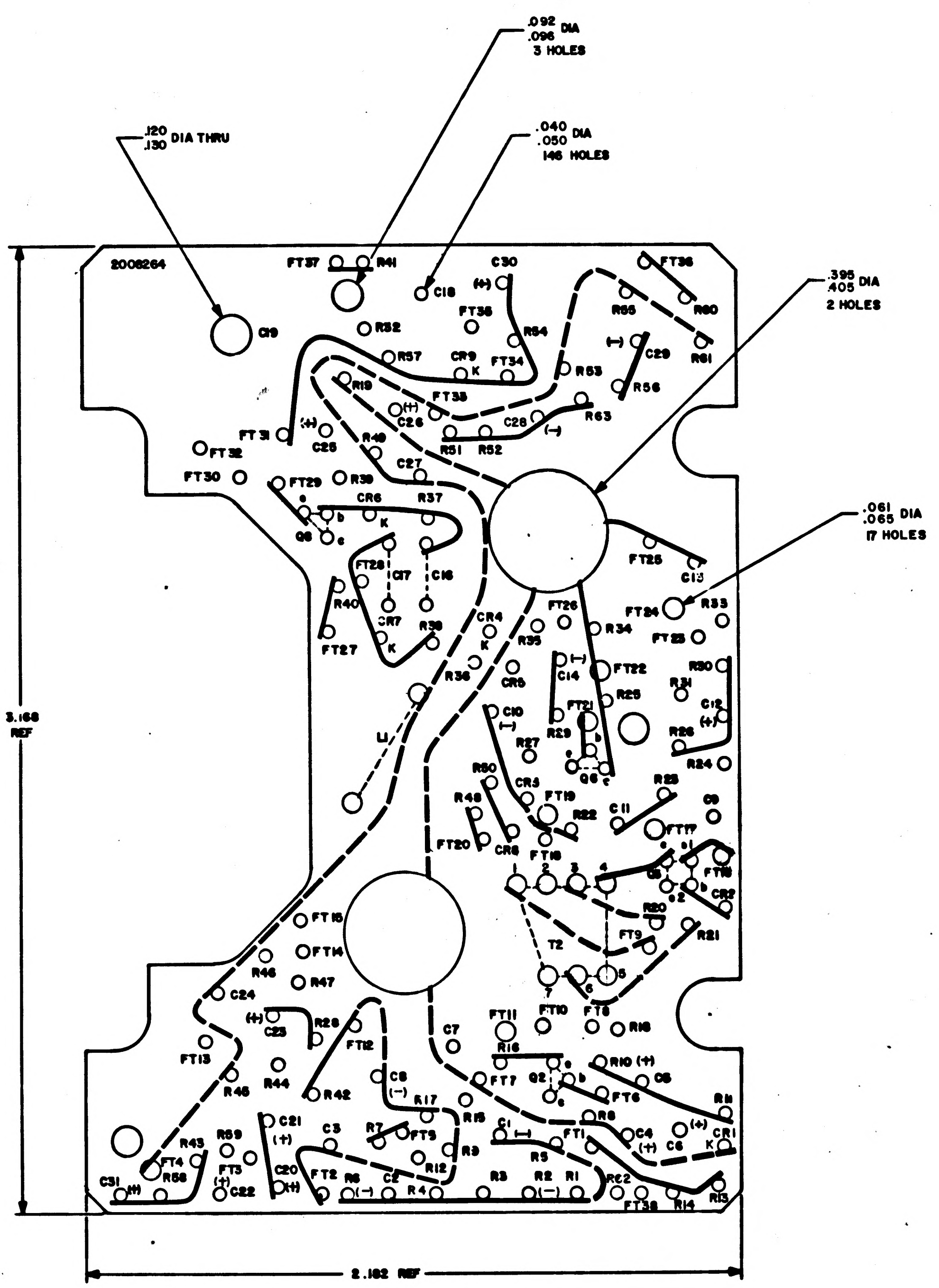
PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. ——
SIZE E
DRAWING NO. 2008263
SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792		CAP	10 MAY 65	



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.061 .065 DIA 17 HOLES
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FT38
R14

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. MARK BLACK CHARACTERS PER ND 1002019
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002125
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DRAWING NO. 2008263 FOR PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007118	

APPLICATION

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J. Crowley 5 APR 65
CHECKED R.P. Kingsbury
APPROVED 4/6/65
APPROVED D.R. 9/6/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

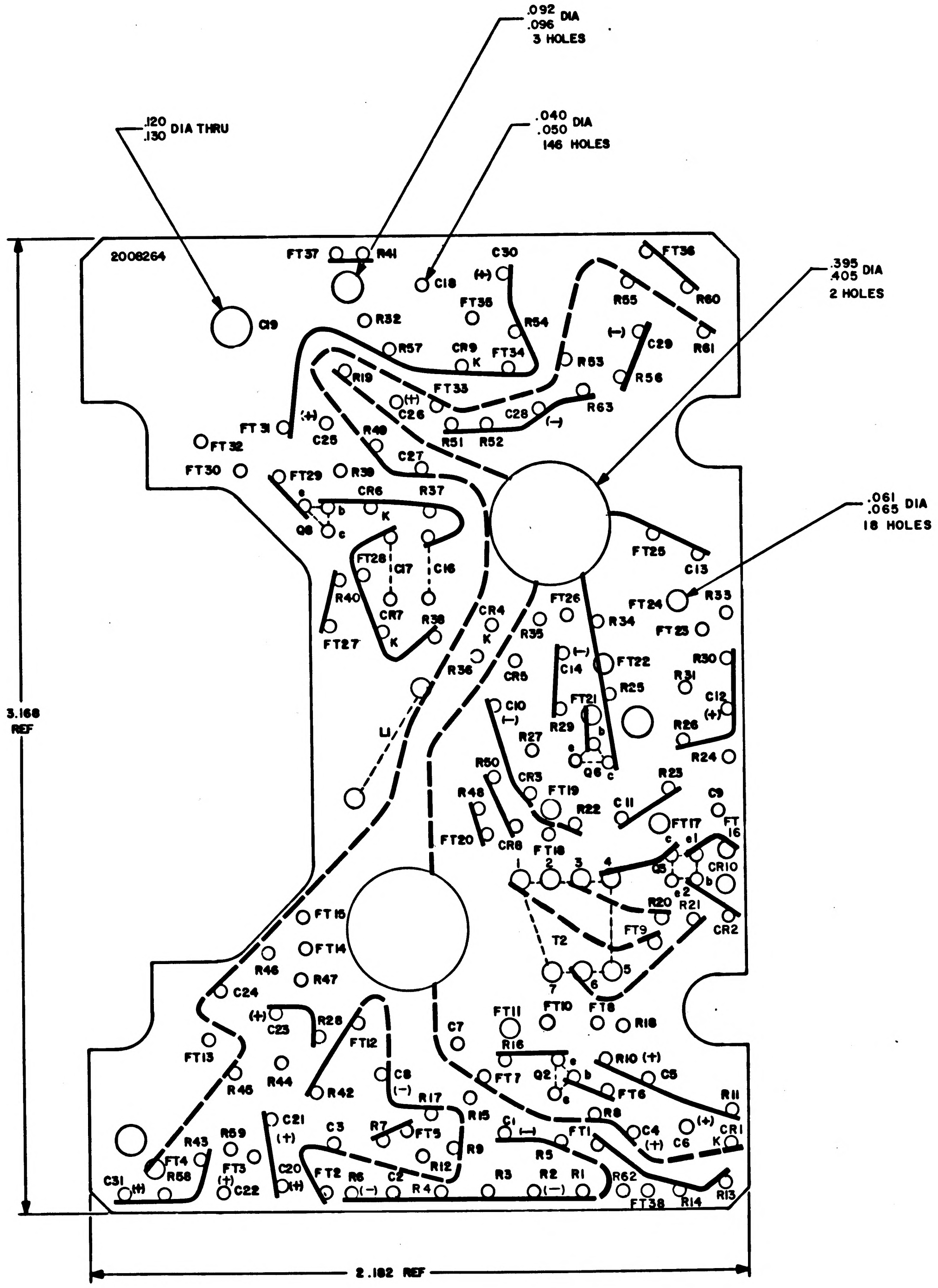
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008264
SCALE 5/1
SHEET 1 OF 1

2008264 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18792		CAP	10 MAY 65	
B		REVISED PER TDRR 20675	C.Y.		12 July 65	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18 HOLES
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NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. MARK BLACK CHARACTERS PER ND 1002019
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002123
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DRAWING NO. 2008263 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007118	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J Crowley 5 MAR 65
CHECKED R.P. 4/6/65
APPROVED 4/6/65
APPROVED 9/3/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

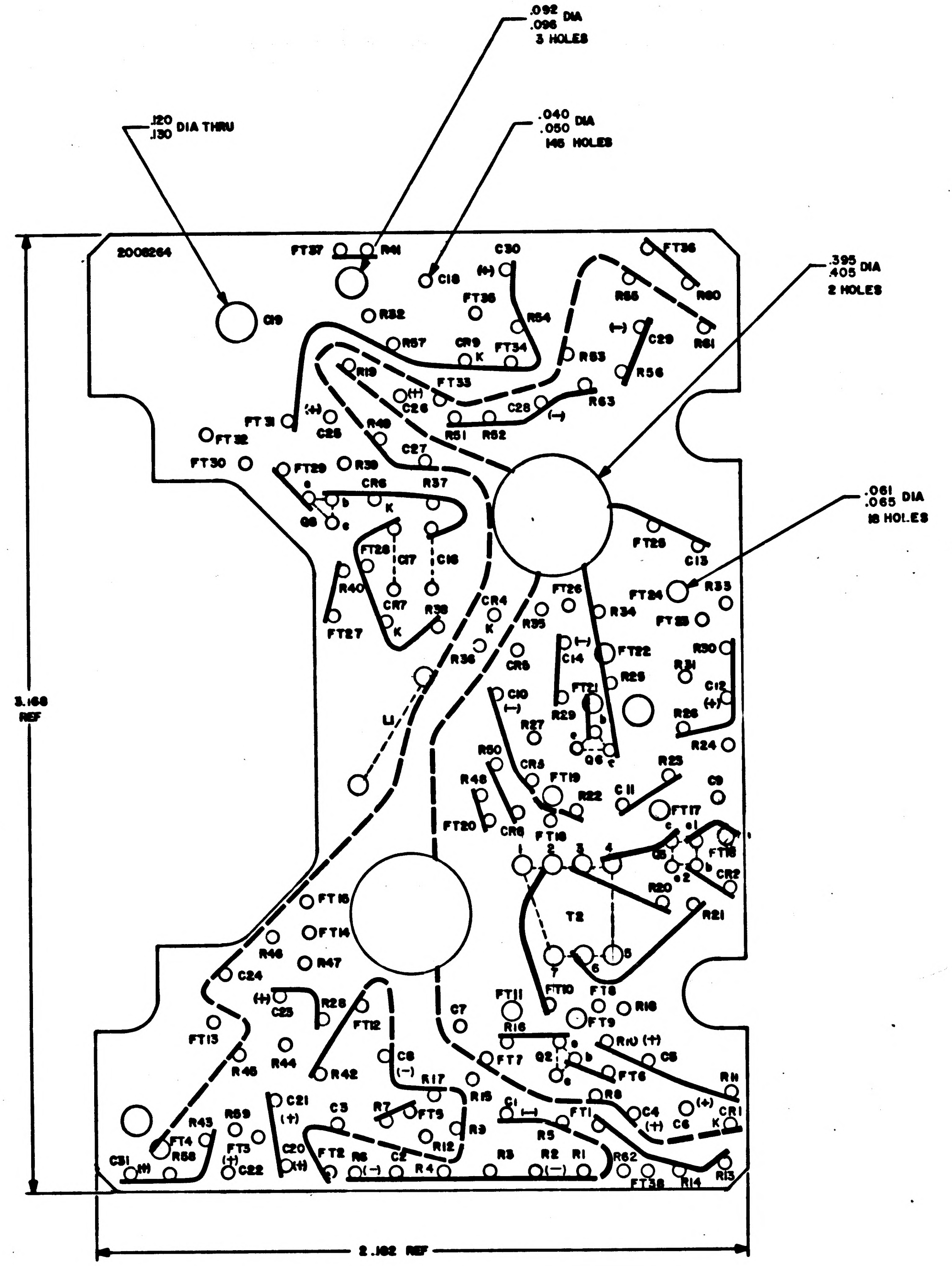
WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008264
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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C5
R45
R44
R42
C8
(−)
FT7
e
FT6
R17
R15
R11
C21
C3
R7
FT5
R3
C1
(−)
R8
R43
R59
(+)
FT1
C4
(+)
C6
(+)
CR1
K
FT4
R58
FT3
(+)
C22
C20
(+)
R12
R5
C31
(+)
FT2
R6
(−)
C2
R4
R3
R2
(−)
R1
R62
FT38
R14
R13
3.168 REF
2.162 REF

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. MARK BLACK CHARACTERS PER ND 1002019
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002123
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DRAWING NO. 2008263 FOR PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007118	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf.
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J. Crowley APR 5 65
CHECKED R.P. 6 APR 65
APPROVED 4/6/65
APPROVED D.R. 4/6/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

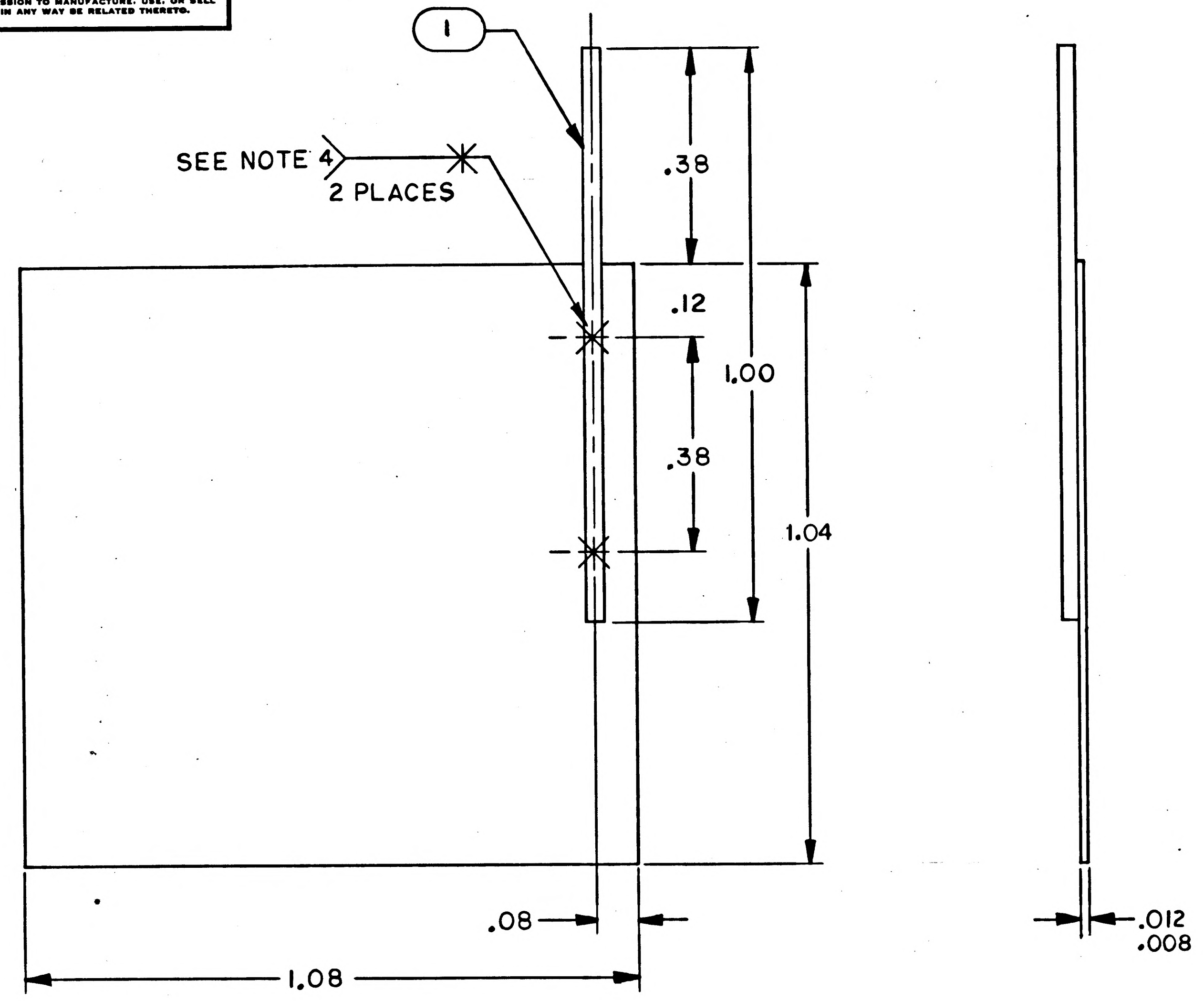
WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2008264
SCALE 8/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18112

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: BE. COPPER PER QQ-C-533, COND 1/2 H
3. FINISH: GOLD PLATE PER MIL-G-45204 CLASS I BEFORE WELDING
4. WELD PER ND 1002005
5. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006757-21	WIRE, ELECTRICAL	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007118	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .01 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	R C Taylor	18 Mar 65
CHECKED	R.P. Bergsbury	6 Apr 65
APPROVED		4/6/65
APPROVED	D. R. Test	4/6/65
APPROVED MIT	W Kupfer	6 Apr 65
APPROVED MSC	W J Rhine	4-6-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHIELD
MOTOR DRIVE AMPLIFIER

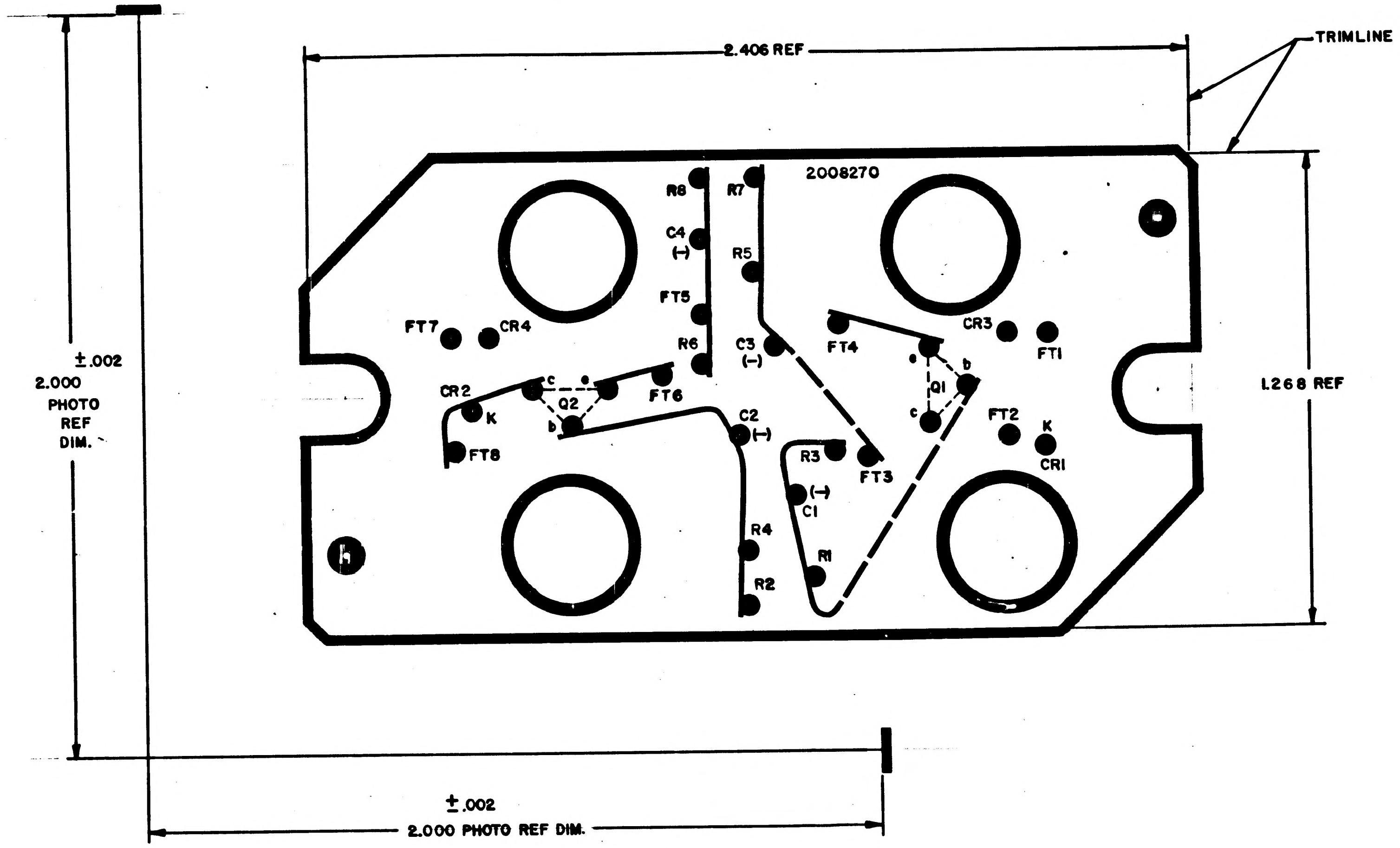
CODE IDENT NO. —
SIZE C
DRAWING NO. 2008265
SCALE 5/1
SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18287

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ——— DECIMALS ± ——— ANGLES ± ———
DO NOT SCALE THIS DRAWING

MATERIAL ———

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN		1 APR 65
CHECKED		7 APR 65
APPROVED		8 APR 65
APPROVED		4/12/65
APPROVED MIT		13 Apr 65
APPROVED MSC		4/13/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM
OPTICS AUTOMATIC OPERATE RELAY

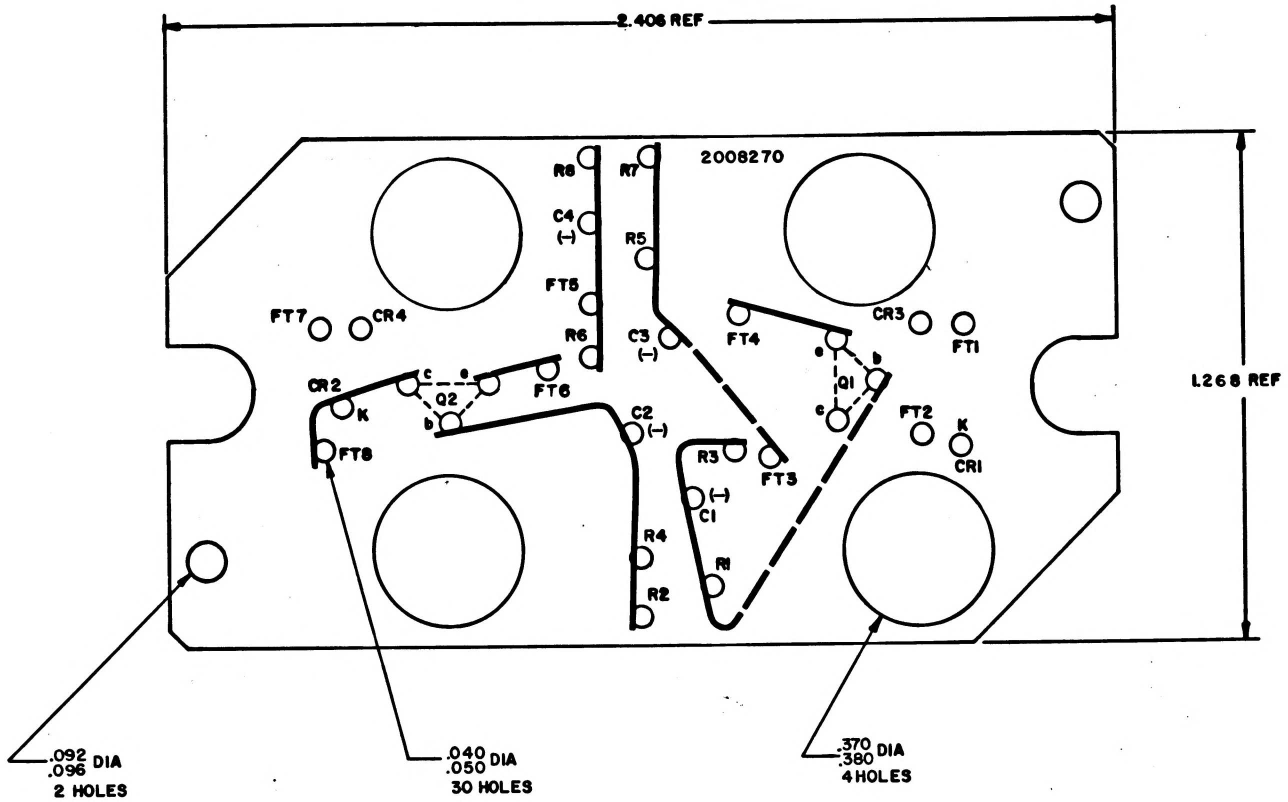
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008269
SCALE 5/1
SHEET 1 OF 1

2008269

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18287

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008269 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007126	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN L. Gaffini 1 Apr 65
CHECKED 7 APR 65
APPROVED 8 APR 65
APPROVED 4/13/65
APPROVED MIT W Kupfer 13 Apr 65
APPROVED MSC 4-13-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD BOTTOM
OPTICS AUTOMATIC
OPERATE RELAY

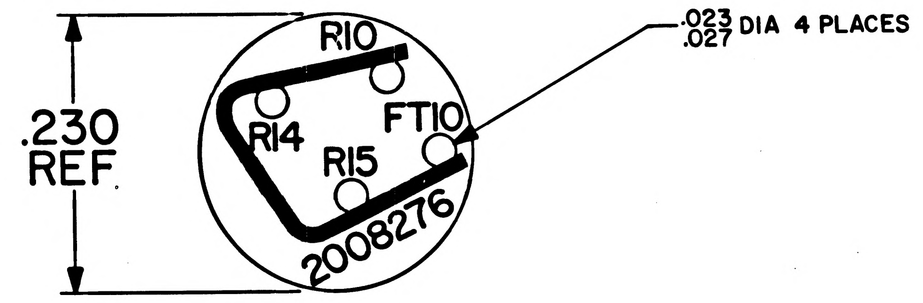
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008270
SCALE 5/1
SHEET 1 OF 1

2008270

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18537

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .015 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

REF DWG:
2008280 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007144	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Ed Mahoney	12 APRIL 65
CHECKED	C.A. Pieftie	14 APR 65
APPROVED		
APPROVED	D.R. Fest	4/21/65
APPROVED MIT	W Koppler	21 Apr 65
APPROVED MSC	W. J. Rhine	4-21-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

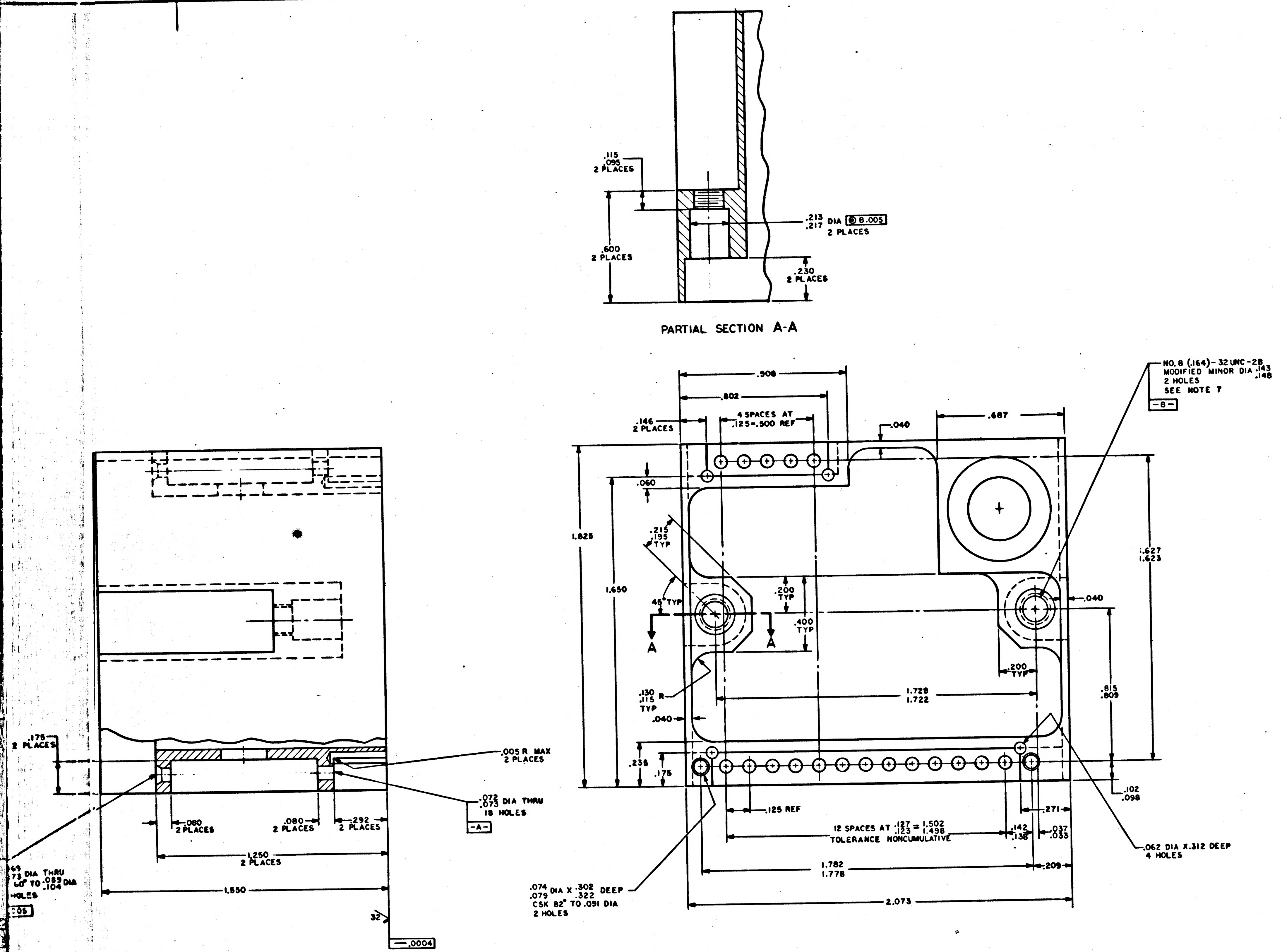
WIRING BOARD, A
OPERATIONAL AMPLIFIER
ELECTRONIC CDU

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008276
SCALE 10/1
SHEET 1 OF 1

MASTER

REVISIONS 18925

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.115
.095
2 PLACES
.600
2 PLACES
.213
.217 DIA ◎ B.005
2 PLACES
.230
2 PLACES
PARTIAL SECTION A-A
.908
.802
.146
2 PLACES
4 SPACES AT .125=.500 REF
.040
.687
NO. 8 (.164)-32 UNC-2B
MODIFIED MINOR DIA .143 .148
2 HOLES
SEE NOTE 7
-B-
.060
1.825
1.650
.215
.195
TYP
45° TYP
A
A
.200
TYP
.400
TYP
1.627
1.623
.040
.200
TYP
.130
.115 R
TYP
.040
1.728
1.722
.815
.809
.238
.175
.102
.098
.125 REF
12 SPACES AT .127 .123 = 1.502 1.498
TOLERANCE NONCUMULATIVE
.142
.138
.271
.037
.033
.062 DIA X .312 DEEP
4 HOLES
1.782
1.778
.209
2.073
.074
.079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.175
2 PLACES
.005 R MAX
2 PLACES
.072
.073 DIA THRU
18 HOLES
-A-
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
69
73 DIA THRU
60° TO .089 .104 DIA
HOLES
.005
32
.0004

3H

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007122	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Sam J. Nicholson 12 APR 1965
CHECKED C.A. Bartle 4 MAY 65
APPROVED Allmar 5 MAY 65
APPROVED 5/4/65
APPROVED MIT 11 May 65
APPROVED MSC 5-11-65
DATE

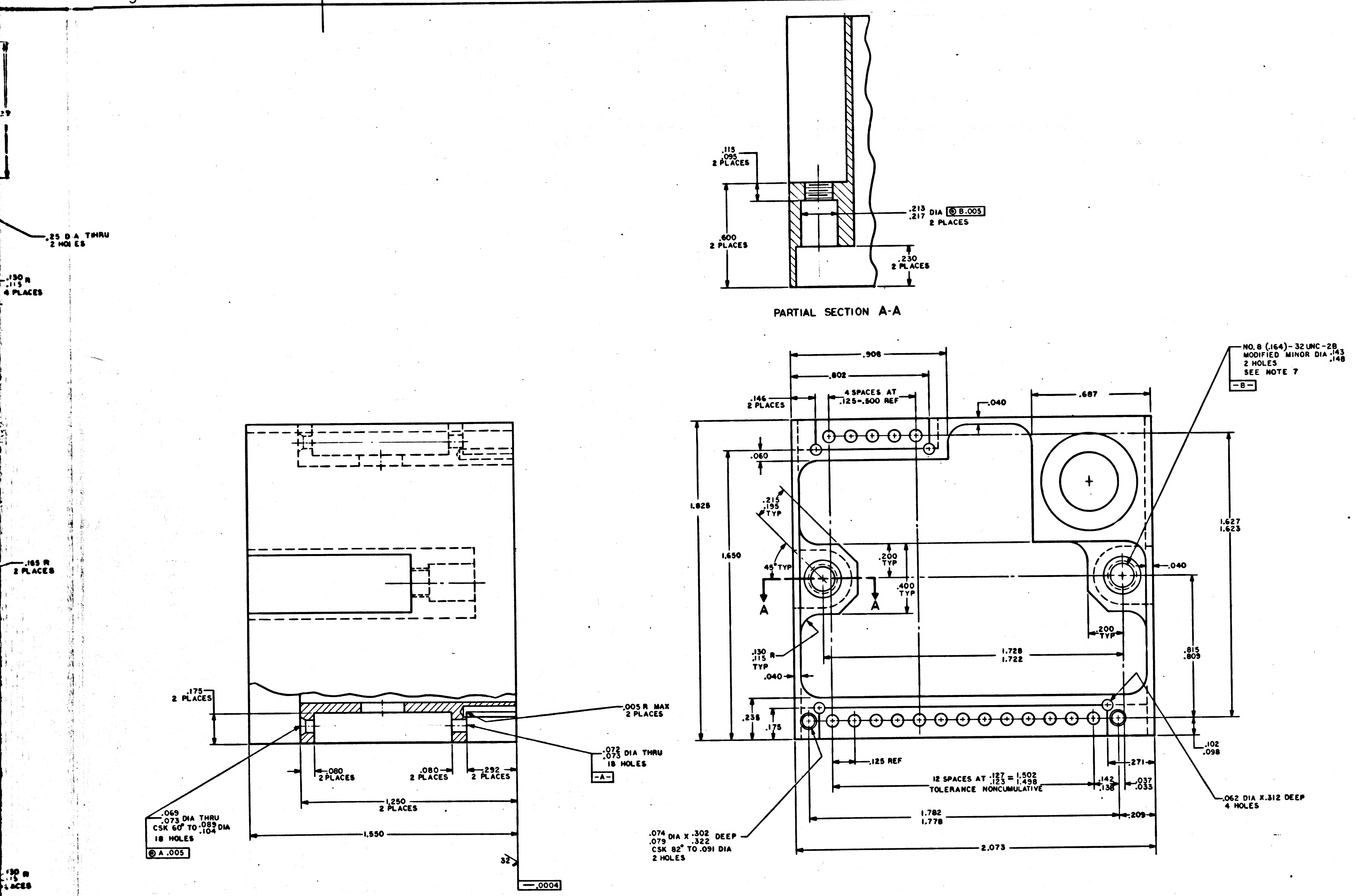
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
COSECANT GENERATOR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008277
SCALE 5/1
SHEET 1 OF 1

2008277

2008277



.25 DIA THRU
2 HOLES
.130 R
.115
4 PLACES
.165 R
2 PLACES
.25 DIA THRU
5 HOLES
.115
.095
2 PLACES
.600
2 PLACES
.213
.217 DIA ⓢ B .005
2 PLACES
.230
2 PLACES
PARTIAL SECTION A-A
.906
.802
.146
2 PLACES
4 SPACES AT
.125=.500 REF
.040
.687
NO. 8 (.164)-32 UNC-2B
MODIFIED MINOR DIA .143
.148
2 HOLES
SEE NOTE 7
-B-
.060
1.825
1.650
.215
.195
TYP
45° TYP
.200
TYP
.400
TYP
A
A
1.627
1.623
.040
.200
TYP
.815
.809
.130
.115 R
TYP
.040
1.728
1.722
.235
.175
.102
.098
.125 REF
12 SPACES AT .127/.123 = 1.502/1.498
TOLERANCE NONCUMULATIVE
.142
.138
.271
.037
.033
.062 DIA X .312 DEEP
4 HOLES
1.782
1.778
.209
2.073
.074 DIA X .302 DEEP
.079 .322
CSK 82° TO .091 DIA
2 HOLES
.175
2 PLACES
.005 R MAX
2 PLACES
.072
.073 DIA THRU
18 HOLES
-A-
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
.069
.073 DIA THRU
CSK 60° TO .089/.104 DIA
18 HOLES
ⓢ A .005
32
—.0004
.99
5
4
3
2
1
D
C
B

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007122	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 12 APR 1965
CHECKED C.A. Pratt 5 MAY 65
APPROVED 5 MAY 65
APPROVED 5/14/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

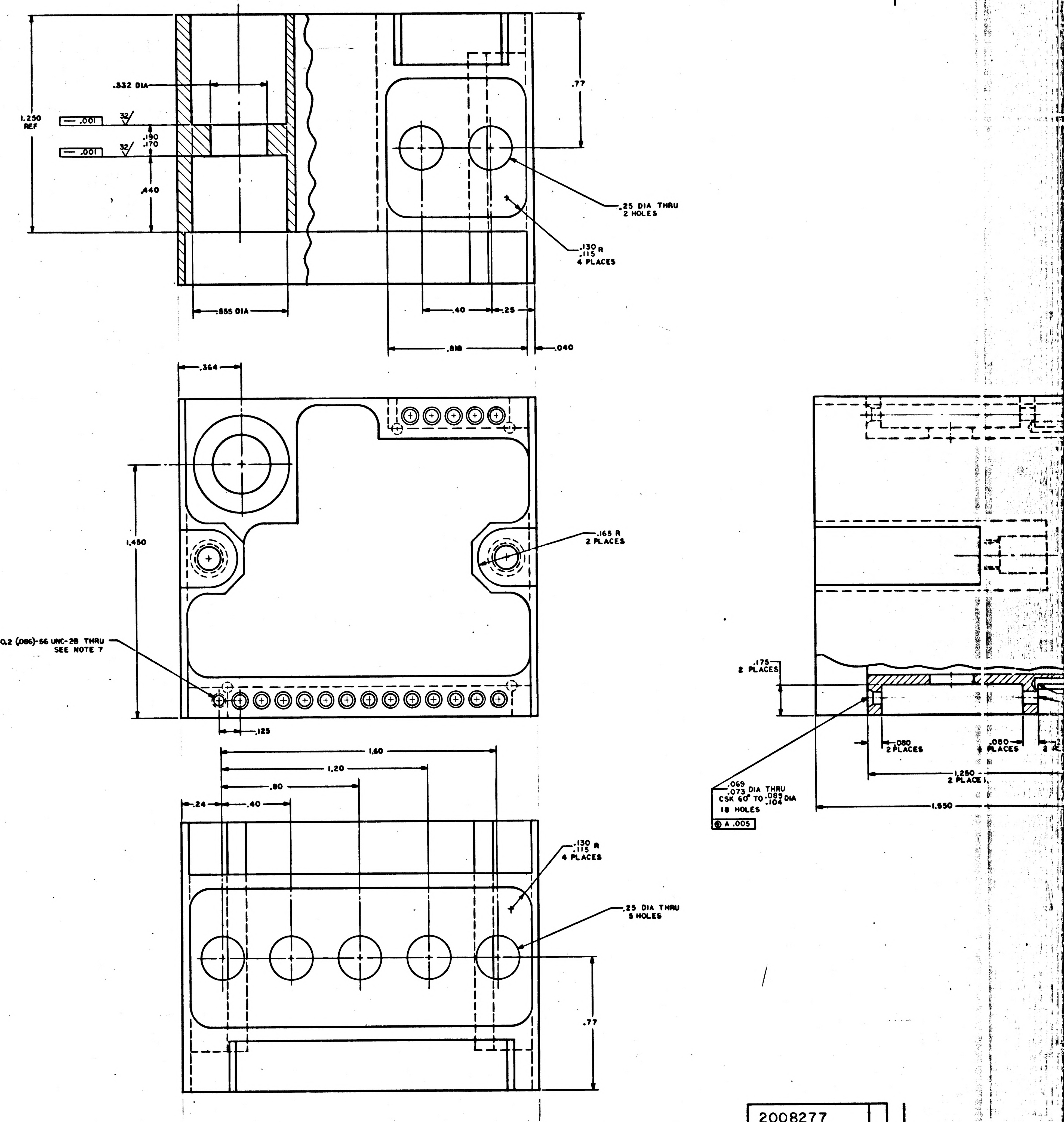
FRAME
COSECANT GENERATOR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008277
SCALE 5/1
SHEET 1 OF 1

MASTER

2008277

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.332 DIA
1.250
REF
.001
32
.001
32
.190
.170
.440
.555 DIA
.77
.25 DIA THRU
2 HOLES
.130
.115 R
4 PLACES
.40
.25
.818
.040
.364
1.450
.165 R
2 PLACES
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125
1.60
1.20
.80
.40
.24
.130
.115 R
4 PLACES
.25 DIA THRU
5 HOLES
.77
.175
2 PLACES
.080
2 PLACES
.080
4 PLACES
1.250
2 PLACES
1.550
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
18 HOLES
A .005

NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL : MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP T5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005 /.015
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
6. FINISH : ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

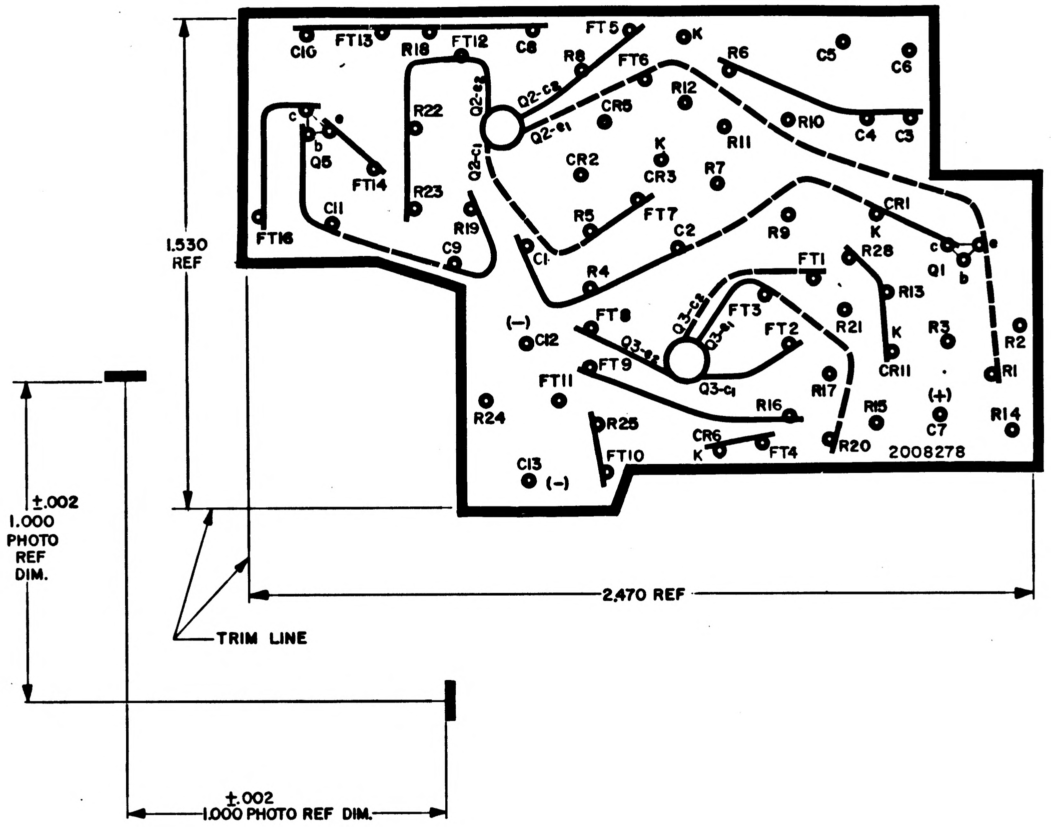
3H

2008277

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19175

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19988	KCH	RL	16 JUN 65	W.6%


CI6
FT13
R18
FT12
C8
FT5
R8
K
R6
C5
C6
FT6
R12
Q2-C2
Q2-e1
CR5
R22
Q2-C1
R10
R11
C4
C3
c
b
e
Q5
FT14
CR2
K
CR3
R7
CR1
C11
R23
R5
FT7
C2
R9
K
R28
c
e
b
Q1
FT16
R19
C9
C1
R4
FT1
R13
(−)
FT8
Q3-C2
FT3
FT2
R21
K
R3
R2
C12
Q3-e1
FT9
Q3-C1
CR11
R1
FT11
R16
R17
R15
(+)
R14
R24
R25
CR6
K
C7
FT10
FT4
R20
2008278
C13
(−)
1.530 REF
±.002
1.000
PHOTO
REF
DIM.
TRIM LINE
2.470 REF
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .040/.050 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007142	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Louis A Cook	12 APR 65
CHECKED	A. Lindstrom	13 May 65
APPROVED	R.V. Vecchio	13 MAY 65
APPROVED	D.R. Frost	5/14/65
APPROVED MIT	W Kupfer	18 May 65
APPROVED MSC		5-18-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (BOT)
PHOTOGRAPHIC MASTER
CDU POWER SUPPLY

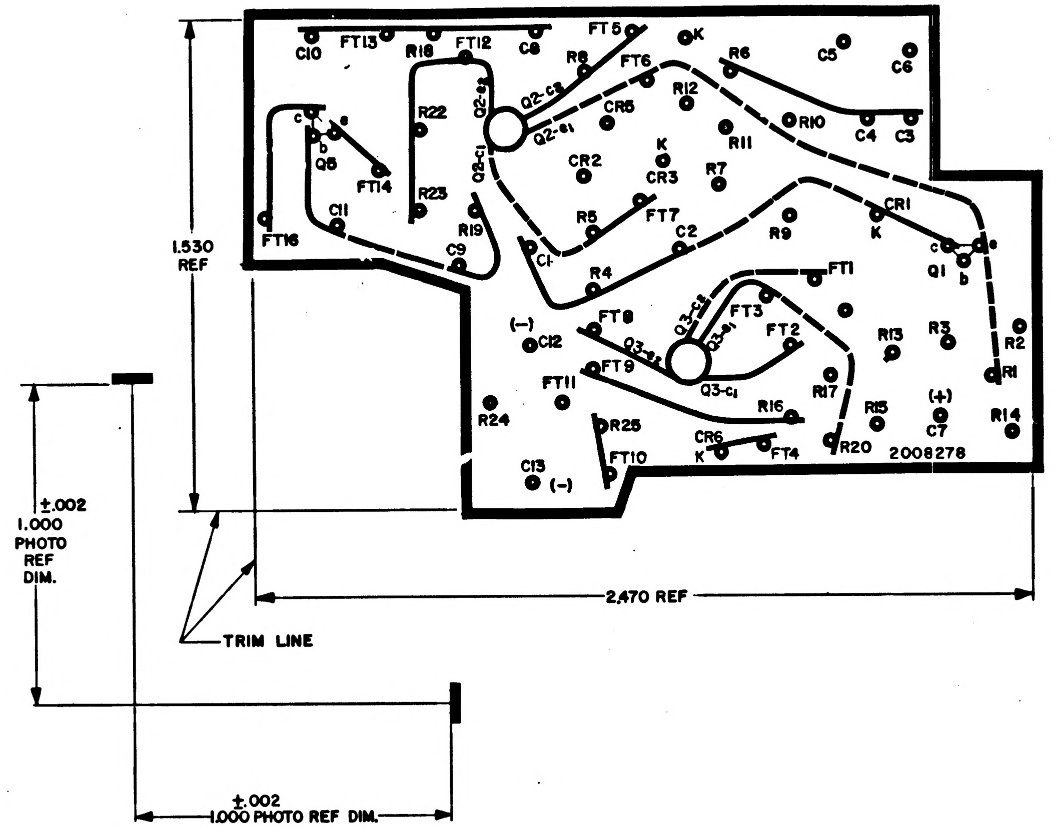
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008278

SCALE 4/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS /9/75

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



C10
FT13
R18
FT12
C8
FT5
K
R8
FT6
R6
C5
C6
Q2-C2
Q2-e2
Q2-e1
Q2-C1
R12
CR5
R10
R11
C4
C3
c
e
b
Q5
FT14
R22
R23
CR2
K
CR3
R7
C11
FT16
R19
C9
C1
R5
FT7
C2
R9
CR1
K
c
e
b
Q1
R4
FT1
Q3-C2
Q3-e1
Q3-e2
Q3-C1
FT3
FT2
(−)
C12
FT8
FT9
FT11
R13
R3
R2
R1
R17
R16
R24
R25
R15
(+)
C7
R14
CR6
K
FT4
R20
2008278
FT10
C13
(−)
1.530 REF
2.470 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.
TRIM LINE

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ⊙ .040/.050 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007142	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Louis A. Cook	12 May 65
CHECKED	A. Lindstrom	13 May 65
APPROVED	R V Vaccaro	13 May 65
APPROVED	D. A. Frost	5/14/65
APPROVED MIT	W. Kupfer	18 May 65
APPROVED MSC		5-18-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (BOT)
PHOTOGRAPHIC MASTER
CDU POWER SUPPLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008278

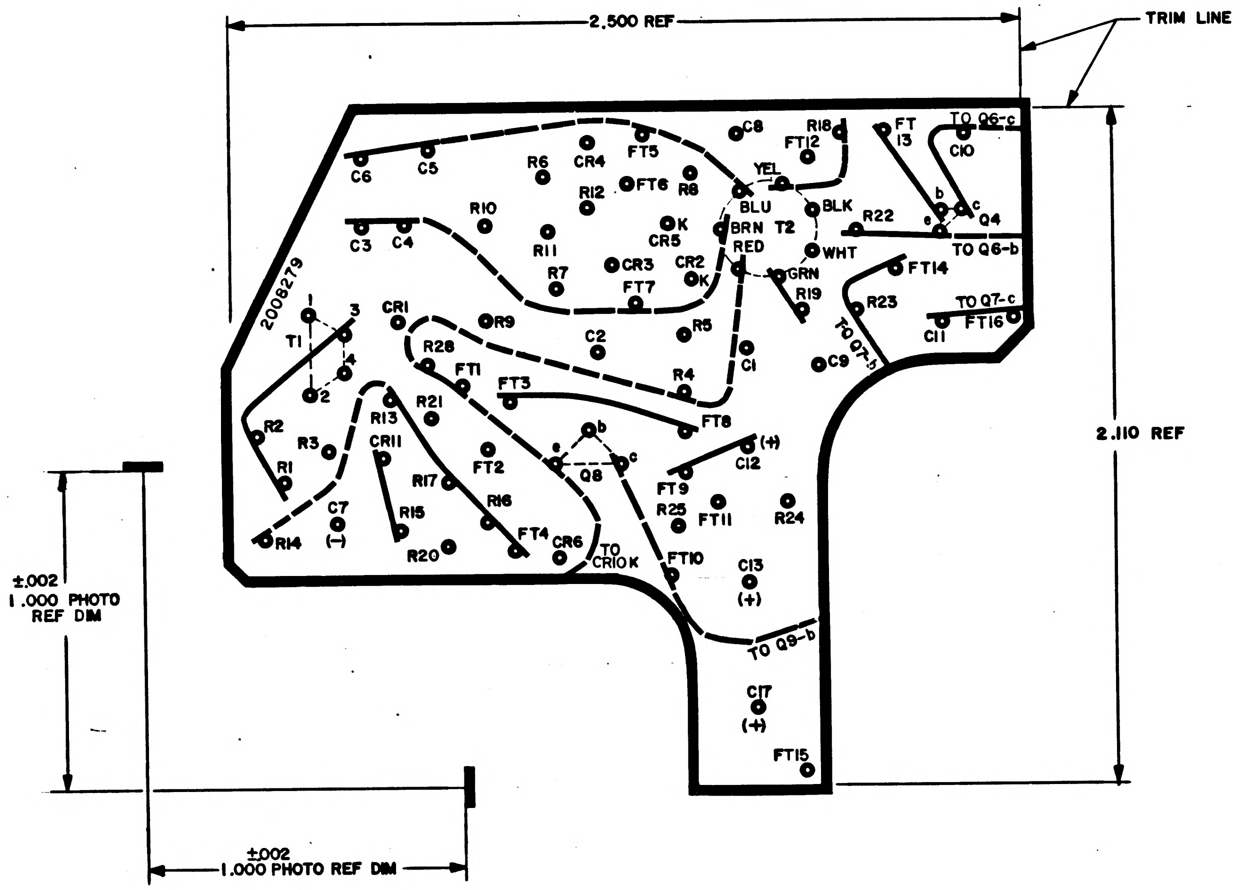
SCALE 4/1 SHEET 1 OF 1

2008278

NOTICE – WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19175

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19988	KCH	RL	6/24/65	


2,500 REF
TRIM LINE
2.110 REF
±.002
1.000 PHOTO REF DIM
±.002
1.000 PHOTO REF DIM
2008279
C6
C5
R6
CR4
FT5
C8
R18
FT12
FT 13
TO Q6-c
C10
R12
FT6
R8
YEL
R10
C3
C4
R11
K
CR5
BLU
BRN
T2
RED
BLK
R22
b
c
e
Q4
TO Q6-b
WHT
R7
CR3
FT7
CR2
K
GRN
R19
FT14
R23
TO Q7-c
C11
FT16
TO Q7-b
T1
1
3
4
2
CR1
R9
R28
C2
R5
C1
C9
R4
FT1
FT3
FT8
R2
R3
R1
R13
CR11
R21
FT2
b
e
c
Q8
C12
(+)
FT9
R25
FT11
R24
C7
(–)
R14
R15
R17
R16
R20
FT4
CR6
TO CR10 K
FT10
C13
(+)
TO Q9-b
C17
(+)
FT15

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ◉ .040/.050 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007142	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Louis A Lowe	2 APRIL 65
CHECKED	A. Lindstrom	13 May 65
APPROVED	R. Weratti	13 May 65
APPROVED	D. G. Test	5/14/65
APPROVED MIT	W. Kupfer	14 May 65
APPROVED MSC	W. J. Rhine	5-18-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (TOP)
PHOTOGRAPHIC MASTER
CDU POWER SUPPLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008279

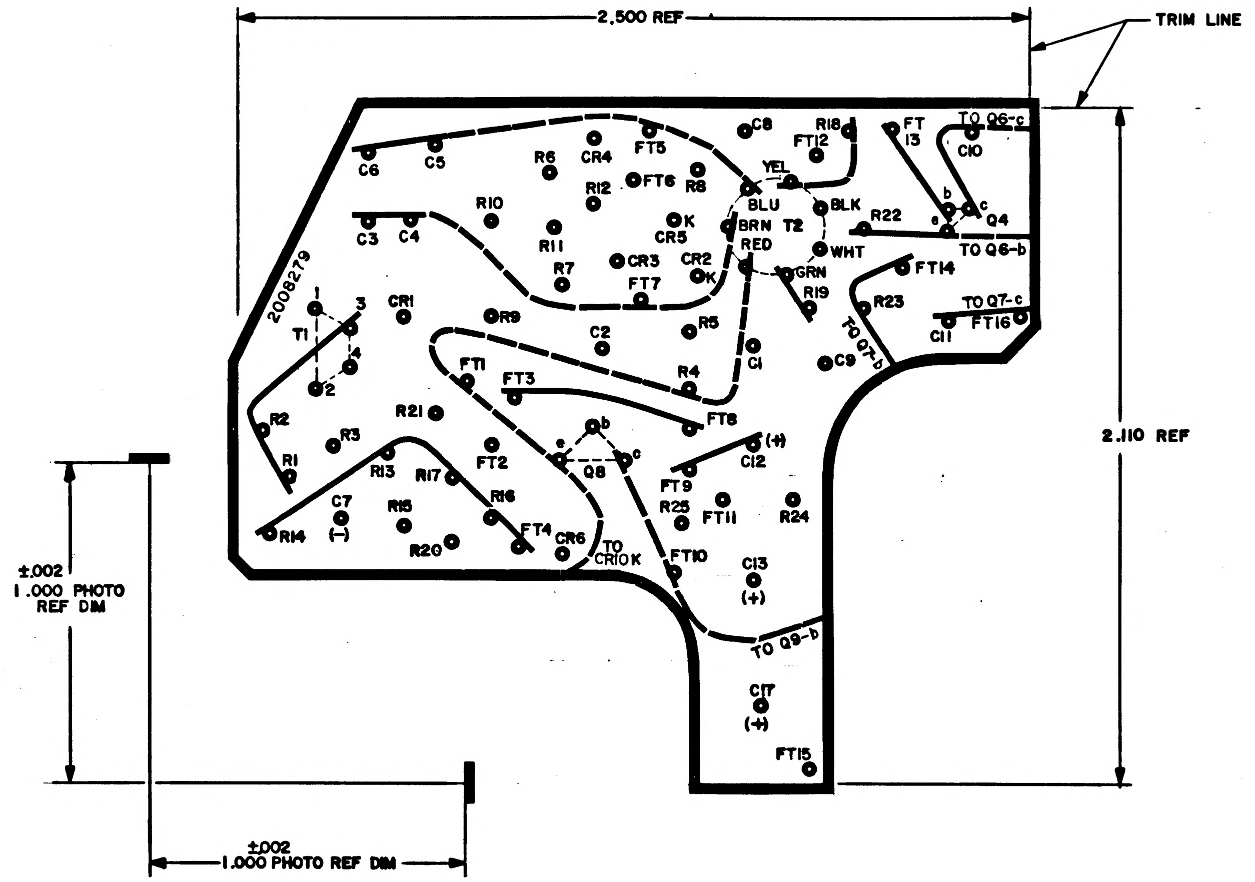
SCALE 4/1 SHEET 1 OF 1

2008279 A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19175

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2,500 REF
TRIM LINE
2.110 REF
±.002
1.000 PHOTO REF DIM
±.002
1.000 PHOTO REF DIM
2008279
C6
C5
R6
CR4
FT5
R12
FT6
R8
C8
R18
FT12
FT 13
TO Q6-c
C10
R10
C3
C4
R11
K
CR5
YEL
BLU
BRN
T2
RED
BLK
WHT
GRN
R22
b
e
c
Q4
TO Q6-b
R7
CR3
CR2
K
FT7
FT14
R19
R23
TO Q7-c
FT16
C11
TO Q7-b
1
3
T1
4
2
CR1
R9
C2
R5
C1
C9
FT1
FT3
R4
FT8
R2
R3
R21
b
e
c
Q8
(+)
C12
R1
R13
R17
FT2
FT9
R25
FT11
R24
C7
(−)
R15
R16
R14
R20
FT4
CR6
TO CR10 K
FT10
C13
(+)
TO Q9-b
C17
(+)
FT15

NOTES:
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2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .040/.050 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007142	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Louis A Lowe	8 APRIL 65
CHECKED	A. Lindstrom	13 May 65
APPROVED	R W Marsh	13 May 65
APPROVED	D. A. Fest	5/14/65
APPROVED MIT	W Trageser	18 May 65
APPROVED MSC	W J Rhine	5-18-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR (TOP)
PHOTOGRAPHIC MASTER
CDU POWER SUPPLY

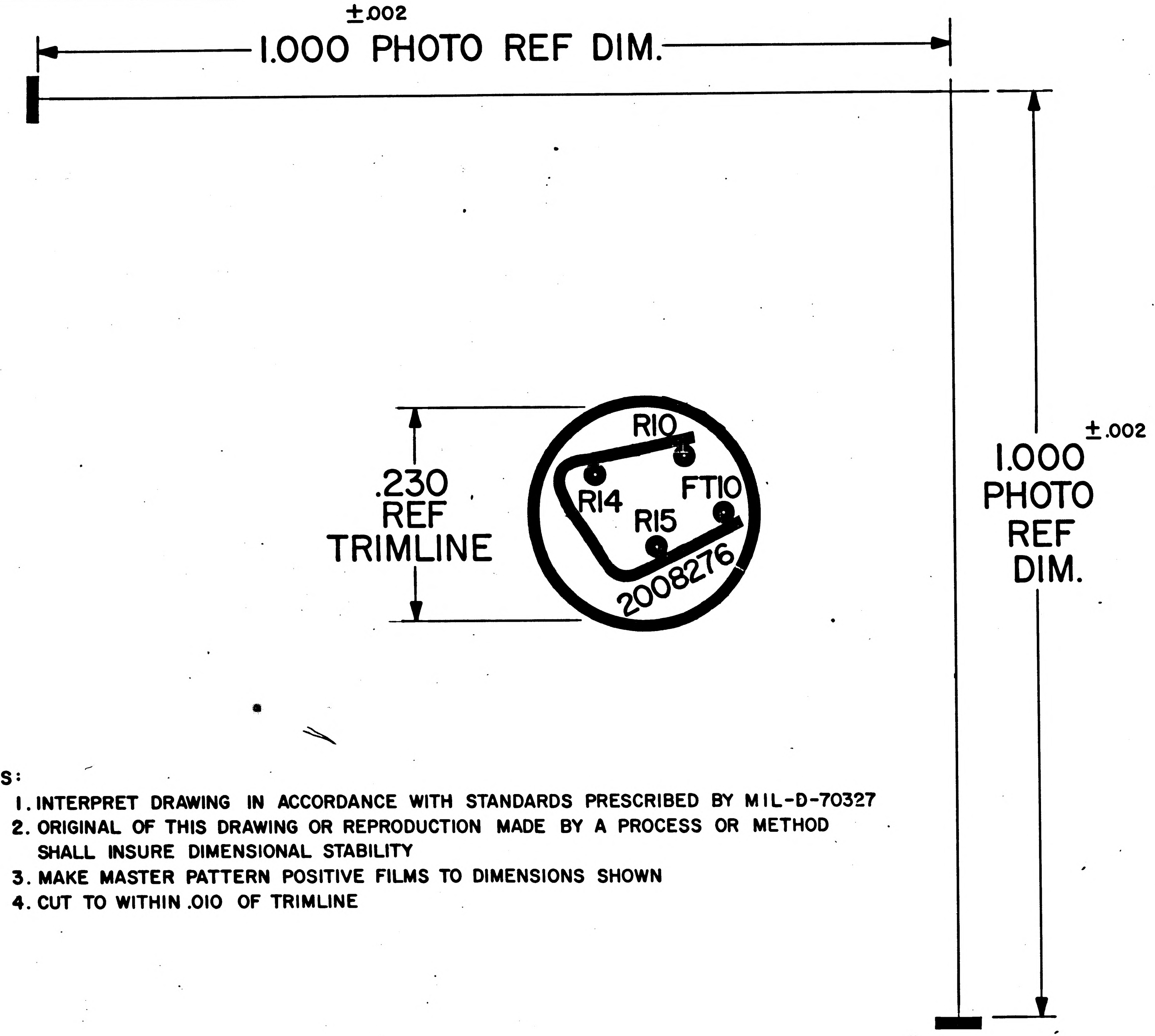
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008279
SCALE 4/1		SHEET 1 OF 1

2008279

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18537

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Ed Mahoney	APRIL 13 65
CHECKED	C. A. Cusita	14APR65
APPROVED		
APPROVED	A. R. Test	4/21/65
APPROVED MIT	W Kupfer	21 Apr 65
APPROVED MSC	W J Rhine	4-21-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD, A OPERATIONAL AMPLIFIER ELECTRONIC CDU

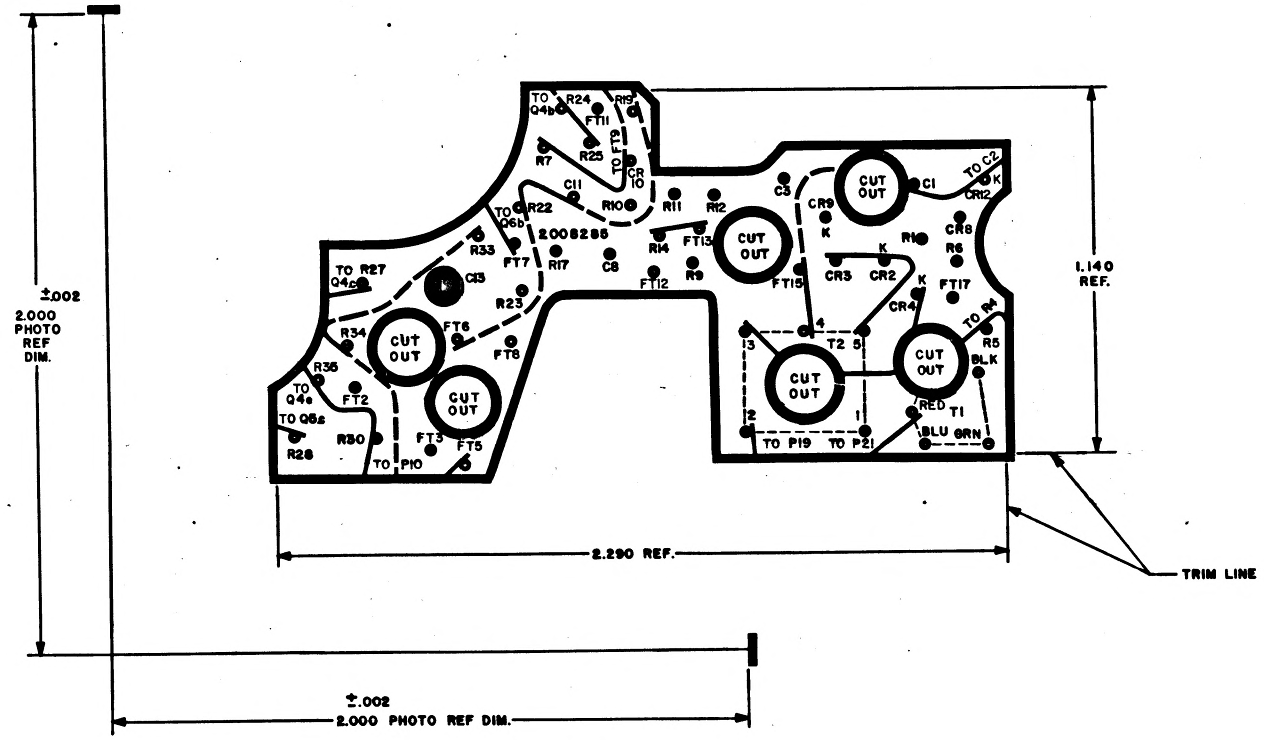
CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008280
SCALE 10/1
SHEET 1 OF 1

2008280

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21461	LC	BK	17Aug65	



TO Q4b
R24
R19
FT11
R7
R25
TO FT9
CR 10
C11
TO Q6b
R22
R10
R11
R12
C3
CR9
C1
TO C2
K
CR12
2008285
R33
FT7
R17
C8
R14
FT13
CUT OUT
K
R1
CR8
R6
TO R27
Q4c
C13
R23
FT12
R9
FT15
CR3
CR2
K
FT17
CR4
TO R4
R34
CUT OUT
FT6
FT8
4
T2
5
R5
BLK
R35
TO Q4e
FT2
CUT OUT
3
CUT OUT
TO Q6a
R30
FT3
FT5
2
1
RED
T1
BLU
GRN
R28
TO P10
TO P19
TO P21
±.002
2.000 PHOTO REF DIM.
1.140 REF.
2.290 REF.
TRIM LINE
±.002
2.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340 TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .040/.050 DIA.HOLE
8. ● .125/.135 DIA. HOLE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007114	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.D. Midgley 15 Apr 65
CHECKED Rokosky
APPROVED
APPROVED 6/1/65
APPROVED MIT M. Manley 6-2-65
APPROVED MSC W.J. Rhine 6-2-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

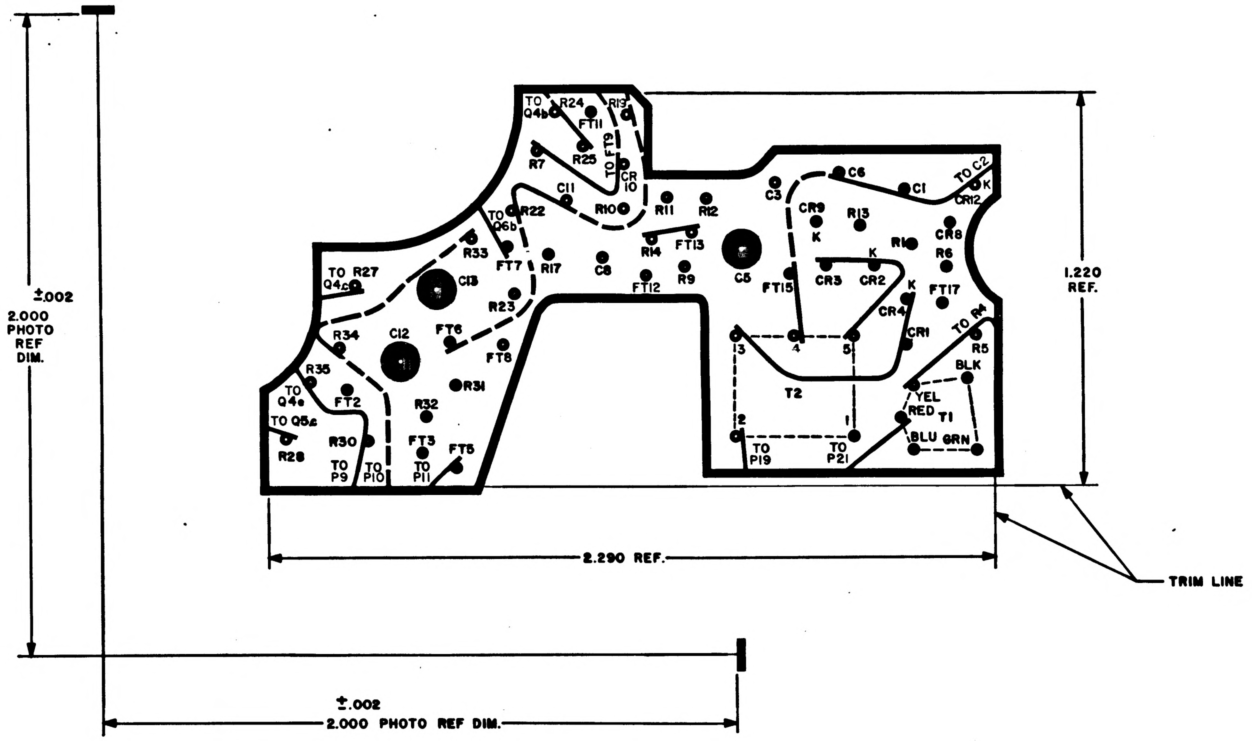
INSULATOR, TOP
PHOTOGRAPHIC MASTER
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008285
SCALE 5/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TO Q4b
R24
R19
FT11
R7
R25
TO FT9
CR 10
C11
R10
R11
R12
C3
C6
C1
TO C2
K
CR12
TO Q6b
R22
CR9
K
R13
R1
CR8
R6
R33
FT7
R17
C8
R14
FT13
C5
FT15
CR3
CR2
K
FT17
TO R27
Q4c
C13
R23
FT12
R9
CR4
K
CR1
TO R4
R5
BLK
R34
C12
FT6
FT8
13
4
5
T2
YEL
RED
T1
BLU
GRN
R35
TO Q4e
FT2
R31
TO Q5c
R32
R30
FT3
FT5
R28
TO P9
TO P10
TO P11
2
1
TO P19
TO P21
±.002
2.000 PHOTO REF DIM.
1.220 REF.
2.290 REF.
TRIM LINE
±.002
2.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340 TYPE I B, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .040/.050 DIA.HOLE
8. ⬤ .125/.135 DIA. HOLE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007114	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.D. Midgley 15 April [illegible]
CHECKED R. [illegible] [illegible]
APPROVED [illegible] [illegible]
APPROVED [illegible] [illegible]
APPROVED MIT M.J. Mackey 6-8-65
APPROVED MSC W.J. [illegible] 6-2-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP PHOTOGRAPHIC MASTER
GIMBAL SERVO AMPLIFIER

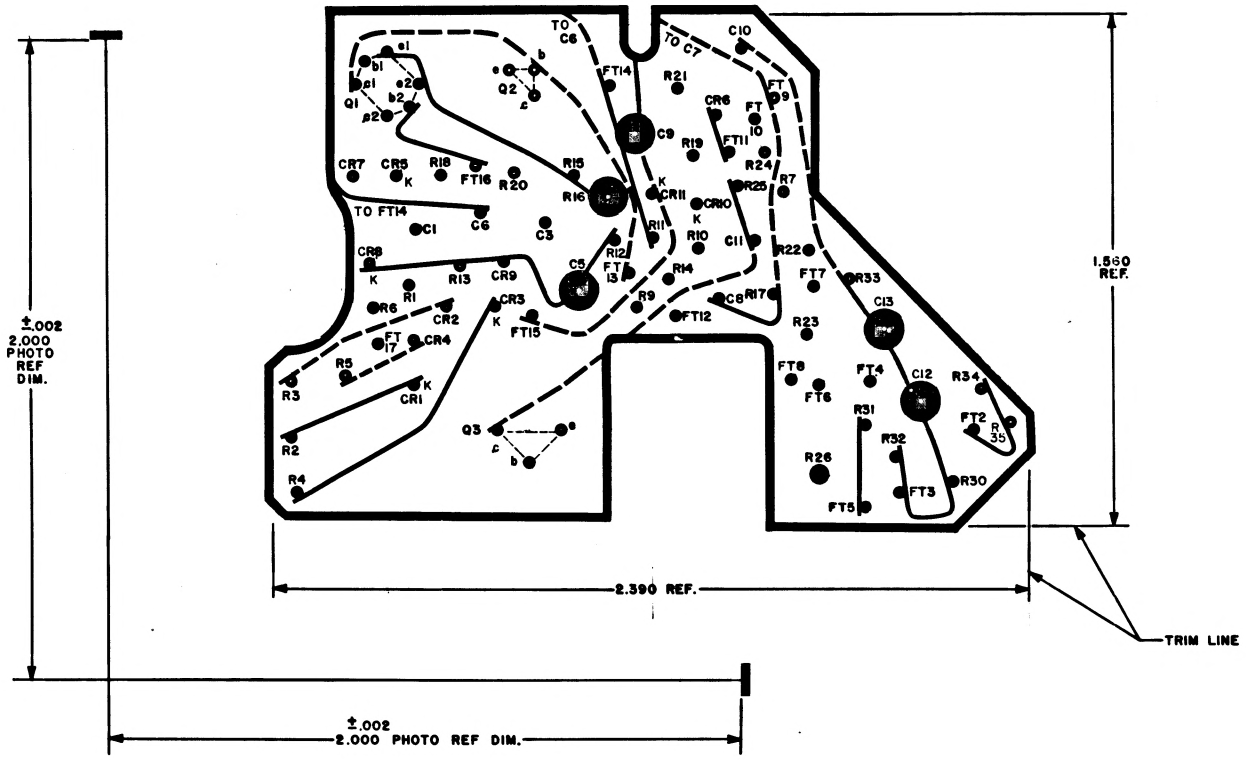
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008285
SCALE 5/1
SHEET 1 OF 1

2008285

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



TO C6
TO C7
C10
e1
b1
e2
c1
b2
Q1
c2
e
b
Q2
c
FT14
R21
CR6
FT 9
FT 10
FT11
C9
R19
R24
R25
R7
CR7
CR5
K
R18
FT16
R20
R15
R16
K
CR11
CR10
K
TO FT14
C1
C6
C3
R11
R10
C11
R22
CR8
K
C5
R12
FT 13
R14
R17
C8
FT7
R33
R6
R1
R13
CR9
CR3
K
R9
FT12
R23
C13
FT 17
CR2
CR4
FT15
R5
R3
K
CR1
FT8
FT6
FT4
C12
R34
R31
FT2
R 35
Q3
e
c
b
R2
R32
R26
R4
FT5
FT3
R30
±.002
2.000 PHOTO REF DIM.
1.560 REF.
2.390 REF.
TRIM LINE
±.002
2.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
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4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .040/.050 DIA. HOLE
8. ● .061/.065 DIA. HOLE
9. ● .125/.135 DIA. HOLE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007114	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	R.D. Midgley	16 Apr 65
CHECKED	[illegible]	[illegible]
APPROVED	[illegible]	[illegible]
APPROVED	[illegible]	6/1/65
APPROVED MIT	[illegible]	6-2-65
APPROVED MSC	[illegible]	6-2-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, BOTTOM PHOTOGRAPHIC MASTER
GIMBAL SERVO AMPLIFIER

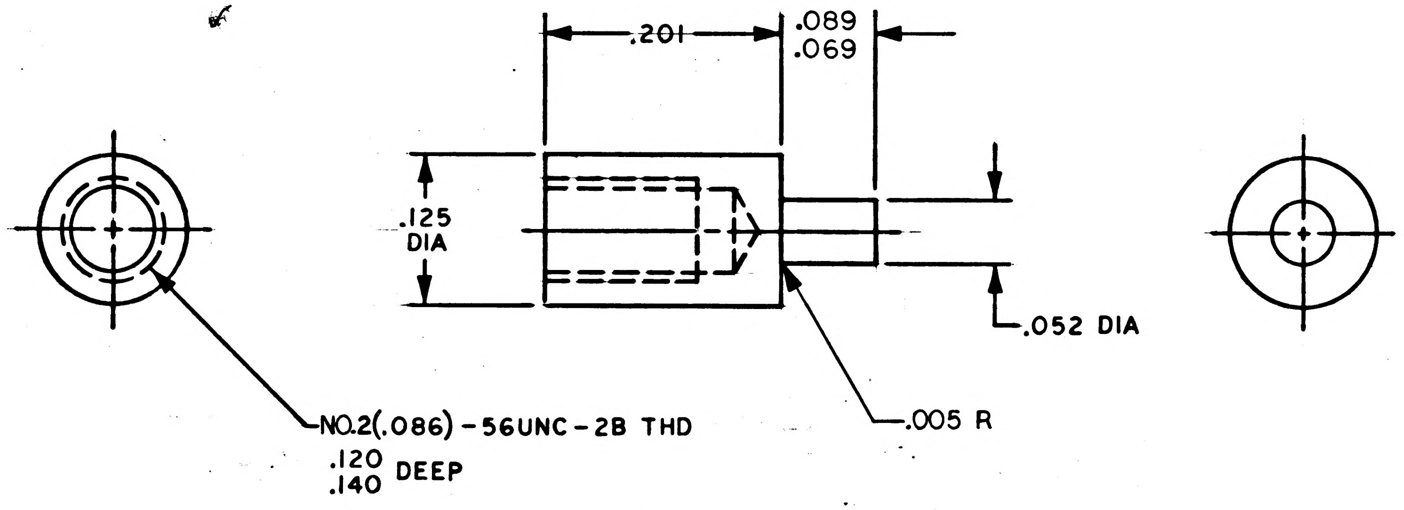
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008286

SCALE 5/1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19285

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: LAMINATED PLASTIC ROD PER 1010692-5
3. REMOVE BURRS AND SHARP EDGES .010 MAX
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007154	
2007143	
2007138	
2007137	
2007136	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

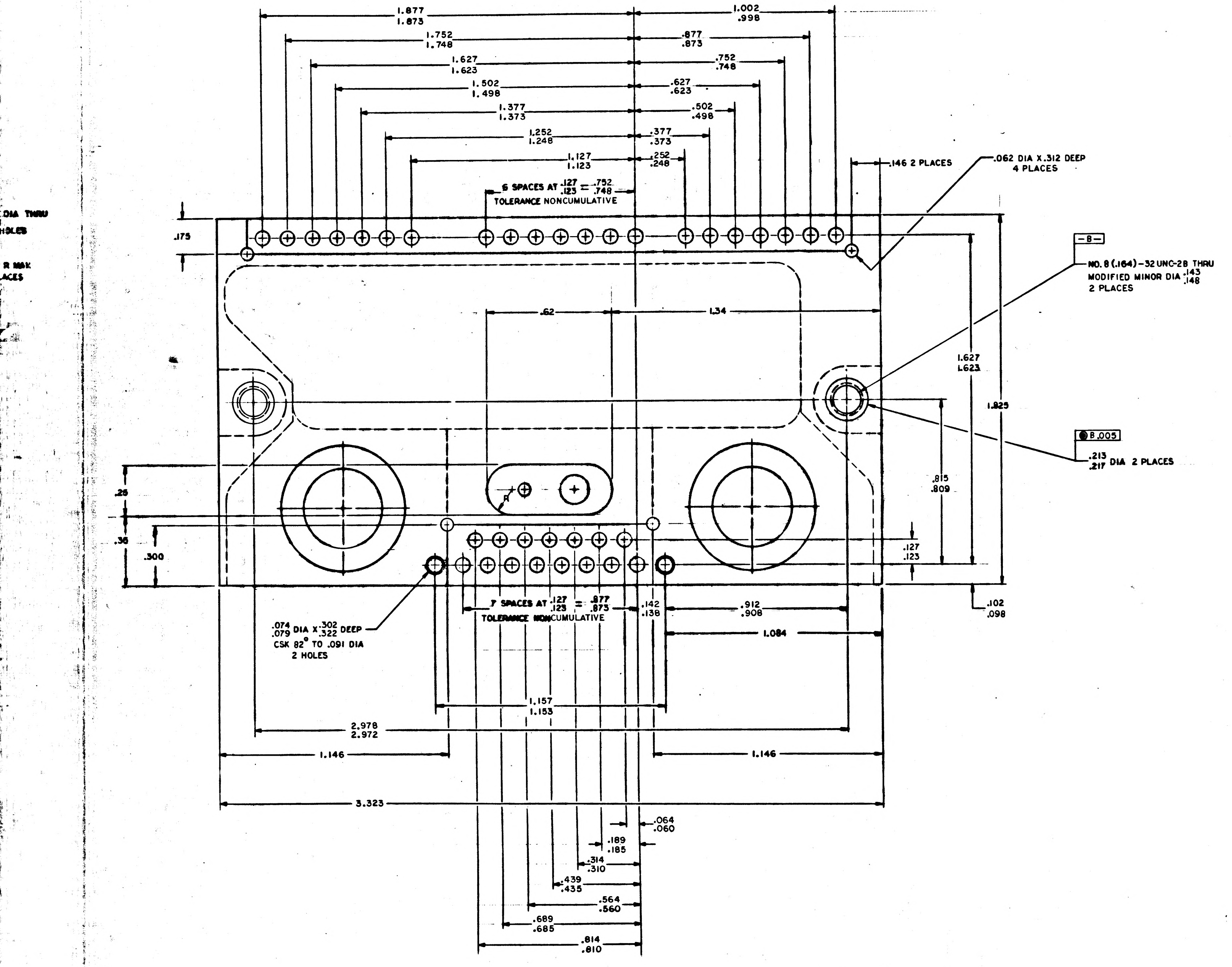
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

		DATE
DRAWN	Ken Healy	20 APR 65
CHECKED	Bongarrigo	20 MAY 65
APPROVED	R.V. Varato	21 MAY 65
APPROVED	D.R. Test	5/21/65
APPROVED MIT	W Kupfer	26 May 65
APPROVED MSC		5/26/6

SPACER,
CDU

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008287
SCALE 10/1
SHEET 1 OF 1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


DIA THRU
HOLES
R MAX
ACES
1.877 1.873
1.752 1.748
1.627 1.623
1.502 1.498
1.377 1.373
1.252 1.248
1.127 1.123
1.002 .998
.877 .873
.752 .748
.627 .623
.502 .498
.377 .373
.252 .248
6 SPACES AT .127/.123 = .752/.748
TOLERANCE NONCUMULATIVE
.146 2 PLACES
.062 DIA X .312 DEEP 4 PLACES
-B-
NO. 8 (.164)-32 UNC-2B THRU MODIFIED MINOR DIA .143/.148 2 PLACES
B .005
.213/.217 DIA 2 PLACES
.175
.62
1.34
1.627 1.623
1.825
.815 .809
.25
.36
.300
R
.127 .123
.102 .098
.074/.079 DIA X .302/.322 DEEP CSK 82° TO .091 DIA 2 HOLES
7 SPACES AT .127/.123 = .877/.873
TOLERANCE NONCUMULATIVE
.142 .138
.912 .908
1.084
1.157 1.153
2.978 2.972
1.146
1.146
3.323
.064 .060
.189 .185
.314 .310
.439 .435
.564 .560
.689 .685
.814 .810

MASTER

2007113	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Ed Powers	16 April 65
CHECKED	C.A. Bentley	6 May 65
APPROVED	E.T. Sulak	6 May 65
APPROVED		
APPROVED MIT		11 May 65
APPROVED MSC		5/14/65

HEATSINK
G & N SUBSYSTEM
SUPPLY FILTER

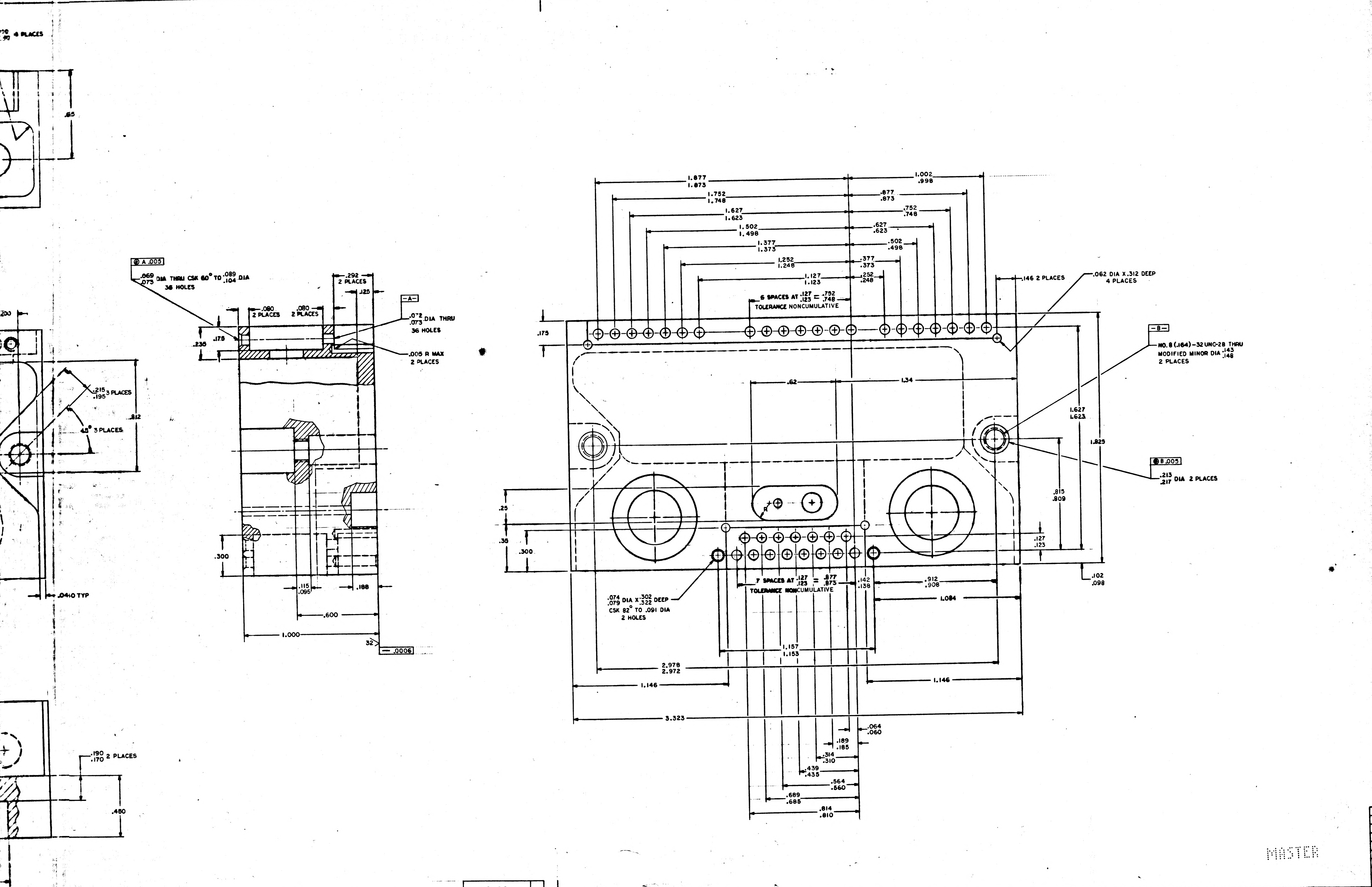
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008288

SCALE 5/1 SHEET OF

2008288

2008288

341

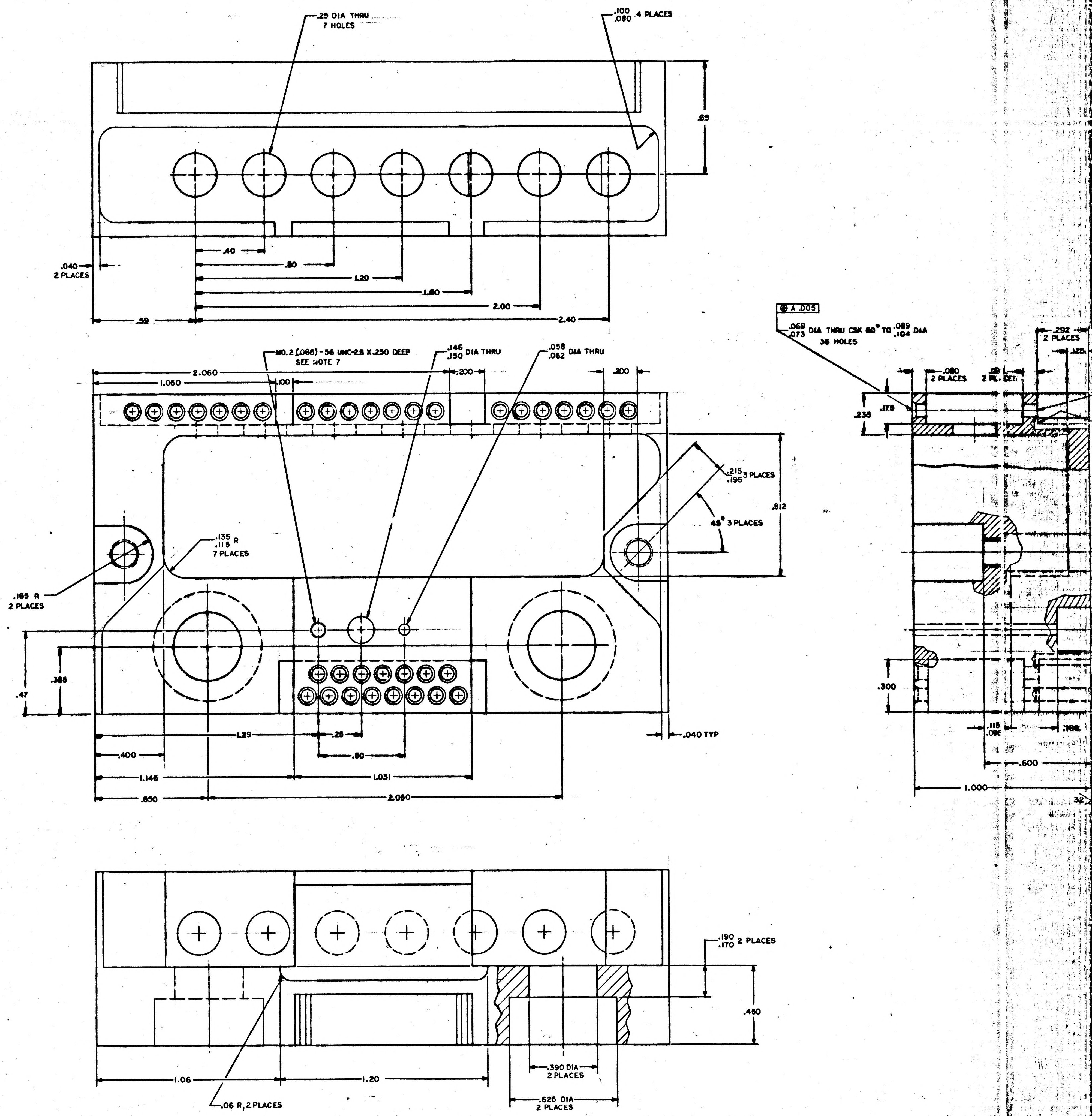


6
5
4
3
2
4 PLACES
.65
Ⓞ A .005
.069 .075 DIA THRU CSK 60° TO .089 .104 DIA
36 HOLES
.292 2 PLACES
.125
.080 2 PLACES
.080 2 PLACES
-A-
.072 .073 DIA THRU
36 HOLES
.005 R MAX 2 PLACES
.175
.235
.215 .195 3 PLACES
45° 3 PLACES
.812
.300
.115 .095
.188
.600
1.000
32
— .0006
.040 TYP
.190 .170 2 PLACES
.450
1.877 1.873
1.752 1.748
1.627 1.623
1.502 1.498
1.377 1.373
1.252 1.248
1.127 1.123
1.002 .998
.877 .873
.752 .748
.627 .623
.502 .498
.377 .373
.252 .248
6 SPACES AT .127 .123 = .752 .748
TOLERANCE NONCUMULATIVE
.146 2 PLACES
.062 DIA X .312 DEEP
4 PLACES
-B-
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 PLACES
.62
1.34
1.627 1.623
1.825
.815 .809
Ⓞ B .005
.213 .217 DIA 2 PLACES
.127 .123
.102 .098
.175
.25
.35
.300
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
7 SPACES AT .127 .123 = .877 .873
TOLERANCE NONCUMULATIVE
.142 .138
.912 .908
1.084
1.157 1.153
2.978 2.972
1.146
1.146
3.323
.064 .060
.189 .185
.314 .310
.439 .435
.564 .560
.689 .685
.814 .810

MASTER

2008288

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.25 DIA THRU
7 HOLES
.100
.080 4 PLACES
.65
.40
.80
1.20
1.60
2.00
2.40
.59
.040
2 PLACES
NO. 2 (.086)-56 UNC-2B X .250 DEEP
SEE NOTE 7
.146
.150 DIA THRU
.058
.062 DIA THRU
2.060
1.050
.100
.200
.200
.215
.195 3 PLACES
45° 3 PLACES
.812
.135
.115 R
7 PLACES
.165 R
2 PLACES
.385
.47
1.29
.25
.50
.400
1.146
1.031
.650
2.060
.040 TYP
Ⓟ A .005
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
36 HOLES
.292
2 PLACES
.125
.080
2 PLACES
.08
2 PLACES
.175
.235
.300
.115
.095
.188
.600
1.000
32
.190
.170 2 PLACES
.450
1.06
1.20
.06 R, 2 PLACES
.390 DIA
2 PLACES
.625 DIA
2 PLACES

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

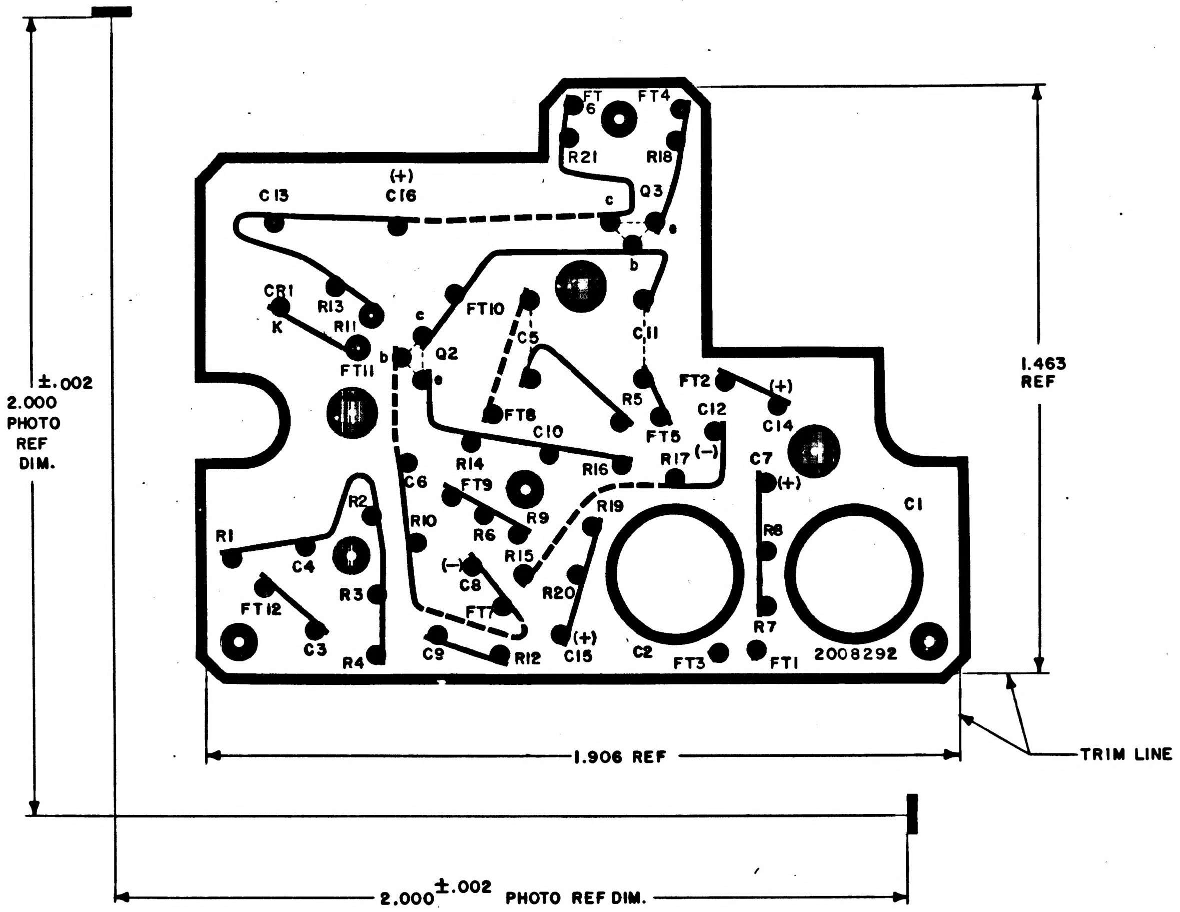
34

2008288

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18925

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


FT 6
FT4
R21
R18
Q3
c
e
b
(+)
C16
C13
CR1
K
R13
R11
FT11
c
b
Q2
e
FT10
C5
C11
R5
FT2
(+)
C14
FT8
C10
FT5
C12
(–)
R17
R16
R14
C6
FT9
R9
R10
R6
R15
R2
R1
C4
R3
(–)
C8
FT7
R20
R19
C7
(+)
R8
C1
FT12
C3
R4
C9
R12
(+)
C15
C2
FT3
R7
FT1
2008292
1.463 REF
±.002
2.000 PHOTO REF DIM.
1.906 REF
TRIM LINE
2.000 ±.002 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMESIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Tony Bell	12/Apr/65
CHECKED	C. A. Preston	4 MAY 65
APPROVED	Ullmer	5 MAY 65
APPROVED	D. A. Fest	5/10/65
APPROVED MIT	W Cuffe	11 May 65
APPROVED MSC	W J Rhine	5/14/65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD, BOTTOM
COSECANT GENERATOR MODULE

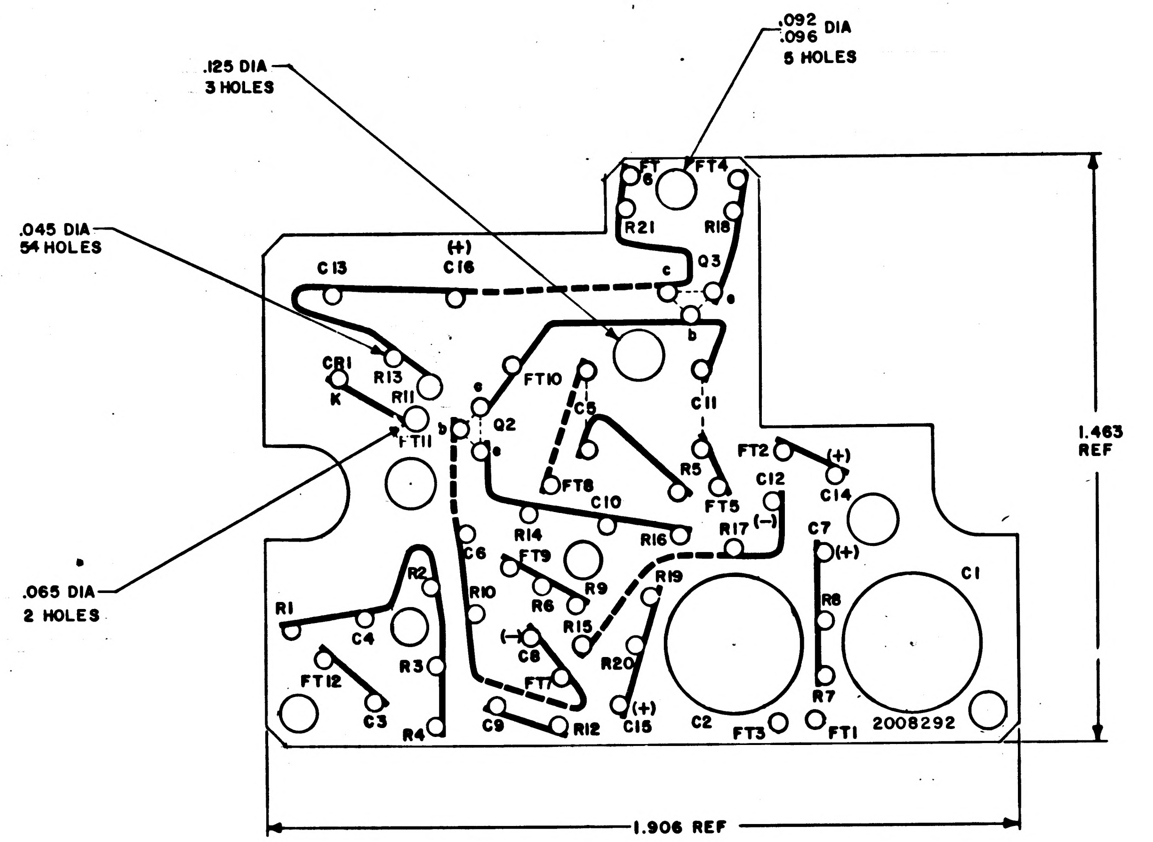
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008291

SCALE 5 / 1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18925

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.092 .096 DIA
5 HOLES
.125 DIA
3 HOLES
.045 DIA
54 HOLES
.065 DIA
2 HOLES
FT 6
FT4
R21
R18
C13
(+)
C16
c
Q3
e
b
CR1
K
R13
R11
FT11
e
b
Q2
e
FT10
C5
C11
FT8
R5
FT5
FT2
(+)
C14
C12
C10
R14
R16
R17
(–)
C7
(+)
C6
FT9
R9
R6
R15
R19
R2
R10
R1
C4
R3
(–)
C8
FT7
R20
R8
C1
FT12
C3
R4
C9
R12
(+)
C15
C2
FT3
R7
FT1
2008292
1.463 REF
1.906 REF

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008291 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007122	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Tony Bell	12/20/60
CHECKED	C. E. Baxter	4 MAY 65
APPROVED	Palmer	5 MAY 65
APPROVED	A. R. Fest	5/10/65
APPROVED MIT	W Kupfer	11 May 65
APPROVED MSC	W J Ph	5-11-61
		DATE

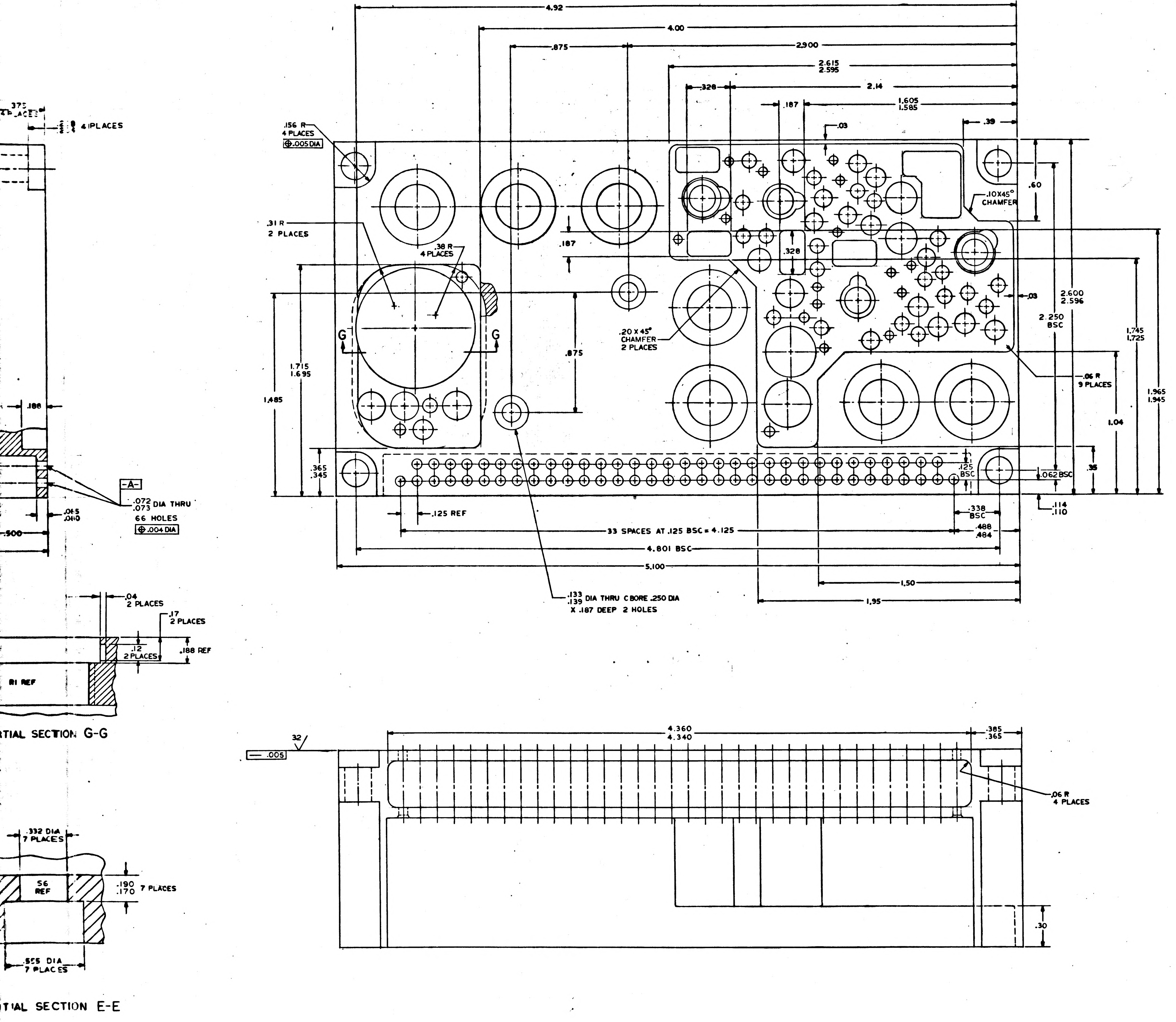
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD, BOTTOM
COSECANT GENERATOR MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008292

SCALE 5 / 1
SHEET 1 OF 1

REVISIONS 19175						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19988	KEN		65	WGM



4.92
4.00
.875
2.900
2.615
2.595
.328
2.14
.187
1.605
1.585
.03
.39
.156 R 4 PLACES
.005 DIA
.31 R 2 PLACES
.38 R 4 PLACES
.187
.328
.10X45° CHAMFER
.60
.20 X 45° CHAMFER 2 PLACES
.875
1.715
1.695
1.485
.365
.345
2.600
2.596
2.250 BSC
1.745
1.725
.06 R 9 PLACES
1.965
1.945
1.04
.35
.062 BSC
.125 BSC
.114
.110
-A-
.072
.073 DIA THRU
66 HOLES
.004 DIA
.125 REF
.338 BSC
.488
.484
33 SPACES AT .125 BSC = 4.125
4.801 BSC
5.100
1.50
1.95
.133
.139 DIA THRU C BORE .250 DIA X .187 DEEP 2 HOLES
G
G
.375
4 PLACES
4 PLACES
.188
.045
.040
.500
.04 2 PLACES
.17 2 PLACES
.12 2 PLACES
.188 REF
R1 REF
RTIAL SECTION G-G
32
.005
4.360
4.340
.385
.365
.06 R 4 PLACES
.30
.332 DIA 7 PLACES
.56 REF
.190
.170 7 PLACES
.555 DIA 7 PLACES
TIAL SECTION E-E

3H

2007142	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .01 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

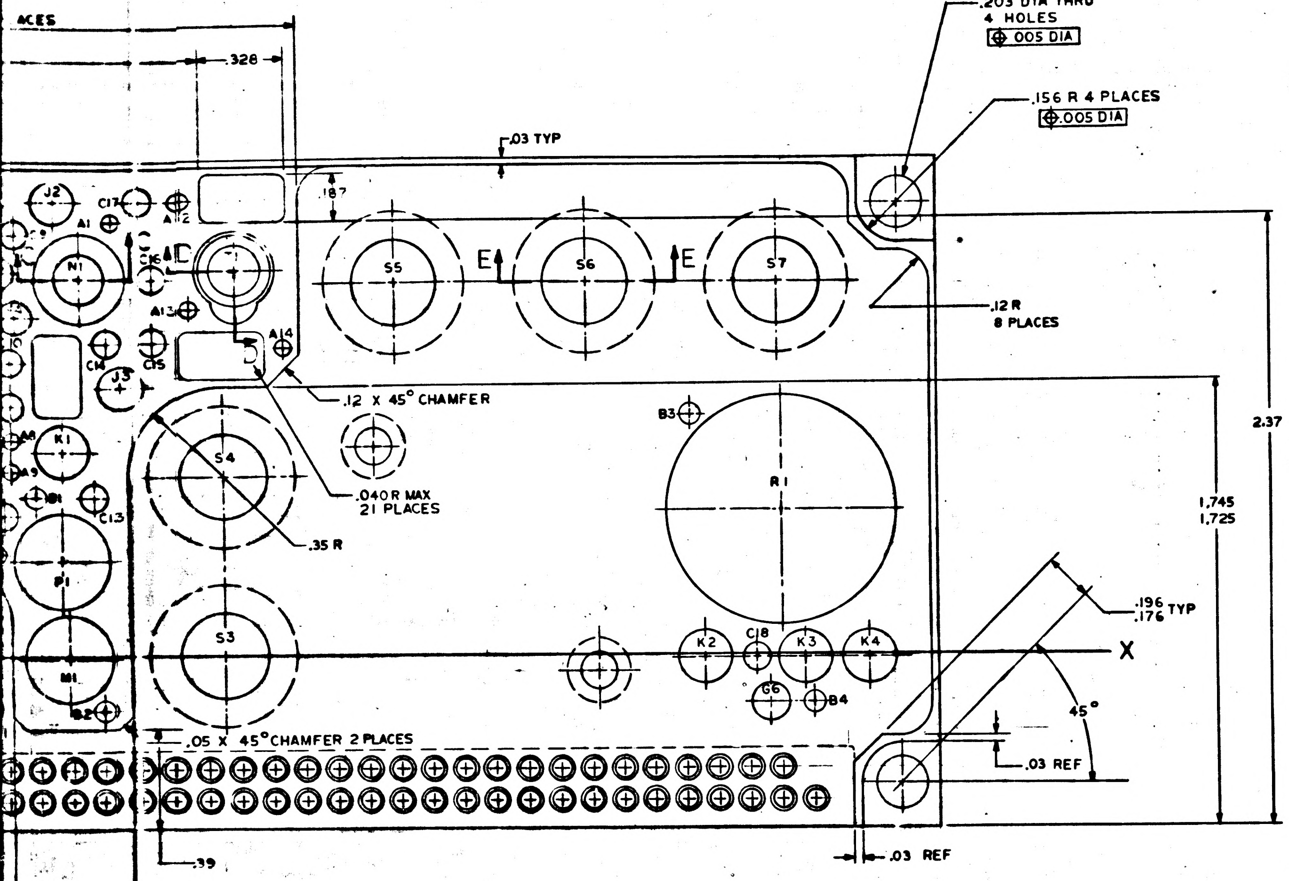
DRAWN Bongarzio
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

HEADER HOUSING
CDU POWER SUPPLY

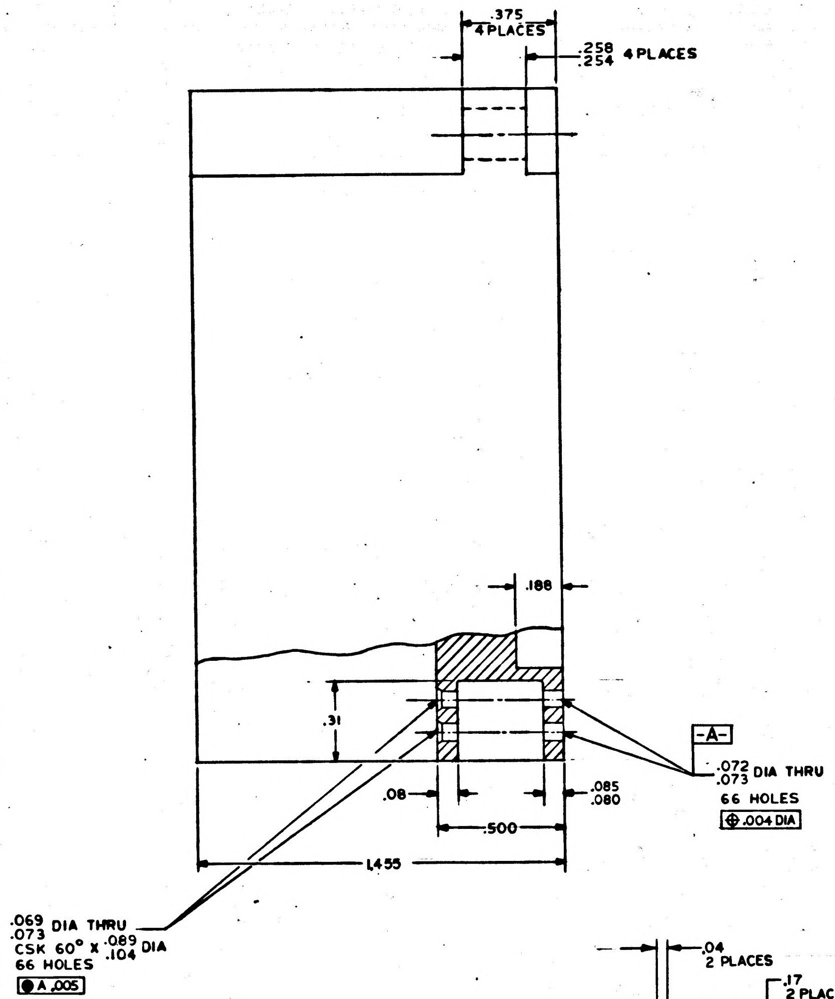
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008297
SCALE 4/1
SHEET 1 OF 1

MASTER

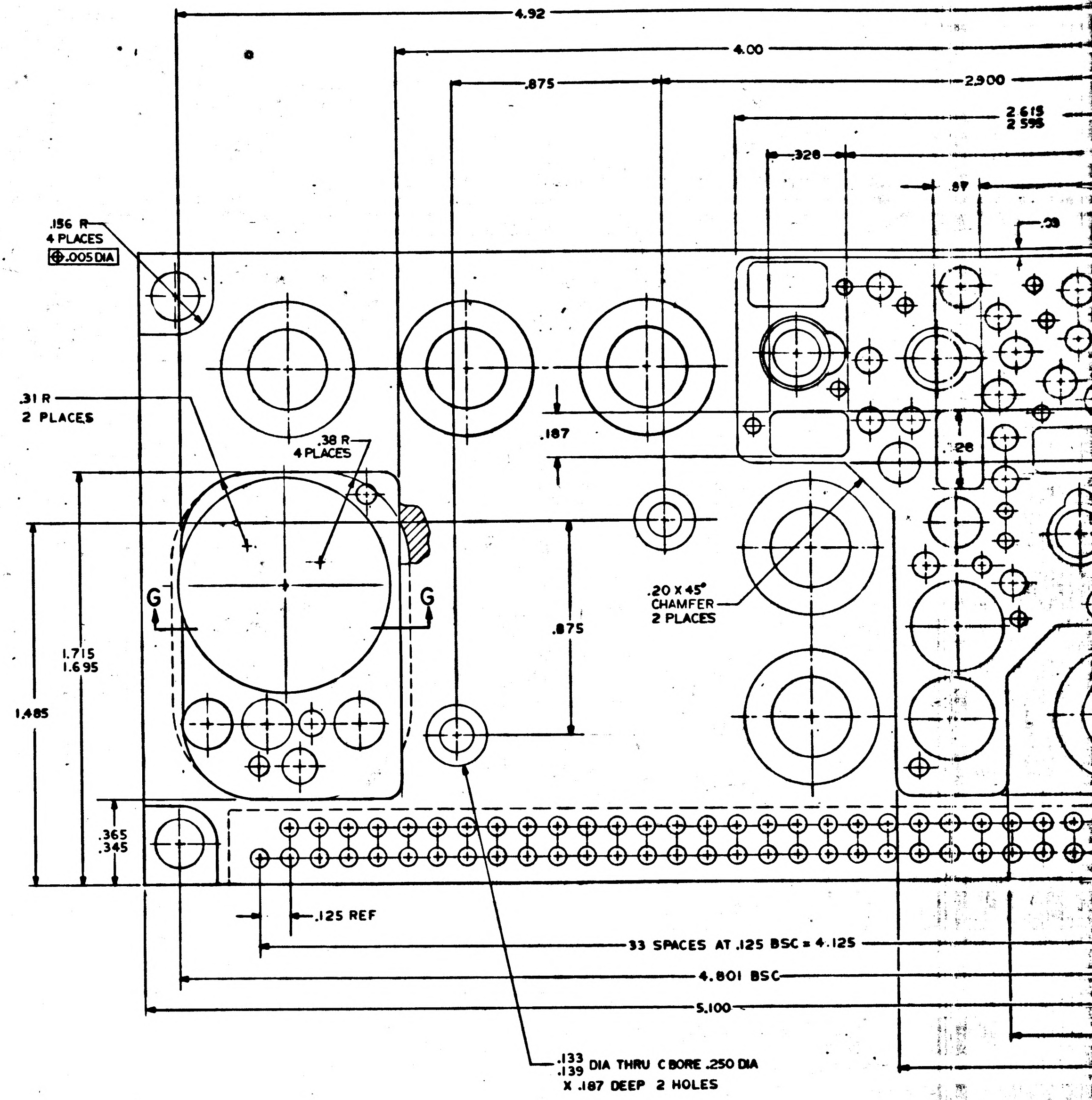
2008297 A



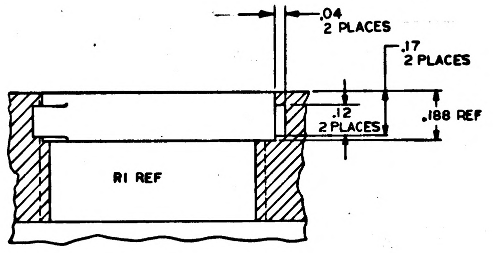
ACES
.328
.03 TYP
.203 DIA THRU
4 HOLES
⊕ .005 DIA
.156 R 4 PLACES
⊕ .005 DIA
.187
J2
C17
A1
A12
N1
C16
A13
C14
C15
J3
A14
S5
S6
S7
E
E
.12 R
8 PLACES
.12 X 45° CHAMFER
B3
K1
S4
R1
2.37
1.745
1.725
C13
.040 R MAX
21 PLACES
P1
.35 R
.196
.176 TYP
S3
M1
K2
C18
K3
K4
G6
B4
X
45°
B2
.05 X 45° CHAMFER 2 PLACES
.03 REF
.39
.03 REF



.375
4 PLACES
.258
.254 4 PLACES
.188
.31
-A-
.072
.073 DIA THRU
66 HOLES
⊕ .004 DIA
.08
.085
.080
.500
1.455
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
66 HOLES
◎ A .005

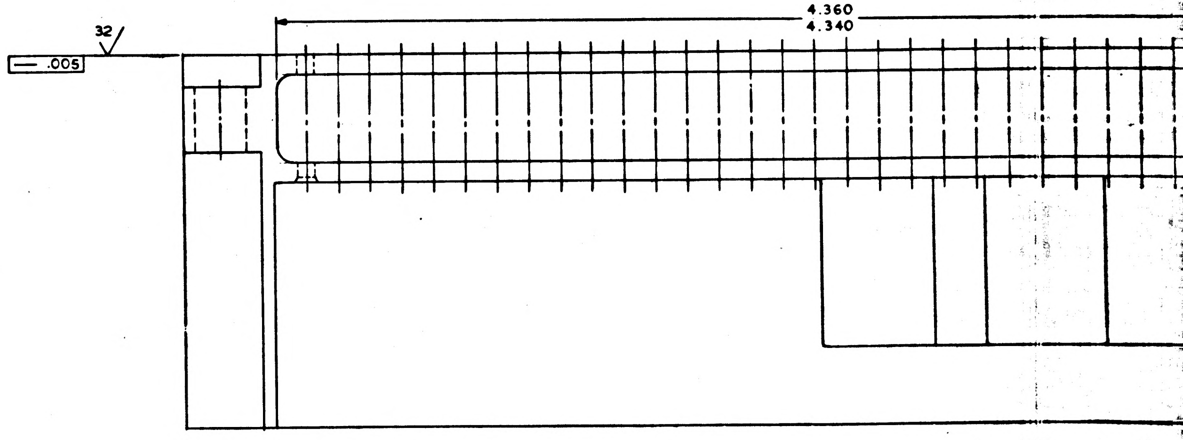


4.92
4.00
.875
2.900
2.615
2.595
.328
.87
.28
.156 R
4 PLACES
⊕ .005 DIA
.31 R
2 PLACES
.38 R
4 PLACES
.187
.28
G
G
.20 X 45°
CHAMFER
2 PLACES
.875
1.715
1.695
1.485
.365
.345
.125 REF
33 SPACES AT .125 BSC = 4.125
4.801 BSC
5.100
.133
.139 DIA THRU C BORE .250 DIA
X .187 DEEP 2 HOLES

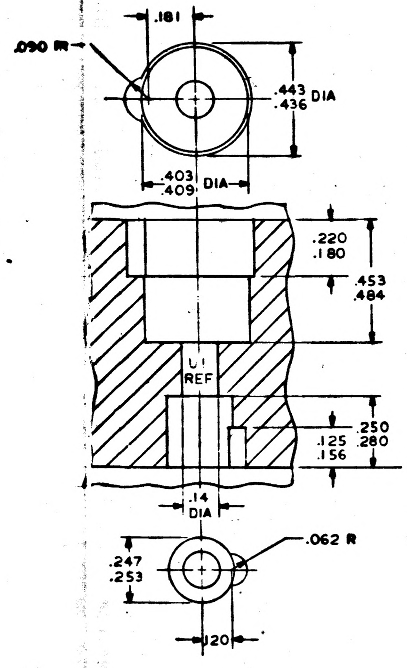


.04
2 PLACES
.17
2 PLACES
.12
2 PLACES
.188 REF
R1 REF

PARTIAL SECTION G-G

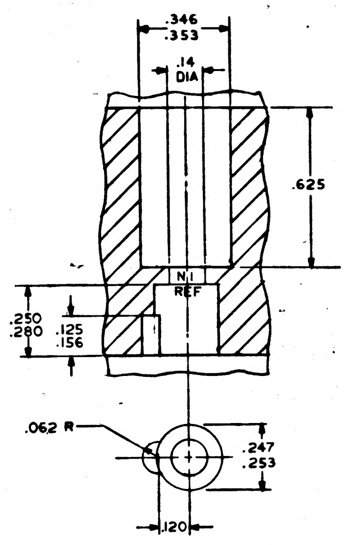


4.360
4.340
32
— .005



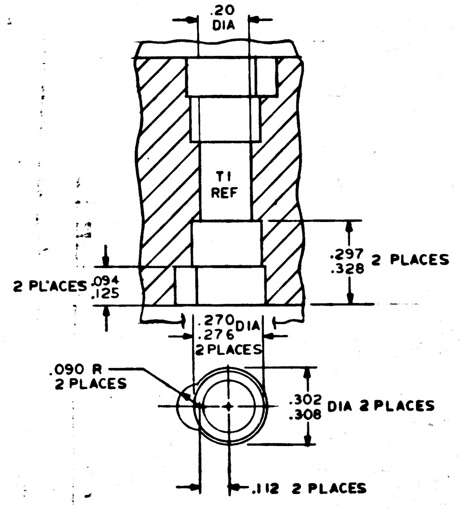
.181
.090 R
.443
.436 DIA
.403
.409 DIA
.220
.180
.453
.484
U1
REF
.250
.280
.125
.156
.14
DIA
.247
.253
.062 R
.120

PARTIAL SECTION B-B



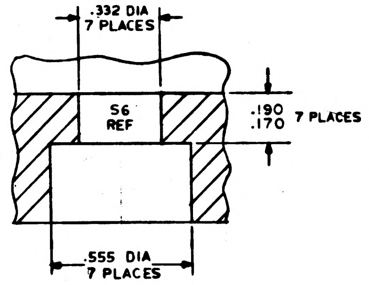
.346
.353
.14
DIA
.625
N1
REF
.250
.280
.125
.156
.062 R
.247
.253
.120

PARTIAL SECTION C-C



.20
DIA
T1
REF
.297
.328 2 PLACES
2 PLACES .094
.125
.270
.276 DIA
2 PLACES
.090 R
2 PLACES
.302
.308 DIA 2 PLACES
.112 2 PLACES

PARTIAL SECTION D-D

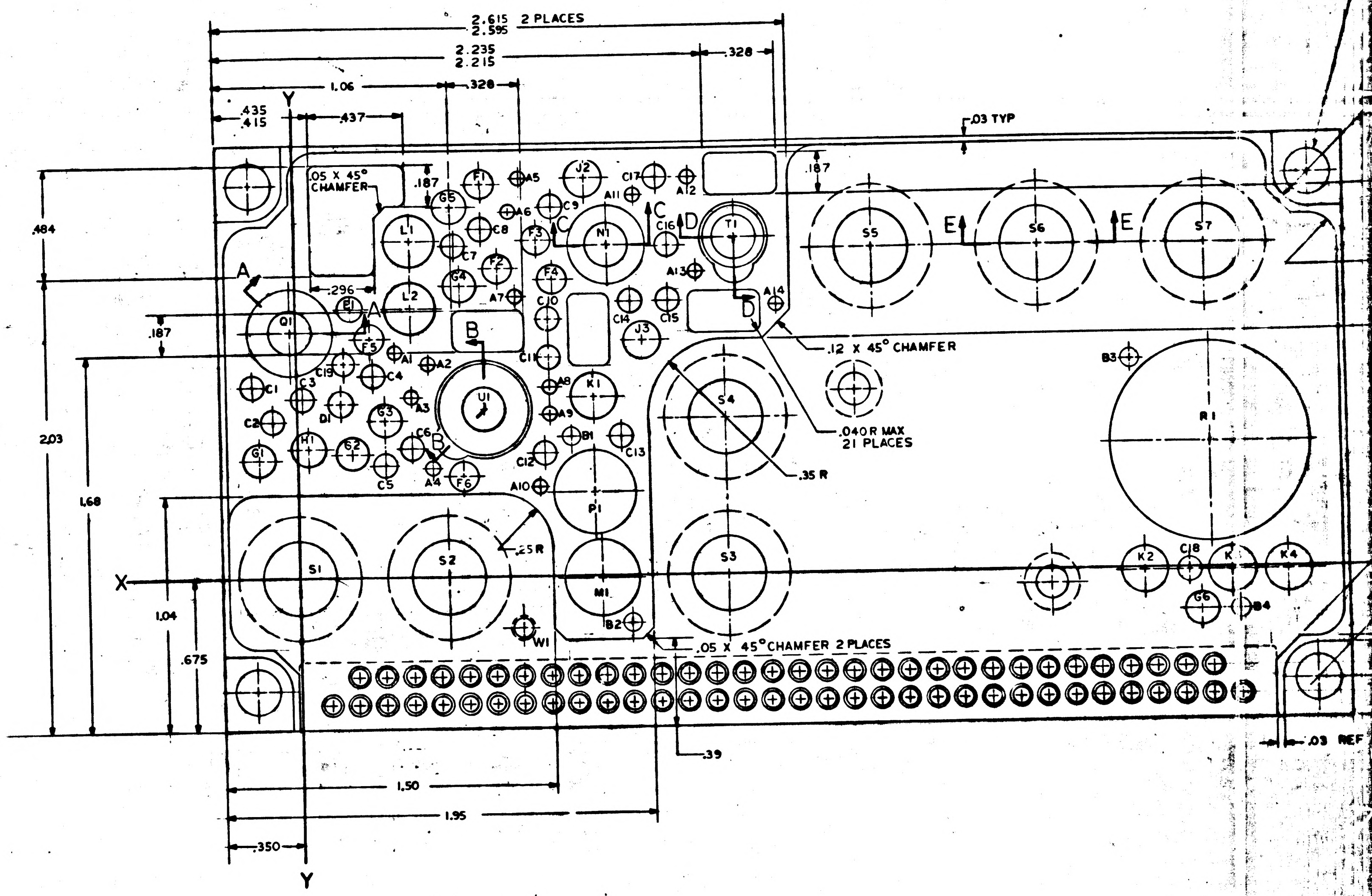


.332 DIA
7 PLACES
S6
REF
.190
.170 7 PLACES
.555 DIA
7 PLACES

PARTIAL SECTION E-E

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.450	1.000	.058/.062	14
A2	.600	.950		
A3	.525	.800		
A4	.610	.485		
A5	1.025	1.775		
A6	.975	1.625		
A7	1.000	1.250		
A8	1.150	.850		
A9	1.150	.725		
A10	1.100	.400		
A11	1.550	1.700		
A12	1.800	1.775		
A13	1.825	1.350		
A14	2.185	1.200		
B1	1.250	.625	.080/.084	4
B2	1.510	-.210		
B3	3.785	.935		
B4	4.260	-.185		
C1	-.200	.850	.100/.104	19
C2	-.110	.700		
C3	.025	.800		
C4	.350	.900		
C5	.400	.500		
C6	.525	.575		
C7	.725	1.475		
C8	.850	1.550		
C9	1.175	1.650		
C10	1.150	1.150		
C11	1.150	.975		
C12	1.125	.550		
C13	1.475	.625		
C14	1.525	1.225		
C15	1.700	1.225		
C16	1.700	1.475		
C17	1.655	1.785		
C18	4.035	-.010		
C19	.217	.955		
D1	.200	.775	.109/.113	1
E1	.250	1.200	.112/.116	1
F1	.850	1.760	.127/.131	6
F2	.925	1.375		
F3	1.100	1.505		
F4	1.175	1.325		
F5	.334	1.064		
F6	.750	.450		

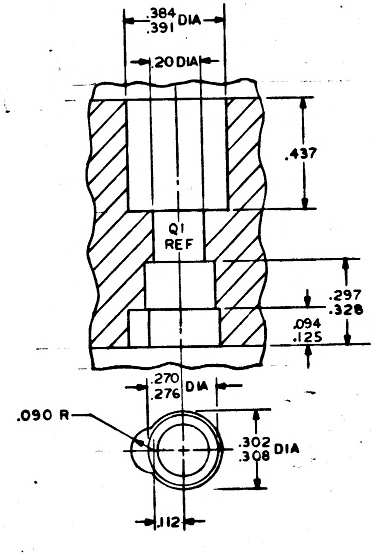
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
G1	-.175	.525	.146/.150	6
G2	.250	.550		
G3	.400	.700		
G4	.750	1.300		
G5	.710	1.650		
G6	4.095	-.185		
H1	.050	.575	.153/.157	1
J2	1.325	1.775	.165/.169	2
J3	1.575	1.050		
K1	1.350	.800	.202/.206	4
K2	3.840	-.010		
K3	4.230	-.010		
K4	4.480	-.010		
L1	.525	1.500	.227/.231	2
L2	.525	1.200		
M1	1.375	-.010	.330/.337	1
N1	1.425	1.475	SEE SECT C-C	1
P1	1.350	.375	.366/.373	1
Q1	-.025	1.100	SEE SECT A-A	1
R1	4.135	.560	.888/.895	1
S1	.000	.000	SEE SECTION E-E	7
S2	.675	.000		
S3	1.950	.000		
S4	1.950	.700		
S5	2.625	1.450		
S6	3.375	1.450		
S7	4.125	1.450		
T1	2.000	1.500	SEE SECT D-D	1
			SEE SECTION B-B	
U1	.850	.750		1
W1	1.010	-.225	NO.2(.086)-56 UNC THD X .19 DEEP SEE NOTE 8	1



2.615
2.595
2 PLACES
2.235
2.215
.328
1.06
.328
.435
.415
.437
Y
.03 TYP
.484
.05 X 45° CHAMFER
.187
.187
A
.296
B
C
D
E
E
.12 X 45° CHAMFER
.040 R MAX
21 PLACES
.35 R
.25 R
2.03
1.68
1.04
.675
X
.05 X 45° CHAMFER 2 PLACES
.39
.03 REF
1.50
1.95
.350
Y
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14
B1 B2 B3 B4
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19
D1 E1
F1 F2 F3 F4 F5 F6
G1 G2 G3 G4 G5 G6
H1 J2 J3 K1 K2 K4 L1 L2 M1 N1 P1 Q1 R1
S1 S2 S3 S4 S5 S6 S7
T1 U1 W1

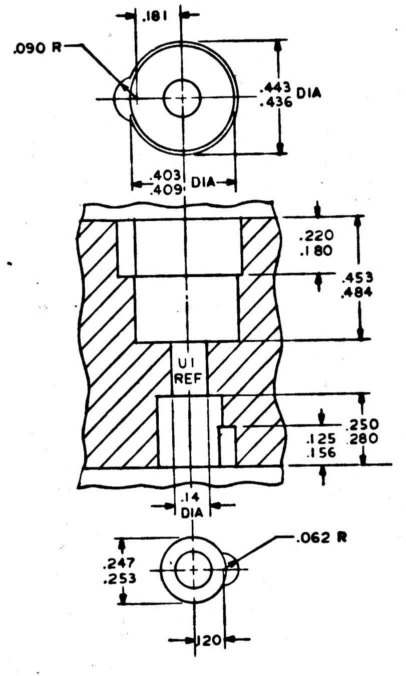
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040



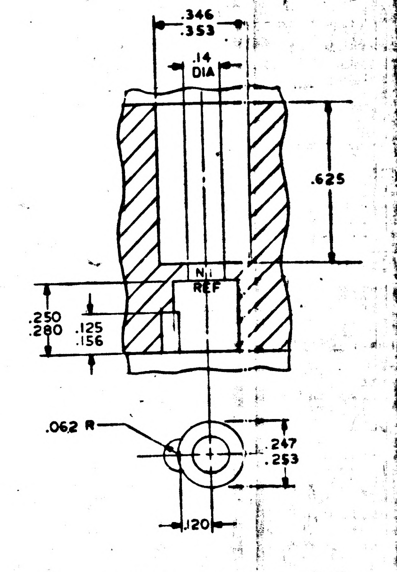
.384
.391
DIA
.20 DIA
.437
Q1
REF
.297
.328
.094
.125
.270
.276
DIA
.090 R
.302
.308
DIA
.112

PARTIAL SECTION A-A



.181
.090 R
.443
.436
DIA
.403
.409
DIA
.220
.180
.453
.484
U1
REF
.250
.280
.125
.156
.14
DIA
.247
.253
.062 R
.120

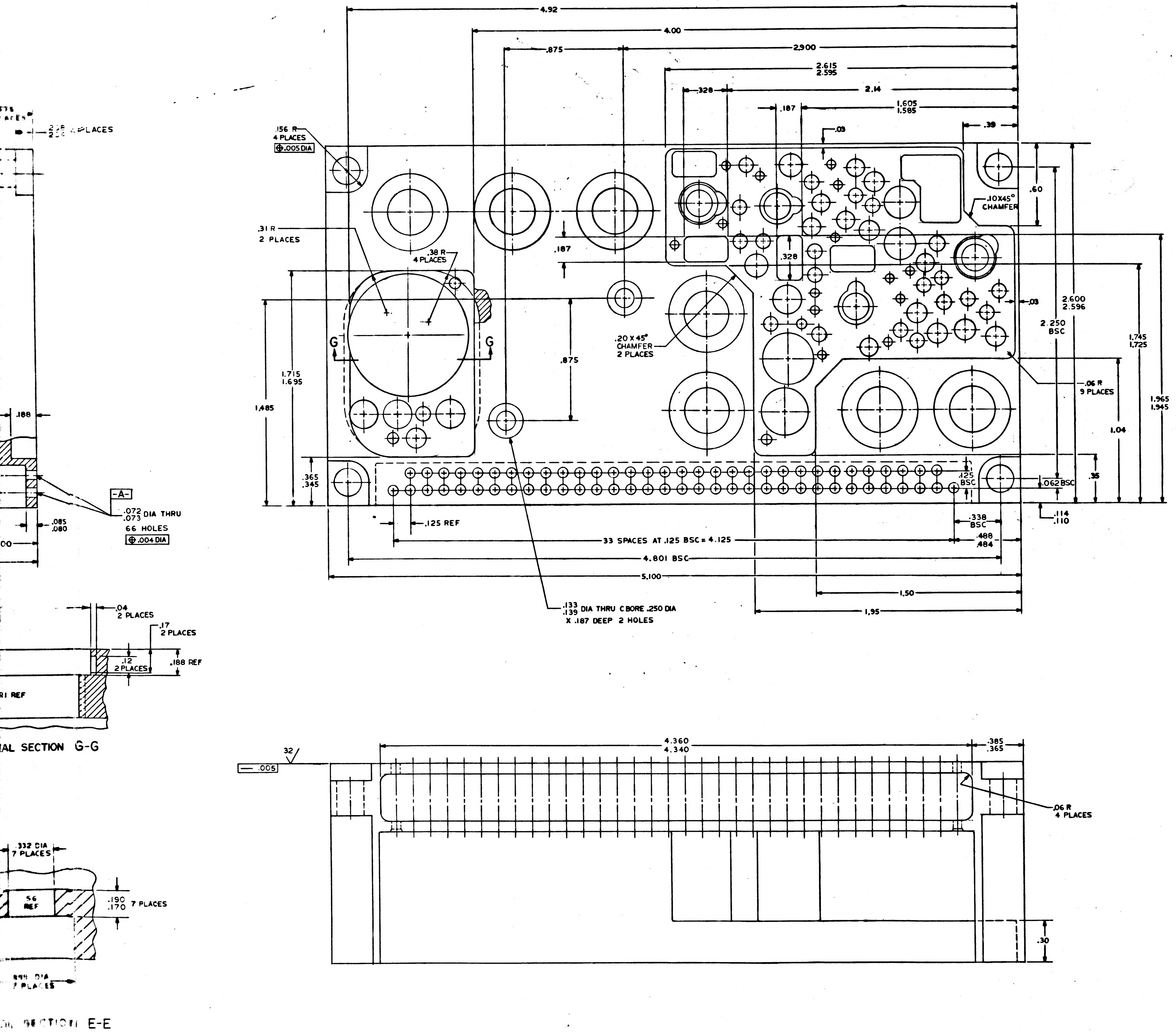
PARTIAL SECTION B-B



.346
.353
.14
DIA
.625
N1
REF
.250
.280
.125
.156
.062 R
.247
.253
.120

PARTIAL SECTION C-C

2008297 A



4.92
4.00
.875
2.900
2.615
2.595
.328
2.14
.187
1.605
1.585
.03
.39
.156 R
4 PLACES
⊕ .005 DIA
.60
.10X45°
CHAMFER
.31 R
2 PLACES
.38 R
4 PLACES
.187
.328
.03
2.600
2.596
2.250
BSC
1.745
1.725
1.965
1.945
G
G
1.715
1.695
1.485
.875
.20 X 45°
CHAMFER
2 PLACES
.06 R
9 PLACES
1.04
.35
.365
.345
.125
BSC
.062 BSC
.114
.110
.338
BSC
.488
.484
.125 REF
33 SPACES AT .125 BSC = 4.125
4.801 BSC
5.100
1.50
1.95
.133
.139 DIA THRU C BORE .250 DIA
X .187 DEEP 2 HOLES
-A-
.072
.073 DIA THRU
66 HOLES
⊕ .004 DIA
.188
.085
.080
.04
2 PLACES
.17
2 PLACES
.12
2 PLACES
.188 REF
RI REF
IAL SECTION G-G
.332 DIA
7 PLACES
.56
REF
.190
.170 7 PLACES
DIA
7 PLACES
SECTION E-E
PLACES
32
.005
4.360
4.340
.385
.365
.06 R
4 PLACES
.30

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19988	KCN	RL	16 Jun 63	WGM
B		REVISED PER TDRR 22208	AA	[illegible]	9 [illegible] 65	WGM

19175

34

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007142	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XXX ± .005 .XX ± .01 ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

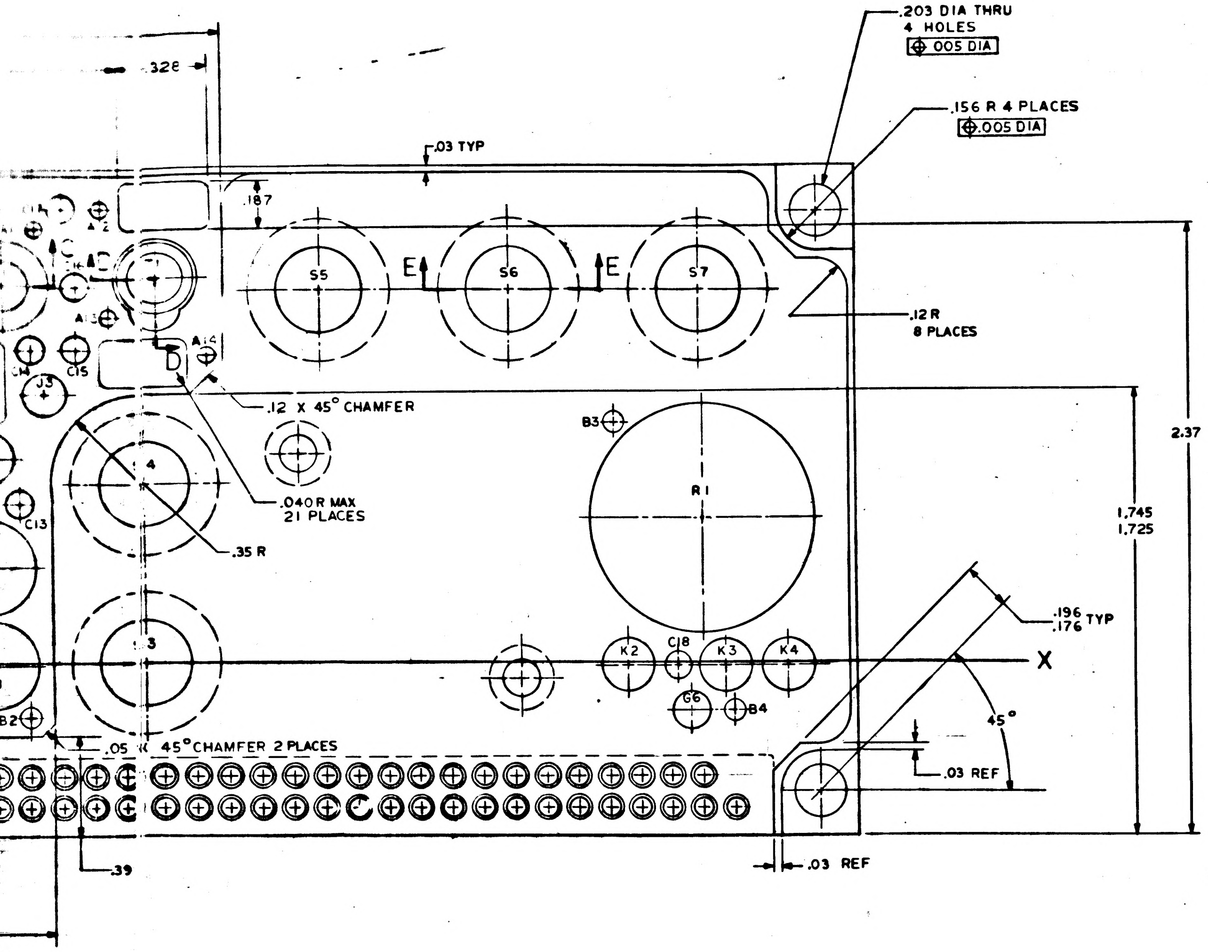
DRAWN Bonarrigo
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
CDU POWER SUPPLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008297
SCALE 4/1
SHEET 1 OF

2008297 B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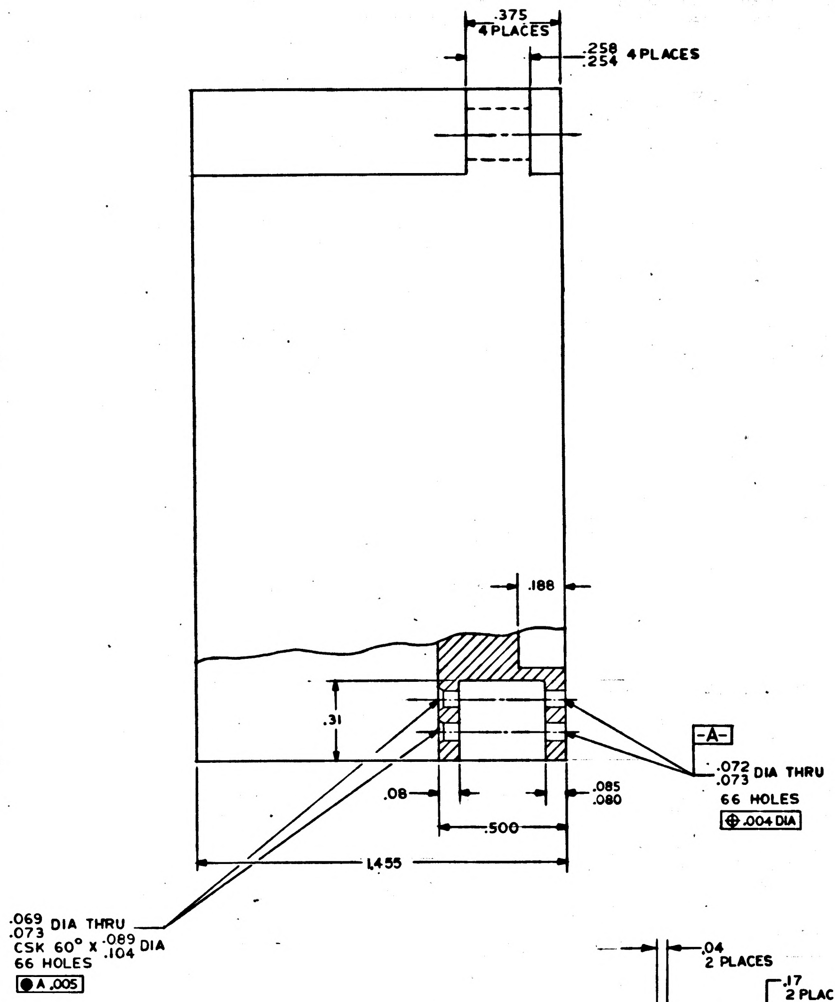
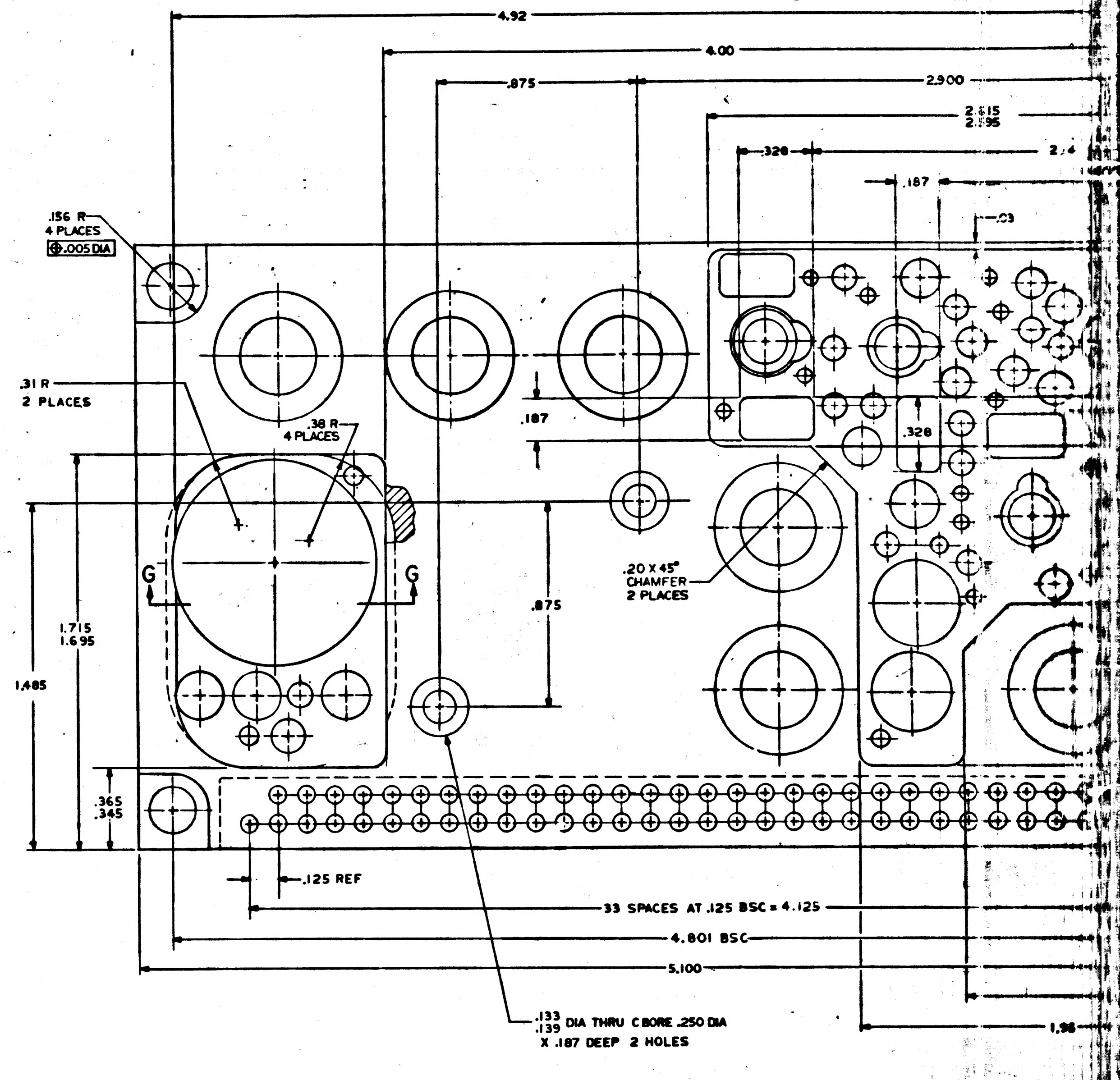
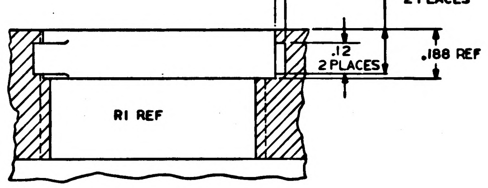
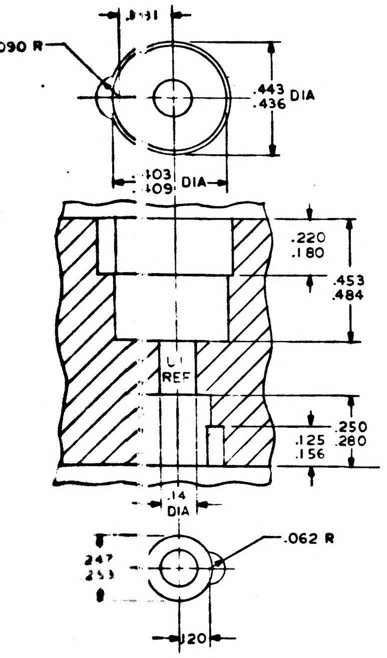
.03 TYP
.187
.203 DIA THRU
4 HOLES
⊕ .005 DIA
.156 R 4 PLACES
⊕ .005 DIA
.12 R
8 PLACES
S5
S6
S7
E
E
D
.12 X 45° CHAMFER
.040 R MAX
21 PLACES
.35 R
B3
R1
2.37
1.745
1.725
.196
.176 TYP
X
45°
.03 REF
K2
C18
K3
K4
G6
B4
.05 R 45° CHAMFER 2 PLACES
.39
.03 REF


.375
4 PLACES
.258
.254 4 PLACES
.188
.31
-A-
.072
.073 DIA THRU
66 HOLES
⊕ .004 DIA
.08
.085
.080
.500
1.455
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
66 HOLES
● A .005

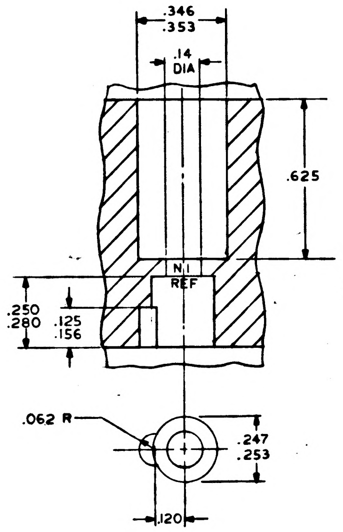

4.92
4.00
.875
2.900
2.615
2.595
.328
.187
.03
.156 R
4 PLACES
⊕ .005 DIA
.31 R
2 PLACES
.38 R
4 PLACES
.187
.328
G
G
.875
1.715
1.695
1.485
.20 X 45°
CHAMFER
2 PLACES
.365
.345
.125 REF
33 SPACES AT .125 BSC = 4.125
4.801 BSC
5.100
.133
.139 DIA THRU C BORE .250 DIA
X .187 DEEP 2 HOLES
1.95


.04
2 PLACES
.17
2 PLACES
.12
2 PLACES
.188 REF
R1 REF

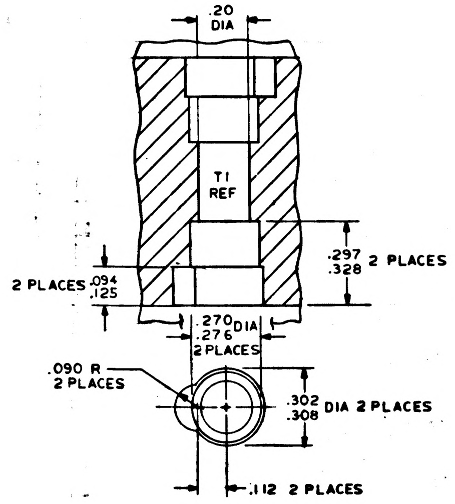
PARTIAL SECTION G-G


.090 R
.031
.443
.436 DIA
.403
.409 DIA
.220
.180
.453
.484
L1
REF
.250
.280
.125
.156
.14
DIA
.062 R
.247
.253
.120

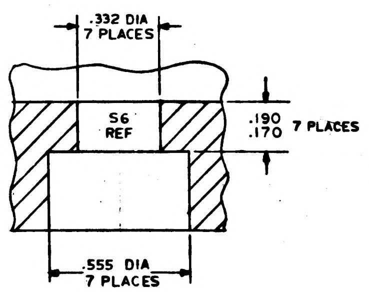
PARTIAL SECTION B-B


.346
.353
.14
DIA
.625
N1
REF
.250
.280
.125
.156
.062 R
.247
.253
.120

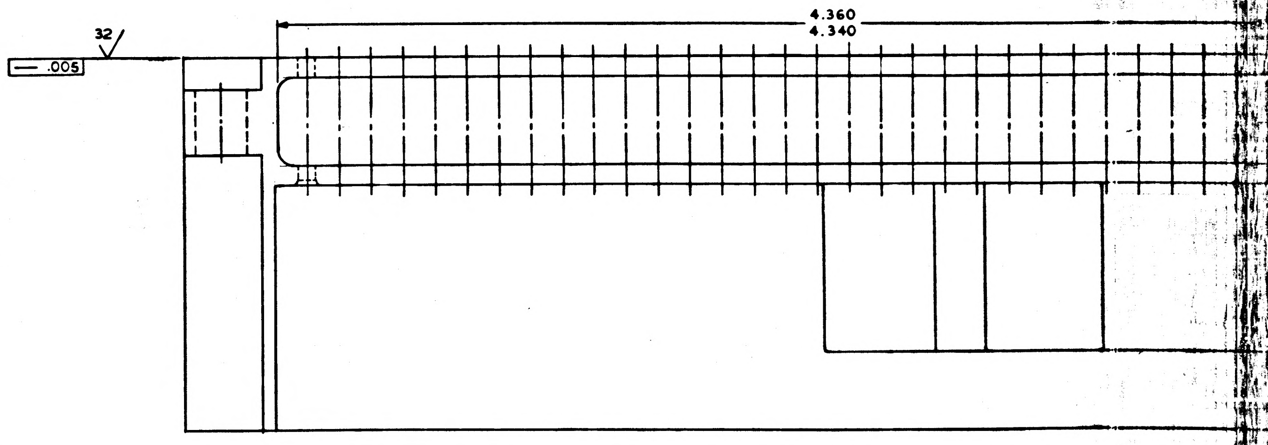
PARTIAL SECTION C-C


.20
DIA
T1
REF
.297
.328 2 PLACES
2 PLACES .094
.125
.270
.276 DIA
2 PLACES
.090 R
2 PLACES
.302
.308 DIA 2 PLACES
.112 2 PLACES

PARTIAL SECTION D-D

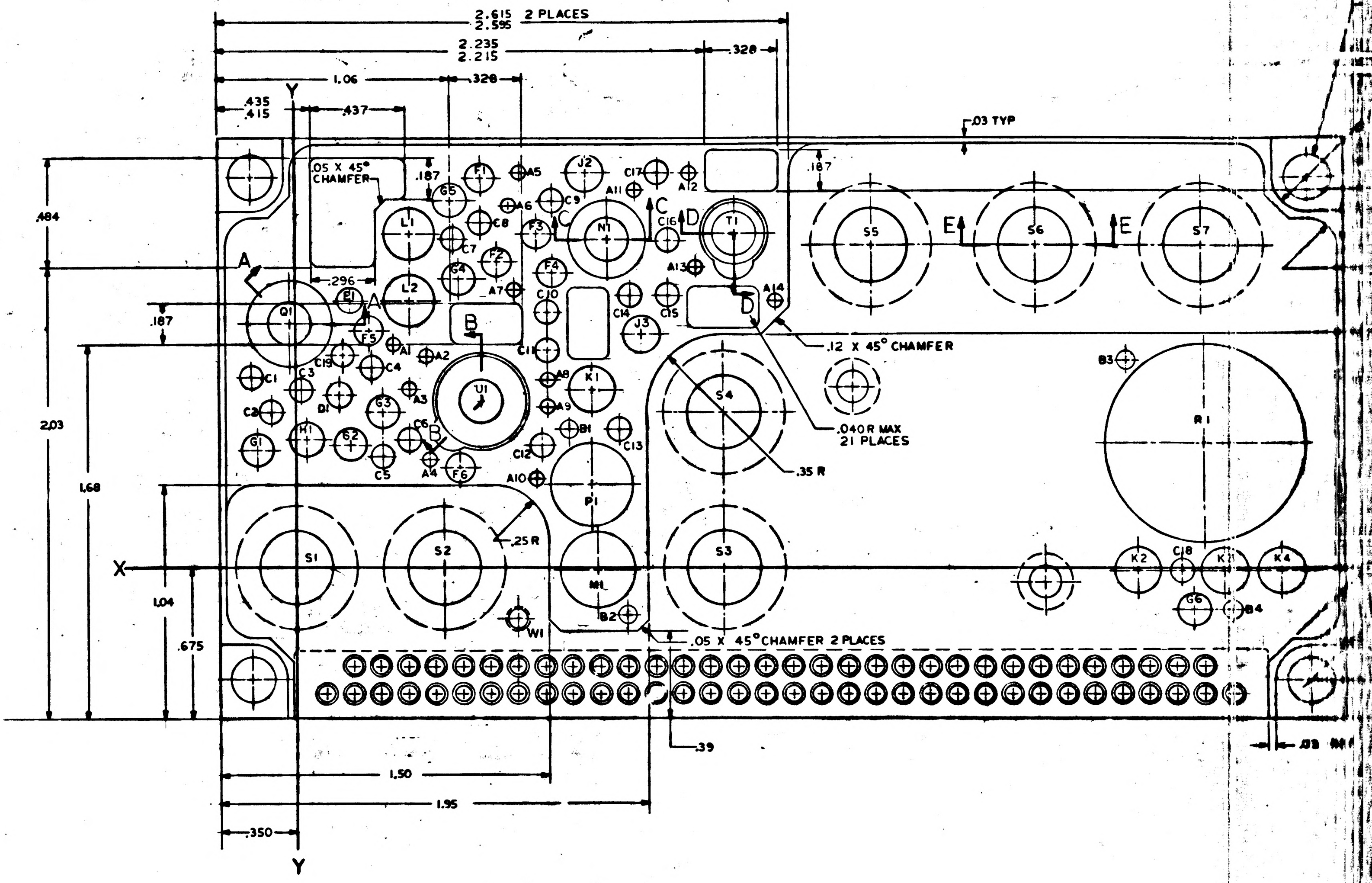

.332 DIA
7 PLACES
S6
REF
.190
.170 7 PLACES
.555 DIA
7 PLACES

PARTIAL SECTION E-E


32
— .005
4.360
4.340

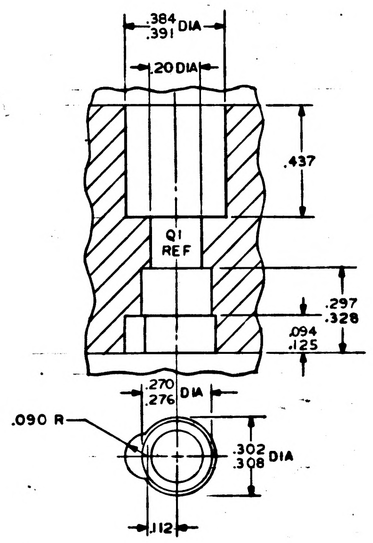
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.450	1.000	.058/.062	14
A2	.600	.950		
A3	.525	.800		
A4	.610	.485		
A5	1.025	1.775		
A6	.975	1.625		
A7	1.000	1.250		
A8	1.150	.850		
A9	1.150	.725		
A10	1.100	.400		
A11	1.550	1.700		
A12	1.800	1.775		
A13	1.825	1.350		
A14	2.185	1.200		
B1	1.250	.625	.080/.084	4
B2	1.510	-.210		
B3	3.785	.935		
B4	4.260	-.185		
C1	-.200	.850	.100/.104	19
C2	-.110	.700		
C3	.025	.800		
C4	.350	.900		
C5	.400	.500		
C6	.525	.575		
C7	.725	1.475		
C8	.850	1.550		
C9	1.175	1.650		
C10	1.150	1.150		
C11	1.150	.975		
C12	1.125	.550		
C13	1.475	.625		
C14	1.525	1.225		
C15	1.700	1.225		
C16	1.700	1.475		
C17	1.655	1.785		
C18	4.035	-.010		
C19	.217	.955		
D1	.200	.775	.109/.113	1
E1	.250	1.200	.112/.116	1
F1	.850	1.760	.127/.131	6
F2	.925	1.375		
F3	1.100	1.505		
F4	1.175	1.325		
F5	.334	1.064		
F6	.750	.450		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
G1	-.175	.525	.146/.150	6
G2	.250	.550		
G3	.400	.700		
G4	.750	1.300		
G5	.710	1.650		
G6	4.095	-.185		
H1	.050	.575	.153/.157	1
			.165/.169	2
J2	1.325	1.775		
J3	1.575	1.050		
K1	1.350	.800	.202/.206	4
K2	3.840	-.010		
K3	4.230	-.010		
K4	4.480	-.010		
L1	.525	1.500	.227/.231	2
L2	.525	1.200		
M1	1.375	-.010	.330/.337	1
N1	1.425	1.475	SEE SECT C-C	1
P1	1.350	.375	.366/.373	1
Q1	-.025	1.100	SEE SECT A-A	1
R1	4.135	.560	.888/.895	1
S1	.000	.000	SEE SECTION E-E	7
S2	.675	.000		
S3	1.950	.000		
S4	1.950	.700		
S5	2.625	1.450		
S6	3.375	1.450		
S7	4.125	1.450		
T1	2.000	1.500	SEE SECT D-D	1
			SEE SECTION B-B	1
U1	.850	.750		
W1	1.010	-.225	NO.2(.086)-56 UNC THD X .19 DEEP SEE NOTE 8	1



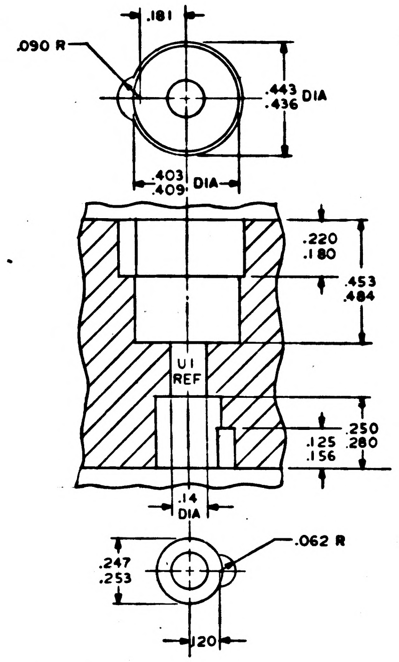
2.615
2.595 2 PLACES
2.235
2.215
.328
1.06
.328
.435
.415
.437
Y
.03 TYP
.05 X 45° CHAMFER
.187
.187
.484
.296
.187
2.03
1.68
1.04
.675
A
B
C
D
E
X
.12 X 45° CHAMFER
.040 R MAX
21 PLACES
.35 R
.25 R
.05 X 45° CHAMFER 2 PLACES
.39
1.50
1.95
.350
.03
S1
S2
S3
S4
S5
S6
S7
T1
U1
N1
P1
M1
Q1
R1
L1
L2
K1
K2
K3
K4
W1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II, TO THE TWO HEATSINK SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.155 FROM THE MOUNTING SURFACE.



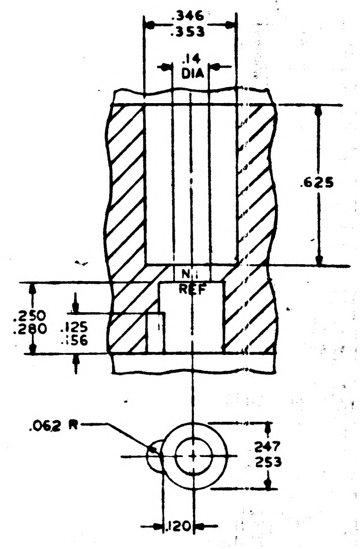
.384
.391 DIA
.20 DIA
.437
Q1
REF
.297
.328
.094
.125
.270
.276 DIA
.090 R
.302
.308 DIA
.112

PARTIAL SECTION A-A



.181
.090 R
.443
.436 DIA
.403
.409 DIA
.220
.180
.453
.484
U1
REF
.250
.280
.125
.156
.14
DIA
.062 R
.247
.253
.120

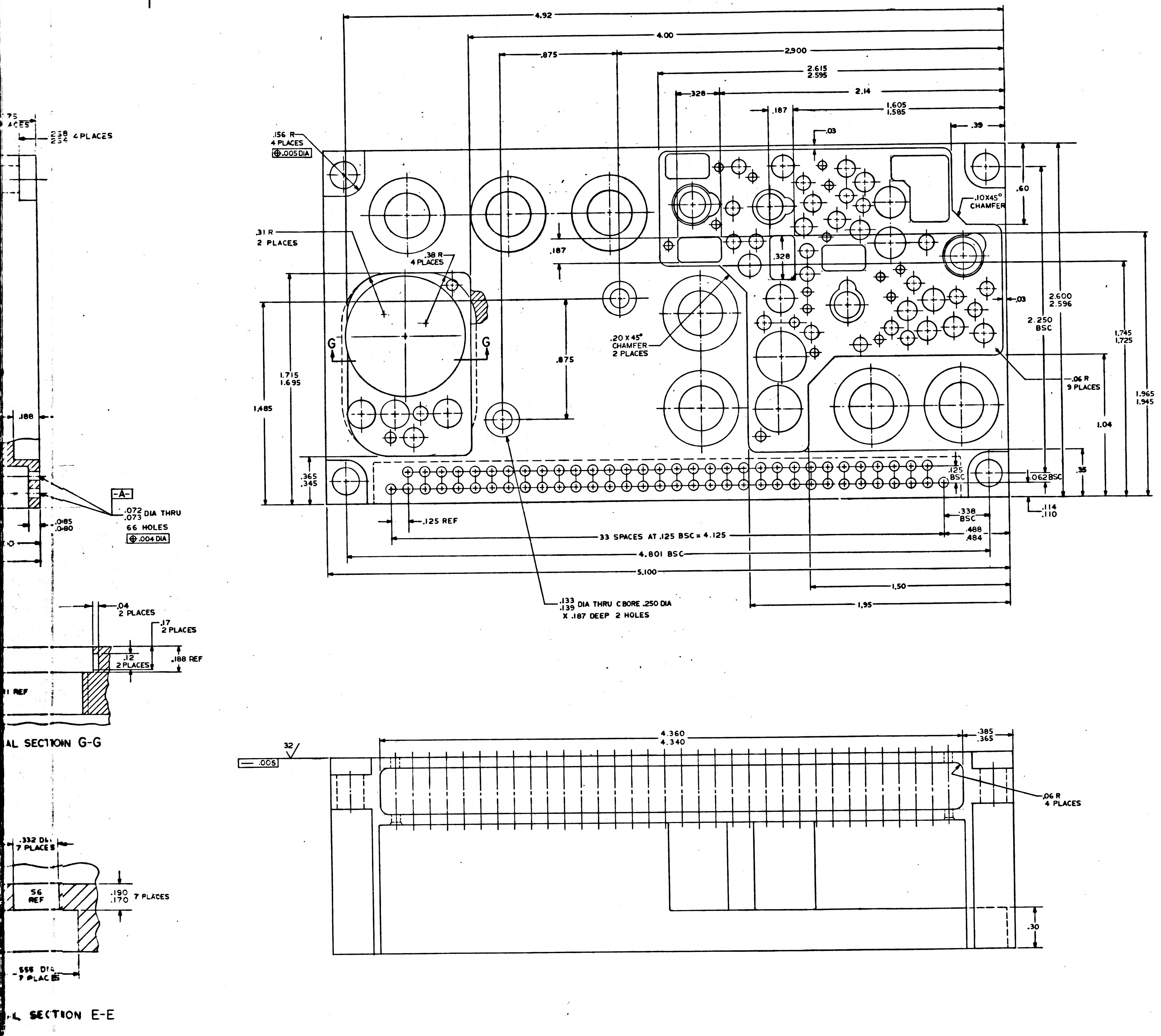
PARTIAL SECTION B-B



.346
.353
.14
DIA
.625
N1
REF
.250
.280
.125
.156
.062 R
.247
.253
.120

PARTIAL SECTION C-C

REVISIONS 19175						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



4.92
4.00
2.900
.875
2.615
2.595
.328
2.14
.187
1.605
1.585
.03
.39
.156 R
4 PLACES
⊕ .005 DIA
.60
.10X45° CHAMFER
.31 R
2 PLACES
.38 R
4 PLACES
.187
.328
2.600
2.596
.03
2.250 BSC
1.745
1.725
G
G
.20 X 45° CHAMFER 2 PLACES
.875
.875
1.715
1.695
1.485
.06 R
9 PLACES
1.965
1.945
1.04
.365
.345
.125 BSC
.062 BSC
.35
.114
.110
.125 REF
.338 BSC
33 SPACES AT .125 BSC = 4.125
.488
.484
4.801 BSC
5.100
1.50
1.95
.133
.139 DIA THRU C BORE .250 DIA
X .187 DEEP 2 HOLES
.75
ACES
.238
.234 4 PLACES
.188
-A-
.072
.073 DIA THRU
66 HOLES
⊕ .004 DIA
.085
.080
.04
2 PLACES
.17
2 PLACES
.12
2 PLACES
.188 REF
1 REF
AL SECTION G-G
32
.005
4.360
4.340
.385
.365
.06 R
4 PLACES
.332 DI
7 PLACES
56 REF
.190
.170 7 PLACES
.30
.555 DI
7 PLACES
L SECTION E-E

D

C

B

3H

2008297

A

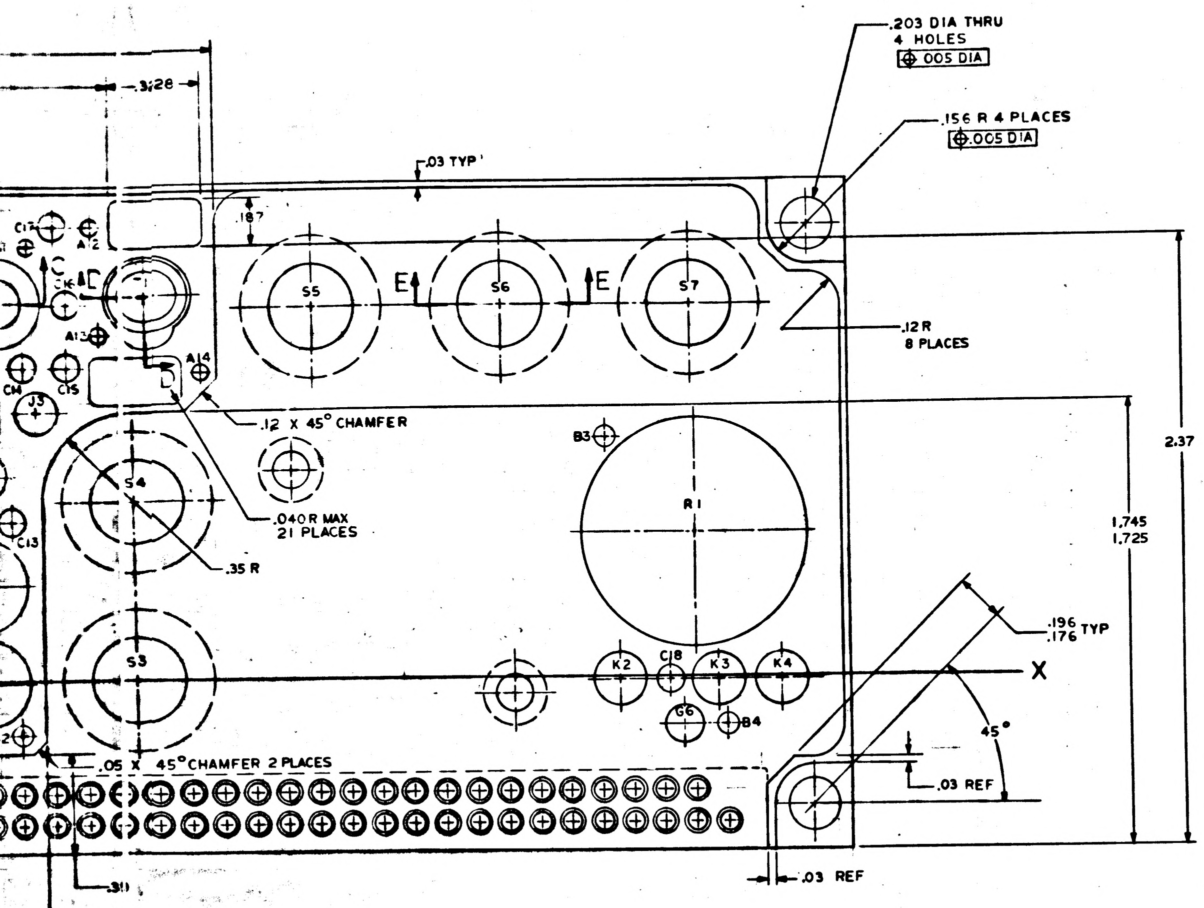
		QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
		LIST OF MATERIALS			

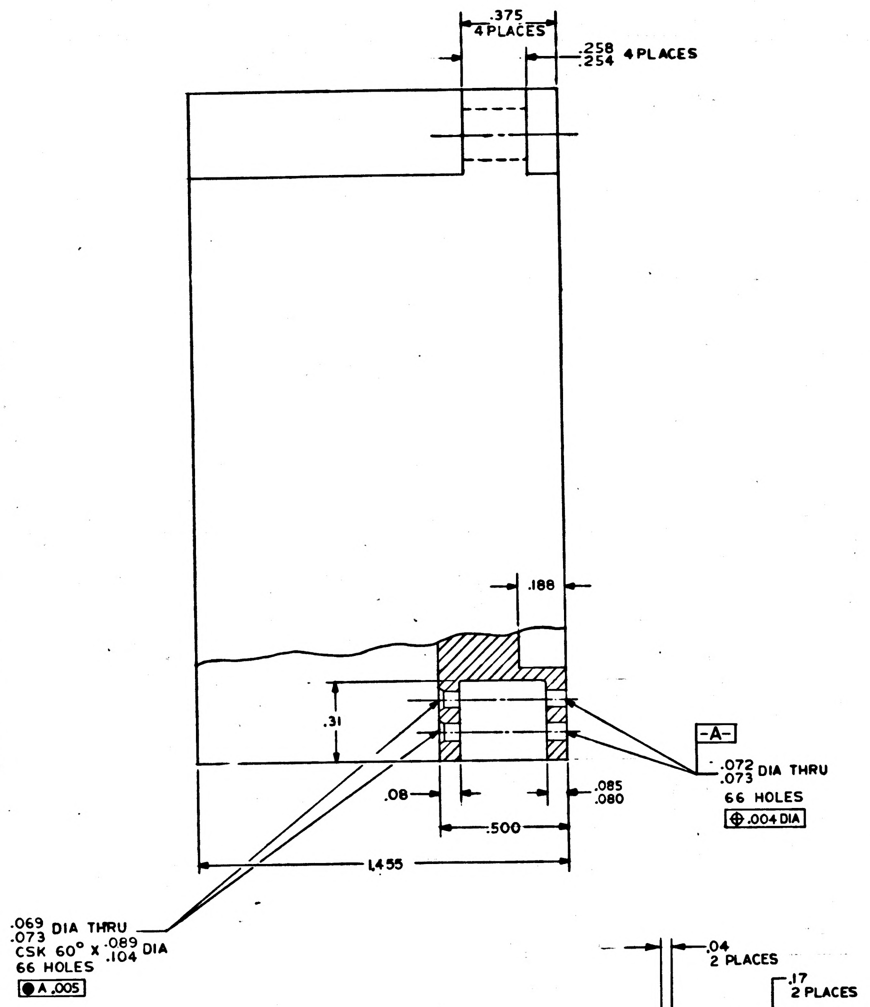
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± — DECIMALS XXX ± .005 XX ± .01 ANGLES ± 2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS		MANNED SPACECRAFT CENTER HOUSTON, TEXAS
			DRAWN Bongarrigo CHECKED A. Singleton APPROVED P.V. [illegible] APPROVED D. R. Frost	10 MAY 65 [illegible] [illegible] 5/14/65	HEADER HOUSING CDU POWER SUPPLY
2007142		MATERIAL SEE NOTE 2	APPROVED MIT W. Kupfer APPROVED MSC	[illegible] [illegible]	CODE IDENT NO. 80230 SIZE J DRAWING NO. 2008297
NEXT ASSY	USED ON			DATE	SCALE 4/1 SHEET 1 OF 1
APPLICATION					

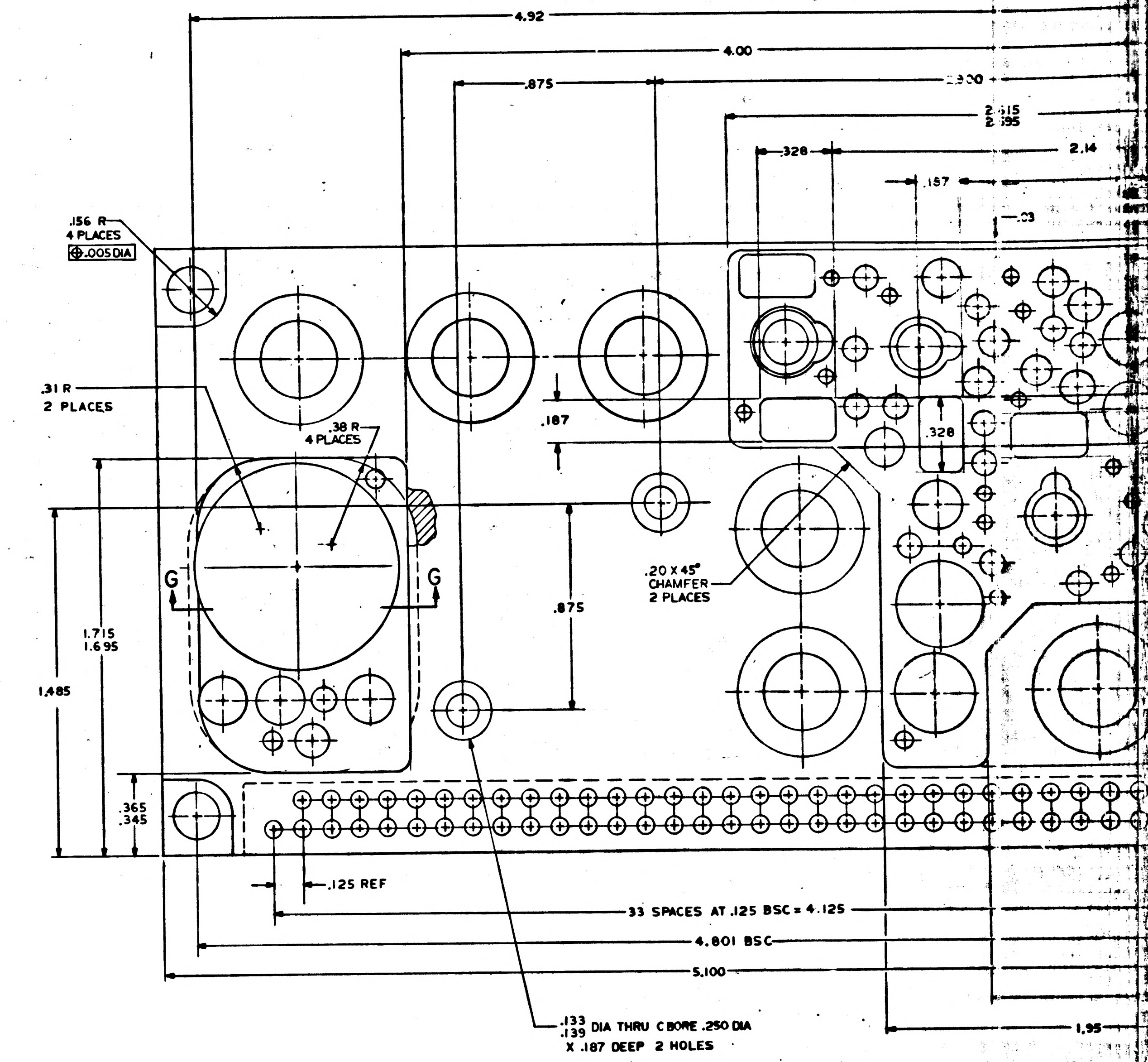
MASTER

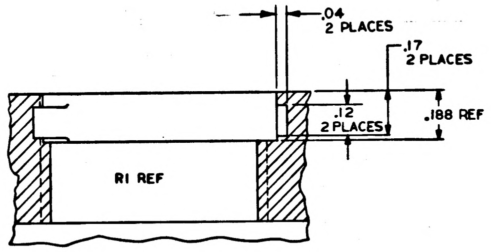
2008297

F13

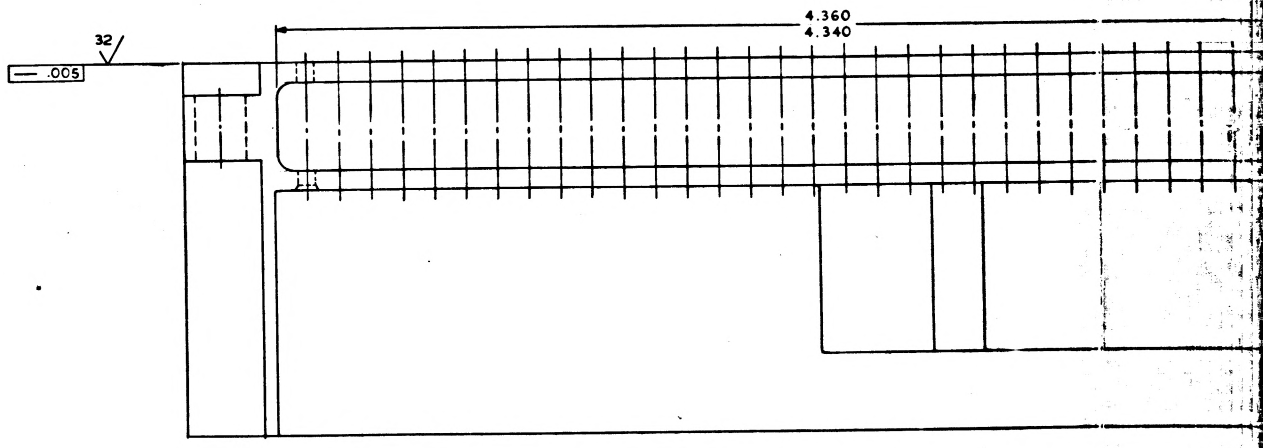

.203 DIA THRU
4 HOLES
⊕ .005 DIA
.156 R 4 PLACES
⊕ .005 DIA
.328
.03 TYP
.187
S5
S6
S7
E
E
C
D
.12 R
8 PLACES
.12 X 45° CHAMFER
2.37
B3
R1
S4
.040 R MAX
21 PLACES
.35 R
1.745
1.725
.196
.176 TYP
S3
X
45°
K2
C18
K3
K4
G6
B4
.03 REF
.05 X 45° CHAMFER 2 PLACES
.31
.03 REF

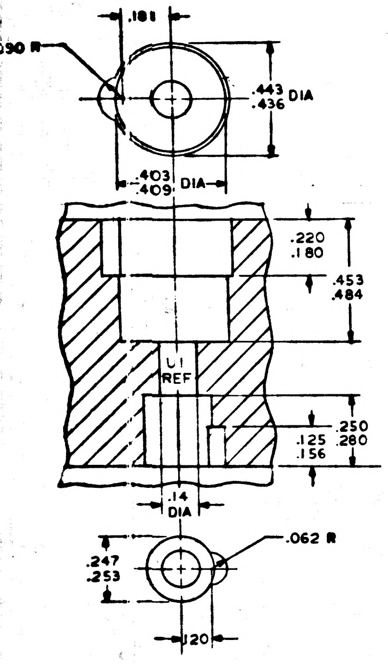

.375
4 PLACES
.258
.254 4 PLACES
.188
.31
-A-
.072
.073 DIA THRU
66 HOLES
⊕ .004 DIA
.08
.085
.080
.500
1.455
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
66 HOLES
● A .005


4.92
4.00
.875
2.615
2.595
.328
2.14
.187
.03
.156 R
4 PLACES
⊕ .005 DIA
.31 R
2 PLACES
.38 R
4 PLACES
.187
.328
G
G
.20 X 45°
CHAMFER
2 PLACES
1.715
1.695
1.485
.875
.365
.345
.125 REF
33 SPACES AT .125 BSC = 4.125
4.801 BSC
5.100
.133
.139 DIA THRU C BORE .250 DIA
X .187 DEEP 2 HOLES
1.95

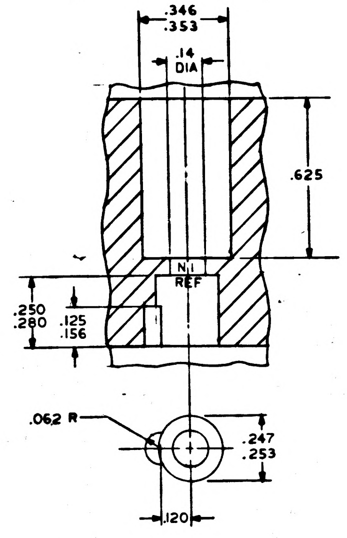

.04
2 PLACES
.17
2 PLACES
.12
2 PLACES
.188 REF
R1 REF

PARTIAL SECTION G-G

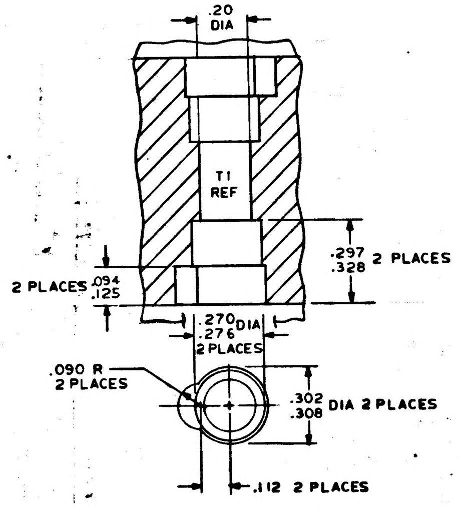

4.360
4.340
32
— .005


.181
.090 R
.443
.436 DIA
.403
.409 DIA
.220
.180
.453
.484
U1
REF
.125
.156
.250
.280
.14
DIA
.062 R
.247
.253
.120

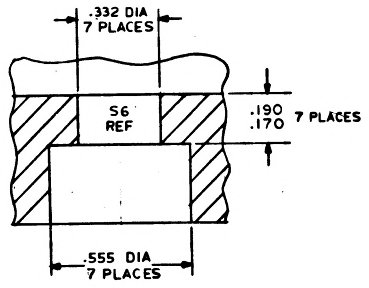
PARTIAL SECTION B-B


.346
.353
.14
DIA
.625
N1
REF
.250
.280
.125
.156
.062 R
.247
.253
.120

PARTIAL SECTION C-C


.20
DIA
T1
REF
.297
.328 2 PLACES
2 PLACES .094
.125
.270
.276 DIA
2 PLACES
.090 R
2 PLACES
.302
.308 DIA 2 PLACES
.112 2 PLACES

PARTIAL SECTION D-D


.332 DIA
7 PLACES
S6
REF
.190
.170 7 PLACES
.555 DIA
7 PLACES

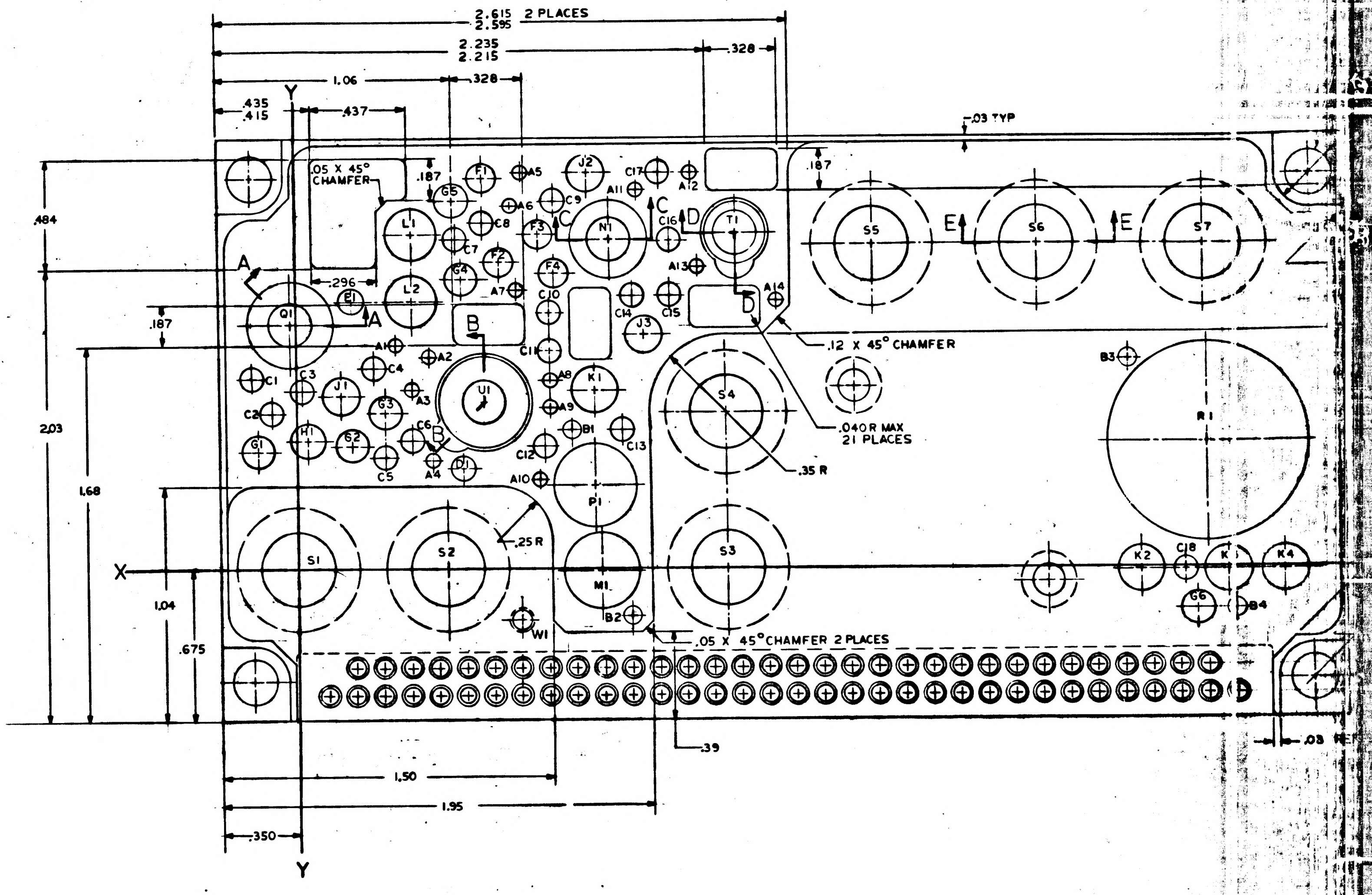
PARTIAL SECTION E-E

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

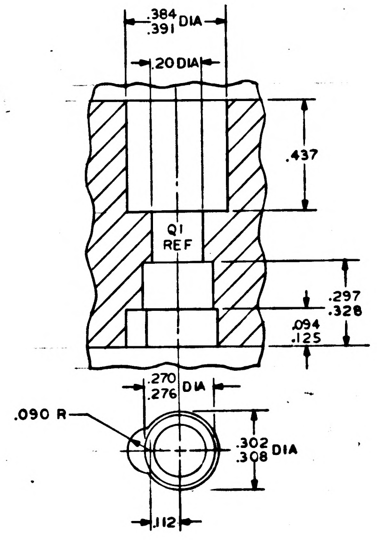
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.450	1.000	.058/.062	14
A2	.600	.950		
A3	.525	.800		
A4	.610	.485		
A5	1.025	1.775		
A6	.975	1.625		
A7	1.000	1.250		
A8	1.150	.850		
A9	1.150	.725		
A10	1.100	.400		
A11	1.550	1.700		
A12	1.800	1.775		
A13	1.825	1.350		
A14	2.185	1.200		
B1	1.250	.625	.080/.084	4
B2	1.510	-.210		
B3	3.785	.935		
B4	4.260	-.185		
C1	-.200	.850	.100/.104	18
C2	-.1[illegible]0	.700		
C3	.025	.800		
C4	.350	.900		
C5	.400	.500		
C6	.525	.575		
C7	.725	1.475		
C8	.850	1.550		
C9	1.175	1.650		
C10	1.150	1.150		
C11	1.150	.975		
C12	1.125	.550		
C13	1.475	.625		
C14	1.525	1.225		
C15	1.700	1.225		
C16	1.700	1.475		
C17	1.655	1.785		
C18	4.035	-.010		
D1	.750	.450	.109/.113	1
E1	.250	1.200	.112/.116	1
F1	.850	1.760	.127/.131	4
F2	.925	1.375		
F3	1.100	1.505		
F4	1.175	1.325		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
G1	-.175	.525	.146/.150	6
G2	.250	.550		
G3	.400	.700		
G4	.75C	1.300		
G5	.710	1.650		
G6	4.095	-.185		
H1	.050	.575	.153/.157	1
J1	.200	.775	.165/.169	3
J2	1.325	1.775		
J3	1.575	1.050		
K1	1.350	.800	.202/.206	4
K2	3.840	-.010		
K3	4.230	-.010		
K4	4.480	-.010		
L1	.525	1.500	.227/.231	2
L2	.525	1.200		
M1	1.375	-.010	.330/.337	1
N1	1.425	1.475	SEE SECT C-C	1
P1	1.350	.375	.366/.373	1
Q1	-.025	1.100	SEE SECT A-A	1
R1	4.135	.560	.888/.895	1
S1	.000	.000	SEE SECTION E-E	7
S2	.675	.000		
S3	1.950	.000		
S4	1.950	.700		
S5	2.625	1.450		
S6	3.375	1.450		
S7	4.125	1.450		
T1	2.000	1.500	SEE SECT D-D	1
U1	.850	.750	SEE SECTION B-B	1
W1	1.010	-.225	NO.2(086)56 UNC THD X .19 DEEP SEE NOTE 8	1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040

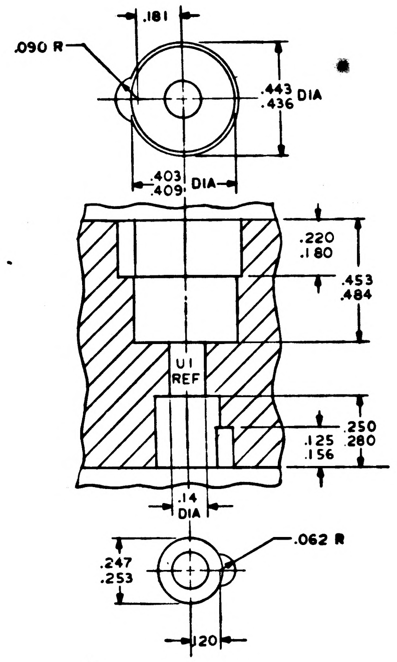


2.615 2.595 2 PLACES
2.235 2.215
.328
1.06
.328
.435 .415
.437
Y
.03 TYP
.05 X 45° CHAMFER
.187
.484
.296
A
B
C
D
E
.187
.12 X 45° CHAMFER
.040 R MAX 21 PLACES
.35 R
.25 R
2.03
1.68
1.04
.675
X
.05 X 45° CHAMFER 2 PLACES
.39
1.50
1.95
.350
.03 REF
S1
S2
S3
S4
S5
S6
S7
Q1
U1
T1
N1
P1
M1
R1
L1
L2
K1
K2
K3
K4
W1



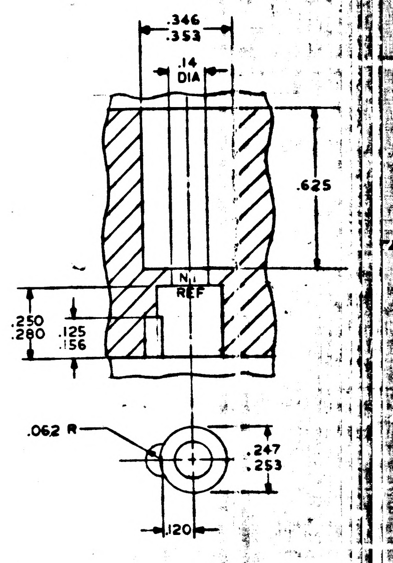
.384 .391 DIA
.20 DIA
.437
Q1 REF
.297 .328
.094 .125
.270 .276 DIA
.090 R
.302 .308 DIA
.112

PARTIAL SECTION A-A



.181
.090 R
.443 .436 DIA
.403 .409 DIA
.220 .180
.453 .484
U1 REF
.250 .280
.125 .156
.14 DIA
.247 .253
.062 R
.120

PARTIAL SECTION B-B

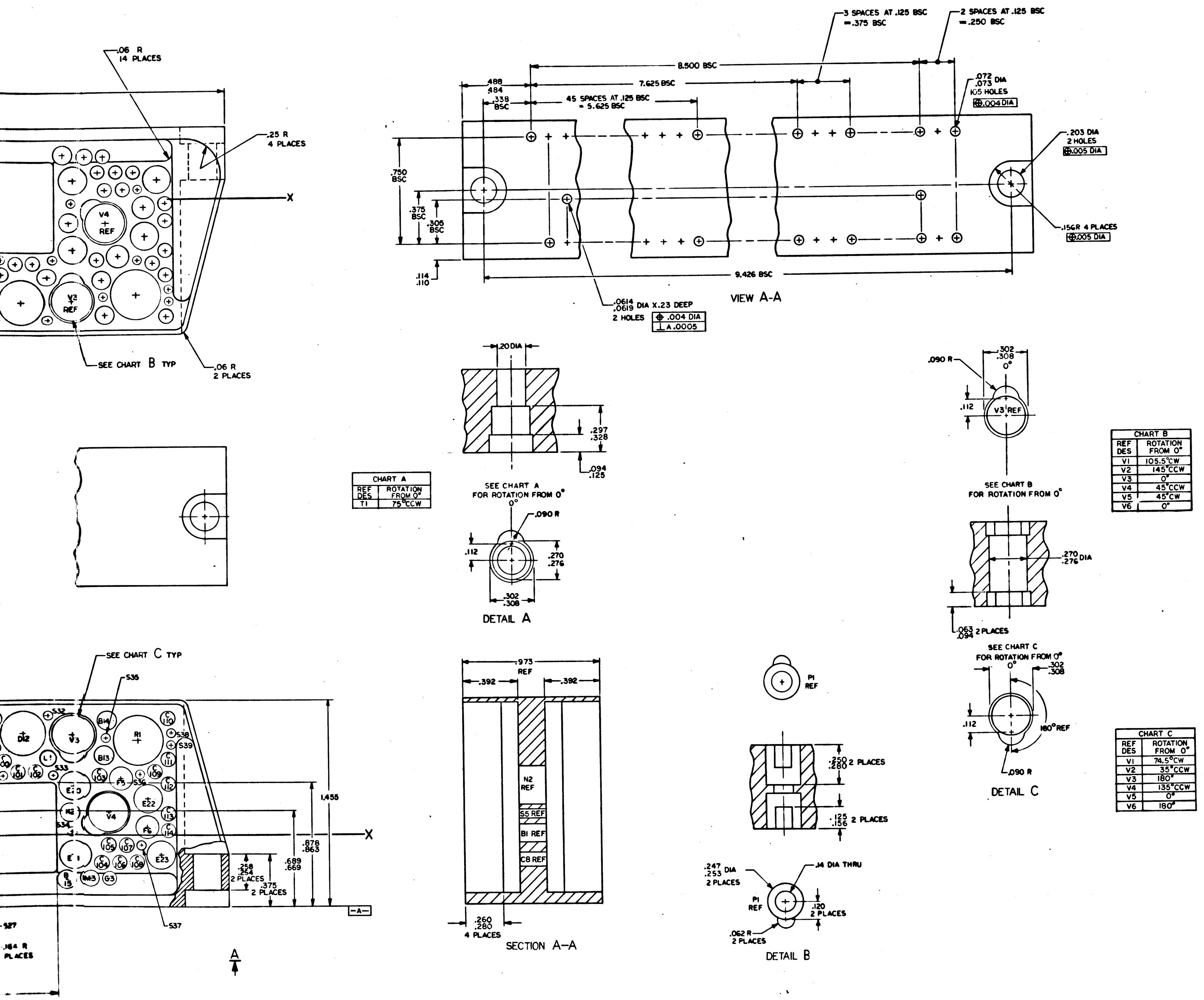


.346 .353
.14 DIA
.625
N1 REF
.250 .280
.125 .156
.062 R
.247 .253
.120

PARTIAL SECTION C-C

2008297

REVISIONS 19903			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 22515	9/13/65	



.06 R 14 PLACES
.25 R 4 PLACES
X
V4 REF
V3 REF
SEE CHART B TYP
.06 R 2 PLACES
3 SPACES AT .125 BSC =.375 BSC
2 SPACES AT .125 BSC =.250 BSC
8.500 BSC
7.625 BSC
.488 .484
.338 BSC
45 SPACES AT .125 BSC = 5.625 BSC
.072 .073 DIA 105 HOLES
⊕ .004 DIA
.203 DIA 2 HOLES
⊕ .005 DIA
.750 BSC
.375 BSC
.305 BSC
.15GR 4 PLACES
⊕ .005 DIA
.114 .110
9.426 BSC
.0614 .0619 DIA X.23 DEEP 2 HOLES
⊕ .004 DIA
⊥ A .0005
VIEW A-A
.20 DIA
.297 .328
.094 .125
SEE CHART A FOR ROTATION FROM 0°
0°
.090 R
.112
.270 .276
.302 .308
DETAIL A
.090 R
.302 .308
0°
.112
V3 REF
SEE CHART B FOR ROTATION FROM 0°
.270 .276 DIA
.063 .094 2 PLACES
SEE CHART C FOR ROTATION FROM 0°
0°
.302 .308
.112
180° REF
.090 R
DETAIL C
SEE CHART C TYP
S35
S32
D12
V3
B14
R1
C110
S38
S39
B13
C111
S33
E20
C103
F5
S36
C112
E22
V4
C113
F6
C114
E1
C105
C107
C104
C106
C109
E23
B13
B43
G3
S37
1.455
.878 .863
.689 .669
.258 .254 2 PLACES
.375 2 PLACES
-A-
X
.164 R PLACES
A
.973 REF
.392
.392
N2 REF
S5 REF
B1 REF
C8 REF
.260 .280 4 PLACES
SECTION A-A
P1 REF
.250 .280 2 PLACES
.125 .156 2 PLACES
.247 .253 DIA 2 PLACES
.14 DIA THRU
P1 REF
.120 2 PLACES
.062 R 2 PLACES
DETAIL B

CHART A	
REF DES	ROTATION FROM 0°
T1	75° CCW

CHART B	
REF DES	ROTATION FROM 0°
V1	105.5° CW
V2	145° CCW
V3	0°
V4	45° CCW
V5	45° CW
V6	0°

CHART C	
REF DES	ROTATION FROM 0°
V1	74.5° CW
V2	35° CCW
V3	180°
V4	135° CCW
V5	0°
V6	180°

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007206	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 XX±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED 1 JUN 65
APPROVAL R.V.
APPROVAL A.R. 6/7/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
MSA & QUADRATURE REJECTION
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008300
SCALE 4/1
WT
SHEET 1 OF 1

2008300 A

E3

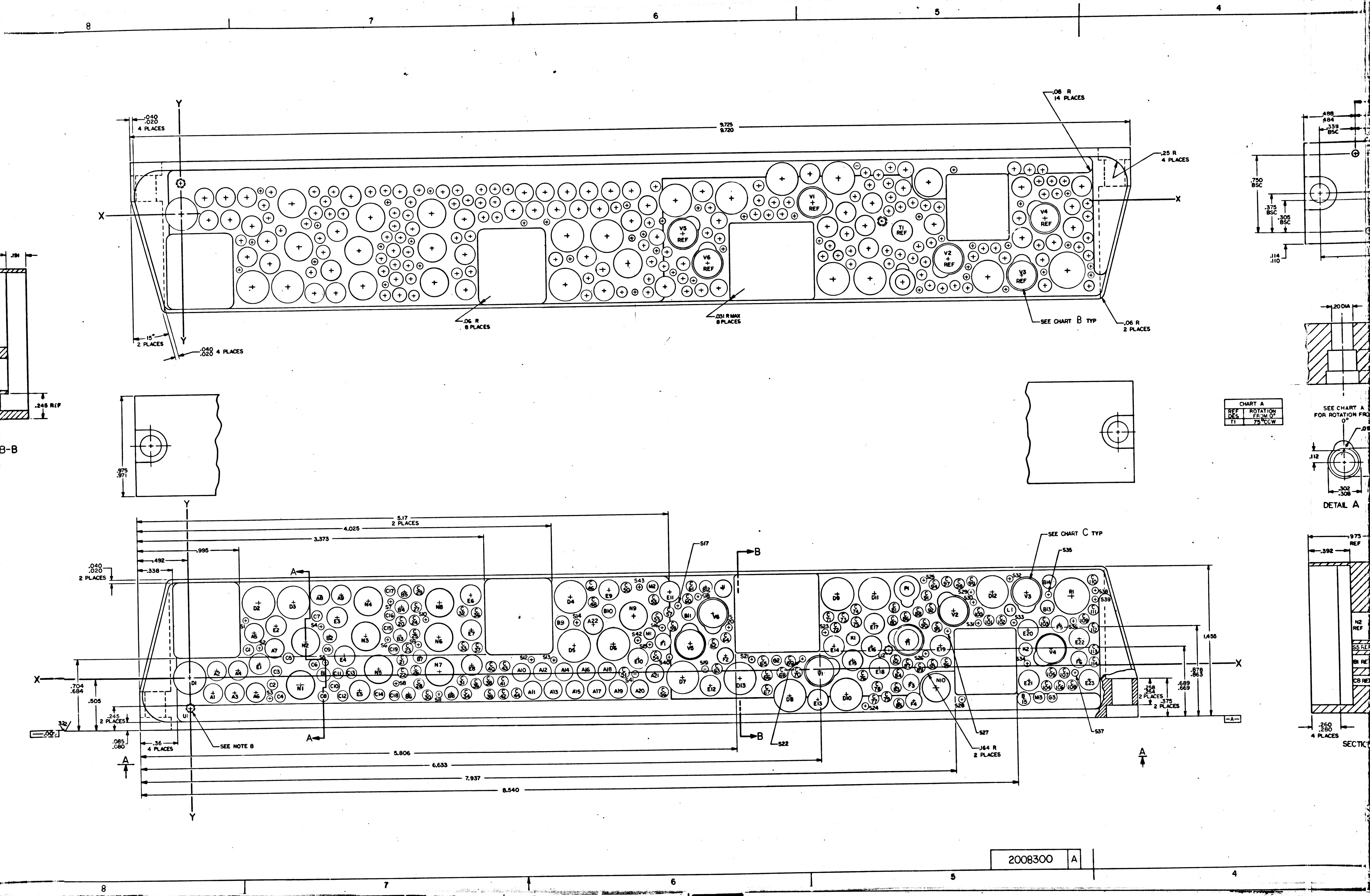

8
7
6
5
4
.040
.020
4 PLACES
9.725
9.720
.06 R
14 PLACES
.25 R
4 PLACES
X
Y
V1 REF
V2 REF
V3 REF
V4 REF
V5 REF
V6 REF
T1 REF
15°
2 PLACES
.040
.020 4 PLACES
.06 R
8 PLACES
.031 R MAX
8 PLACES
SEE CHART B TYP
.06 R
2 PLACES
.488
.484
.339 BSC
.750 BSC
.375 BSC
.305 BSC
.114
.110
.191
.245 REF
B-B
.975
.971
.20 DIA
SEE CHART A
FOR ROTATION FROM
0°
.112
.302
.308
DETAIL A
5.17
2 PLACES
4.025
3.373
.995
.492
.338
.040
.020
2 PLACES
S17
B
A
SEE CHART C TYP
S35
.973 REF
.392
1.455
.878
.863
.689
.669
.704
.684
.505
.245
2 PLACES
32
.085
.080
.36
4 PLACES
SEE NOTE 8
S22
.164 R
2 PLACES
S27
S37
.258
.254
2 PLACES
.375
2 PLACES
-A-
.260
.280
4 PLACES
SECTI
N2 REF
S5 REF
B1 REF
C8 REF
5.806
6.633
7.937
8.540
U1
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13
N1 N2 N3 N4 N5 N6 N7 N8 N9 N10
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22
V1 V2 V3 V4 V5 V6
T1 R1 K1 K2 L1 M1 M2 M3 G1 G2 G3
F1 F2 F3 F4 F5 F6

CHART A	
REF DES	ROTATION FROM 0°
T1	75° CCW

2008300 A

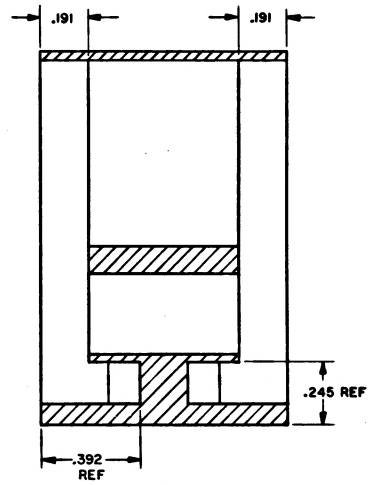
F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

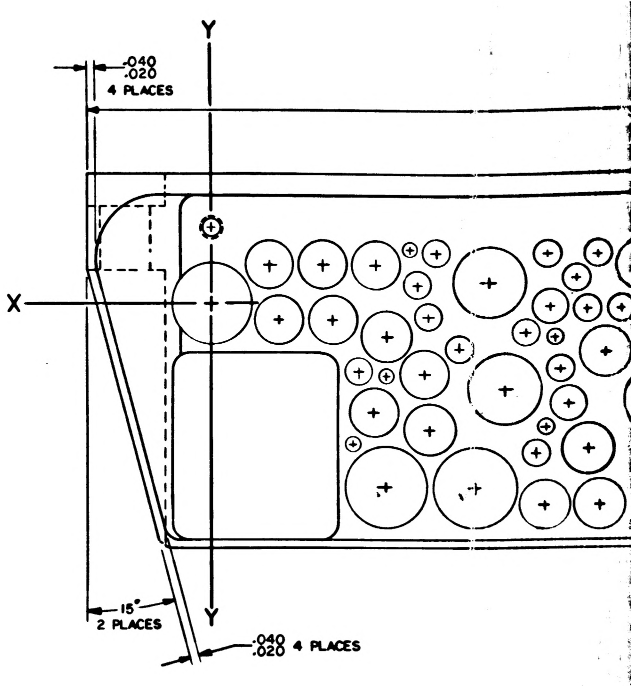
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.225	—.150	.181 .185	22
A2	.265	.065		
A3	.435	—.150		
A4	.475	.065		
A5	.642	.425		
A6	.645	—.150		
A7	.836	.275		
A8	1.287	.780		
A9	1.492	.780		
A10	3.225	.016		
A11	3.330	—.161		
A12	3.430	.016		
A13	3.535	—.161		
A14	3.635	.016		
A15	3.744	—.161		
A16	3.852	.016		
A17	3.955	—.161		
A18	4.057	.016		
A19	4.160	—.161		
A20	4.365	—.161		
A21	4.525	—.017		
A22	3.933	.468		
B1	1.310	.005	.127 .131	15
B2	1.377	.387		
B3	2.060	.380		
B4	2.080	.658		
B5	2.107	.808		
B6	2.130	—.180		
B7	2.245	.175		
B8	2.545	—.180		
B9	3.630	.490		
B10	4.085	.595		
B11	4.862	.557		
B12	5.038	.808		
B13	8.368	.560		
B14	8.386	.808		
B15	8.120	—.318		
C1	.580	.268	.100 .104	58
C2	.806	—.075		
C3	.850	.053		
C4	.978	—.195		
C5	.970	.170		
C6	1.218	.110		
C7	1.267	.580		
C8	1.300	—.195		
C9	1.356	.250		
C10	1.408	—.100		
C11	1.450	.022		
C12	1.487	—.195		
C13	1.580	.022		
C14	1.845	—.180		
C15	1.943	.455		
C16	1.957	.580		
C17	1.967	.817		
C18	1.992	—.195		
C19	2.000	.250		
C20	2.068	.518		
C21	2.075	.143		
C22	2.075	.017		
C23	2.130	.260		
C24	2.200	.528		
C25	2.200	.397		
C26	2.203	.042		
C27	2.218	.663		
C28	2.230	—.085		
C29	2.250	.820		
C30	2.315	—.195		
C31	2.653	—.060		
C32	2.672	.610		
C33	2.672	.270		
C34	2.688	—.188		
C35	2.776	—.090		
C36	2.802	.597		
C37	2.802	.255		
C38	2.905	—.065		
C39	2.917	—.195		
C40	2.935	.072		
C41	3.045	—.065		
C42	3.045	—.195		
C43	3.065	.080		
C44	3.169	—.185		
C46	3.920	.843		
C48	3.940	.680		
C50	4.260	.817		
C51	4.225	.000		
C53	4.528	.693		
C54	4.540	.150		
C55	4.555	.527		
C56	4.600	—.195		
C57	4.670	.573		
C59	4.710	.437		
C60	4.857	.700		
C61	4.895	.820		
C62	5.102	.262		

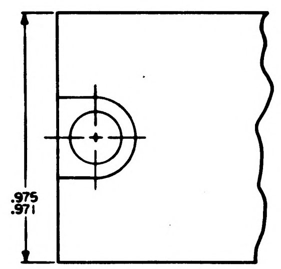
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
C63	5.135	.020	.100 .104	52
C64	5.223	.313		
C65	5.580	.087		
C66	5.617	—.045		
C67	5.617	—.185		
C68	5.765	—.023		
C69	5.845	.087		
C70	5.910	—.023		
C71	6.227	.505		
C72	6.295	.400		
C73	6.375	.495		
C74	6.500	.573		
C75	6.500	.448		
C76	6.555	—.070		
C77	6.660	—.295		
C78	6.698	—.178		
C79	6.785	—.275		
C80	6.855	.458		
C81	6.870	.535		
C82	6.875	.080		
C83	6.880	—.190		
C84	6.900	—.055		
C85	6.900	—.340		
C86	6.987	.497		
C87	6.993	.035		
C88	7.107	.537		
C89	7.118	.000		
C90	7.166	.425		
C91	7.188	.695		
C92	7.230	.570		
C93	7.241	.030		
C94	7.266	.800		
C95	7.290	.390		
C96	7.369	.046		
C97	7.385	.823		
C98	7.510	.800		
C99	7.632	.823		
C100	7.693	.525		
C101	7.790	.445		
C102	7.914	.445		
C103	8.335	.418		
C104	8.345	—.193		
C105	8.395	—.068		
C106	8.470	—.193		
C107	8.520	—.068		
C108	8.595	—.193		
C109	8.720	.445		
C110	8.814	.823		
C111	8.814	.530		
C112	8.814	.360		
C113	8.814	.150		
C114	8.814	.026		
D1	.000	.000	.309 .316	13
D2	.686	.715		
D3	1.023	.715		
D4	3.717	.735		
D5	3.744	.265		
D6	4.130	.278		
D7	4.795	—.060		
D8	5.839	—.250		
D9	6.323	.720		
D10	6.394	—.250		
D11	6.683	.720		
D12	7.835	.717		
D13	5.351	—.073		
E1	.683	.125	.202 .206	23
E2	.852	.488		
E3	1.450	.565		
E4	1.518	.190		
E5	1.655	—.142		
E6	2.750	.767		
E7	2.750	.427		
E8	2.750	.087		
E9	4.090	.800		
E10	4.365	.132		
E11	4.687	.770		
E12	5.065	—.142		
E13	6.116	—.295		
E14	6.280	.220		
E15	6.460	.080		
E16	6.645	.212		
E17	6.675	.430		
E18	6.720	.005		
E19	7.319	.210		
E20	8.175	.347		
E21	8.177	—.142		
E22	8.672	.255		
E23	8.763	—.142		
F1	4.613	.287	.153 .157	6
F2	5.218	.147		
F3	7.025	—.145		
F4	7.050	—.322		
F5	8.492	.398		
F6	8.664	.052		

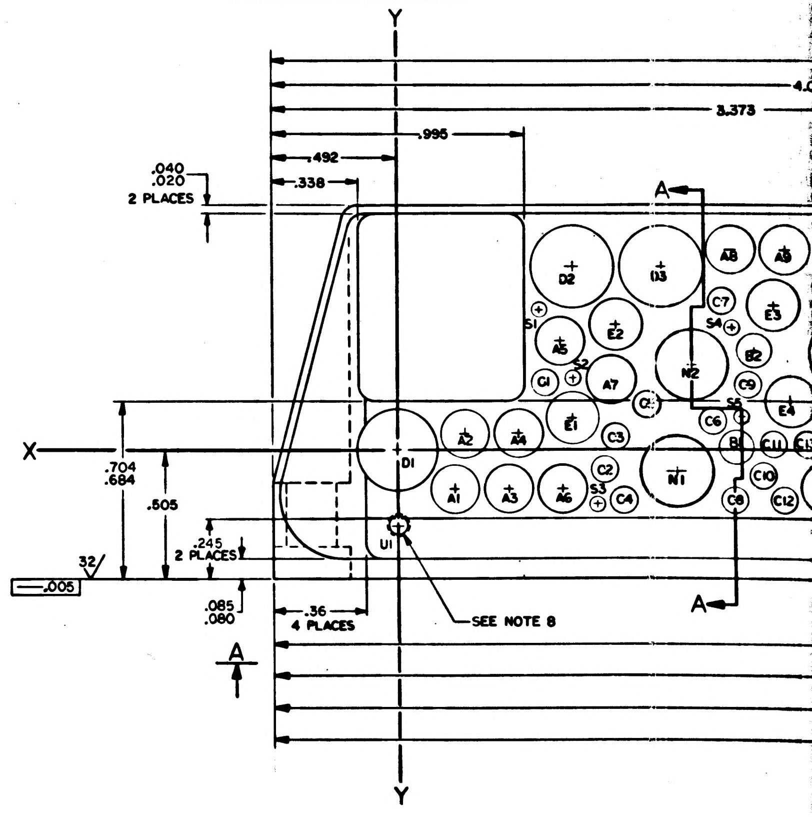
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
			.092 .096	2
G2	5.710	.095		
G3	8.395	—.305		
J1	5.206	.790	.165 .169	1
K1	6.470	.290	.124 .129	2
K2	8.150	.160		
			.112 .116	1
L1	8.005	.540		
M1	4.480	.369	.105 .109	3
M2	4.515	.822		
M3	8.267	—.305		
N1	1.082	—.083	.270 .276	10
N2	1.141	.330		
N3	1.725	.381		
N4	1.756	.717		
N5	1.847	.063		
N6	2.435	.363		
N7	2.435	.028		
N8	2.448	.697		
N9	4.322	.547		
N10	7.269	—.193		
V1	6.141	—.020	SEE DETAIL C	6
V2	7.455	.545		
V3	8.167	.709		
V4	8.400	.160		
V5	4.869	.266		
V6	5.100	.552		
P1	7.000	.751	SEE DETAIL B	1
R1	8.609	.670	.346 .353	1
S1	.561	.545	.058 .062	43
S2	.687	.283		
S3	.775	—.210		
S4	1.292	.480		
S5	1.325	.128		
S6	1.937	.343		
S7	1.974	.708		
S8	2.010	—.078		
S9	2.235	.294		
S10	2.312	.535		
S11	2.424	—.185		
S12	3.325	.137		
S13	3.543	.131		
S14	3.770	.490		
S15	4.480	.260		
S16	4.603	.425		
S17	4.763	.637		
S18	4.964	.715		
S19	5.017	.012		
S20	5.256	.418		
S21	5.470	.105		
S22	5.965	.105		
S23	6.196	.350		
S24	6.573	—.364		
S25	7.165	.844		
S26	7.175	.135		
S27	7.392	.349		
S28	7.518	—.315		
S29	7.626	.720		
S30	7.645	.625		
S31	7.689	.422		
S32	8.005	.844		
S33	8.035	.422		
S34	8.162	.024		
S35	8.377	.685		
S36	8.617	.443		
S37	8.624	—.075		
S38	8.835	.721		
S39	8.835	.639		
S40	4.670	.140		
S41	4.330	—.018		
S42	4.358	.309		
S43	4.385	.820		
T1	7.005	.266	SEE DETAIL A	1
U1	.000	—.297	NO. 2(.086) —56UNC —2B	2
U2	6.807	.172		



SECTION B-B



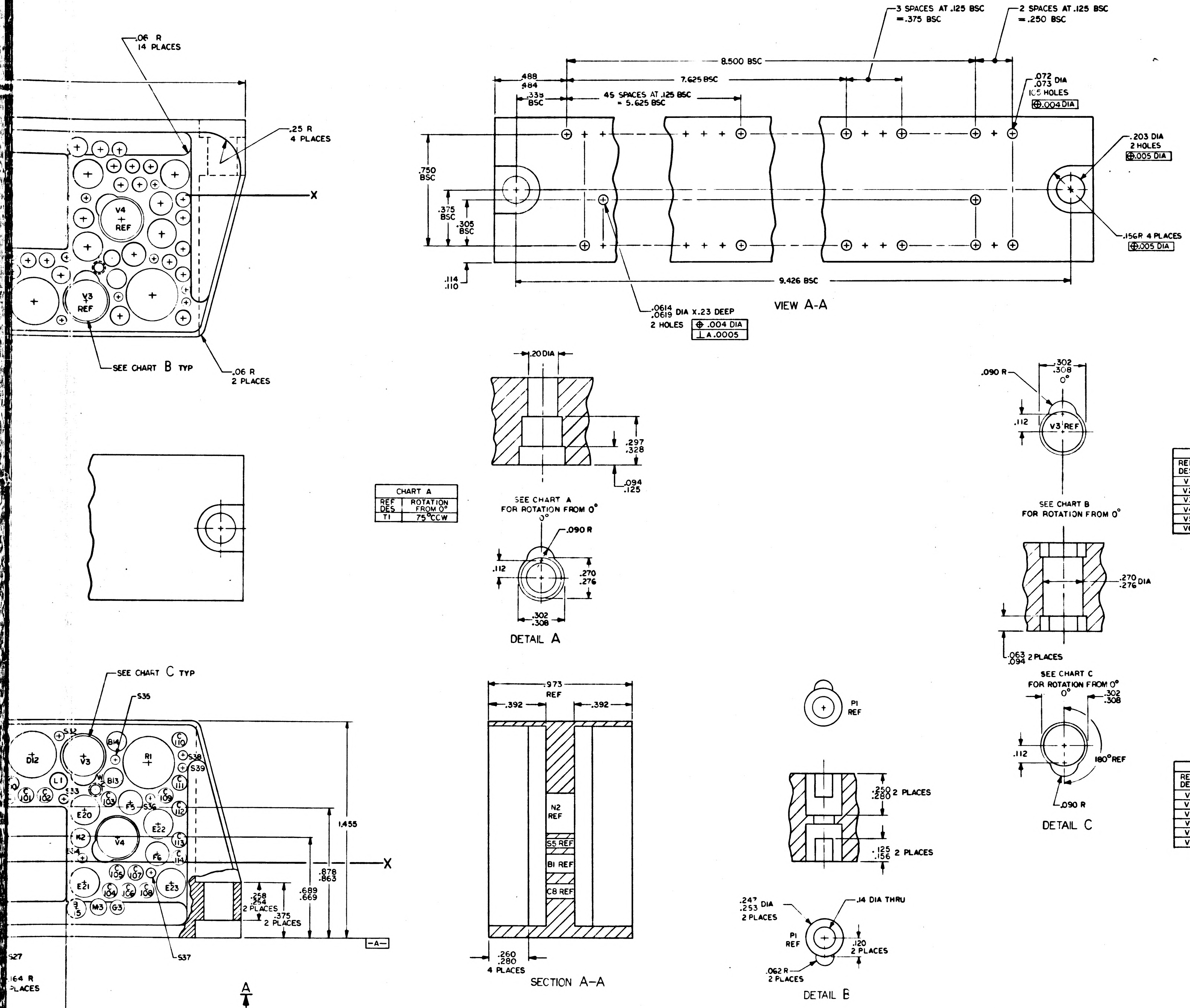




NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH PART NO. PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

REVISIONS 19907			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 22515	1/17/65	
B	REVISED PER TDRR 27819	15 APR 66	



.06 R
14 PLACES
.25 R
4 PLACES
X
V4 REF
V3 REF
SEE CHART B TYP
.06 R
2 PLACES
3 SPACES AT .125 BSC =.375 BSC
2 SPACES AT .125 BSC =.250 BSC
8.500 BSC
7.625 BSC
.488
.484
.339 BSC
45 SPACES AT .125 BSC = 5.625 BSC
.072 DIA
.073 DIA
105 HOLES
⊕.004 DIA
.203 DIA
2 HOLES
⊕.005 DIA
.750 BSC
.375 BSC
.305 BSC
.156R 4 PLACES
⊕.005 DIA
.114
.110
9.426 BSC
.0614
.0619 DIA X.23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A.0005
VIEW A-A
.20 DIA
.297
.328
.094
.125
SEE CHART A
FOR ROTATION FROM 0°
0°
.090 R
.112
.270
.276
.302
.308
DETAIL A
.090 R
.302
.308
0°
.112
V3 REF
SEE CHART B
FOR ROTATION FROM 0°
.270
.276 DIA
.063
.094 2 PLACES
SEE CHART C
FOR ROTATION FROM 0°
0°
.302
.308
.112
180°REF
.090 R
DETAIL C
SEE CHART C TYP
S35
S12
D12
V3
B14
R1
C110
S38
S39
L1
B13
C111
C101
C102
S33
W
C103
C109
E20
F5
S36
C112
E22
K2
V4
C113
S34
F6
C114
C105
C107
E21
C104
C106
C108
E23
G3
M3
S37
S27
.164 R
PLACES
1.455
.878
.863
.689
.669
.258
.254
2 PLACES
.375
2 PLACES
X
-A-
A
.973
REF
.392
.392
N2 REF
S5 REF
B1 REF
C8 REF
.260
.280
4 PLACES
SECTION A-A
P1 REF
.250
.280 2 PLACES
.125
.156 2 PLACES
.247
.253 DIA
2 PLACES
.14 DIA THRU
P1 REF
.120
2 PLACES
.062 R
2 PLACES
DETAIL B

CHART A	
REF DES	ROTATION FROM 0°
T1	75°CCW

CHART B	
REF DES	ROTATION FROM 0°
V1	105.5°CW
V2	145°CCW
V3	0°
V4	45°CCW
V5	45°CW
V6	0°

CHART C	
REF DES	ROTATION FROM 0°
V1	74.5°CW
V2	35°CCW
V3	180°
V4	135°CCW
V5	0°
V6	180°

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007206	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 XX±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT

FINAL FINISH SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN O. Pazia DATE 28 Jun 65
CHECKED 1 JUN 65
APPROVAL R V 23 JUN 65
APPROVAL A R Test 6/7/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
MSA & QUADRATURE REJECTION
CDU ELECTRONICS

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO 2008300
SCALE 4/1
WT
SHEET 1 OF 1

2008300 B

2008300 B

3720083000

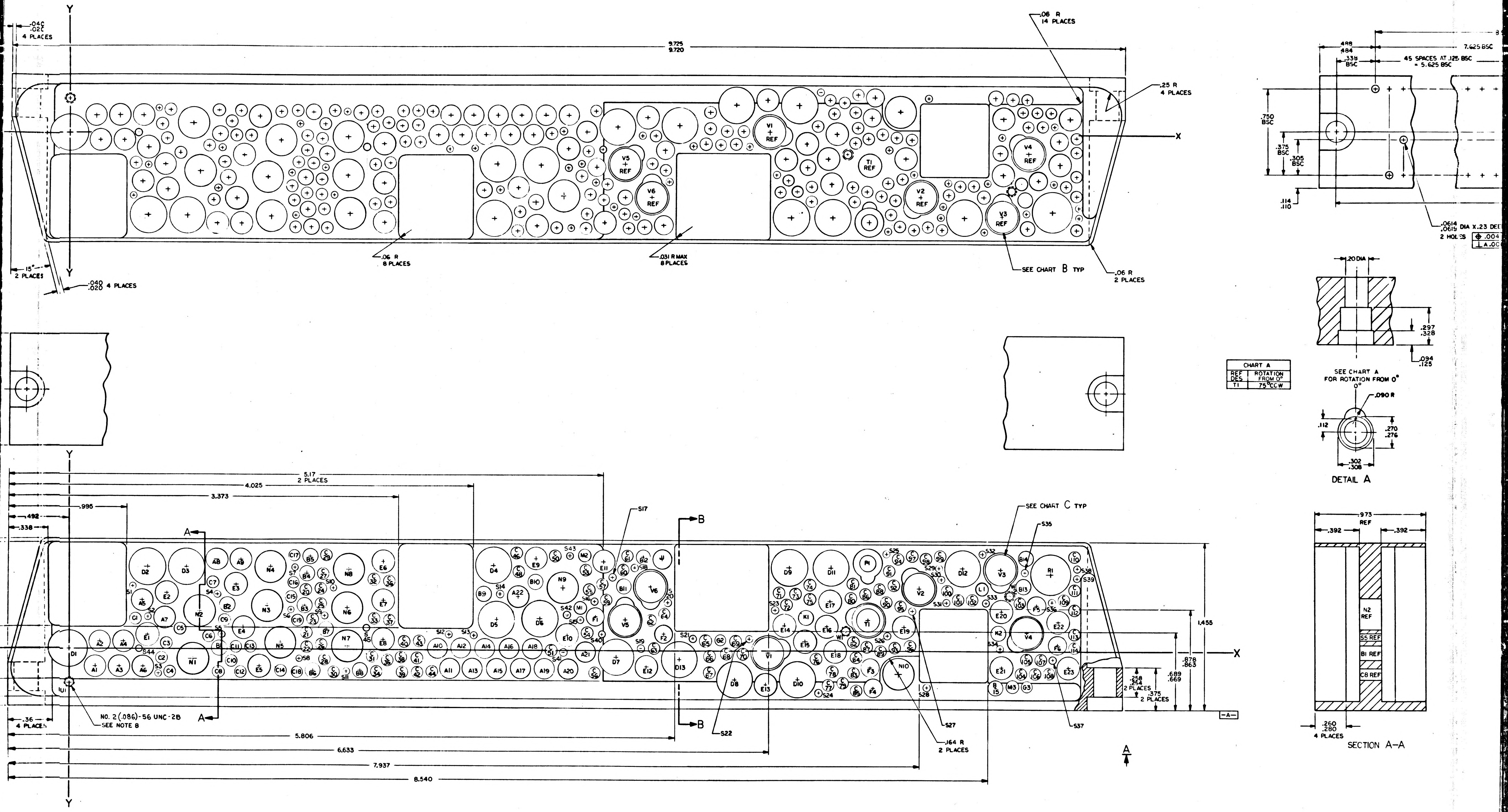

Y
X
.040
.020 4 PLACES
9.725
9.720
.06 R
14 PLACES
.25 R
4 PLACES
15°
2 PLACES
.06 R
8 PLACES
.031 R MAX
8 PLACES
SEE CHART B TYP
.06 R
2 PLACES
V1 REF
V2 REF
V3 REF
V4 REF
V5 REF
V6 REF
T1 REF
5.17
2 PLACES
4.025
3.373
.995
.492
.338
S17
B
SEE CHART C TYP
S35
A
1.455
.878
.863
.689
.669
.258
.254
2 PLACES
.375
2 PLACES
A
.36
4 PLACES
NO. 2 (.086)-56 UNC-2B
SEE NOTE 8
5.806
6.633
7.937
8.540
S22
S27
.164 R
2 PLACES
S37
.488
.484
.338
BSC
7.625 BSC
45 SPACES AT .125 BSC
= 5.625 BSC
.750
BSC
.375
BSC
.305
BSC
.114
.110
.0614
.0619 DIA X.23 DE
2 HOLES
⊕ .004
⊥ A .00
.20 DIA
.297
.328
.094
.125
SEE CHART A
FOR ROTATION FROM 0°
0°
.090 R
.112
.270
.276
.302
.308
DETAIL A
.973
REF
.392
.392
N2 REF
S5 REF
B1 REF
C8 REF
.260
.280
4 PLACES
SECTION A-A

CHART A	
REF DES	ROTATION FROM 0°
T1	75° CCW

2008300 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

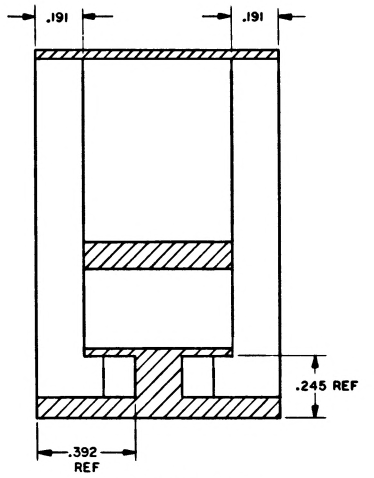
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.225	—.150	.181 .185	22
A2	.265	.065		
A3	.435	—.150		
A4	.475	.065		
A5	.642	.425		
A6	.645	—.150		
A7	.836	.275		
A8	1.287	.780		
A9	1.492	.780		
A10	3.225	.016		
A11	3.330	—.161		
A12	3.430	.016		
A13	3.535	—.161		
A14	3.635	.016		
A15	3.744	—.161		
A16	3.852	.016		
A17	3.955	—.161		
A18	4.057	.016		
A19	4.160	—.161		
A20	4.365	—.161		
A21	4.525	—.017		
A22	3.933	.468		
B1	1.310	.005	.127 .131	15
B2	1.377	.387		
B3	2.060	.380		
B4	2.080	.658		
B5	2.107	.808		
B6	2.130	—.180		
B7	2.245	.175		
B8	2.545	—.180		
B9	3.630	.490		
B10	4.085	.595		
B11	4.862	.557		
B12	5.038	.808		
B13	8.368	.560		
B14	8.386	.808		
B15	8.120	—.318		
C1	.580	.268	.100 .104	58
C2	.806	—.075		
C3	.850	.053		
C4	.878	—.195		
C5	.970	.170		
C6	1.218	.110		
C7	1.267	.580		
C8	1.300	—.195		
C9	1.356	.250		
C10	1.408	—.100		
C11	1.450	.022		
C12	1.487	—.195		
C13	1.580	.022		
C14	1.845	—.180		
C15	1.943	.455		
C16	1.957	.580		
C17	1.967	.817		
C18	1.992	—.195		
C19	2.000	.250		
C20	2.068	.518		
C21	2.075	.143		
C22	2.075	.017		
C23	2.130	.260		
C24	2.200	.528		
C25	2.200	.397		
C26	2.203	.042		
C27	2.218	.663		
C28	2.230	—.085		
C29	2.250	.820		
C30	2.315	—.195		
C31	2.653	—.060		
C32	2.672	.610		
C33	2.672	.270		
C34	2.688	—.188		
C35	2.776	—.090		
C36	2.802	.597		
C37	2.802	.255		
C38	2.905	—.065		
C39	2.917	—.195		
C40	2.935	.072		
C41	3.045	—.065		
C42	3.045	—.195		
C43	3.065	.080		
C44	3.169	—.185		
C46	3.920	.843		
C48	3.940	.680		
C50	4.260	.817		
C51	4.225	.000		
C53	4.528	.693		
C54	4.540	.150		
C55	4.555	.527		
C56	4.600	—.195		
C57	4.670	.573		
C59	4.710	.437		
C60	4.857	.700		
C61	4.895	.820		
C62	5.102	.262		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
C63	5.135	.020	.100 .104	52
C64	5.223	.313		
C65	5.580	.087		
C66	5.617	—.045		
C67	5.617	—.185		
C68	5.765	—.023		
C69	5.845	.087		
C70	5.910	—.023		
C71	6.227	.505		
C72	6.295	.400		
C73	6.375	.495		
C74	6.500	.573		
C75	6.500	.448		
C76	6.555	—.070		
C77	6.660	—.295		
C78	6.698	—.178		
C79	6.785	—.275		
C80	6.855	.458		
C81	6.870	.585		
C82	6.875	.080		
C83	6.880	—.190		
C84	6.900	—.055		
C85	6.900	—.340		
C86	6.987	.497		
C87	6.993	.035		
C88	7.107	.537		
C89	7.118	.000		
C90	7.166	.425		
C91	7.188	.695		
C92	7.230	.570		
C93	7.241	.030		
C94	7.266	.800		
C95	7.290	.390		
C96	7.369	.046		
C97	7.38[illegible]	.823		
C98	7.510	.800		
C99	7.632	.823		
C100	7.693	.525		
C101	7.790	.445		
C102	7.914	.445		
C103	8.335	.418		
C104	8.345	—.193		
C105	8.395	—.068		
C106	8.470	—.193		
C107	8.520	—.068		
C108	8.595	—.193		
C109	8.720	.445		
C110	8.814	.823		
C111	8.814	.530		
C112	8.814	.360		
C113	8.814	.150		
C114	8.814	.026		
D1	.000	.000	.309 .316	13
D2	.686	.715		
D3	1.023	.715		
D4	3.717	.735		
D5	3.744	.265		
D6	4.130	.278		
D7	4.795	—.060		
D8	5.839	—.250		
D9	6.323	.720		
D10	6.394	—.250		
D11	6.683	.720		
D12	7.835	.717		
D13	5.351	—.073		
E1	.683	.125	.202 .206	23
E2	.852	.488		
E3	1.450	.565		
E4	1.518	.190		
E5	1.655	—.142		
E6	2.750	.767		
E7	2.750	.427		
E8	2.750	.087		
E9	4.090	.800		
E10	4.365	.132		
E11	4.687	.770		
E12	5.065	—.142		
E13	6.116	—.295		
E14	6.280	.220		
E15	6.460	.080		
E16	6.645	.212		
E17	6.675	.430		
E18	6.720	.005		
E19	7.319	.210		
E20	8.175	.347		
E21	8.177	—.142		
E22	8.672	.255		
E23	8.763	—.142		
F1	4.613	.287	.153 .157	6
F2	5.218	.147		
F3	7.025	—.145		
F4	7.050	—.322		
F5	8.492	.398		
F6	8.664	.052		

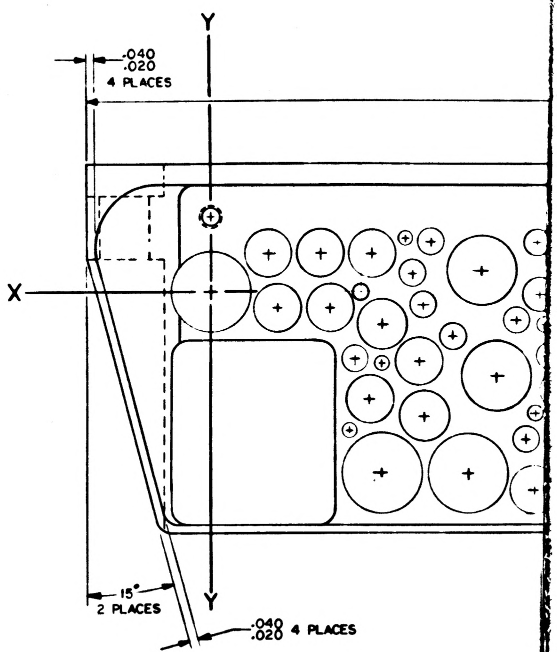
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
			.092 .096	2
G2	5.710	.095		
G3	8.395	—.305		
J1	5.206	.790	.165 .169	1
K1	6.470	.290	.124 .129	2
K2	8.150	.160		
			.112 .116	1
L1	8.005	.540		
M1	4.480	.369	.105 .109	3
M2	4.515	.822		
M3	8.267	—.305		
N1	1.082	—.083	.270 .276	10
N2	1.141	.330		
N3	1.725	.381		
N4	1.756	.717		
N5	1.847	.063		
N6	2.435	.363		
N7	2.435	.028		
N8	2.448	.697		
N9	4.322	.547		
N10	7.269	—.193		
V1	6.141	—.020	SEE DETAIL C	6
V2	7.455	.545		
V3	8.167	.709		
V4	8.400	.160		
V5	4.869	.266		
V6	5.100	.552		
P1	7.000	.751	SEE DETAIL B	1
R1	8.609	.670	.346 .353	1
S1	.561	.545	.058 .062	45
S2	.687	.283		
S3	.775	—.210		
S4	1.292	.480		
S5	1.325	.128		
S6	1.937	.343		
S7	1.974	.708		
S8	2.010	—.078		
S9	2.235	.294		
S10	2.312	.535		
S11	2.424	—.185		
S12	3.325	.137		
S13	3.543	.131		
S14	3.770	.490		
S15	4.480	.260		
S16	4.603	.425		
S17	4.763	.637		
S18	4.964	.715		
S19	5.017	.012		
S20	5.256	.418		
S21	5.470	.105		
S22	5.965	.105		
S23	6.196	.350		
S24	6.573	—.364		
S25	7.165	.844		
S26	7.175	.135		
S27	7.392	.349		
S28	7.518	—.315		
S29	7.626	.720		
S30	7.645	.625		
S31	7.689	.422		
S32	8.005	.844		
S33	8.035	.422		
S34	8.162	.024		
S35	8.377	.685		
S36	8.617	.443		
S37	8.624	—.075		
S38	8.835	.721		
S39	8.835	.639		
S40	4.670	.140		
S41	4.330	—.018		
S42	4.358	.309		
S43	4.385	.820		
S44	.600	.000		
S45	2.600	.175		
T1	7.005	.266	SEE DETAIL A	1
			.069 .073	1
U1	.000	—.297		
W1	6.807	.172	NO. 2(.086) -56UNC-2B .28 DEEP BOTH SIDES	2
W2	8.248	.480		

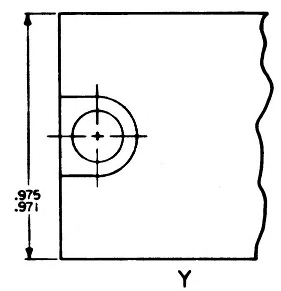
NOTES:

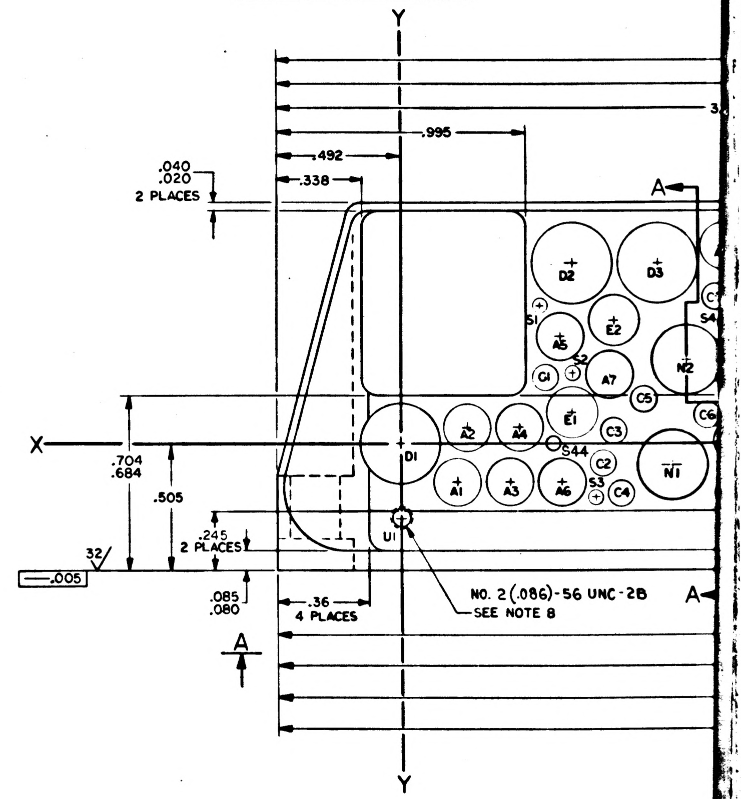
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH PART NO. PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040



SECTION B-B



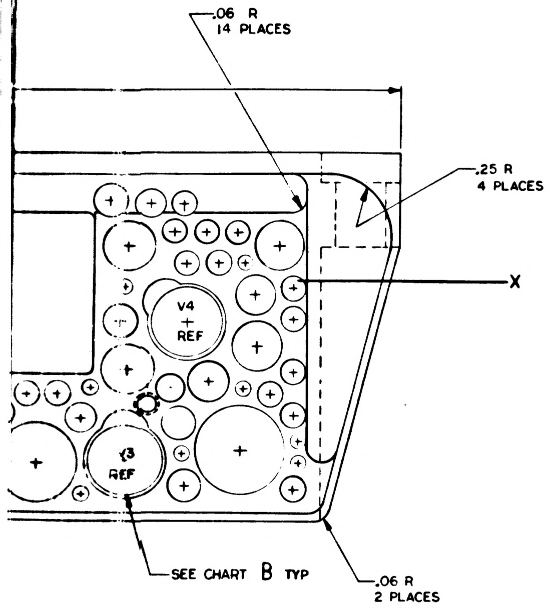




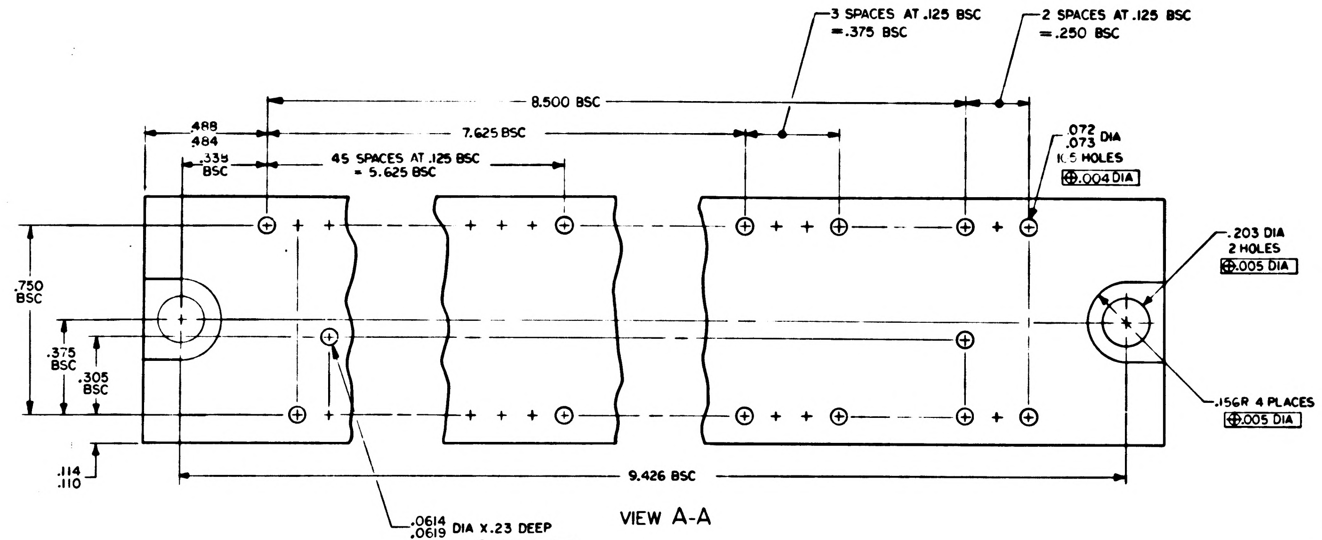
2008300	B

1/2008300

REVISIONS 19907			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 22515	11/17/65	
B	REVISED PER TDRR 27819	15-APR-66	PF
C	REVISED PER TDRR 29246	7-JUN-66	B PF



.06 R
14 PLACES
.25 R
4 PLACES
X
V4
REF
V3
REF
SEE CHART B TYP
.06 R
2 PLACES



3 SPACES AT .125 BSC
=.375 BSC
2 SPACES AT .125 BSC
=.250 BSC
8.500 BSC
.488
.484
7.625 BSC
.072
.073 DIA
115 HOLES
⊕.004 DIA
.338 BSC
45 SPACES AT .125 BSC
= 5.625 BSC
.750 BSC
.375 BSC
.305 BSC
.203 DIA
2 HOLES
⊕.005 DIA
.156R 4 PLACES
⊕.005 DIA
.114
.110
9.426 BSC
.0614
.0619 DIA X.23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005

VIEW A-A

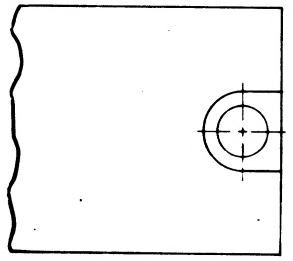
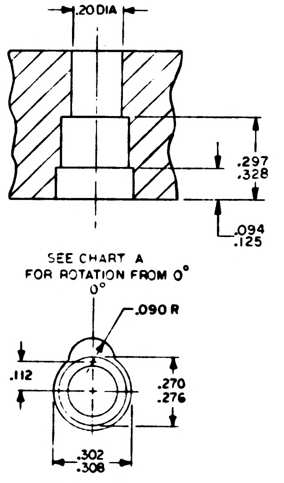
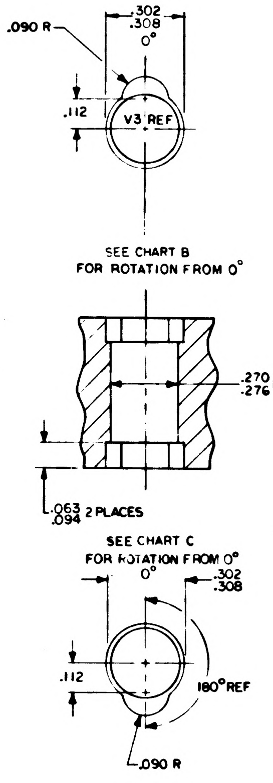


CHART A	
REF DES	ROTATION FROM 0°
T1	75°CCW



.20 DIA
.297
.328
.094
.125
SEE CHART A
FOR ROTATION FROM 0°
0°
.090 R
.112
.270
.276
.302
.308

DETAIL A

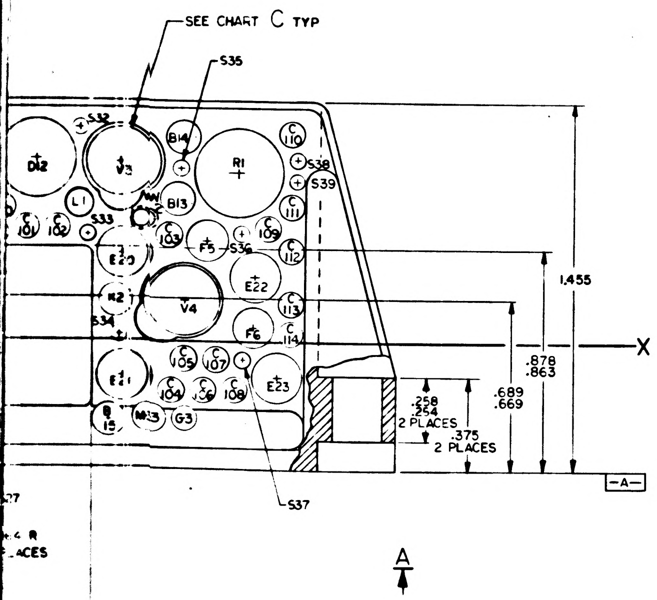


.302
.308
0°
.090 R
.112
V3 REF
SEE CHART B
FOR ROTATION FROM 0°
.270
.276 DIA
.063
.094 2 PLACES
SEE CHART C
FOR ROTATION FROM 0°
0°
.302
.308
.112
180° REF
.090 R

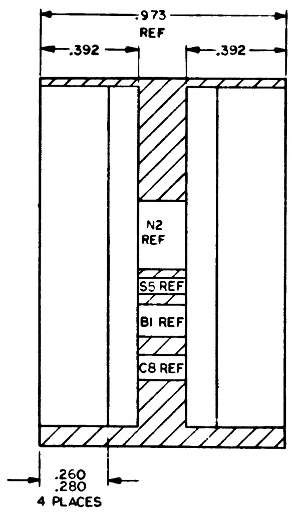
DETAIL C

CHART B	
REF DES	ROTATION FROM 0°
V1	105.5°CW
V2	145°CCW
V3	0°
V4	45°CCW
V5	45°CW
V6	0°

CHART C	
REF DES	ROTATION FROM 0°
V1	74.5°CW
V2	35°CCW
V3	180°
V4	135°CCW
V5	0°
V6	180°

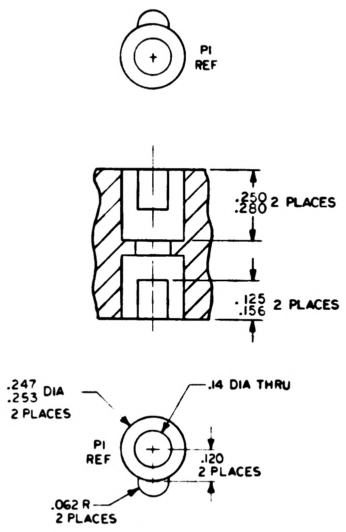


SEE CHART C TYP
S35
S32
D12
V3
B14
R1
C110
S38
S39
L1
S33
B13
101
102
F5
S36
109
103
112
E20
K2
S34
V4
E22
113
F6
114
X
1.455
.878
.863
.689
.669
105
107
E21
104
106
108
E23
15
M13
G3
.258
.254
2 PLACES
.375
2 PLACES
S37
-A-
4 R
PLACES
A



.973
REF
.392
.392
N2
REF
S5 REF
B1 REF
C8 REF
.260
.280
4 PLACES

SECTION A-A



P1
REF
.250
.260 2 PLACES
.125
.156 2 PLACES
.247 DIA
.253
2 PLACES
.14 DIA THRU
P1
REF
.120
2 PLACES
.062 R
2 PLACES

DETAIL B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007206	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX±.005 XX±.02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
CONTRACT NAS 9-497
DRAWN B Pagia DATE 28 JUN 65
CHECKED JUN 65
APPROVAL R V 23 JUN 65
APPROVAL A R 6/7/65
NASA APPROVAL
MIT APPROVAL

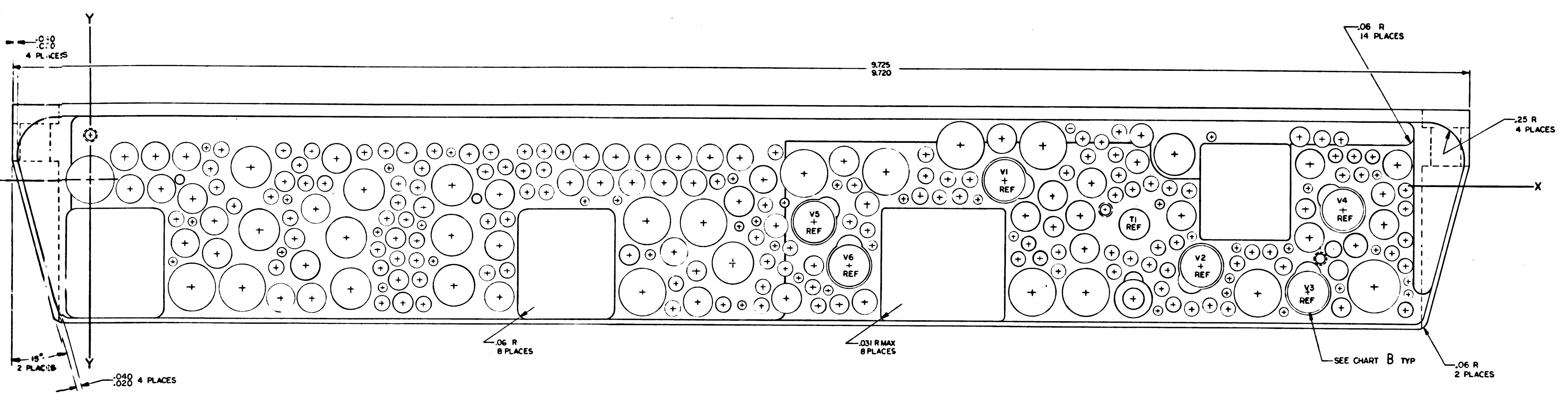
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

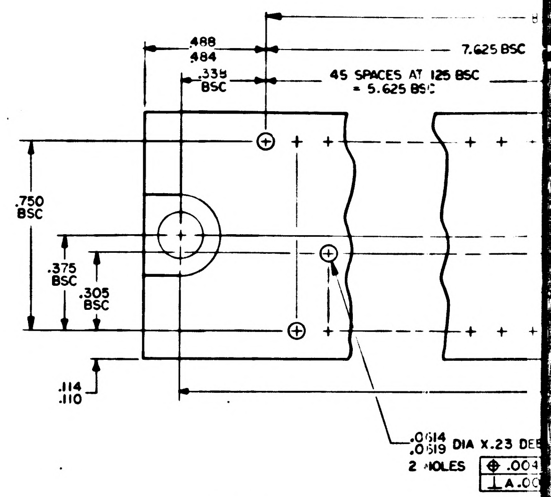
HEADER HOUSING
MSA & QUADRATURE REJECTION
CDU ELECTRONICS

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2008300
SCALE 4/1
WT
SHEET 1 OF 1

3/-

S008300


Y
.040
.020
4 PLACES
9.725
9.720
.06 R
14 PLACES
.25 R
4 PLACES
X
V1 REF
V5 REF
V6 REF
T1 REF
V2 REF
V4 REF
V3 REF
15°
2 PLACES
.040
.020 4 PLACES
.06 R
8 PLACES
.031 R MAX
8 PLACES
SEE CHART B TYP
.06 R
2 PLACES
Y


.488
.484
.338
BSC
45 SPACES AT .125 BSC
= 5.625 BSC
7.625 BSC
.750
BSC
.375
BSC
.305
BSC
.114
.110
.0614
.0519 DIA X .23 DEEP
2 HOLES
⊕ .004
⊥ A .00

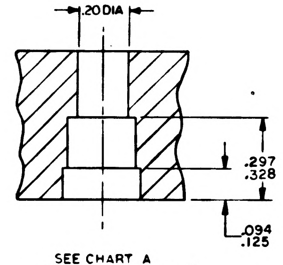
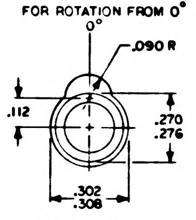
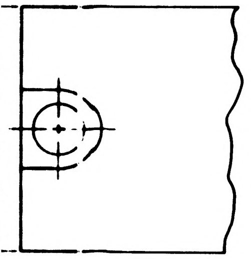

.20 DIA
.297
.328
.094
.125

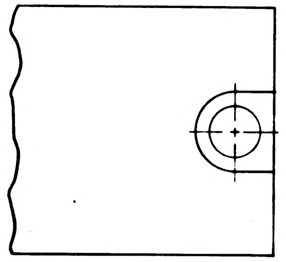
CHART A	
REF DES	ROTATION FROM 0°
T1	75° CCW

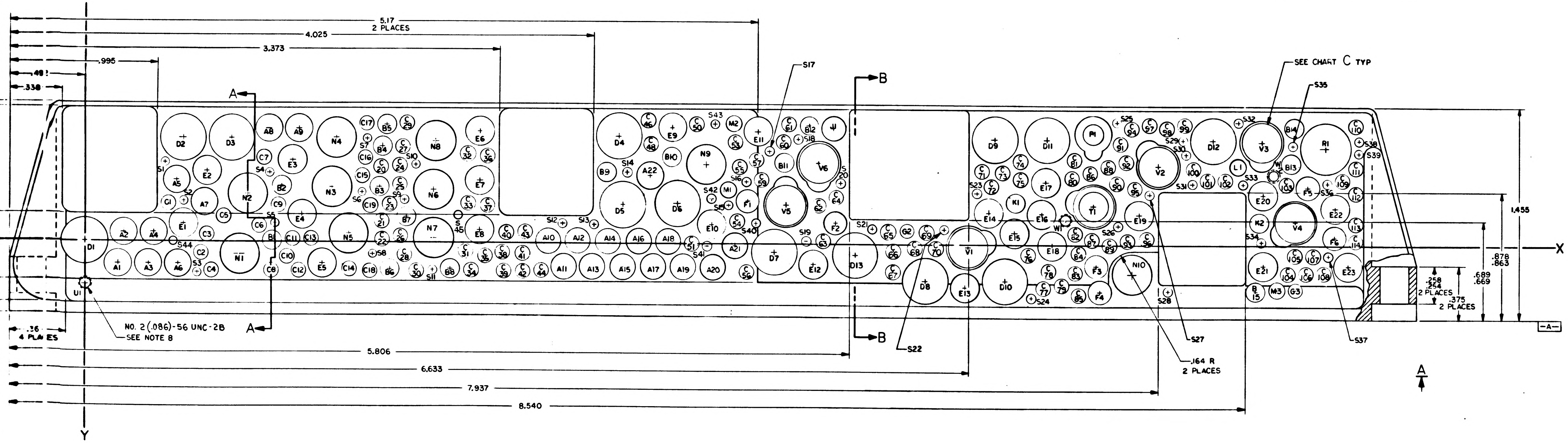
SEE CHART A
FOR ROTATION FROM 0°

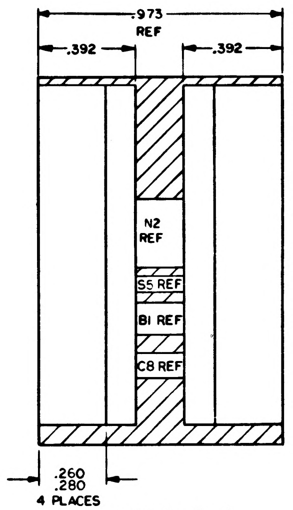

0°
.090 R
.112
.270
.276
.302
.308

DETAIL A






Y
5.17
2 PLACES
4.025
3.373
.995
.481
.338
A
S17
B
SEE CHART C TYP
S35
1.455
.878
.863
.689
.669
.258
.254
2 PLACES
.375
2 PLACES
X
-A-
U1
NO. 2 (.086)-56 UNC-2B
SEE NOTE 8
A
.36
4 PLACES
5.806
6.633
7.937
8.540
B
S22
S27
.164 R
2 PLACES
S37
A
Y


.973
REF
.392
.392
N2
REF
S5 REF
B1 REF
C8 REF
.260
.280
4 PLACES

SECTION A-A

2/2008300

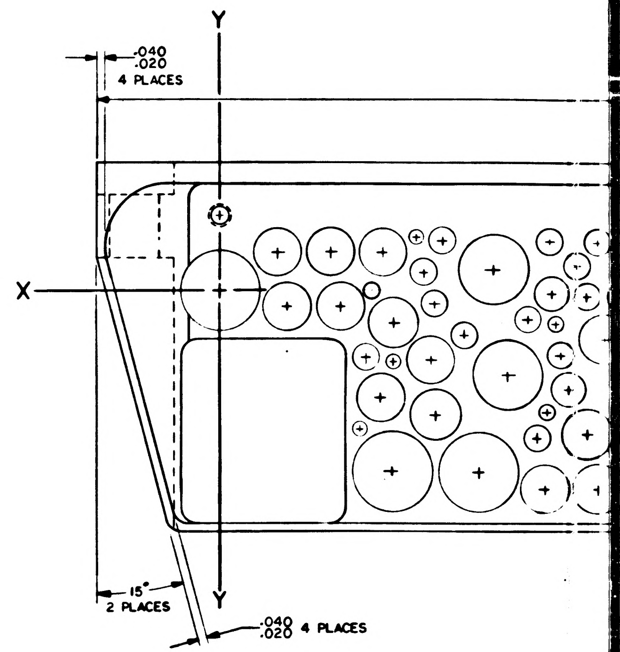
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

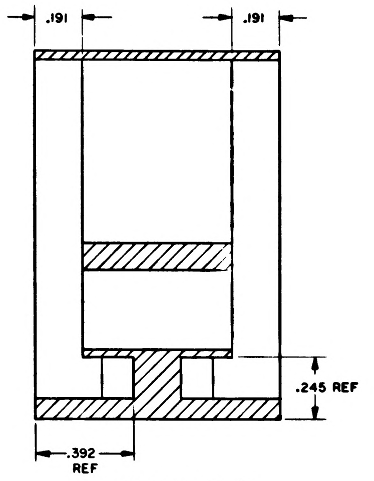
2008300

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.225	—.150	.181 .185	22
A2	.265	.065		
A3	.435	—.150		
A4	.475	.065		
A5	.642	.425		
A6	.645	—.150		
A7	.836	.275		
A8	1.287	.780		
A9	1.492	.780		
A10	3.225	.016		
A11	3.330	—.161		
A12	3.430	.016		
A13	3.535	—.161		
A14	3.635	.016		
A15	3.744	—.161		
A16	3.852	.016		
A17	3.955	—.161		
A18	4.057	.016		
A19	4.160	—.161		
A20	4.365	—.161		
A21	4.525	—.017		
A22	3.933	.468		
B1	1.310	.005	.127 .131	15
B2	1.377	.387		
B3	2.060	.380		
B4	2.080	.658		
B5	2.107	.808		
B6	2.130	—.180		
B7	2.245	.175		
B8	2.545	—.180		
B9	3.630	.490		
B10	4.085	.595		
B11	4.862	.557		
B12	5.038	.808		
B13	8.368	.560		
B14	8.386	.808		
B15	8.120	—.318		
C1	.580	.268	.100 .104	58
C2	.806	—.075		
C3	.850	.053		
C4	.878	—.195		
C5	.970	.170		
C6	1.218	.110		
C7	1.267	.580		
C8	1.300	—.195		
C9	1.356	.250		
C10	1.408	—.100		
C11	1.450	.022		
C12	1.487	—.195		
C13	1.580	.022		
C14	1.845	—.180		
C15	1.943	.455		
C16	1.957	.580		
C17	1.967	.817		
C18	1.992	—.195		
C19	2.000	.250		
C20	2.068	.518		
C21	2.075	.143		
C22	2.075	.017		
C23	2.130	.260		
C24	2.200	.528		
C25	2.200	.397		
C26	2.203	.042		
C27	2.218	.663		
C28	2.230	—.085		
C29	2.250	.820		
C30	2.315	—.195		
C31	2.653	—.060		
C32	2.672	.610		
C33	2.672	.270		
C34	2.688	—.188		
C35	2.776	—.090		
C36	2.802	.597		
C37	2.802	.255		
C38	2.905	—.065		
C39	2.917	—.195		
C40	2.935	.072		
C41	3.045	—.065		
C42	3.045	—.195		
C43	3.065	.080		
C44	3.169	—.185		
C46	3.920	.843		
C48	3.940	.680		
C50	4.260	.817		
C51	4.225	.000		
C53	4.528	.693		
C54	4.540	.150		
C55	4.555	.527		
C56	4.600	—.195		
C57	4.670	.573		
C59	4.710	.437		
C60	4.857	.700		
C61	4.895	.820		
C62	5.102	.262		

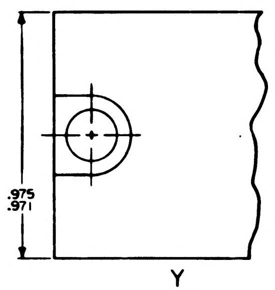
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
C63	5.135	.020	.100 .104	52
C64	5.223	.313		
C65	5.580	.087		
C66	5.617	—.045		
C67	5.617	—.185		
C68	5.765	—.023		
C69	5.845	.087		
C70	5.910	—.023		
C71	6.227	.505		
C72	6.295	.400		
C73	6.375	.495		
C74	6.500	.573		
C75	6.500	.448		
C76	6.555	—.070		
C77	6.660	—.295		
C78	6.698	—.178		
C79	6.785	—.275		
C80	6.855	.458		
C81	6.870	.585		
C82	6.875	.080		
C83	6.880	—.190		
C84	6.900	—.055		
C85	6.900	—.340		
C86	6.987	.497		
C87	6.993	.035		
C88	7.107	.537		
C89	7.118	.000		
C90	7.166	.425		
C91	7.188	.695		
C92	7.230	.570		
C93	7.241	.030		
C94	7.266	.800		
C95	7.290	.390		
C96	7.369	.046		
C97	7.389	.823		
C98	7.510	.800		
C99	7.632	.823		
C100	7.693	.525		
C101	7.790	.445		
C102	7.914	.445		
C103	8.335	.418		
C104	8.345	—.193		
C105	8.395	—.068		
C106	8.470	—.193		
C107	8.520	—.068		
C108	8.595	—.193		
C109	8.720	.445		
C110	8.814	.823		
C111	8.814	.530		
C112	8.814	.360		
C113	8.814	.150		
C114	8.814	.026		
D1	.000	.000	.309 .316	13
D2	.686	.715		
D3	1.023	.715		
D4	3.717	.735		
D5	3.744	.265		
D6	4.130	.278		
D7	4.795	—.060		
D8	5.839	—.250		
D9	6.323	.720		
D10	6.394	—.250		
D11	6.683	.720		
D12	7.835	.717		
D13	5.351	—.073		
E1	.683	.125	.202 .206	23
E2	.852	.488		
E3	1.450	.565		
E4	1.518	.190		
E5	1.655	—.142		
E6	2.750	.767		
E7	2.750	.427		
E8	2.750	.087		
E9	4.090	.800		
E10	4.365	.132		
E11	4.687	.770		
E12	5.065	—.142		
E13	6.116	—.295		
E14	6.280	.220		
E15	6.460	.080		
E16	6.645	.212		
E17	6.675	.430		
E18	6.720	.005		
E19	7.319	.210		
E20	8.175	.347		
E21	8.177	—.142		
E22	8.672	.255		
E23	8.763	—.142		
F1	4.613	.287	.153 .157	6
F2	5.218	.147		
F3	7.025	—.145		
F4	7.050	—.322		
F5	8.492	.398		
F6	8.664	.052		

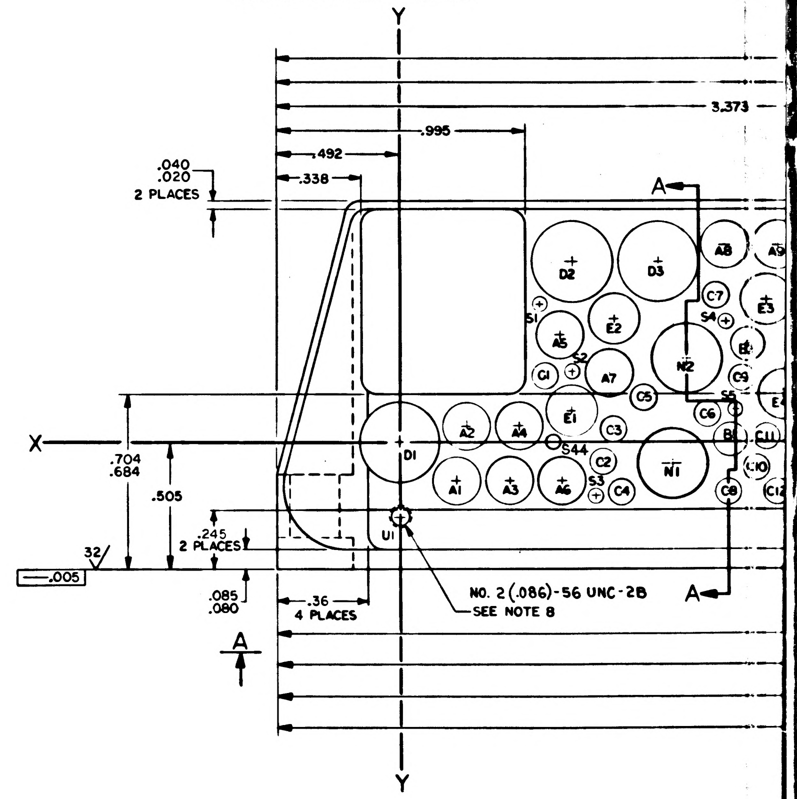
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
			.092 .096	2
G2	5.710	.095		
G3	8.395	—.305		
J1	5.206	.790	.165 .169	1
K1	6.470	.290	.124 .129	2
K2	8.150	.160		
			.112 .116	1
L1	8.005	.540		
M1	4.480	.369	.105 .109	3
M2	4.515	.822		
M3	8.267	—.305		
N1	1.082	—.083	.270 .276	10
N2	1.141	.330		
N3	1.725	.381		
N4	1.756	.717		
N5	1.847	.063		
N6	2.435	.363		
N7	2.435	.028		
N8	2.448	.697		
N9	4.322	.547		
N10	7.269	—.193		
V1	6.141	—.020	SEE DETAIL C	6
V2	7.455	.545		
V3	8.167	.709		
V4	8.400	.160		
V5	4.869	.266		
V6	5.100	.552		
P1	7.000	.751	SEE DETAIL B	1
R1	8.609	.670	.358 .363	1
S1	.561	.545	.058 .062	45
S2	.687	.283		
S3	.775	—.210		
S4	1.292	.480		
S5	1.325	.128		
S6	1.937	.343		
S7	1.974	.708		
S8	2.010	—.078		
S9	2.235	.294		
S10	2.312	.535		
S11	2.424	—.185		
S12	3.325	.137		
S13	3.543	.131		
S14	3.770	.490		
S15	4.480	.260		
S16	4.603	.425		
S17	4.763	.637		
S18	4.964	.715		
S19	5.017	.012		
S20	5.256	.418		
S21	5.470	.105		
S22	5.965	.105		
S23	6.196	.350		
S24	6.573	—.364		
S25	7.165	.844		
S26	7.175	.135		
S27	7.392	.349		
S28	7.518	—.315		
S29	7.626	.720		
S30	7.645	.625		
S31	7.689	.422		
S32	8.005	.844		
S33	8.035	.422		
S34	8.162	.024		
S35	8.377	.685		
S36	8.617	.443		
S37	8.624	—.075		
S38	8.835	.721		
S39	8.835	.639		
S40	4.670	.140		
S41	4.330	—.018		
S42	4.358	.309		
S43	4.385	.820		
S44	.600	.000		
S45	2.600	.175		
T1	7.005	.266	SEE DETAIL A	1
			.069 .073	1
U1	.000	—.297		
W1	6.807	.172	NO.2(.086) -56UNC-2B .28 DEEP BOTH SIDES	2
W2	8.248	.480		





SECTION B-B





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH PART NO. PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040

2008300	C

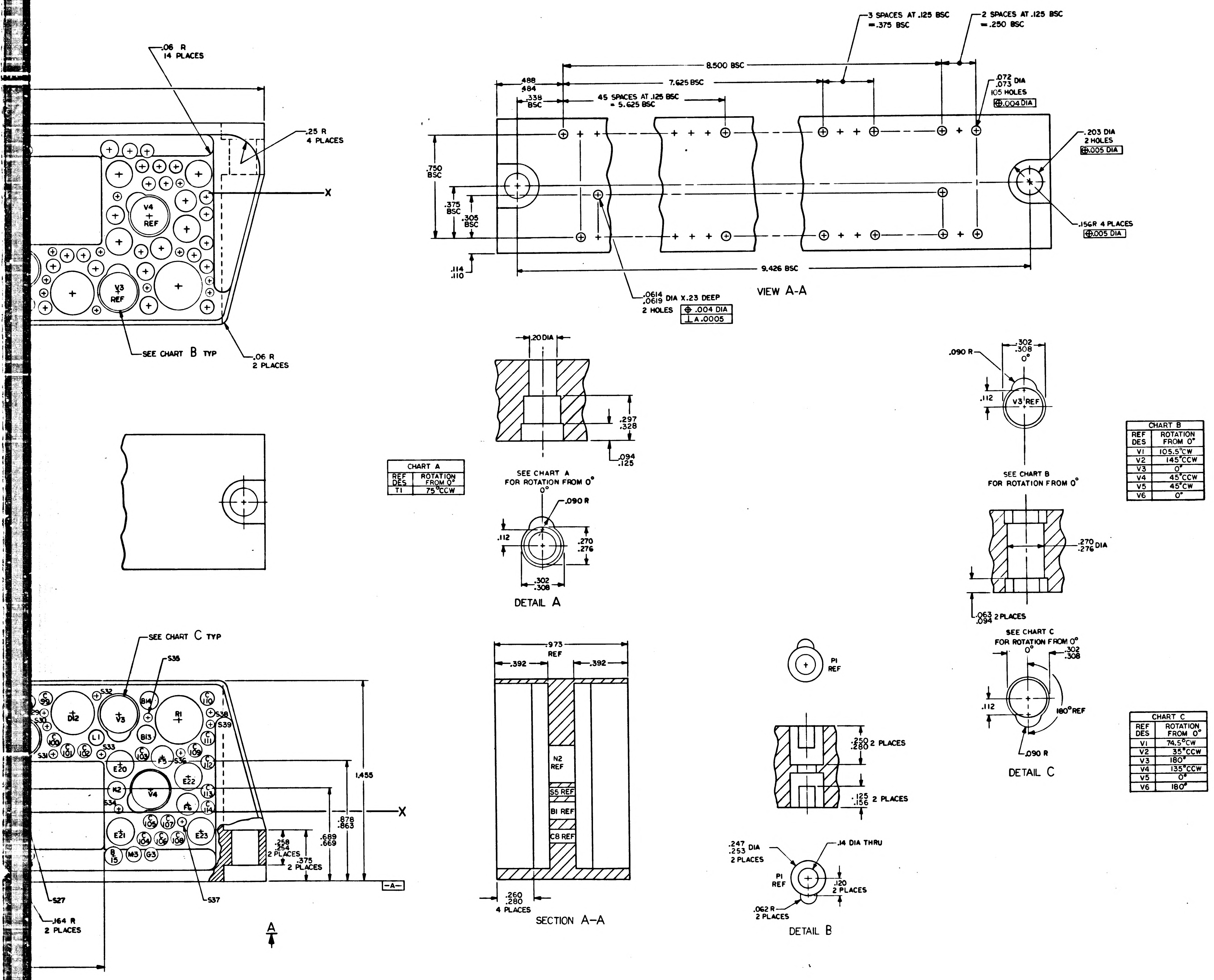

.06 R
14 PLACES
.25 R
4 PLACES
X
V4 REF
V3 REF
SEE CHART B TYP
.06 R
2 PLACES
3 SPACES AT .125 BSC = .375 BSC
2 SPACES AT .125 BSC = .250 BSC
8.500 BSC
7.625 BSC
.488
.484
.338 BSC
45 SPACES AT .125 BSC = 5.625 BSC
.072
.073 DIA
105 HOLES
⊕ .004 DIA
.203 DIA
2 HOLES
⊕ .005 DIA
.750 BSC
.375 BSC
.305 BSC
.156R 4 PLACES
⊕ .005 DIA
.114
.110
9.426 BSC
.0614
.0619 DIA X.23 DEEP
2 HOLES ⊕ .004 DIA
⊥ A .0005
VIEW A-A
.20 DIA
.297
.328
.094
.125
SEE CHART A
FOR ROTATION FROM 0°
0°
.090 R
.112
.270
.276
.302
.308
DETAIL A
.090 R
.302
.308
0°
.112
V3 REF
SEE CHART B
FOR ROTATION FROM 0°
.270
.276 DIA
.063
.094 2 PLACES
SEE CHART C
FOR ROTATION FROM 0°
0°
.302
.308
.112
180° REF
.090 R
DETAIL C
SEE CHART C TYP
S35
S32
D12
V3
B14
R1
S38
S39
L1
B13
S33
S31
S30
E20
F5
S36
E22
K2
V4
F6
S34
E21
M3
G3
E23
S27
S37
.164 R
2 PLACES
1.455
.878
.863
.689
.669
.258
.254
2 PLACES
.375
2 PLACES
X
A
A
.973
REF
.392
.392
N2 REF
S5 REF
B1 REF
C8 REF
.260
.280
4 PLACES
SECTION A-A
P1 REF
.250
.280 2 PLACES
.125
.156 2 PLACES
.247
.253 DIA
2 PLACES
.14 DIA THRU
P1 REF
.120
2 PLACES
.062 R
2 PLACES
DETAIL B
4
3
2
1
D
C
B
A

CHART A	
REF DES	ROTATION FROM 0°
T1	75°CCW

CHART B	
REF DES	ROTATION FROM 0°
V1	105.5°CW
V2	145°CCW
V3	0°
V4	45°CCW
V5	45°CW
V6	0°

CHART C	
REF DES	ROTATION FROM 0°
V1	74.5°CW
V2	35°CCW
V3	180°
V4	135°CCW
V5	0°
V6	180°

REVISIONS 19907
SYM | DESCRIPTION | DATE | APPROVAL

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX±.005 .XX±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 3

MIT INSTRUMENTATION LAB CAMBRIDGE MASS
DRAWN B. Pagia DATE 1965
CHECKED 1 JUN 65
APPROVAL R.V. 1965
APPROVAL A.R. 6/7/65
NASA APPROVAL 6/4
MIT APPROVAL

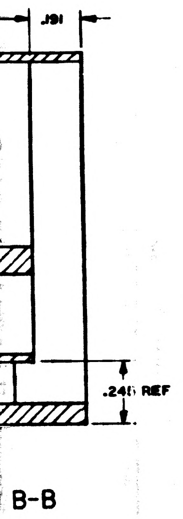
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
MSA & QUADRATURE REJECTION
CDU ELECTRONICS

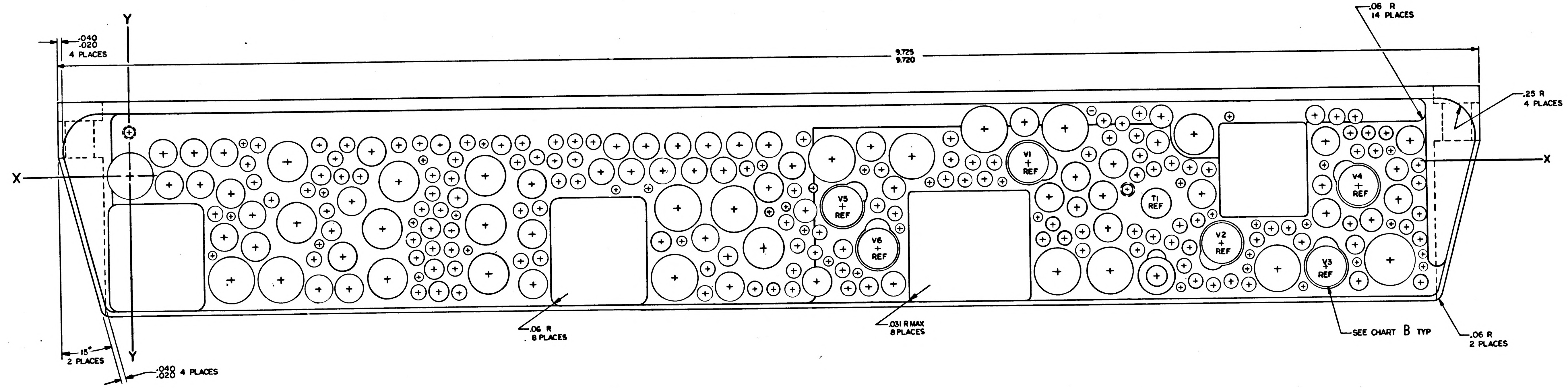
2007206	
NEXT ASSY	USED ON
APPLICATION	

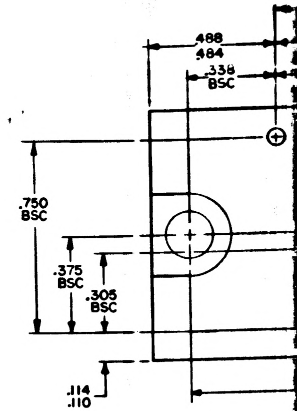
CODE IDENT NO. 80230 | SIZE J | NASA DRAWING NO. 2008300
SCALE 4/1 | WT | SHEET 1 OF 1

2008300



B-B


.040
.020
4 PLACES
9.725
9.720
.06 R
14 PLACES
.25 R
4 PLACES
X
Y
V1 REF
V5 REF
V6 REF
T1 REF
V4 REF
V2 REF
V3 REF
15°
2 PLACES
.040
.020 4 PLACES
.06 R
8 PLACES
.031 R MAX
8 PLACES
SEE CHART B TYP
.06 R
2 PLACES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.484
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BSC
.750
BSC
.375
BSC
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BSC
.114
.110

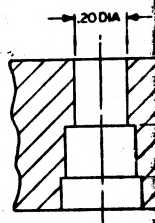
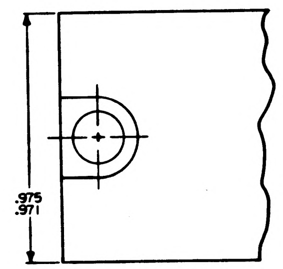
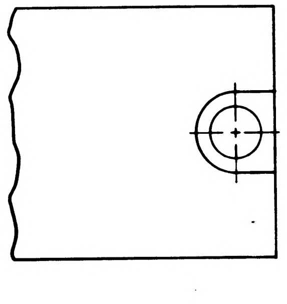
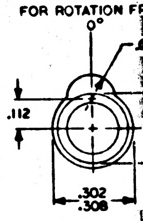


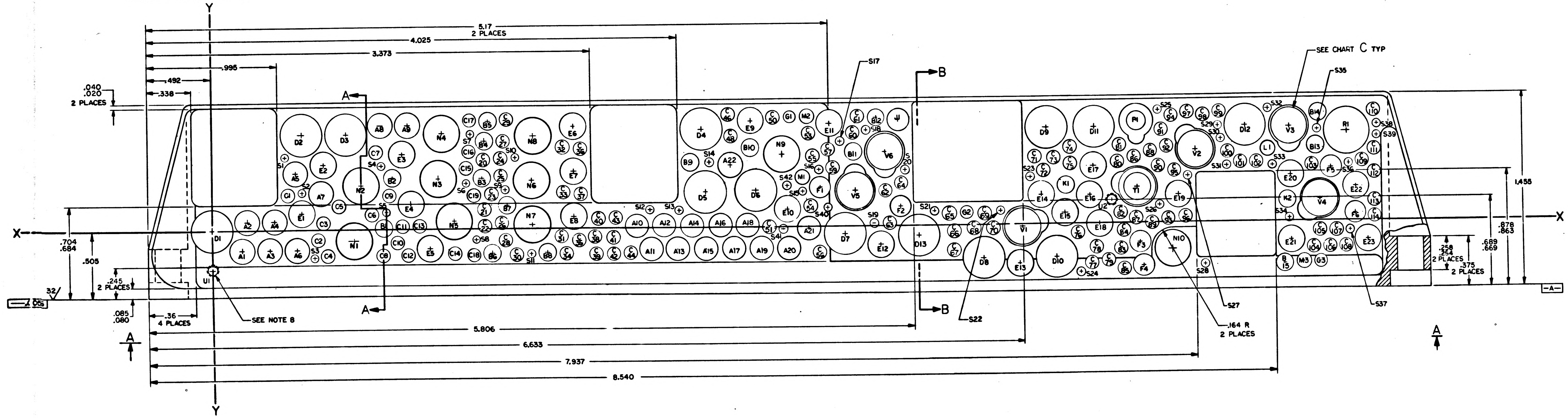
CHART A	
REF DES	ROTATION FROM 0°
T1	75° CCW

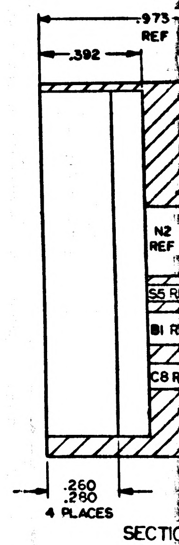





SEE CHART A
FOR ROTATION FR
0°
.112
.302
.308

DETAIL A


Y
5.17
2 PLACES
4.025
3.373
.995
.492
.338
.040
.020
2 PLACES
A
B
S17
SEE CHART C TYP
S35
1.455
X
.704
.684
.505
.245
2 PLACES
32
.005
.085
.080
.36
4 PLACES
SEE NOTE 8
S22
.164 R
2 PLACES
S27
S37
.878
.863
.689
.669
.258
.254
2 PLACES
.375
2 PLACES
-A-
5.806
6.633
7.937
8.540
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13
N1 N2 N3 N4 N5 N6 N7 N8 N9 N10
V1 V2 V3 V4 V5 V6
T1 R1 L1 K1 K2 P1 U1 U2
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23
F1 F2 F3 F4 F5 F6
G1 G2 G3
M1 M2 M3
B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15
A


.973
REF
.392
N2
REF
.260
.290
4 PLACES

SECTIO

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2008300

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.225	—.150	.181 .185	22
A2	.265	.065		
A3	.435	—.150		
A4	.475	.065		
A5	.642	.425		
A6	.645	—.150		
A7	.836	.275		
A8	1.287	.780		
A9	1.492	.780		
A10	3.225	.016		
A11	3.330	—.161		
A12	3.430	.016		
A13	3.535	—.161		
A14	3.635	.016		
A15	3.744	—.161		
A16	3.852	.016		
A17	3.955	—.161		
A18	4.057	.016		
A19	4.160	—.161		
A20	4.365	—.161		
A21	4.525	—.017		
A22	3.933	.468		
B1	1.310	.005	.127 .131	15
B2	1.377	.387		
B3	2.060	.380		
B4	2.080	.658		
B5	2.107	.808		
B6	2.130	—.180		
B7	2.245	.175		
B8	2.545	—.180		
B9	3.630	.490		
B10	4.085	.595		
B11	4.862	.557		
B12	5.038	.808		
B13	8.368	.560		
B14	8.386	.808		
B15	8.120	—.318		
C1	.580	.268	.100 .104	58
C2	.806	—.075		
C3	.850	.053		
C4	.878	—.195		
C5	.970	.170		
C6	1.218	.110		
C7	1.267	.580		
C8	1.300	—.195		
C9	1.356	.250		
C10	1.408	—.100		
C11	1.450	.022		
C12	1.487	—.195		
C13	1.580	.022		
C14	1.845	—.180		
C15	1.943	.455		
C16	1.957	.580		
C17	1.967	.817		
C18	1.992	—.195		
C19	2.000	.250		
C20	2.068	.518		
C21	2.075	.143		
C22	2.075	.017		
C23	2.130	.260		
C24	2.200	.528		
C25	2.200	.397		
C26	2.203	.042		
C27	2.218	.663		
C28	2.230	—.085		
C29	2.250	.820		
C30	2.315	—.195		
C31	2.653	—.060		
C32	2.672	.610		
C33	2.672	.270		
C34	2.688	—.188		
C35	2.776	—.090		
C36	2.802	.597		
C37	2.802	.255		
C38	2.905	—.065		
C39	2.917	—.195		
C40	2.935	.072		
C41	3.045	—.065		
C42	3.045	—.195		
C43	3.065	.080		
C44	3.169	—.185		
C46	3.920	.843		
C48	3.940	.680		
C50	4.260	.817		
C51	4.225	.000		
C53	4.528	.693		
C54	4.540	.150		
C55	4.555	.527		
C56	4.600	—.195		
C57	4.670	.573		
C59	4.710	.437		
C60	4.857	.700		
C61	4.895	.820		
C62	5.102	.262		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
C63	5.135	.020	.100 .104	52
C64	5.223	.313		
C65	5.580	.087		
C66	5.617	—.045		
C67	5.617	—.185		
C68	5.765	—.023		
C69	5.845	.087		
C70	5.910	—.023		
C71	6.227	.505		
C72	6.295	.400		
C73	6.375	.495		
C74	6.500	.573		
C75	6.500	.448		
C76	6.555	—.070		
C77	6.660	—.295		
C78	6.698	—.178		
C79	6.785	—.275		
C80	6.855	.458		
C81	6.870	.585		
C82	6.875	.080		
C83	6.880	—.190		
C84	6.900	—.055		
C85	6.900	—.340		
C86	6.987	.497		
C87	6.993	.035		
C88	7.107	.537		
C89	7.118	.000		
C90	7.166	.425		
C91	7.188	.695		
C92	7.230	.570		
C93	7.241	.030		
C94	7.266	.800		
C95	7.290	.390		
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C97	7.38[illegible]	.823		
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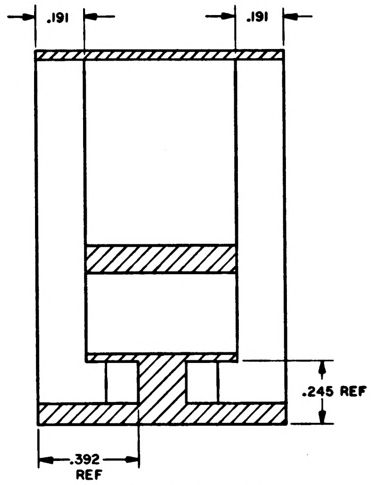
C100	7.693	.525		
C101	7.790	.445		
C102	7.914	.445		
C103	8.335	.418		
C104	8.345	—.193		
C105	8.395	—.068		
C106	8.470	—.193		
C107	8.520	—.068		
C108	8.595	—.193		
C109	8.720	.445		
C110	8.814	.823		
C111	8.814	.530		
C112	8.814	.360		
C113	8.814	.150		
C114	8.814	.026		
D1	.000	.000	.309 .316	13
D2	.686	.715		
D3	1.023	.715		
D4	3.717	.735		
D5	3.744	.265		
D6	4.130	.278		
D7	4.795	—.060		
D8	5.839	—.250		
D9	6.323	.720		
D10	6.394	—.250		
D11	6.683	.720		
D12	7.835	.717		
D13	5.351	—.073		
E1	.683	.125	.202 .206	23
E2	.852	.488		
E3	1.450	.565		
E4	1.518	.190		
E5	1.655	—.142		
E6	2.750	.767		
E7	2.750	.427		
E8	2.750	.087		
E9	4.090	.800		
E10	4.365	.132		
E11	4.687	.770		
E12	5.065	—.142		
E13	6.116	—.295		
E14	6.280	.220		
E15	6.460	.080		
E16	6.645	.212		
E17	6.675	.430		
E18	6.720	.005		
E19	7.319	.210		
E20	8.175	.347		
E21	8.177	—.142		
E22	8.672	.255		
E23	8.763	—.142		
F1	4.613	.287	.153 .157	6
F2	5.218	.147		
F3	7.025	—.145		
F4	7.050	—.322		
F5	8.492	.398		
F6	8.664	.052		

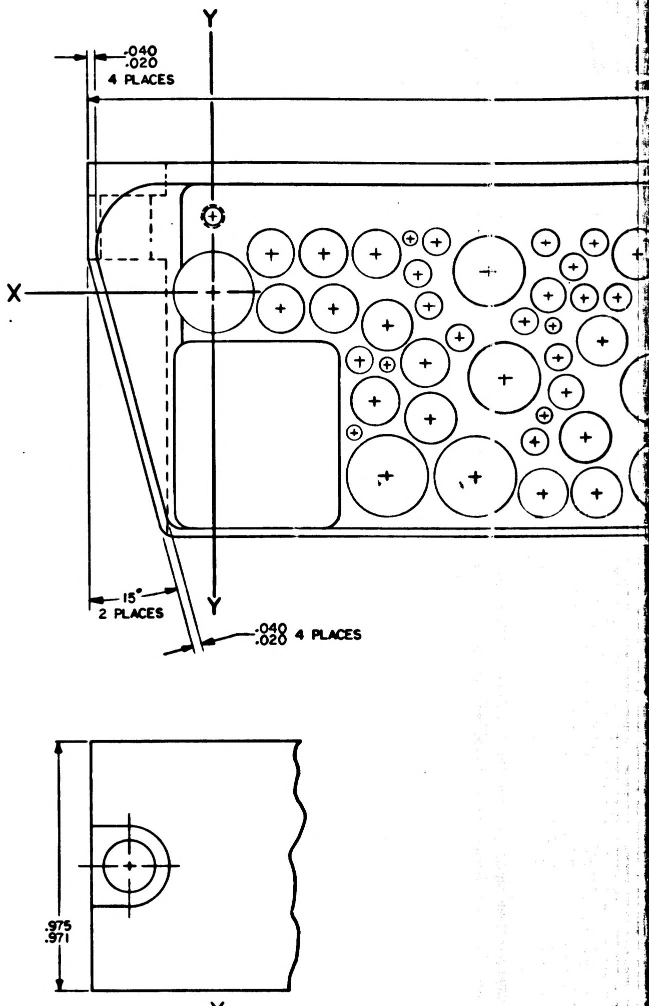
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	4.385	.820	.092 .096	3
G2	5.710	.095		
G3	8.395	—.305		
J1	5.206	.790	.165 .169	1
K1	6.470	.290	.124 .129	2
K2	8.150	.160		
			.112 .116	1
L1	8.005	.540		
M1	4.480	.369	.105 .109	3
M2	4.515	.822		
M3	8.267	—.305		
N1	1.082	—.083	.270 .276	10
N2	1.141	.330		
N3	1.725	.381		
N4	1.756	.717		
N5	1.847	.063		
N6	2.435	.363		
N7	2.435	.028		
N8	2.448	.697		
N9	4.322	.547		
N10	7.269	—.193		
V1	6.141	—.020	SEE DETAIL C	6
V2	7.455	.545		
V3	8.167	.709		
V4	8.400	.160		
V5	4.869	.266		
V6	5.100	.552		
P1	7.000	.751	SEE DETAIL B	1
R1	8.609	.670	.346 .353	1
S1	.561	.545	.058 .062	42
S2	.687	.283		
S3	.775	—.210		
S4	1.292	.480		
S5	1.325	.128		
S6	1.937	.343		
S7	1.974	.708		
S8	2.010	—.078		
S9	2.235	.294		
S10	2.312	.535		
S11	2.424	—.185		
S12	3.325	.137		
S13	3.543	.131		
S14	3.770	.490		
S15	4.480	.260		
S16	4.603	.425		
S17	4.763	.637		
S18	4.964	.715		
S19	5.017	.012		
S20	5.256	.418		
S21	5.470	.105		
S22	5.965	.105		
S23	6.196	.350		
S24	6.573	—.364		
S25	7.165	.844		
S26	7.175	.135		
S27	7.392	.349		
S28	7.518	—.315		
S29	7.626	.720		
S30	7.645	.625		
S31	7.689	.422		
S32	8.005	.844		
S33	8.035	.422		
S34	8.162	.024		
S35	8.377	.685		
S36	8.617	.443		
S37	8.624	—.075		
S38	8.835	.721		
S39	8.835	.639		
S40	4.670	.140		
S41	4.330	—.018		
S42	4.358	.309		
T1	7.005	.266	SEE DETAIL A	1
U1	.000	—.297	NO. 2(.086) –56UNC –2B	2
U2	6.807	.172		

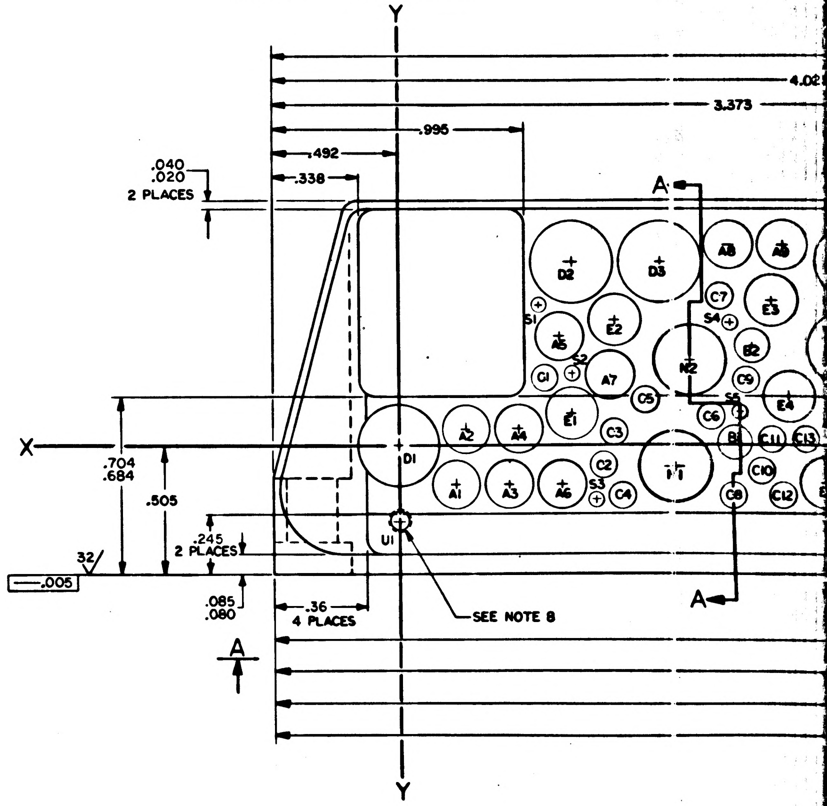
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAG ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040



SECTION B-B

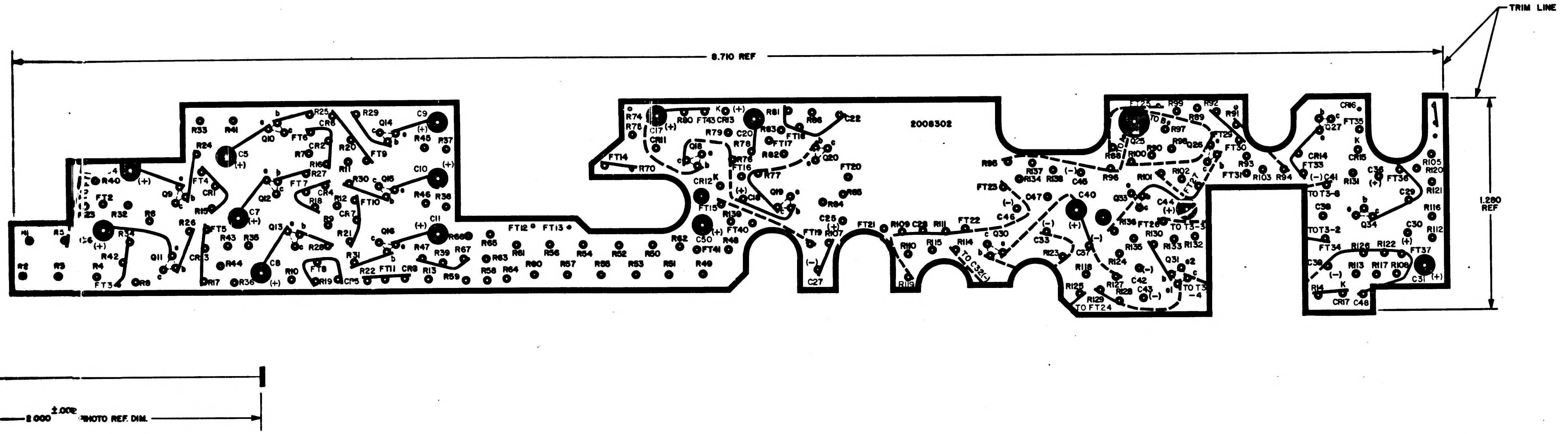




2008300

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 22515	13 Sep 65	26

REVISIONS 19722



H STANDARDS PRESCRIBED BY MIL-D-70327
RODUCTION MADE BY A PROCESS OR
STABILITY
LM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Van Vleck DATE 7/19/65
CHECKED R. Kaslow 15JUN65
APPROVAL R V Van Buren
APPROVAL A.B. 6/3/65
NASA APPROVAL
MIT APPROVAL 8 Jun 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
MSA & QUADRATURE REJECTION MODULE

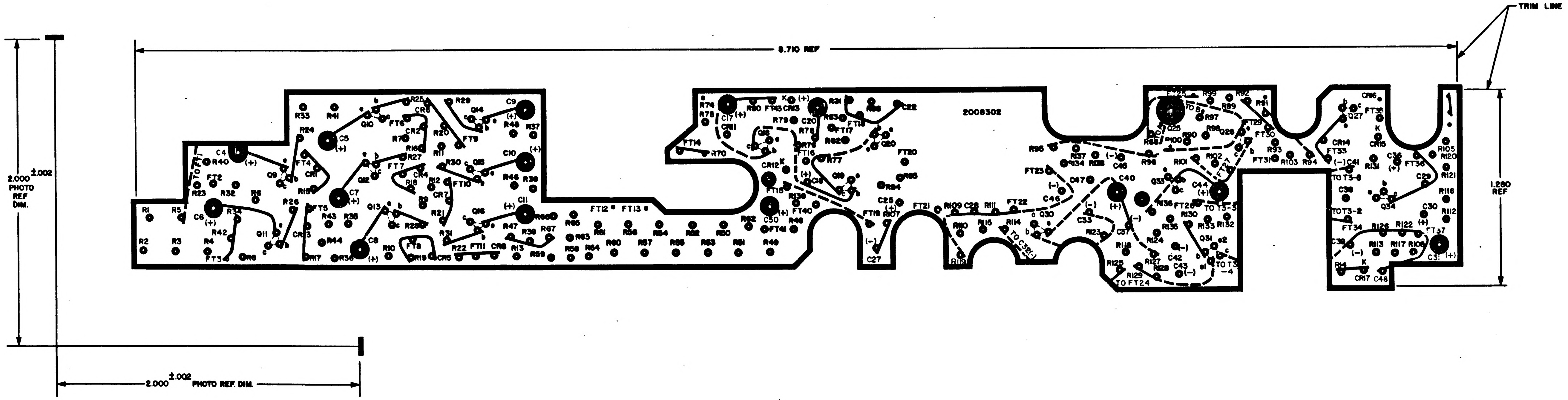
CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2008301
SCALE 4/1 WT SHEET 1 OF 1

2008301 A

MASTER

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

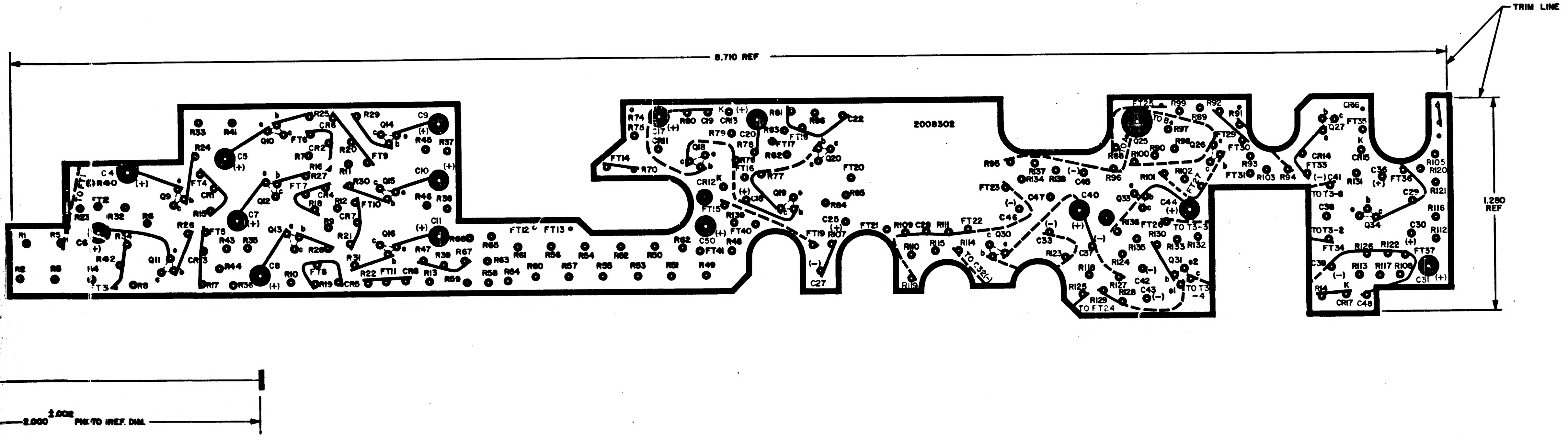
QTY REQD

MIT
INSTRUMENTATION
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

2008301 A

2008301

REVISIONS 1993			
SYM	DESCRIPTION	DATE	APPROVAL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1.280 REF
2008302
2.000 ±.002 PHOTO REF. DIM.
C4 C5 C7 C8 C9 C10 C11 C17 C20 C22 C25 C27 C31 C40 C44 C50
R24 R25 R29 R33 R41 R46 R37 R38 R70 R74 R80 R81 R96 R105 R120 R121 R116 R112
Q9 Q10 Q11 Q13 Q14 Q15 Q16 Q18 Q20 Q25 Q26 Q27 Q30 Q31 Q33 Q34
CR1 CR2 CR3 CR4 CR5 CR6 CR7 CR12 CR14 CR15 CR16 CR17
FT1 FT2 FT3 FT4 FT5 FT6 FT7 FT8 FT9 FT10 FT11 FT12 FT13 FT14 FT15 FT16 FT17 FT18 FT19 FT20 FT21 FT22 FT23 FT25 FT26 FT27 FT28 FT29 FT30 FT31 FT33 FT34 FT35 FT36 FT37 FT40 FT41
TO T3-6
TO T3-2
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TANDARDS PRESCRIBED BY MIL-D-70327
UCTION MADE BY A PROCESS OR
TABILITY
TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN Kim Kieley DATE 7/1/65
CHECKED R. Kaden 1JUN65
APPROVAL R V Van Dusen
APPROVAL A.B. Fest 6/7/65
NASA APPROVAL 6/8/65
MIT APPROVAL W. Kopp Jun 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008301
SCALE 4/1	WT	SHEET 1 OF 1

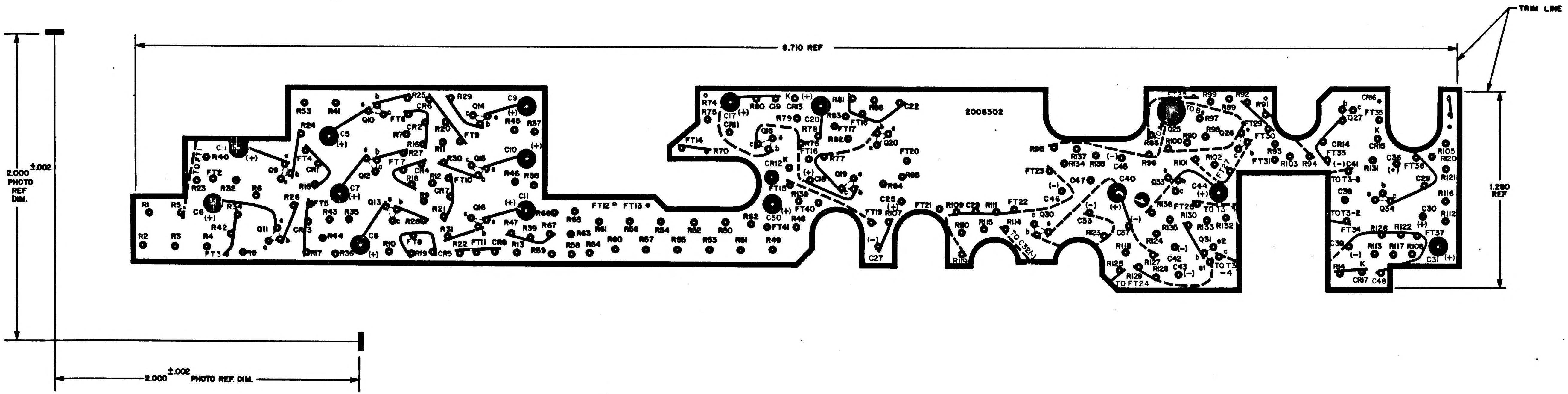
2008301

2008301

2H

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


TRIM LINE
8.710 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF. DIM.
1.280 REF
2008302
R1
R2
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C6 (+)
R40
FT2
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R42
R4
FT3
Q9
Q11
R24
R33
R41
C5 (+)
C7 (+)
C8 (+)
Q10
Q12
Q13
Q14
Q15
Q16
C9 (+)
C10 (+)
C11 (+)
FT4
FT5
FT6
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C17
CR11
R80
C19
CR13
R81
C20
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FT16
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FT21
FT22
FT23
Q18
Q19
Q20
C25
C27
C50
FT40
FT41
R49
R109
C28
R111
R114
R115
Q30
C33
C40
C44
C46
C47
Q25
Q26
Q33
FT30
FT31
R103
R94
CR16
Q27
FT35
CR14
FT33
C41
R131
C36
FT36
C38
TO T3-6
TO T3-2
Q34
C30
FT34
R126
R122
R117
R108
FT37
C31 (+)
R14
CR17
C48
R105
R120
R121
R116
R112
TO FT24
TO T3-4
TO C32

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

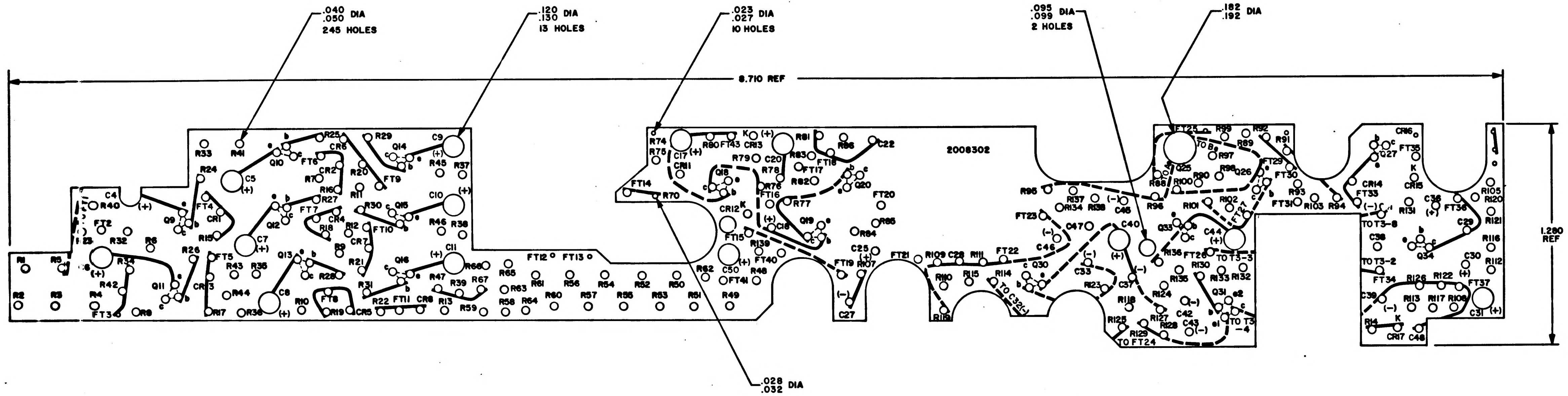
QTY REQD
PART IDENTIFYING

MIT
INSTRUMENTATION
CAMBRIDGE, MASS.
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

2008301

2008302 A

REVISIONS 19903			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 22515	[illegible]	MFK



.040 DIA
.050
245 HOLES
.120 DIA
.130
13 HOLES
.023 DIA
.027
10 HOLES
.095 DIA
.099
2 HOLES
.182 DIA
.192
8.710 REF
1.280 REF
.028 DIA
.032
2008302

STANDARDS PRESCRIBED BY MIL-D-70327
PER MIL-P-181`7 TYPE GEE
ER NO 1002133
02019

REF: DRAWING NO. 2008301 FOR
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Von Hrdy DATE 10 [illegible]
CHECKED Rotiroleni JUN65
APPROVAL [illegible] 5TJ[illegible]
APPROVAL [illegible] 6/7/65
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2008302
SCALE 4/1
WT
SHEET 1 OF 1

MASTER

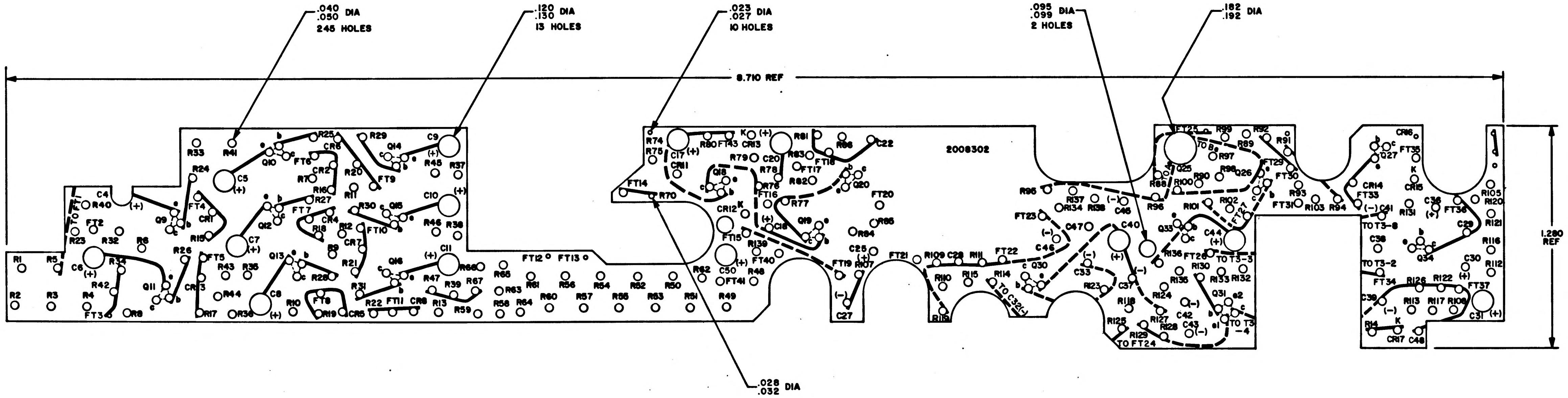
2008302 A

2H

2008302 A

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.040
.050 DIA
245 HOLES
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13 HOLES
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10 HOLES
.095
.099 DIA
2 HOLES
.182
.192 DIA
8.710 REF
1.280
REF
.028
.032 DIA
2008302
TO C32(-)
TO FT24
TO T3-3
TO T3-4
TO T3-8
TO T3-2

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF: DRAWING NO.
PHOTOGRAPH

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH

QTY REQD | PART IDENTIFYING

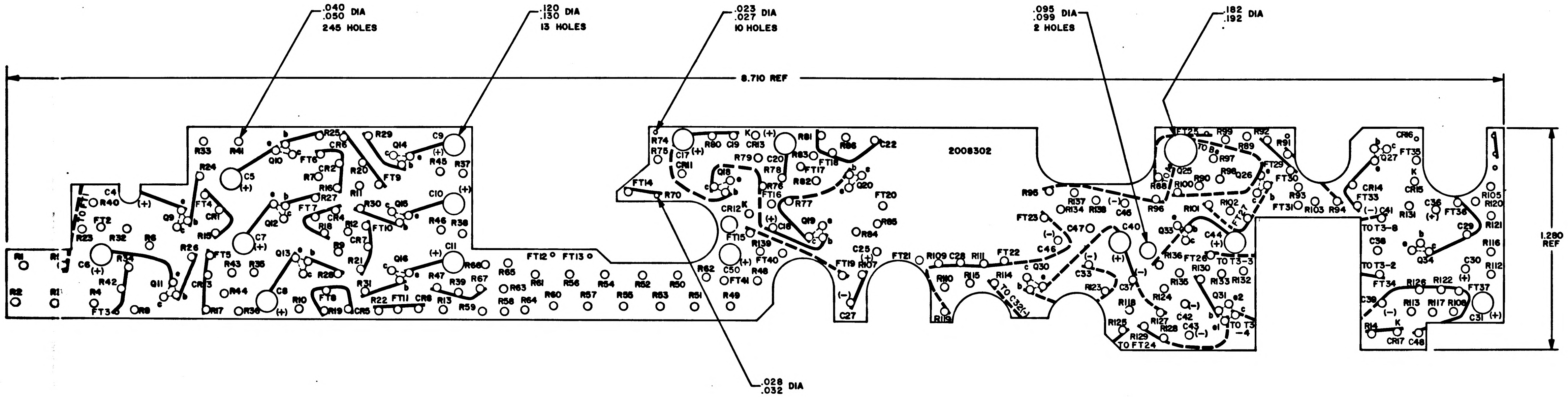
MIT
INSTRUMENTATION
Cambridge Mass

DRAWN Van Wagner
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

2008302 A

2008302

REVISIONS 19903			
SYM	DESCRIPTION	DATE	APPROVAL



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2008302
TO FT24
TO T3-3
TO T3-4
TO T3-2
TO T3-8
TO C32(-)

TH STANDARDS PRESCRIBED BY MIL-D-70327
ICK PER MIL-P- 48177 TYPE GEE
T PER ND 1002133
1002019

REF: DRAWING NO. 2008301 FOR
PHOTOGRAPHIC MASTER

2H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Ken Healy DATE 10 APR 65
CHECKED R. Lindemann 1 JUN 65
APPROVAL P V Vasquez 3 JUN 65
APPROVAL 6/7/65
NASA APPROVAL
MIT APPROVAL 8 June 65

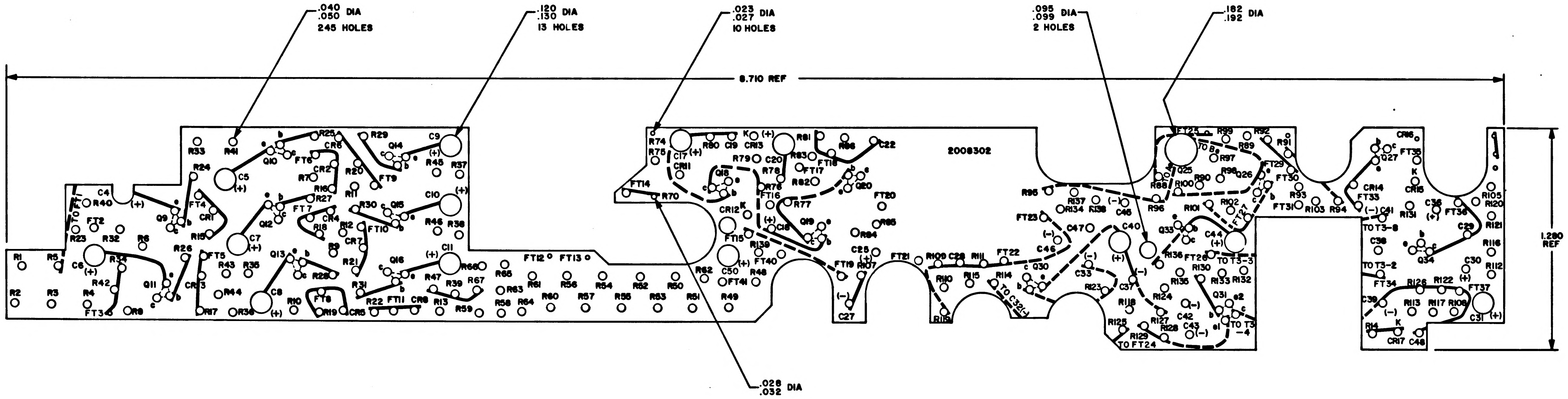
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO	SIZE	NASA DRAWING NO
80230	J	2008302
SCALE 4/1	WT	SHEET 1 OF 1

2008302

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.040 .050 DIA 245 HOLES
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.023 .027 DIA 10 HOLES
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.182 .192 DIA
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2008302
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CR1
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R17
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R25
CR6
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CR2
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C36
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TO T3-8
C38
Q34
C29
TO T3-2
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C30
R126
R122
C39
R14
CR17
C48
R117
R108
FT37
C31
R105
R120
R121
R116
R112

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

24

REF: DRAWING N
PHOTOGRAP

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

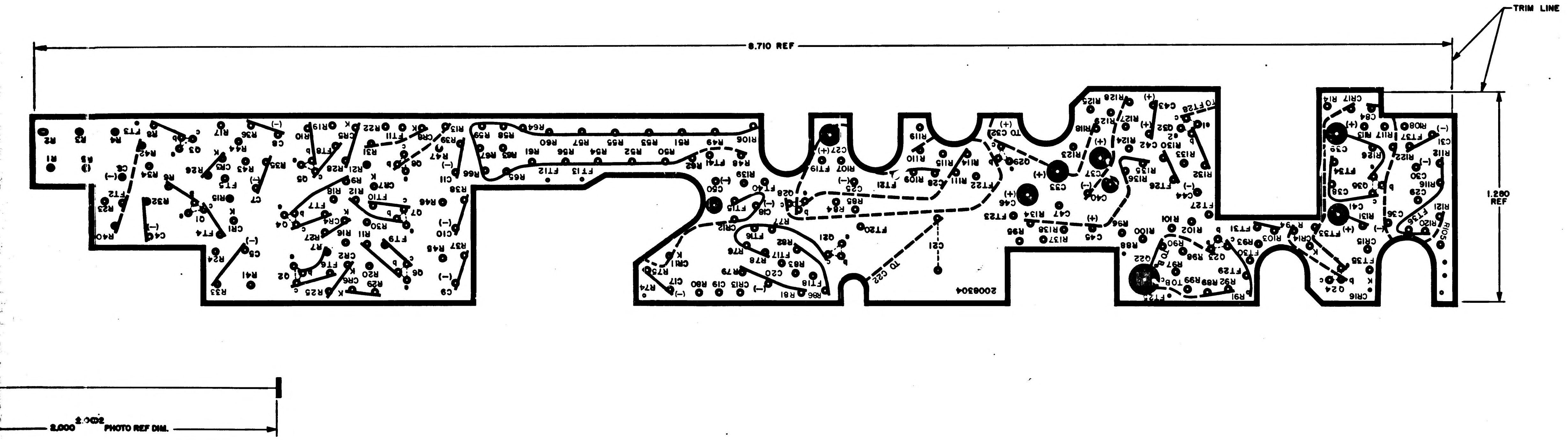
FINAL FINISH

QTY REQD

DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL

2008302

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS			



H STANDARDS PRESCRIBED BY MIL-D-70327
ODUCTION MADE BY A PROCESS OR
STABILITY
LMS TO DIMENSIONS SHOWN

2008303

3H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT

DRAWN DATE 6/4/65
CHECKED 4 JUN 65
APPROVAL RV
APPROVAL 6/7/65
NASA APPROVAL
MIT APPROVAL

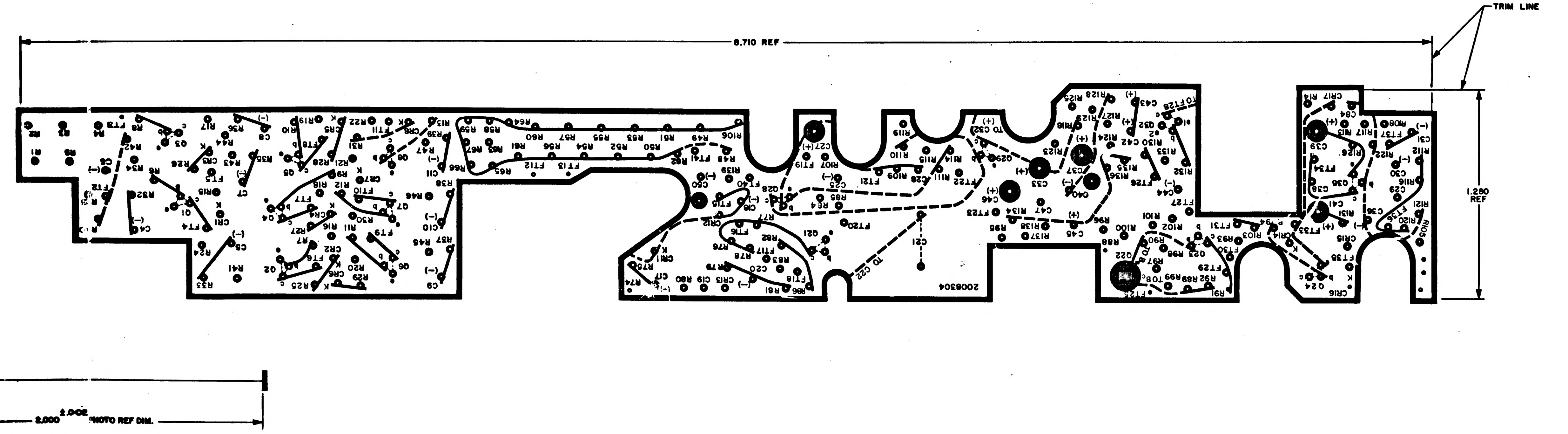
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD B
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008303
SCALE 4/1	WT	SHEET 1 OF 1

E2

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS		



TANDARDS PRESCRIBED BY MIL-D-70327
UCTION MADE BY A PROCESS OR
ABILITY
TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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APPLICATION	

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FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN Roy Healy DATE 6/4/65
CHECKED Petrolli 4JUN65
APPROVAL R V [illegible] 8JUN65
APPROVAL A. R. [illegible] 6/7/65
NASA APPROVAL [illegible] 6/[illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

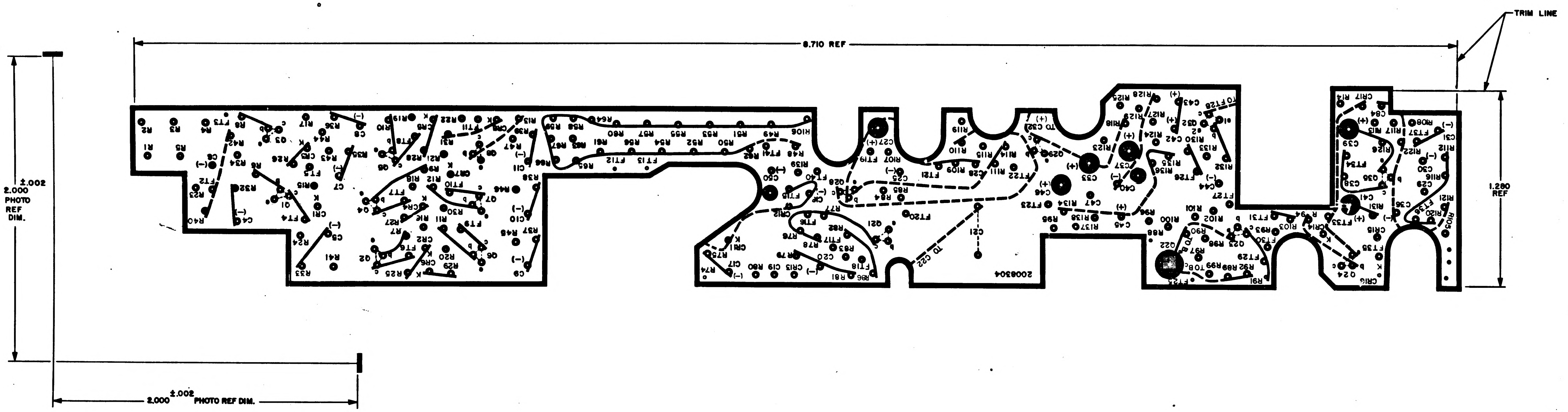
PHOTOGRAPHIC MASTER
WIRING BOARD B
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO
80230	J	2008303
SCALE 4/1	WT	SHEET 1 OF 1

2008303

2008303

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

JH

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

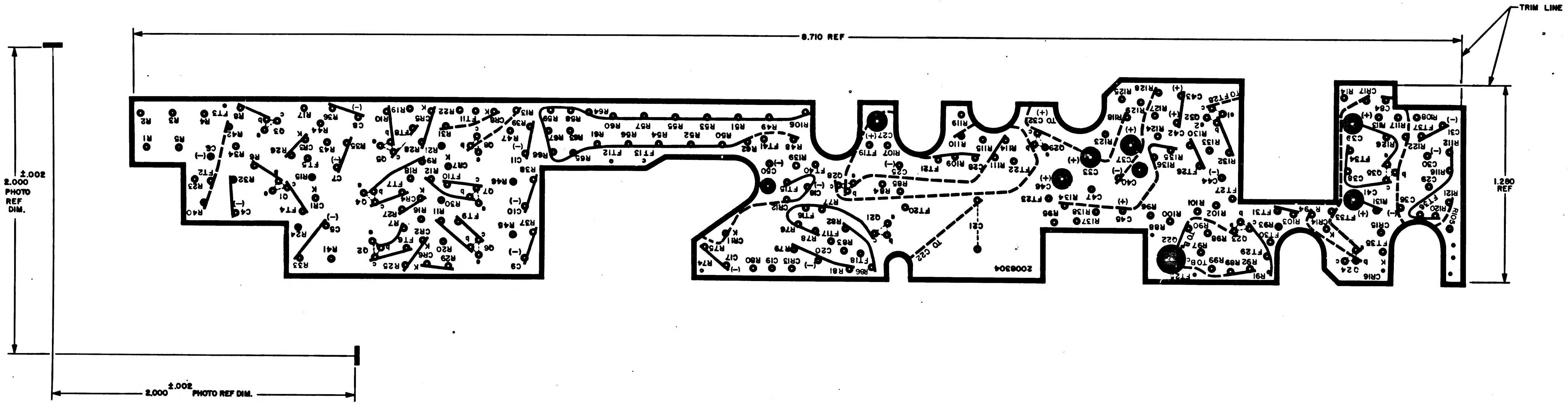
QTY REQD

INSTRUMENTATION

DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL

2008303

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

5H

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

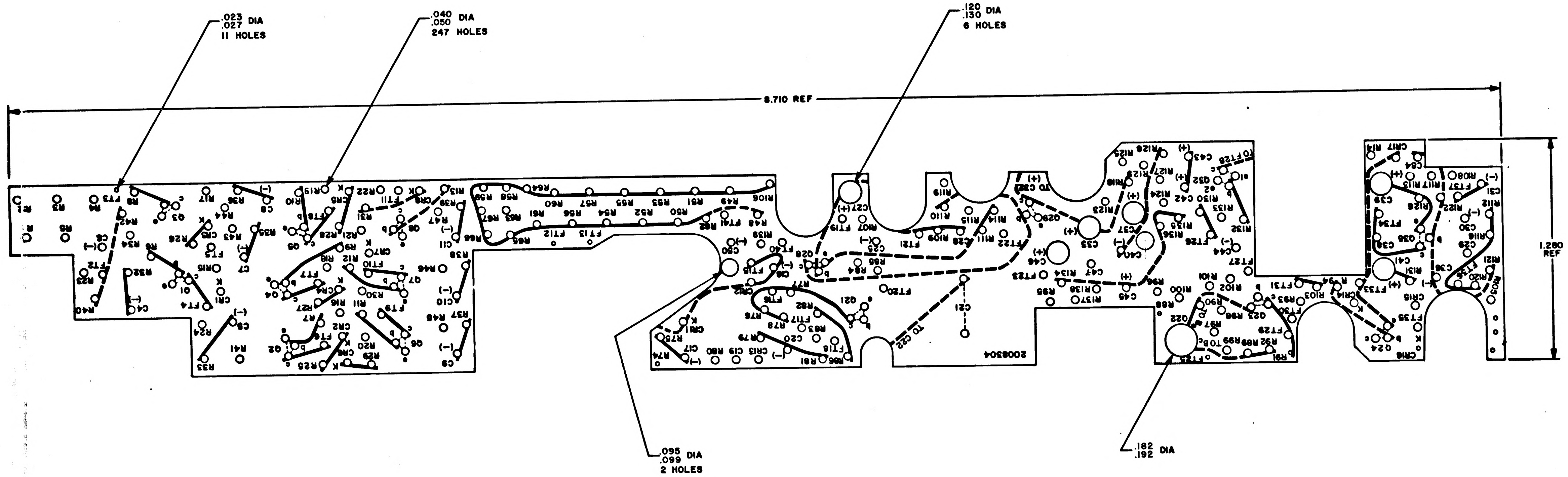
QTY REQD | PART IDENTIFY

MIT
INSTRUMENTATION
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

2008303

REVISIONS 19903			
SYM	DESCRIPTION	DATE	APPROVAL



.023 DIA
.027
11 HOLES
.040 DIA
.050
247 HOLES
.120 DIA
.130
6 HOLES
8.710 REF
1.280 REF
.095 DIA
.099
2 HOLES
.182 DIA
.192
2008304

ITH STANDARDS PRESCRIBED BY MIL-D-70327
HICK PER IMIL-P-18177 TYPE GEE
Y PER ND 1002133
D 1002019

REF: DRAWING NO. 2008303 FOR
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE May 25
CHECKED 4JUN65
APPROVAL R V 3JUN65
APPROVAL 6/7/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

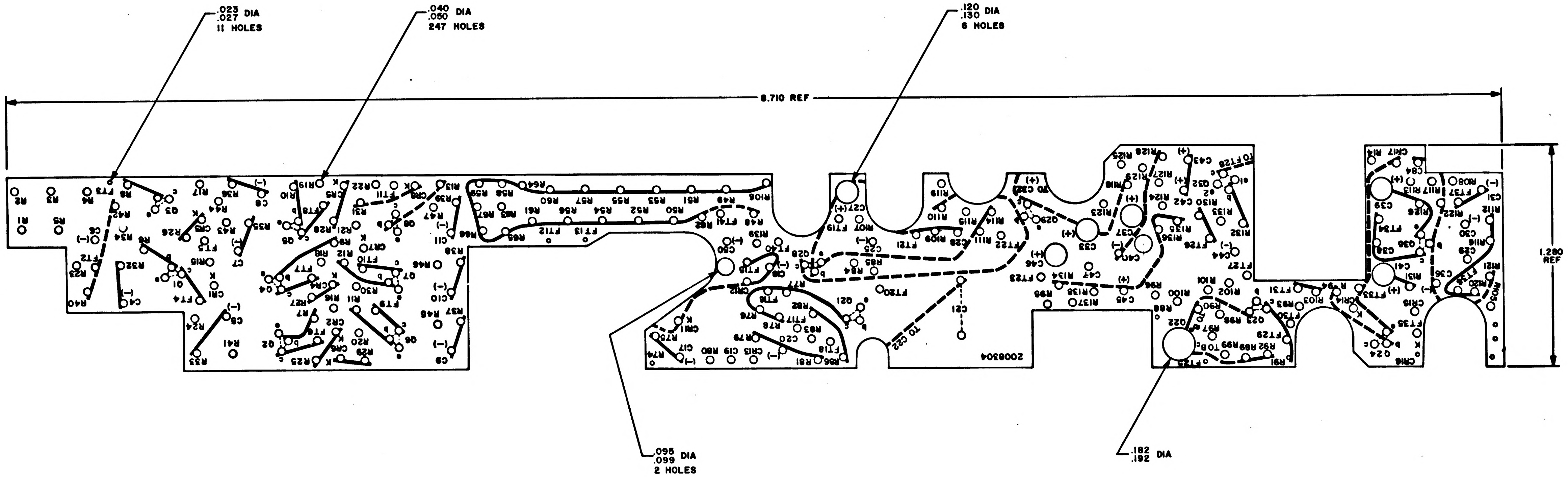
WIRING BOARD B
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008304
SCALE 4/1
WT
SHEET 1 OF 1

2008304

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF: DRAWING NO.
PHOTOGRAPH

JH

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH

QTY REQD

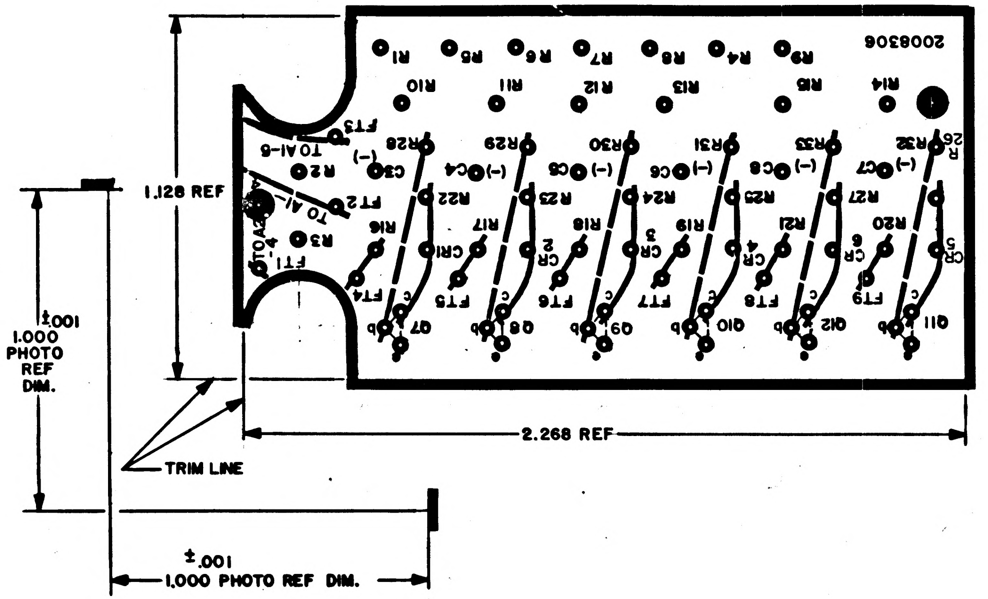
M I T
INSTRUMENTATION
CAMBRIDGE

DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

2008304

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 17285			
SYM	DESCRIPTION	DATE	APPROVAL


1.128 REF
±.001
1.000
PHOTO
REF
DIM.
TRIM LINE
2.268 REF
±.001
1.000 PHOTO REF DIM.
2008306
R1 R5 R6 R7 R8 R4 R9
R10 R11 R12 R13 R15 R14
FT3 TO AI-5 R28 R29 R30 R31 R33 R32
C3 (−) C4 (−) C5 (−) C6 (−) C8 (−) C7
R2 FT2 R22 R23 R24 R25 R27
TO AI-4 TO A2
R3 R16 CR1 R17 CR2 R18 CR3 R19 CR4 R21 CR6 R20 CR5
FT1 FT4 FT5 FT6 FT7 FT8 FT9
Q7 Q8 Q9 Q10 Q12 Q11

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM, TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis A Lowe DATE May 4 65
CHECKED Bonarrigo 20 ? 65
APPROVAL R V Viera 21 May 65
APPROVAL D. R. Fest 5/21/65
NASA APPROVAL [illegible]
MIT APPROVAL W Kupfer 2 Jun 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAHIC MASTER
WIRING BOARD A
QUADRANT SELECTOR MODULE

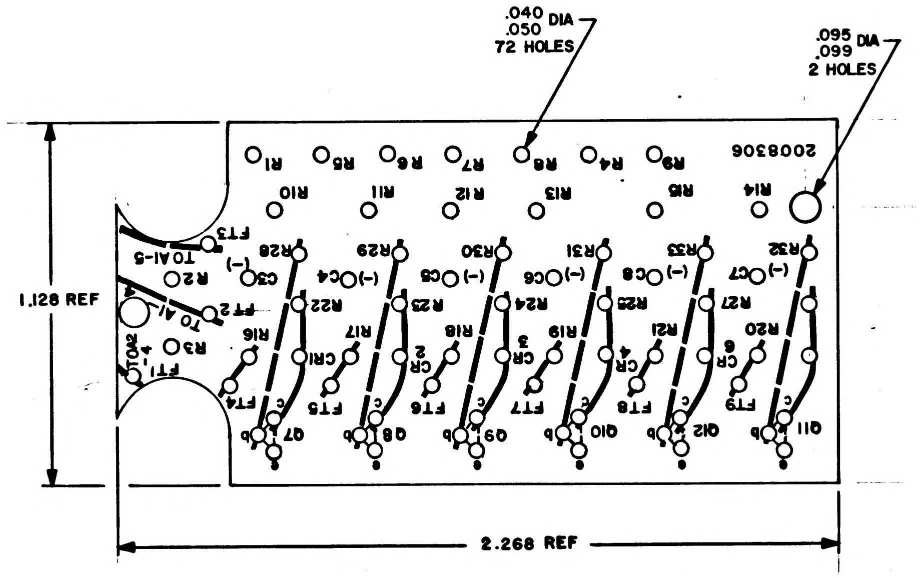
CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	D	2008305

SCALE 4/1 WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 19275

SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DRAWING NO.2008305 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007243	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN Louis A Lowe DATE 18/5/65
CHECKED Bonarrigo 20 May 65
APPROVAL R V [illegible] 21 May 65
APPROVAL D. R. [illegible] 5/21/65
NASA APPROVAL [illegible] 5/24/65
MIT APPROVAL W [illegible] 24 May 65

MANNED SPACECRAFT CENTE
HOUSTON, TEXAS

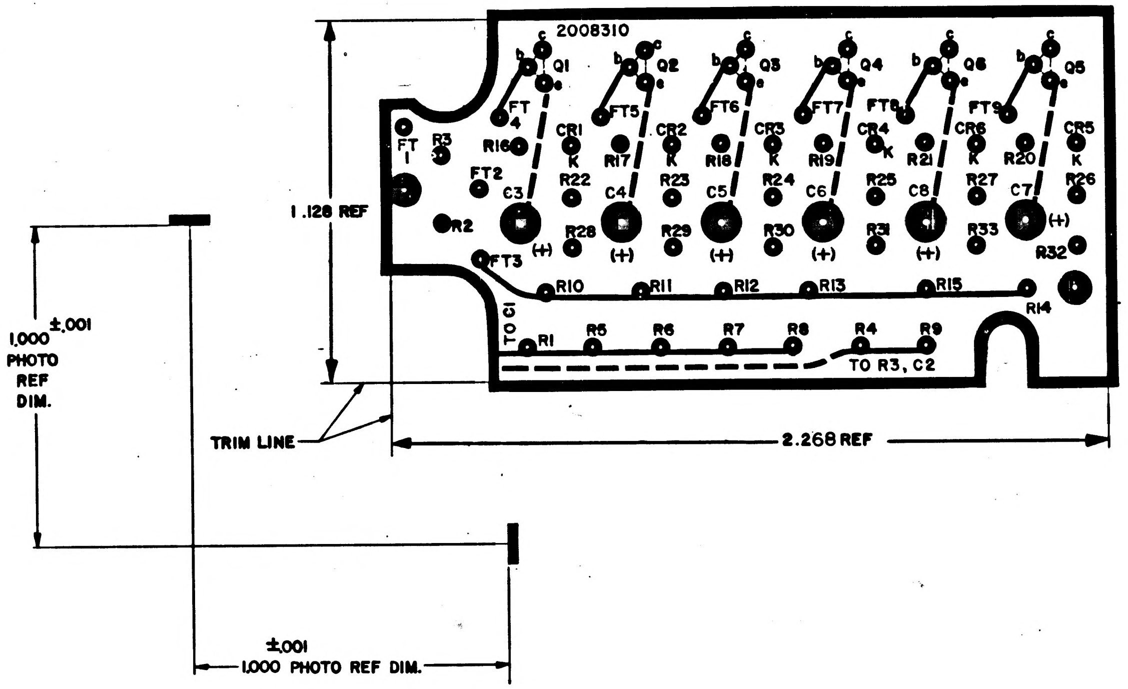
WIRING BOARD A
QUADRANT SELECTOR MODULE

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008306
SCALE 4/1
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19275

SYM	DESCRIPTION	DATE	APPROVAL


2008310
Q1
Q2
Q3
Q4
Q8
Q5
b
c
e
FT 4
FT5
FT6
FT7
FT8
FT9
FT 1
FT2
FT3
R3
R16
R17
R18
R19
R21
R20
CR1
CR2
CR3
CR4
CR6
CR5
K
R22
R23
R24
R25
R27
R26
C3
C4
C5
C6
C8
C7
(+)
R2
R28
R29
R30
R31
R33
R32
R10
R11
R12
R13
R15
R14
TO C1
R1
R5
R6
R7
R8
R4
R9
TO R3, C2
1.128 REF
2.268 REF
TRIM LINE
1.000 ±.001 PHOTO REF DIM.
±.001 1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN R.J. Hays DATE 4 May '65
CHECKED Bongarrigo 20 May 65
APPROVAL R.V. Vincenzi 21 May 65
APPROVAL D.A. Fout 5/21/65
NASA APPROVAL [illegible] 5/24/65
MIT APPROVAL [illegible] 24 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

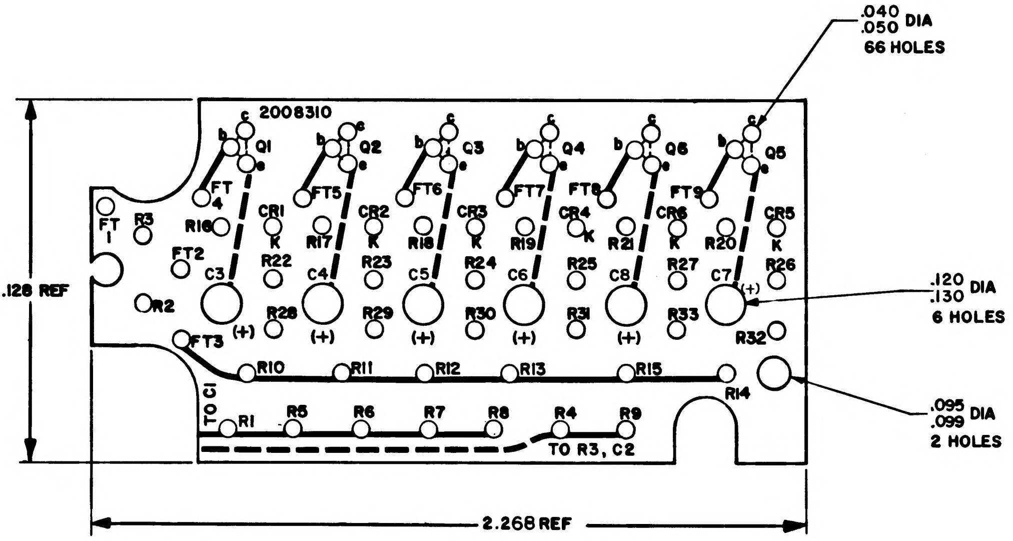
PHOTOGRAPHIC MASTER WIRING BOARD C
QUADRANT SELECTOR MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	D	2008309

SCALE 4/1 WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19285			
SYM	DESCRIPTION	DATE	APPROVAL


.040
.050 DIA
66 HOLES
2008310
Q1
Q2
Q3
Q4
Q6
Q5
b
c
e
FT 4
FT5
FT6
FT7
FT8
FT9
FT 1
R3
R16
CR1
K
R17
CR2
R18
CR3
R19
CR4
R21
CR6
R20
CR5
FT2
R22
R23
R24
R25
R27
R26
C3
C4
C5
C6
C8
C7
(+)
1.128 REF
R2
R28
R29
R30
R31
R33
R32
FT3
R10
R11
R12
R13
R15
R14
TO C1
R1
R5
R6
R7
R8
R4
R9
TO R3, C2
.120
.130 DIA
6 HOLES
.095
.099 DIA
2 HOLES
2.268 REF

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008309 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007243	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH —

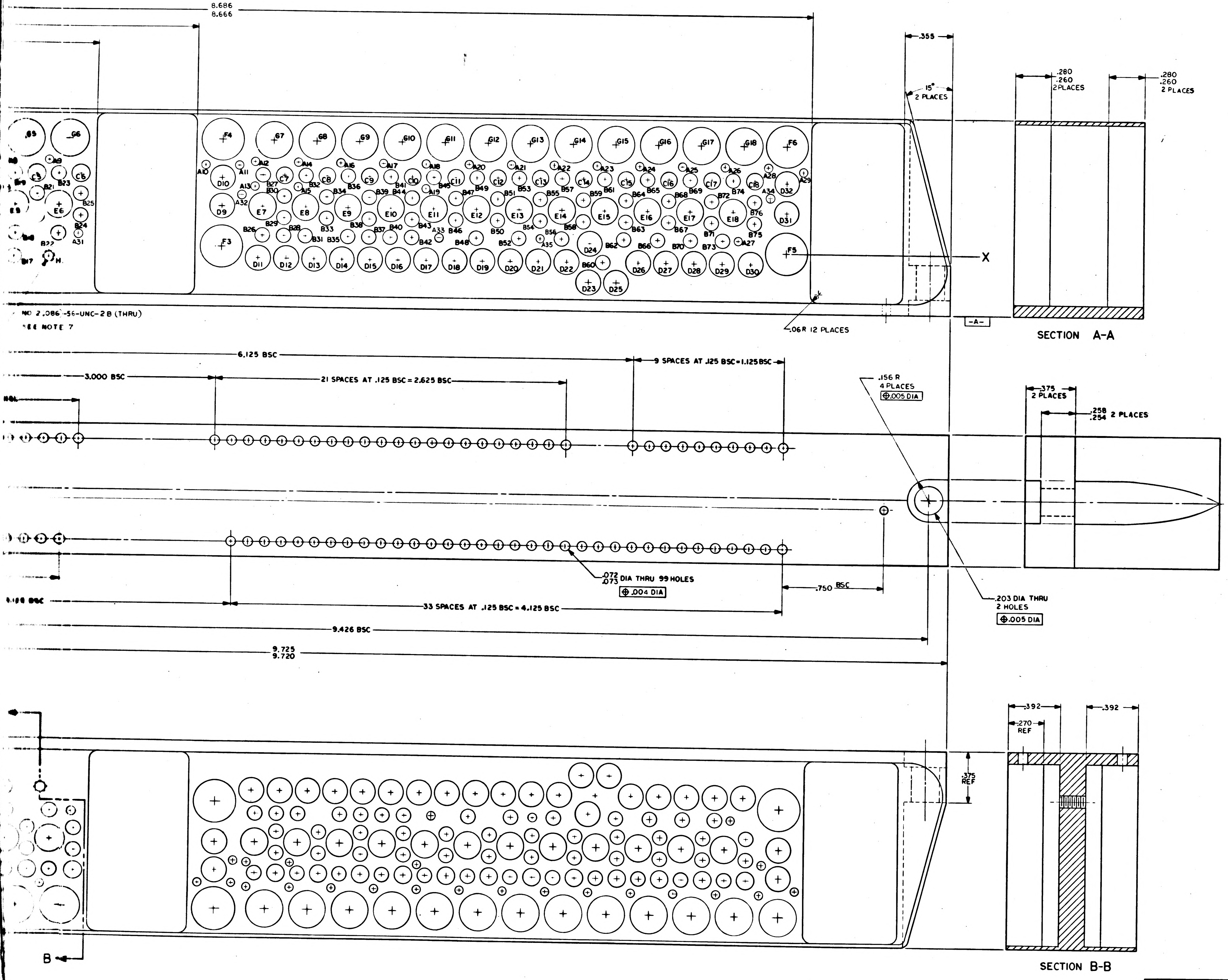
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN DATE 4 MAY 65
CHECKED Bobarrigo 20 May 65
APPROVAL R. V. 21 MAY 65
APPROVAL 5/21/65
NASA APPROVAL 5/26/65
MIT APPROVAL 26 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
QUADRANT SELECTOR MODULE

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008310
SCALE 4/1
WT —
SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 25810	9FEB66	


8.686
8.666
.355
15°
2 PLACES
.280
.260
2 PLACES
.280
.260
2 PLACES
X
NO 2 .086 -56-UNC-2 B (THRU)
SEE NOTE 7
.06R 12 PLACES
-A-
SECTION A-A
6.125 BSC
3.000 BSC
21 SPACES AT .125 BSC = 2.625 BSC
9 SPACES AT .125 BSC = 1.125 BSC
.156 R
4 PLACES
⊕ .005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.072
.073 DIA THRU 99 HOLES
⊕ .004 DIA
.750 BSC
33 SPACES AT .125 BSC = 4.125 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
9.426 BSC
9.725
9.720
.392
.392
.270
REF
.375
REF
B
SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007207	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT —

FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT

DRAWN DATE APR 5 65
CHECKED Bonaga 20 MAY 65
APPROVAL 21 MAY 65
APPROVAL 5/21/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
QUADRANT SELECTOR

CODE IDENT NO	SIZE	NASA DRAWING NO
80230	J	2008313
SCALE 4/1	WT —	SHEET 1 OF 1

2008313 A

2008313

S008313

2/2008313

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.125	.605	.058 .062	29
A2	.120	.415		
A3	.120	.195		
A4	.180	.635		
A5	.500	.635		
A6	.820	.635		
A7	1.140	.635		
A8	1.460	.635		
A9	1.780	.635		
A10	2.920	.605		
A11	3.170	.605		
A12	3.285	.635		
A13	3.285	.450		
A14	3.605	.635		
A15	3.605	.450		
A16	3.925	.635		
A17	4.245	.635		
A18	4.565	.635		
A19	4.565	.450		
A20	4.885	.635		
A21	5.205	.635		
A22	5.525	.635		
A23	5.845	.635		
A24	6.165	.635		
A25	6.485	.635		
A26	6.805	.635		
A27	6.910	.090		
A28	7.125	.635		
A29	7.390	.605		
B1	.250	.530	.100 .104	47
B2	.325	.090		
B3	.410	.220		
B4	.410	.380		
B5	.570	.530		
B6	.630	.090		
B7	.730	.220		
B8	.730	.380		
B9	.890	.530		
B10	.910	.090		
B11	1.050	.220		
B12	1.050	.380		
B13	1.155	.090		
B14	1.210	.530		
B15	1.370	.220		
B16	1.370	.380		
B17	1.525	−.082		
B18	1.530	.090		
B19	1.530	.530		
B20	1.690	.220		
B21	1.690	.380		
B22	1.850	.090		
B23	1.850	.530		
B24	2.010	.220		
B25	2.010	.380		
B26	3.345	.090		
B27	3.345	.530		
B28	3.505	.090		
B29	3.505	.220		
B30	3.505	.380		
B31	3.665	.090		
B32	3.665	.530		
B33	3.825	.220		
B34	3.825	.380		
B35	3.985	.090		
B36	3.985	.530		
B37	4.145	.090		
B38	4.145	.220		
B39	4.145	.380		
B40	4.305	.090		
B41	4.305	.530		
B42	4.465	.090		
B43	4.465	.220		
B44	4.465	.380		
B45	4.625	.530		
B46	4.785	.220		
B47	4.785	.380		

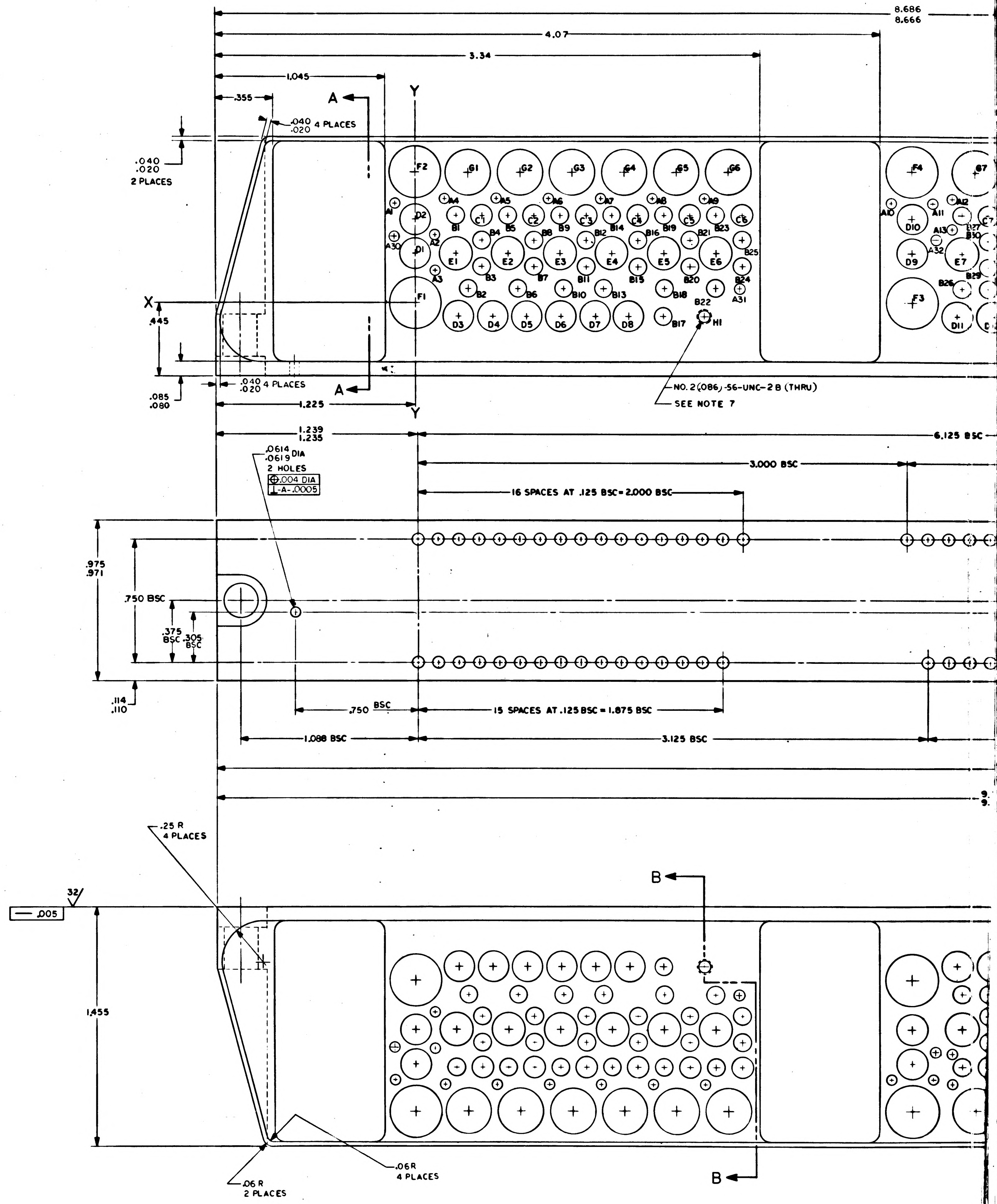
HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
B48	4.945	.090	.100 .104	29
B49	4.945	.530		
B50	5.105	.220		
B51	5.105	.380		
B52	5.265	.090		
B53	5.265	.530		
B54	5.425	.220		
B55	5.425	.380		
B56	5.585	.090		
B57	5.585	.530		
B58	5.745	.220		
B59	5.745	.380		
B60	5.895	−.082		
B61	5.905	.530		
B62	6.055	.090		
B63	6.065	.220		
B64	6.065	.380		
B65	6.225	.530		
B66	6.310	.090		
B67	6.385	.220		
B68	6.385	.380		
B69	6.550	.530		
B70	6.550	.090		
B71	6.705	.220		
B72	6.705	.380		
B73	6.795	.090		
B74	6.865	.530		
B75	7.025	.220		
B76	7.025	.380		
C1	.410	.530	.127 .131	18
C2	.730			
C3	1.050			
C4	1.370			
C5	1.690			
C6	2.010			
C7	3.505			
C8	3.825			
C9	4.145			
C10	4.465			
C11	4.785			
C12	5.105			
C13	5.425			
C14	5.745			
C15	6.065			
C16	6.385			
C17	6.705			
C18	7.025	.530		
D1	.000	.300	.181 .185	25
D2	.000	.510		
D3	.265	−.082		
D4	.475	−.082		
D5	.685	−.082		
D6	.895	−.082		
D7	1.105	−.082		
D8	1.315	−.082		
D9	3.045	.300		
D10	3.045	.510		
D11	3.315	−.082		
D12	3.525	−.082		
D13	3.735	−.082		
D14	3.945	−.082		
D15	4.155	−.082		
D16	4.365	−.082		
D17	4.575	−.082		
D18	4.785	−.082		
D19	4.995	−.082		
D20	5.205	−.082		
D21	5.415	−.082		
D22	5.625	−.082		
D23	5.797	−.230		
D24	5.795	.055		
D25	5.997	−.230		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D26	6.160	−.082	.181 .185	7
D27	6.370	−.082		
D28	6.580	−.082		
D29	6.790	−.082		
D30	7.000	−.082		
D31	7.267	.300		
D32	7.267	.510		
E1	.250	.300	.202 .206	18
E2	.570			
E3	.890			
E4	1.210			
E5	1.530			
E6	1.850			
E7	3.345			
E8	3.665			
E9	3.985			
E10	4.305			
E11	4.625			
E12	4.945			
E13	5.265			
E14	5.585			
E15	5.905			
E16	6.225			
E17	6.545			
E18	6.865	.300		
F1	.000	.000	.309 .316	6
F2	.000	.796		
F3	3.045	.000		
F4	3.045	.796		
F5	7.267	.000		
F6	7.267	.796		
G1	.322	.795	.270 .276	18
G2	.642			
G3	.962			
G4	1.282			
G5	1.602			
G6	1.922			
G7	3.425			
G8	3.745			
G9	4.065			
G10	4.385			
G11	4.705			
G12	5.025			
G13	5.345			
G14	5.665			
G15	5.985			
G16	6.305			
G17	6.625			
G18	6.945	.795		
H1	1.775	−.082	SEE SECTION B-B	1
A30	-.130	.405	.058 .062	6
A31	1.990	.090		
A32	3.187	.390		
A33	4.670	.090		
A34	7.147	.412		
A35	5.425	.090		

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED

5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019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8.666
4.07
3.34
1.045
.355
A
Y
.040
.020 4 PLACES
.040
.020
2 PLACES
X
.445
.085
.080
.040
.020 4 PLACES
A
1.225
Y
F1
F2
F3
F4
G1
G2
G3
G4
G5
G6
G7
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
E1
E2
E3
E4
E5
E6
E7
C1
C2
C3
C4
C5
C6
C7
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A30
A31
A32
B1
B2
B3
B4
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B7
B8
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B10
B11
B12
B13
B14
B15
B16
B17
B18
B19
B20
B21
B22
B23
B24
B25
B26
B27
B29
B30
H1
NO. 2 (.086)-56-UNC-2B (THRU)
SEE NOTE 7
1.239
1.235
6.125 BSC
.0614
.0619 DIA
2 HOLES
⊕ .004 DIA
⊥ -A- .0005
3.000 BSC
16 SPACES AT .125 BSC = 2.000 BSC
.975
.971
.750 BSC
.375 BSC
.305 BSC
.114
.110
.750 BSC
15 SPACES AT .125 BSC = 1.875 BSC
1.088 BSC
3.125 BSC
9.
9.
.25 R
4 PLACES
B
32
.005
1.455
.06 R
2 PLACES
.06 R
4 PLACES
B

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HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.125	.605	.058 .062	29
A2	.120	.415		
A3	.120	.195		
A4	.180	.635		
A5	.500	.635		
A6	.820	.635		
A7	1.140	.635		
A8	1.460	.635		
A9	1.780	.635		
A10	2.920	.605		
A11	3.170	.605		
A12	3.285	.635		
A13	3.285	.450		
A14	3.605	.635		
A15	3.605	.450		
A16	3.925	.635		
A17	4.245	.635		
A18	4.565	.635		
A19	4.565	.450		
A20	4.885	.635		
A21	5.205	.635		
A22	5.525	.635		
A23	5.845	.635		
A24	6.165	.635		
A25	6.485	.635		
A26	6.805	.635		
A27	6,910	.090		
A28	7.125	.635		
A29	7.390	.605		
B1	.250	.530	.100 .104	47
B2	.325	.090		
B3	.410	.220		
B4	.410	.380		
B5	.570	.530		
B6	.630	.090		
B7	.730	.220		
B8	.730	.380		
B9	.890	.530		
B10	.910	.090		
B11	1.050	.220		
B12	1.050	.380		
B13	1.155	.090		
B14	1.210	.530		
B15	1.370	.220		
B16	1.370	.380		
B17	1.525	−.082		
B18	1.530	.090		
B19	1.530	.530		
B20	1.690	.220		
B21	1.690	.380		
B22	1.850	.090		
B23	1.850	.530		
B24	2.010	.220		
B25	2.010	.380		
B26	3.345	.090		
B27	3.345	.530		
B28	3.505	.090		
B29	3.505	.220		
B30	3.505	.380		
B31	3.665	.090		
B32	3.665	.530		
B33	3.825	.220		
B34	3.825	.380		
B35	3.985	.090		
B36	3.985	.530		
B37	4.145	.090		
B38	4.145	.220		
B39	4.145	.380		
B40	4.305	.090		
B41	4.305	.530		
B42	4.465	.090		
B43	4.465	.220		
B44	4.465	.380		
B45	4.625	.530		
B46	4.765	.220		
B47	4.785	.380		

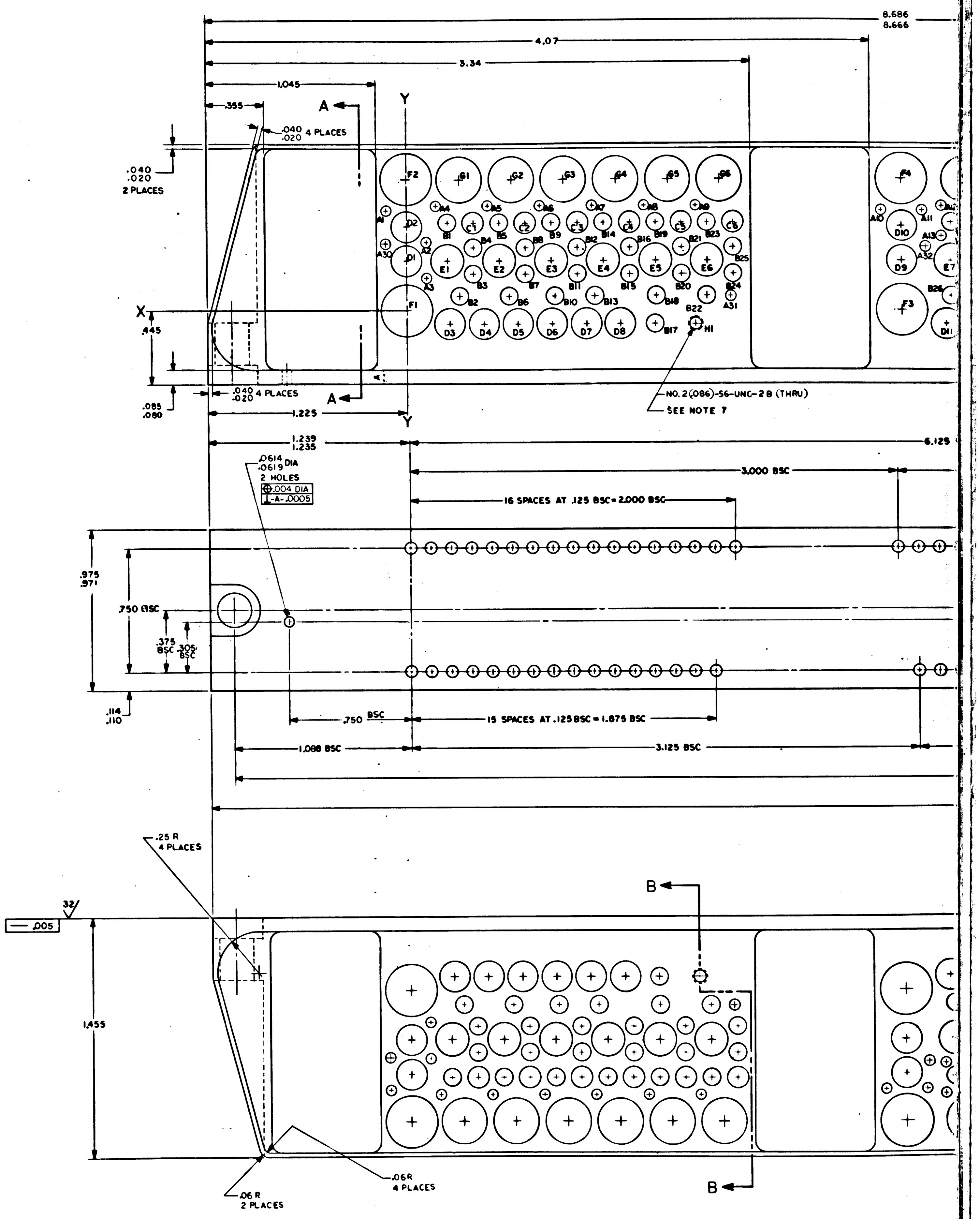
HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
B48	4.945	.090	.100 .104	29
B49	4.945	.530		
B50	5.105	.220		
B51	5.105	.380		
B52	5.265	.090		
B53	5.265	.530		
B54	5.425	.220		
B55	5.425	.380		
B56	5.585	.090		
B57	5.585	.530		
B58	5.745	.220		
B59	5.745	.380		
B60	5.895	−.082		
B61	5.905	.530		
B62	6.055	.090		
B63	6.065	.220		
B64	6.065	.380		
B65	6.225	.530		
B66	6.310	.090		
B67	6.385	.220		
B68	6.385	.380		
B69	6.550	.530		
B70	6.550	.090		
B71	6.705	.220		
B72	6.705	.380		
B73	6.795	.090		
B74	6.865	.530		
B75	7.025	.220		
B76	7.025	.380		
C1	.410	.530	.127 .131	18
C2	.730			
C3	1.050			
C4	1.370			
C5	1.690			
C6	2.010			
C7	3.505			
C8	3.825			
C9	4.145			
C10	4.465			
C11	4.785			
C12	5.105			
C13	5.425			
C14	5.745			
C15	6.065			
C16	6.385			
C17	6.705			
C18	7.025	.530		
D1	.000	.300	.181 .185	25
D2	.000	.510		
D3	.265	−.082		
D4	.475	−.082		
D5	.685	−.082		
D6	.895	−.082		
D7	1.105	−.082		
D8	1.315	−.082		
D9	3.045	.300		
D10	3.045	.510		
D11	3.315	−.082		
D12	3.525	−.082		
D13	3.735	−.082		
D14	3.945	−.082		
D15	4.155	−.082		
D16	4.365	−.082		
D17	4.575	−.082		
D18	4.785	−.082		
D19	4.995	−.082		
D20	5.205	−.082		
D21	5.415	−.082		
D22	5.625	−.082		
D23	5.797	−.230		
D24	5.795	.055		
D25	5.997	−.230		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D26	6.160	−.082	.181 .185	7
D27	6.370	−.082		
D28	6.580	−.082		
D29	6.790	−.082		
D30	7.000	−.082		
D31	7.267	.300		
D32	7.267	.510		
E1	.250	.300	.202 .206	18
E2	.570			
E3	.890			
E4	1.210			
E5	1.530			
E6	1.850			
E7	3.345			
E8	3.665			
E9	3.985			
E10	4.305			
E11	4.625			
E12	4.945			
E13	5.265			
E14	5.585			
E15	5.905			
E16	6.225			
E17	6.545			
E18	6.865	.300		
F1	.000	.000	.309 .316	6
F2	.000	.796		
F3	3.045	.000		
F4	3.045	.796		
F5	7.267	.000		
F6	7.267	.796		
G1	.322	.795	.270 .276	18
G2	.642			
G3	.962			
G4	1.282			
G5	1.602			
G6	1.922			
G7	3.425			
G8	3.745			
G9	4.065			
G10	4.385			
G11	4.705			
G12	5.025			
G13	5.345			
G14	5.665			
G15	5.985			
G16	6.305			
G17	6.625			
G18	6.945	.795		
H1	1.775	−.082	SEE SECTION B-B	1
A30	-.130	.405	.058 .062	6
A31	1.990	.090		
A32	3.187	.390		
A33	4.670	.090		
A34	7.147	.412		
A35	5.425	.090		

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED

5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019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.040
.020 4 PLACES
.040
.020
2 PLACES
A
Y
X
.445
.085
.080
.040
.020 4 PLACES
1.225
F1
F2
F3
F4
G1
G2
G3
G4
G5
G6
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
E1
E2
E3
E4
E5
E6
E7
C1
C2
C3
C4
C5
C6
B17
B22
H1
A30
A31
A32
NO. 2 (.086)-56-UNC-2B (THRU)
SEE NOTE 7
1.239
1.235
6.125
.0614
.0619 DIA
2 HOLES
.004 DIA
-A- .0005
3.000 BSC
16 SPACES AT .125 BSC = 2.000 BSC
.975
.971
.750 BSC
.375 BSC
.305 BSC
.114
.110
.750 BSC
15 SPACES AT .125 BSC = 1.875 BSC
1.088 BSC
3.125 BSC
.25 R
4 PLACES
B
32
.005
1.455
.06 R
2 PLACES
.06R
4 PLACES

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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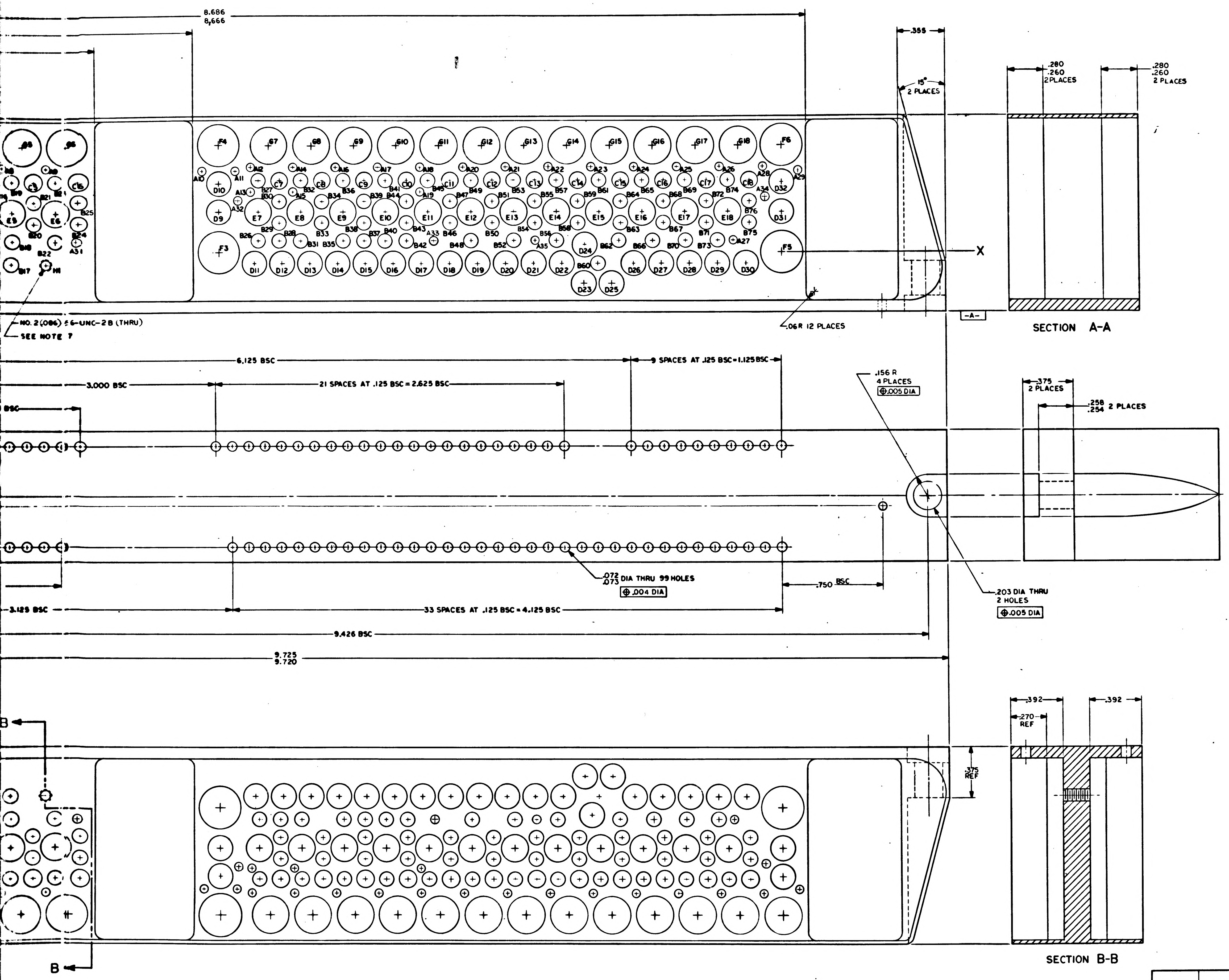
B	REVISED PER TDRR 30712	25AUG66	JB



4
3
2
1
D
C
B
A
8.686
8.666
.355
15°
2 PLACES
.280
.260
2 PLACES
.280
.260
2 PLACES
F3
F4
F5
F6
G7
G8
G9
G10
G11
G12
G13
G14
G15
G16
G17
G18
D9
D10
D11
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D16
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E16
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E18
C3
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
H1
X
NO. 2 (.086) -56-UNC-2B (THRU)
SEE NOTE 7
.06R 12 PLACES
-A-
SECTION A-A
6.125 BSC
9 SPACES AT .125 BSC = 1.125 BSC
3.000 BSC
21 SPACES AT .125 BSC = 2.625 BSC
.156 R
4 PLACES
⊕ .005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.072
.073 DIA THRU 99 HOLES
⊕ .004 DIA
.750 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
3.125 BSC
33 SPACES AT .125 BSC = 4.125 BSC
9.426 BSC
9.725
9.720
.392
.392
.270
REF
.375
REF
B
B
SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007207	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN DATE APR 5 65
CHECKED Bonacorgo 20 Jan 66
APPROVAL R V Viscanti
APPROVAL 5/1/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

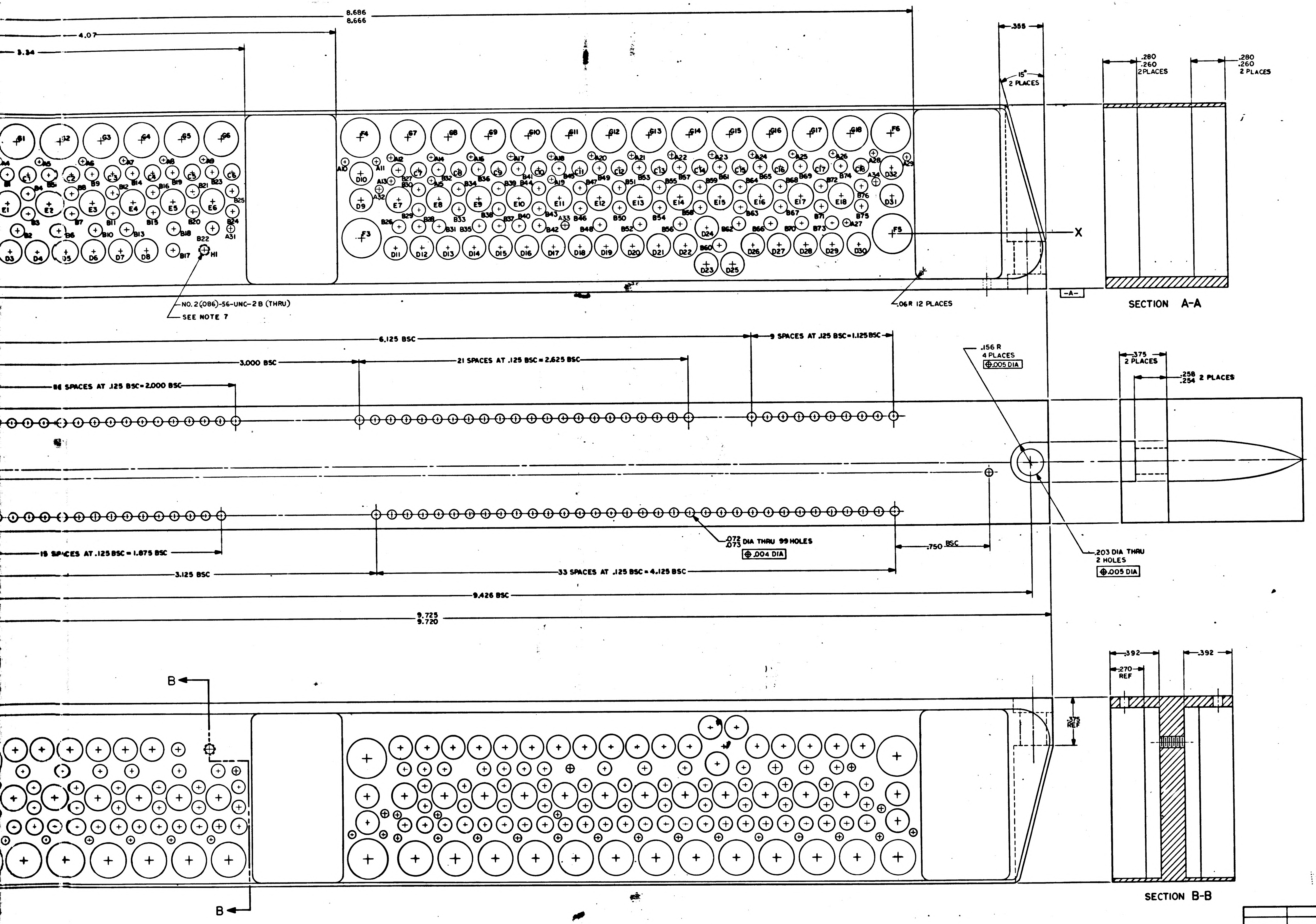
HEADER HOUSING
QUADRANT SELECTOR

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008313
SCALE 4/1
WT —
SHEET 1 OF 1

2008313 B

2008313 B

2/2008313



5
4
3
2
1
REVISIONS
8.686
8.666
4.07
3.34
.355
15°
2 PLACES
.280
.260
2 PLACES
.280
.260
2 PLACES
X
NO. 2 (086)-56-UNC-2 B (THRU)
SEE NOTE 7
.06R 12 PLACES
-A-
SECTION A-A
6.125 BSC
9 SPACES AT .125 BSC = 1.125 BSC
3.000 BSC
21 SPACES AT .125 BSC = 2.625 BSC
16 SPACES AT .125 BSC = 2.000 BSC
.156 R
4 PLACES
⊕ .005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.072
.073 DIA THRU 99 HOLES
⊕ .004 DIA
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.750 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.125 BSC
33 SPACES AT .125 BSC = 4.125 BSC
9.426 BSC
9.725
9.720
.392
.392
.270
REF
.375
REF
B
B
SECTION B-B
MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007207	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX ±.02 ANGLES ±½°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH SEE NOTE 6

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE APR 5 65
CHECKED 20 APR 65
APPROVAL R V Vincent
APPROVAL 5/21/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
QUADRANT SELECTOR

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2008313
SCALE 4/1 WT — SHEET 1 OF 1

2008313

F-2

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HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
A1	-.125	.605	.058 .062	29
A2	.120	.415		
A3	.120	.195		
A4	.180	.635		
A5	.500	.635		
A6	.820	.635		
A7	1.140	.635		
A8	1.460	.635		
A9	1.780	.635		
A10	2.920	.605		
A11	3.170	.605		
A12	3.285	.635		
A13	3.285	.450		
A14	3.605	.635		
A15	3.605	.450		
A16	3.925	.635		
A17	4.245	.635		
A18	4.565	.635		
A19	4.565	.450		
A20	4.885	.635		
A21	5.205	.635		
A22	5.525	.635		
A23	5.845	.635		
A24	6.165	.635		
A25	6.485	.635		
A26	6.805	.635		
A27	6.910	.090		
A28	7.125	.635		
A29	7.390	.605		
B1	.250	.530	.100 .104	47
B2	.325	.090		
B3	.410	.220		
B4	.410	.380		
B5	.570	.530		
B6	.630	.090		
B7	.730	.220		
B8	.730	.380		
B9	.890	.530		
B10	.910	.090		
B11	1.050	.220		
B12	1.050	.380		
B13	1.155	.090		
B14	1.210	.530		
B15	1.370	.220		
B16	1.370	.380		
B17	1.525	-.082		
B18	1.530	.090		
B19	1.530	.530		
B20	1.690	.220		
B21	1.690	.380		
B22	1.850	.090		
B23	1.850	.530		
B24	2.010	.220		
B25	2.010	.380		
B26	3.345	.090		
B27	3.345	.530		
B28	3.505	.090		
B29	3.505	.220		
B30	3.505	.380		
B31	3.665	.090		
B32	3.665	.530		
B33	3.825	.220		
B34	3.825	.380		
B35	3.985	.090		
B36	3.985	.530		
B37	4.145	.090		
B38	4.145	.220		
B39	4.145	.380		
B40	4.305	.090		
B41	4.305	.530		
B42	4.465	.090		
B43	4.465	.220		
B44	4.465	.380		
B45	4.625	.530		
B46	4.785	.220		
B47	4.785	.380		

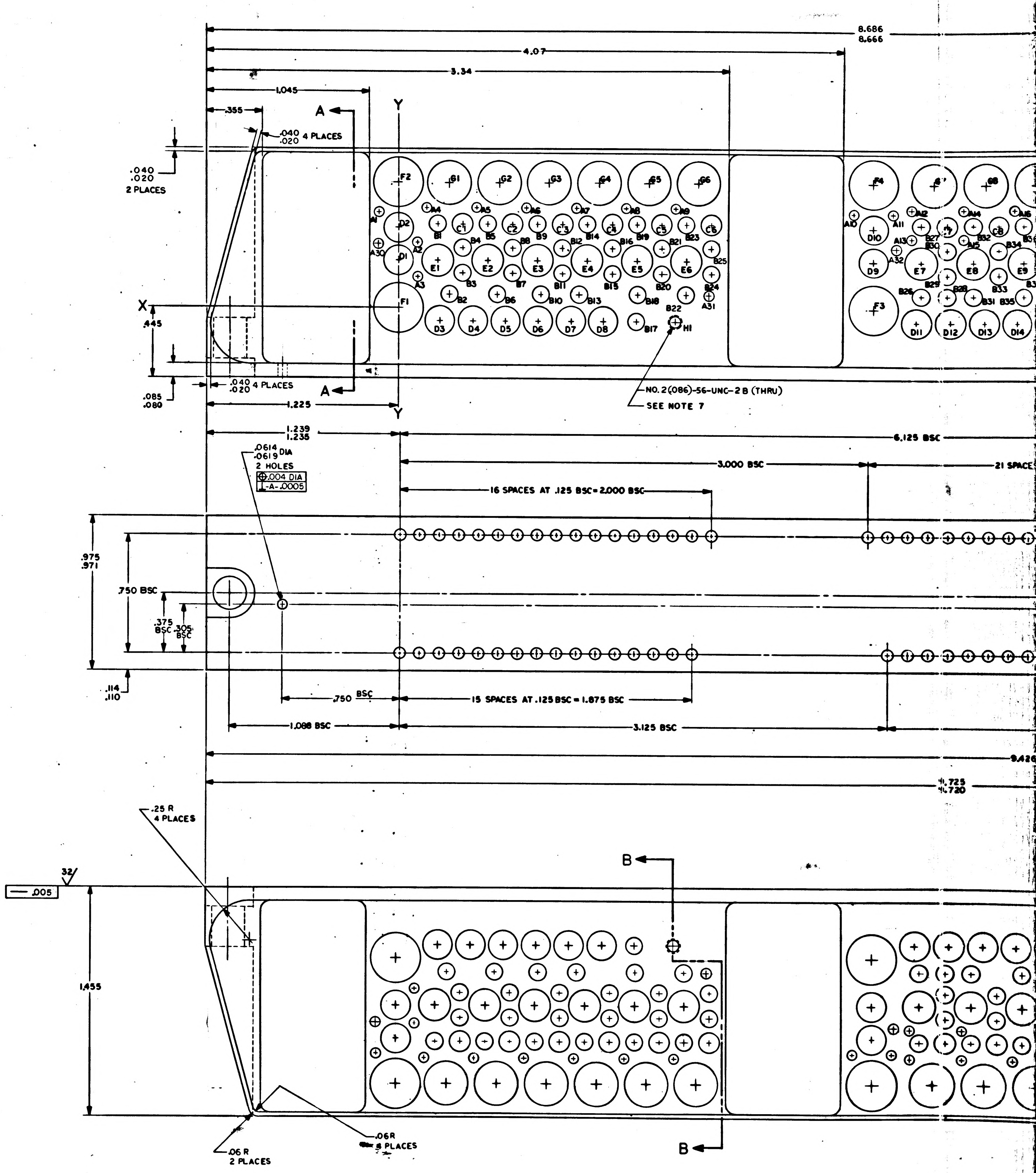
HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
B48	4.945	.090	.100 .104	29
B49	4.945	.530		
B50	5.105	.220		
B51	5.105	.380		
B52	5.265	.090		
B53	5.265	.530		
B54	5.425	.220		
B55	5.425	.380		
B56	5.585	.090		
B57	5.585	.530		
B58	5.745	.220		
B59	5.745	.380		
B60	5.895	-.082		
B61	5.905	.530		
B62	6.055	.090		
B63	6.065	.220		
B64	6.065	.380		
B65	6.225	.530		
B66	6.310	.090		
B67	6.385	.220		
B68	6.385	.380		
B69	6.550	.530		
B70	6.550	.090		
B71	6.705	.220		
B72	6.705	.380		
B73	6.795	.090		
B74	6.865	.530		
B75	7.025	.220		
B76	7.025	.380		
C1	.410	.530	.127 .131	18
C2	.730			
C3	1.050			
C4	1.370			
C5	1.690			
C6	2.010			
C7	3.505			
C8	3.825			
C9	4.145			
C10	4.465			
C11	4.785			
C12	5.105			
C13	5.425			
C14	5.745			
C15	6.065			
C16	6.385			
C17	6.705			
C18	7.025	.530		
D1	.000	.300	.181 .185	25
D2	.000	.510		
D3	.265	-.082		
D4	.475	-.082		
D5	.685	-.082		
D6	.895	-.082		
D7	1.105	-.082		
D8	1.315	-.082		
D9	3.045	.300		
D10	3.045	.510		
D11	3.315	-.082		
D12	3.525	-.082		
D13	3.735	-.082		
D14	3.945	-.082		
D15	4.155	-.082		
D16	4.365	-.082		
D17	4.575	-.082		
D18	4.785	-.082		
D19	4.995	-.082		
D20	5.205	-.082		
D21	5.415	-.082		
D22	5.625	-.082		
D23	5.787	-.230		
D24	5.795	.055		
D25	5.997	-.230		

HOLE IDENT	X DIM	Y DIM	HOLE DIA	QTY
D26	6.160	-.082	.181 .185	7
D27	6.370	-.082		
D28	6.580	-.082		
D29	6.790	-.082		
D30	7.000	-.082		
D31	7.267	.300		
D32	7.267	.510		
E1	.250	.300	.202 .206	18
E2	.570			
E3	.890			
E4	1.210			
E5	1.530			
E6	1.850			
E7	3.345			
E8	3.665			
E9	3.985			
E10	4.305			
E11	4.625			
E12	4.945			
E13	5.265			
E14	5.585			
E15	5.905			
E16	6.225			
E17	6.545			
E18	6.865	.300		
F1	.000	.000	.309 .316	6
F2	.000	.796		
F3	3.045	.000		
F4	3.045	.796		
F5	7.267	.000		
F6	7.267	.796		
G1	.322	.795	.270 .276	18
G2	.642			
G3	.962			
G4	1.282			
G5	1.602			
G6	1.922			
G7	3.425			
G8	3.745			
G9	4.065			
G10	4.385			
G11	4.705			
G12	5.025			
G13	5.345			
G14	5.665			
G15	5.985			
G16	6.305			
G17	6.625			
G18	6.945	.795		
H1	1.775	-.082	SEE SECTION B-B	1
A30	-.130	.405	.058 .062	5
A31	1.990	.090		
A32	3.187	.390		
A33	4.670	.090		
A34	7.147	.412		

NOTES:

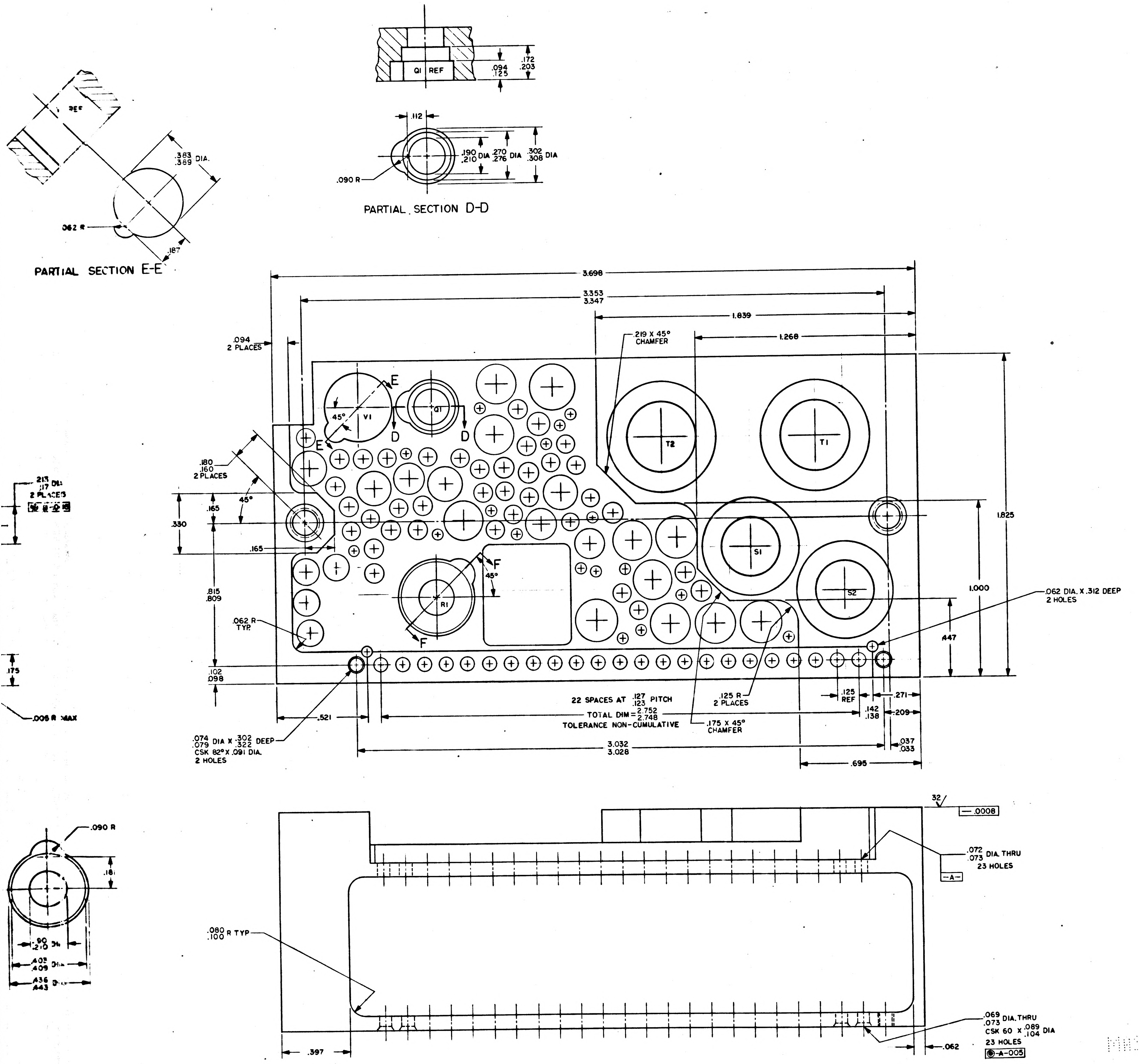
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES $\sqrt[125]{}$ UNLESS OTHERWISE SPECIFIED

5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019



8.686
8.666
4.07
3.34
1.045
.355
A
Y
.040
.020 4 PLACES
.040
.020
2 PLACES
X
.445
.085
.080
.040
.020 4 PLACES
1.225
F1 F2 F3 G1 G2 G3 G4 G5 G6 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 E1 E2 E3 E4 E5 E6 E7 E8 E9 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20 B21 B22 B23 B24 B25 C1 C2 C3 C4 C5 C6 C7 C8 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A30 A31 A32 H1
NO. 2(086)-56-UNC-2B (THRU)
SEE NOTE 7
1.239
1.235
6.125 BSC
.0614
.0619 DIA
2 HOLES
⊕ .004 DIA
⊥ -A- .0005
3.000 BSC
21 SPACES
16 SPACES AT .125 BSC = 2.000 BSC
.975
.971
.750 BSC
.375 BSC
.305 BSC
.114
.110
.750 BSC
15 SPACES AT .125 BSC = 1.875 BSC
1.088 BSC
3.125 BSC
9.426
4.725
4.720
.25 R
4 PLACES
B
32
.005
1.455
.06 R
2 PLACES
.06R
8 PLACES

REVISIONS 19773						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21290	KCH		65	



PARTIAL SECTION E-E
.383 .369 DIA.
.062 R
.187
35°
QI REF
.094 .125
.172 .203
.112
.190 .210 DIA
.270 .276 DIA
.302 .308 DIA
.090 R
PARTIAL SECTION D-D
3.698
3.353 3.347
1.839
1.268
.219 X 45° CHAMFER
.094 2 PLACES
.180 .160 2 PLACES
45°
.165
.330
.165
.815 .809
.062 R TYP.
.102 .098
.213 .17 DIA 2 PLACES
.175
.005 R MAX
V1
Q1
T2
T1
S1
S2
R1
E
D
F
45°
1.825
1.000
.447
.062 DIA. X .312 DEEP 2 HOLES
22 SPACES AT .127 .123 PITCH
TOTAL DIM = 2.752 2.748
TOLERANCE NON-CUMULATIVE
.125 R 2 PLACES
.175 X 45° CHAMFER
.125 REF
.142 .138
.271
.209
.037 .033
.521
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA.
2 HOLES
3.032 3.028
.695
32
—.0008
.072 .073 DIA. THRU
23 HOLES
-A-
.090 R
.181
.190 .210 DIA
.403 .409 DIA
.436 .443 DIA
.080 .100 R TYP
.397
.069 .073 DIA. THRU
CSK 60 X .089 .104 DIA
23 HOLES
.062
-A-.005

2007114	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.D. Midgley 27Apr65
CHECKED
APPROVED
APPROVED 5/1/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

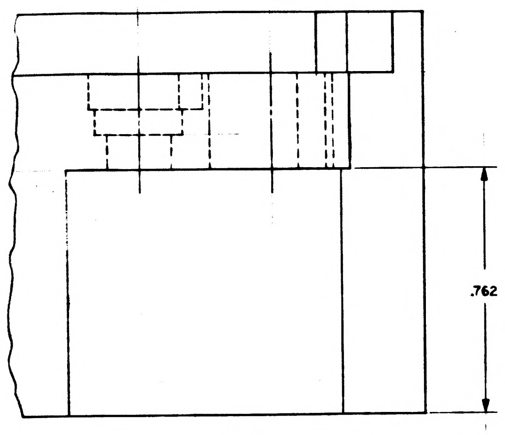
HEATSINK
GIMBAL SERVO AMPLIFIER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008315

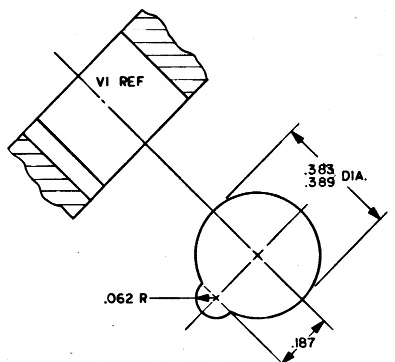
SCALE 5/1
SHEET 1 OF 1

2008315

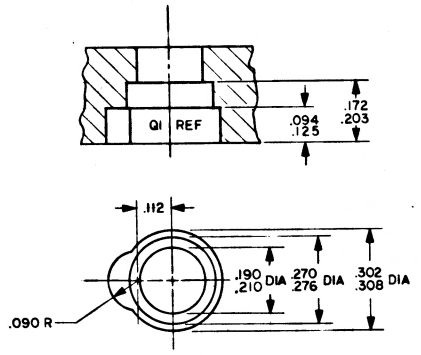
MASTER



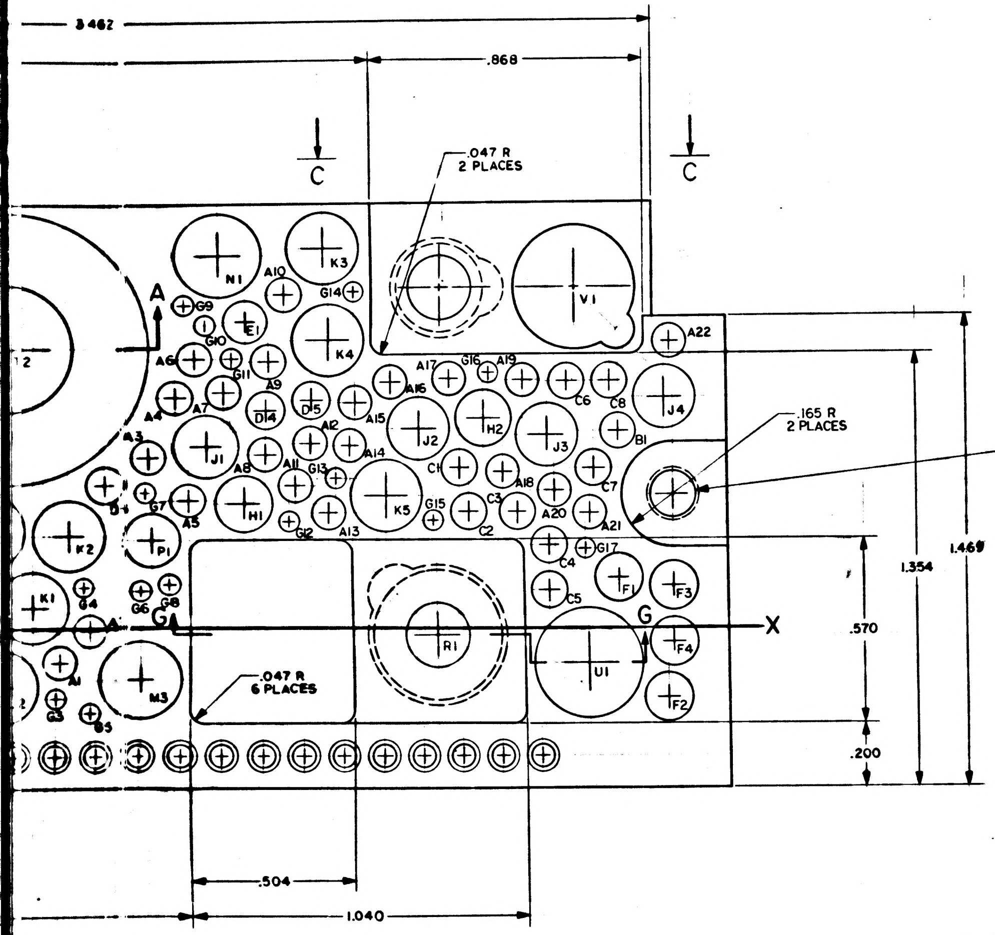
VIEW C-C

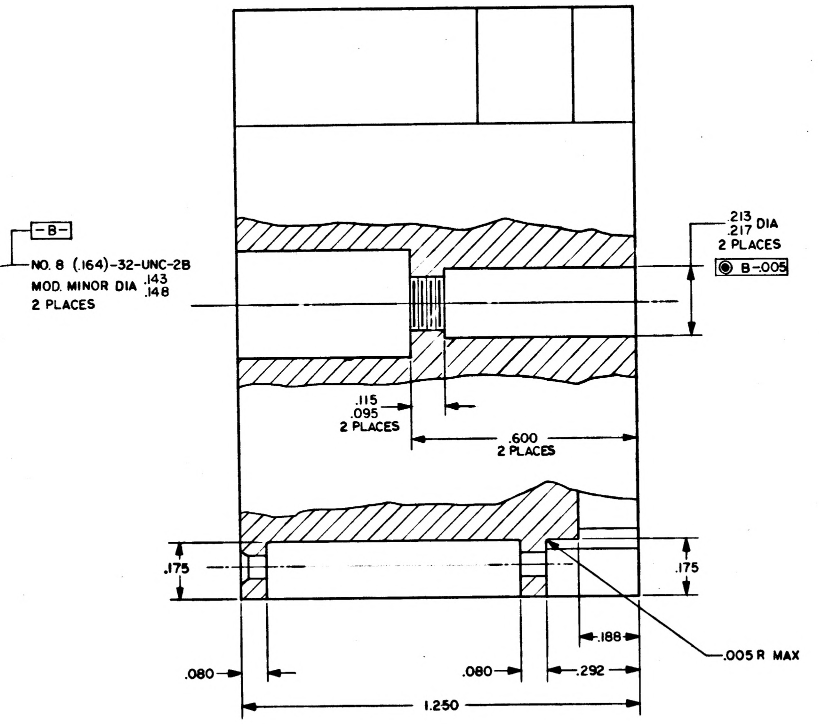

V1 REF
.383
.389 DIA.
.062 R
.187

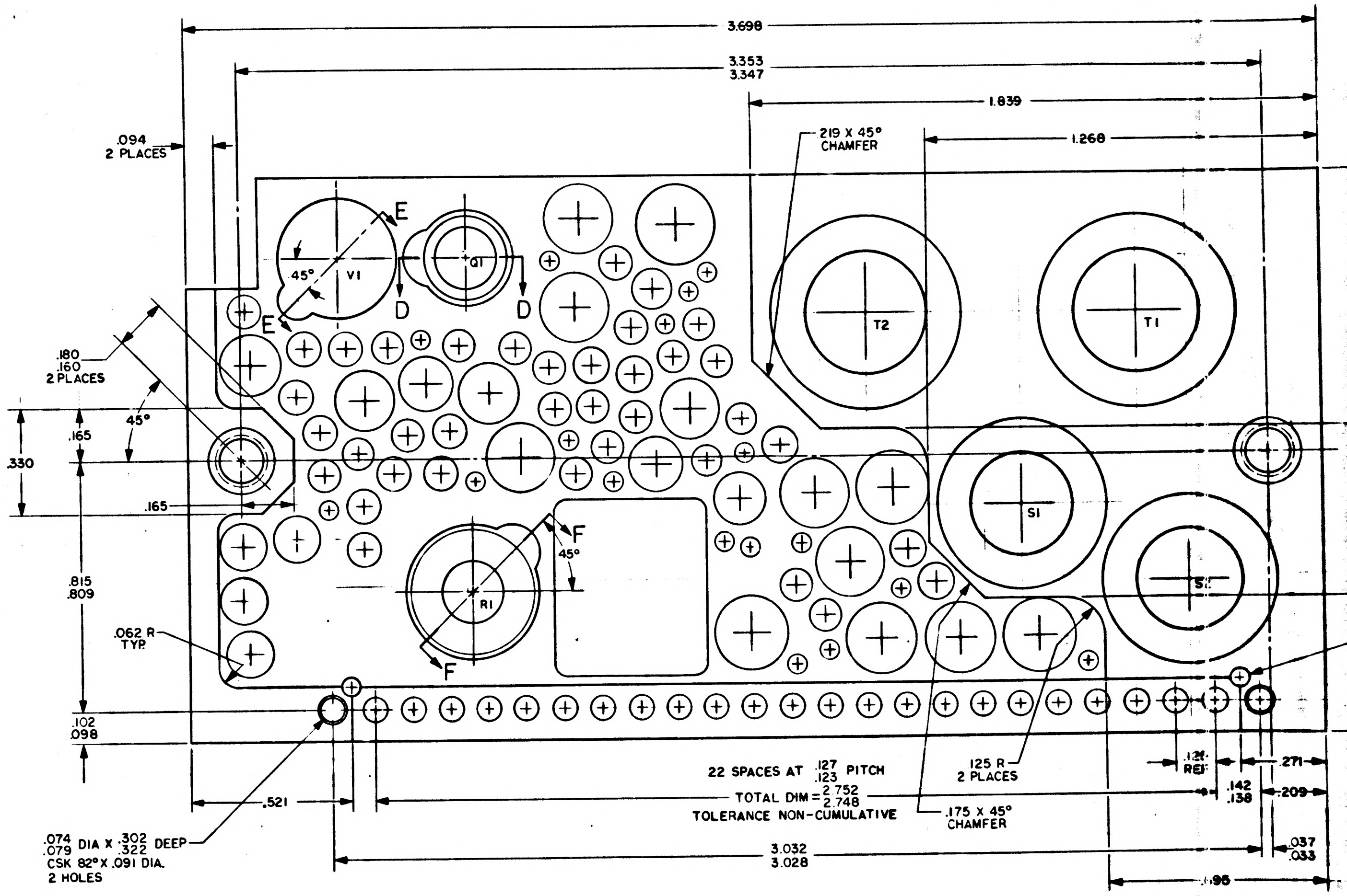
PARTIAL SECTION E-E

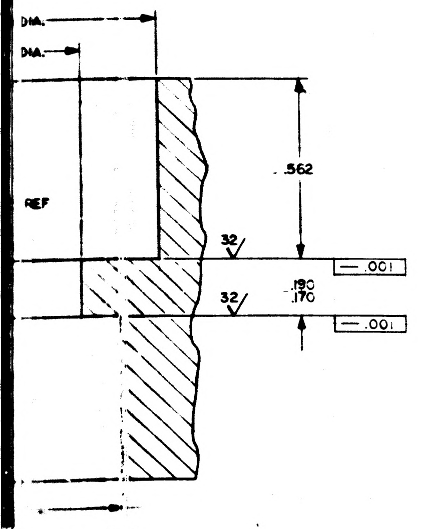

Q1 REF
.094
.125
.172
.203
.112
.190
.210 DIA
.270
.276 DIA
.302
.308 DIA
.090 R

PARTIAL SECTION D-D


3.462
.868
C
C
.047 R
2 PLACES
A
N1
K3
A10
G14
V1
A22
G9
E1
A6
G10
K4
A9
A17
G16
A19
A4
D5
D14
A16
A12
A15
H2
J2
C6
C8
J4
A3
A7
J1
A8
A11
G13
A14
C1
J3
B1
.165 R
2 PLACES
G4
A5
H1
K5
C3
A18
A20
A21
F2
P1
G7
G2
A13
G15
C2
C4
G17
K1
G8
G6
G
F1
F3
X
U1
F4
R1
M3
.047 R
6 PLACES
F2
1.469
1.354
.570
.200
.504
1.040

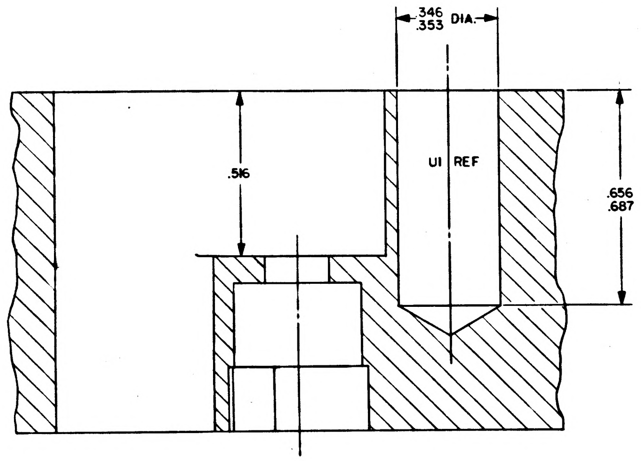

-B-
NO. 8 (.164)-32-UNC-2B
MOD. MINOR DIA .143 .148
2 PLACES
.213
.217 DIA
2 PLACES
◉ B-.005
.115
.095
2 PLACES
.600
2 PLACES
.175
.175
.188
.005 R MAX
.080
.080
.292
1.250


3.698
3.353
3.347
1.839
.094
2 PLACES
.219 X 45°
CHAMFER
1.268
E
V1
45°
Q1
D
D
E
T2
T1
.180
.160
2 PLACES
45°
.165
.330
.165
S1
F
45°
R1
F
.815
.809
.062 R
TYP.
.102
.098
22 SPACES AT .127 .123 PITCH
TOTAL DIM = 2.752 2.748
TOLERANCE NON-CUMULATIVE
.125 R
2 PLACES
.175 X 45°
CHAMFER
.121
REF
.271
.142
.138
.209
.521
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA.
2 HOLES
3.032
3.028
.037
.033
1.96

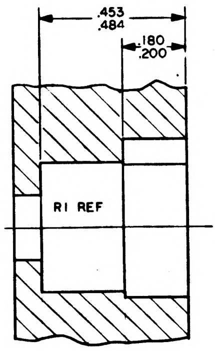

DIA.
DIA.
REF
.562
32
.190
.170
— .001
32
— .001

TION A-A

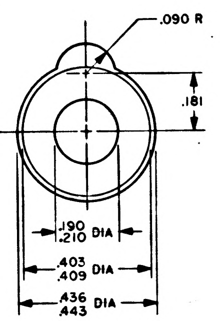
ES

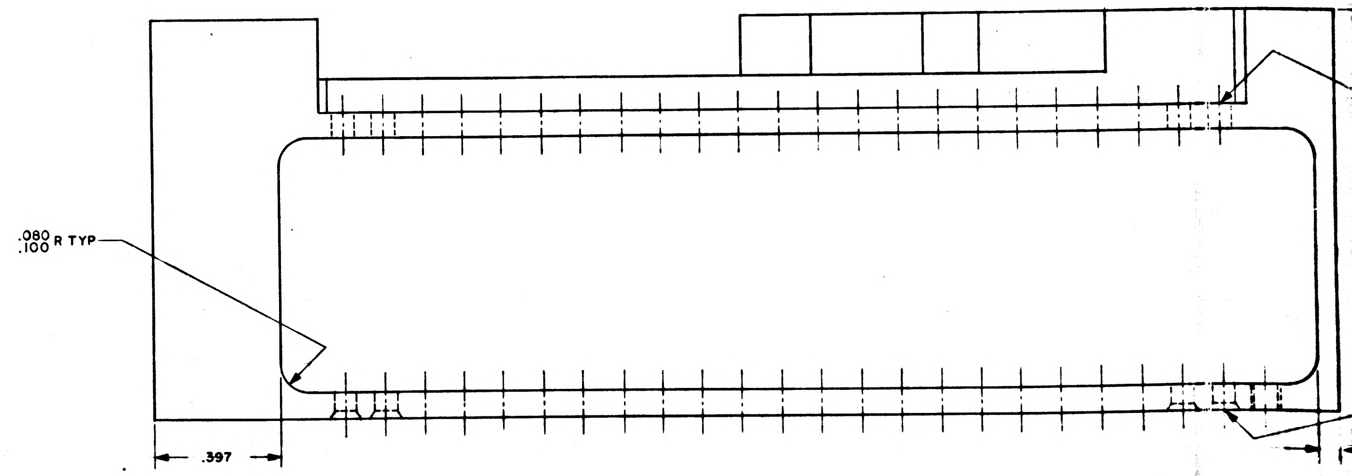

.346
.353 DIA.
.516
U1 REF
.656
.687

PARTIAL SECTION G-G


.453
.484
.180
.200
R1 REF

PARTIAL SECTION F-F
ROTATED 45° CCW

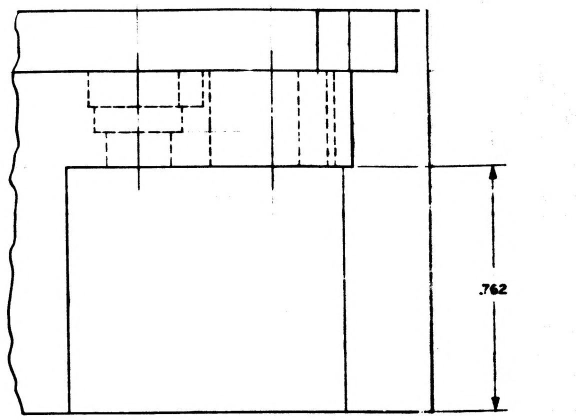

.090 R
.181
.190
.210 DIA
.403
.409 DIA
.436
.443 DIA


.080
.100 R TYP
.397

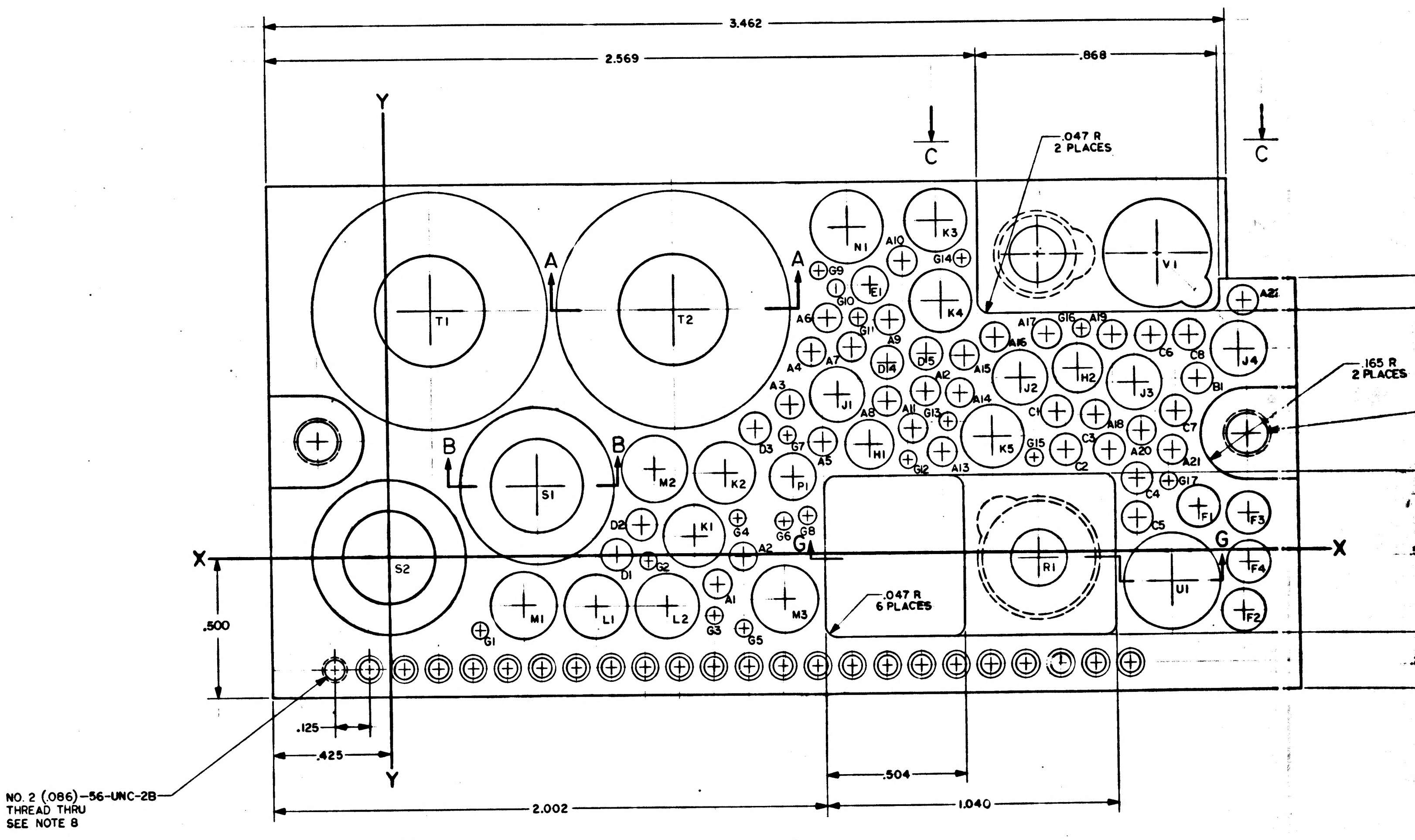
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY.
A1	1.190	-.105	.100 .104	22
A2	1.280	-.010		
A3	1.460	.535		
A4	1.540	.720		
A5	1.575	.400		
A6	1.600	.840		
A7	1.685	.735		
A8	1.810	.545		
A9	1.825	.835		
A10	1.870	1.045		
A11	1.905	.445		
A12	1.950	.575		
A13	2.005	.360		
A14	2.075	.570		
A15	2.090	.705		
A16	2.200	.770		
A17	2.390	.775		
A18	2.560	.485		
A19	2.620	.770		
A20	2.720	.430		
A21	2.835	.360		
A22	3.090	.890		
B1	2.925	.610	.105 .109	1
C1	2.420	.500	.108 .112	8
C2	2.450	.360		
C3	2.605	.360		
C4	2.705	.260		
C5	2.705	.115		
C6	2.760	.770		
C7	2.845	.495		
C8	2.900	.770		
D1	.825	.000	.112 .116	5
D2	.915	.110		
D3	1.335	.450		
D4	1.815	.680		
D5	1.955	.710		
E1	1.750	.960	.127 .131	1
F1	2.925	.155	.146 .150	4
F2	3.080	-.220		
F3	3.095	.130		
F4	3.095	-.045		
G1	.325	-.265	.058 .062	17
G2	.940	-.020		
G3	1.175	-.220		
G4	1.265	.125		
G5	1.280	-.265		
G6	1.430	.115		
G7	1.450	.425		
G8	1.520	.135		
G9	1.565	1.010		
G10	1.630	.950		
G11	1.710	.845		
G12	1.885	.335		
G13	2.030	.465		
G14	2.085	1.050		
G15	2.335	.335		
G16	2.510	.795		
G17	2.820	.245		

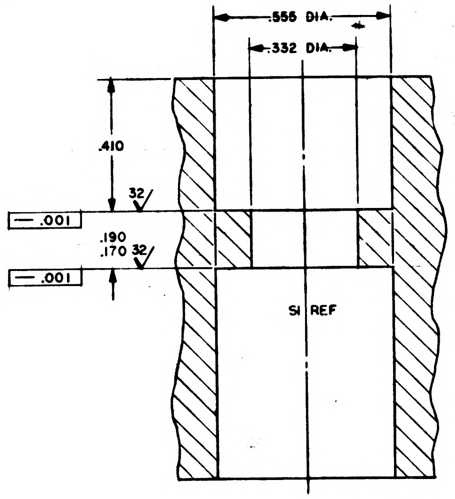
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY.
H1	1.745	.390	.172 .176	2
H2	2.500	.650		
J1	1.630	.570	.192 .196	4
J2	2.290	.620		
J3	2.700	.600		
J4	3.075	.715		
K1	1.105	.065	.218 .222	5
K2	1.220	.290		
K3	1.990	1.190		
K4	2.005	.900		
K5	2.185	.410		
L1	.745	-.180	.227 .231	2
L2	1.005	-.180		
M1	.485	-.175	.237 .241	3
M2	.965	.305		
M3	1.430	-.160		
N1	1.675	1.165	.255 .262	1
P1	1.465	.275	.165 .169	1
Q1	2.360	1.065	SEE SECTION D-D	1
R1	2.345	-.020	SEE SECTION F-F	1
S1	.535	.250	SEE SECTION B-B	2
S2	.000	.000		
T1	.160	.875	SEE SECTION A-A	2
T2	1.040	.875		
U1	2.825	-.115	SEE SECTION G-G	1
V1	2.790	1.065	SEE SECTION E-E	1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5, PER QQ-M-31, TEMP. 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\surd}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZING, COAT PER ND1002040

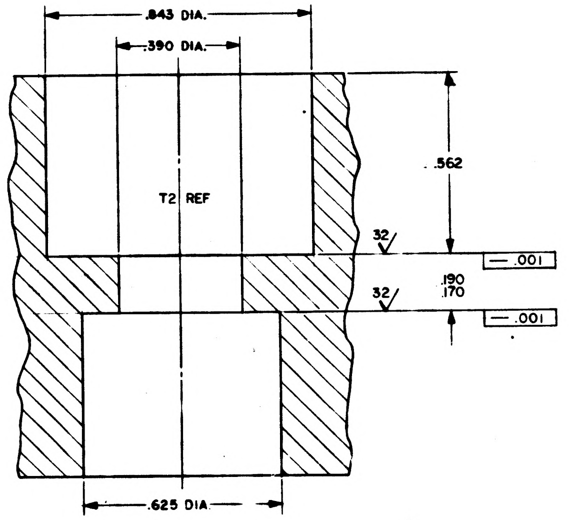


VIEW C-C

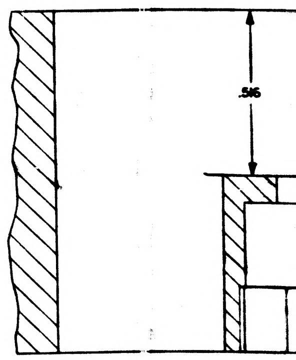

3.462
2.569
.868
C
C
.047 R
2 PLACES
Y
X
A
A
B
B
G
G
.165 R
2 PLACES
.047 R
6 PLACES
.500
.125
.425
NO. 2 (086)-56-UNC-2B
THREAD THRU
SEE NOTE 8
.504
2.002
1.040
T1
T2
S1
S2
R1
U1
V1


.555 DIA.
.332 DIA.
.410
32
.001
.190
.170
32
.001
S1 REF

PARTIAL SECTION B-B
2 PLACES


.843 DIA.
.390 DIA.
T2 REF
.562
32
.001
.190
.170
32
.001
.625 DIA

PARTIAL SECTION A-A
2 PLACES



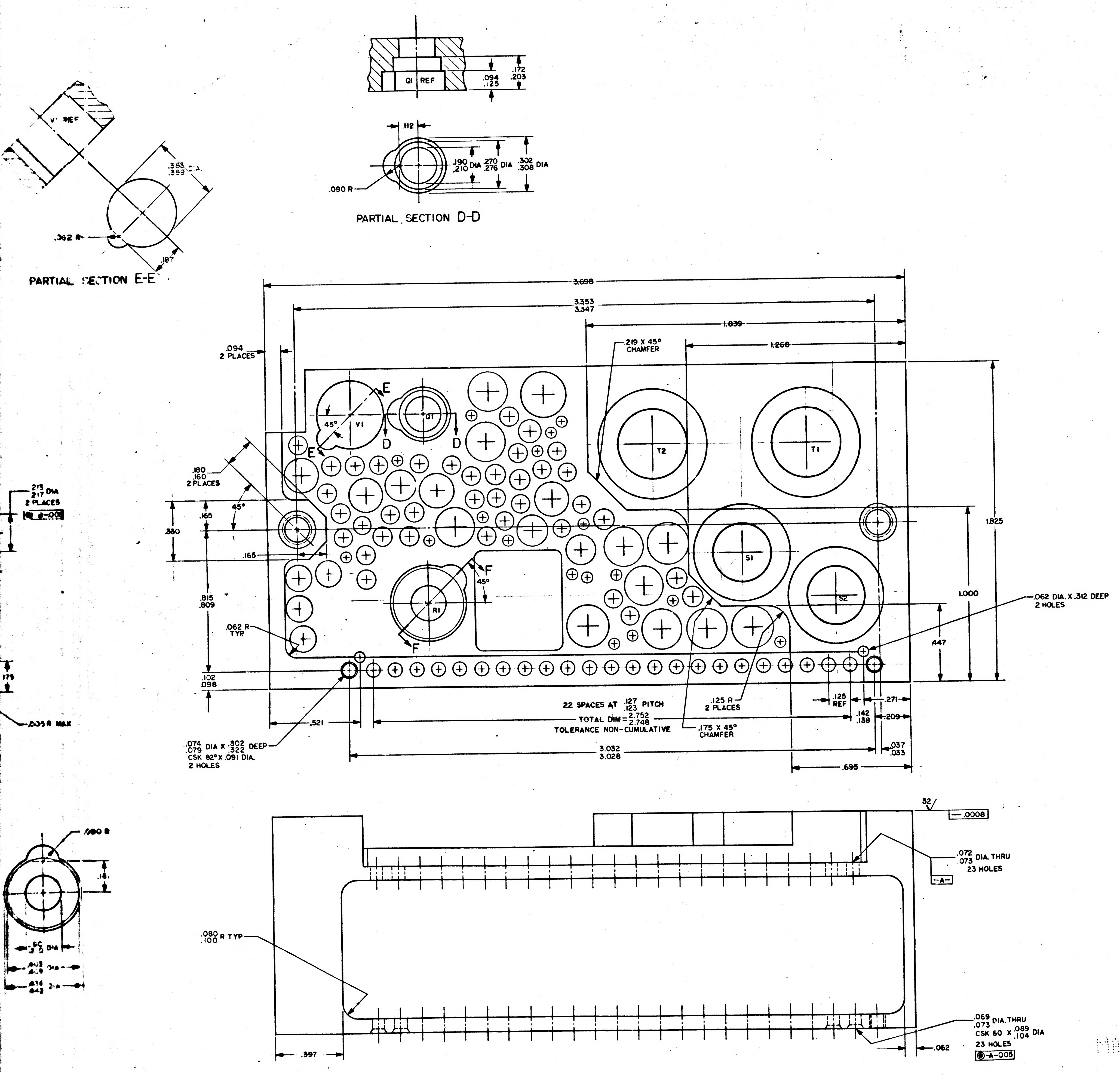
PARTIAL SE

2008315

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21290			29 JUL 65	
B		REVISED PER TDRR 21476				

REVISIONS 19773

3 0/0 50



QI REF
.094
.125
.172
.203
.112
.090 R
.190
.210 DIA
.270
.276 DIA
.302
.308 DIA
PARTIAL SECTION D-D
V1 REF
.363
.369 DIA
.062 R
.187
PARTIAL SECTION E-E
3.698
3.353
3.347
1.839
1.268
.219 X 45° CHAMFER
.094 2 PLACES
.180
.160
2 PLACES
45°
.165
.380
.165
.815
.809
.062 R TYP.
.102
.098
.213 DIA
.217
2 PLACES
.179
.035 R MAX
V1
Q1
T1
T2
S1
S2
R1
D
E
F
1.825
1.000
.447
.062 DIA. X .312 DEEP 2 HOLES
22 SPACES AT .127
.123 PITCH
TOTAL DIM = 2.752
2.748
TOLERANCE NON-CUMULATIVE
.125 R 2 PLACES
.175 X 45° CHAMFER
.125 REF
.142
.138
.271
.209
.521
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA.
2 HOLES
3.032
3.028
.037
.033
.695
32
.0008
.072
.073 DIA. THRU
23 HOLES
A
.080
.100 R TYP
.069
.073 DIA. THRU
CSK 60 X .089
.104 DIA
23 HOLES
A-.005
.397
.062
.080 R

MASTER

(3/4)

2007114	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

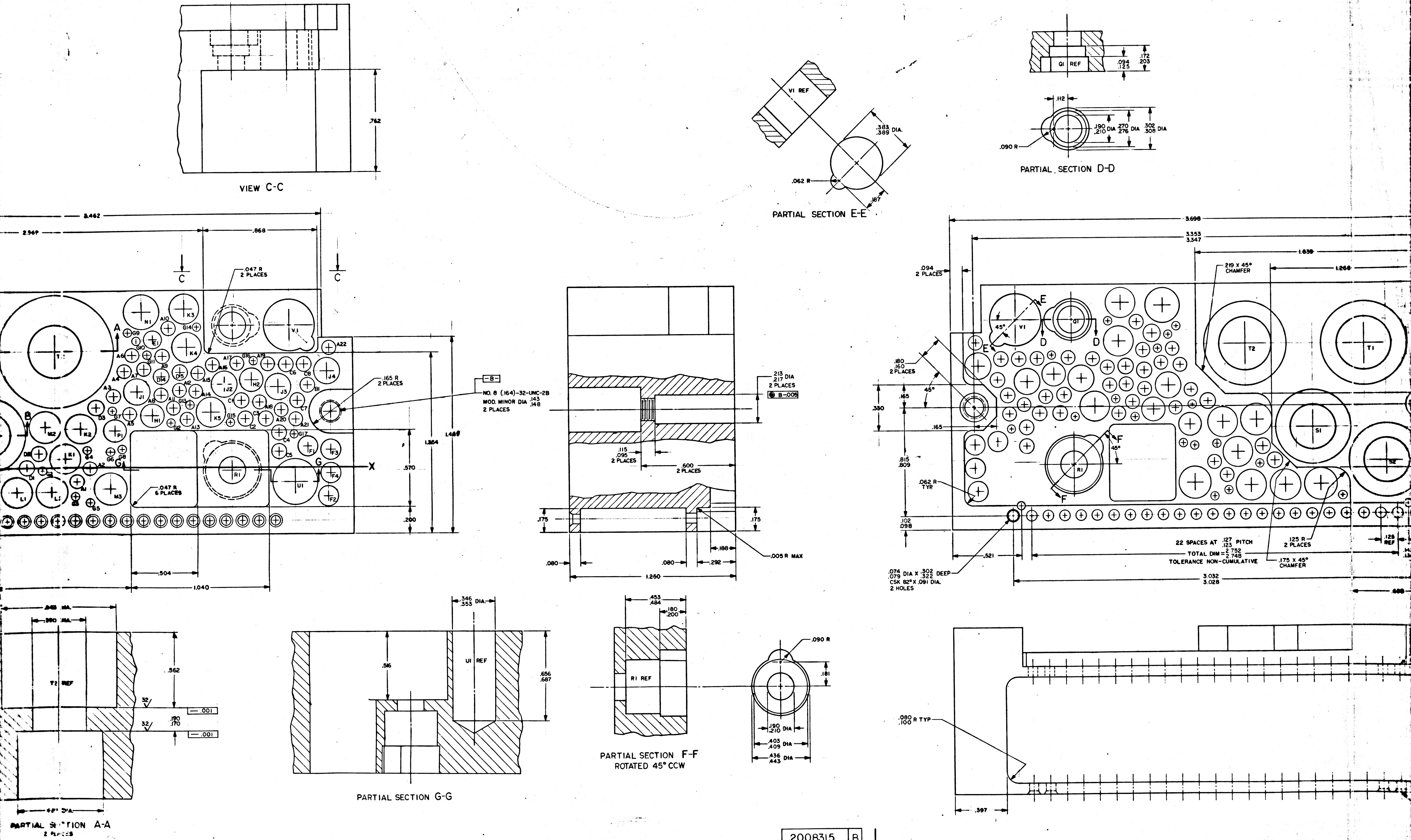
DRAWN R.D. Midgley 27 Apr 65
CHECKED
APPROVED
APPROVED 6/1/65
APPROVED MIT 6-2-65
APPROVED MSC W. J. 6-2-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008315
SCALE 5/1
SHEET OF

2008315 B


VIEW C-C

PARTIAL SECTION E-E

PARTIAL SECTION D-D

PARTIAL SECTION A-A
2 PLACES

PARTIAL SECTION G-G

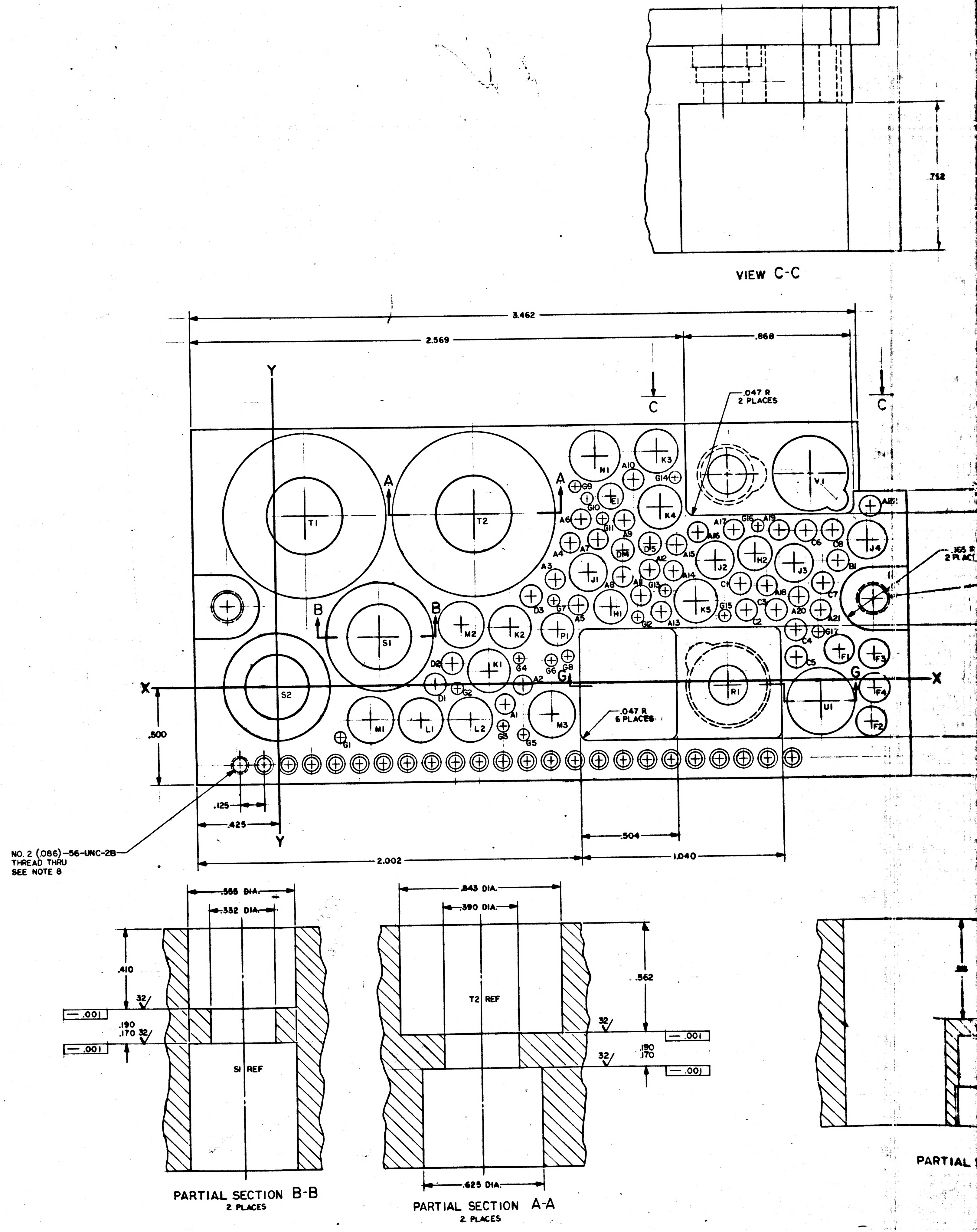
PARTIAL SECTION F-F
ROTATED 45° CCW

.762
VI REF
.383
.389 DIA.
.062 R
.187
QI REF
.094
.125
.172
.203
.112
.090 R
.190
.210 DIA
.270
.276 DIA
.302
.308 DIA
3.462
2.969
.868
.047 R
2 PLACES
.165 R
2 PLACES
B
NO. 8 (.164)-32-UNC-2B
MOD. MINOR DIA .143
.148
2 PLACES
.047 R
6 PLACES
.570
1.354
.200
.504
1.040
X
.213 DIA
.217
2 PLACES
B .005
.115
.095
2 PLACES
.600
2 PLACES
.175
.188
.080
.292
.005 R MAX
1.250
3.698
3.353
3.347
1.839
1.268
.094
2 PLACES
.219 X 45°
CHAMFER
.180
.160
2 PLACES
45°
.165
.330
.815
.809
.062 R
TYP
.102
.098
.521
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA.
2 HOLES
22 SPACES AT .127
.123 PITCH
TOTAL DIM = 2.752
2.748
TOLERANCE NON-CUMULATIVE
.125 R
2 PLACES
.175 X 45°
CHAMFER
.125
REF
3.032
3.028
T1 T2 S1 S2 R1 U1 V1 Q1 J1 J2 J3 J4 K1 K2 K3 K4 K5 L1 L2 M1 M2 M3 N1 P1 H1 H2 E1
.080
.100 R TYP
.397
T2 REF
.562
32
.190
.170
.001
.001
.346
.353 DIA.
.516
U1 REF
.656
.687
.453
.484
.180
.200
R1 REF
.090 R
.181
.190
.210 DIA
.403
.409 DIA
.436
.443 DIA

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY.
A1	1.190	-.105	.100 .104	22
A2	1.280	-.010		
A3	1.460	.535		
A4	1.540	.720		
A5	1.575	.400		
A6	1.600	.840		
A7	1.685	.735		
A8	1.810	.545		
A9	1.825	.835		
A10	1.870	1.045		
A11	1.905	.445		
A12	1.950	.575		
A13	2.005	.360		
A14	2.075	.570		
A15	2.090	.705		
A16	2.200	.770		
A17	2.390	.775		
A18	2.560	.485		
A19	2.620	.770		
A20	2.720	.430		
A21	2.835	.360		
A22	3.090	.890		
B1	2.925	.610	.105 .109	1
C1	2.420	.500	.108 .112	8
C2	2.450	.360		
C3	2.605	.360		
C4	2.705	.260		
C5	2.705	.115		
C6	2.760	.770		
C7	2.845	.495		
C8	2.900	.770		
D1	.825	.000	.112 .116	5
D2	.915	.110		
D3	1.335	.450		
D4	1.815	.680		
D5	1.955	.710		
E1	1.750	.960	.127 .131	1
F1	2.925	.155	.146 .150	4
F2	3.080	-.220		
F3	3.095	.130		
F4	3.095	-.045		
G1	.325	-.265	.058 .062	17
G2	.940	-.020		
G3	1.175	-.220		
G4	1.265	.125		
G5	1.280	-.265		
G6	1.430	.115		
G7	1.450	.425		
G8	1.520	.135		
G9	1.565	1.010		
G10	1.630	.950		
G11	1.710	.845		
G12	1.885	.335		
G13	2.030	.465		
G14	2.085	1.050		
G15	2.335	.335		
G16	2.510	.795		
G17	2.820	.245		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY.
H1	1.745	.390	.172 .176	2
H2	2.500	.650		
J1	1.630	.570	.192 .196	4
J2	2.290	.620		
J3	2.700	.600		
J4	3.075	.715		
K1	1.105	.065	.218 .222	5
K2	1.220	.290		
K3	1.990	1.190		
K4	2.005	.900		
K5	2.185	.410		
L1	.745	-.180	.227 .231	2
L2	1.005	-.180		
M1	.485	-.175	.237 .241	3
M2	.965	.305		
M3	1.430	-.160		
N1	1.675	1.165	.255 .262	1
P1	1.465	.275	.165 .169	1
Q1	2.360	1.065	SEE SECTION D-D	1
R1	2.345	-.020	SEE SECTION F-F	1
S1	.535	.250	SEE SECTION B-B	2
S2	.000	.000		
T1	.160	.875	SEE SECTION A-A	2
T2	1.040	.875		
U1	2.825	-.115	SEE SECTION G-G	1
V1	2.790	1.065	SEE SECTION E-E	1

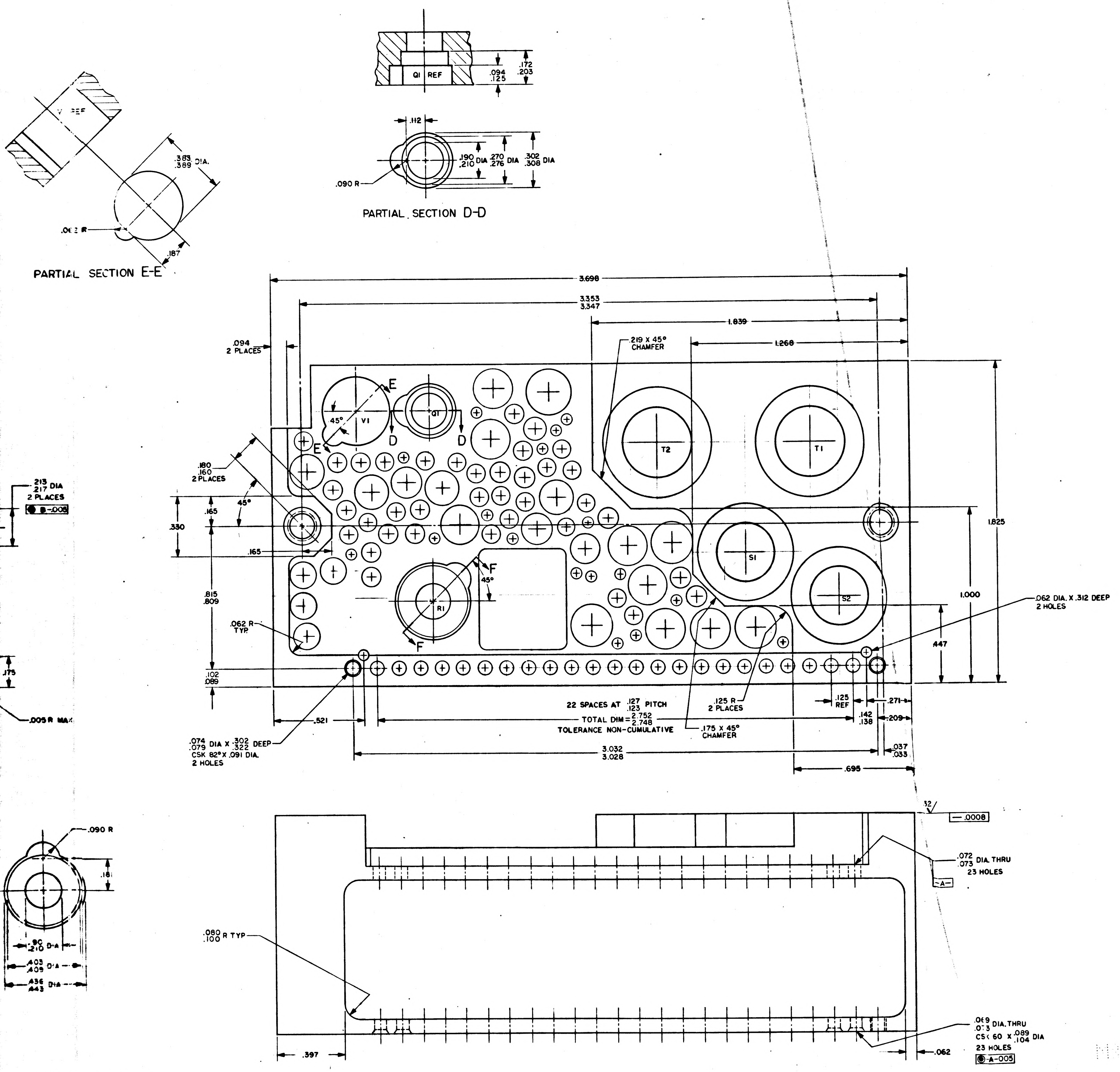


NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5, PER QQ-M-31, TEMP. 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125/√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZING, COAT PER ND1002040
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND1002187 TYPE II, TO THE TWO SURFACES WITH COMPONENT HOLES WHICH ARE .188 AND 1.25 FROM THE MOUNTING SURFACE

REVISIONS 19773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



QI REF
.094 .125
.172 .203
.112
.190 .210 DIA
.270 .276 DIA
.302 .308 DIA
.090 R
PARTIAL SECTION D-D
VI REF
.383 .389 DIA.
.062 R
.187
PARTIAL SECTION E-E
3.698
3.353 3.347
1.839
1.268
.219 X 45° CHAMFER
.094 2 PLACES
VI
QI
T2
T1
S1
S2
R1
E
D
F
45°
.180 .160 2 PLACES
.213 .217 DIA 2 PLACES
.165
.330
.815 .809
.062 R TYP.
.102 .089
1.825
1.000
.447
.062 DIA. X .312 DEEP 2 HOLES
22 SPACES AT .127 .123 PITCH
TOTAL DIM = 2.752 2.748
TOLERANCE NON-CUMULATIVE
.125 R 2 PLACES
.175 X 45° CHAMFER
.125 REF
.271
.142 .138
.209
.521
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA.
2 HOLES
3.032 3.028
.037 .033
.695
.175
.005 R MAX
.090 R
.181
.190 .210 DIA
.403 .409 DIA
.436 .443 DIA
32
.0008
A
.072 .073 DIA. THRU 23 HOLES
.080 .100 R TYP
.069 .073 DIA. THRU
CSK 60 X .089 .104 DIA
23 HOLES
A-.005
.397
.062

2008315		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ANGLES ±½°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007114	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.C. Midgley 27Nov65
CHECKED
APPROVED
APPROVED 1/1/65
APPROVED MIT 6-2-65
APPROVED MSC W J
DATE

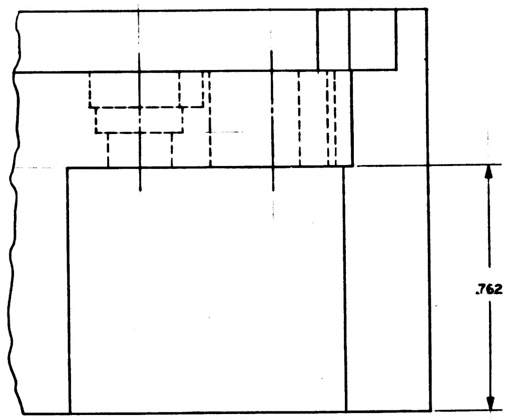
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
GIMBAL SERVO AMPLIFIER

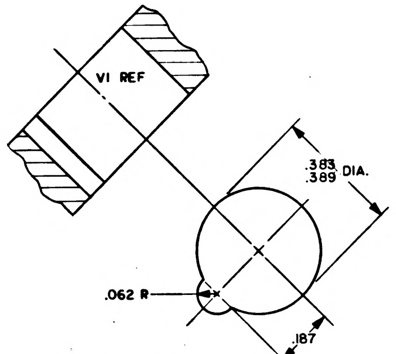
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008315
SCALE 5/1
SHEET 1 OF 1

2008315

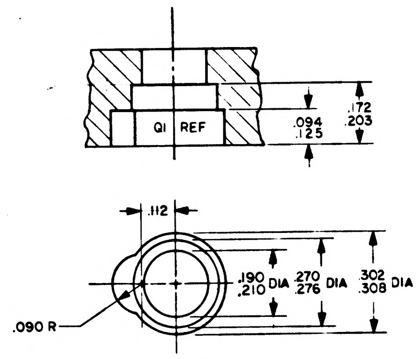
F3



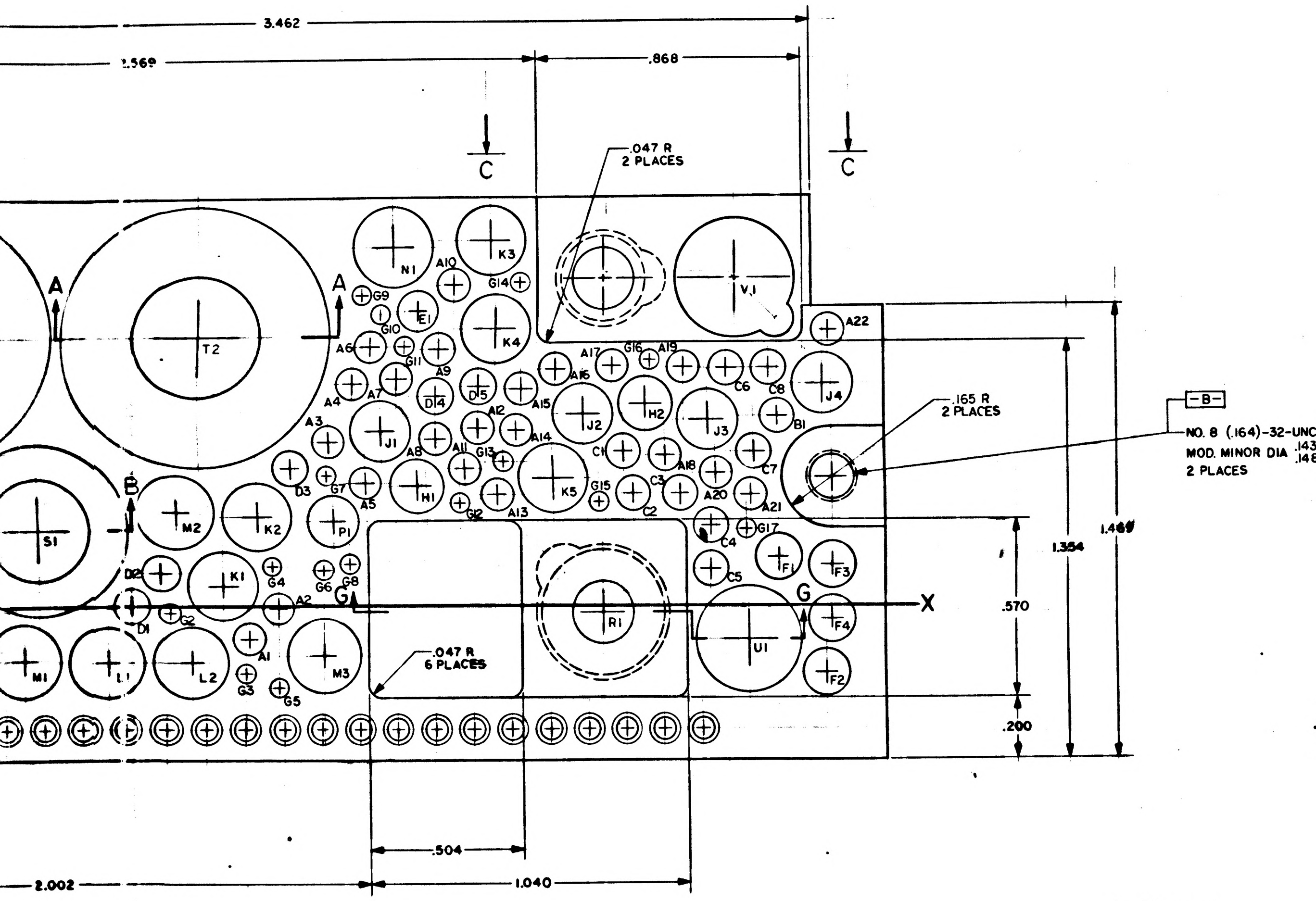
VIEW C-C

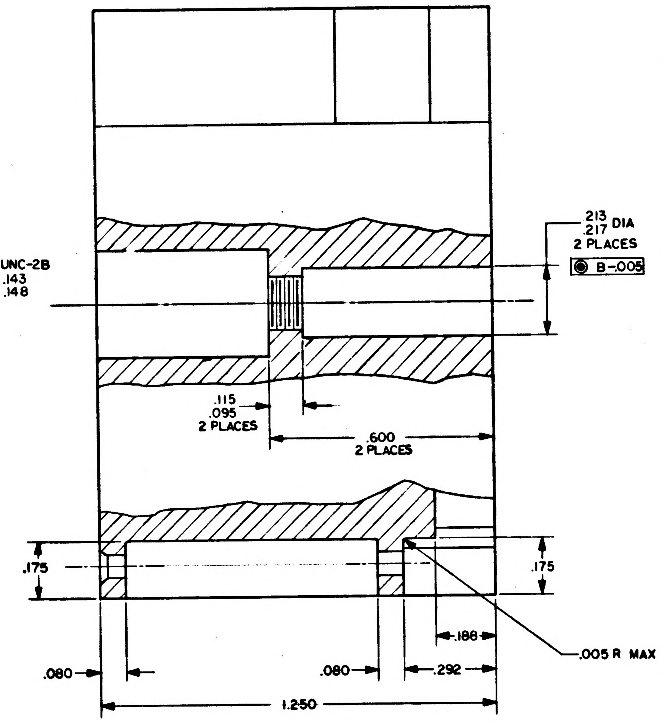

V1 REF
.383 .389 DIA.
.062 R
.187

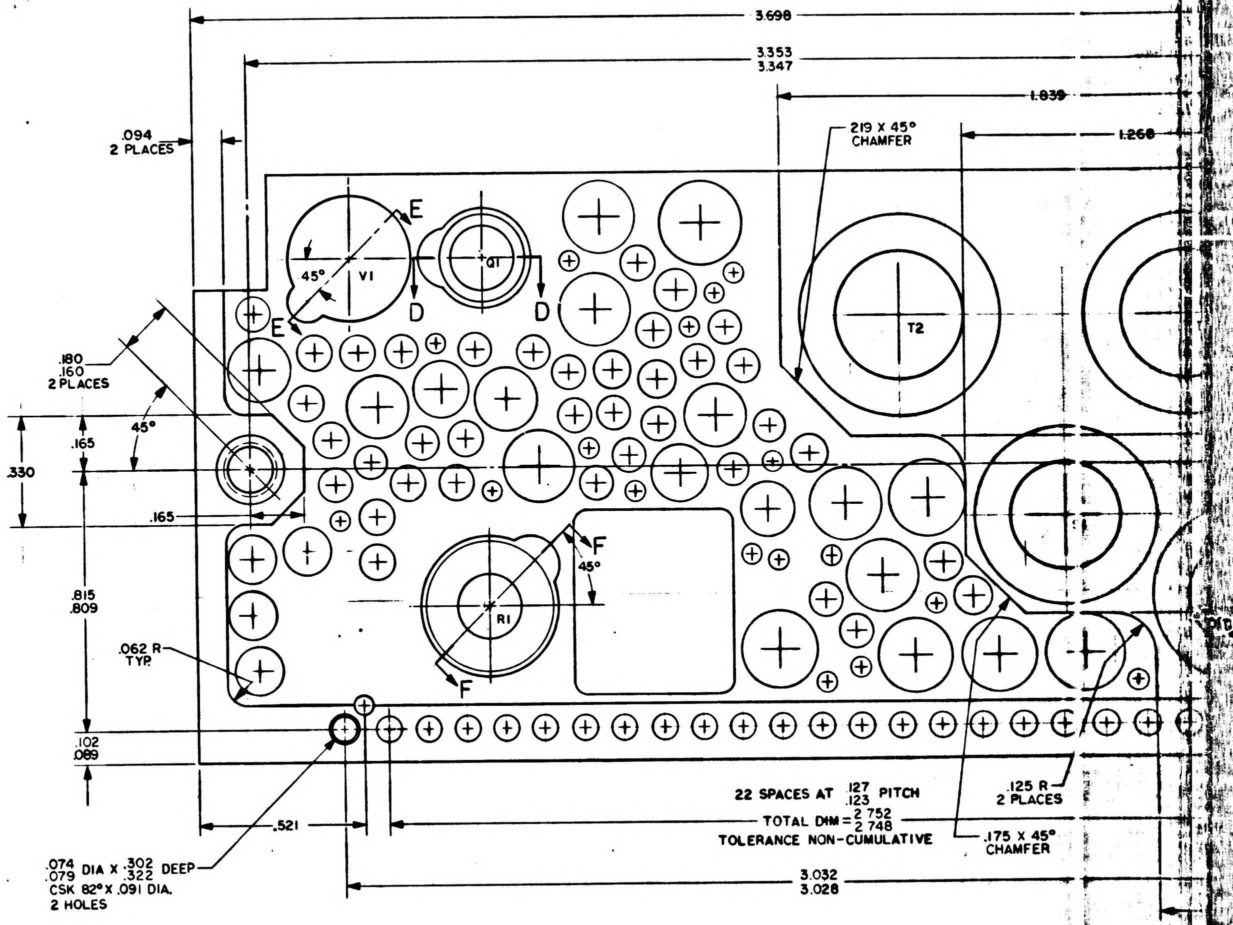
PARTIAL SECTION E-E

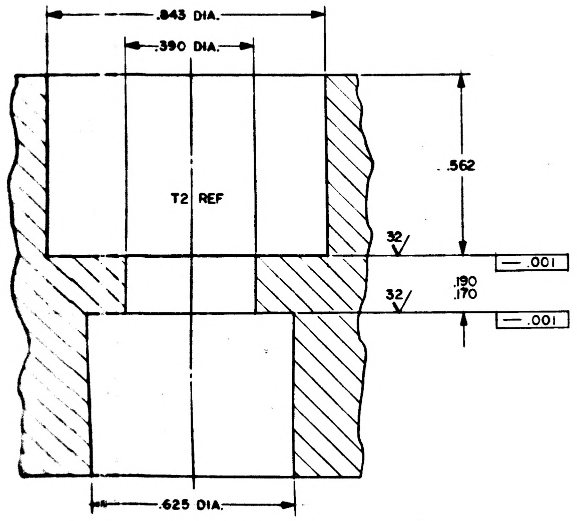

Q1 REF
.094 .125
.172 .203
.112
.190 .210 DIA
.270 .276 DIA
.302 .308 DIA
.090 R

PARTIAL SECTION D-D

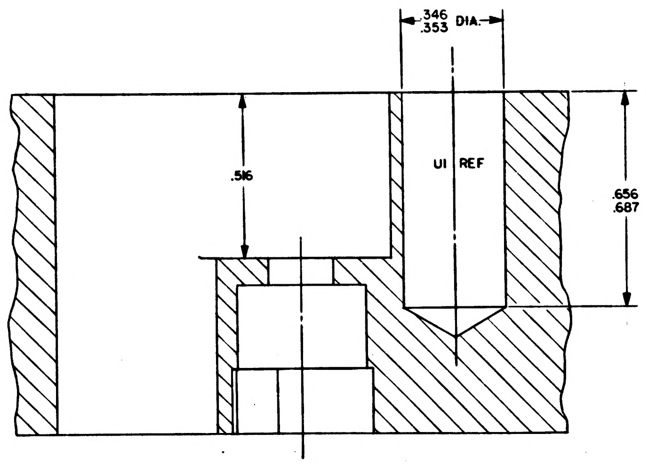

3.462
2.569
.868
C
C
.047 R 2 PLACES
A
A
T2
N1
K3
V1
A22
K4
J4
.165 R 2 PLACES
B
S1
M2
K2
K1
P1
R1
U1
F1
F2
F3
F4
G
G
X
M1
L1
L2
M3
.047 R 6 PLACES
-B-
NO. 8 (.164)-32-UNC-2B MOD. MINOR DIA .143 .148 2 PLACES
.570
.200
1.354
1.469
.504
1.040
2.002


.213 .217 DIA 2 PLACES
B .005
.115 .095 2 PLACES
.600 2 PLACES
.175
.175
.188
.292
.080
.080
.005 R MAX
1.250

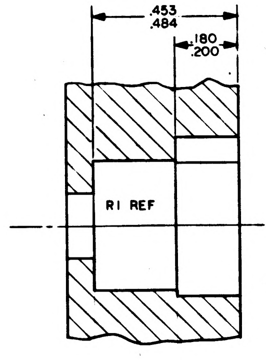

3.698
3.353 3.347
1.839
1.268
.094 2 PLACES
.219 X 45° CHAMFER
E
E
V1
45°
Q1
D
D
T2
.180 .160 2 PLACES
45°
.165
.330
.165
F
45°
F
R1
.815 .809
.062 R TYP.
.102 .089
22 SPACES AT .127 .123 PITCH
TOTAL DIM = 2.752 2.748
TOLERANCE NON-CUMULATIVE
.125 R 2 PLACES
.175 X 45° CHAMFER
.521
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA.
2 HOLES
3.032 3.028


.843 DIA.
.390 DIA.
T2 REF
.562
32
32
.001
.001
.190 .170
.625 DIA.

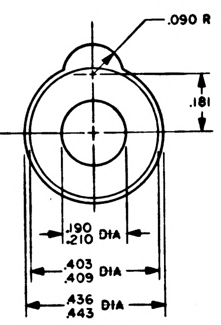
PARTIAL SECTION A-A
2 PLACES

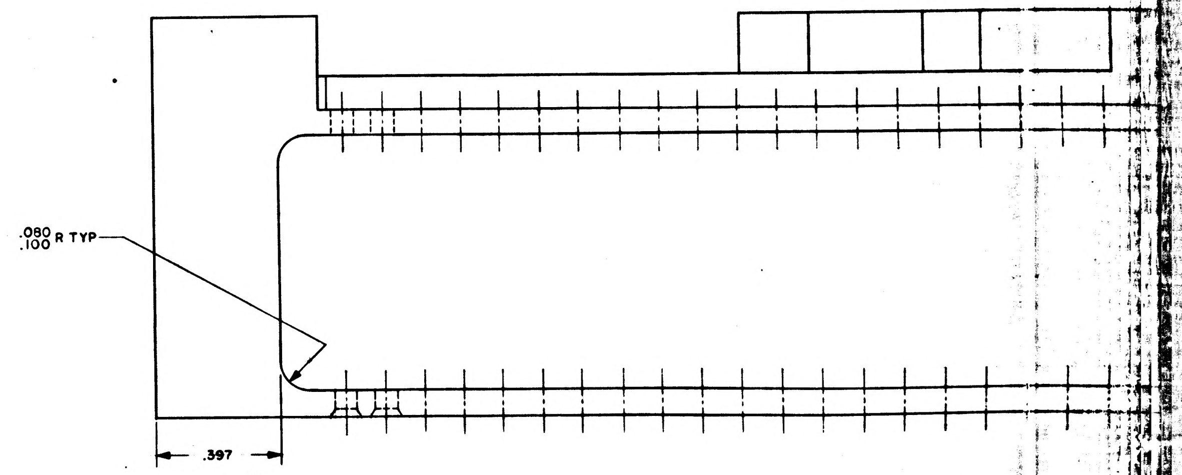

.346 .353 DIA.
.516
U1 REF
.656 .687

PARTIAL SECTION G-G


.453 .484
.180 .200
R1 REF

PARTIAL SECTION F-F
ROTATED 45° CCW

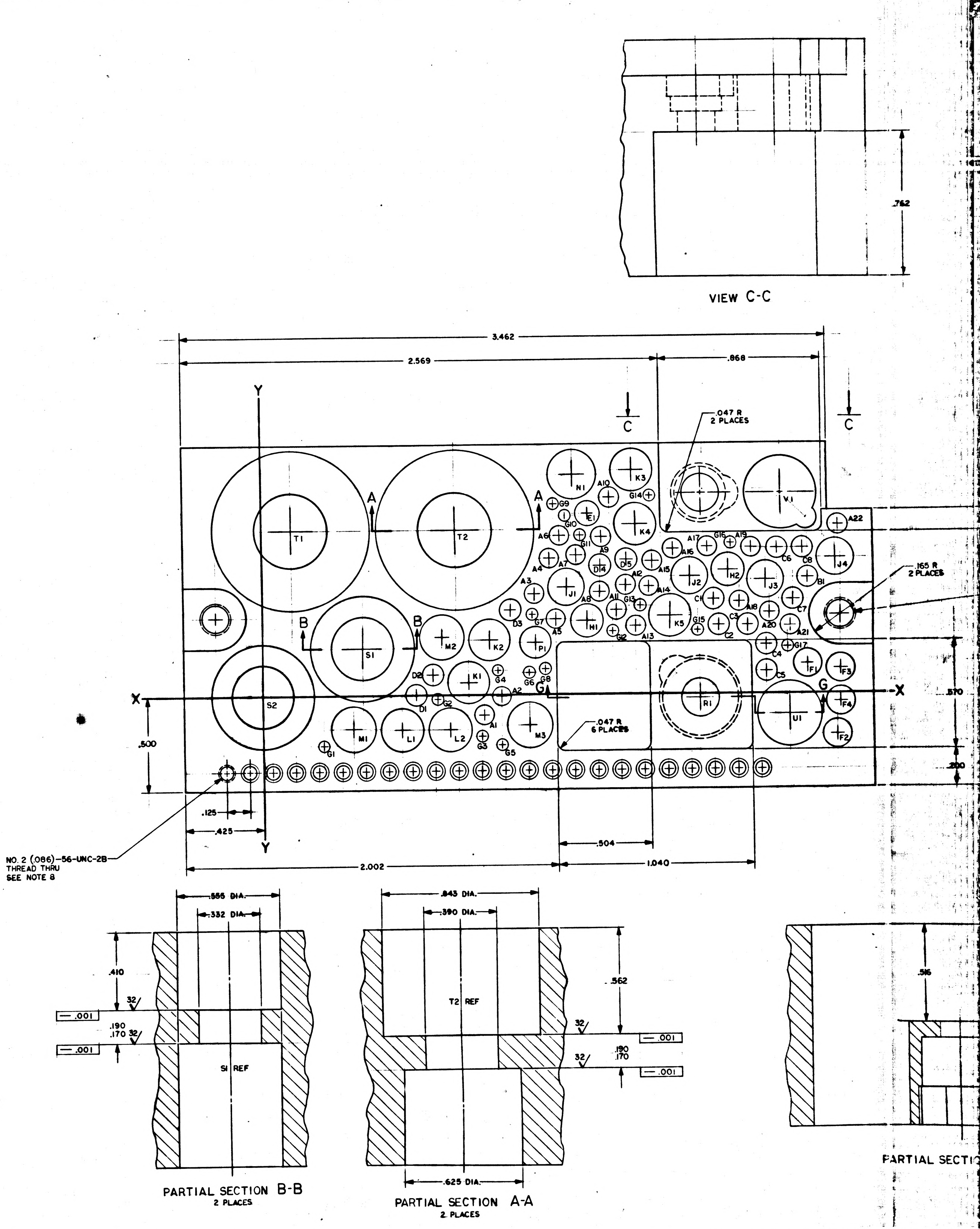

.090 R
.181
.190 .210 DIA
.403 .409 DIA
.436 .443 DIA


.080 .100 R TYP
.397

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY.
A1	1.190	-.105	.100 .104	22
A2	1.280	-.010		
A3	1.460	.535		
A4	1.540	.720		
A5	1.575	.400		
A6	1.600	.840		
A7	1.685	.735		
A8	1.810	.545		
A9	1.825	.835		
A10	1.870	1.045		
A11	1.905	.445		
A12	1.950	.575		
A13	2.005	.360		
A14	2.075	.570		
A15	2.090	.705		
A16	2.200	.770		
A17	2.390	.775		
A18	2.560	.485		
A19	2.620	.770		
A20	2.720	.430		
A21	2.835	.360		
A22	3.090	.890		
B1	2.925	.610	.105 .109	1
C1	2.420	.500	.108 .112	8
C2	2.450	.360		
C3	2.605	.360		
C4	2.705	.260		
C5	2.705	.115		
C6	2.760	.770		
C7	2.845	.495		
C8	2.900	.770		
D1	.825	.000	.112 .116	5
D2	.915	.110		
D3	1.335	.450		
D4	1.815	.680		
D5	1.955	.710		
E1	1.750	.960	.127 .131	1
F1	2.925	.155	.146 .150	4
F2	3.080	-.220		
F3	3.095	.130		
F4	3.095	-.045		
G1	.325	-.265	.058 .062	17
G2	.940	-.020		
G3	1.175	-.220		
G4	1.265	.125		
G5	1.280	-.265		
G6	1.430	.115		
G7	1.450	.425		
G8	1.520	.135		
G9	1.565	1.010		
G10	1.630	.950		
G11	1.710	.845		
G12	1.885	.335		
G13	2.030	.465		
G14	2.085	1.050		
G15	2.335	.335		
G16	2.510	.795		
G17	2.820	.245		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY.
H1	1.745	.390	.172 .176	2
H2	2.500	.650		
J1	1.630	.570	.192 .196	4
J2	2.290	.620		
J3	2.700	.600		
J4	3.075	.715		
K1	1.105	.065	.218 .222	5
K2	1.220	.290		
K3	1.990	1.190		
K4	2.005	.900		
K5	2.185	.410		
L1	.745	-.180	.227 .231	2
L2	1.005	-.180		
M1	.485	-.175	.237 .241	3
M2	.965	.305		
M3	1.430	-.160		
N1	1.675	1.165	.255 .262	1
P1	1.465	.275	.165 .169	1
Q1	2.360	1.065	SEE SECTION D-D	1
R1	2.345	-.020	SEE SECTION F-F	1
S1	.535	.250	SEE SECTION B-B	2
S2	.000	.000		
T1	.160	.875	SEE SECTION A-A	2
T2	1.040	.875		
U1	2.825	-.115	SEE SECTION G-G	1
V1	2.790	1.065	SEE SECTION E-E	1

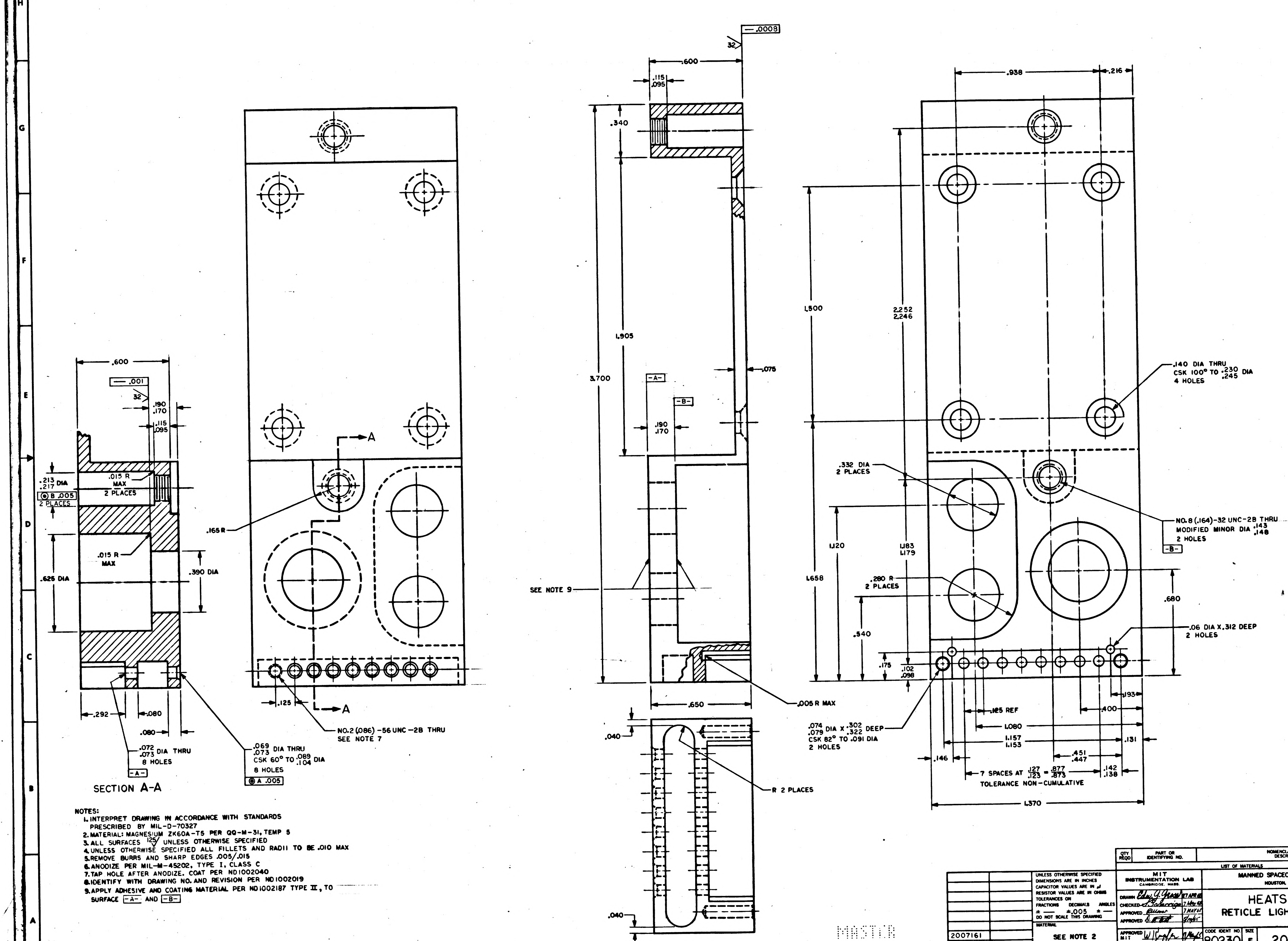

VIEW C-C
.762
3.462
2.569
.868
C
C
.047 R
2 PLACES
.165 R
2 PLACES
Y
X
A
A
B
B
G
G
.570
.200
.500
.125
.425
.504
2.002
1.040
NO. 2 (086)-56-UNC-2B
THREAD THRU
SEE NOTE 8
.047 R
6 PLACES
T1
T2
S1
S2
R1
U1
V1
.555 DIA.
.332 DIA.
.410
.190
.170
32
.001
S1 REF
PARTIAL SECTION B-B
2 PLACES
.843 DIA.
.390 DIA.
T2 REF
.562
.625 DIA.
PARTIAL SECTION A-A
2 PLACES
.516
PARTIAL SECTI

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5, PER QQ-M-31, TEMP. 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\surd}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZING, COAT PER ND1002040

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18951

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21453	SP		11 Aug 65	WK



— .0008
32
.600
.115
.095
.340
1.905
3.700
-A-
-B-
.075
.190
.170
SEE NOTE 9
.005 R MAX
.650
.040
R 2 PLACES
.040
.938
.216
1.500
2.252
2.246
.140 DIA THRU
CSK 100° TO .230 .245 DIA
4 HOLES
.332 DIA
2 PLACES
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
-B-
1.120
1.183
1.179
.280 R
2 PLACES
1.658
.680
.540
.06 DIA X .312 DEEP
2 HOLES
.175
.102
.098
.193
.125 REF
.400
1.080
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
1.157
1.153
.131
.451
.447
.146
7 SPACES AT .127 .123 = .877 .873
TOLERANCE NON-CUMULATIVE
.142
.138
1.370
.600
— .001
32
.190
.170
.115
.095
.213
.217 DIA
◎ B .005
2 PLACES
.015 R
MAX
2 PLACES
.015 R
MAX
.625 DIA
.390 DIA
.292
.080
.080
.072
.073 DIA THRU
8 HOLES
-A-
SECTION A-A
A
A
.165 R
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.069
.073 DIA THRU
CSK 60° TO .089 .104 DIA
8 HOLES
◎ A .005

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
9. APPLY ADHESIVE AND COATING MATERIAL PER ND1002187 TYPE II, TO SURFACE -A- AND -B-

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007161	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Edw. G. Gross	27 APR 65
CHECKED	S. Bonarrigo	7 May 65
APPROVED	RWeiner	7 MAY 65
APPROVED	D.	5/10/65
APPROVED MIT	W Kupfer	11 May 65
APPROVED MSC	W J Rhine	5/14/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
RETICLE LIGHT DIMMER

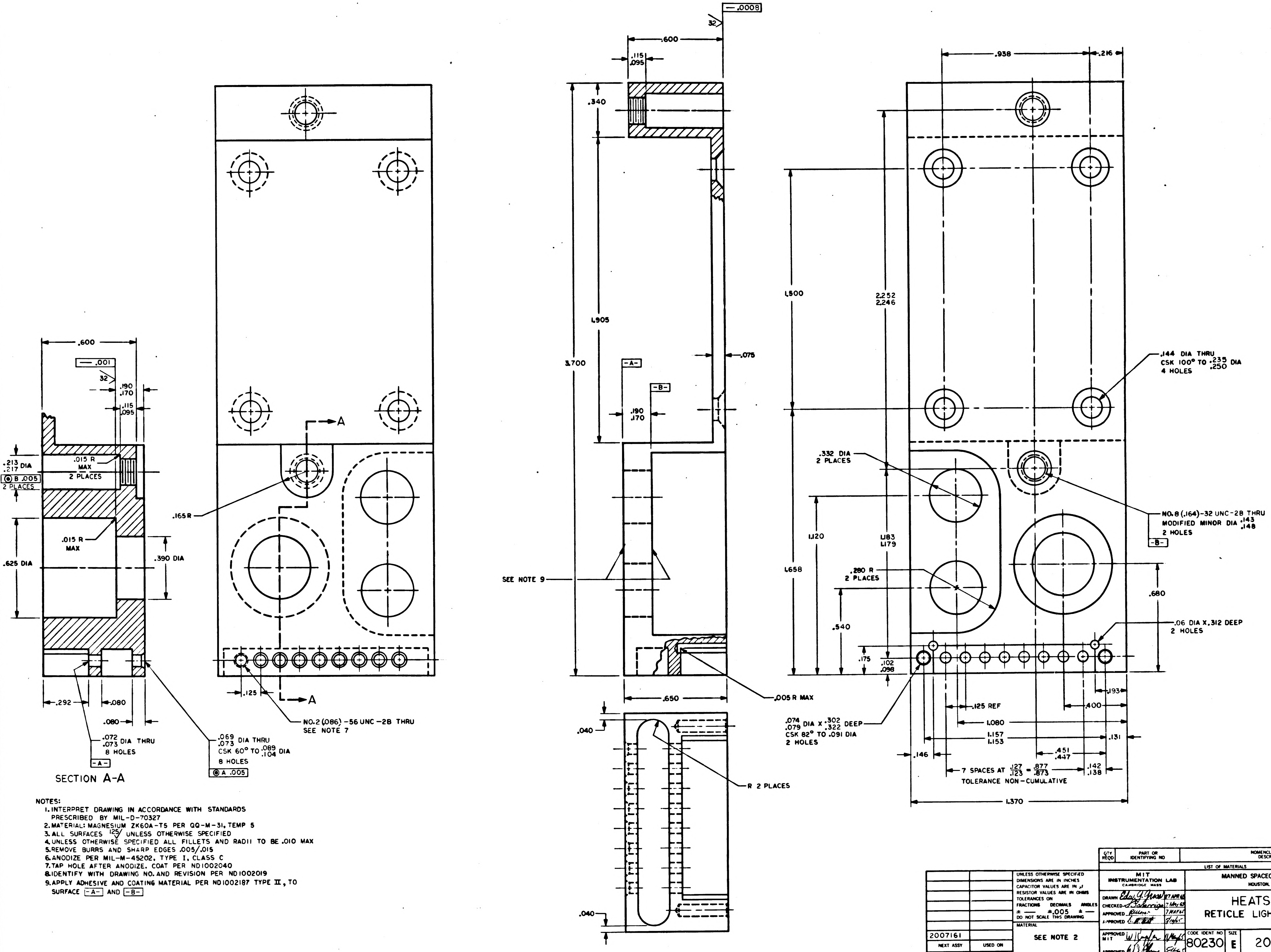
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008318

SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18951

SYM	ZONE	DESCRIPTION	DR	CHK.	DATE	APPROVED
A		REVISED PER TDRR 21453	[illegible]	[illegible]	[illegible] 65	[illegible]
B		REVISED PER TDRR 307 5	JJB	[illegible]	24 [illegible]	



— .0008
32
.600
.115
.095
.340
1.905
3.700
-A-
-B-
.190
.170
.075
SEE NOTE 9
.005 R MAX
.650
.040
R 2 PLACES
.040
.938
.216
1.500
2.252
2.246
.144 DIA THRU
CSK 100° TO .235/.250 DIA
4 HOLES
.332 DIA
2 PLACES
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143/.148
2 HOLES
-B-
1.120
1.183
1.179
1.658
.280 R
2 PLACES
.680
.540
.06 DIA X .312 DEEP
2 HOLES
.175
.102
.098
.074/.079 DIA X .302/.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.193
.125 REF
.400
1.080
1.157
1.153
.131
.146
.451
.447
7 SPACES AT .127/.123 = .877/.873
.142
.138
TOLERANCE NON-CUMULATIVE
1.370
.600
— .001
32
.190
.170
.115
.095
.213/.217 DIA
◉ B .005
2 PLACES
.015 R
MAX
2 PLACES
.015 R
MAX
.625 DIA
.390 DIA
.292
.080
.080
.072/.073 DIA THRU
8 HOLES
-A-
.069/.073 DIA THRU
CSK 60° TO .089/.104 DIA
8 HOLES
◉ A .005
A
.165 R
.125
A
NO. 2 (.086) -56 UNC -2B THRU
SEE NOTE 7

SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
9. APPLY ADHESIVE AND COATING MATERIAL PER ND1002187 TYPE II, TO SURFACE -A- AND -B-

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007161	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

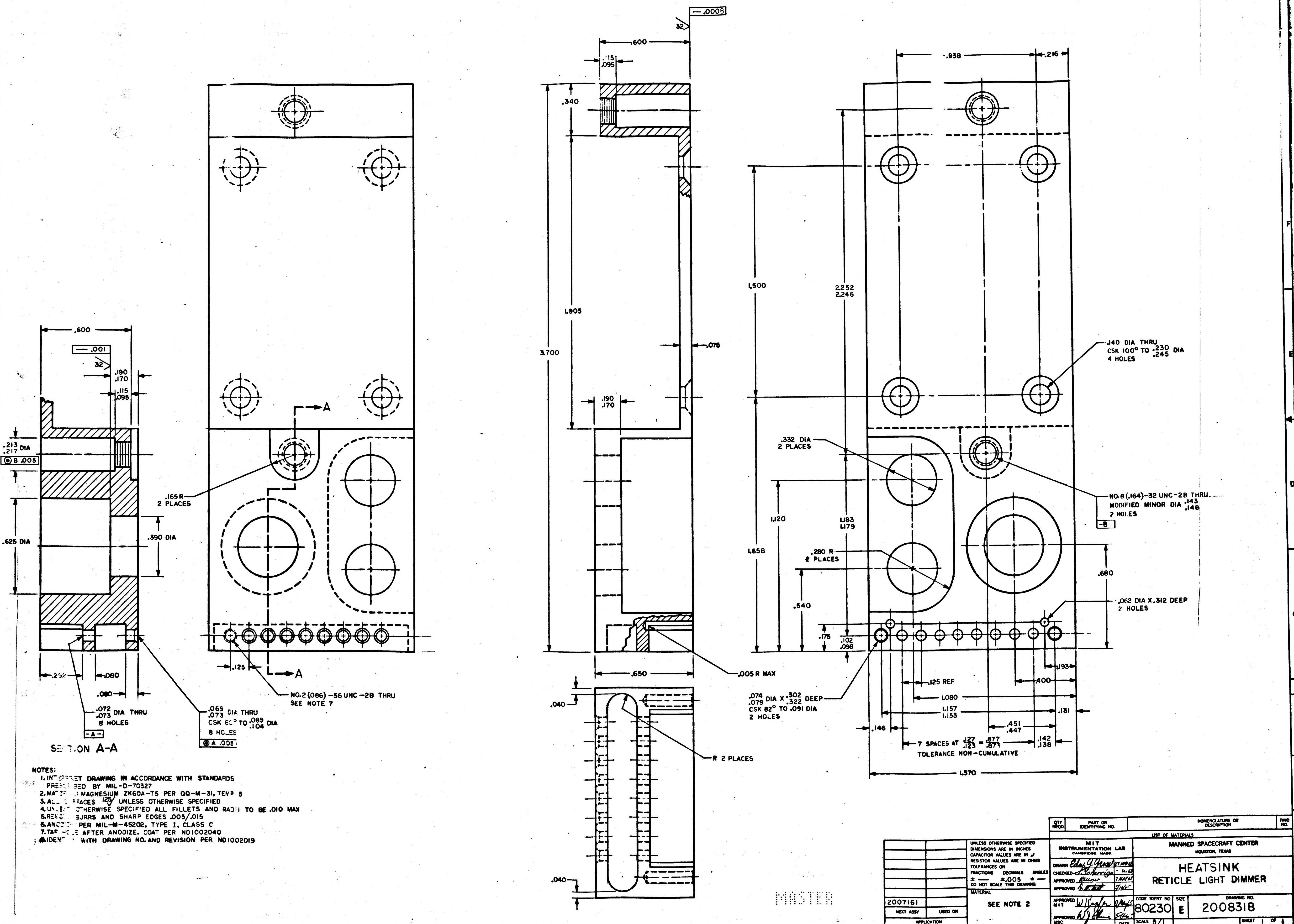
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Edw. G. Gross 27 APR 65
CHECKED S. Babarriga 7 May 65
APPROVED [illegible] 7 MAY 65
APPROVED [illegible] 5/10/65
APPROVED MIT W. [illegible] 11 May 65
APPROVED MSC W. J. [illegible] 5/14/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
RETICLE LIGHT DIMMER

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2008318
SCALE 5/1
SHEET 1 OF 1



— .0008
32
.600
.115
.095
.340
1.905
3.700
.076
.190
.170
.650
.040
.040
R 2 PLACES
.005 R MAX
.938
.216
1.500
2.252
2.246
.140 DIA THRU
CSK 100° TO .230 .245 DIA
4 HOLES
.332 DIA
2 PLACES
NO.8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
-B-
1.120
1.183
1.179
1.658
.280 R
2 PLACES
.540
.680
.062 DIA X .312 DEEP
2 HOLES
.175
.102
.098
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.193
.125 REF
.400
1.080
1.157
1.153
.131
.146
.451
.447
7 SPACES AT .127 .123 = .877 .873
TOLERANCE NON-CUMULATIVE
.142
.138
1.370
.165 R
2 PLACES
A
A
.125
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.600
— .001
32
.190
.170
.115
.095
.213
.217 DIA
◎ B .005
.625 DIA
.390 DIA
.252
.080
.080
.072
.073 DIA THRU
8 HOLES
-A-
.065
.073 DIA THRU
CSK 60° TO .089 .104 DIA
8 HOLES
◎ A .005

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
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7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007161	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Edw. G. Gross 27 APR 65
CHECKED S. Bakerrige
APPROVED 7 MAY 65
APPROVED 7/14/65
APPROVED MIT 11 May 65
APPROVED MSC
DATE

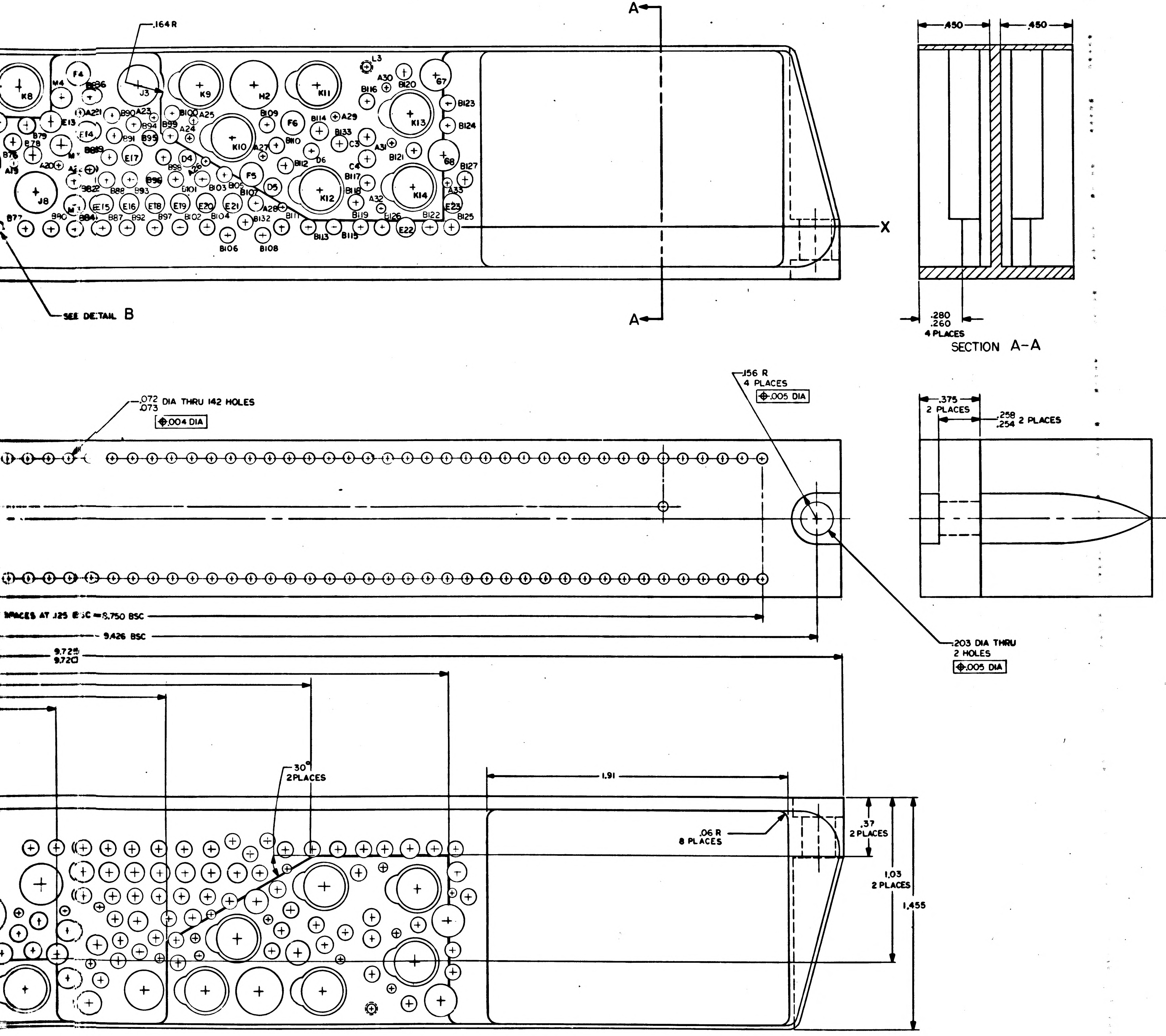
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
RETICLE LIGHT DIMMER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008318
SCALE 5/1
SHEET 1 OF 1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 22189				

21079



.164 R
A
A
X
SEE DETAIL B
.450
.450
.280
.260
4 PLACES
SECTION A-A
.392
.392
1.02 REF
.63 REF
.191
.191
SECTION B-B
.072 DIA THRU 142 HOLES
.073
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.203 DIA THRU
2 HOLES
⊕ .005 DIA
SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
30°
2 PLACES
1.91
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455
K8 M4 F4 B86 J3 K9 M2 K11 L3 A30 B120 G7 B116 B123 B124 K13 K10 K12 K14 J8 F5 F6 D4 D5 D6 C3 C4 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 E23 A24 A25 A27 A28 A29 A31 A32 A33 B106 B108 B113 B115 B119 B122 B125 B126 B127

2008320 A

2007211	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

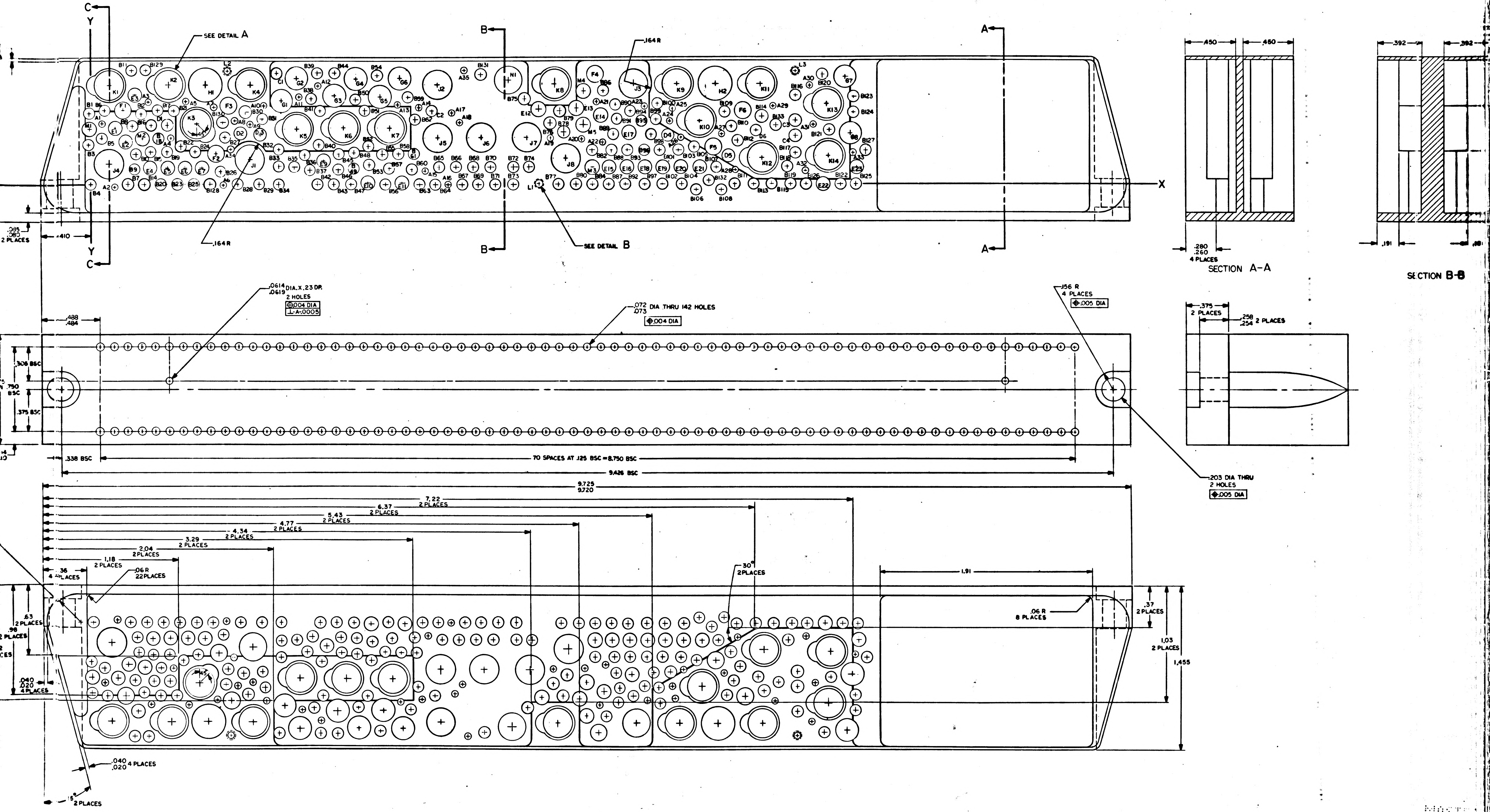
DRAWN 4/29/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
MODE MODULE

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008320
SCALE 4/1
SHEET 1 OF 1

MASTER

SEE DETAIL A
.164R
SEE DETAIL B
C
Y
B
A
X
.085
.080
2 PLACES
.410
SECTION A-A
SECTION B-B
.450
.450
.280
.260
4 PLACES
.392
.392
.191
.0614
.0619 DIA.X.23 DP.
2 HOLES
⊕.004 DIA
⊥-A-.0005
.072
.073 DIA THRU 142 HOLES
⊕.004 DIA
.156 R
4 PLACES
⊕.005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.488
.484
.306 BSC
.750 BSC
.375 BSC
.338 BSC
70 SPACES AT .125 BSC=8.750 BSC
9.426 BSC
.203 DIA THRU
2 HOLES
⊕.005 DIA
9.725
9.720
7.22
2 PLACES
6.37
2 PLACES
5.43
2 PLACES
4.77
2 PLACES
4.34
2 PLACES
3.29
2 PLACES
2.04
2 PLACES
1.18
2 PLACES
.36
4 PLACES
.06R
22PLACES
.63
2 PLACES
.98
2 PLACES
.040
.020
4 PLACES
45°
.040
.020 4 PLACES
15°
2 PLACES
30°
2PLACES
1.91
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455
K1
K2
H1
K3
K4
K5
K6
K7
K8
K9
K10
K11
K12
K13
K14
H2
J1
J2
J3
J4
J5
J6
J7
J8
N1
L1
L2
L3
MASTER

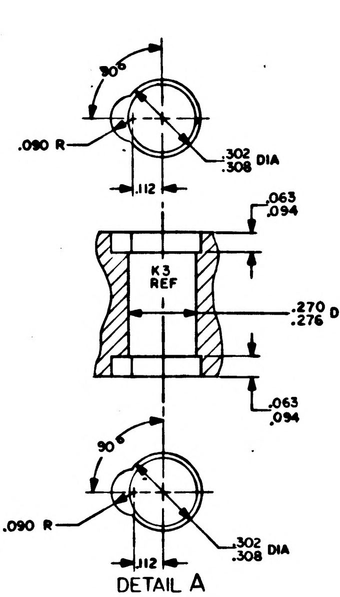
2008320 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.100	.537	.058 .062	35
A2	.215	-.025		
A3	.520	.730		
A4	.725	.410		
A5	.860	.735		
A6	1.195	-.010		
A7	1.115	.685		
A8	1.300	.560		
A9	1.440	.532		
A10	1.565	.695		
A11	1.885	.775		
A12	2.055	.870		
A13	2.767	.707		
A14	2.955	.685		
A15	3.012	.120		
A16	3.215	.000		
A17	3.250	.637		
A18	3.315	.550		
A19	4.130	.407		
A20	4.408	.400		
A21	4.542	.732		
A22	4.592	.375		
A23	4.980	.692		
A24	5.202	.560		
A25	5.225	.670		
A26	5.300	.410		
A27	5.665	.440		
A28	5.790	.125		
A29	6.130	.690		
A30	6.450	.875		
A31	6.488	.525		
A32	6.410	.115		
A33	6.835	.275		
A34	1.262	.312		
A35	3.350	1.010		
B1	-.010	.632	.100 .104	72
B2	—	—		
B3	-.017	.350		
B4	.000	.000		
B5	.100	.407		
B6	.125	.655		
B7	.330	.000		
B8	.377	.515		
B9	.390	.130		
B10	.407	.265		
B11	.365	1.015		
B12	.457	.625		
B13	—	—		
B14	.480	.000		
B15	.542	.287		
B16	.545	.527		
B17	.607	.657		
B18	.610	.407		
B19	.687	.287		
B20	.630	.000		
B21	.750	.652		
B22	.817	.337		
B23	.780	.000		
B24	.945	.287		
B25	.930	.000		
B26	1.172	.110		
B27	1.215	.412		
B28	1.325	.000		
B29	1.520	.000		
B30	1.395	.642		
B31	1.550	.580		
B32	1.700	.310		
B33	1.700	.160		
B34	1.700	.000		
B35	1.840	.155		
B36	1.935	.262		
B37	1.980	.125		
B38	1.997	.762		
B39	2.050	.985		
B40	2.065	.350		
B41	2.075	.650		
B42	2.050	.000		
B43	2.195	.000		
B44	2.205	.985		
B45	2.240	.270		
B46	2.235	.132		
B47	2.350	.000		
B48	2.380	.280		
B49	2.375	.140		
B50	2.392	.750		
B51	2.475	.645		
B52	2.505	.335		
B53	2.515	.175		
B54	2.580	.967		
B55	2.625	.265		
B56	2.655	.000		
B57	2.685	.140		
B58	2.770	.270		
B59	2.865	.775		
B60	2.892	.135		
B61	2.912	.270		
B62	2.920	.570		
B63	2.960	.000		
B64	3.100	.000		
B65	3.135	.155		
B66	3.280	.155		
B67	3.340	.000		
B68	3.435	.155		
B69	3.482	.000		
B70	3.590	.155		
B71	3.630	.000		
B72	3.795	.155		
B73	3.795	.000		
B74	3.935	.155		

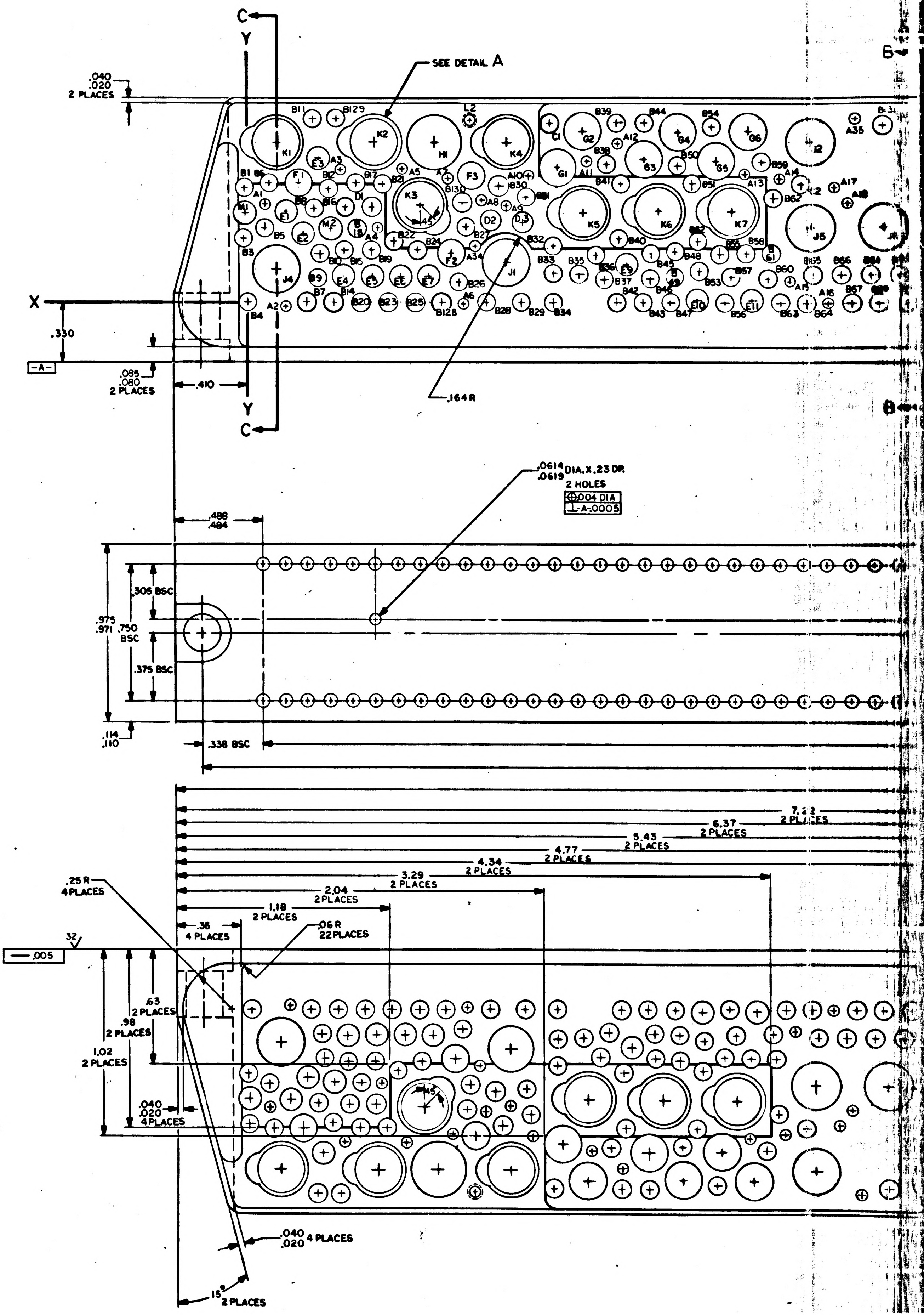
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B75	3.897	.762	.100 .104	56
B76	4.127	.542		
B77	4.200	.000		
B78	4.252	.465		
B79	4.215	.652		
B80	4.355	.000		
B81	—	—		
B82	4.500	.300		
B83	—	—		
B84	4.500	.000		
B85	—	—		
B86	4.600	.830		
B87	4.650	.000		
B88	4.677	.300		
B89	4.690	.442		
B90	4.710	.707		
B91	4.725	.575		
B92	4.800	.000		
B93	4.817	.300		
B94	4.845	.650		
B95	4.950	.560		
B96	4.970	.300		
B97	4.975	.000		
B98	5.037	.442		
B99	5.082	.575		
B100	5.097	.715		
B101	5.110	.300		
B102	5.135	.000		
B103	5.282	.300		
B104	5.305	.000		
B105	5.420	.325		
B106	5.435	-.050		
B107	5.615	.150		
B108	5.660	-.050		
B109	5.695	.642		
B110	5.757	.512		
B111	5.782	.000		
B112	5.810	.385		
B113	5.950	.000		
B114	6.027	.605		
B115	6.110	.000		
B116	6.325	.785		
B117	6.325	.275		
B118	6.250	.150		
B119	6.275	.000		
B120	6.567	.970		
B121	6.625	.480		
B122	6.725	.000		
B123	6.845	.777		
B124	6.845	.637		
B125	6.865	.000		
B126	6.415	.000		
B127	6.950	.300		
B128	1.075	.000		
B129	.490	1.015		
B130	1.190	.550		
B131	3.500	.975		
B132	5.550	.030		
B133	6.150	.525		
C1	1.680	.985	.106 .110	4
C2	3.070	.652		
C3	6.325	.562		
C4	6.325	.425		
D1	.690	.525	.112 .116	6
D2	1.352	.450		
D3	1.530	.440		
D4	5.187	.430		
D5	5.732	.250		
D6	5.975	.475		
E1	.220	.500	.127 .131	22
E2	.317	.375		
E3	.400	.792		
E4	.535	.142		
E5	.694	.142		
E6	.850	.142		
E7	1.007	.142		
E8	—	—		
E9	2.105	.207		
E10	2.500	.010		
E11	2.807	.010		
E12	4.025	.667		
E13	4.362	.677		
E14	4.580	.610		
E15	4.650	.150		
E16	4.815	.150		
E17	4.837	.455		
E18	4.975	.150		
E19	5.135	.150		
E20	5.302	.150		
E21	5.470	.150		
E22	6.572	.000		
E23	6.865	.150		
F1	.292	.657	.153 .157	6
F2	1.132	.272		
F3	1.245	.697		
F4	4.525	.975		
F5	5.585	.325		
F6	5.855	.650		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	1.725	.742	.202 .206	8
G2	1.862	.942		
G3	2.207	.785		
G4	2.395	.937		
G5	2.610	.777		
G6	2.785	.940		
G7	6.767	.950		
G8	6.815	.452		
H1	1.040	.882	.310 .317	2
H2	5.612	.887		
J1	1.435	.217	.270 .276	8
J2	3.125	.887		
J3	4.875	.887		
J4	.162	.180		
J5	3.120	.415		
J6	3.512	.415		
J7	3.915	.415		
J8	4.265	.230		
K1	.162	.882	SEE DETAIL A	14
K2	.708	.882		
K3	.962	.537		
K4	1.440	.882		
K5	1.867	.492		
K6	2.282	.500		
K7	2.690	.500		
K8	4.170	.890		
K9	5.265	.887		
K10	5.472	.562		
K11	6.010	.887		
K12	6.025	.230		
K13	6.600	.710		
K14	6.615	.250		
L1	4.025	.010	SEE DETAIL B	3
L2	1.240	1.003		
L3	6.325	1.003		
M1	-.010	.492	.124 .128	5
M2	.465	.404		
M3	4.500	.150		
M4	4.427	.827		
M5	4.427	.530		
N1	3.750	.925	.241 .245	1

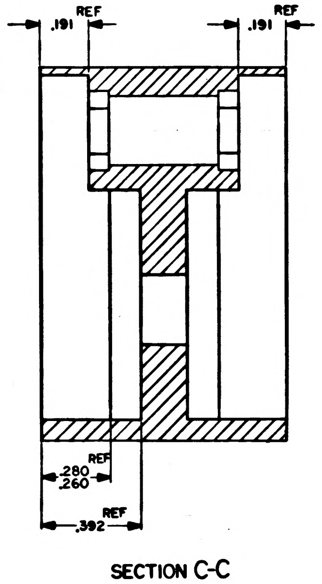


90°
.090 R
.302
.308 DIA
.112
.063
.094
K3
REF
.270 DIA
.276
.063
.094
90°
.090 R
.112
.302
.308 DIA

DETAIL A
TYP 14 PLACES

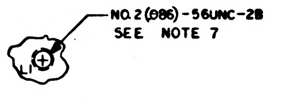


C
Y
SEE DETAIL A
.040
.020
2 PLACES
X
.330
-A-
.085
.080
2 PLACES
.410
Y
C
.164 R
B
B
.0614
.0619 DIA. X .23 DP.
2 HOLES
.004 DIA
A .0005
.488
.484
.305 BSC
.975
.971
.750 BSC
.375 BSC
.114
.110
.338 BSC
7.23 2 PLACES
6.37 2 PLACES
5.43 2 PLACES
4.77 2 PLACES
4.34 2 PLACES
3.29 2 PLACES
2.04 2 PLACES
1.18 2 PLACES
.36 4 PLACES
.25 R 4 PLACES
.06 R 22 PLACES
.005
32
.63 2 PLACES
.98 2 PLACES
1.02 2 PLACES
.040
.020
4 PLACES
.040
.020 4 PLACES
15° 2 PLACES



.191
REF
.191
REF
.280
.260
REF
.392
REF

SECTION C-C



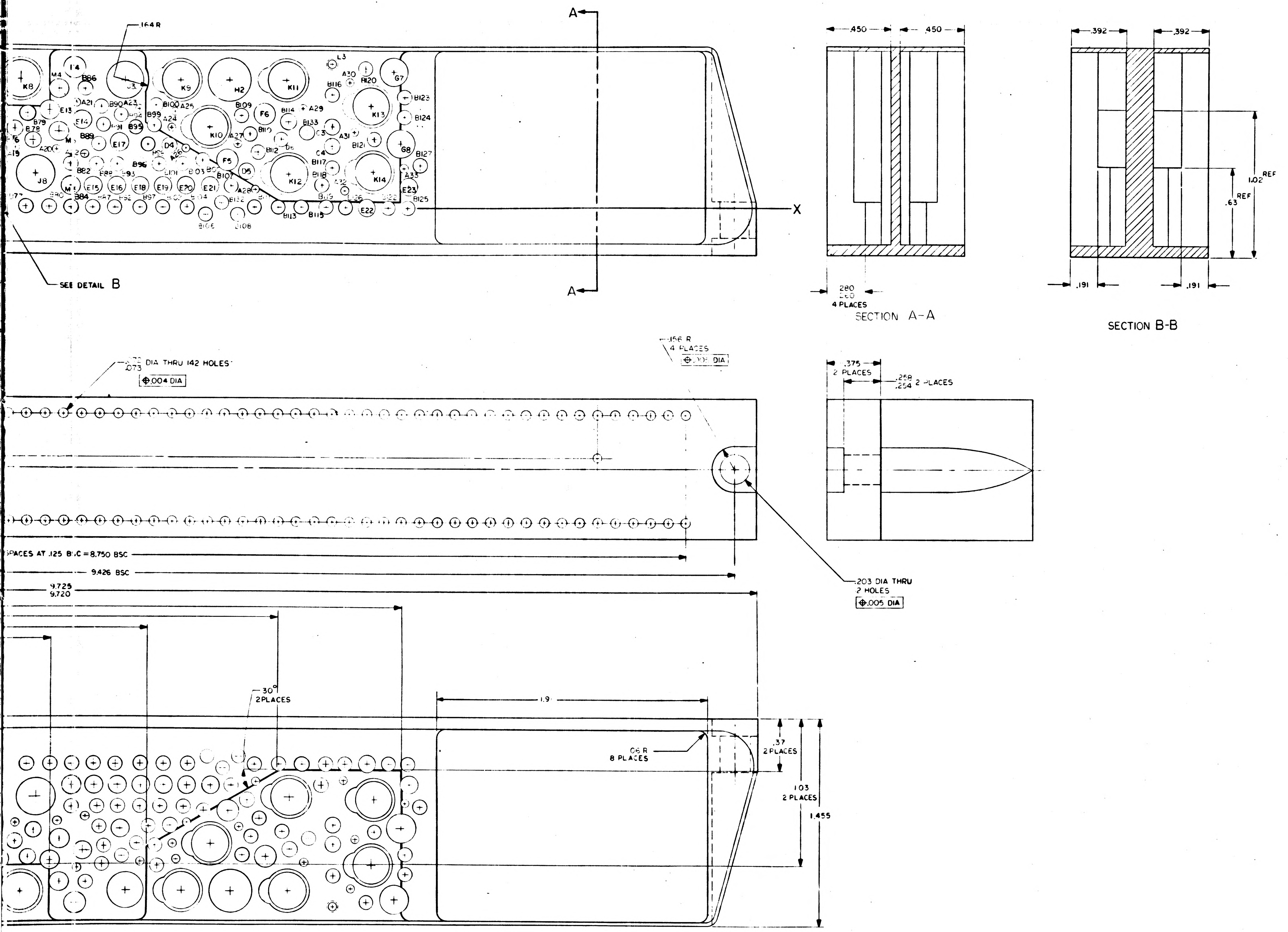
L1
NO. 2 (.086) - 56UNC-2B
SEE NOTE 7

DETAIL B
3 PLACES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

2008320	A

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 22189	LAL		3 Sept 65	
B		REVISED PER TDRR 27207	A.N		22 MAR 66	



4
3
2
1
.164 R
K8
M4
I4
B86
C3
K9
H2
K11
L3
A30
B120
G7
B116
B123
B124
E13
A21
B90
A23
B100
A25
B109
F6
B114
A29
K13
B133
B79
B78
E14
B95
B99
A24
K10
A27
B110
C3
A31
B121
G8
B127
A20
B89
E17
D4
B112
C4
K12
K14
B117
A33
J8
B82
B96
F5
D5
B118
E23
M1
B84
E15
E16
E18
E19
E20
E21
A28
B107
B125
B113
B115
E22
B106
B108
A
A
X
SEE DETAIL B
.450
.450
.280
.260
4 PLACES
SECTION A-A
.392
.392
1.02 REF
.63 REF
.191
.191
SECTION B-B
.156 R
4 PLACES
.073 DIA THRU 142 HOLES
⊕.004 DIA
.375
2 PLACES
.258
.254 2 PLACES
SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
.203 DIA THRU
2 HOLES
⊕.005 DIA
30°
2 PLACES
1.9
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455
D
C
B

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007211	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX ±.02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 4/29/65
CHECKED 7 JUN 65
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

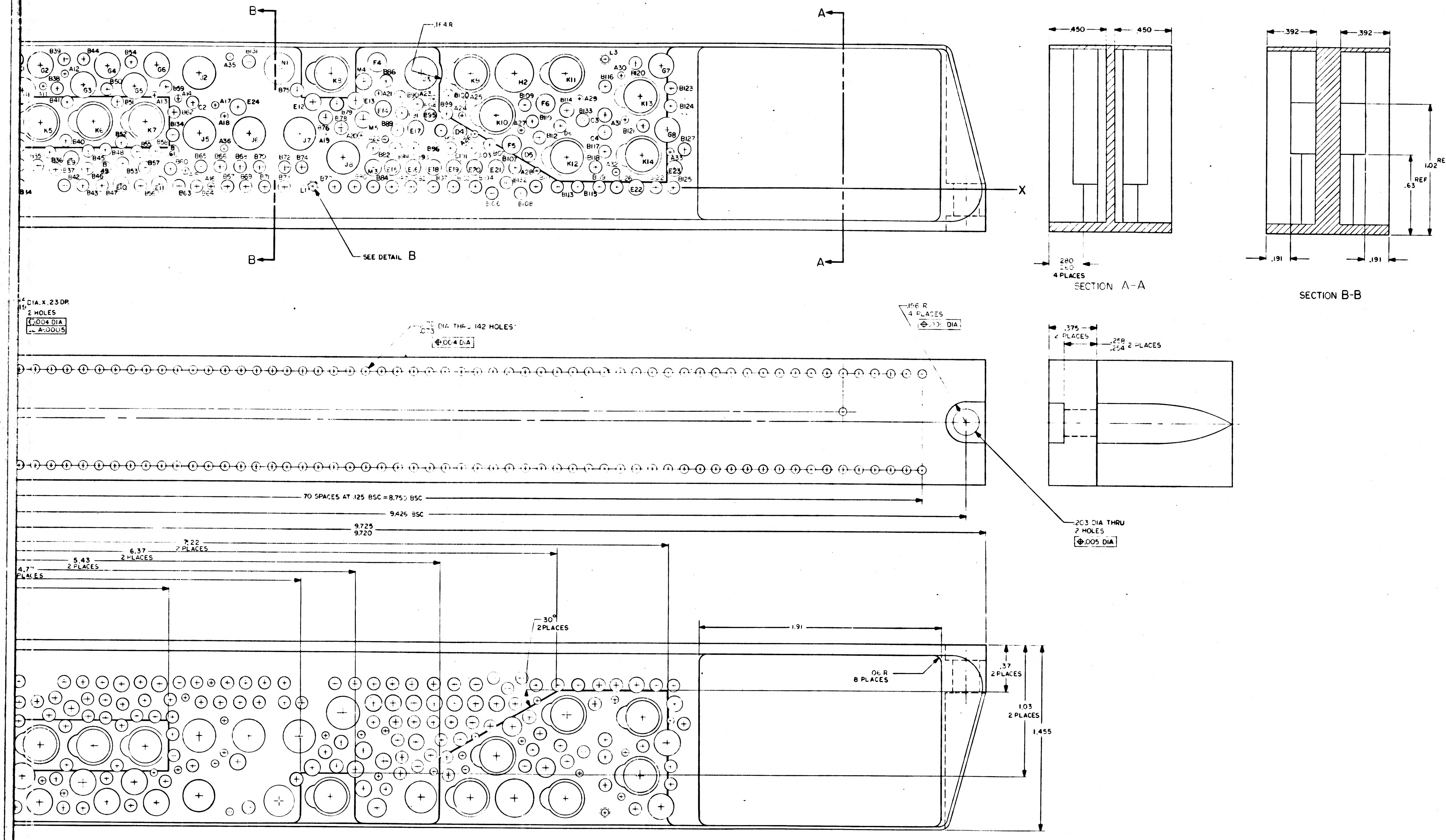
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATER HOUSING
MODE MODULE

CODE IDENT NO 80230
SIZE J
DRAWING NO 2008320
SCALE 4/1
SHEET 1 OF 1

008320 B

3/2008320


B
B
A
A
.164 R
SEE DETAIL B
X
.450
.450
.280
.260
4 PLACES
SECTION A-A
.392
.392
1.02 REF
.63 REF
.191
.191
SECTION B-B
DIA. X .23 DP.
2 HOLES
.004 DIA
A .0005
DIA THRU 142 HOLES
.004 DIA
.156 R
4 PLACES
DIA
.375
2 PLACES
.258
.254 2 PLACES
70 SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
7.22
2 PLACES
6.37
2 PLACES
5.43
2 PLACES
4.77
PLACES
.203 DIA THRU
2 HOLES
.005 DIA
30°
2 PLACES
1.91
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455
B39
B44
B54
G2
A12
G4
G6
J2
A35
B131
N1
K8
F4
M4
B86
K9
H2
K11
L3
A30
B116
B120
G7
B123
B124
K13
B127
K14
B125
A33
E23
E22
G3
G5
B50
B59
A14
C2
A17
E24
B75
E12
E13
K5
K6
K7
J5
J6
A18
A36
J7
J8
A19
B76
E17
E99
D4
F5
K10
A27
D5
K12
F6
G8
B109
B114
A29
B133
A31
B121
B117
B118
B112
B113
B115
L1
B72
B74
B79
E108
E106
B40
B45
B36
B42
B43
B47
E10
B56
B63
B64
B57
B53
B52
B51
A13
B134
B62
B65
B66
B67
B68
B69
B70
B71
B73
B84
M3
M5
B82
B89
B96
E14
E15
E16
E18
E19
E20
E21
A21
A23
A24
A25
A26
B99
B107
B130
B108
B110
B119
B122
C3
C4
A32
A28
A20
A34
B34
B35
B37
B38
B41
B46
B48
B55
B58
B60
E11

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± — DECIMALS .XXX ±.005 .XX ±.02 ANGLES ± 1/2° DO NOT SCALE THIS DRAWING
2007211		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

QTY REQD

INSTRU

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

2008320 B

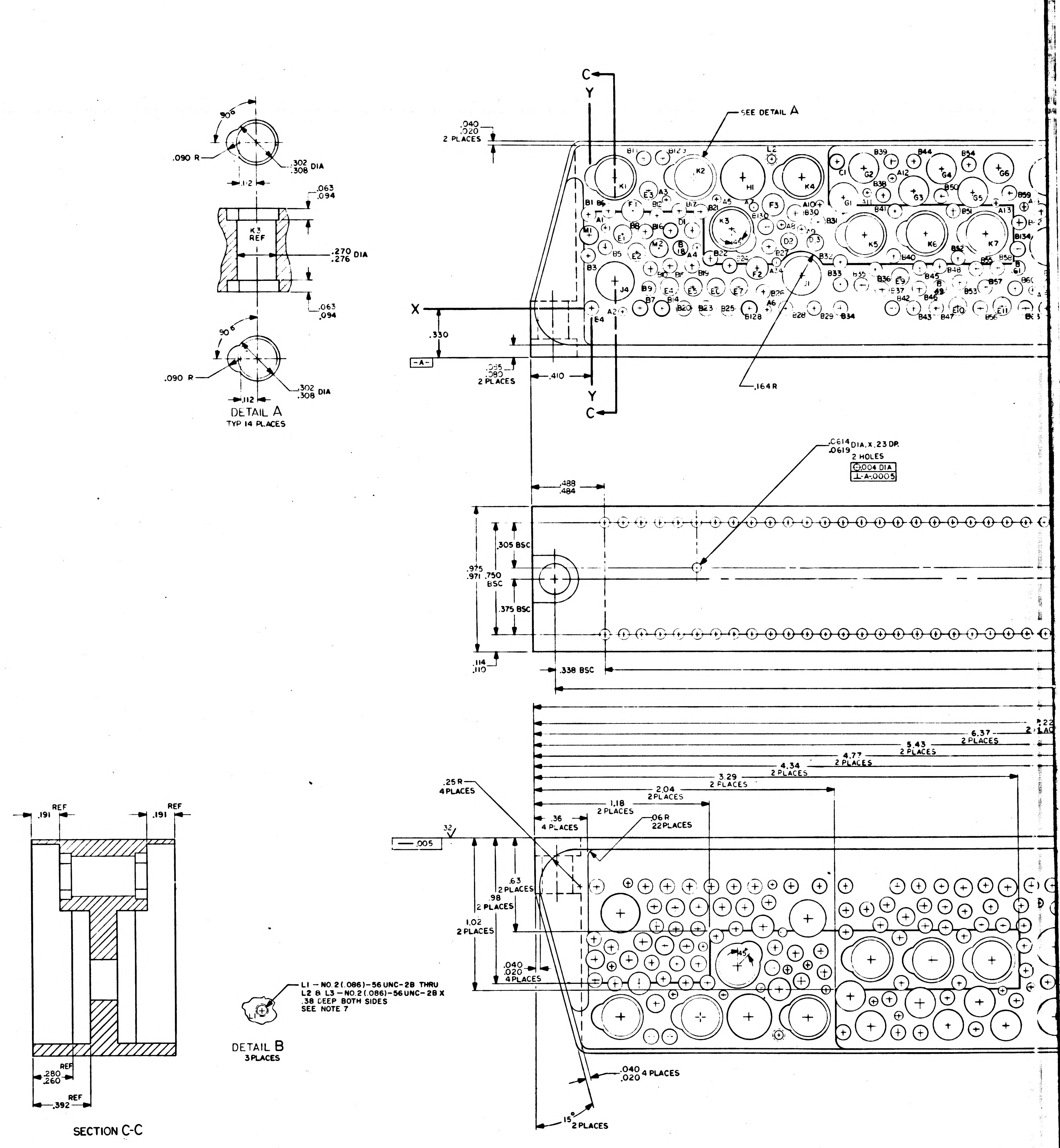
2/2008320

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.100	.537	.058 .062	35
A2	.215	-.025		
A3	.520	.730		
A4	.725	.410		
A5	.860	.735		
A6	1.195	-.010		
A7	1.115	[illegible]		
A8	1.300	.560		
A9	1.440	.532		
A10	1.565	.695		
A11	1.885	.775		
A12	2.055	.870		
A13	2.767	.707		
A14	2.955	.685		
A15	3.012	.120		
A16	3.215	.000		
A17	3.250	.637		
A18	3.315	.550		
A19	4.130	.407		
A20	4.408	.400		
A21	4.542	.732		
A22	4.592	.375		
A23	4.980	.692		
A24	5.202	.560		
A25	5.225	.670		
A26	5.300	.410		
A27	5.665	.440		
A28	5.790	.125		
A29	6.130	.690		
A30	6.450	.875		
A31	6.488	.525		
A32	6.410	.115		
A33	6.835	.275		
A34	1.262	.312		
A35	3.350	1.010		
B1	-.010	.632	.100 .104	72
B2	—	—		
B3	-.017	.350		
B4	.000	.000		
B5	.100	.407		
B6	.125	.655		
B7	.330	.000		
B8	.377	.515		
B9	.390	.130		
B10	.407	.265		
B11	.365	1.015		
B12	.457	.625		
B13	—	—		
B14	.480	.000		
B15	.542	.287		
B16	.545	.527		
B17	.607	.657		
B18	.610	.407		
B19	.687	.287		
B20	.630	.000		
B21	.750	.652		
B22	.817	.337		
B23	.760	.000		
B24	.945	.287		
B25	.930	.000		
B26	1.172	.110		
B27	1.215	.412		
B28	1.325	.000		
B29	1.520	.000		
B30	1.395	.642		
B31	1.550	.580		
B32	1.700	.310		
B33	1.700	.160		
B34	1.700	.000		
B35	1.840	.155		
B36	1.935	.262		
B37	1.980	.125		
B38	1.997	.762		
B39	2.050	.985		
B40	2.065	.350		
B41	2.075	.650		
B42	2.050	.000		
B43	2.195	.000		
B44	2.205	.985		
B45	2.240	.270		
B46	2.235	.132		
B47	2.350	.000		
B48	2.380	.280		
B49	2.375	.140		
B50	2.392	.750		
B51	2.475	.645		
B52	2.505	.335		
B53	2.515	.175		
B54	2.580	.967		
B55	2.625	.265		
B56	2.655	.000		
B57	2.685	.140		
B58	2.770	.270		
B59	2.865	.775		
B60	2.892	.135		
B61	2.912	.270		
B62	2.920	.570		
B63	2.960	.000		
B64	3.100	.000		
B65	3.135	.155		
B66	3.280	.155		
B67	3.340	.000		
B68	3.435	.155		
B69	3.482	.000		
B70	3.590	.155		
B71	3.630	.000		
B72	3.795	.155		
B73	3.795	.000		
B74	3.935	.155		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B75	3.897	.762	.100 .104	57
B76	4.127	.542		
B77	4.200	.000		
B78	4.252	.465		
B79	4.215	.652		
B80	4.355	.000		
B81	—	—		
B82	4.500	.300		
B83	—	—		
B84	4.500	.000		
B85	—	—		
B86	4.600	.830		
B87	4.650	.000		
B88	4.677	.300		
B89	4.690	.442		
B90	4.710	.707		
B91	4.725	.575		
B92	4.800	.000		
B93	4.817	.300		
B94	4.845	.650		
B95	4.950	.560		
B96	4.970	.300		
B97	4.975	.000		
B98	5.037	.442		
B99	5.082	.575		
B100	5.097	.715		
B101	5.110	.300		
B102	5.135	.000		
B103	5.282	.300		
B104	5.305	.000		
B105	5.420	.325		
B106	5.435	.050		
B107	5.615	.150		
B108	5.660	-.050		
B109	5.695	.642		
B110	5.757	.512		
B111	5.782	.000		
B112	5.810	.385		
B113	5.950	.000		
B114	6.027	.625		
B115	6.110	.000		
B116	6.325	.785		
B117	6.325	.275		
B118	6.250	.150		
B119	6.275	.000		
B120	6.567	.970		
B121	6.625	.480		
B122	6.725	.000		
B123	6.845	.777		
B124	6.845	.637		
B125	6.865	.000		
B126	6.415	.000		
B127	6.950	.300		
B128	1.075	.000		
B129	.490	.015		
B130	1.190	.550		
B131	3.500	.975		
B132	5.550	.030		
B133	6.150	.525		
B134	2.910	.400		
C1	1.680	.985	.106 .110	4
C2	3.070	.652		
C3	6.325	.562		
C4	6.325	.425		
D1	.690	.525	.112 .116	6
D2	1.352	.450		
D3	1.530	.440		
D4	5.187	.430		
D5	5.732	.250		
D6	5.975	.475		
E1	.220	.500	.127 .131	23
E2	.317	.375		
E3	.400	.792		
E4	.535	.142		
E5	.694	.142		
E6	.850	.142		
E7	1.007	.142		
E8	—	—		
E9	2.105	.207		
E10	2.500	.010		
E11	2.807	.010		
E12	4.025	.667		
E13	4.362	.677		
E14	4.580	.610		
E15	4.650	.150		
E16	4.815	.150		
E17	4.837	.455		
E18	4.975	.150		
E19	5.135	.150		
E20	5.302	.150		
E21	5.470	.150		
E22	6.572	.000		
E23	6.865	.150		
E24	3.421	.621		
F1	.292	.657	.153 .157	6
F2	1.132	.272		
F3	1.245	.697		
F4	4.525	.975		
F5	5.585	.325		
F6	5.855	.650		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	1.725	.742	.202 .206	8
G2	1.862	.942		
G3	2.207	.785		
G4	2.395	.937		
G5	2.610	.777		
G6	2.785	.940		
G7	6.767	.950		
G8	6.815	.452		
H1	1.040	.882	.310 .317	2
H2	5.612	.887		
J1	1.435	.217	.270 .276	8
J2	3.125	.887		
J3	4.875	.887		
J4	.162	.180		
J5	3.120	.415		
J6	3.512	.415		
J7	3.915	.415		
J8	4.265	.230		
K1	.162	.892	SEE DETAIL A	14
K2	[illegible]	.882		
K3	.942	.537		
K4	1.440	.882		
K5	1.867	.492		
K6	2.282	.500		
K7	2.690	.500		
K8	4.170	.890		
K9	5.265	.887		
K10	5.472	.562		
K11	6.010	.887		
K12	6.025	.230		
K13	6.600	.710		
K14	6.615	.250		
L1	4.025	.010	SEE DETAIL B	3
L2	1.240	1.003		
L3	6.325	1.003		
M1	-.010	.492	.124 .128	5
M2	.465	.404		
M3	4.500	.150		
M4	4.427	.827		
M5	4.427	.530		
N1	3.750	.925	.241 .245	1
A36	3.311	.296	.058/.062	1


SEE DETAIL A
.040
.020
2 PLACES
C
Y
X
.330
-A-
.410
2 PLACES
.164 R
90°
.090 R
.302
.308 DIA
.112
.063
.094
K3
REF
.270
.276 DIA
DETAIL A
TYP 14 PLACES
.0614
.0619 DIA. X .23 DP.
2 HOLES
.488
.484
.305 BSC
.975
.971
.750
BSC
.375 BSC
.114
.110
.338 BSC
6.37
2 PLACES
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2 PLACES
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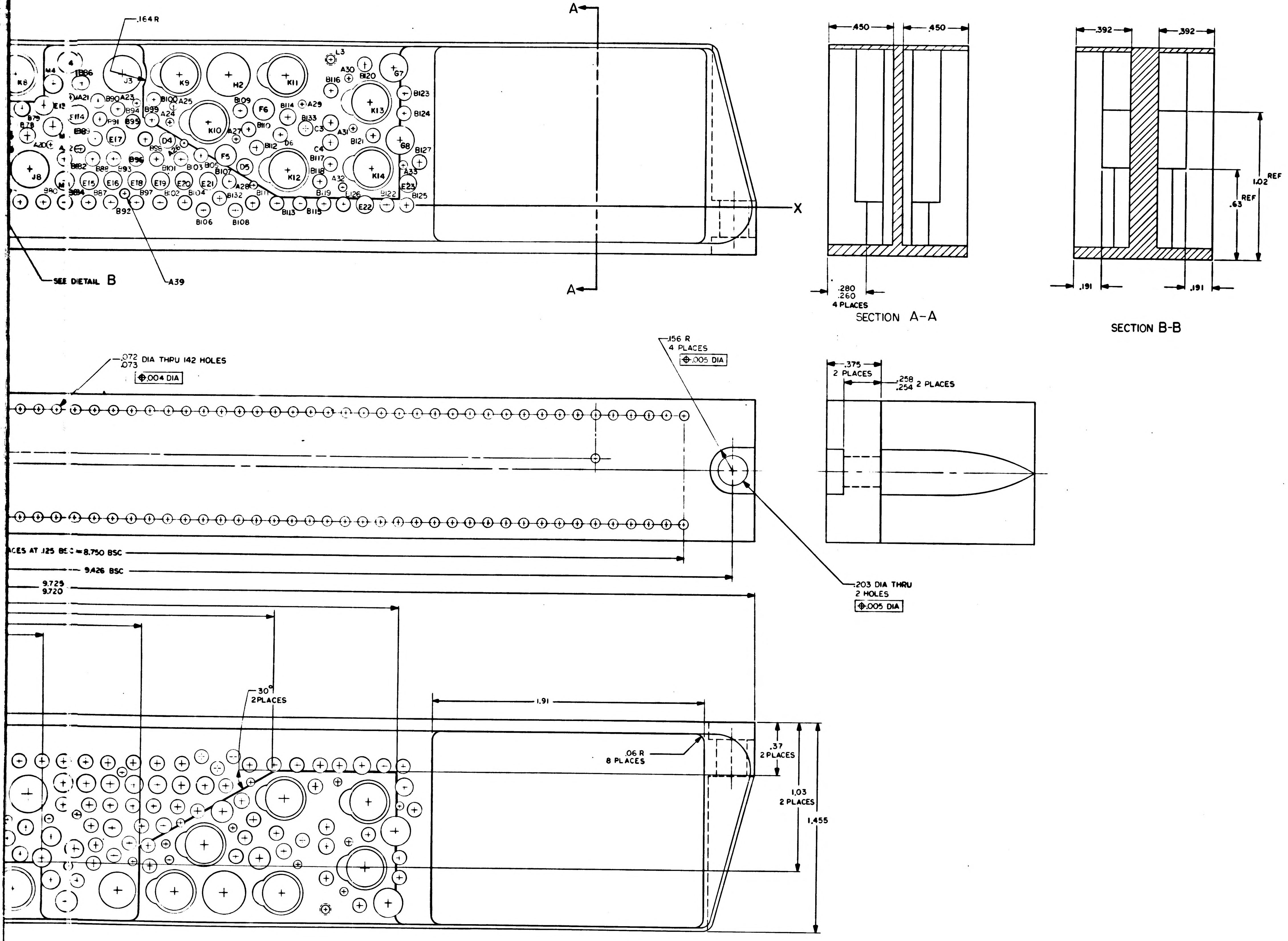
4 PLACES
.25 R
4 PLACES
.06 R
22 PLACES
32
.005
.63
2 PLACES
.98
2 PLACES
1.02
2 PLACES
.040
.020
4 PLACES
15°
2 PLACES
.191
REF
.280
.260
.392
SECTION C-C
L1 - NO.2(.086)-56UNC-2B THRU
L2 & L3 - NO.2(.086)-56UNC-2B X
.38 DEEP BOTH SIDES
SEE NOTE 7
DETAIL B
3 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK60A-T5 PER QQ-M-31 TEMP S
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE, COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

2008320 B

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 22189	LAL		3 ?? 65	
B		REVISED PER TDRR 27207	A.N		22 MAR 66	
C		REVISED PER TDRR 27970	J.K		2? APR 66	



.164 R
A
X
A
SEE DETAIL B
A39
J3
J8
K8
K9
H2
K11
K10
K12
K13
K14
F5
F6
G7
G8
.450
.450
.280
.260
4 PLACES
SECTION A-A
.392
.392
1.02 REF
.63 REF
.191
.191
SECTION B-B
.072
.073 DIA THRU 142 HOLES
⌖.004 DIA
.156 R
4 PLACES
⌖.005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.203 DIA THRU
2 HOLES
⌖.005 DIA
ACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
30°
2 PLACES
1.91
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007211	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN M. F. Troy 4/29/65
CHECKED 7 JUN 65
APPROVED R V Varnak 2? JUN 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

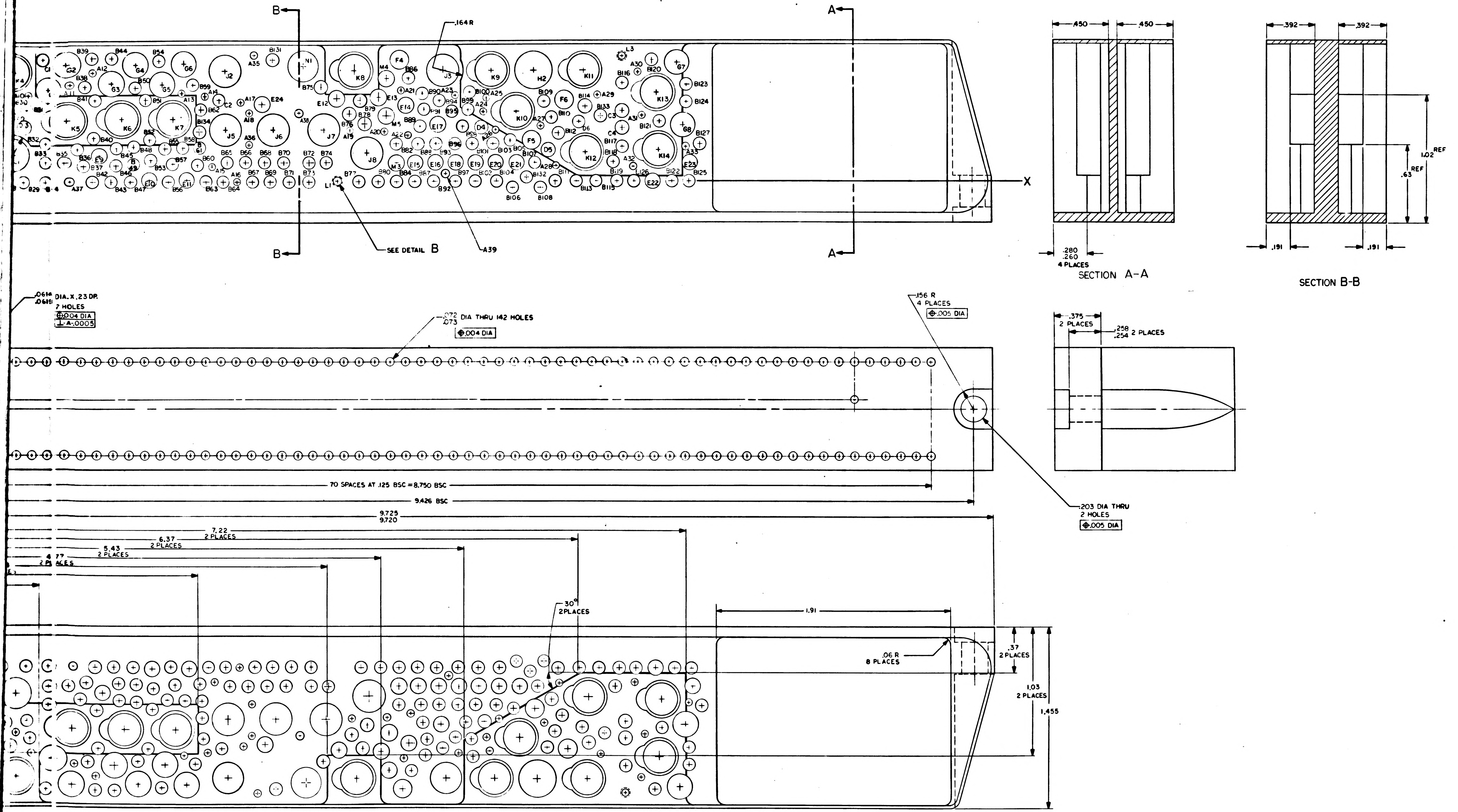
HEADER HOUSING
MODE MODULE

CODE IDENT NO 80230
SIZE J
DRAWING NO 2008320
SCALE 4/
SHEET 1 OF 1

2008320 C

008320 C

3/2008320


B
B
A
A
X
.164 R
SEE DETAIL B
A39
L1
L3
N1
J2
J3
J5
J6
J7
J8
K5
K6
K7
K8
K9
K10
K11
K12
K13
K14
M2
M3
M4
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F4
F5
F6
G2
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D4
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B131
B132
B133
B134
.450
.450
.280
.260
4 PLACES
SECTION A-A
.392
.392
1.02 REF
.63 REF
.191
.191
SECTION B-B
.0614
.0615 DIA. X .23 DP.
7 HOLES
⊕ .004 DIA
⊥ -A- .0005
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.203 DIA THRU
2 HOLES
⊕ .005 DIA
70 SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
7.22
2 PLACES
6.37
2 PLACES
5.43
2 PLACES
4.77
2 PLACES
30°
2 PLACES
1.91
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455

2007211	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XXX ± .005 ± 1/2°
.XX ± .02
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

DRAWN
CHECKED
APPROVED
APPROVED

2008320 C

27 2008320

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.100	.537	.058 .062	35
A2	.215	-.025		
A3	.520	.730		
A4	.725	.410		
A5	.860	.735		
A6	1.195	-.010		
A7	1.115	.685		
A8	1.300	.560		
A9	1.440	.532		
A10	1.565	.695		
A11	1.885	.775		
A12	2.055	.870		
A13	2.767	.707		
A14	2.955	.685		
A15	3.012	.120		
A16	3.215	.000		
A17	3.250	.637		
A18	3.315	.550		
A19	4.130	.407		
A20	4.408	.400		
A21	4.542	.732		
A22	4.592	.375		
A23	4.980	.692		
A24	5.202	.560		
A25	5.225	.670		
A26	5.300	.410		
A27	5.665	.440		
A28	5.790	.125		
A29	6.130	.690		
A30	6.450	.875		
A31	6.488	.525		
A32	6.410	.115		
A33	6.835	.275		
A34	1.262	.312		
A35	3.350	1.010		
B1	-.010	.632	.100 .104	72
B2	—	—		
B3	-.017	.350		
B4	.000	.000		
B5	.100	.407		
B6	.125	.655		
B7	.330	.000		
B8	.377	.515		
B9	.390	.130		
B10	.407	.265		
B11	.365	1.015		
B12	.457	.625		
B13	—	—		
B14	.480	.000		
B15	.542	.287		
B16	.545	.527		
B17	.607	.657		
B18	.610	.407		
B19	.687	.287		
B20	.630	.000		
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B22	.817	.337		
B23	.780	.000		
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B42	2.050	.000		
B43	2.195	.000		
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B45	2.240	.270		
B46	2.235	.132		
B47	2.350	.000		
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B49	2.375	.140		
B50	2.392	.750		
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B52	2.505	.335		
B53	2.515	.175		
B54	2.580	.967		
B55	2.625	.265		
B56	2.655	.000		
B57	2.685	.140		
B58	2.770	.270		
B59	2.865	.775		
B60	2.892	.135		
B61	2.912	.270		
B62	2.920	.570		
B63	2.960	.000		
B64	3.100	.000		
B65	3.135	.155		
B66	3.280	.155		
B67	3.340	.000		
B68	3.435	.155		
B69	3.482	.000		
B70	3.590	.155		
B71	3.630	.000		
B72	3.795	.155		
B73	3.795	.000		
B74	3.935	.155		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B75	3.897	.762	.100 .104	57
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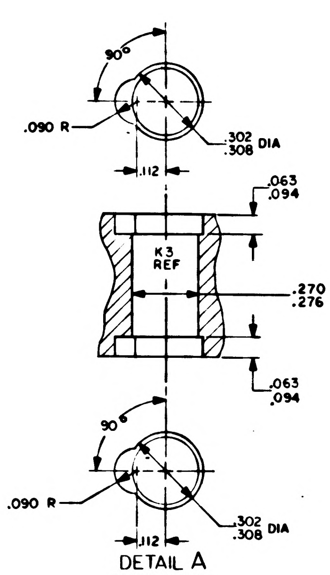
B77	4.200	.000		
B78	4.252	.465		
B79	4.215	.652		
B80	4.355	.000		
B81	—	—		
B82	4.500	.300		
B83	—	—		
B84	4.500	.000		
B85	—	—		
B86	4.600	.830		
B87	4.650	.000		
B88	4.677	.300		
B89	4.690	.442		
B90	4.710	.707		
B91	4.725	.575		
B92	4.800	.000		
B93	4.817	.300		
B94	4.845	.650		
B95	4.950	.560		
B96	4.970	.300		
B97	4.975	.000		
B98	5.037	.442		
B99	5.082	.575		
B100	5.097	.715		
B101	5.110	.300		
B102	5.135	.000		
B103	5.282	.300		
B104	5.305	.000		
B105	5.420	.325		
B106	5.435	-.050		
B107	5.615	.150		
B108	5.660	-.050		
B109	5.695	.642		
B110	5.757	.512		
B111	5.782	.000		
B112	5.810	.385		
B113	5.950	.000		
B114	6.027	.605		
B115	6.110	.000		
B116	6.325	.785		
B117	6.325	.275		
B118	6.250	.150		
B119	6.275	.000		
B120	6.567	.970		
B121	6.625	.480		
B122	6.725	.000		
B123	6.845	.777		
B124	6.845	.637		
B125	6.865	.000		
B126	6.415	.000		
B127	6.950	.300		
B128	1.075	.000		
B129	.490	1.015		
B130	1.190	.550		
B131	3.500	.975		
B132	5.550	.030		
B133	6.150	.525		
B134	2.910	.400		
C1	1.680	.985	.106 .110	4
C2	3.070	.652		
C3	6.325	.562		
C4	6.325	.425		
D1	.690	.525	.112 .116	6
D2	1.352	.450		
D3	1.530	.440		
D4	5.187	.430		
D5	5.732	.250		
D6	5.975	.475		
E1	.220	.500	.127 .131	23
E2	.317	.375		
E3	.400	.792		
E4	.535	.142		
E5	.694	.142		
E6	.850	.142		
E7	1.007	.142		
E8	—	—		
E9	2.105	.207		
E10	2.500	.010		
E11	2.807	.010		
E12	4.025	.667		
E13	4.362	.677		
E14	4.580	.610		
E15	4.650	.150		
E16	4.815	.150		
E17	4.837	.455		
E18	4.975	.150		
E19	5.135	.150		
E20	5.302	.150		
E21	5.470	.150		
E22	6.572	.000		
E23	6.865	.150		
E24	3.421	.621		
F1	.292	.657	.153 .157	6
F2	1.132	.272		
F3	1.245	.697		
F4	4.525	.975		
F5	5.585	.325		
F6	5.855	.650		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	1.725	.742	.202 .206	8
G2	1.862	.942		
G3	2.207	.785		
G4	2.395	.937		
G5	2.610	.777		
G6	2.785	.940		
G7	6.767	.950		
G8	6.815	.452		
H1	1.040	.882	.310 .317	2
H2	5.612	.887		
J1	1.435	.217	.270 .276	8
J2	3.125	.887		
J3	4.875	.887		
J4	.162	.180		
J5	3.120	.415		
J6	3.512	.415		
J7	3.915	.415		
J8	4.265	.230		
K1	.162	.882	SEE DETAIL A	14
K2	.708	.882		
K3	.962	.537		
K4	1.440	.882		
K5	1.867	.492		
K6	2.282	.500		
K7	2.690	.500		
K8	4.170	.890		
K9	5.265	.887		
K10	5.472	.562		
K11	6.010	.887		
K12	6.025	.230		
K13	6.600	.710		
K14	6.615	.250		
L1	4.025	.010	SEE DETAIL B	3
L2	1.240	1.003		
L3	6.325	1.003		
M1	-.010	.492	.124 .128	5
M2	.465	.404		
M3	4.500	.150		
M4	4.427	.827		
M5	4.427	.530		
N1	3.750	.925	.241 .245	1
A36	3.311	.296	.058 .062	4
A37	1.875	.000		
A38	3.713	.550		
A39	4.895	.070		


90°
.090 R
.302
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90°
.090 R
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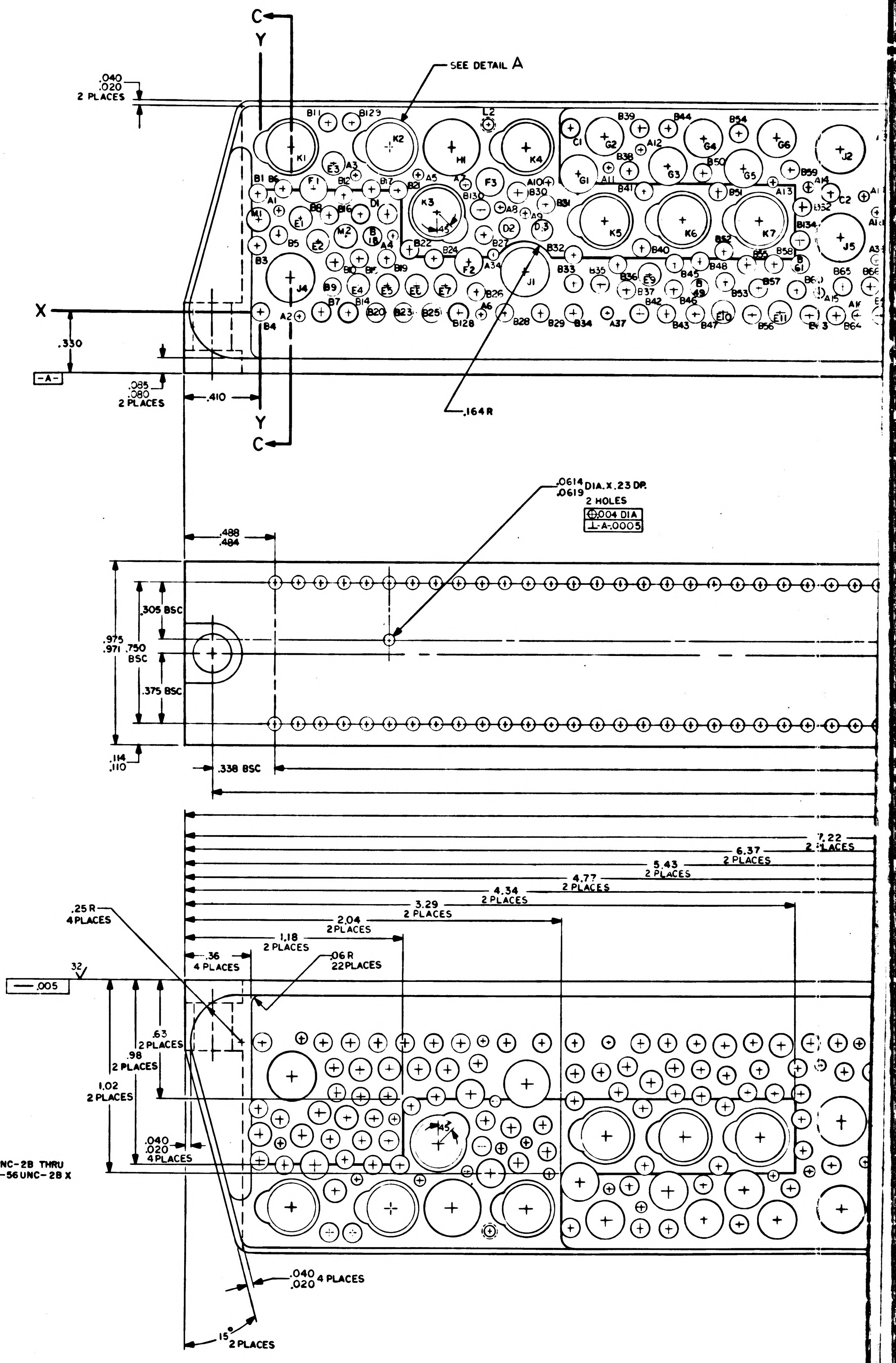
DETAIL A
TYP 14 PLACES


SEE DETAIL A
C
Y
.040
.020
2 PLACES
X
.330
-A-
.085
.080
2 PLACES
.410
Y
C
.164R
.0614
.0619 DIA.X.23 DP.
2 HOLES
⊕.004 DIA
⊥A.0005
.488
.484
.305 BSC
.975
.971
.750
BSC
.375 BSC
.114
.110
.338 BSC
7.22
2 PLACES
6.37
2 PLACES
5.43
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4.77
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3.29
2 PLACES
2.04
2 PLACES
1.18
2 PLACES
.36
4 PLACES
.25R
4 PLACES
.06R
22 PLACES
32
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.040
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.040
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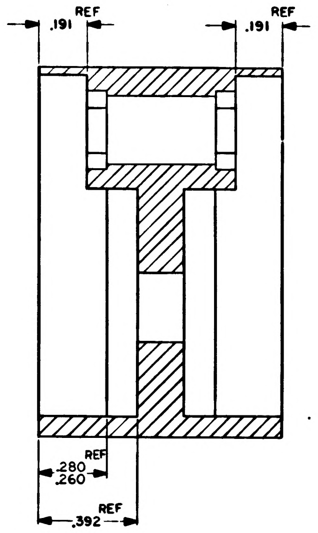
15°
2 PLACES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.191
REF
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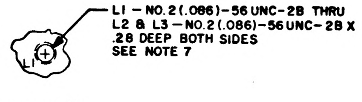
REF

SECTION C-C


L1
L1 — NO.2(.086)-56 UNC-2B THRU
L2 & L3 — NO.2(.086)-56 UNC-2B X
.28 DEEP BOTH SIDES
SEE NOTE 7

DETAIL B
3 PLACES

NOTES:

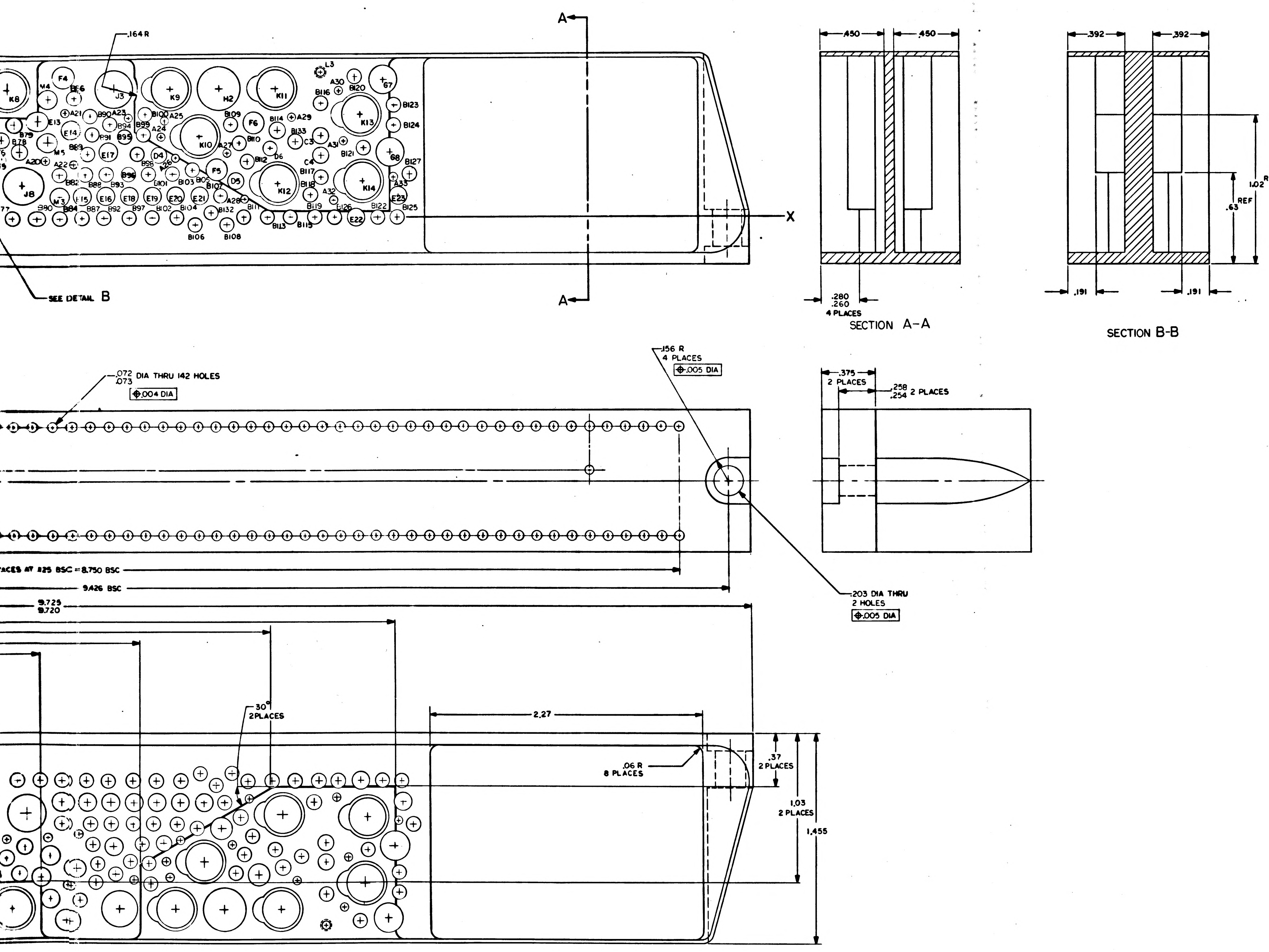
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005-.015
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

2008320	C

1/2008320

REVISIONS 21079

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.164 R
SEE DETAIL B
A
X
.450
.392
1.02 REF
.63 REF
.280
.260
4 PLACES
.191
SECTION A-A
SECTION B-B
.156 R
4 PLACES
⊕ .005 DIA
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.375
2 PLACES
.258
.254 2 PLACES
ACES AT .25 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
.203 DIA THRU
2 HOLES
⊕ .005 DIA
30°
2 PLACES
2.27
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX ±.02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007211	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W. F. Toof 4/29/65
CHECKED Rolandoni 7 JUN 65
APPROVED R V Vanik 8 JUN 65
APPROVED 7 Jun 65
APPROVED MIT W Kupfer 22/6/65
APPROVED MSC 7-1-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

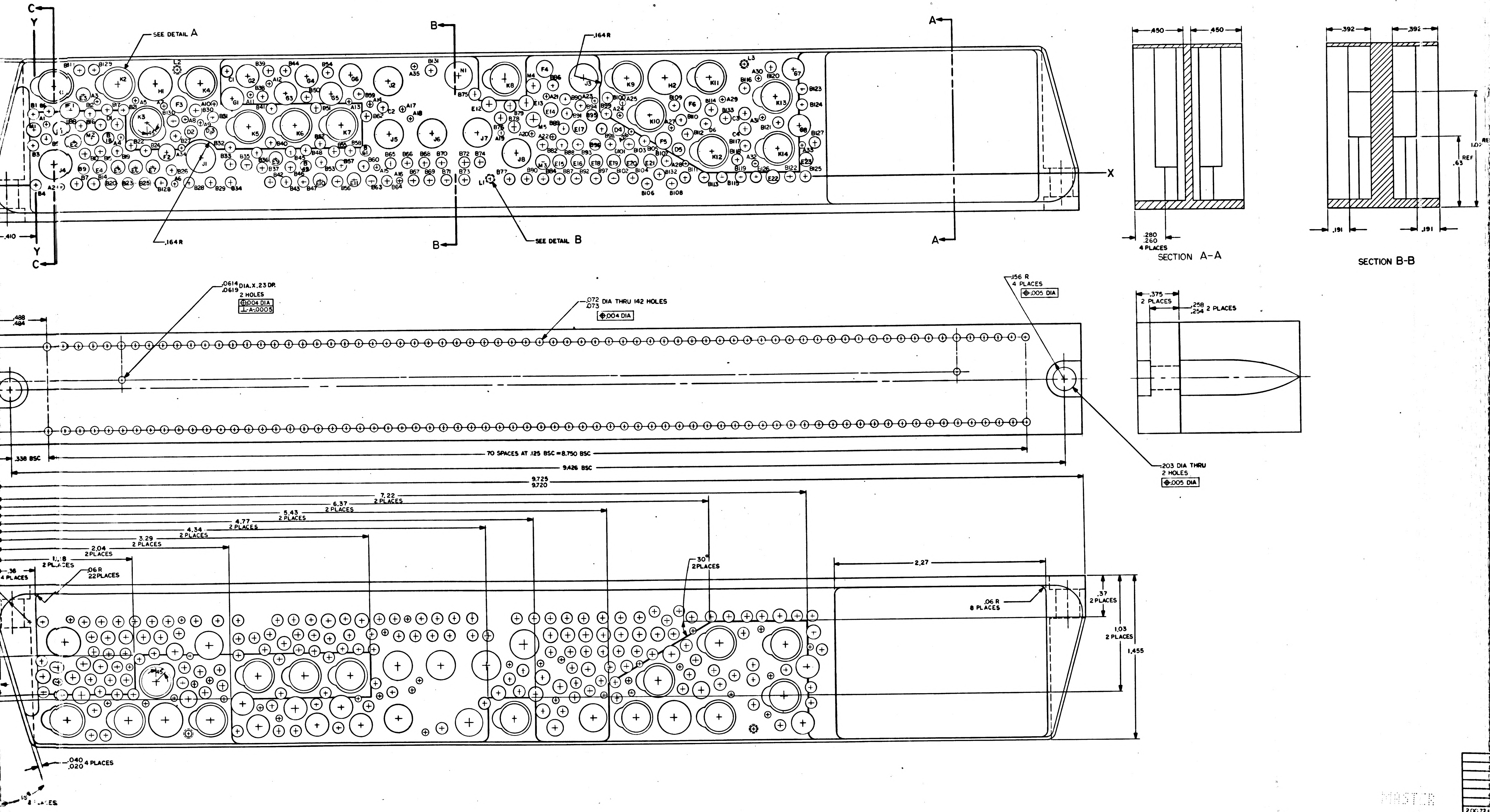
HEADER HOUSING
MODE MODULE

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008320
SCALE 4/1
SHEET 1 OF 1

2008320

2008320

3H

SEE DETAIL A
SEE DETAIL B
.164 R
.164 R
C
Y
B
A
X
.410
SECTION A-A
SECTION B-B
.450
.450
.392
.392
.280
.260
4 PLACES
.191
.191
1.02 REF
.63
.0614
.0619 DIA. X .23 DP.
2 HOLES
⊕ .004 DIA
⊥ -A- .0005
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.375
2 PLACES
.258
.254 2 PLACES
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.488
.484
.338 BSC
70 SPACES AT .125 BSC = 8.750 BSC
9.426 BSC
9.725
9.720
7.22
2 PLACES
6.37
2 PLACES
5.43
2 PLACES
4.77
2 PLACES
4.34
2 PLACES
3.29
2 PLACES
2.04
2 PLACES
1.18
2 PLACES
.36
4 PLACES
.06 R
22 PLACES
30°
2 PLACES
2.27
.06 R
8 PLACES
.37
2 PLACES
1.03
2 PLACES
1.455
.040
.020 4 PLACES
15°
8 PLACES
K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K14
H1 H2
J1 J2 J3 J4 J5 J6 J7 J8
G1 G2 G3 G4 G5 G6 G7 G8
F1 F2 F3 F4 F5 F6
E1–E23
D1–D6
C1–C4
M1–M5
N1
L1 L2 L3
A1–A35
B1–B133

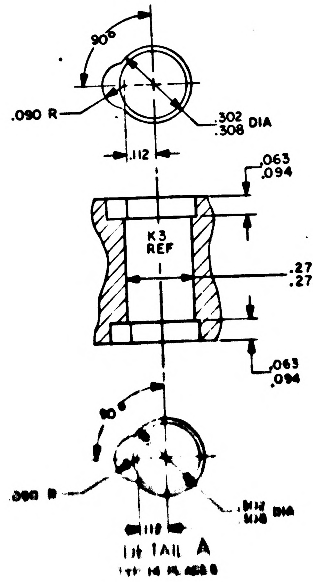
2008320

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.100	.537		
A2	.215	-.025		
A3	.320	.730		
A4	.725	.410		
A5	.880	.735		
[illegible]	[illegible]	-.040		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B75	3.897	.762		
B76	4.127	.542		
B77	4.200	.000		
B78	4.252	.465		
B79	4.215	.652		
B80	4.355	.000		
B81	—	—		
B82	4.500	.300		
B83	—	—		
B84	4.500	.000		
B85	—	—		
B86	4.600	.830		
[illegible]	4.650	.000		
[illegible]	4.677	.300		
[illegible]	4.690	.442		
[illegible]	[illegible]	.707		
[illegible]	[illegible]	.575		
[illegible]	[illegible]	.000		
[illegible]	[illegible]	.300		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
G1	1.725	.742	.202 .206	8
G2	1.862	.942		
G3	2.207	.785		
G4	2.395	.937		
G5	2.610	.777		
G6	2.785	.940		
G7	6.767	.950		
G8	6.815	.452		
H1	1.040	.882	.310 .317	2
H2	5.612	.887		
J1	1.435	.217	.270 .276	8
J2	3.125	.887		
J3	4.875	.887		
J4	.162	.180		
J5	3.120	.415		
J6	3.512	.415		
J7	3.918	.415		
[illegible]	4.265	.230		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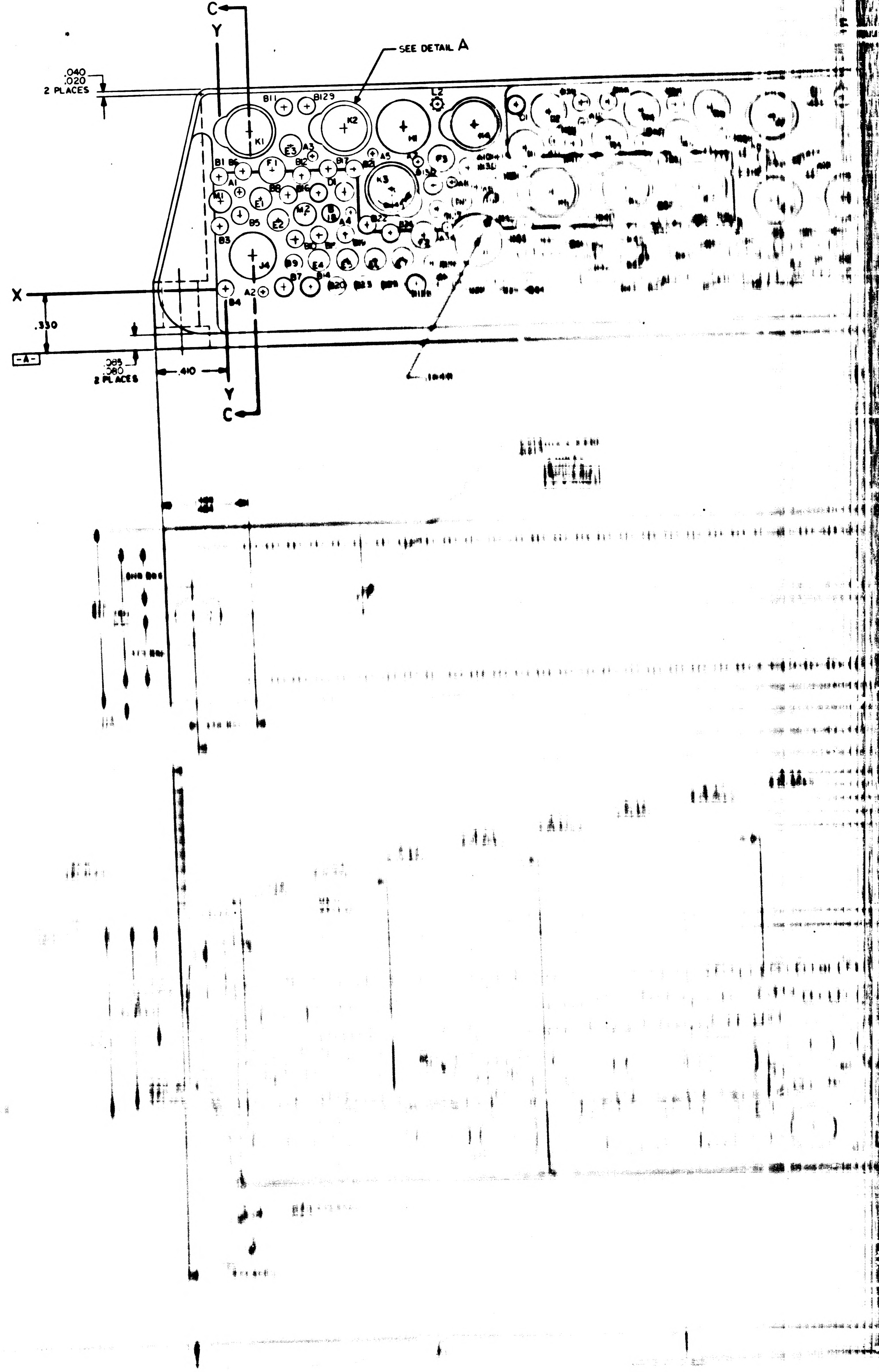
.302
.308 DIA
.112
.063
.094
K3
REF
.270
.276 DIA
.063
.094
90°

DETAIL A


C
Y
SEE DETAIL A
.040
.020
2 PLACES
B11
B129
K1
K2
L2
E3
A3
A5
B1
B6
F1
B12
B17
A1
D1
K3
M1
E1
B8
B16
M2
B5
E2
A4
B22
B3
J4
B10
B9
E4
B7
B14
B20
X
B4
A2
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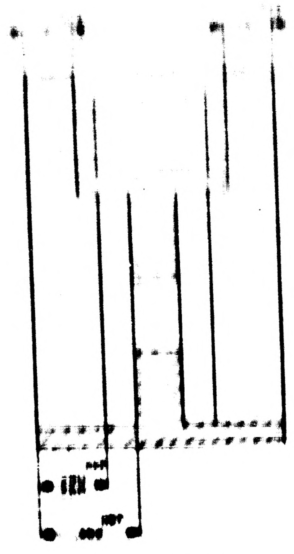
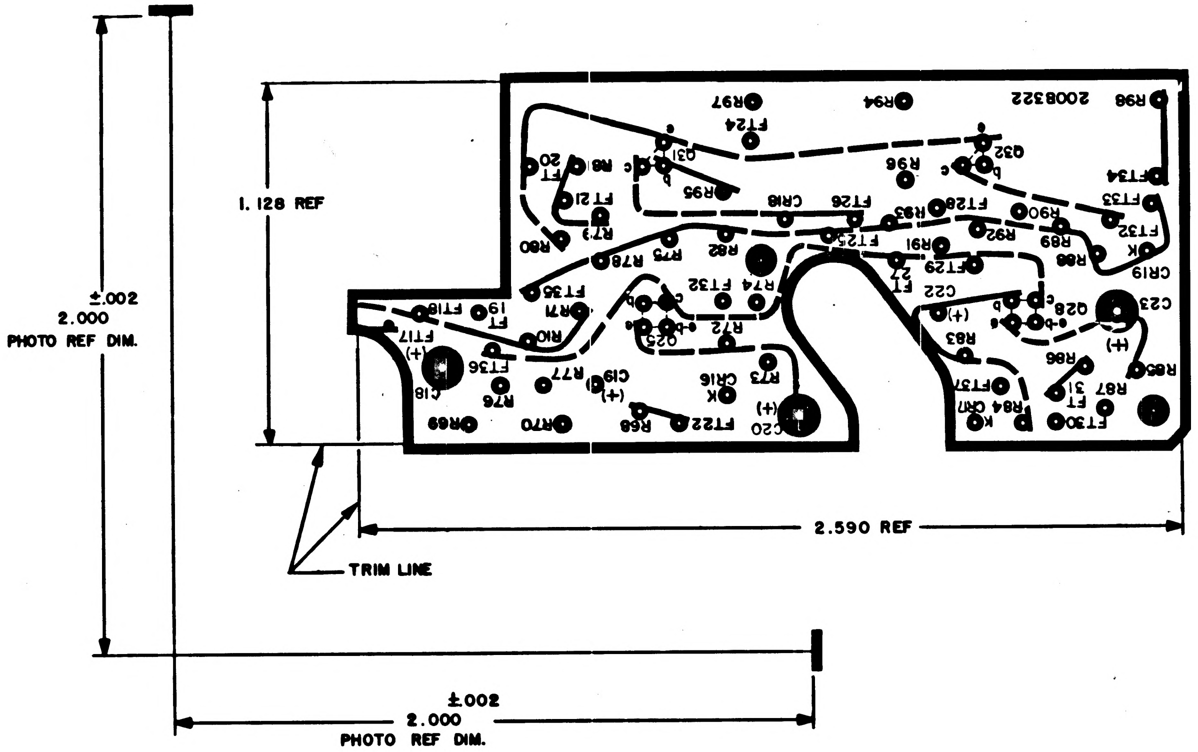
-A-
.085
.080
2 PLACES
.410
Y
C



SECTION C C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19774			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS — DECIMALS — ANGLES —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN Terry Bur DATE 7 MAY 65
CHECKED Bonarrigo 28 MAY 65
APPROVAL R V Venuto 28 May 65
APPROVAL A. R. Frost 6/1/65
NASA APPROVAL W J Rhine 6-2-65
MIT APPROVAL McMurley 6-2-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

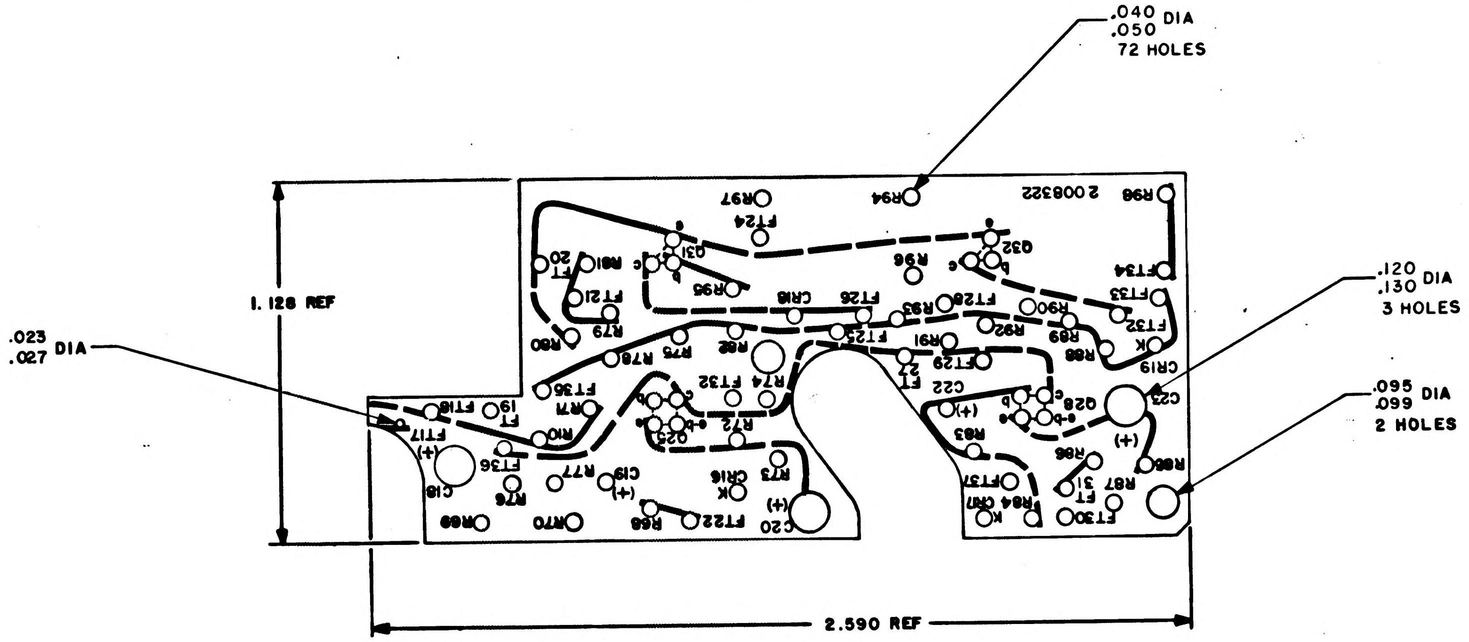
PHOTOGRAPHIC MASTER WIRING BOARD B
COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	D	2008321

SCALE 4/1 WT ——— SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19774			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008321 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007236	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±. ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN Gary Bell DATE 7 MAY 65
CHECKED Bonarrigo 28 MAY 65
APPROVAL RN
APPROVAL 6/1/65
NASA APPROVAL 6-2-65
MIT APPROVAL 6-2-65

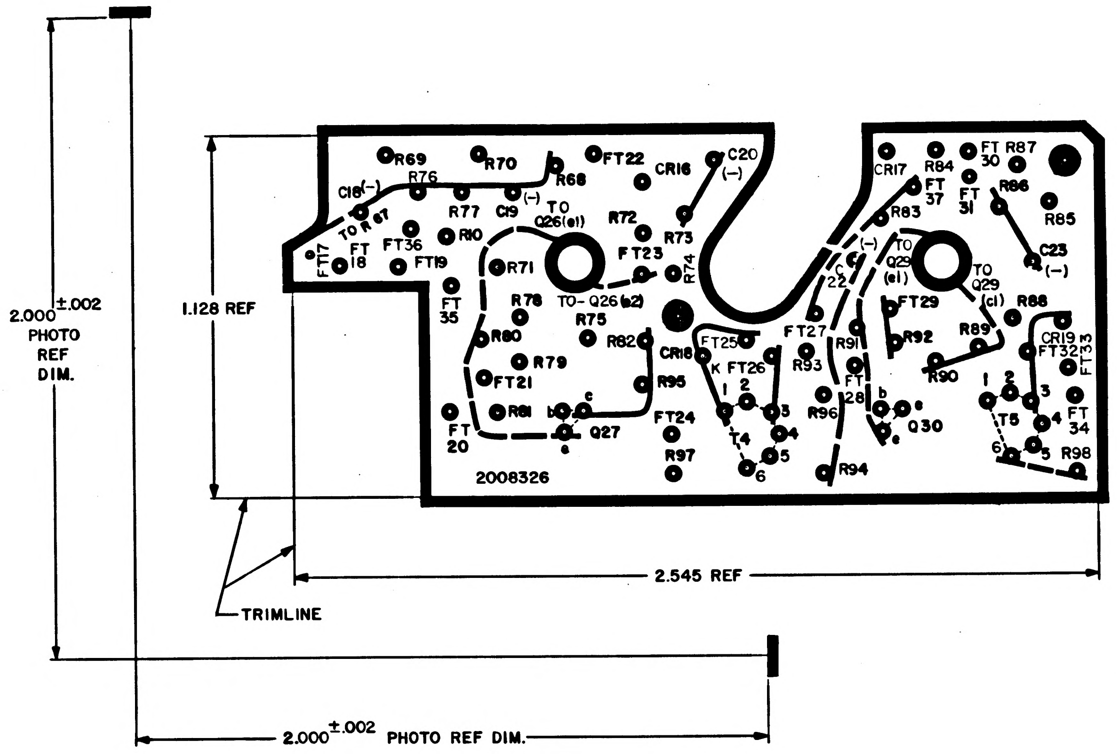
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008322
SCALE 4/1
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19774			
SYM	DESCRIPTION	DATE	APPROVAL



R69
R70
FT22
CR16
C20 (–)
R76
R68
C18(–)
R77
C19
(–)
TO Q26(el)
TO R 67
R72
R73
FT17
FT 18
FT36
FT19
R10
R71
FT23
R74
FT 35
R78
TO-Q26(b2)
R75
R80
R82
R79
FT21
R95
R81
b
c
e
Q27
FT 20
FT24
R97
2008326
CR18
FT25
K
FT26
1 2 3 4 5 6
T4
FT27
R93
R91
R96
FT 28
R94
CR17
R84
FT 37
FT 30
R87
FT 31
R86
R85
R83
(–)
C 22
TO Q29 (el)
C23 (–)
TO Q29 (cl)
FT29
R88
R92
R89
R90
CR19
FT32
FT33
b
e
Q30
1 2 3 4 5 6
T5
FT 34
R98
1.128 REF
2.545 REF
TRIMLINE
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. CONTRACT
DRAWN L Krahn DATE 10 MAY 65
CHECKED Bonarrigo 28 May 65
APPROVAL R V Vassak 28 May 65
APPROVAL D. R. Test 6/1/65
NASA APPROVAL 6-2-65
MIT APPROVAL 6-2-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD D
COARSE SYSTEM ELECTRONICS, CDU

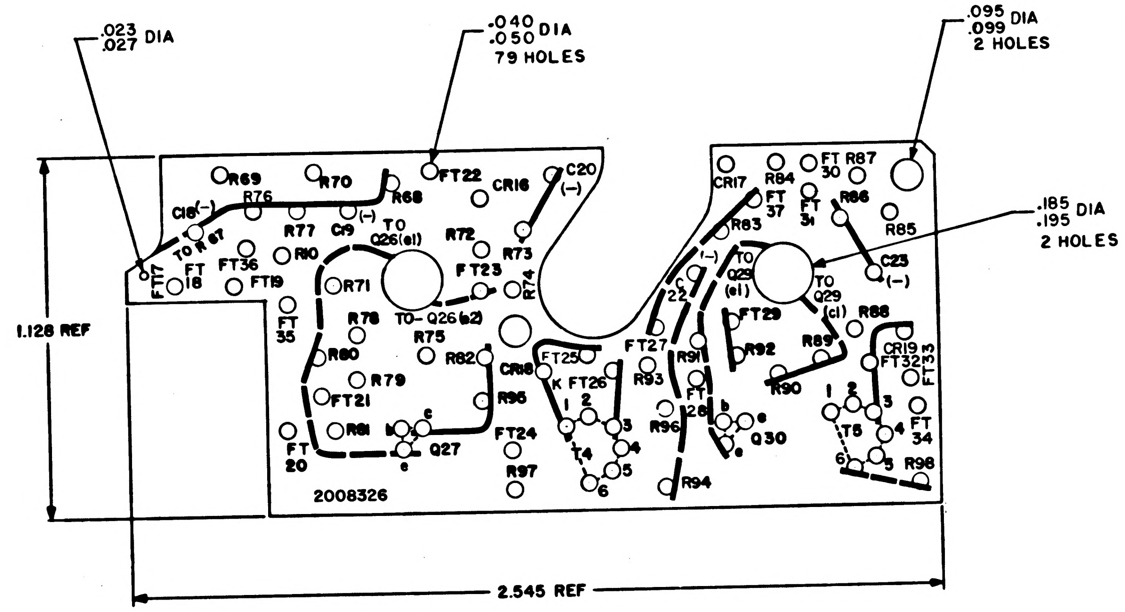
CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008325
SCALE 4/1
WT
SHEET 1 OF 1

2008325

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS 19774

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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.027 DIA
.040
.050 DIA
79 HOLES
.095
.099 DIA
2 HOLES
.185
.195 DIA
2 HOLES
1.128 REF
2.545 REF
R69
R70
FT22
CR16
C20
(–)
C18(–)
R76
R68
R77
C19
(–)
TO
Q26(e1)
R72
TO R67
FT17
FT
18
FT36
FT19
R10
R71
R73
FT23
R74
FT
35
R78
TO–Q26(b2)
R75
R80
R82
CR18
R79
FT21
R95
R81
b
c
Q27
e
FT
20
FT24
R97
2008326
FT25
K FT26
1
2
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4
5
6
T4
FT27
R93
R91
FT
28
R96
R94
C
22
(–)
CR17
R84
FT
37
FT R87
30
FT
31
R86
R85
R83
TO
Q29
(e1)
TO
Q29
(c1)
C23
(–)
FT29
R88
R92
R89
R90
b
e
Q30
e
CR19
FT32
FT33
1
2
3
4
5
6
T5
FT
34
R98

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008325 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007236	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN L Krahn DATE 10 MAY 65
CHECKED Bonarrigo 20 May 65
APPROVAL R V Varani 20 May 65
APPROVAL 6/1/65
NASA APPROVAL 6-2-65
MIT APPROVAL 6-2-65

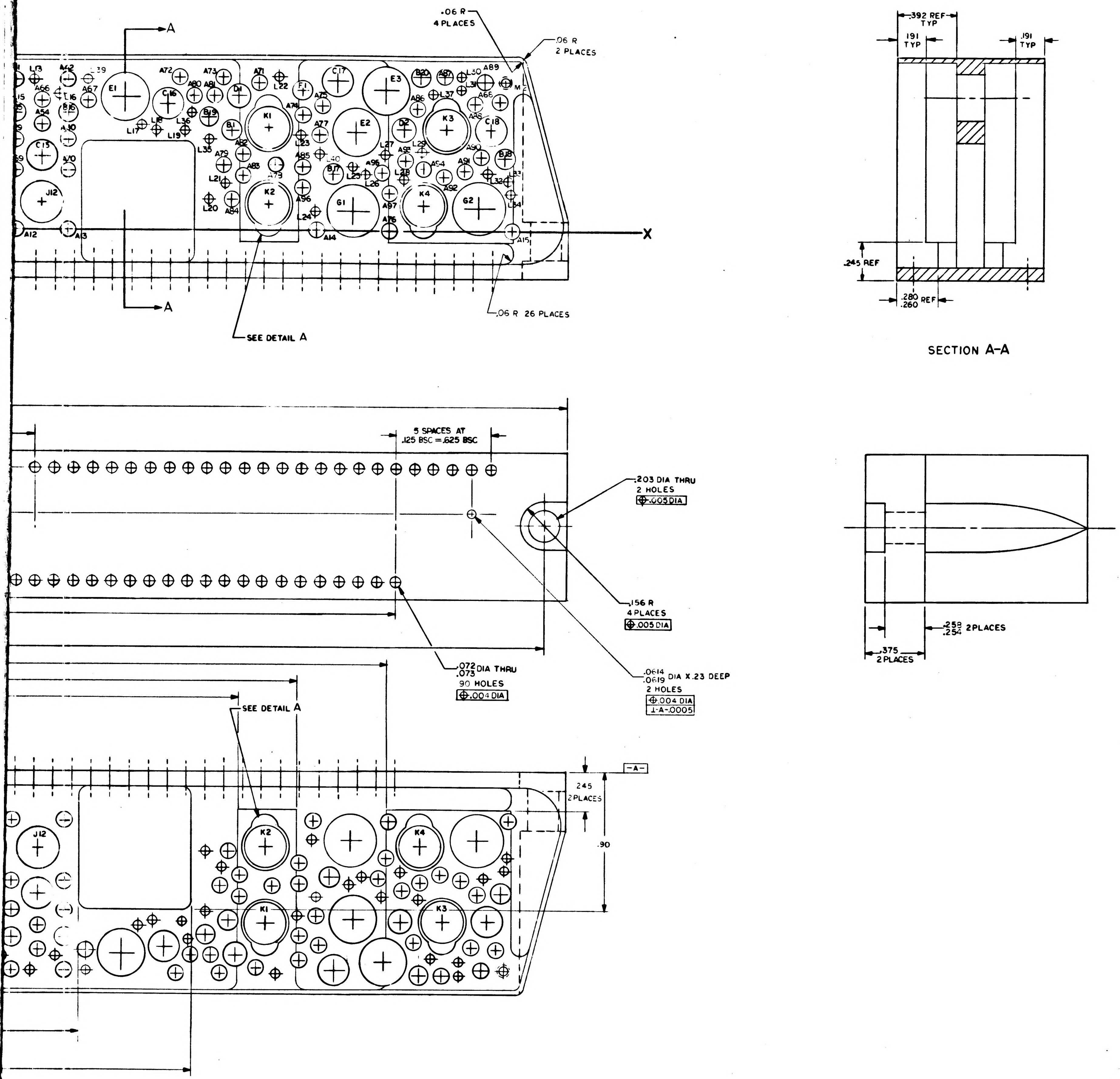
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008326
SCALE 4/1 WT
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27152	25 MAR 66	

REVISIONS 19774



A
A
X
.06 R
4 PLACES
.06 R
2 PLACES
.06 R 26 PLACES
SEE DETAIL A
E1
E2
E3
C15
C16
C17
C18
D1
D2
F1
G1
G2
J12
K1
K2
K3
K4
A12
A13
A14
A15
A16
A54
A56
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L21
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L23
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L26
L28
L29
L30
L31
L32
L33
L34
L35
L36
L37
.392 REF
TYP
.191
TYP
.191
TYP
.245 REF
.280
.260 REF
SECTION A-A
5 SPACES AT
.125 BSC = .625 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.156 R
4 PLACES
⊕ .005 DIA
.072
.075 DIA THRU
90 HOLES
⊕ .004 DIA
.0614
.0619 DIA X .23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005
.258
.254 2 PLACES
.375
2 PLACES
SEE DETAIL A
-A-
.245
2 PLACES
.90

(3H)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS XXX ± .005 XX .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 5

NEXT ASSY	USED ON
2007209	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R. Finey DATE 24 May
CHECKED Bonarrigo 28 May 65
APPROVAL R V Ivanitz
APPROVAL R. B. Frost 6/1/65
NASA APPROVAL 6-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

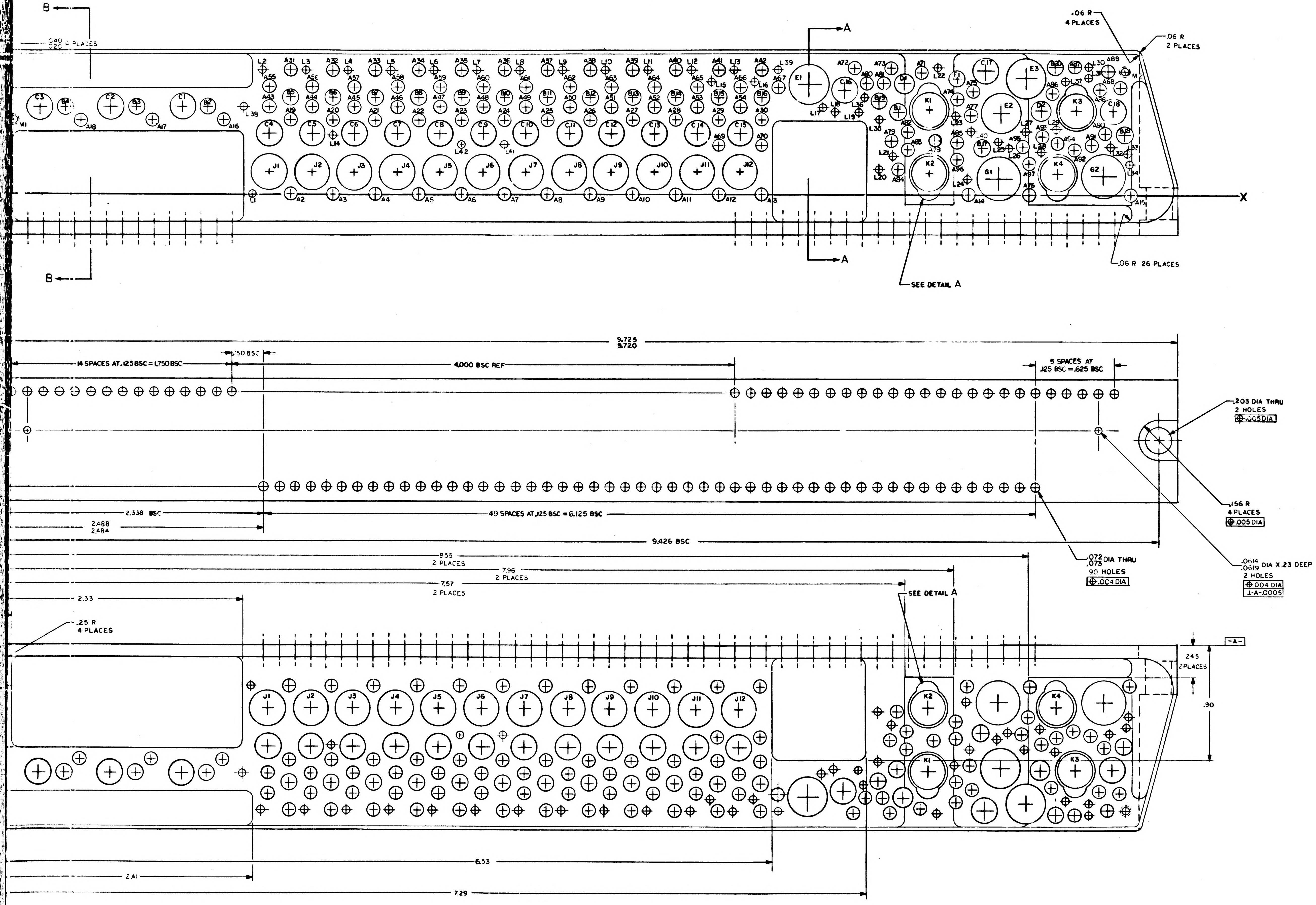
HEADER HOUSING
COARSE SYSTEM ELECTRONICS
CDU

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO 2008330
SCALE 4/1
WT ——
SHEET 1 OF 1

2008330 A

2008330 A

3/2008330


B
B
A
A
X
.040
.020 4 PLACES
.06 R
4 PLACES
.06 R
2 PLACES
.06 R 26 PLACES
SEE DETAIL A
C1
C2
C3
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
E1
E2
E3
K1
K2
K3
K4
G1
G2
9.725
9.720
14 SPACES AT .125 BSC = 1.750 BSC
.250 BSC
4.000 BSC REF
5 SPACES AT
.125 BSC = .625 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.156 R
4 PLACES
⊕ .005 DIA
2.338 BSC
49 SPACES AT .125 BSC = 6.125 BSC
2.488
2.484
9.426 BSC
.072
.073 DIA THRU
90 HOLES
⊕ .004 DIA
.0614
.0619 DIA X .23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005
8.55
2 PLACES
7.96
2 PLACES
7.57
2 PLACES
SEE DETAIL A
2.33
.25 R
4 PLACES
-A-
.245
2 PLACES
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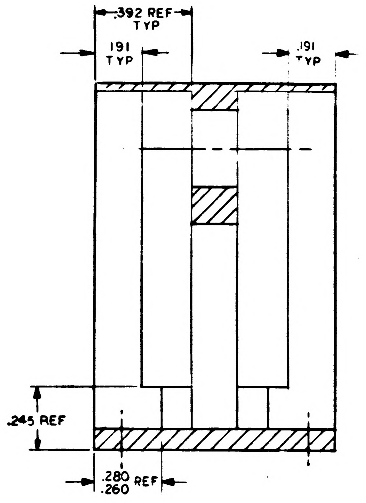
6.53
2.41
7.29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TYP
.191
TYP
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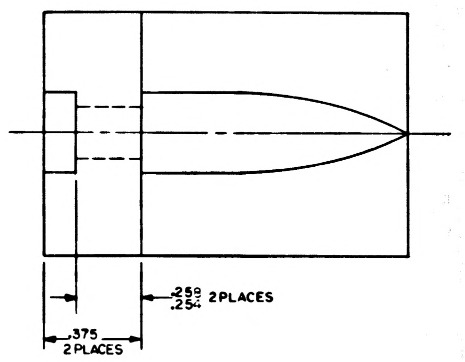
TYP
.245 REF
.280
.260 REF

SECTION A-A


.258
.254 2 PLACES
.375
2 PLACES

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104 DIA	72
A2	2.300	↓		
A3	2.640	↓		
A4	2.980	↓		
A5	3.320	↓		
A6	3.660	↓		
A7	4.000	↓		
A8	4.340	↓		
A9	4.680	↓		
A10	5.020	↓		
A11	5.360	↓		
A12	5.700	↓		
A13	6.040	↓		
A14	7.680	↓		
A15	8.960	.000		
A16	1.770	.578		
A17	1.200	↓		
A18	.640	↓		
A19	2.300	↓		
A20	2.640	↓		
A21	2.980	↓		
A22	3.320	↓		
A23	3.660	↓		
A24	4.000	↓		
A25	4.340	↓		
A26	4.680	↓		
A27	5.020	↓		
A28	5.360	↓		
A29	5.700	↓		
A30	6.040	.578		
A31	2.300	.980		
A32	2.640	↓		
A33	2.980	↓		
A34	3.320	↓		
A35	3.660	↓		
A36	4.000	↓		
A37	4.340	↓		
A38	4.680	↓		
A39	5.020	↓		
A40	5.360	↓		
A41	5.700	↓		
A42	6.040	.980		
A43	2.130	.682		
A44	2.470	↓		
A45	2.810	↓		
A46	3.150	↓		
A47	3.490	↓		
A48	3.830	↓		
A49	4.170	↓		
A50	4.510	↓		
A51	4.850	↓		
A52	5.190	↓		
A53	5.530	↓		
A54	5.870	.682		
A55	2.130	.840		
A56	2.470	↓		
A57	2.810	↓		
A58	3.150	↓		
A59	3.490	↓		
A60	3.830	↓		
A61	4.170	↓		
A62	4.510	↓		
A63	4.850	↓		
A64	5.190	↓		
A65	5.530	↓		
A66	5.870	↓		
A67	6.180	↓		
A68	8.875	.840		
A69	5.700	.385		
A70	6.040	.385		
A71	7.305	.960		
A72	6.775	.995		

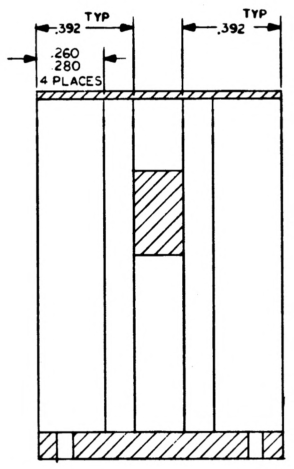
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A73	7.065	.995	.100 .104 DIA	25
A74	7.590	.750		
A75	7.715	.812		
A76	8.155	.000		
A77	7.695	.620		
A78	7.415	.420		
A79	7.070	.420		
A80	6.870	.870		
A81	7.005	.870		
A82	7.200	.495		
A83	7.200	.350		
A84	7.125	.200		
A85	7.590	.410		
A86	8.335	.800		
A87	8.515	1.005		
A88	8.710	.830		
A89	8.775	.970		
A90	8.755	.480		
A91	8.645	.390		
A92	8.510	.355		
A93	8.260	.455		
A94	8.380	.405		
A95	8.105	.380		
A96	7.590	.275		
A97	8.155	.245		
B1	7.125	.645	.127 .131 DIA	20
B2	1.645	.682		
B3	1.075	.682		
B4	.515	.682		
B5	2.300	.755		
B6	2.640	↓		
B7	2.980	↓		
B8	3.320	↓		
B9	3.660	↓		
B10	4.000	↓		
B11	4.340	↓		
B12	4.680	↓		
B13	5.020	↓		
B14	5.360	↓		
B15	5.700	↓		
B16	6.040	.755		
B17	7.780	.365		
B18	8.905	.475		
B19	6.965	.735		
B20	8.365	1.005		
C1	1.445	.682	.202 .206 DIA	18
C2	.875	.682		
C3	.315	.682		
C4	2.130	.475		
C5	2.470	↓		
C6	2.810	↓		
C7	3.150	↓		
C8	3.490	↓		
C9	3.830	↓		
C10	4.170	↓		
C11	4.510	↓		
C12	4.850	↓		
C13	5.190	↓		
C14	5.530	↓		
C15	5.870	.475		
C16	6.695	.820		
C17	7.810	.975		
C18	8.812	.660		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
D1	7.170	.870	.153 .157 DIA	2
D2	8.255	.660		
E1	6.415	.865	.309 .316 DIA	3
E2	7.930	.640		
E3	8.130	.915		
F1	7.590	.910	.112 .116 DIA	1
G1	7.915	.125	.346 .353 DIA	2
G2	8.745	.145		
J1	2.130	.170	.270 .276 DIA	12
J2	2.470	↓		
J3	2.810	↓		
J4	3.150	↓		
J5	3.490	↓		
J6	3.830	↓		
J7	4.170	↓		
J8	4.510	↓		
J9	4.850	↓		
J10	5.190	↓		
J11	5.530	↓		
J12	5.870	.170		
K1	7.370	.665	SEE DETAIL A	4
K2	7.370	.170		
K3	8.530	.665		
K4	8.380	.170		
L1	2.000	.000	.058 .062 DIA	42
L2	2.080	.980		
L3	2.420	↓		
L4	2.760	↓		
L5	3.100	↓		
L6	3.440	↓		
L7	3.780	↓		
L8	4.120	↓		
L9	4.460	↓		
L10	4.800	↓		
L11	5.140	↓		
L12	5.480	↓		
L13	5.820	.980		
L14	2.640	.460		
L15	5.640	.885		
L16	5.985	.885		
L17	6.525	.682		
L18	6.620	.650		
L19	6.805	.650		
L20	6.965	.200		
L21	7.080	.300		
L22	7.435	[illegible]		
L23	7.580	.620		
L24	7.670	.120		
L25	7.915	.415		
L26	7.995	.360		
L27	8.125	.500		
L28	8.250	.335		
L29	8.375	.515		
L30	8.625	1.005		
L31	8.625	.920		
L32	8.795	.378		
L33	8.925	.320		
L34	8.955	.238		
L35	6.965	.578		
L36	6.845	.765		
L37	8.445	.895		
L38	1.943	.682		
L39	6.180	.980		
L40	7.700	.490		
L41	4.000	.402		
L42	3.660	.402		
M1	.110	.578	NC2-56UNC 2B THD	2
M2	8.930	.970		

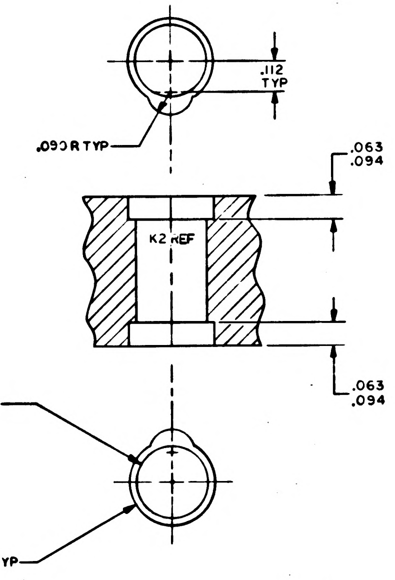
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31 TEMP 5
3. REMOVE ALL BURRS AND SHARP EDGES .005/.015
4. ALL SURFACES √125 UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.

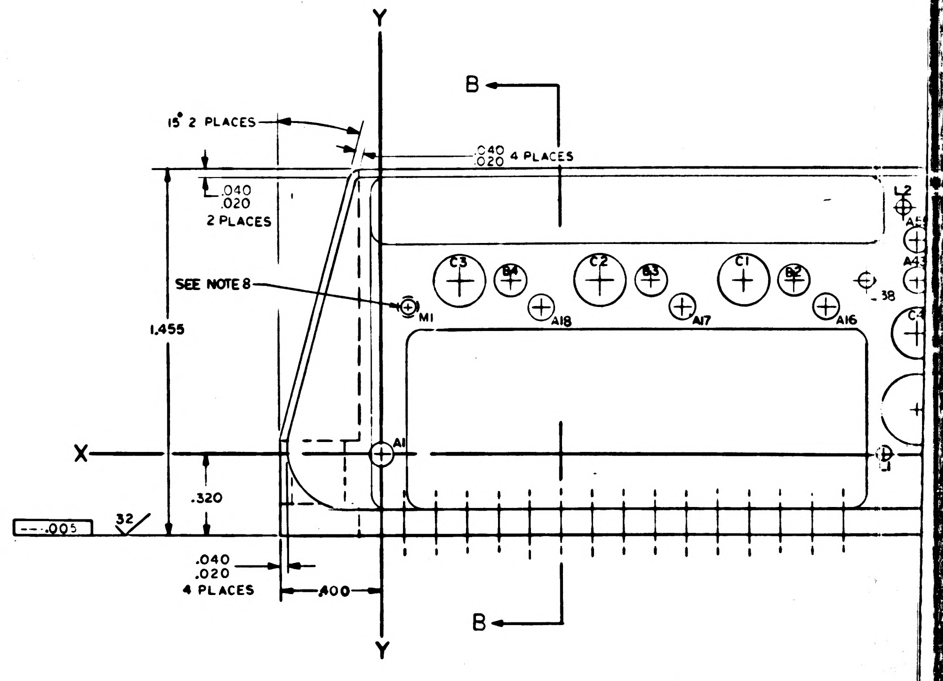
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE, COAT PER ND1002040

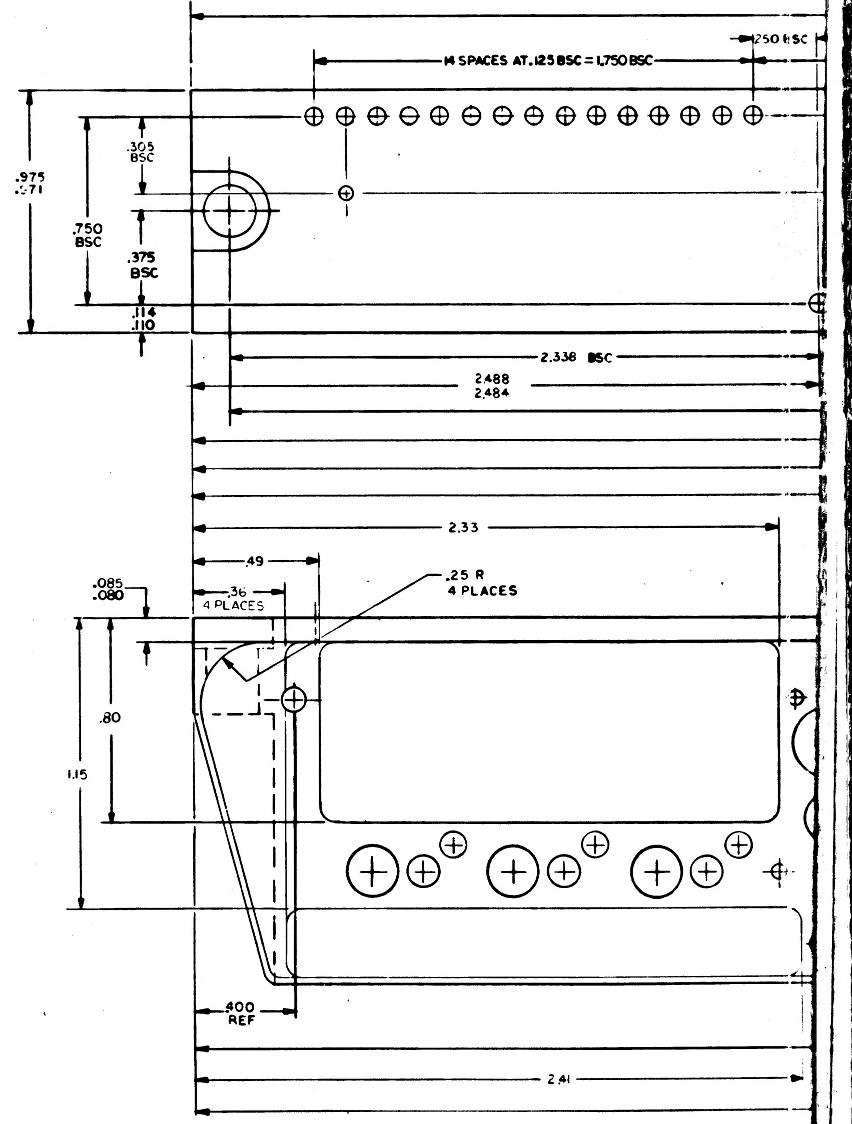


SECTION B-B

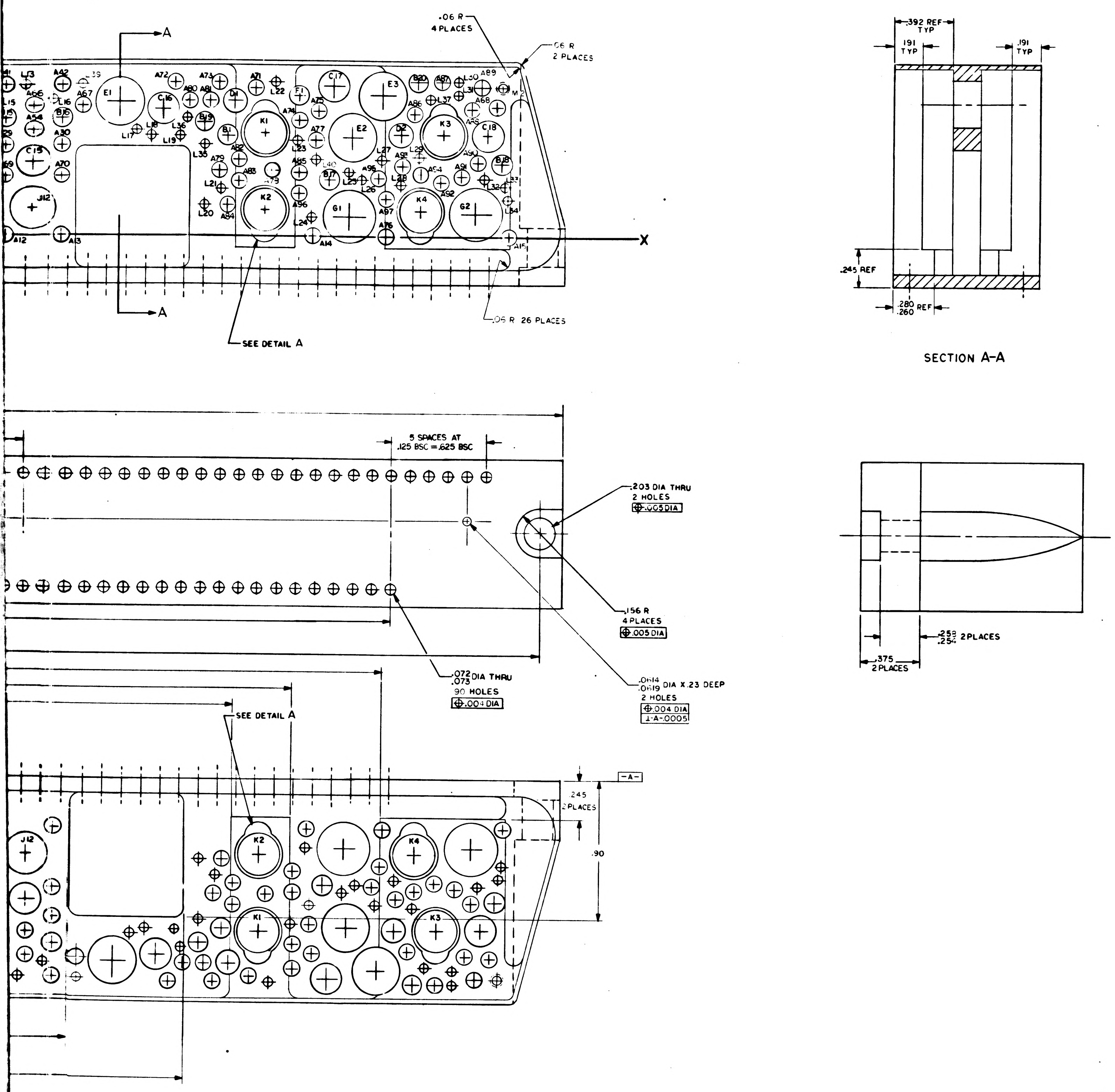


DETAIL A
TYP 4 PLACES





REVISIONS 19774			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27152	25 MAR 66	
B	REVISED PER TDRR 29244	7-JUL-66	JHC



.06 R
4 PLACES
.06 R
2 PLACES
A
A
X
SEE DETAIL A
.06 R 26 PLACES
E1
E2
E3
K1
K2
K3
K4
G1
G2
J12
C15
C16
C17
C18
.392 REF TYP
.191 TYP
.191 TYP
.245 REF
.280
.260 REF
SECTION A-A
5 SPACES AT
.125 BSC = .625 BSC
.203 DIA THRU
2 HOLES
.005 DIA
.156 R
4 PLACES
.005 DIA
.072
.073 DIA THRU
90 HOLES
.004 DIA
.0614
.0619 DIA X .23 DEEP
2 HOLES
.004 DIA
⊥ A .0005
SEE DETAIL A
-A-
.245
2 PLACES
.90
.259
.254 2 PLACES
.375
2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ±.005 XX .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT

FINAL FINISH
SEE NOTE 5

NEXT ASSY	USED ON
2007209	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R. Covey DATE 24 Mar 66
CHECKED Bonarrigo 28 Mar 66
APPROVAL R.V. Vasta
APPROVAL A.A. Frost 6/1/65
NASA APPROVAL 6-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

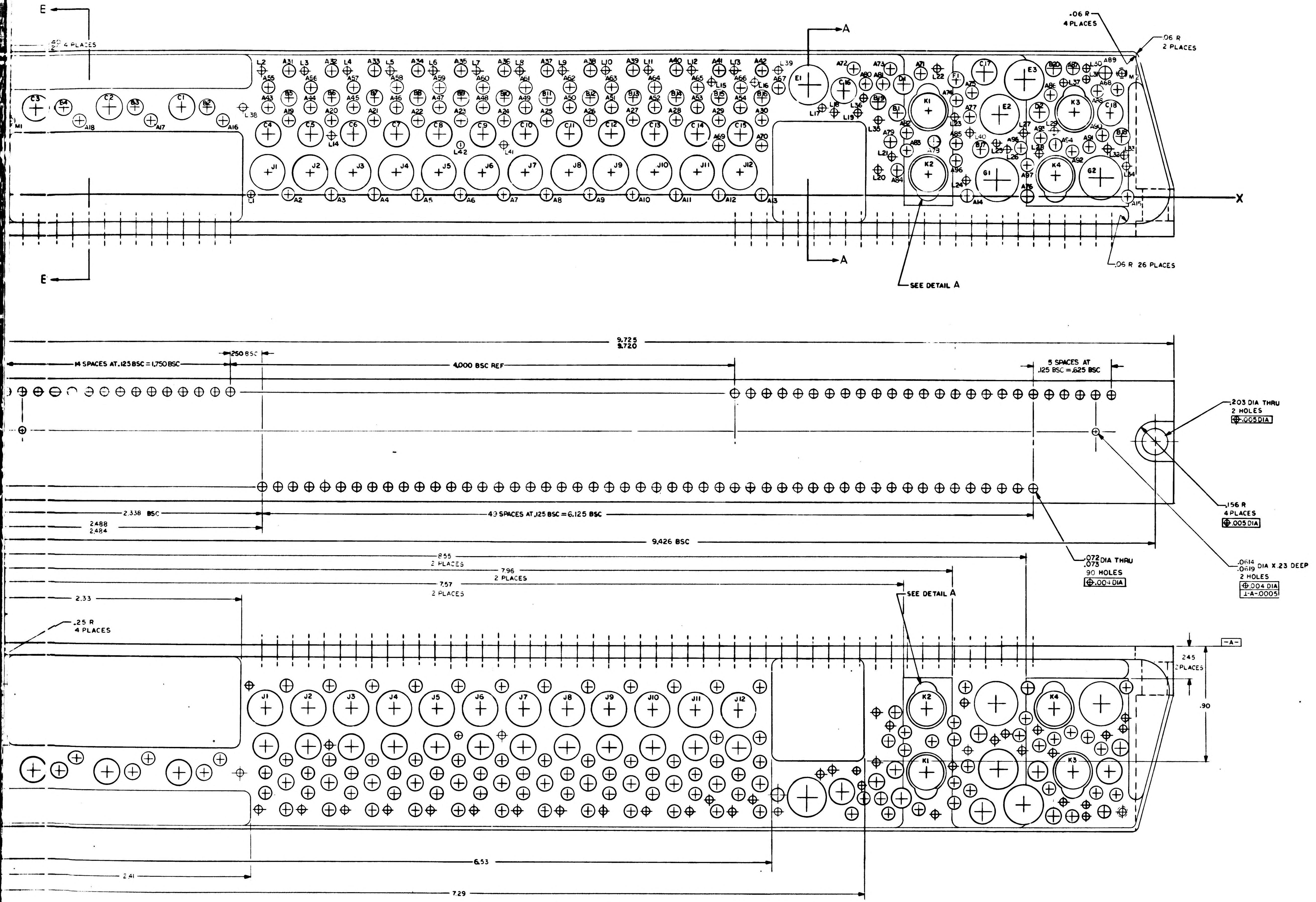
HEADER HOUSING
COARSE SYSTEM ELECTRONICS
CDU

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO 2008330
SCALE 4/1 WT — SHEET 1 OF 1

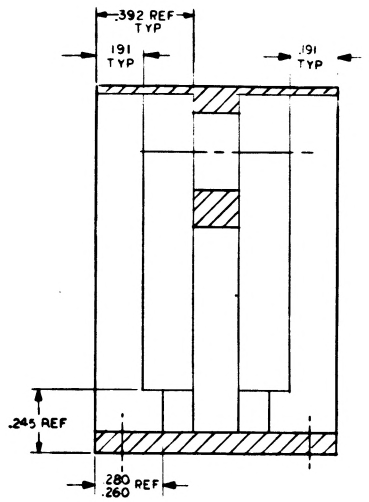
2008330 B

2008330 B

3/2008330

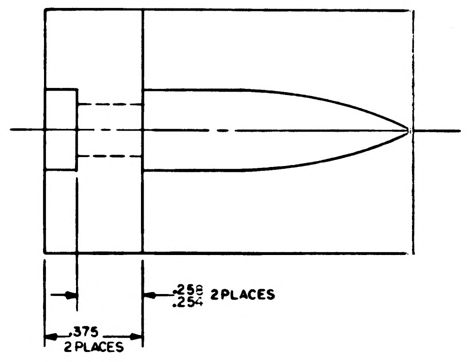


E
A
X
.06 R
4 PLACES
.06 R
2 PLACES
.06 R 26 PLACES
SEE DETAIL A
4 PLACES
9.725
9.720
14 SPACES AT .125 BSC = 1.750 BSC
.250 BSC
4.000 BSC REF
5 SPACES AT
.125 BSC = .625 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.156 R
4 PLACES
⊕ .005 DIA
2.338 BSC
2.488
2.484
43 SPACES AT .125 BSC = 6.125 BSC
9.426 BSC
.072 DIA THRU
.073
90 HOLES
⊕ .004 DIA
.0614
.0619 DIA X .23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005
8.55
2 PLACES
7.96
2 PLACES
7.57
2 PLACES
2.33
.25 R
4 PLACES
SEE DETAIL A
-A-
.245
2 PLACES
.90
6.53
2.41
7.29
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
K1
K2
K3
K4
E1
E2
E3
G1
G2



.392 REF
TYP
.191
TYP
.191
TYP
.245 REF
.280
.260 REF

SECTION A-A



.258
.254 2 PLACES
.375
2 PLACES

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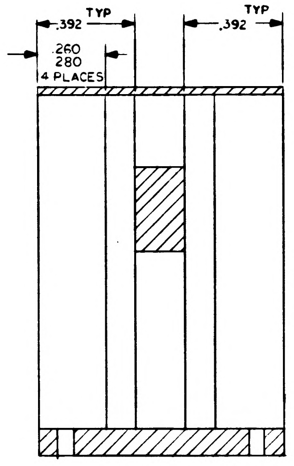
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104 DIA	72
A2	2.300			
A3	2.640			
A4	2.980			
A5	3.320			
A6	3.660			
A7	4.000			
A8	4.340			
A9	4.680			
A10	5.020			
A11	5.360			
A12	5.700			
A13	6.040			
A14	7.680			
A15	8.960	.000		
A16	1.770	.578		
A17	1.200			
A18	.640			
A19	2.300			
A20	2.640			
A21	2.980			
A22	3.320			
A23	3.660			
A24	4.000			
A25	4.340			
A26	4.680			
A27	5.020			
A28	5.360			
A29	5.700			
A30	6.040	.578		
A31	2.300	.980		
A32	2.640			
A33	2.980			
A34	3.320			
A35	3.660			
A36	4.000			
A37	4.340			
A38	4.680			
A39	5.020			
A40	5.360			
A41	5.700			
A42	6.040	.980		
A43	2.130	.682		
A44	2.470			
A45	2.810			
A46	3.150			
A47	3.490			
A48	3.830			
A49	4.170			
A50	4.510			
A51	4.850			
A52	5.190			
A53	5.530			
A54	5.870	.682		
A55	2.130	.840		
A56	2.470			
A57	2.810			
A58	3.150			
A59	3.490			
A60	3.830			
A61	4.170			
A62	4.510			
A63	4.850			
A64	5.190			
A65	5.530			
A66	5.870			
A67	6.180			
A68	8.875	.840		
A69	5.700	.385		
A70	6.040	.385		
A71	7.305	.960		
A72	6.775	.995		

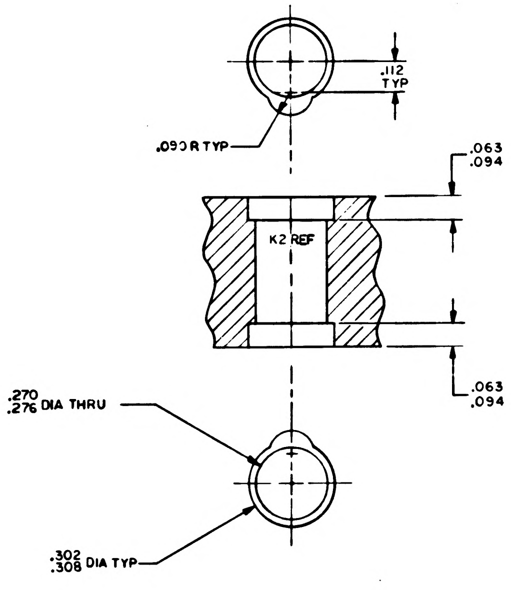
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A73	7.065	.995	.100 .104 DIA	25
A74	7.590	.750		
A75	7.715	.812		
A76	8.155	.000		
A77	7.695	.620		
A78	7.415	.420		
A79	7.070	.420		
A80	6.870	.870		
A81	7.005	.870		
A82	7.200	.495		
A83	7.200	.350		
A84	7.125	.200		
A85	7.590	.410		
A86	8.335	.800		
A87	8.515	1.005		
A88	8.710	.830		
A89	8.775	.970		
A90	8.755	.480		
A91	8.645	.390		
A92	8.510	.355		
A93	8.260	.455		
A94	8.380	.405		
A95	8.105	.380		
A96	7.590	.275		
A97	8.155	.245		
B1	7.125	.645	.127 .131 DIA	20
B2	1.645	.682		
B3	1.075	.682		
B4	.515	.682		
B5	2.300	.755		
B6	2.640			
B7	2.980			
B8	3.320			
B9	3.660			
B10	4.000			
B11	4.340			
B12	4.680			
B13	5.020			
B14	5.360			
B15	5.700			
B16	6.040	.755		
B17	7.780	.365		
B18	8.905	.475		
B19	6.965	.735		
B20	8.365	1.005		
C1	1.445	.682	.202 .206 DIA	18
C2	.875	.682		
C3	.315	.682		
C4	2.130	.475		
C5	2.470			
C6	2.810			
C7	3.150			
C8	3.490			
C9	3.830			
C10	4.170			
C11	4.510			
C12	4.850			
C13	5.190			
C14	5.530			
C15	5.870	.475		
C16	6.695	.820		
C17	7.810	.975		
C18	8.812	.660		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
D1	7.170	.870	.153 .157 DIA	2
D2	8.255	.660		
E1	6.415	.865	.309 .316 DIA	3
E2	7.930	.640		
E3	8.130	.915		
F1	7.590	.910	.112 .116 DIA	1
G1	7.915	.125	.358 .363 DIA	2
G2	8.745	.145		
J1	2.130	.170	.270 .276 DIA	12
J2	2.470			
J3	2.810			
J4	3.150			
J5	3.490			
J6	3.830			
J7	4.170			
J8	4.510			
J9	4.850			
J10	5.190			
J11	5.530			
J12	5.870	.170		
K1	7.370	.665	SEE DETAIL A	4
K2	7.370	.170		
K3	8.530	.665		
K4	8.350	.170		
L1	2.000	.000	.058 .062 DIA	42
L2	2.080	.980		
L3	2.420			
L4	2.760			
L5	3.100			
L6	3.440			
L7	3.780			
L8	4.120			
L9	4.460			
L10	4.800			
L11	5.140			
L12	5.480			
L13	5.820	.980		
L14	2.640	.460		
L15	5.640	.885		
L16	5.985	.885		
L17	6.525	.682		
L18	6.620	.650		
L19	6.805	.750		
L20	6.965	.200		
L21	7.080	.300		
L22	7.435	.995		
L23	7.580	.620		
L24	7.670	.120		
L25	7.915	.415		
L26	7.995	.360		
L27	8.125	.500		
L28	8.250	.335		
L29	8.375	.515		
L30	8.625	1.005		
L31	8.625	.920		
L32	8.795	.378		
L33	8.925	.320		
L34	8.955	.238		
L35	6.965	.578		
L36	6.845	.765		
L37	8.445	.895		
L38	1.943	.682		
L39	6.180	.980		
L40	7.700	.490		
L41	4.000	.402		
L42	3.660	.402		
M1	.110	.578	NO2-56UNC 2B THD	2
M2	8.930	.970		



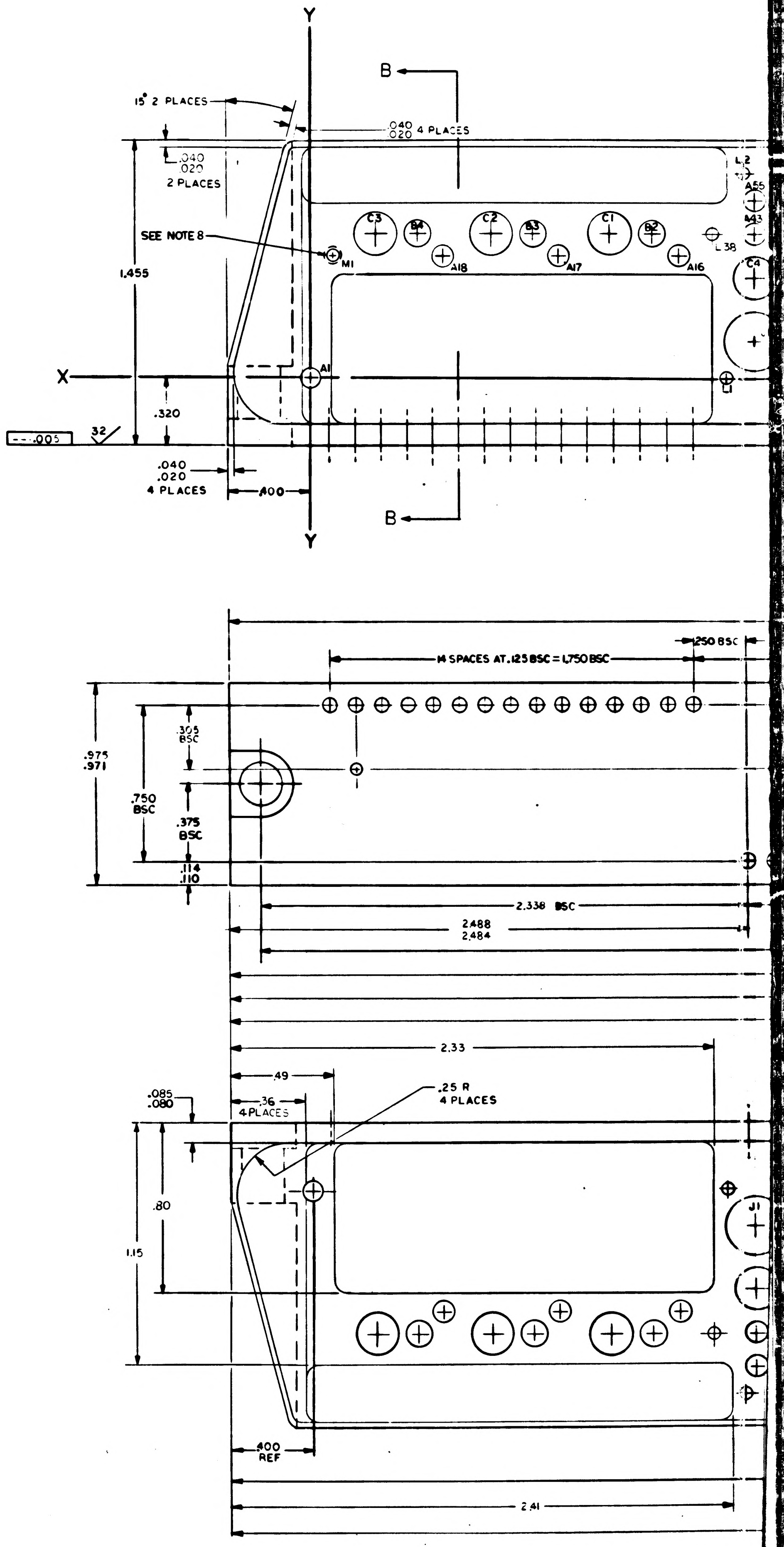
.392 TYP
.392 TYP
.260
.280
4 PLACES

SECTION B-B



.112 TYP
.090 R TYP
.063
.094
K2 REF
.063
.094
.270
.276 DIA THRU
.302
.308 DIA TYP

DETAIL A
TYP 4 PLACES

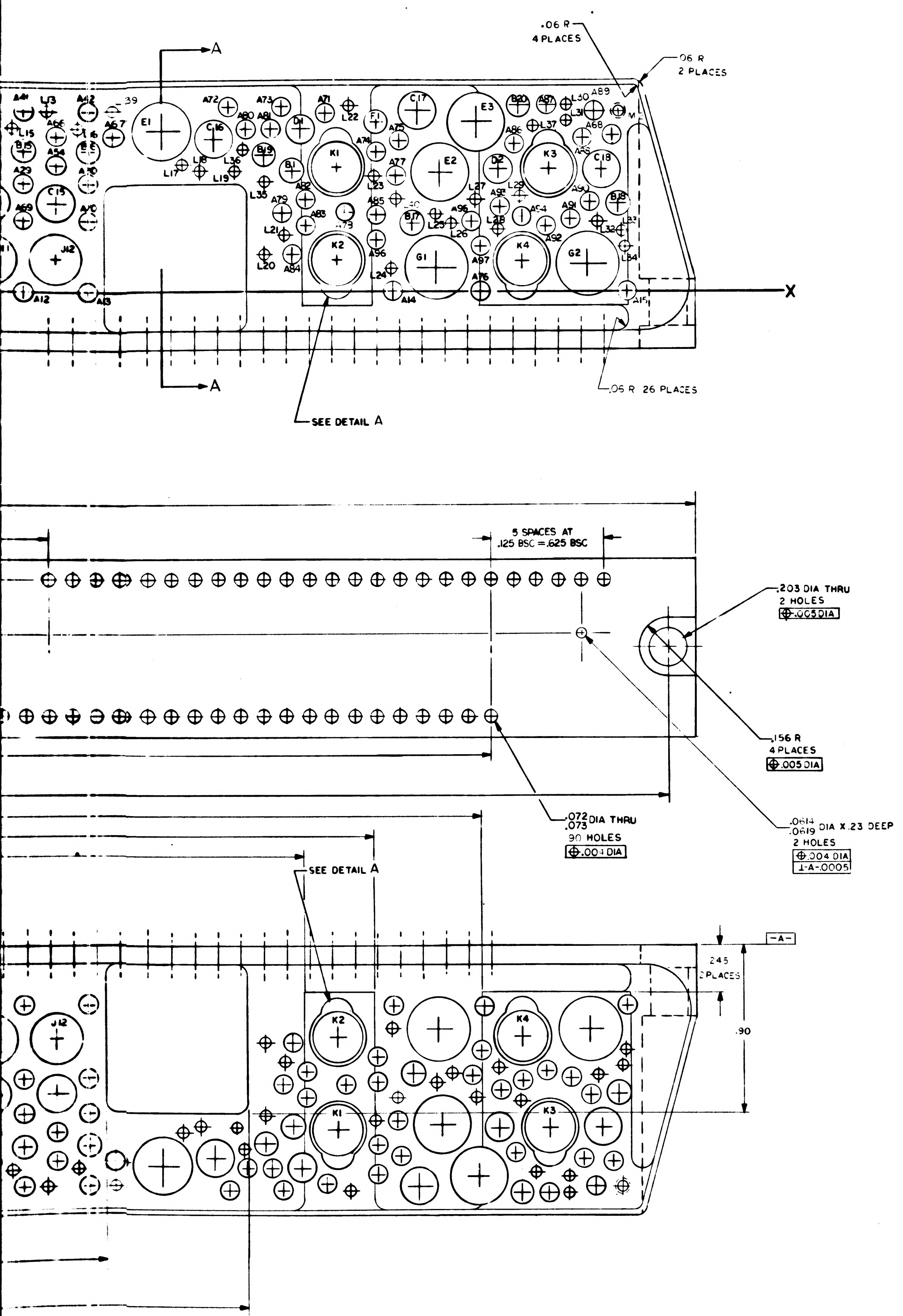


Y
B
15° 2 PLACES
.040
.020 4 PLACES
.040
.020
2 PLACES
SEE NOTE 8
M1
C3
B4
A18
C2
B3
A17
C1
B2
A16
L2
A56
A43
L38
C4
1.455
X
A1
.320
.005
32
.040
.020
4 PLACES
.400
B
Y
.250 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.975
.971
.305
BSC
.750
BSC
.375
BSC
.114
.110
2.338 BSC
2.488
2.484
2.33
.49
.36
4 PLACES
.085
.080
.25 R
4 PLACES
.80
1.15
J1
.400
REF
2.41

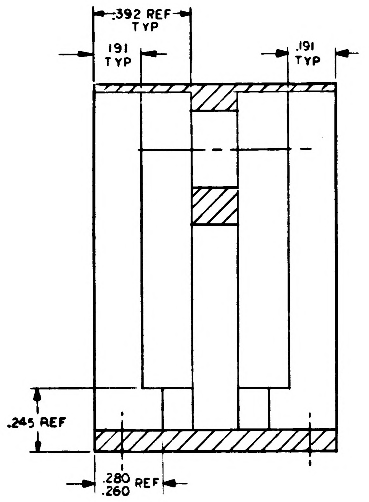
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31 TEMP 5
3. REMOVE ALL BURRS AND SHARP EDGES .005/.015
4. ALL SURFACES 125 UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.

6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE, COAT PER ND1002040

REVISIONS 19774			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27152	25 MAR 66	
B	REVISED PER TDRR 29244	7-JUN-66	B. JAC
C	REVISED PER TDRR 29442	10-JUN-66	B.

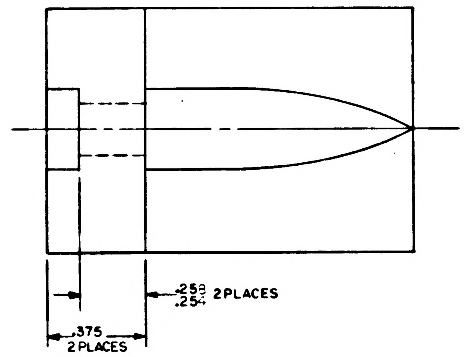


.06 R 4 PLACES
.06 R 2 PLACES
A
A
X
.39
E1 E2 E3 G1 G2 K1 K2 K3 K4 J12 C15 C16 C17 C18
SEE DETAIL A
.06 R 26 PLACES
5 SPACES AT .125 BSC = .625 BSC
.203 DIA THRU 2 HOLES ⊕ .005 DIA
.156 R 4 PLACES ⊕ .005 DIA
.072/.073 DIA THRU 90 HOLES ⊕ .004 DIA
.0614/.0619 DIA X .23 DEEP 2 HOLES ⊕ .004 DIA ⊥ A .0005
SEE DETAIL A
-A-
.245 2 PLACES
.90



.392 REF TYP
.191 TYP
.191 TYP
.245 REF
.280/.260 REF

SECTION A-A



.258/.254 2 PLACES
.375 2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007209	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT

FINAL FINISH SEE NOTE 5

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
NAS 9-497 CONTRACT

DRAWN DATE
CHECKED Bonarrigo 28 65
APPROVAL R V
APPROVAL 6/1/65
NASA APPROVAL 6-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

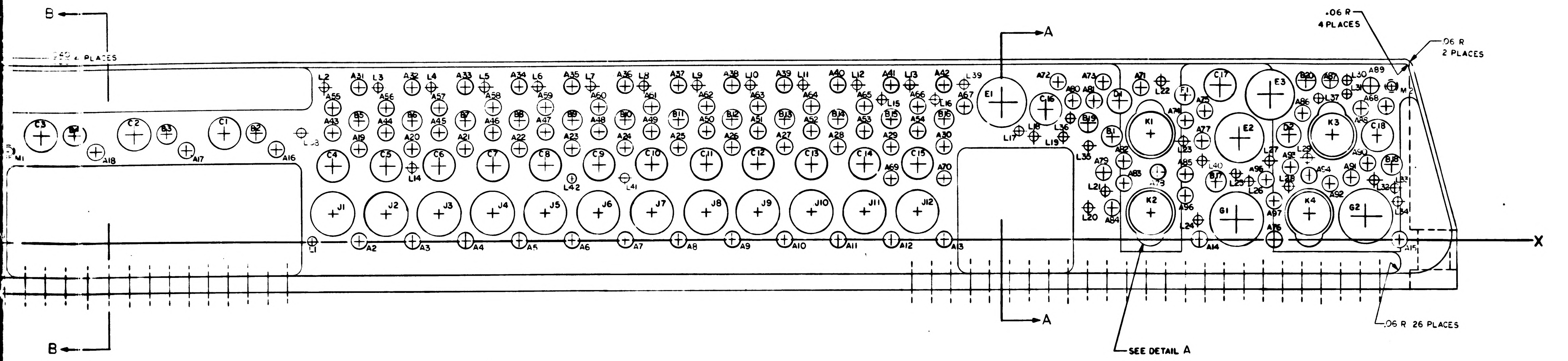
HEADER HOUSING
COARSE SYSTEM ELECTRONICS
CDU

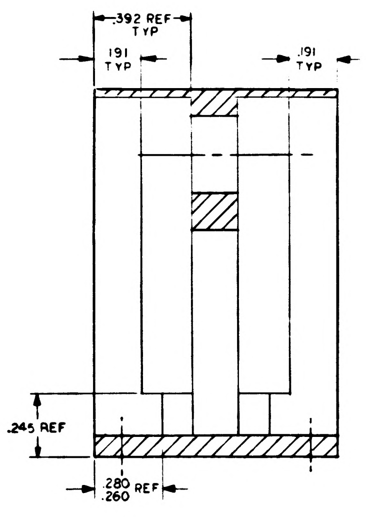
CODE IDENT NO. 80230 SIZE J NASA DRAWING NO 2008330
SCALE 4/1 WT SHEET 1 OF 1

2008330 C

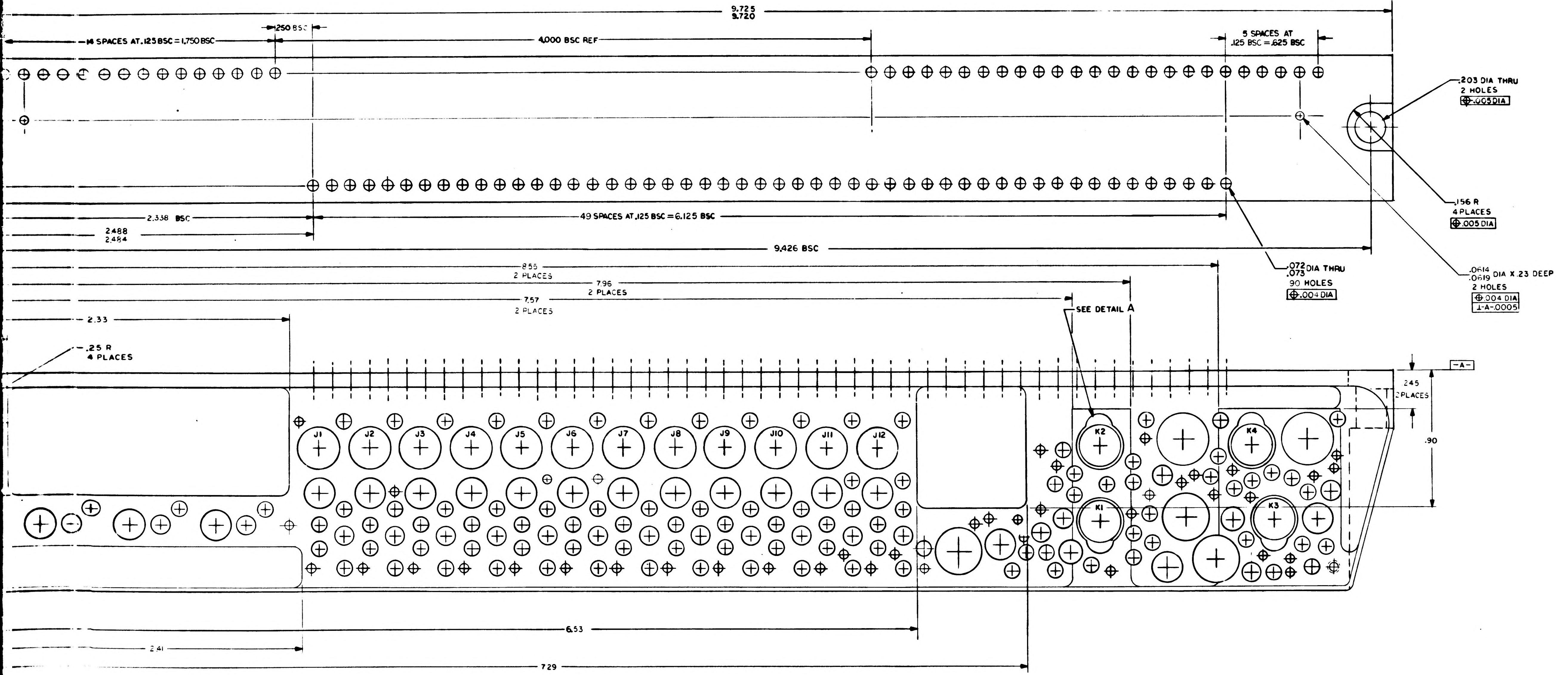
(34)

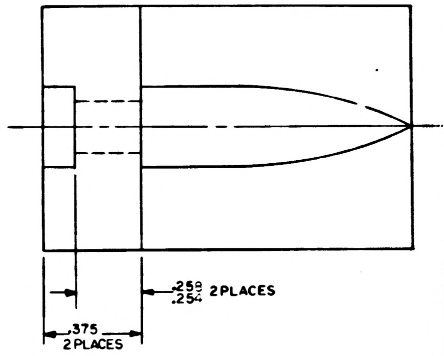
3/2008330


B
B
A
A
X
.250 4 PLACES
.06 R 4 PLACES
.06 R 2 PLACES
.06 R 26 PLACES
SEE DETAIL A
J1 J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
E1 E2 E3
K1 K2 K3 K4
G1 G2
D1 D2
F1
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13 L14 L15 L16 L17 L18 L19 L20 L21 L22 L23 L24
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18
B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20


.392 REF TYP
191 TYP
.191 TYP
.245 REF
.280
.260 REF

SECTION A-A


9.725
9.720
.250 BSC
14 SPACES AT .125 BSC = 1.750 BSC
4.000 BSC REF
5 SPACES AT .125 BSC = .625 BSC
.203 DIA THRU
2 HOLES
⊕ .005 DIA
.156 R
4 PLACES
⊕ .005 DIA
2.338 BSC
2.488
2.484
49 SPACES AT .125 BSC = 6.125 BSC
9.426 BSC
.072
.073 DIA THRU
90 HOLES
⊕ .004 DIA
.0614
.0619 DIA X .23 DEEP
2 HOLES
⊕ .004 DIA
⊥ -A- .0005
8.55 2 PLACES
7.96 2 PLACES
7.57 2 PLACES
SEE DETAIL A
2.33
.25 R 4 PLACES
.245 2 PLACES
-A-
.90
J1 J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12
K1 K2 K3 K4
6.53
2.41
7.29


.258
.254 2 PLACES
.375
2 PLACES

2008330 C

2-/2008330

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104 DIA	72
A2	2.300			
A3	2.640			
A4	2.980			
A5	3.320			
A6	3.660			
A7	4.000			
A8	4.340			
A9	4.680			
A10	5.020			
A11	5.360			
A12	5.700			
A13	6.040			
A14	7.680			
A15	8.960	.000		
A16	1.770	.578		
A17	1.200			
A18	.640			
A19	2.300			
A20	2.640			
A21	2.980			
A22	3.320			
A23	3.660			
A24	4.000			
A25	4.340			
A26	4.680			
A27	5.020			
A28	5.360			
A29	5.700			
A30	6.040	.578		
A31	2.300	.980		
A32	2.640			
A33	2.980			
A34	3.320			
A35	3.660			
A36	4.000			
A37	4.340			
A38	4.680			
A39	5.020			
A40	5.360			
A41	5.700			
A42	6.040	.980		
A43	2.130	.682		
A44	2.470			
A45	2.810			
A46	3.150			
A47	3.490			
A48	3.830			
A49	4.170			
A50	4.510			
A51	4.850			
A52	5.190			
A53	5.530			
A54	5.870	.682		
A55	2.130	.840		
A56	2.470			
A57	2.810			
A58	3.150			
A59	3.490			
A60	3.830			
A61	4.170			
A62	4.510			
A63	4.850			
A64	5.190			
A65	5.530			
A66	5.870			
A67	6.180			
A68	8.875	.840		
A69	5.700	.385		
A70	6.040	.385		
A71	7.305	.960		
A72	6.775	.995		

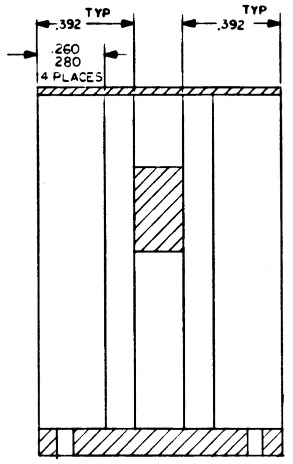
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A73	7.065	.995	.100 .104 DIA	25
A74	7.590	.750		
A75	7.715	.812		
A76	8.155	.500		
A77	7.695	.620		
A78	7.415	.420		
A79	7.070	.420		
A80	6.870	.870		
A81	7.005	.870		
A82	7.200	.495		
A83	7.200	.350		
A84	7.125	.200		
A85	7.590	.410		
A86	8.335	.800		
A87	8.515	1.005		
A88	8.710	.830		
A89	8.775	.970		
A90	8.755	.480		
A91	8.645	.390		
A92	8.510	.355		
A93	8.260	.455		
A94	8.380	.405		
A95	8.105	.380		
A96	7.590	.275		
A97	8.155	.245		
B1	7.125	.645	.127 .131 DIA	20
B2	1.645	.682		
B3	1.075	.682		
B4	.515	.682		
B5	2.300	.755		
B6	2.640			
B7	2.980			
B8	3.320			
B9	3.660			
B10	4.000			
B11	4.340			
B12	4.680			
B13	5.020			
B14	5.360			
B15	5.700			
B16	6.040	.755		
B17	7.780	.365		
B18	8.905	.475		
B19	6.965	.735		
B20	8.365	1.005		
C1	1.445	.682	.202 .206 DIA	18
C2	.875	.682		
C3	.315	.682		
C4	2.130	.475		
C5	2.470			
C6	2.810			
C7	3.150			
C8	3.490			
C9	3.830			
C10	4.170			
C11	4.510			
C12	4.850			
C13	5.190			
C14	5.530			
C15	5.870	.475		
C16	6.695	.820		
C17	7.810	.975		
C18	8.812	.660		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
D1	7.170	.870	.153 .157 DIA	2
D2	8.255	.660		
E1	6.415	.865	.309 .316 DIA	3
E2	7.930	.640		
E3	8.130	.915		
F1	7.590	.910	.112 .116 DIA	1
G1	7.915	.125	.358 .363 DIA	2
G2	8.745	.145		
J1	2.130	.170	.270 .276 DIA	12
J2	2.470			
J3	2.810			
J4	3.150			
J5	3.490			
J6	3.830			
J7	4.170			
J8	4.510			
J9	4.850			
J10	5.190			
J11	5.530			
J12	5.870	.170		
K1	7.370	.665	SEE DETAIL A	4
K2	7.370	.170		
K3	8.530	.665		
K4	8.380	.170		
L1	2.000	.000	.058 .062 DIA	42
L2	2.080	.980		
L3	2.420			
L4	2.760			
L5	3.100			
L6	3.440			
L7	3.780			
L8	4.120			
L9	4.460			
L10	4.800			
L11	5.140			
L12	5.480			
L13	5.820	.980		
L14	2.640	.460		
L15	5.640	.885		
L16	5.985	.885		
L17	6.525	.682		
L18	6.620	.650		
L19	6.805	.650		
L20	6.965	.200		
L21	7.080	.300		
L22	7.435	.995		
L23	7.580	.620		
L24	7.670	.120		
L25	7.915	.415		
L26	7.995	.360		
L27	8.125	.500		
L28	8.250	.335		
L29	8.375	.515		
L30	8.625	1.005		
L31	8.625	.920		
L32	8.795	.378		
L33	8.925	.320		
L34	8.955	.238		
L35	6.965	.578		
L36	6.845	.765		
L37	8.445	.895		
L38	1.943	.682		
L39	6.180	.980		
L40	7.700	.490		
L41	4.000	.402		
L42	3.660	.402		
M1	.110	.578	.069/.073 SEE NOTES 8 AND 9	1
M2	8.930	.970	.069/.073 SEE NOTES 8 AND 10	1

NOTES:

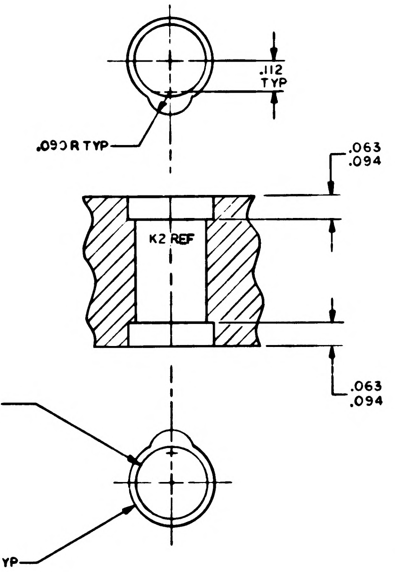
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31 TEMP 5
3. REMOVE ALL BURRS AND SHARP EDGES .005/.015
4. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.

6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE, COAT PER ND1002040
9. TAP NO. 2-56 UNC-2 THD THRU AND C'SK TO MAJOR DIA OF THREAD.
10. TAP NO. 2-56 UNC-2 THD .28 DEEP BOTH SIDES AND C'SK TO MAJOR DIA OF THREAD.



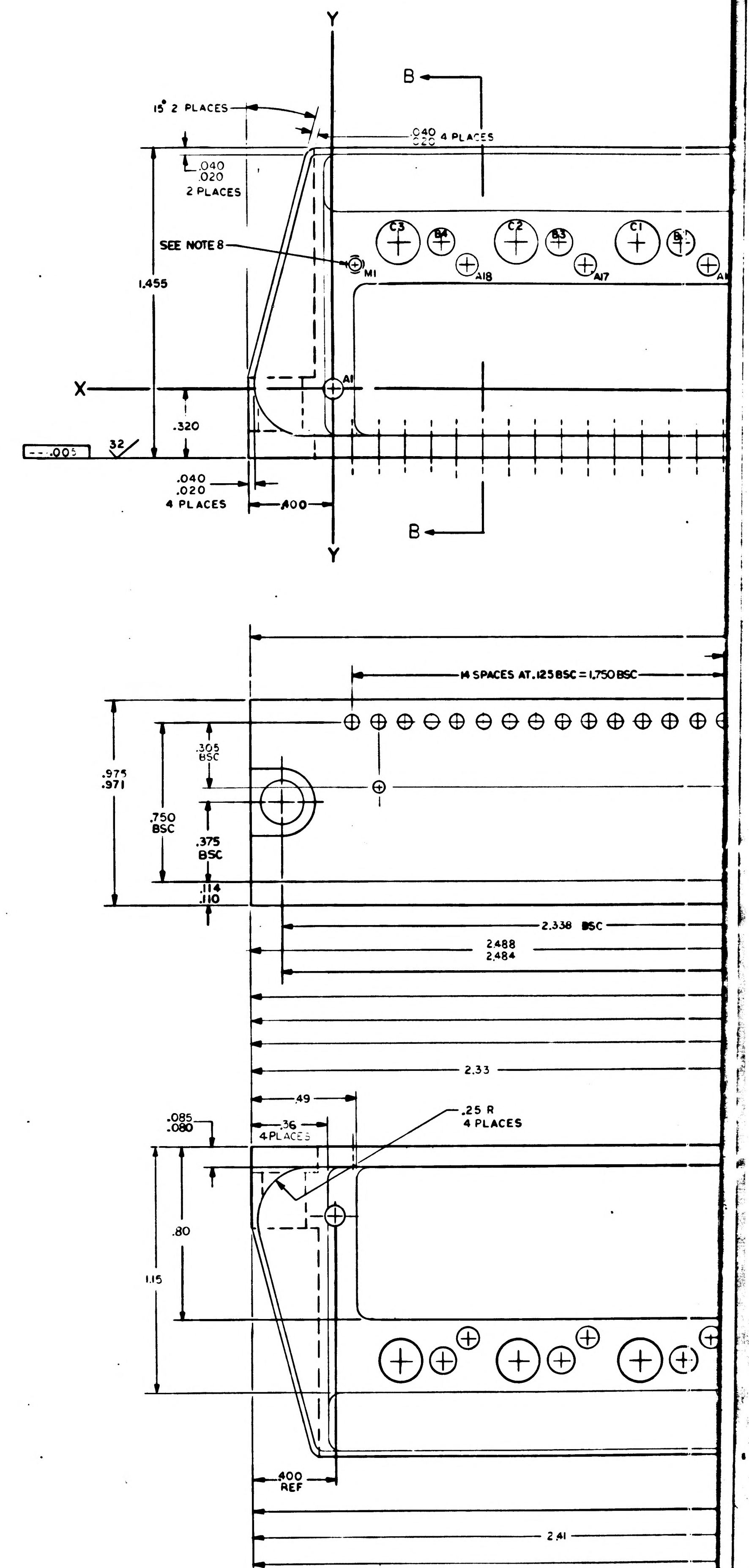
.392 TYP
.392 TYP
.260
.280
14 PLACES

SECTION B-B



.112 TYP
.090 R TYP
.063
.094
K2 REF
.063
.094
.270
.276 DIA THRU
.302
.308 DIA TYP

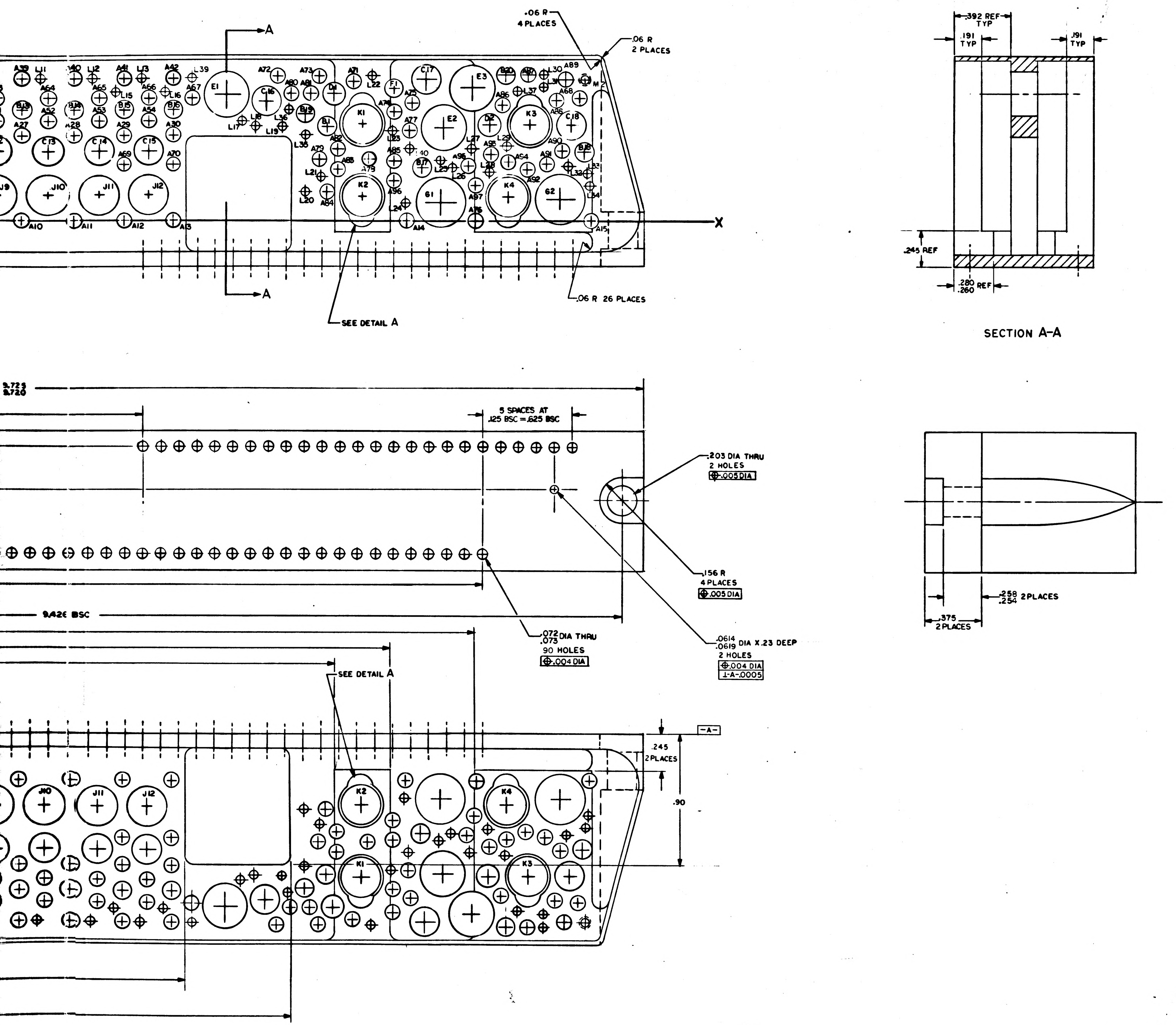
DETAIL A
TYP 4 PLACES



Y
B
15° 2 PLACES
.040
.020 4 PLACES
.040
.020
2 PLACES
SEE NOTE 8
C3
B4
C2
B3
C1
M1
A18
A17
A1
1.455
X
.320
.005
32
.040
.020
4 PLACES
.400
B
Y
14 SPACES AT .125 BSC = 1.750 BSC
.975
.971
.305
BSC
.750
BSC
.375
BSC
.114
.110
2.338 BSC
2.488
2.484
2.33
.085
.080
.49
.36
4 PLACES
.25 R
4 PLACES
.80
1.15
.400
REF
2.41
J1

2008330 C

1720 08330



.06 R 4 PLACES
.06 R 2 PLACES
A
X
SEE DETAIL A
.06 R 26 PLACES
.392 REF TYP
.191 TYP
.191 TYP
.245 REF
.280 .260 REF
SECTION A-A
9.725 9.720
5 SPACES AT .125 BSC = .625 BSC
.203 DIA THRU 2 HOLES ⊕ .005 DIA
.156 R 4 PLACES ⊕ .005 DIA
9.426 BSC
.072 .073 DIA THRU 90 HOLES ⊕ .004 DIA
.0614 .0619 DIA X .23 DEEP 2 HOLES ⊕ .004 DIA ⊥ -A- .0005
.258 .254 2 PLACES
.375 2 PLACES
SEE DETAIL A
-A-
.245 2 PLACES
.90
E1 E2 E3 C13 C14 C15 C16 C17 C18 J9 J10 J11 J12 K1 K2 K3 K4 G1 G2 D1 D2 F1

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007209	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH SEE NOTE 5,

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN R. Romey DATE 12 May 65
CHECKED Bonadrigo 20 May 65
APPROVAL R. V. Van de Koerne
APPROVAL A. R. Fost 6/1/65
NASA APPROVAL W. J. Blair 6-2-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

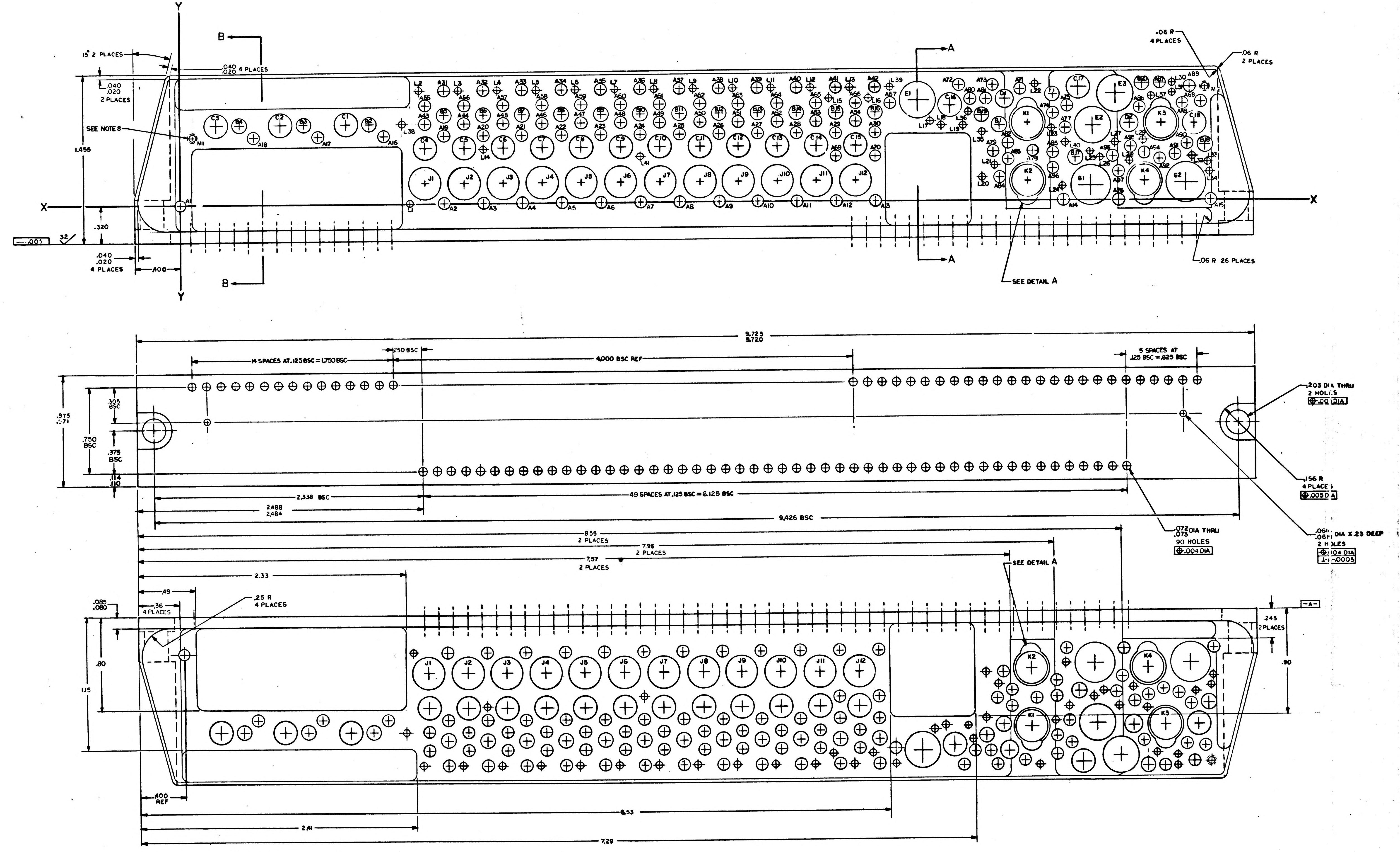
HEADER HOUSING
COARSE SYSTEM ELECTRONICS
CDU

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2008330
SCALE 4/1 WT — SHEET 1 OF 1

2008330

2008330

MASTER


7
6
5
4
B
A
Y
X
15° 2 PLACES
.040 .020 4 PLACES
.040 .020 2 PLACES
SEE NOTE 8
M1
1.455
.320
.005
32
.040 .020 4 PLACES
.400
.06 R 4 PLACES
.06 R 2 PLACES
.06 R 26 PLACES
SEE DETAIL A
J1 J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
E1 E2 E3
K1 K2 K3 K4
G1 G2
9.725 9.720
14 SPACES AT .125 BSC = 1.750 BSC
.250 BSC
4.000 BSC REF
5 SPACES AT .125 BSC = .625 BSC
.203 DIA THRU 2 HOLES
.005 DIA
.975 .971
.305 BSC
.750 BSC
.375 BSC
.114 .110
2.338 BSC
49 SPACES AT .125 BSC = 6.125 BSC
2.488 2.484
9.426 BSC
.156 R 4 PLACES
.005 D A
.072 .073 DIA THRU 90 HOLES
.004 DIA
.061 .061 DIA X .23 DEEP 2 HOLES
.004 DIA
.0005
8.55 2 PLACES
7.96 2 PLACES
7.57 2 PLACES
SEE DETAIL A
2.33
.49
.36 4 PLACES
.25 R 4 PLACES
.085 .080
.80
1.15
-A-
.245 2 PLACES
.90
.400 REF
6.53
2.41
7.29

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HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104 DIA	72
A2	2.300			
A3	2.640			
A4	2.980			
A5	3.320			
A6	3.660			
A7	4.000			
A8	4.340			
A9	4.680			
A10	5.020			
A11	5.360			
A12	5.700			
A13	6.040			
A14	7.680			
A15	8.960	.000		
A16	1.770	.578		
A17	1.200			
A18	.640			
A19	2.300			
A20	2.640			
A21	2.980			
A22	3.320			
A23	3.660			
A24	4.000			
A25	4.340			
A26	4.680			
A27	5.020			
A28	5.360			
A29	5.700			
A30	6.040	.578		
A31	2.300	.980		
A32	2.640			
A33	2.980			
A34	3.320			
A35	3.660			
A36	4.000			
A37	4.340			
A38	4.680			
A39	5.020			
A40	5.360			
A41	5.700			
A42	6.040	.980		
A43	2.130	.682		
A44	2.470			
A45	2.810			
A46	3.150			
A47	3.490			
A48	3.830			
A49	4.170			
A50	4.510			
A51	4.850			
A52	5.190			
A53	5.530			
A54	5.870	.682		
A55	2.130	.840		
A56	2.470			
A57	2.810			
A58	3.150			
A59	3.490			
A60	3.830			
A61	4.170			
A62	4.510			
A63	4.850			
A64	5.190			
A65	5.530			
A66	5.870			
A67	6.180			
A68	8.875	.840		
A69	5.700	.385		
A70	6.040	.385		
A71	7.305	.960		
A72	6.775	.995		

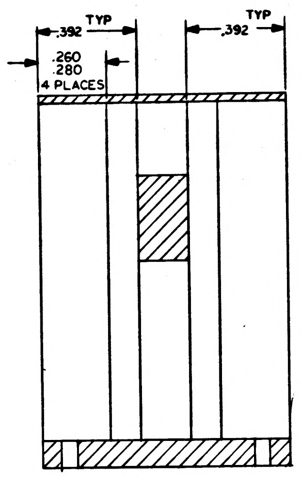
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A73	7.065	.995	.100 .104 DIA	25
A74	7.590	.750		
A75	7.715	.812		
A76	8.155	.000		
A77	7.695	.620		
A78	7.415	.420		
A79	7.070	.420		
A80	6.870	.870		
A81	7.005	.870		
A82	7.200	.495		
A83	7.200	.350		
A84	7.125	.200		
A85	7.590	.410		
A86	8.335	.800		
A87	8.515	1.005		
A88	8.710	.830		
A89	8.775	.970		
A90	8.755	.480		
A91	8.645	.390		
A92	8.510	.355		
A93	8.260	.455		
A94	8.380	.405		
A95	8.105	.380		
A96	7.590	.275		
A97	8.155	.245		
B1	7.125	.645	.127 .131 DIA	20
B2	1.645	.682		
B3	1.075	.682		
B4	.515	.682		
B5	2.300	.755		
B6	2.640			
B7	2.980			
B8	3.320			
B9	3.660			
B10	4.000			
B11	4.340			
B12	4.680			
B13	5.020			
B14	5.360			
B15	5.700			
B16	6.040	.755		
B17	7.780	.365		
B18	8.905	.475		
B19	6.965	.735		
B20	8.365	1.005		
C1	1.445	.682	.202 .206 DIA	18
C2	.875	.682		
C3	.315	.682		
C4	2.130	.475		
C5	2.470			
C6	2.810			
C7	3.150			
C8	3.490			
C9	3.830			
C10	4.170			
C11	4.510			
C12	4.850			
C13	5.190			
C14	5.530			
C15	5.870	.475		
C16	6.695	.820		
C17	7.810	.975		
C18	8.812	.660		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
D1	7.170	.870	.153 .157 DIA	2
D2	8.255	.660		
E1	6.415	.865	.309 .316 DIA	3
E2	7.930	.640		
E3	8.130	.915		
F1	7.590	.910	.112 .116 DIA	1
G1	7.915	.125	.346 .353 DIA	2
G2	8.745	.145		
J1	2.130	.170	.270 .276 DIA	12
J2	2.470			
J3	2.810			
J4	3.150			
J5	3.490			
J6	3.830			
J7	4.170			
J8	4.510			
J9	4.850			
J10	5.190			
J11	5.530			
J12	5.870	.170		
K1	7.370	.665	SEE DETAIL A	4
K2	7.370	.170		
K3	8.530	.665		
K4	8.380	.170		
L1	2.000	.000	.058 .062 DIA	41
L2	2.080	.980		
L3	2.420			
L4	2.760			
L5	3.100			
L6	3.440			
L7	3.780			
L8	4.120			
L9	4.460			
L10	4.800			
L11	5.140			
L12	5.480			
L13	5.820	.980		
L14	2.640	.460		
L15	5.640	.885		
L16	5.985	.885		
L17	6.525	.682		
L18	6.620	.650		
L19	6.805	.650		
L20	6.965	.200		
L21	7.080	.300		
L22	7.435	[illegible]		
L23	7.580	.620		
L24	7.670	.120		
L25	7.915	.415		
L26	7.995	.360		
L27	8.125	.500		
L28	8.250	.335		
L29	8.375	.515		
L30	8.625	1.005		
L31	8.625	.920		
L32	8.795	.378		
L33	8.925	.320		
L34	8.955	.238		
L35	6.965	.578		
L36	6.845	.765		
L37	8.445	.895		
L38	1.943	.682		
L39	6.180	.980		
L40	7.700	.490		
L41	4.000	.402		
M1	.110	.578	NO.2-56UNC 2B THD	2
M2	8.930	.970		

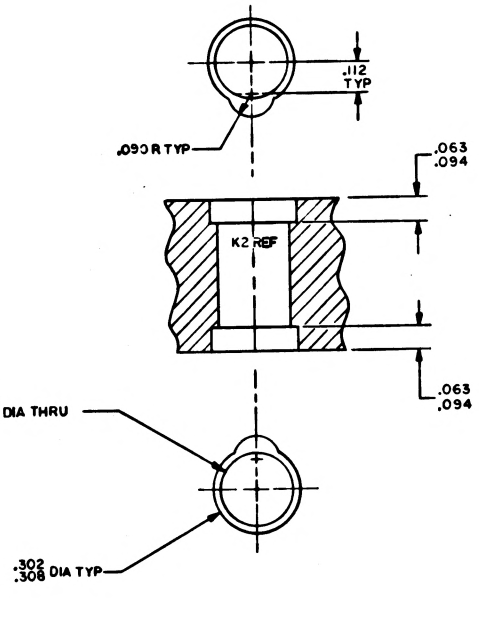
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK-60A-T5 PER QQ-M-31 TEMP 5
3. REMOVE ALL BURRS AND SHARP EDGES .005/.015
4. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.

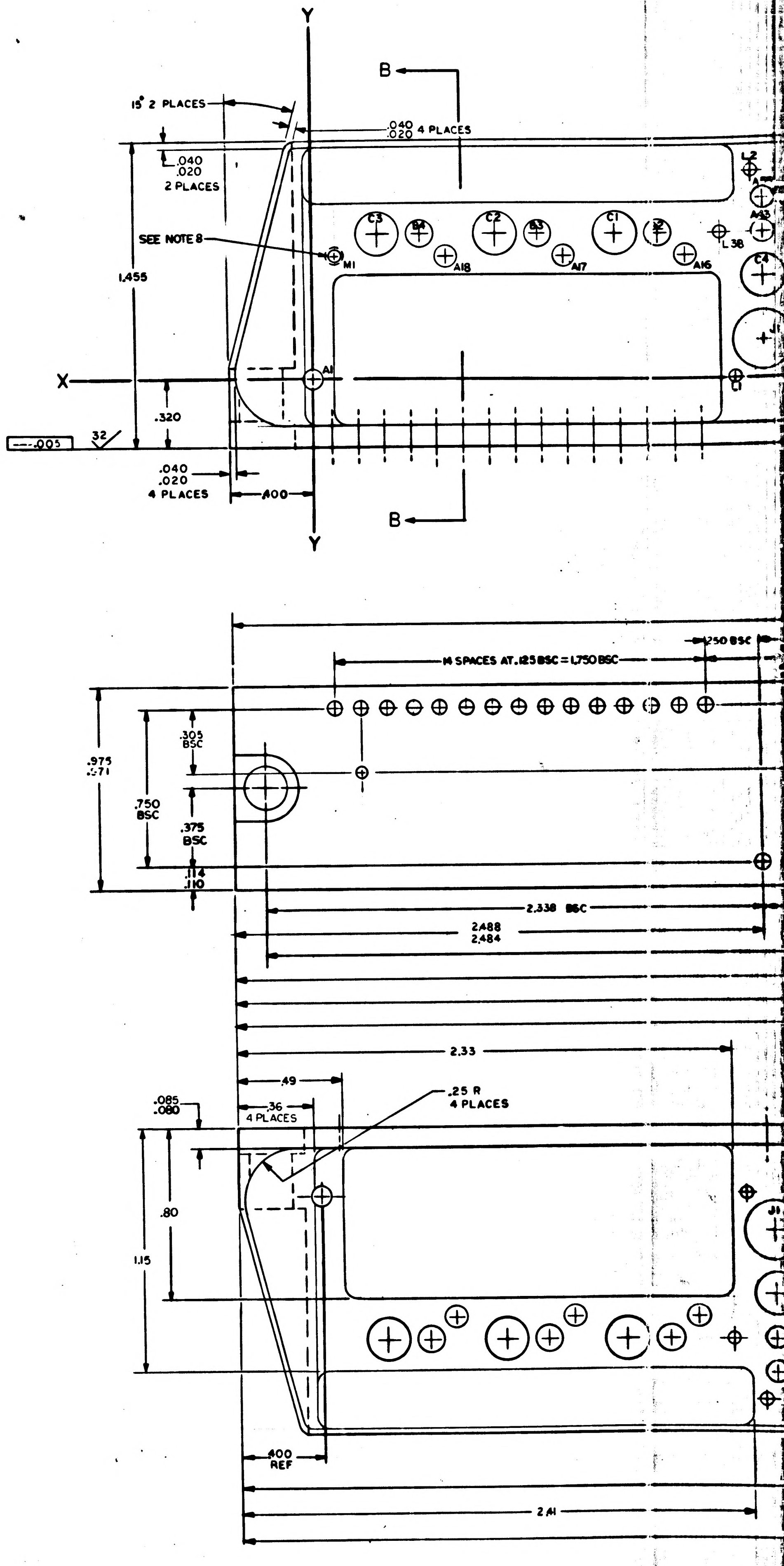
6. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE, COAT PER ND1002040



SECTION B-B



DETAIL A
TYP 4 PLACES



2008331 B

REVISIONS 19784				
SYM	DESCRIPTION	CHG NO.	DATE	APPD.
A	REVISED PER ECM 201214 REVISED PER TDRR 21760		25 JUN 65	~~R~~ W.D.
B	REPLACED BY CONFIGURATION DWG REV C PER TDRR 21761		8/24/65	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY, QQ-A-250/11 TEMPER T6 SIZE TO BE 9.125 x 10.000 x .750. THIS SIZE IS AS FINISHED OVERALL DIMENSIONS.

CONFIGURATION INCOMPLETE

Ⓑ REPLACED BY CONFIGURATION DWG REV C

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	24	MS 21209-C0815	INSERT, SCREW THD., SELF LOCKING
2	8	MS 21209-C0415	INSERT, SCREW THD., SELF LOCKING
1	24	1010620-7	PIN, GUIDE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±	±.005	±

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT

DRAWN R. LaBlue DATE 3 MAY 65
CHECKED Ed Foster 3 MAY 65
APPROVAL
APPROVAL D. B. Test 5/28/65
NASA APPROVAL W J R 6-2-65
MIT APPROVAL 6-2-65

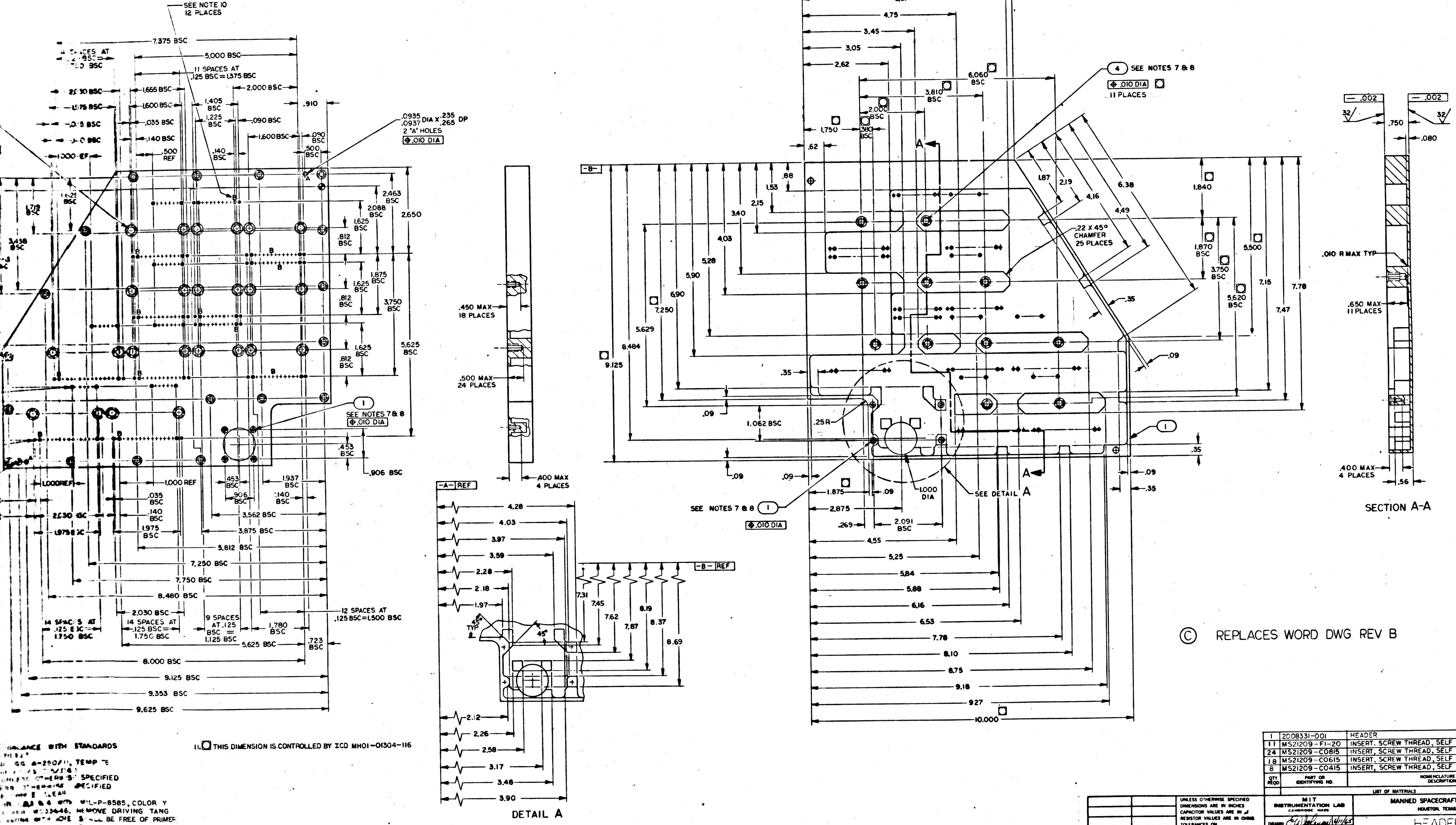
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER, PIPA (C/M)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE B
2008331
SCALE —
SHEET 1 OF 1

MIL 10778-D 11-16-64

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
C		REPLACES WORD DWG REV B PER TDRR 21761			8/24/65	



SEE NOTE 10
12 PLACES
7.375 BSC
5.000 BSC
11 SPACES AT .125 BSC = 1.375 BSC
2.000 BSC
.0935/.0937 DIA X .235/.265 DP
2 "A" HOLES
⊕ .010 DIA
SEE NOTES 7 & 8
⊕ .010 DIA
12 SPACES AT .125 BSC = 1.500 BSC
14 SPACES AT .125 BSC = 1.750 BSC
9 SPACES AT .125 BSC = 1.125 BSC
8.000 BSC
9.125 BSC
9.353 BSC
9.625 BSC
.450 MAX 18 PLACES
.500 MAX 24 PLACES
.400 MAX 4 PLACES
-A- REF
-B- REF
DETAIL A
-A-
-B-
6.500
6.31
4.75
3.45
3.05
2.62
6.060 BSC
3.810 BSC
2.000 BSC
1.750
.380 BSC
4 SEE NOTES 7 & 8
⊕ .010 DIA
11 PLACES
.22 X 45° CHAMFER 25 PLACES
1.000 DIA
SEE DETAIL A
1 SEE NOTES 7 & 8
⊕ .010 DIA
1.062 BSC
2.091 BSC
10.000
9.125
A
SECTION A-A
.002
.750
.080
.010 R MAX TYP
.650 MAX 11 PLACES
.400 MAX 4 PLACES
.56

ANCE WITH STANDARDS
A-250/11, TEMP
OTHERWISE SPECIFIED
SPECIFIED
CLEAR
MIL-P-8585, COLOR Y
33646. REMOVE DRIVING TANG
SHALL BE FREE OF PRIMER
CLEANING OF FIND NO 4,
AND D ED THE FULL LENGTH OF
THREADS.

CHROMATE TREATMENT OF
(IRIDITE) TO BE DONE

11. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

Ⓒ REPLACES WORD DWG REV B

2H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008331-001	HEADER	5
11	MS21209-F1-20	INSERT, SCREW THREAD, SELF LOCKING	4
24	MS21209-C0815	INSERT, SCREW THREAD, SELF LOCKING	3
18	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	2
8	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007092	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

		DATE
DRAWN	C.W. Johnson	4/1/65
CHECKED		
APPROVED		
APPROVED	D.R. Scott	8/23/65
APPROVED MIT		
APPROVED MSC		

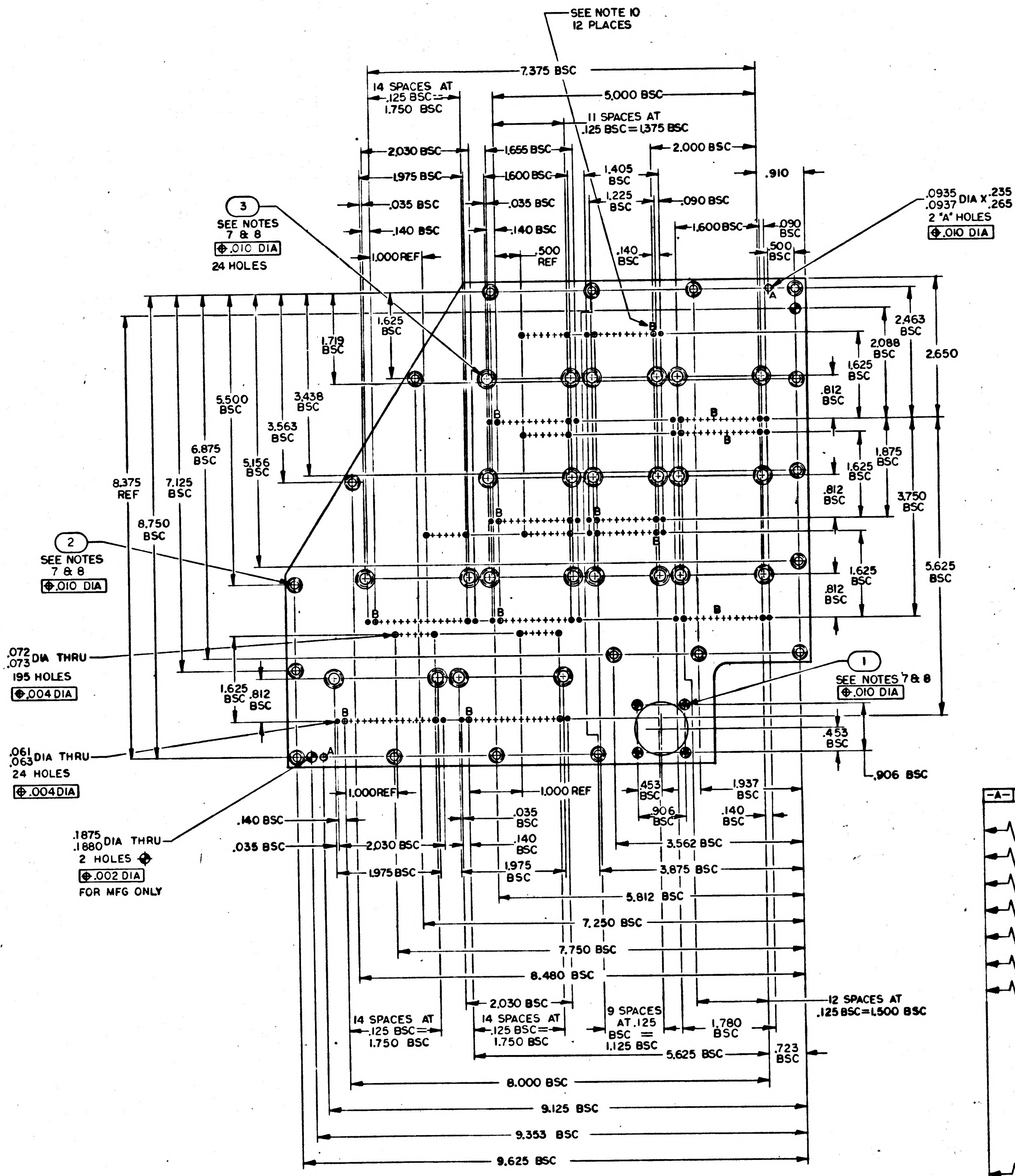
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

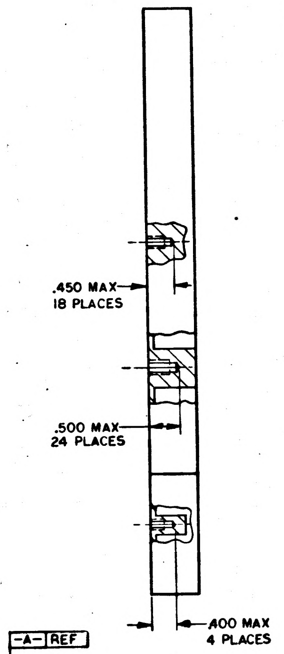
HEADER
INSEPARABLE ASSEMBLY
PIPA ELECTRONICS

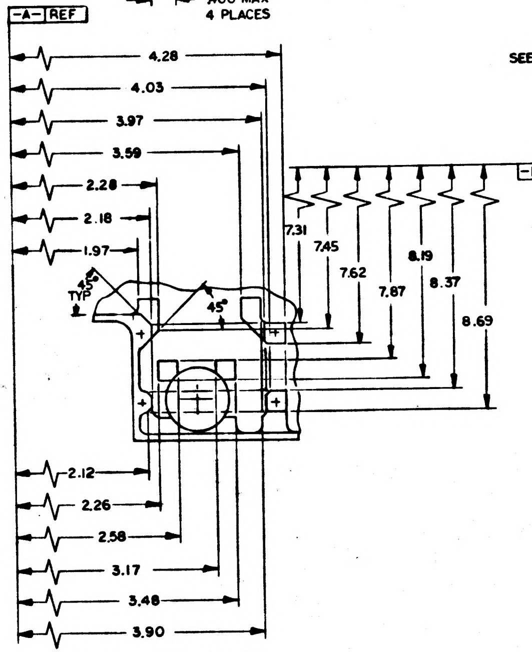
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008331

SCALE FULL
SHEET 1 OF 1

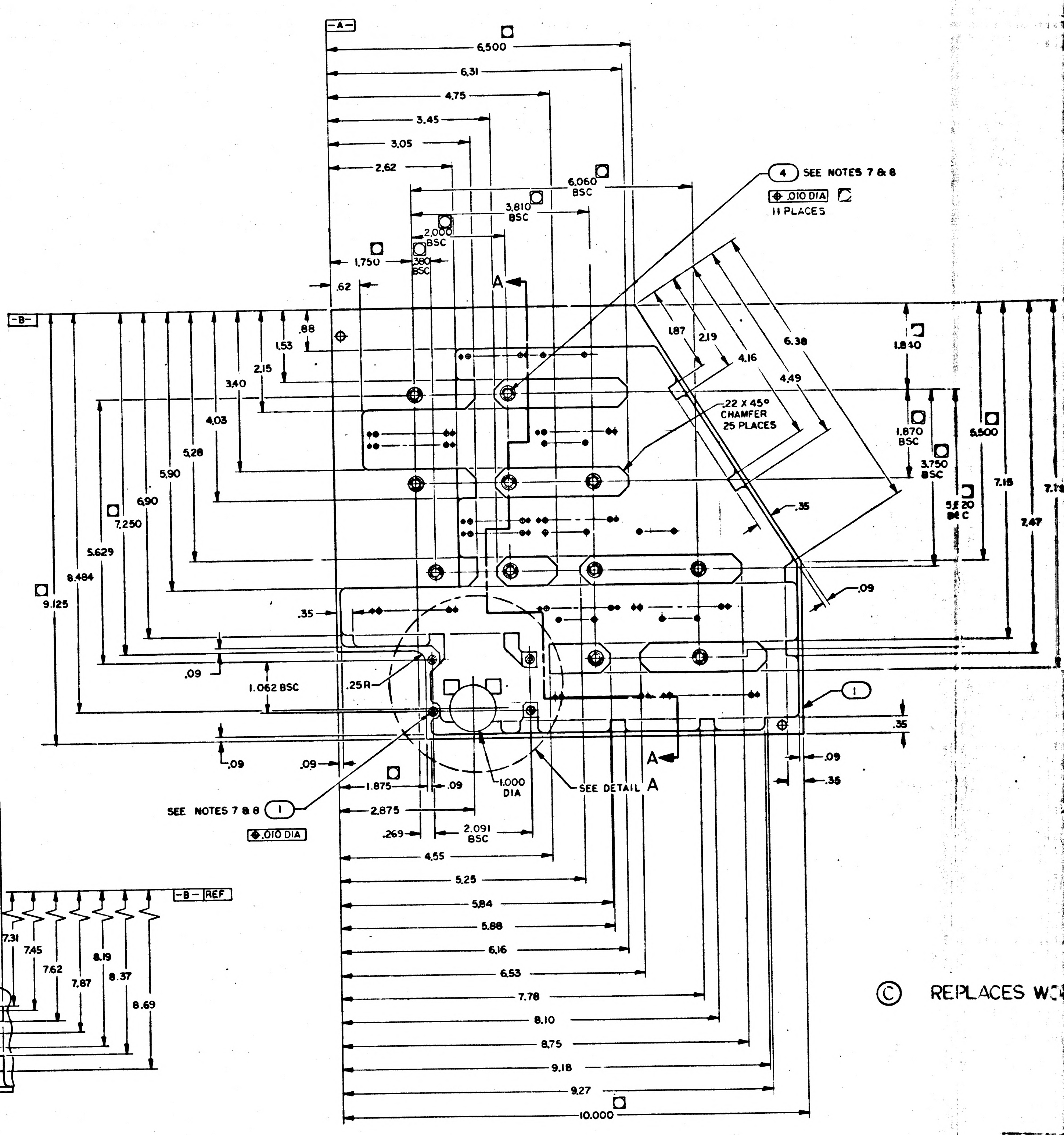
2008331 C


SEE NOTE 10
12 PLACES
7.375 BSC
5.000 BSC
14 SPACES AT .125 BSC = 1.750 BSC
11 SPACES AT .125 BSC = 1.375 BSC
2.000 BSC
.910
.0935 .0937 DIA X .235 .265 DP
2 "A" HOLES
⌖ .010 DIA
③ SEE NOTES 7 & 8
⌖ .010 DIA
24 HOLES
② SEE NOTES 7 & 8
⌖ .010 DIA
.072 .073 DIA THRU
195 HOLES
⌖ .004 DIA
.061 .063 DIA THRU
24 HOLES
⌖ .004 DIA
.1875 .1880 DIA THRU
2 HOLES
⌖ .002 DIA
FOR MFG ONLY
① SEE NOTES 7 & 8
⌖ .010 DIA
8.375 REF
8.750 BSC
2.650
5.625 BSC
.906 BSC
12 SPACES AT .125 BSC = 1.500 BSC
9 SPACES AT .125 BSC = 1.125 BSC
8.000 BSC
9.125 BSC
9.353 BSC
9.625 BSC


.450 MAX
18 PLACES
.500 MAX
24 PLACES
.400 MAX
4 PLACES


-A- REF
-B- REF
4.28
4.03
3.97
3.59
2.28
2.18
1.97
45° TYP
45°
2.12
2.26
2.58
3.17
3.48
3.90
7.31
7.45
7.62
7.87
8.19
8.37
8.69

DETAIL A


-A-
-B-
6.500
6.31
4.75
3.45
3.05
2.62
6.060 BSC
3.810 BSC
2.000 BSC
.380 BSC
1.750
.62
④ SEE NOTES 7 & 8
⌖ .010 DIA
11 PLACES
.22 X 45° CHAMFER
25 PLACES
A
SEE DETAIL A
1.000 DIA
1.062 BSC
.25R
① SEE NOTES 7 & 8
⌖ .010 DIA
9.125
8.484
5.629
7.250
1.875
2.875
.269
2.091 BSC
4.55
5.25
5.84
5.88
6.16
6.53
7.78
8.10
8.75
9.18
9.27
10.000

Ⓒ REPLACES W

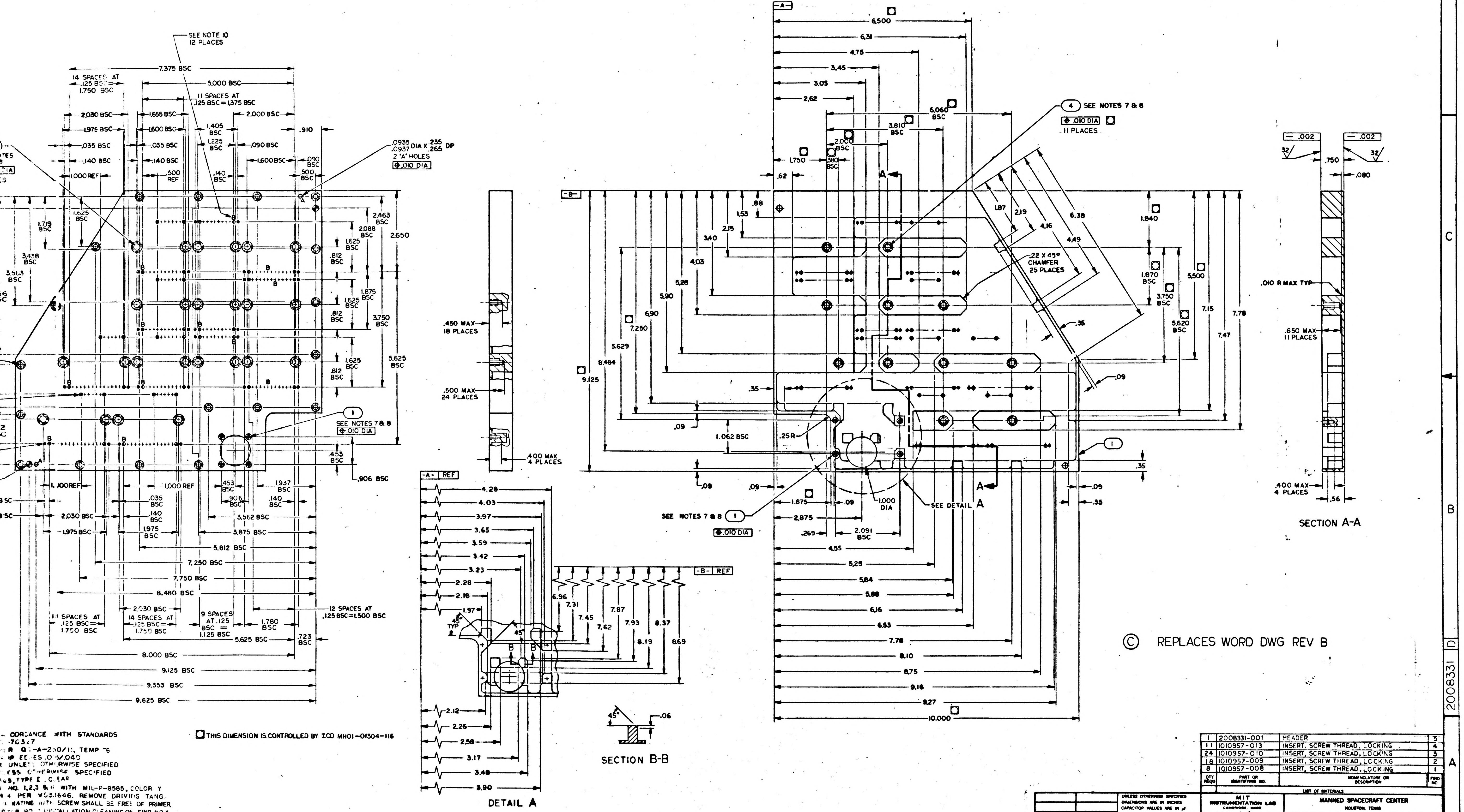
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6 AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .015/.040
4. ALL FILLETS .140 R MAX UNLESS OTHERWISE SPECIFIED
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. ANODIZE PER MIL-A-8625, TYPE I, CLEAR
7. COAT THREADS OF FIND NO. 1,2,3 & 4 WITH MIL-P-8585, COLOR Y
8. ☐ INSTALL FIND NO. 1,2,3 & 4 PER MS33646. REMOVE DRIVING TANG. THE SURFACES OF FIND NO.4 MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO.4, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF FIND NO.4 AS FINAL STEP IN CLEANING OF FIND NO.4 THREADS.
9. IDENTIFY WITH PART NO. PER ND1002019
10. HOLES MARKED B SHALL BE FREE FROM ANODIZE. CHROMATE TREATMENT OF HOLES PER MIL-C-5541, TYPE II, GRADE C, CLASS 3 (IRIDITE) TO BE DONE AFTER ANODIZE
11. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

2007092	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XX ± .XXX ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

2008331 C

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS						
C		REPLACES WORD DWG REV B PER TDRR 21761			5/24/65	
D		REVISED PER TDRR 23752				



SEE NOTE 10
12 PLACES
14 SPACES AT .125 BSC = 1.750 BSC
11 SPACES AT .125 BSC = 1.375 BSC
7.375 BSC
5.000 BSC
.0935 .0937 DIA X .235 .265 DP
2 "A" HOLES
.010 DIA
SEE NOTES 7 & 8
.010 DIA
.450 MAX
18 PLACES
.500 MAX
24 PLACES
.400 MAX
4 PLACES
-A- REF
-B- REF
DETAIL A
SECTION B-B
9 SPACES AT .125 BSC = 1.125 BSC
12 SPACES AT .125 BSC = 1.500 BSC
-A-
-B-
SEE NOTES 7 & 8
.010 DIA
11 PLACES
.22 X 45° CHAMFER
25 PLACES
SEE DETAIL A
1.000 DIA
10.000
.010 R MAX TYP
.650 MAX
11 PLACES
.400 MAX
4 PLACES
SECTION A-A

Ⓒ REPLACES WORD DWG REV B

... CORDANCE WITH STANDARDS
... -70327
... R Q...-A-250/11, TEMP T6
... P EDGES .015/.040
... UNLESS OTHERWISE SPECIFIED
... LESS OTHERWISE SPECIFIED
... 5, TYPE I, CLEAR
... NO. 1,2,3 & 4 WITH MIL-P-8585, COLOR Y
... 4 PER MS33646. REMOVE DRIVING TANG.
... MATING WITH SCREW SHALL BE FREE OF PRIMER
... R PO... INSTALLATION CLEANING OF FIND NO.4,
... ENGAGED AND DISENGAGED THE FULL LENGTH OF
... CLEANING OF FIND NO.4 THREADS.
... PER MDI00... 019
... FROM ANODIZE. CHROMATE TREATMENT OF
... GRADE C, CLASS 3 (IRIDITE) TO BE DONE

☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008331-001	HEADER	5
11	1010957-013	INSERT, SCREW THREAD, LOCKING	4
24	1010957-010	INSERT, SCREW THREAD, LOCKING	3
18	1010957-009	INSERT, SCREW THREAD, LOCKING	2
8	1010957-008	INSERT, SCREW THREAD, LOCKING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007092	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

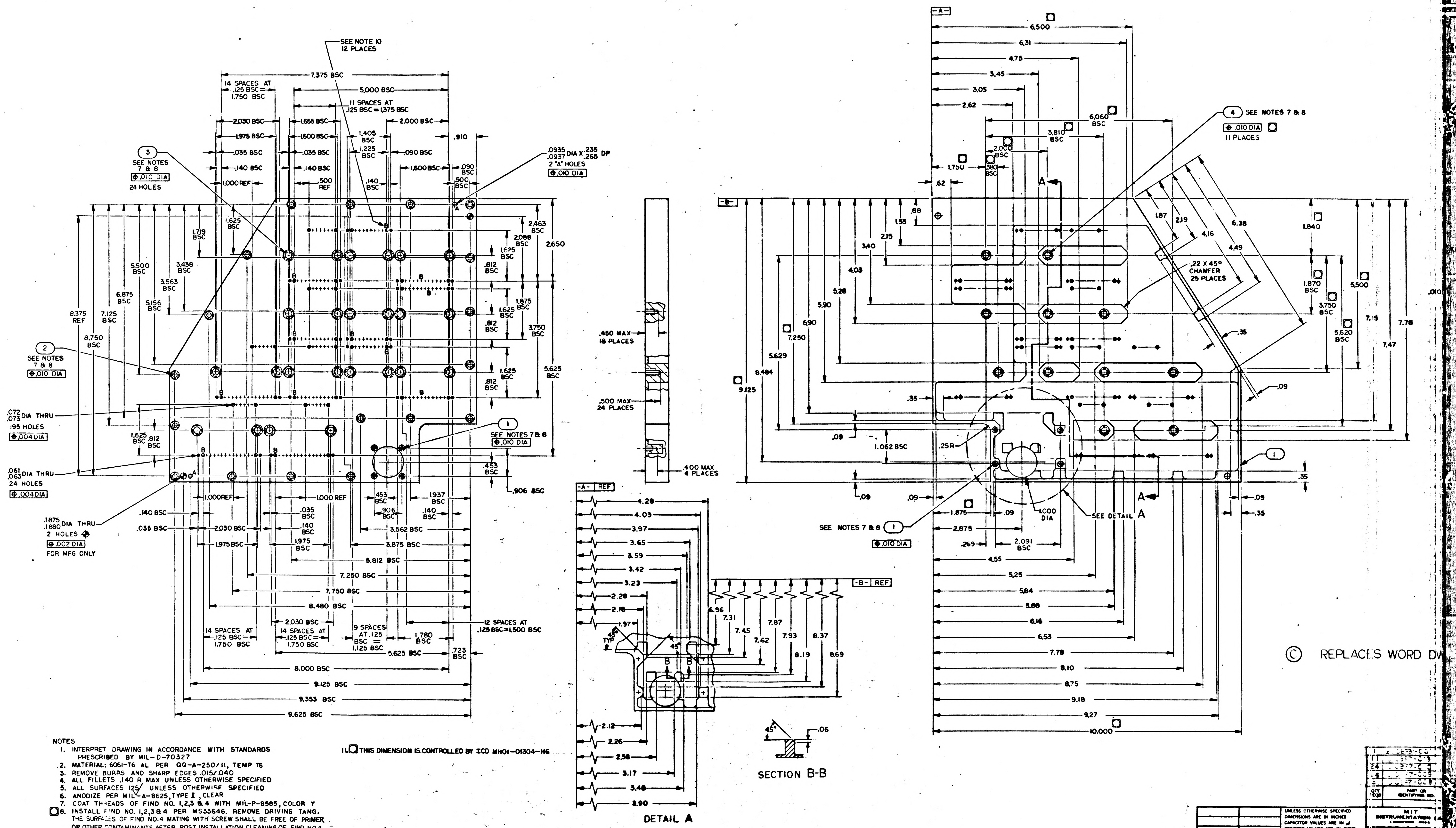
DRAWN 4/1/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASSEMBLY
PIPA ELECTRONICS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008331
SCALE FULL
SHEET 1 OF 1

2008331 D



SEE NOTE 10
12 PLACES
7.375 BSC
14 SPACES AT .125 BSC = 1.750 BSC
5.000 BSC
11 SPACES AT .125 BSC = 1.375 BSC
SEE NOTES 7 & 8
.010 DIA
24 HOLES
.0935/.0937 DIA X .235/.265 DP
2 "A" HOLES
.072/.073 DIA THRU
195 HOLES
.004 DIA
.061/.063 DIA THRU
24 HOLES
.1875/.1880 DIA THRU
2 HOLES
.002 DIA
FOR MFG ONLY
12 SPACES AT .125 BSC = 1.500 BSC
9 SPACES AT .125 BSC = 1.125 BSC
8.000 BSC
9.125 BSC
9.353 BSC
9.625 BSC
.450 MAX
18 PLACES
.500 MAX
24 PLACES
.400 MAX
4 PLACES
-A- REF
-B- REF
DETAIL A
SECTION B-B
SEE NOTES 7 & 8
11 PLACES
.22 X 45° CHAMFER
25 PLACES
1.000 DIA
SEE DETAIL A
10.000

Ⓒ REPLACES WORD DW

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6 AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .015/.040
4. ALL FILLETS .140 R MAX UNLESS OTHERWISE SPECIFIED
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. ANODIZE PER MIL-A-8625, TYPE I, CLEAR
7. COAT THREADS OF FIND NO. 1,2,3 & 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1,2,3 & 4 PER MS33646. REMOVE DRIVING TANG. THE SURFACES OF FIND NO.4 MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO.4, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF FIND NO.4 AS FINAL STEP IN CLEANING OF FIND NO.4 THREADS.
9. IDENTIFY WITH PART NO. PER ND1002019
10. HOLES MARKED B SHALL BE FREE FROM ANODIZE. CHROMATE TREATMENT OF HOLES PER MIL-C-5541, TYPE II, GRADE C, CLASS 3 (IRIDITE) TO BE DONE AFTER ANODIZE

11. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

QTY REQD	PART OR IDENTIFYING NO.
1	[illegible]
11	[illegible]
24	[illegible]
16	[illegible]
8	[illegible]

NEXT ASSY	USED ON
2007092	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

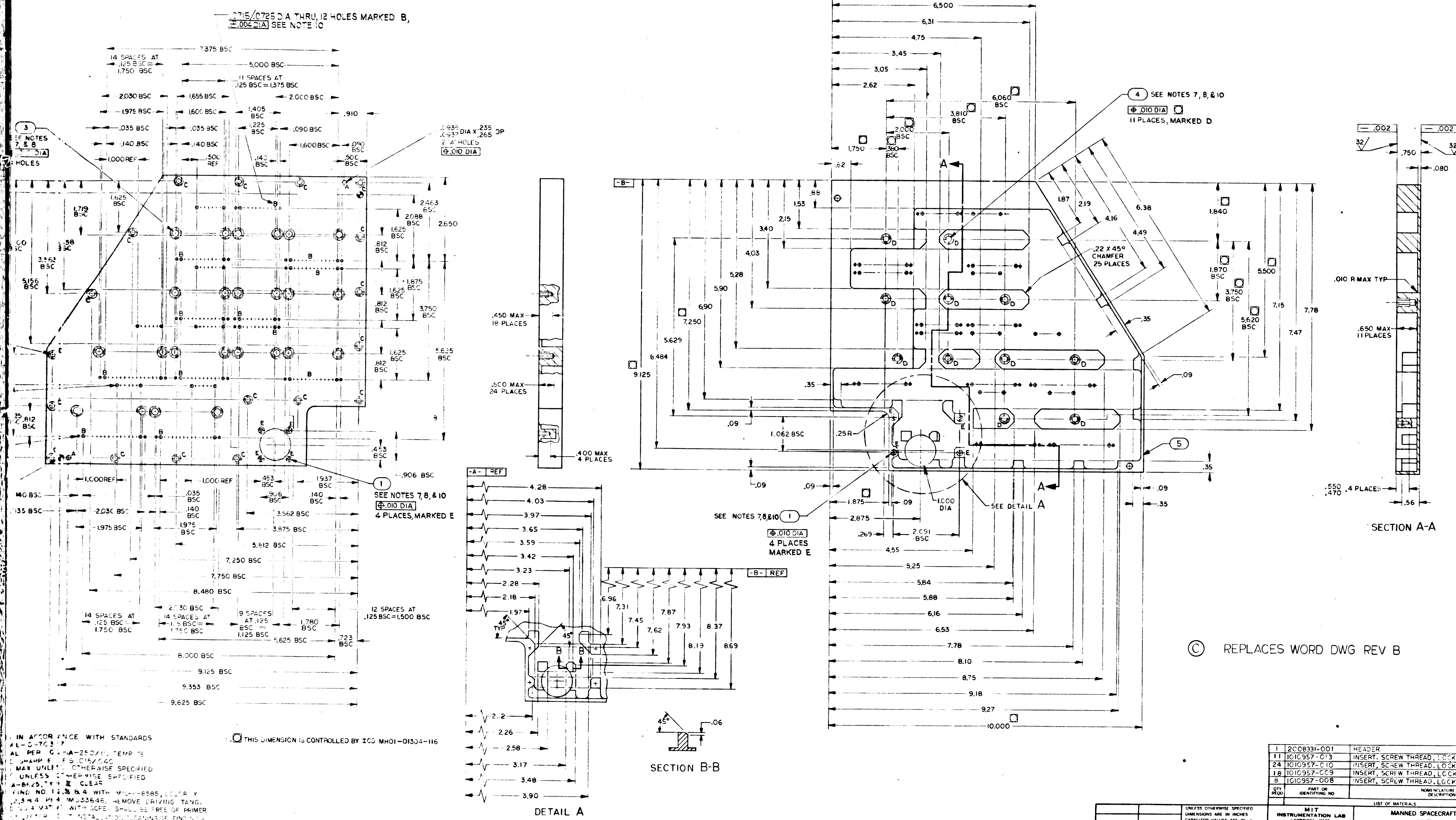
MATERIAL

MIT
INSTRUMENTATION
CAMBRIDGE MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED
APPROVED L

2008331 D

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
C		REPLACES WORD DWG REV B PER TDRR 21761			8/24/65	WK
D		REVISED PER TDRR 23752			5 Nov 65	WK
E		REVISED PER TDRR 23941	WFN		22 Nov 65	WK
F		REVISED PER TDRR 28486	JJJ		9 MAY 66	


.0715/.0725 DIA THRU, 12 HOLES MARKED B, ⊕.004 DIA SEE NOTE 10
7.375 BSC
14 SPACES AT .125 BSC = 1.750 BSC
5.000 BSC
11 SPACES AT .125 BSC = 1.375 BSC
2.000 BSC
③ SEE NOTES 7 & 8
HOLES
.0935/.0937 DIA X .235/.265 DP
2 "A" HOLES
⊕.010 DIA
⑤
① SEE NOTES 7, 8 & 10
⊕.010 DIA
4 PLACES, MARKED E
12 SPACES AT .125 BSC = 1.500 BSC
14 SPACES AT .125 BSC = 1.750 BSC
9 SPACES AT .125 BSC = 1.125 BSC
8.000 BSC
9.125 BSC
9.353 BSC
9.625 BSC
.450 MAX 18 PLACES
.500 MAX 24 PLACES
.400 MAX 4 PLACES
-A- REF
-B- REF
DETAIL A
SECTION B-B
45° TYP
.06
-A-
-B-
6.500
6.31
4.75
3.45
3.05
2.62
④ SEE NOTES 7, 8, & 10
⊕.010 DIA
11 PLACES, MARKED D
.22 X 45° CHAMFER 25 PLACES
A
SEE NOTES 7,8,&10 ①
⊕.010 DIA
4 PLACES MARKED E
1.000 DIA
SEE DETAIL A
10.000
.010 R MAX TYP
.650 MAX 11 PLACES
.550/.470 4 PLACES
.56
.750
.080
.002
32
SECTION A-A

Ⓒ REPLACES WORD DWG REV B

IN ACCORDANCE WITH STANDARDS
MIL-D-70327
AL PER QQ-A-250/11, TEMP T6
SHARP EDGES .015/.040
MAX UNLESS OTHERWISE SPECIFIED
UNLESS OTHERWISE SPECIFIED
A-8625, TYPE II, CLEAR
FIND NO. 1, 2, 3 & 4 WITH MIL-P-8585, COLOR Y
1, 2, 3 & 4 PER MS33646. REMOVE DRIVING TANG.
FIND NO. 4 MATING WITH SCREW SHALL BE FREE OF PRIMER
AFTER INSTALLATION CLEANING OF FIND NO. 4
SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF
CLEANING OF FIND NO. 4 THREADS
PER NO. 2019
SHALL BE FREE FROM ZINC CHROMATE TREATMENT OF
TYPE II, GRADE C, CLASS 3 (IRIDITE) TO BE DONE

☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

1	2008331-001	HEADER	5
11	1010957-013	INSERT, SCREW THREAD, LOCKING	4
24	1010957-010	INSERT, SCREW THREAD, LOCKING	3
18	1010957-009	INSERT, SCREW THREAD, LOCKING	2
8	1010957-008	INSERT, SCREW THREAD, LOCKING	1
QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007092	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 4/1/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

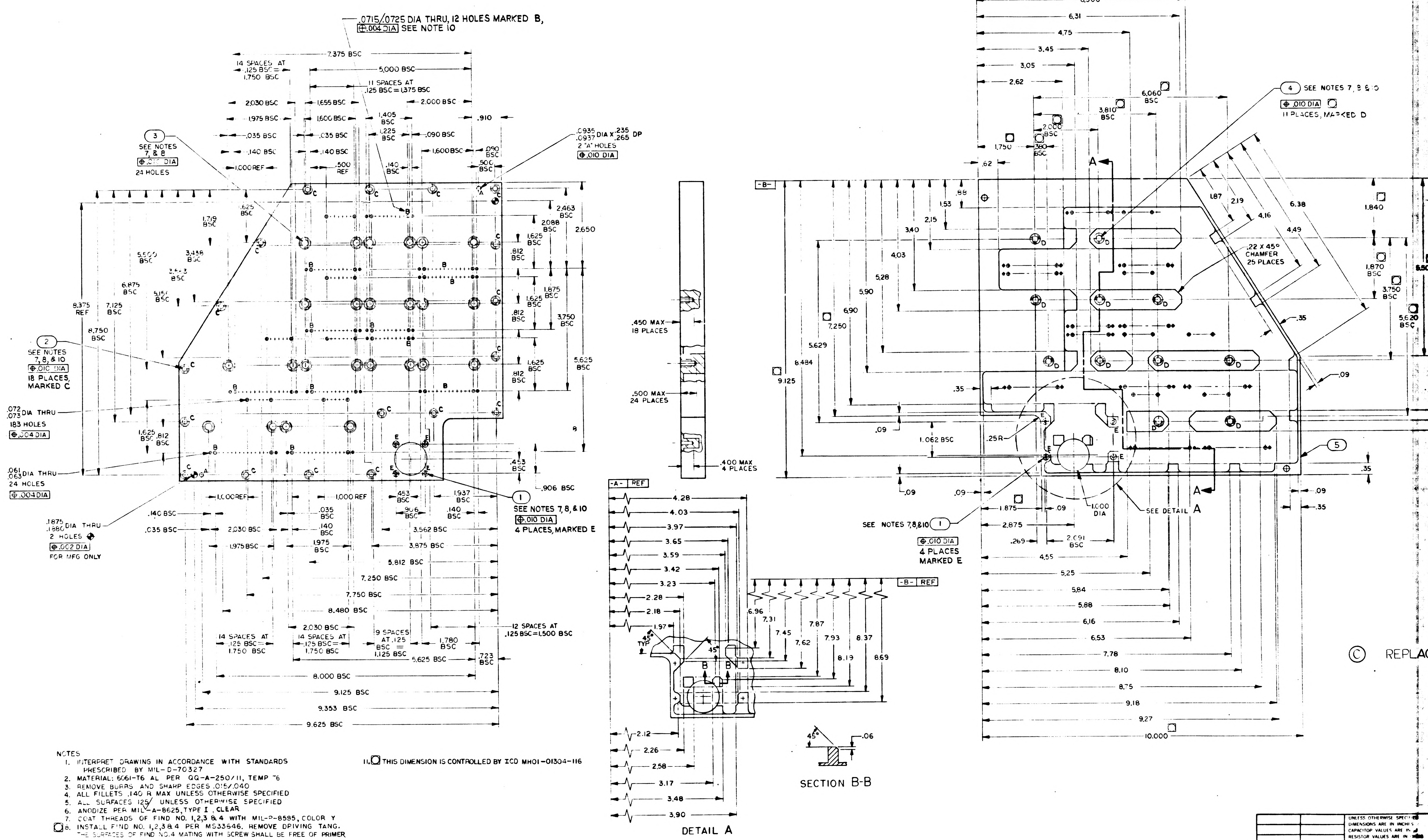
HEADER
INSEPARABLE ASSEMBLY
PIPA ELECTRONICS

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008331
SCALE FULL
SHEET 1 OF 1

2008331 F

2008331 F

2/2008331


.0715/.0725 DIA THRU, 12 HOLES MARKED B,
⊕.004 DIA SEE NOTE 10
7.375 BSC
5.000 BSC
14 SPACES AT .125 BSC = 1.750 BSC
11 SPACES AT .125 BSC = 1.375 BSC
2.000 BSC
.0935/.0937 DIA X .235/.265 DP
2 "A" HOLES
⊕.010 DIA
③ SEE NOTES 7, & 8
24 HOLES
② SEE NOTES 7, 8, & 10
⊕.010 DIA
18 PLACES, MARKED C
.072/.073 DIA THRU
183 HOLES
⊕.004 DIA
.061/.063 DIA THRU
24 HOLES
⊕.004 DIA
.1875/.1880 DIA THRU
2 HOLES
⊕.002 DIA
FOR MFG ONLY
① SEE NOTES 7, 8, & 10
⊕.010 DIA
4 PLACES, MARKED E
12 SPACES AT .125 BSC = 1.500 BSC
8.000 BSC
9.125 BSC
9.353 BSC
9.625 BSC
.450 MAX 18 PLACES
.500 MAX 24 PLACES
.400 MAX 4 PLACES
-A- REF
-B- REF
DETAIL A
SECTION B-B
④ SEE NOTES 7, 8 & 10
⊕.010 DIA
11 PLACES, MARKED D
.22 X 45° CHAMFER 25 PLACES
SEE NOTES 7,8 & 10 ①
⊕.010 DIA
4 PLACES MARKED E
SEE DETAIL A
1.000 DIA
6.500
10.000
⑤
© REPLACES

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6 AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .015/.040
4. ALL FILLETS .140 R MAX UNLESS OTHERWISE SPECIFIED
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. ANODIZE PER MIL-A-8625, TYPE I, CLEAR
7. COAT THREADS OF FIND NO. 1,2,3 & 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1,2,3 & 4 PER MS33646. REMOVE DRIVING TANG. THE SURFACES OF FIND NO.4 MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO.4, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF FIND NO.4 AS FINAL STEP IN CLEANING OF FIND NO.4 THREADS.
9. IDENTIFY WITH PART NO. PER ND1002019
10. HOLES MARKED B,C,D & E SHALL BE FREE FROM ANODIZE. CHROMATE TREATMENT OF HOLES PER MIL-C-5541, TYPE II, GRADE C, CLASS 3 (IRIDITE) TO BE DONE AFTER ANODIZE

11. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

2007092	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XX± .XXX± .005 ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

2008331 F

2008331

REVISIONS 19784				
SYM	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY, QQ-A-250/11 TEMPER T6 SIZE TO BE 9.125 × 10.000 × .750. THIS SIZE IS AS FINISHED OVERALL DIMENSIONS.

CONFIGURATION INCOMPLETE

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
LIST OF PARTS AND MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+—	±.005	+—
−	± —	−

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 3 MAY 65
CHECKED Ed Foster 3 MAY 65
APPROVAL
APPROVAL 5/28/65
NASA APPROVAL 6-2-65
MIT APPROVAL 6-2-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER, PIPA (C/M)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE B
2008331
SCALE —
SHEET 1 OF 1

MIL 10778-D 11-16-64

2008332 | C |

SYM	DESCRIPTION	CHG NO.	DATE	APPD.
A	Ⓐ REVISED PER ECM 201215 TDRR 23536		25 JUN 65	K W.D.
B	REVISED PER CM204199 TDRR 23530		30 AUG 65	B. TATKER W.D.
C	REPLACED BY CONFIGURATION DWG REV D PER TDRR 23531		10/25/65	#PR WR

REVISIONS 19785

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM ALLOY, MIL-M-8213 (ZK51A-T5)(CASTING) SIZE TO BE 22.630 × 23.100 × 2.500 THIS SIZE IS AS FINISHED OVERALL DIMENSIONS.

CONFIGURATION INCOMPLETE

Ⓒ REPLACED BY CONFIGURATION DWG REV D

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	128	MS 21209-C0815	INSERT, SCREW THD, SELF LOCKING
2	12	MS 21209-C0415	INSERT, SCREW THD, SELF LOCKING
1	84	1010620-7	PIN-GUIDE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS ± ± ANGLES + —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. LaDue DATE 3 MAY 65
CHECKED Ed Foster 3 MAY 65
APPROVAL
APPROVAL 5/28/65
NASA APPROVAL 6-2-65
MIT APPROVAL 6-2-65

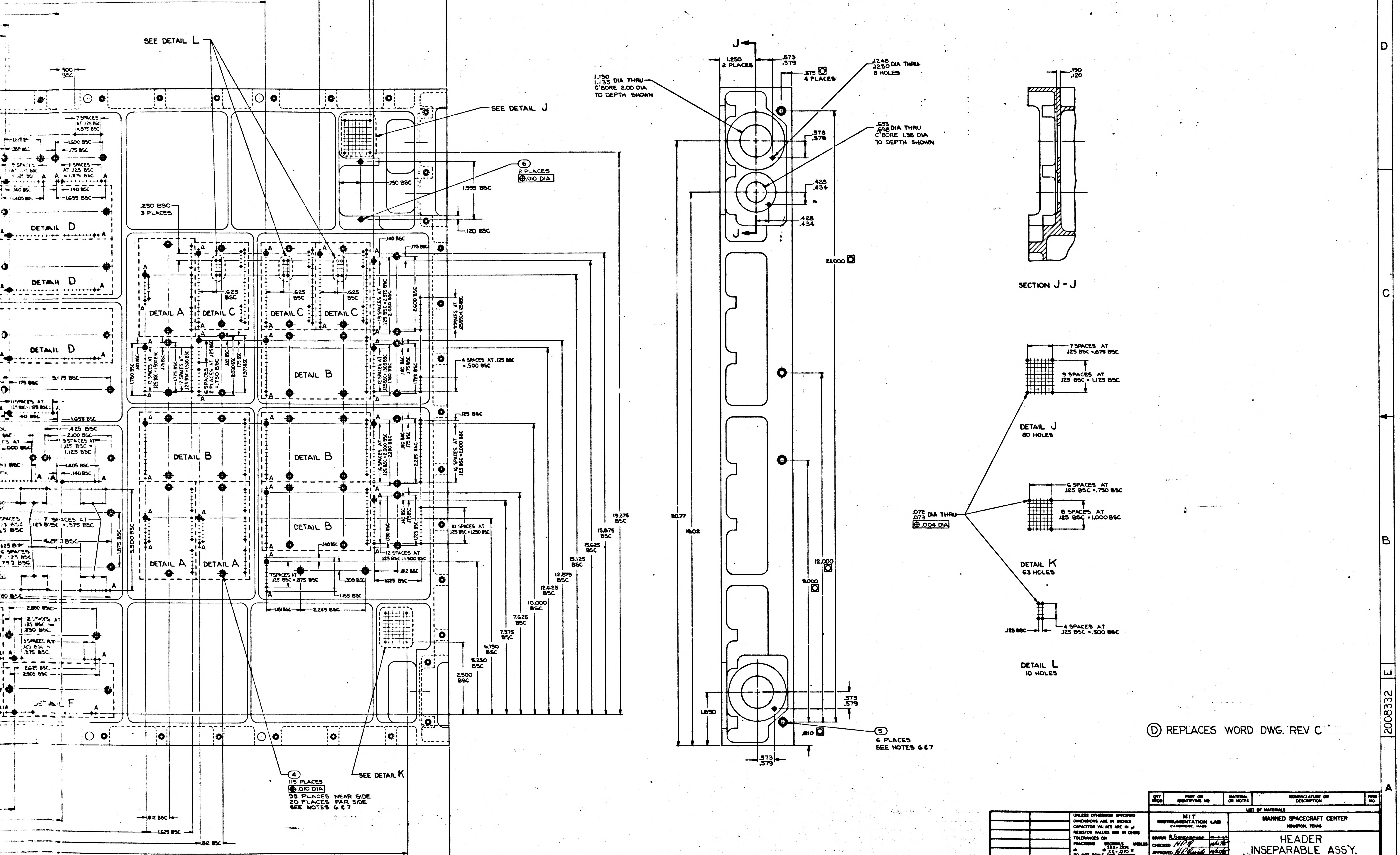
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER, PSA (C/M)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE B
2008332
SCALE —
SHEET 1 OF 1

MIL 1077B-D 11-16-64

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
REVISIONS						
D		REPLACES WORD DWG REV C PER TDRR 23831				
E		REVISED PER TDRR 23939				UR



SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL E
J
SECTION J - J
DETAIL J
80 HOLES
DETAIL K
63 HOLES
DETAIL L
10 HOLES
.072 DIA THRU .073
⊕ .004 DIA
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
④ 115 PLACES ⊕ .010 DIA 95 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
⑤ 6 PLACES SEE NOTES 6 & 7
⑥ 2 PLACES ⊕ .010 DIA

Ⓓ REPLACES WORD DWG. REV C

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007095	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 ± XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.S. [illegible] 10-4-65
CHECKED HPG
APPROVED
APPROVED
APPROVED MIT W Kuhn A. C. MIDDLETON
APPROVED MSC

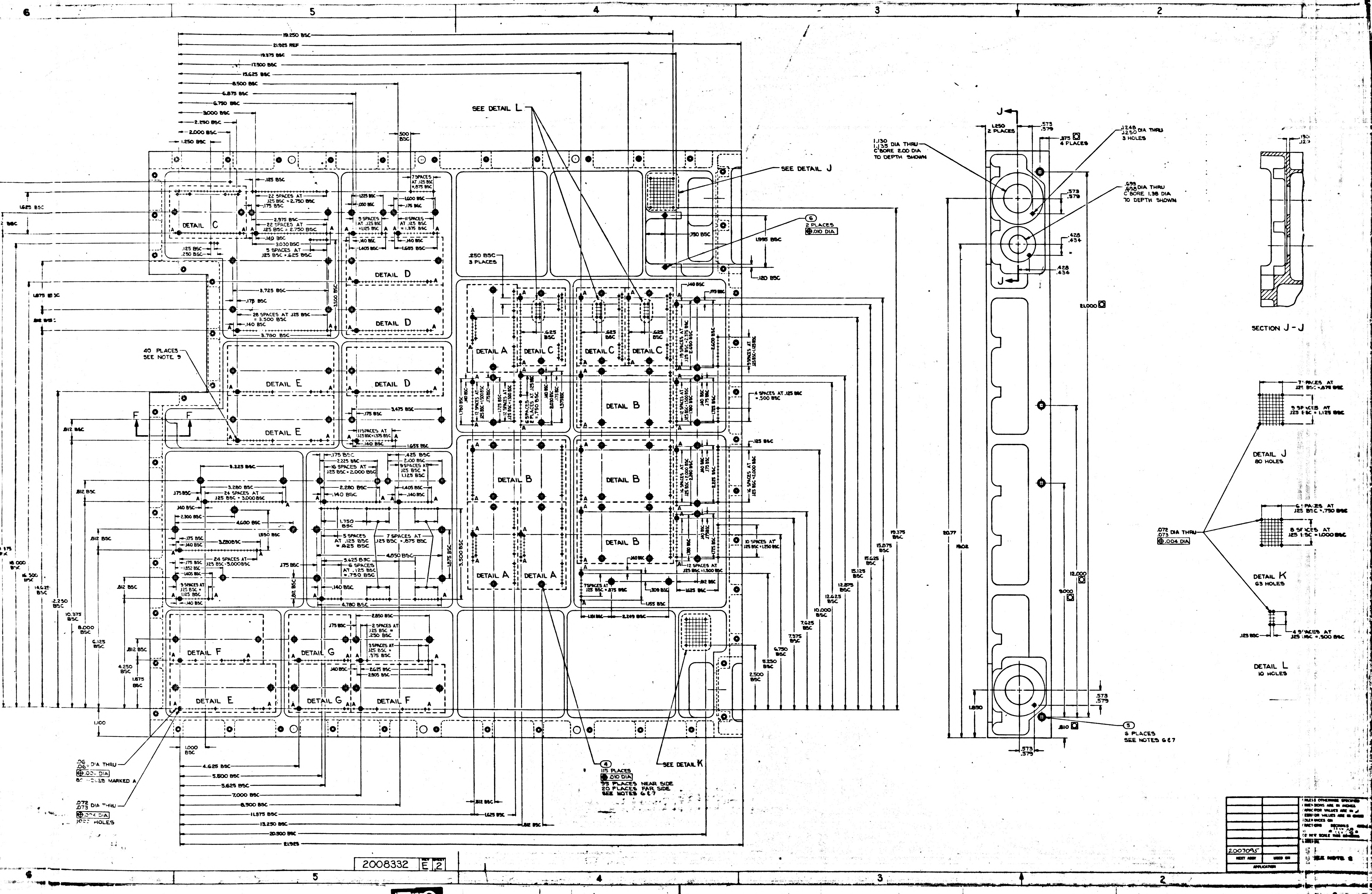
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASS'Y.
C/M PSA

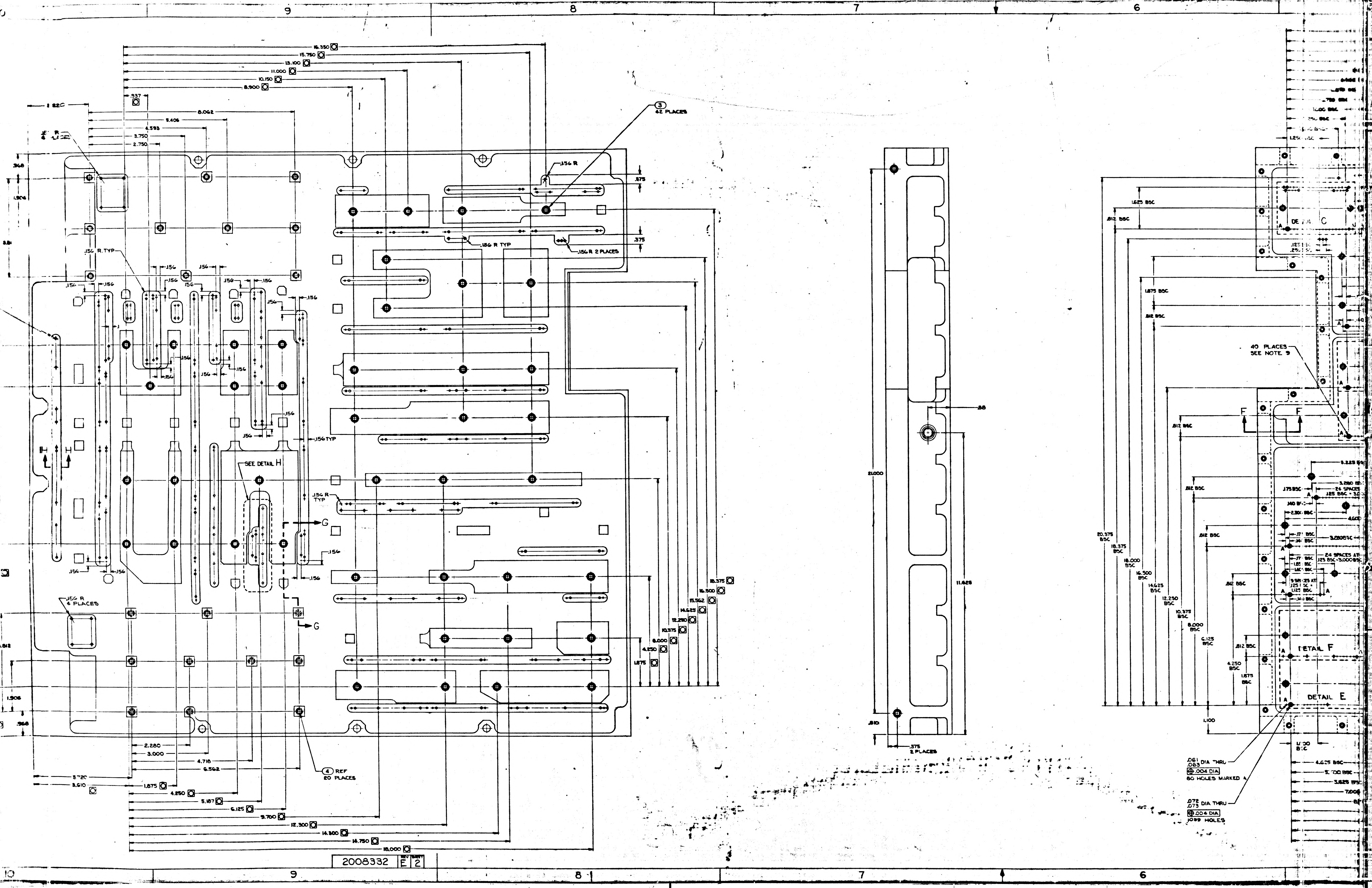
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008332
SCALE
SHEET 2 OF 2

20 8332 REV E SHEET 2

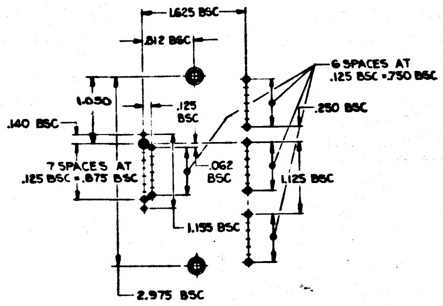
E-4



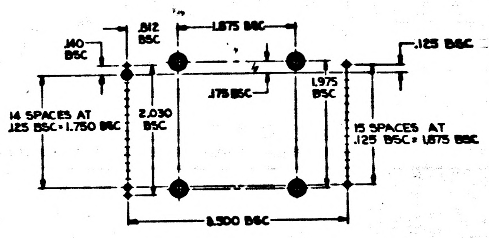
6
5
4
3
2
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.500 BSC
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
DETAIL C
DETAIL D
DETAIL E
DETAIL F
DETAIL G
DETAIL A
DETAIL B
22 SPACES AT .125 BSC = 2.750 BSC
28 SPACES AT .125 BSC = 3.500 BSC
24 SPACES AT .125 BSC = 3.000 BSC
16 SPACES AT .125 BSC = 2.000 BSC
12 SPACES AT .125 BSC = 1.500 BSC
7 SPACES AT .125 BSC = .875 BSC
.250 BSC 3 PLACES
40 PLACES SEE NOTE 9
F
F
⑥ 2 PLACES ⊕ .010 DIA
1.995 BSC
.750 BSC
.120 BSC
④ 115 PLACES ⊕ .010 DIA 95 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
.06 .062 DIA THRU ⊕ .002 DIA 80 HOLES MARKED A
.072 .073 DIA THRU ⊕ .004 DIA 1000 HOLES
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.875 BSC
13.250 BSC
20.500 BSC
21.925
1.100
J
J
1.250 2 PLACES
.573 .579
.375 □ 4 PLACES
1.248 1.250 DIA THRU 3 HOLES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN
.698 .688 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000 □
20.77
19.02
12.000 □
9.000 □
1.850
.810 □
⑤ 8 PLACES SEE NOTES 6 & 7
SECTION J - J
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
.072 .073 DIA THRU ⊕ .004 DIA
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K 63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES
2007095
NEXT ASSY
USED ON
APPLICATION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
2008332
E
2
E3


9
8
7
6
16.350
15.750
13.100
11.000
10.150
8.900
.937
1.820
8.062
5.406
4.593
3.750
2.750
.368
1.906
3.81
.156 R.TYP
.156
.156 R TYP
.156 R 2 PLACES
.156 R
.375
③ 42 PLACES
SEE DETAIL H
H
G
.156 TYP
.156 R TYP
.156 R 4 PLACES
.812
1.906
.368
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
④ REF 20 PLACES
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
21.000
.88
11.625
.810
.375 2 PLACES
1.625 BSC
.812 BSC
1.875 BSC
1.250 BSC
.125 BSC
.250 BSC
DETAIL C
40 PLACES SEE NOTE 9
F
A
3.225 BSC
3.280 BSC
.175 BSC
24 SPACES .125 BSC = 3.000
.140 BSC
2.300 BSC
4.600
.171 BSC
3.280 BSC
24 SPACES AT .125 BSC = 3.000 BSC
1.85 BSC
9 SPACES AT .125 BSC = 1.125 BSC
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.100 BSC
DETAIL F
DETAIL E
.061 .063 DIA THRU
⊕ .004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU
⊕ .004 DIA
1099 HOLES
4.625 BSC
5.100 BSC
5.625 BSC
7.000
10

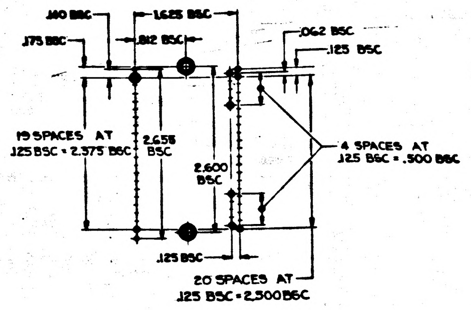
2008332 E 2


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC=.750 BSC
1.030
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC=.875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

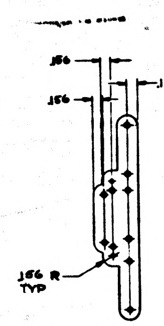
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC=1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC=1.875 BSC
3.500 BSC

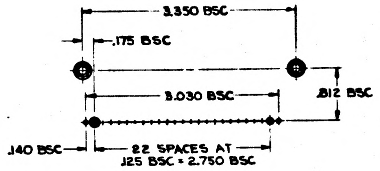
DETAIL B


.140 BSC
1.625 BSC
.062 BSC
.175 BSC
.812 BSC
.125 BSC
19 SPACES AT .125 BSC=2.375 BSC
2.655 BSC
2.600 BSC
4 SPACES AT .125 BSC=.500 BSC
.125 BSC
20 SPACES AT .125 BSC=2.500 BSC

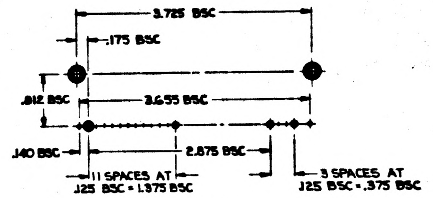
DETAIL C


.156
.156
.156
.156 R TYP

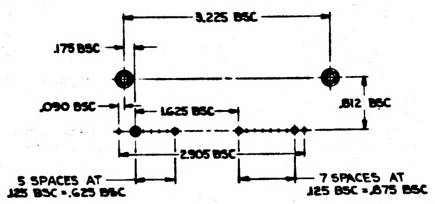
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC=2.750 BSC

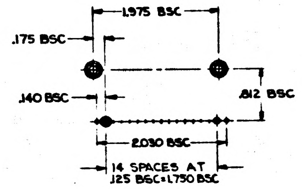
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC=1.375 BSC
3 SPACES AT .125 BSC=.375 BSC

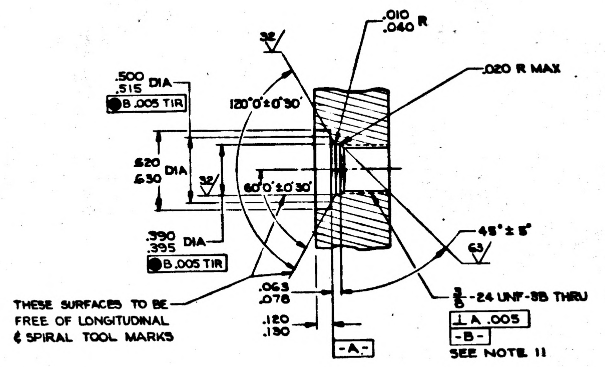
DETAIL E


3.225 BSC
.175 BSC
.812 BSC
.090 BSC
1.625 BSC
2.905 BSC
5 SPACES AT .125 BSC=.625 BSC
7 SPACES AT .125 BSC=.875 BSC

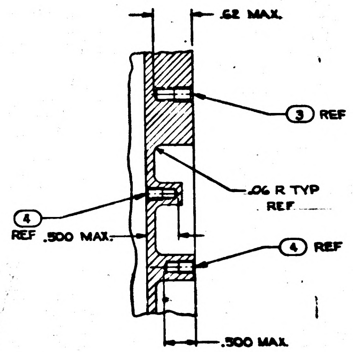
DETAIL F


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC=1.750 BSC

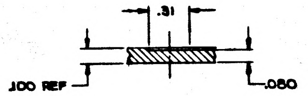
DETAIL G


.010
.040 R
32
.500
.515 DIA
B .005 TIR
120°0'±0°30'
.020 R MAX
.620
.630 DIA
32
60°0'±0°30'
.390
.395 DIA
B .005 TIR
45°±5°
63
3/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11
.063
.078
.120
.130
-A-
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS

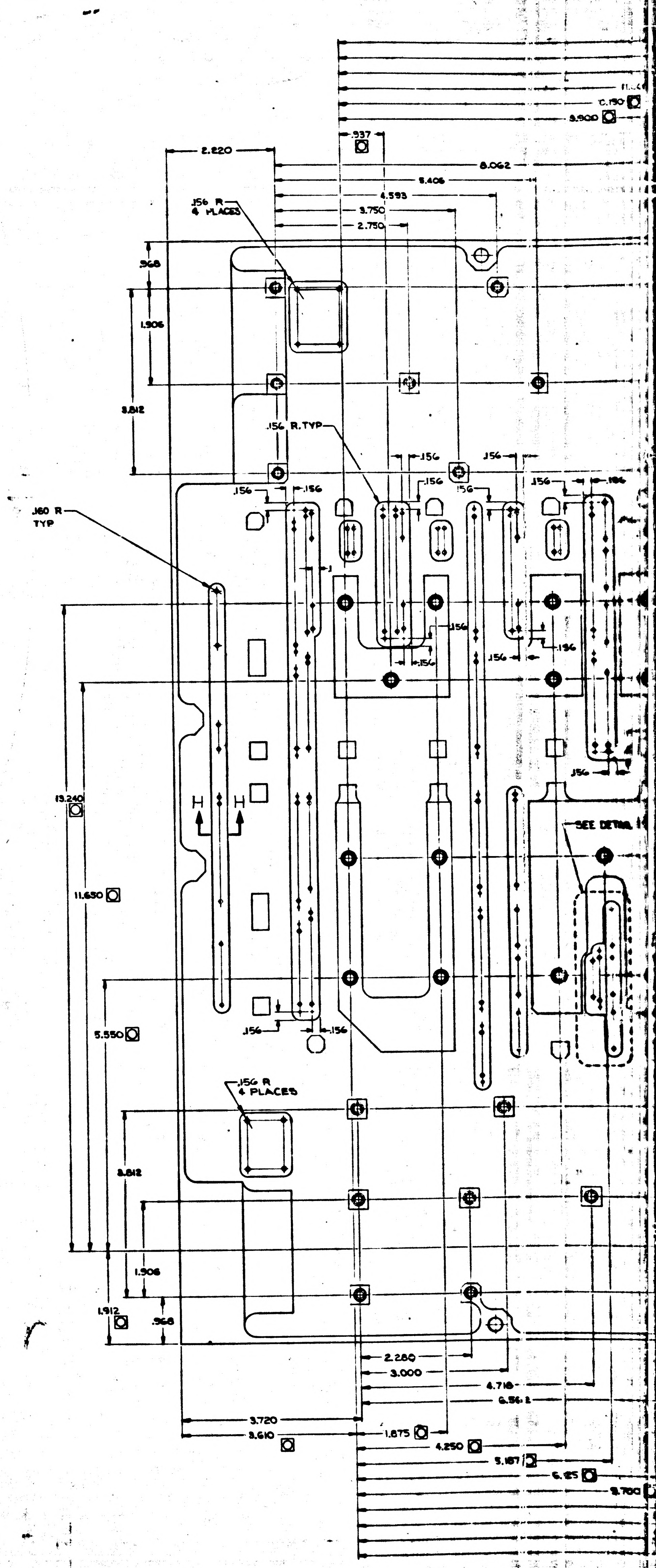
SECTION F-F
SCALE 2/1


.62 MAX
3 REF
.06 R TYP REF
4 REF .500 MAX
4 REF
.500 MAX

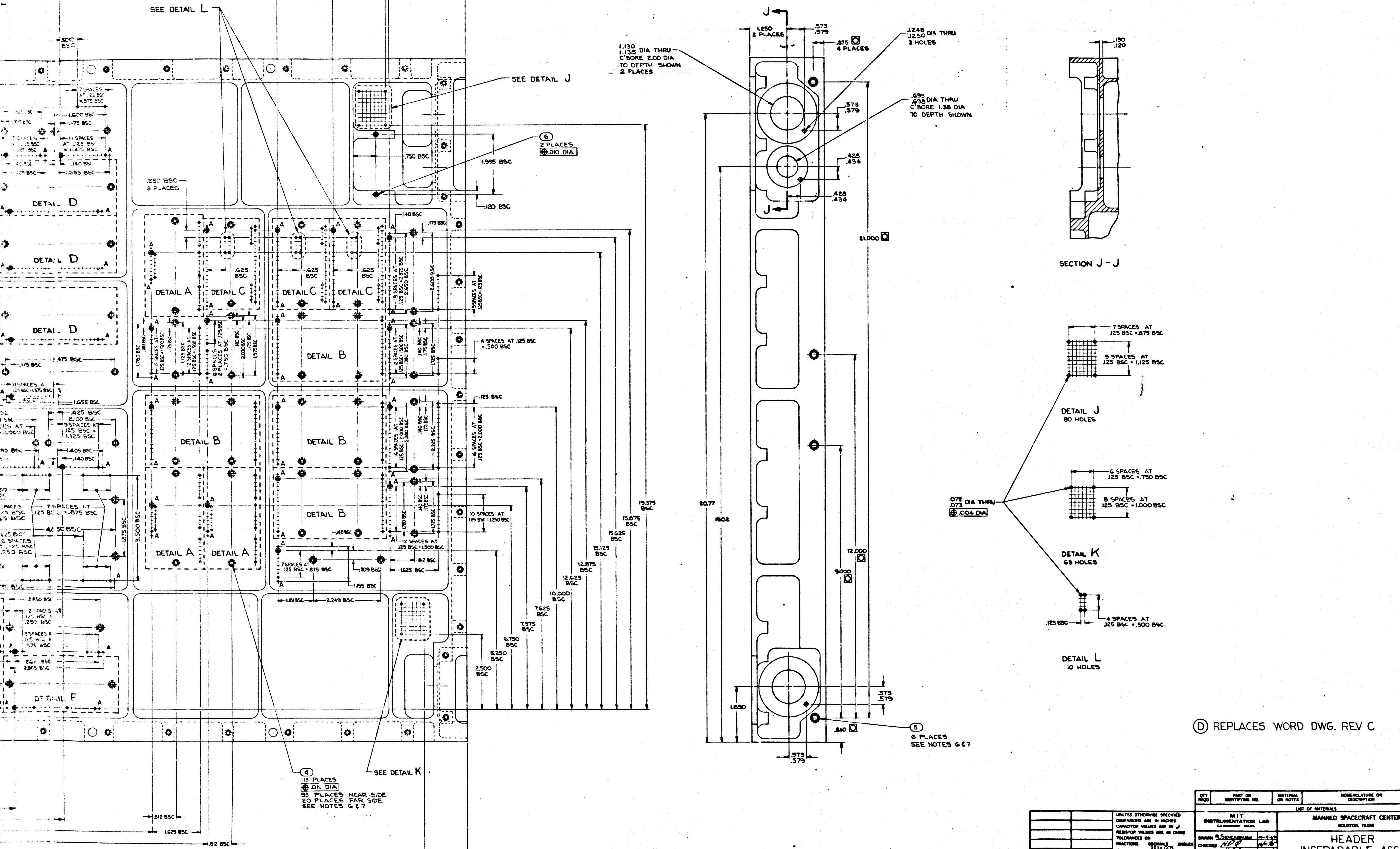
SECTION G-G


.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


2.820
.937
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R TYP
.156
.160 R TYP
H
H
13.240
11.650
5.550
SEE DETAIL
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
D		REPLACES WORD DWG REV C PER TDRR 23531				
E		REVISED PER TDRR 23939				
F		REVISED PER TDRR 25048		EDL	5 Jan	


SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
.500 BSC
DETAIL D
DETAIL D
DETAIL D
DETAIL A
DETAIL C
DETAIL C
DETAIL C
DETAIL B
DETAIL B
DETAIL B
DETAIL B
DETAIL B
DETAIL A
DETAIL A
DETAIL F
.250 BSC 3 PLACES
.625 BSC
.750 BSC
1.995 BSC
.120 BSC
.140 BSC
.125 BSC
6 2 PLACES .010 DIA
4 SPACES AT .125 BSC = .500 BSC
10 SPACES AT .125 BSC = 1.250 BSC
12 SPACES AT .125 BSC = 1.500 BSC
7 SPACES AT .125 BSC = .875 BSC
.812 BSC
1.625 BSC
1.155 BSC
1.161 BSC
2.249 BSC
.309 BSC
2.500 BSC
5.250 BSC
6.750 BSC
7.375 BSC
7.625 BSC
10.000 BSC
12.625 BSC
12.875 BSC
15.125 BSC
15.625 BSC
15.875 BSC
19.375 BSC
4 113 PLACES .014 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
1.250 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
J
SECTION J - J
.130 .120
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
.072 .073 DIA THRU .004 DIA
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K 63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES

Ⓓ REPLACES WORD DWG. REV C

44

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XXX = ± .005 .XX = ± .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007095	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R. Sencabaugh 10-4-65
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kupfer
A. C. METZGER
APPROVED MSC

HEADER INSEPARABLE ASSY.
C/M PSA

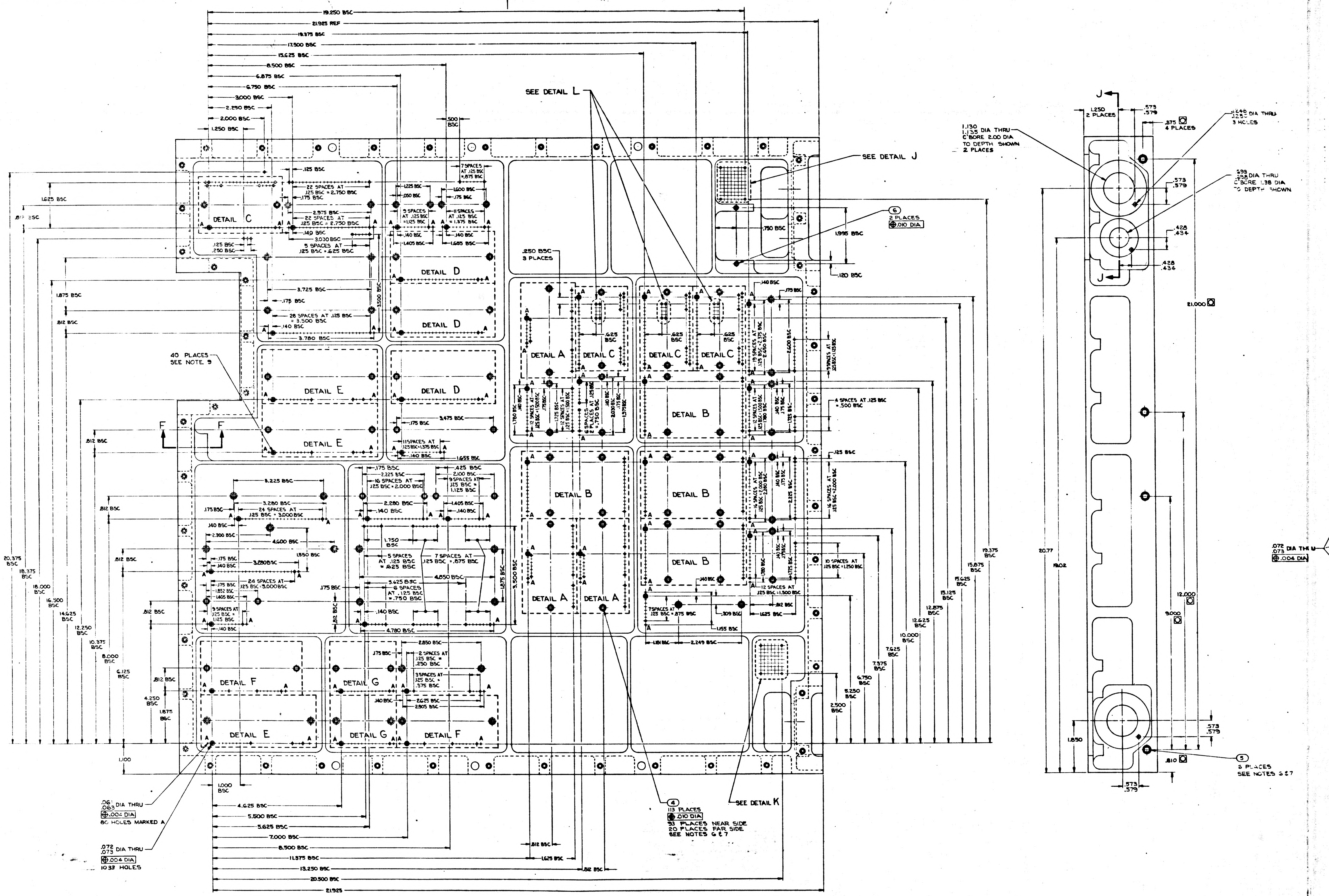
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008332

SCALE SHEET 2 OF 2

2008332 F

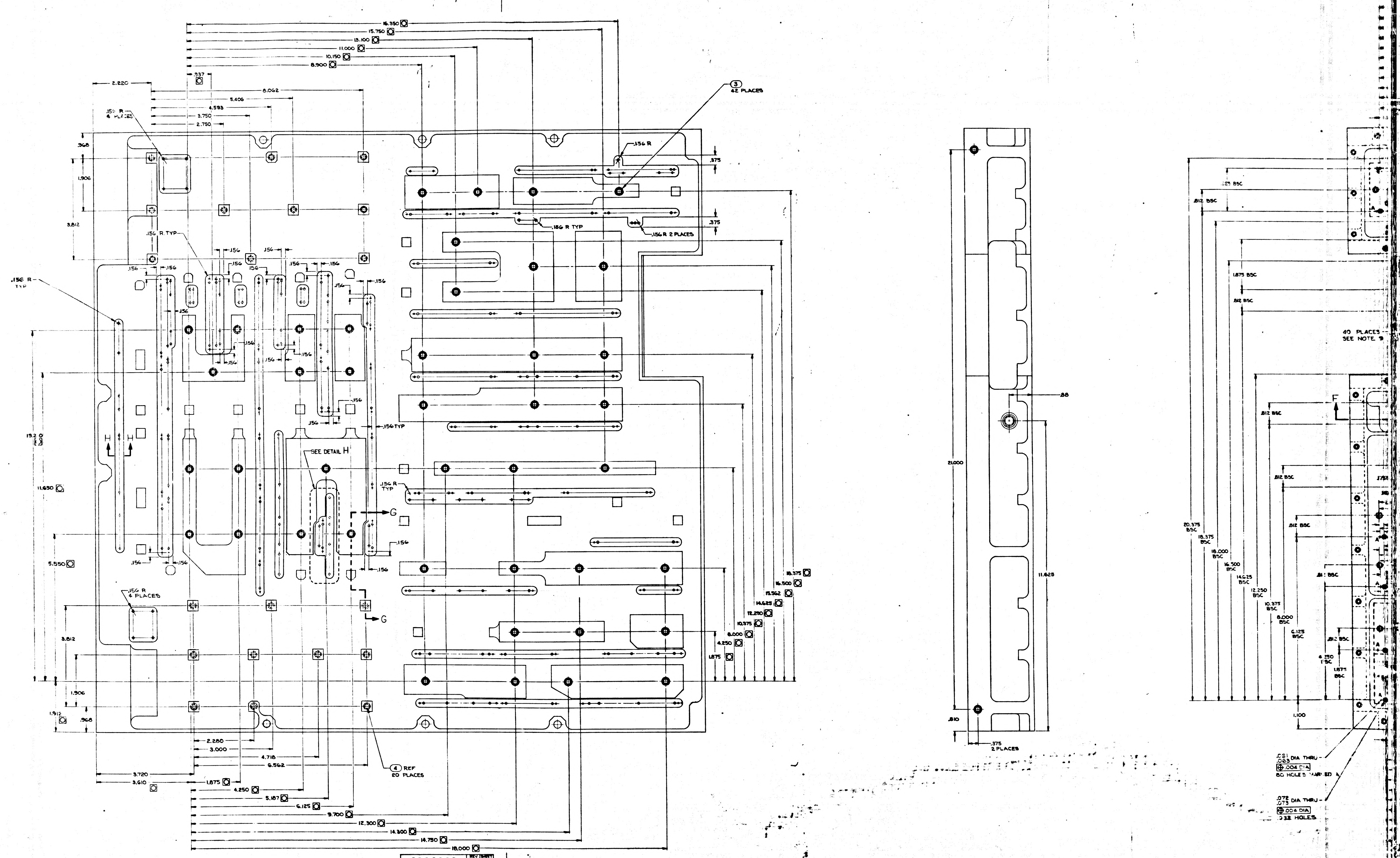
2008332 REV F SHEET 2

F-4


6
5
4
3
2
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
DETAIL C
DETAIL D
DETAIL D
DETAIL D
DETAIL E
DETAIL E
DETAIL E
DETAIL A
DETAIL C
DETAIL C
DETAIL C
DETAIL B
DETAIL B
DETAIL B
DETAIL B
DETAIL A
DETAIL A
DETAIL F
DETAIL F
DETAIL G
DETAIL G
40 PLACES
SEE NOTE 9
F
F
.250 BSC
3 PLACES
6
2 PLACES
.010 DIA
1.995 BSC
.750 BSC
.120 BSC
.061
.063 DIA THRU
.004 DIA
80 HOLES MARKED A
.072
.073 DIA THRU
.004 DIA
1037 HOLES
4
113 PLACES
.010 DIA
93 PLACES NEAR SIDE
20 PLACES FAR SIDE
SEE NOTES 6 & 7
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.500 BSC
21.925
J
J
1.250
2 PLACES
.573
.579
.375
4 PLACES
1.130
1.135 DIA THRU
C'BORE 2.00 DIA
TO DEPTH SHOWN
2 PLACES
1.246
1.250 DIA THRU
3 HOLES
.593
.598 DIA THRU
C'BORE 1.38 DIA
TO DEPTH SHOWN
.428
.434
21.000
20.77
19.02
12.000
9.000
1.850
.810
5
3 PLACES
SEE NOTES 6 & 7
.072
.073 DIA THRU
.004 DIA

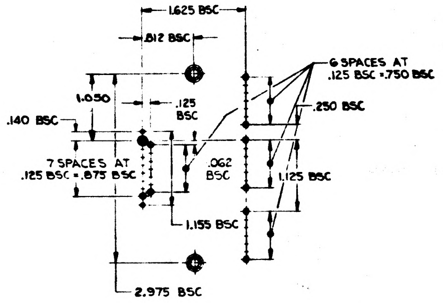
2008332 | REV F | SHEET 2

F-3


16.350
15.750
13.100
11.000
10.150
8.900
.937
2.220
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R TYP
.156
.156 R TYP
19.2 0
11.650
5.550
H
SEE DETAIL H
G
.156 TYP
.156 R TYP
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
4 REF 20 PLACES
3 42 PLACES
.156 R
.375
.186 R TYP
.156 R 2 PLACES
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
21.000
.88
11.628
.810
.375 2 PLACES
.125 BSC
.812 BSC
1.875 BSC
.812 BSC
40 PLACES SEE NOTE 9
F
.812 BSC
.812 BSC
.812 BSC
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
.812 BSC
4.250 BSC
1.875 BSC
1.100
.081 .083 DIA THRU
.004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU
.004 DIA
332 HOLES

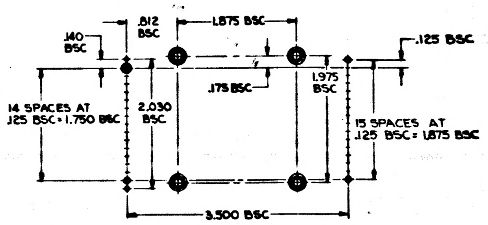
2008332 | REV F | SHEET 2

F-2



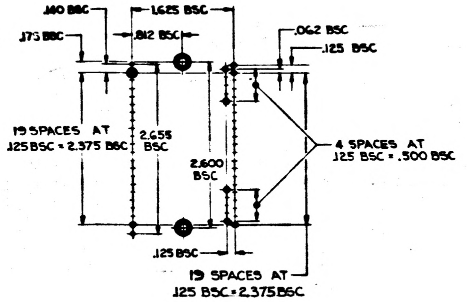
1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

DETAIL A



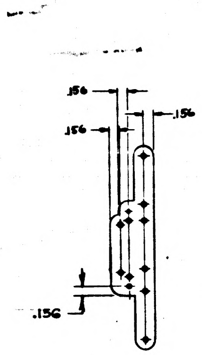
.140 BSC
.812 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

DETAIL B



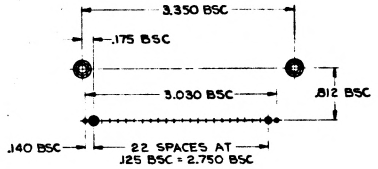
.180 BSC
1.625 BSC
.173 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.655 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

DETAIL C



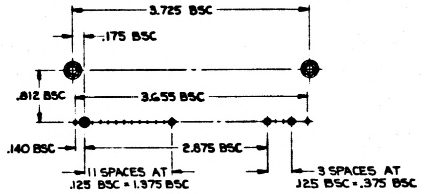
.156
.156
.156
.156

DETAIL H



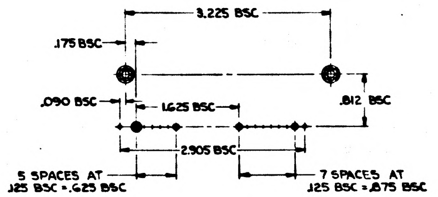
3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

DETAIL D



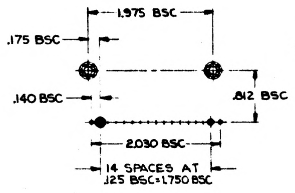
3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

DETAIL E



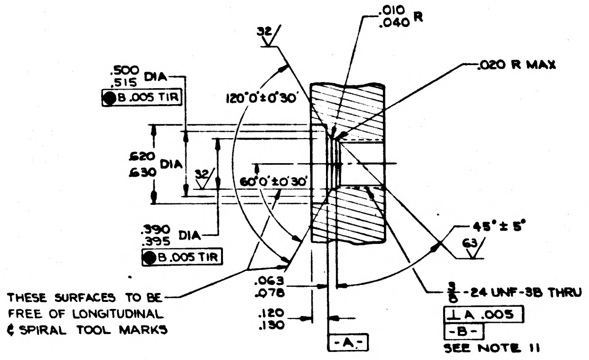
3.225 BSC
.175 BSC
.812 BSC
.090 BSC
1.625 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

DETAIL F



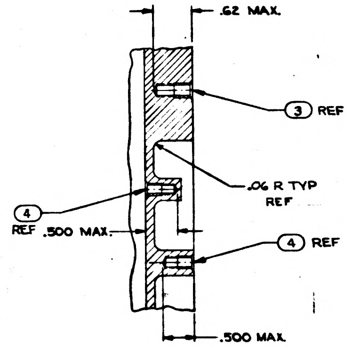
1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

DETAIL G



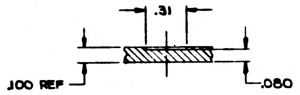
.010
.040 R
32
.020 R MAX
.500
.515 DIA
B .005 TIR
120°0'±0°30'
.620
.630 DIA
32
60°0'±0°30'
45° ± 5°
63
.390
.395 DIA
B .005 TIR
.063
.078
.120
.130
-A-
1/4-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS

SECTION F-F
SCALE 2/1



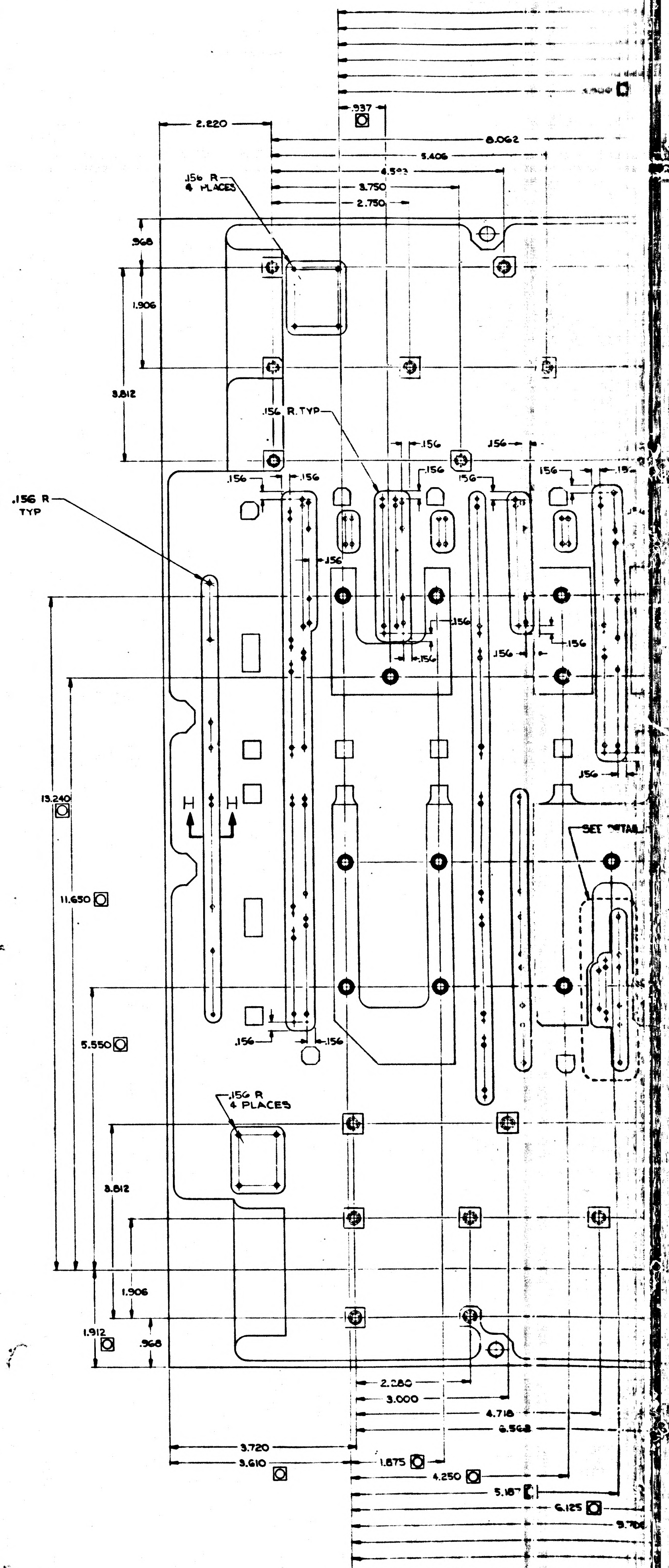
.62 MAX
3 REF
.06 R TYP REF
4 REF .500 MAX
4 REF
.500 MAX

SECTION G-G



.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL



.937
2.220
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R TYP
.156
.156 R TYP
H
H
13.240
11.650
5.550
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.568
3.720
3.610
1.875
4.250
SEE DETAIL

2008332

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM ALLOY, MIL-M-26075 (HK31A-24A) SIZE TO BE 22.630 × 23.100 × 2.880. THIS SIZE IS AS FINISHED OVERALL DIMENSIONS.

CONFIGURATION INCOMPLETE

REVISIONS 19785

SYM	DESCRIPTION	CHG NO.	DATE	APPD.

LIST OF PARTS AND MATERIALS

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ± ±
ANGLES + — −
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT

DRAWN DATE 3 MAY 65
CHECKED Ed Foster 3 MAY 65
APPROVAL
APPROVAL 5/28/65
NASA APPROVAL 6-2-65
MIT APPROVAL 6-2-65

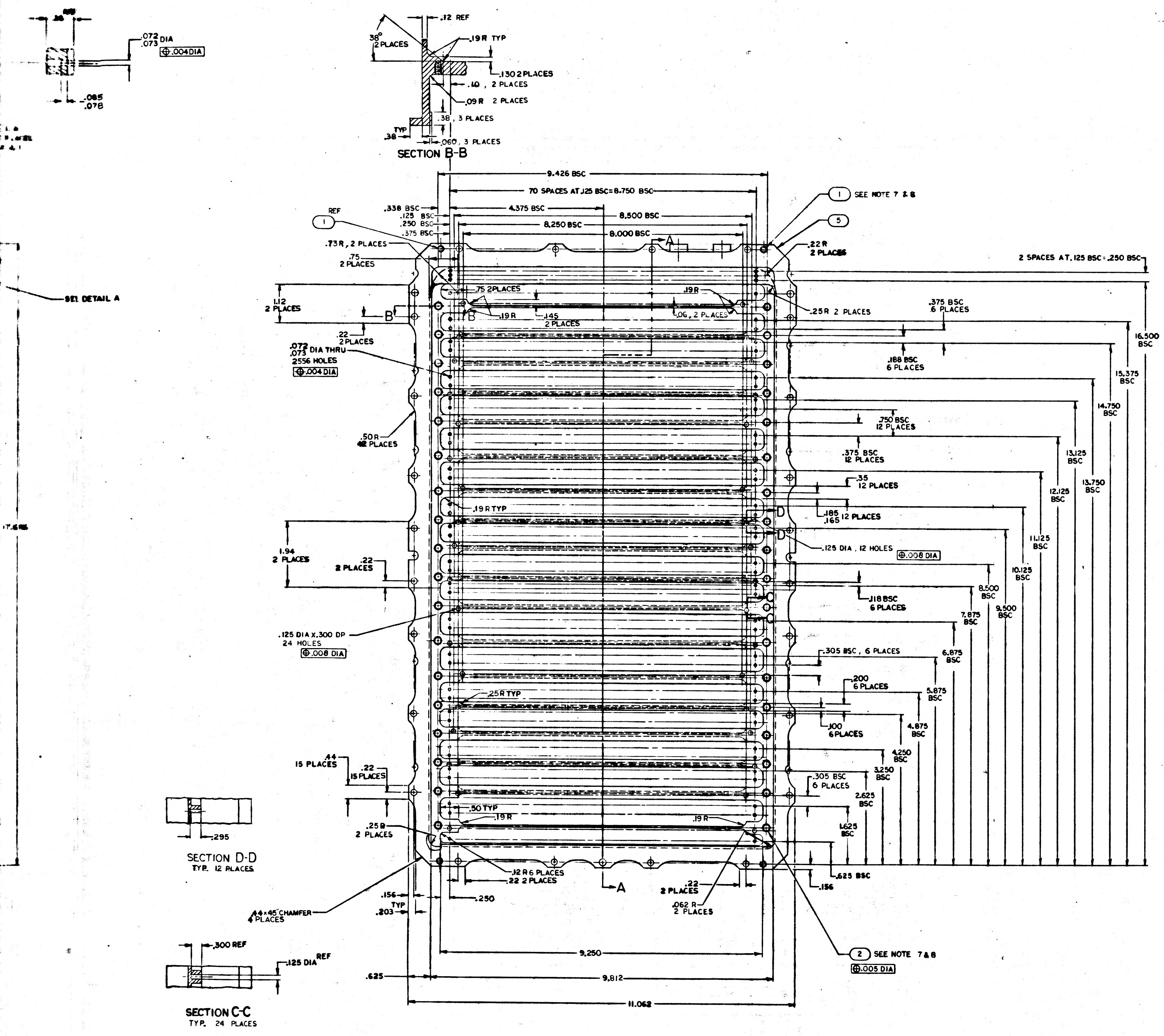
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER, PSA (C/M)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE B
2008332
SCALE —
SHEET 1 OF 1

MIL 1077B-D 11-16-64

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455			7-65	



SECTION B-B
.12 REF
38° 2 PLACES
.19R TYP
.130 2 PLACES
.10, 2 PLACES
.09R 2 PLACES
.38, 3 PLACES
TYP .38
.060, 3 PLACES
.072 DIA .073
⊕ .004 DIA
.085 .078
SEE DETAIL A
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
REF
①
① SEE NOTE 7 & 8
⑤
.73R, 2 PLACES
.75 2 PLACES
.22R 2 PLACES
2 SPACES AT .125 BSC=.250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19R
.145 2 PLACES
.06, 2 PLACES
.25R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 .073 DIA THRU 2556 HOLES
⊕ .004 DIA
.188 BSC 6 PLACES
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50R 48 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
.35 12 PLACES
12.125 BSC
.19R TYP
D
.185 .165 12 PLACES
11.125 BSC
.125 DIA, 12 HOLES
⊕ .008 DIA
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
8.500 BSC
9.500 BSC
.118 BSC 6 PLACES
7.875 BSC
C
.125 DIA X .300 DP 24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.25R TYP
.200 6 PLACES
5.875 BSC
.100 6 PLACES
4.875 BSC
4.250 BSC
3.250 BSC
.44 15 PLACES
.22 15 PLACES
.305 BSC 6 PLACES
2.625 BSC
.50 TYP
.19R
.19R
1.625 BSC
.295
SECTION D-D TYP. 12 PLACES
.25R 2 PLACES
.12R 6 PLACES
.22 2 PLACES
A
.22 2 PLACES
.625 BSC
.156
.062 R 2 PLACES
.44×45° CHAMFER 4 PLACES
.156 TYP .203
.250
② SEE NOTE 7 & 8
⊕ .005 DIA
.300 REF
.125 DIA REF
9.250
.625
9.812
11.062
SECTION C-C TYP. 24 PLACES

Ⓑ REPLACES WORD DRAWING REV A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007085	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

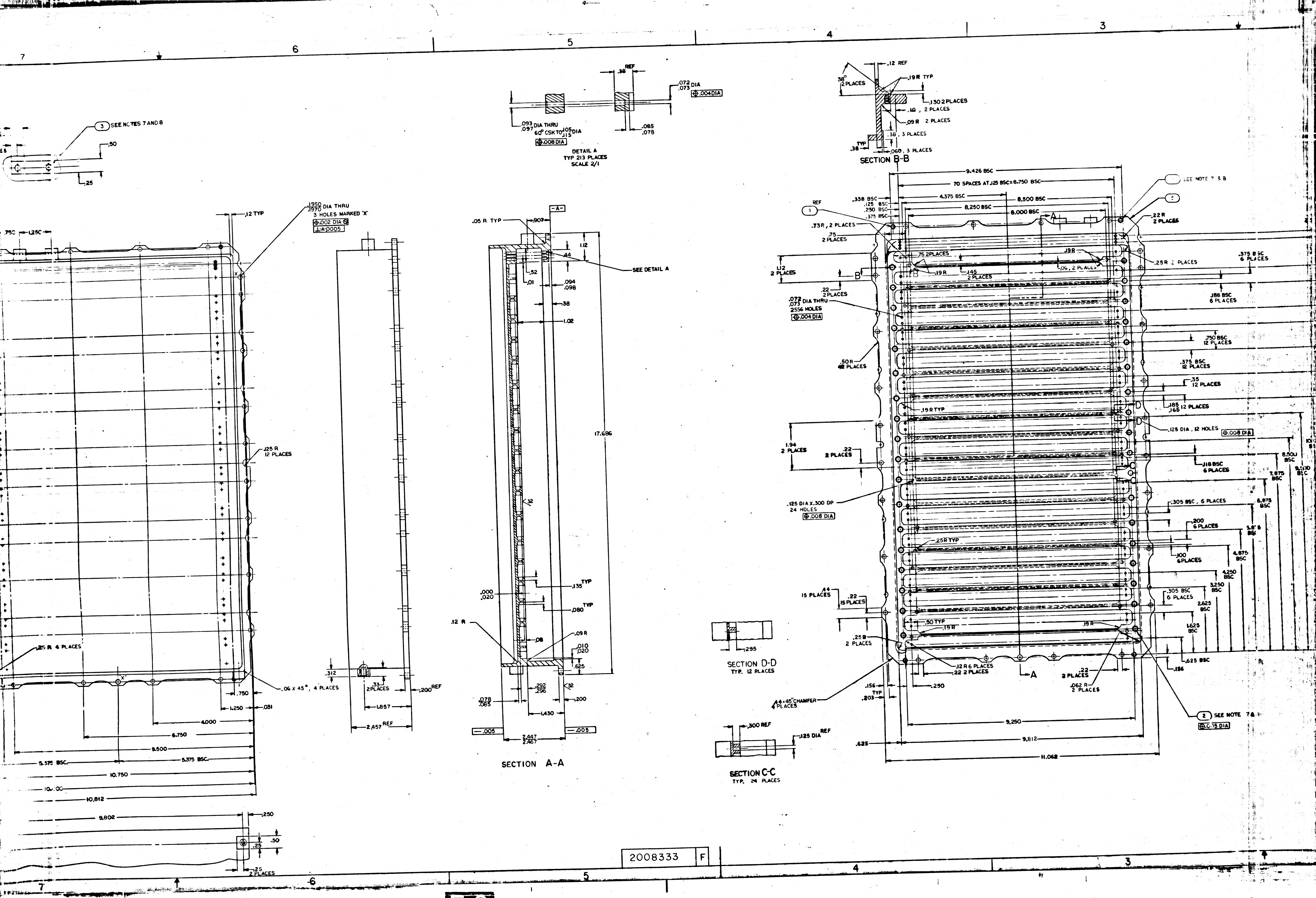
DRAWN De Zenzo 5/10/65
CHECKED 7/16/65
APPROVED 7/16/65
APPROVED 8/2/65
APPROVED MIT W Kupfer
APPROVED MSC 8/10/65
DATE

TRAY S, CDU
INSEP ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008333
SCALE FULL
SHEET 1 OF 1

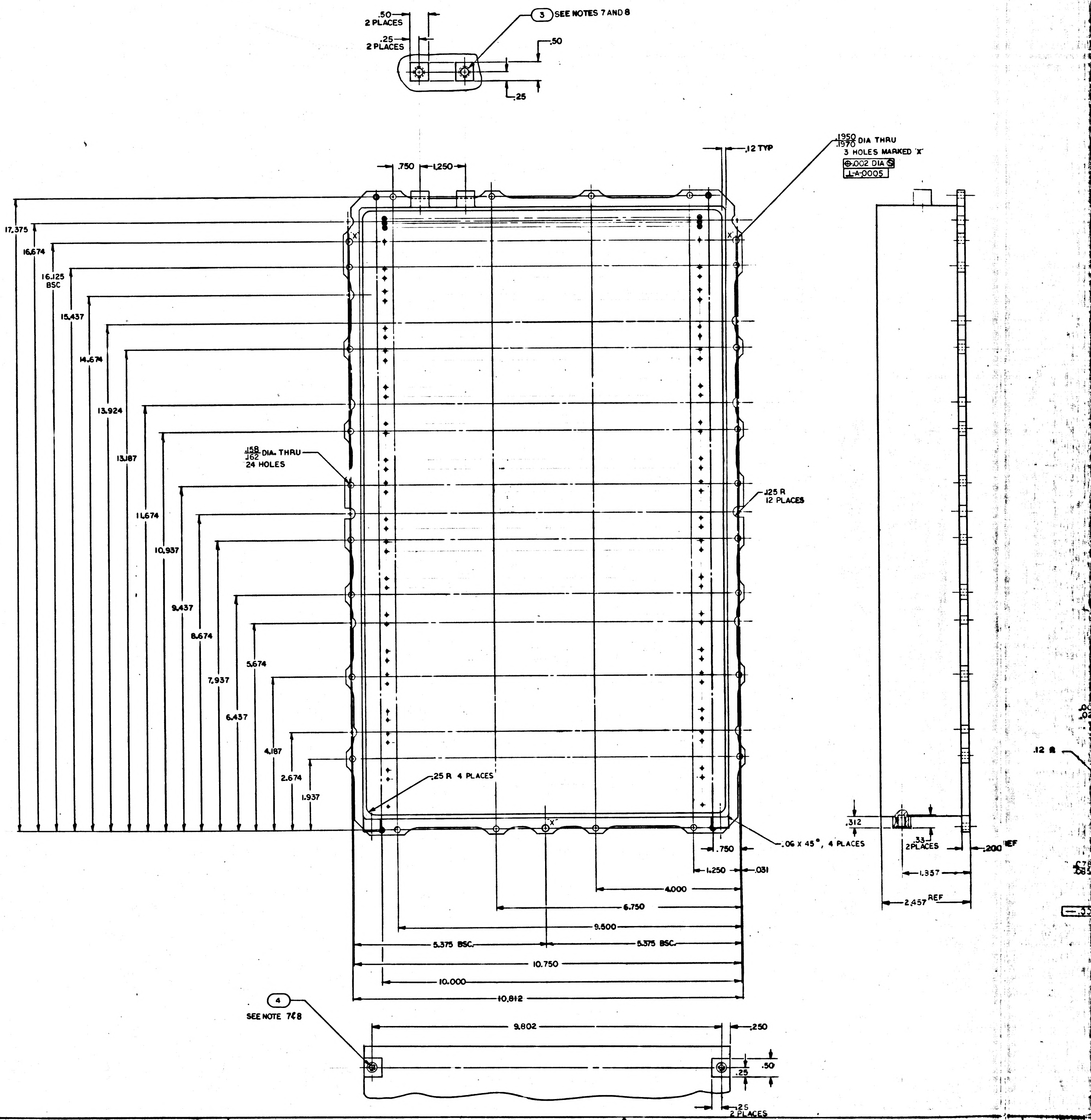
MASTER

2008333 F


7
6
5
4
3
SEE NOTES 7 AND 8
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 DIA THRU
.097
60° CSK TO .105 DIA
.115
.072 DIA
.073
.004 DIA
.008 DIA
SECTION B-B
.12 REF
.19 R TYP
38° 2 PLACES
.130 2 PLACES
.10 , 2 PLACES
.09 R 2 PLACES
.38 , 3 PLACES
.060 , 3 PLACES
.1950 DIA THRU
.1970
3 HOLES MARKED "X"
.002 DIA
-A-0005
.12 TYP
.125 R
12 PLACES
.25 R 4 PLACES
.06 X 45°, 4 PLACES
4.000
6.750
9.500
5.375 BSC
10.750
10.812
9.802
.750
1.250
.031
.250
.50
.25
.25 2 PLACES
.312
.33 2 PLACES
1.857
2.457 REF
.200 REF
SECTION A-A
.05 R TYP
.907
SEE DETAIL A
.12
.44
.52
.01
.094
.098
.38
1.02
17.686
.32
.135 TYP
.080 TYP
.000
.020
.12 R
.08
.09 R
.010
.020
.625
.078
.085
.292
.296
1.430
.200
.005
2.447
2.467
SECTION D-D
TYP. 12 PLACES
.295
SECTION C-C
TYP. 24 PLACES
.300 REF
.125 DIA REF
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
SEE NOTE 7 & 8
.22 R
2 PLACES
.73 R, 2 PLACES
.75
2 PLACES
.75 2 PLACES
.19 R
.145
2 PLACES
.06 , 2 PLACES
.25 R 2 PLACES
.375 BSC
6 PLACES
1.12
2 PLACES
.22
2 PLACES
.072 DIA THRU
.073
2556 HOLES
.004 DIA
.188 BSC
6 PLACES
.750 BSC
12 PLACES
.375 BSC
12 PLACES
.50 R
48 PLACES
.35
12 PLACES
.185
.165 12 PLACES
.19 R TYP
.125 DIA , 12 HOLES
.008 DIA
1.94
2 PLACES
.118 BSC
6 PLACES
8.500
BSC
7.875
BSC
.125 DIA X .300 DP
24 HOLES
.008 DIA
.305 BSC , 6 PLACES
6.875
BSC
.200
6 PLACES
.25 R TYP
.100
6 PLACES
4.875
BSC
4.250
BSC
3.250
BSC
2.625
BSC
1.625
BSC
.625 BSC
.44
15 PLACES
.22
15 PLACES
.50 TYP
.25 R
2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.156
TYP
.203
.250
.44 x 45° CHAMFER
4 PLACES
.22
2 PLACES
.062 R
2 PLACES
.156
SEE NOTE 7 & 8
9.250
9.812
.625
11.068
A
B
D
REF

2008333 | F

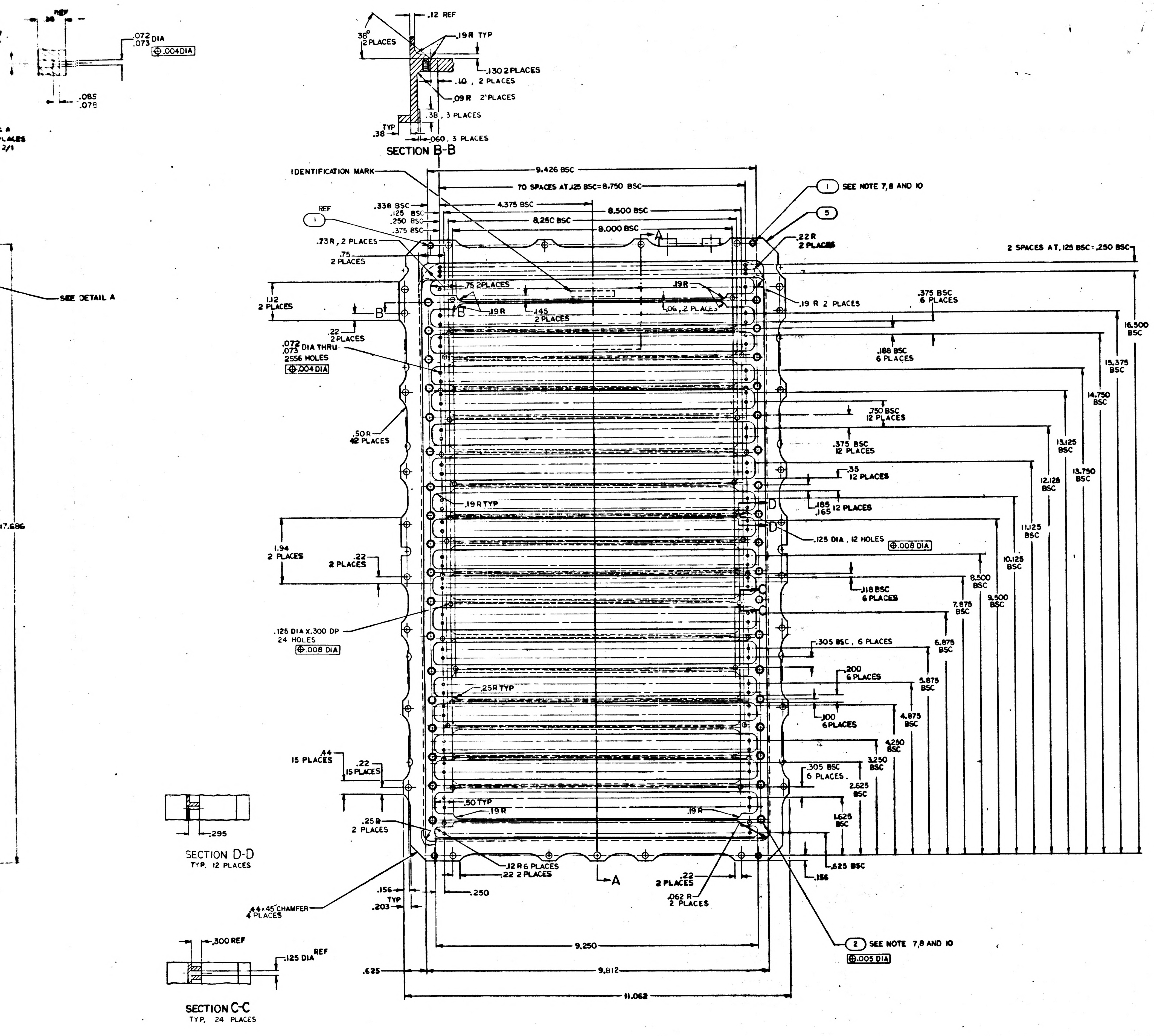
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.50 2 PLACES
.25 2 PLACES
3 SEE NOTES 7 AND 8
.50
.25
.750
1.250
.12 TYP
.1950 .1970 DIA THRU
3 HOLES MARKED 'X'
⊕.002 DIA Ⓢ
⊥-A-.0005
X
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
.158 .162 DIA. THRU
24 HOLES
.125 R
12 PLACES
.25 R 4 PLACES
.06 X 45°, 4 PLACES
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
.312
.33 2PLACES
.200 REF
1.357
2.457 REF
.12 R
4
SEE NOTE 7&8
9.802
.250
.50
.25
.25 2 PLACES

NOTES:
1. INTERPERT DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR YELLOW
8. INSTALL FIND NO. 1, 2, 3 AND 4 PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG
9. IDENTIFY WITH PART NO. PER ND1002019

2008333	F

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455				
G		REVISED PER TDRR 22502			9-2-65	


REF
.072
.073 DIA
⊕.004DIA
.085
.078
SEE DETAIL A
.12 REF
38°
2 PLACES
.19R TYP
.130 2 PLACES
.10 , 2 PLACES
.09R 2 PLACES
.38 , 3 PLACES
TYP
.38
.060, 3 PLACES
SECTION B-B
IDENTIFICATION MARK
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
REF
1
.73R, 2 PLACES
.75
2 PLACES
1 SEE NOTE 7,8 AND 10
5
.22R
2 PLACES
.75 2PLACES
.19R
.19R
.145
2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
1.12
2 PLACES
B
B
.22
2 PLACES
.072
.073 DIA THRU
2556 HOLES
⊕.004 DIA
.50R
42 PLACES
2 SPACES AT .125 BSC=.250 BSC
.375 BSC
6 PLACES
.188 BSC
6 PLACES
16.500
BSC
15.375
BSC
14.750
BSC
.750 BSC
12 PLACES
.375 BSC
12 PLACES
13.125
BSC
13.750
BSC
.35
12 PLACES
12.125
BSC
.19R TYP
.185
.165 12 PLACES
D
D
11.125
BSC
.125 DIA , 12 HOLES
⊕.008 DIA
10.125
BSC
1.94
2 PLACES
.22
2 PLACES
8.500
BSC
.118 BSC
6 PLACES
9.500
BSC
7.875
BSC
.125 DIA X.300 DP
24 HOLES
⊕.008 DIA
.305 BSC , 6 PLACES
6.875
BSC
.200
6 PLACES
5.875
BSC
.25R TYP
.100
6 PLACES
4.875
BSC
4.250
BSC
.44
15 PLACES
.22
15 PLACES
3.250
BSC
.305 BSC
6 PLACES.
2.625
BSC
1.625
BSC
.50 TYP
.19R
.19R
.25R
2 PLACES
.295
SECTION D-D
TYP. 12 PLACES
.12R 6 PLACES
.22 2 PLACES
A
.22
2 PLACES
.062 R
2 PLACES
.625 BSC
.156
.44x45° CHAMFER
4 PLACES
.156
TYP
.203
.250
2 SEE NOTE 7,8 AND 10
⊕.005 DIA
.300 REF
.125 DIA REF
9,250
.625
9,812
11.062
SECTION C-C
TYP. 24 PLACES

Ⓑ REPLACES WORD DRAWING REV A

MASTER

1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007085	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.005 .XX ±.01 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN De Zenzo 5/10/65
CHECKED
APPROVED
APPROVED 8/5/65
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY S, CDU
INSEPERABLE ASSEMBLY

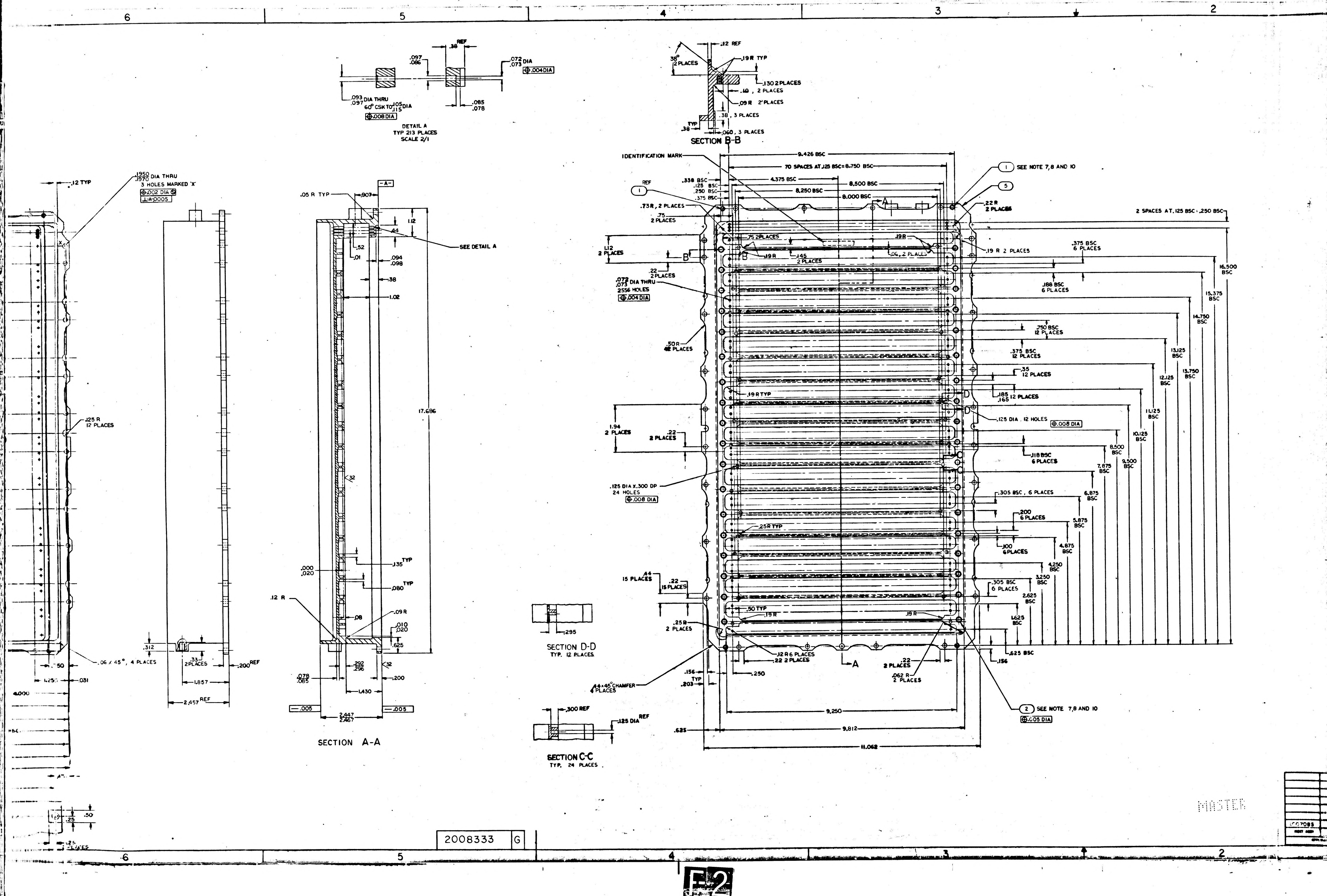
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008333

SCALE FULL SHEET 1 OF 1

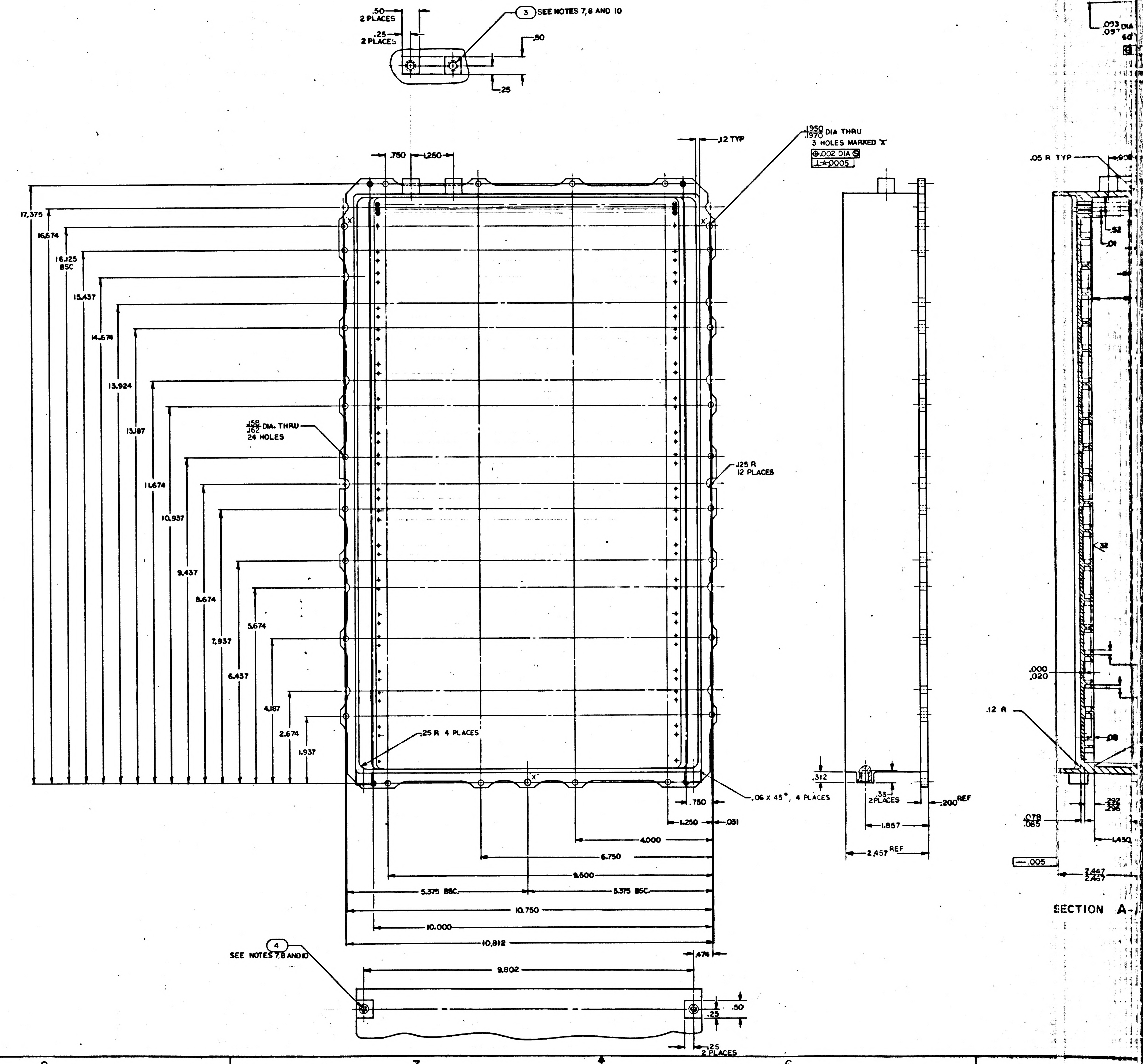
2008333 G

11333 G

F-3

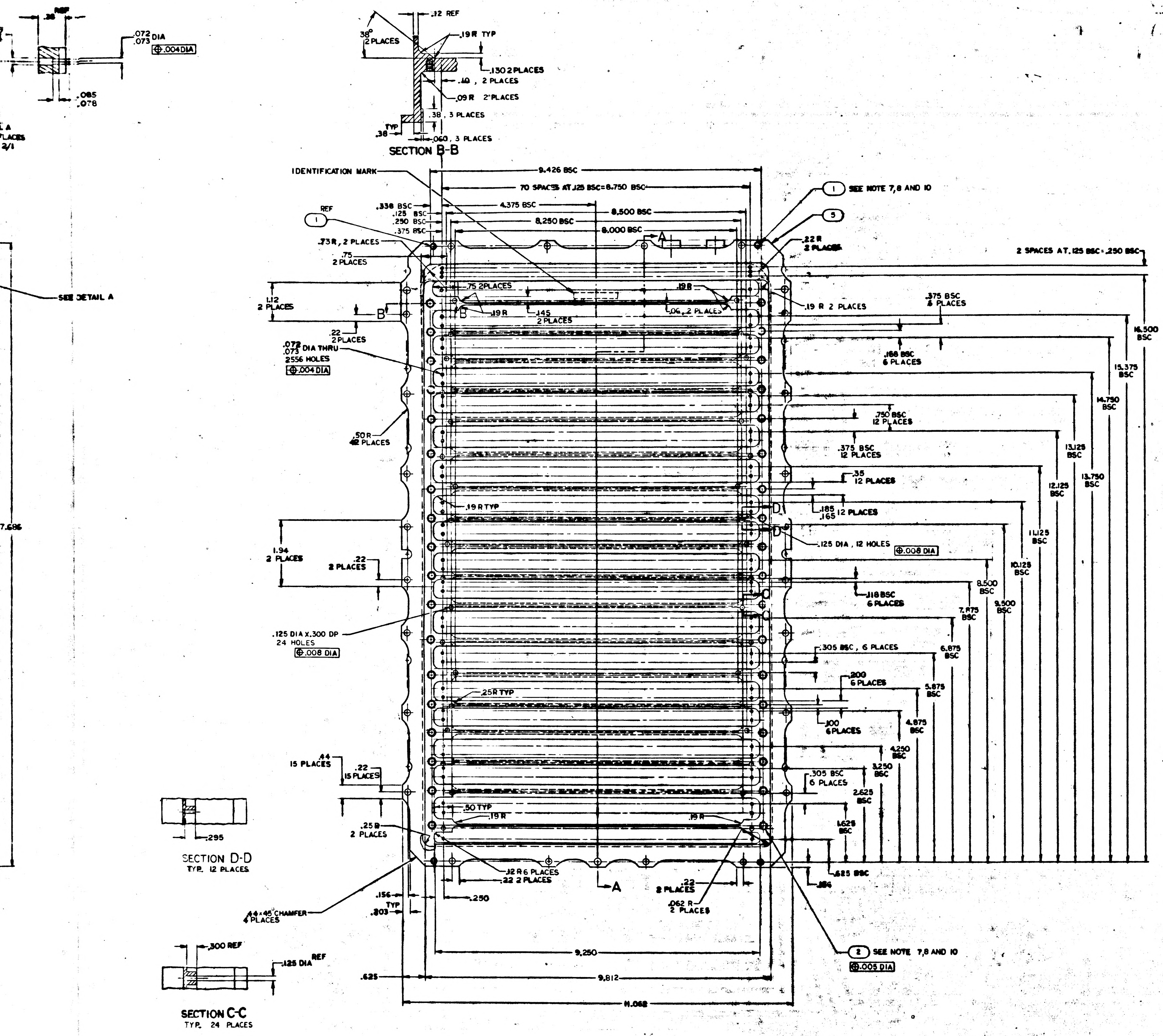
6
5
4
3
2
.097
.086
REF
.38
.072
.073 DIA
⊕.004DIA
.093
.097 DIA THRU
60° CSK TO .105
.115 DIA
⊕.008DIA
.085
.078
DETAIL A
TYP 213 PLACES
SCALE 2/1
38°
2 PLACES
.12 REF
.19R TYP
.130 2 PLACES
.10 , 2 PLACES
.09R 2 PLACES
.38 , 3 PLACES
TYP
.38
.060 , 3 PLACES
SECTION B-B
.1950
.1970 DIA THRU
3 HOLES MARKED 'X'
⊕.002 DIA Ⓢ
⊥-A-.0005
.12 TYP
X
.125 R
12 PLACES
.06 X 45°, 4 PLACES
.50
1.250
.031
4.000
.25
.50
.25
PLACES
.312
.33
2 PLACES
.200 REF
1.857
2.457 REF
-A-
.05 R TYP
.907
1.12
.44
SEE DETAIL A
.52
.01
.094
.098
.38
1.02
17.686
32
.135 TYP
.000
.020
.080 TYP
.12 R
.08
.09 R
.010
.020
.625
.292
.296
32
.078
.085
.200
1.430
—.005
2.447
2.467
—.005
SECTION A-A
.295
SECTION D-D
TYP. 12 PLACES
.300 REF
.125 DIA REF
SECTION C-C
TYP. 24 PLACES
IDENTIFICATION MARK
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
REF
1
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
.73R , 2 PLACES
.75
2 PLACES
1.12
2 PLACES
B
.75 2 PLACES
.19R
B
.19R
.145
2 PLACES
.06 , 2 PLACES
.22
2 PLACES
.072
.073 DIA THRU
2556 HOLES
⊕.004 DIA
.50 R
42 PLACES
.19 R TYP
1.94
2 PLACES
.22
2 PLACES
D
D
.125 DIA X.300 DP
24 HOLES
⊕.008 DIA
.25R TYP
.44
15 PLACES
.22
15 PLACES
.50 TYP
.19 R
.19 R
.25 R
2 PLACES
.12 R 6 PLACES
.22 2 PLACES
A
.22
2 PLACES
.062 R
2 PLACES
.44 x 45° CHAMFER
4 PLACES
.156
TYP
.203
.250
9.250
.625
9.812
11.062
1
SEE NOTE 7,8 AND 10
5
.22 R
2 PLACES
.19 R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
.375 BSC
6 PLACES
.188 BSC
6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
.750 BSC
12 PLACES
.375 BSC
12 PLACES
13.125 BSC
13.750 BSC
.35
12 PLACES
12.125 BSC
.185
.165 12 PLACES
.125 DIA . 12 HOLES
⊕.008 DIA
11.125 BSC
10.125 BSC
.118 BSC
6 PLACES
8.500 BSC
9.500 BSC
7.875 BSC
.305 BSC , 6 PLACES
6.875 BSC
.200
6 PLACES
5.875 BSC
.100
6 PLACES
4.875 BSC
4.250 BSC
3.250 BSC
.305 BSC
6 PLACES
2.625 BSC
1.625 BSC
.625 BSC
.156
2
SEE NOTE 7,8 AND 10
⊕.005 DIA
MASTER
2008333
G
E-2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


3 SEE NOTES 7,8 AND 10
.50 2 PLACES
.25 2 PLACES
.50
.25
.12 TYP
.750
1.250
.1950 .1970 DIA THRU 3 HOLES MARKED 'X'
.002 DIA
A .0005
.05 R TYP
.093 DIA
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
5.674
6.437
4.187
2.674
1.937
.158 .162 DIA. THRU 24 HOLES
.125 R 12 PLACES
.25 R 4 PLACES
.06 X 45°, 4 PLACES
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
.474
4 SEE NOTES 7,8 AND 10
9.802
.50
.25
.25 2 PLACES
.000 .020
.12 R
.52
.08
.078 .085
.232 .236
1.450
.005
2.447 2.427
SECTION A-

NOTES:
1. INTERPERT DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1, 2, 3 AND 4 WET PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG
9. IDENTIFY WITH PART NO. PER ND1002019
10 HOLES FOR FIND NO. 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455			7-65	WK
G		REVISED PER TDRR 22502	ETS	LSB	9-21-65	[illegible]
H		REVISED PER TDRR 23112	SSF	ARC	[illegible]	WK



.072 DIA
.073
⊕ .004 DIA
.085
.078
SEE DETAIL A
7.686
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10, 2 PLACES
.09 R 2 PLACES
.38, 3 PLACES
.38 TYP
.060, 3 PLACES
SECTION B-B
IDENTIFICATION MARK
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
① SEE NOTE 7, 8 AND 10
⑤
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
.22 R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
REF
①
.73 R, 2 PLACES
.75 2 PLACES
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.145 2 PLACES
.198
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 DIA THRU
.073
2556 HOLES
⊕ .004 DIA
.168 BSC 6 PLACES
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50 R 42 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
12.125 BSC
.35 12 PLACES
.185 .165 12 PLACES
.19 R TYP
D
11.125 BSC
.125 DIA, 12 HOLES ⊕ .008 DIA
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
8.500 BSC
9.500 BSC
.118 BSC 6 PLACES
7.875 BSC
C
.125 DIA x .300 DP
24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.200 6 PLACES
.25 R TYP
5.875 BSC
.100 6 PLACES
4.875 BSC
.44 15 PLACES
.22 15 PLACES
4.250 BSC
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.295
SECTION D-D
TYP. 12 PLACES
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.22 2 PLACES
.062 R 2 PLACES
.625 BSC
.184
A
.250
.44 x 45° CHAMFER 4 PLACES
.156 TYP
.803
② SEE NOTE 7, 8 AND 10
⊕ .005 DIA
.300 REF
.125 DIA REF
9.250
.625
9.812
11.062
SECTION C-C
TYP. 24 PLACES

ⒷREPLACES WORD DRAWING REV A

1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2007085	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

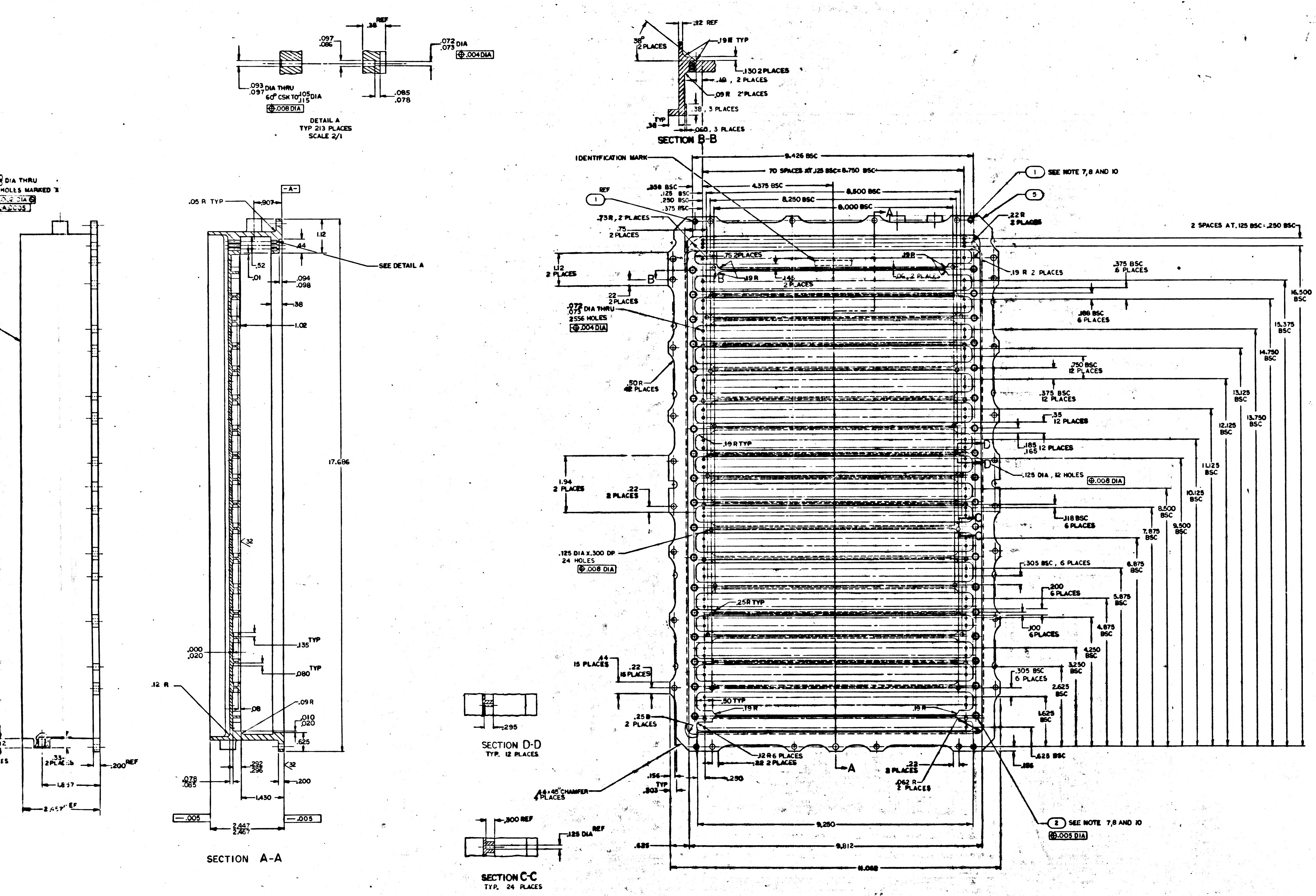
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN De Zengo 5/4/65
CHECKED [illegible]
APPROVED [illegible]
APPROVED [illegible]
APPROVED MIT W. Haffer
APPROVED MSC [illegible]

TRAY S, CDU
INSEPERABLE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008333
SCALE FULL
SHEET OF

2008333 H


DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
.097 .086
.38 REF
.072 .073 DIA
⊕ .004 DIA
.085 .078
SECTION B-B
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10, 2 PLACES
.09 R 2 PLACES
.38, 3 PLACES
.060, 3 PLACES
.38 TYP
SECTION A-A
.05 R TYP
.907
-A-
1.12
.44
.52
.01
.094 .098
.38
1.02
SEE DETAIL A
17.686
.32
.135 TYP
.080 TYP
.000 .020
.12 R
.08
.09 R
.010 .020
.625
.292 .236
.32
.078 .085
.200
1.430
2.447 2.467
.005
DIA THRU
HOLES MARKED
2 PLACES
1.857
2.457 REF
.200 REF
SECTION D-D
TYP. 12 PLACES
.295
SECTION C-C
TYP. 24 PLACES
.300 REF
.125 DIA REF
IDENTIFICATION MARK
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
4.375 BSC
8.250 BSC
8.500 BSC
8.000 BSC
.358 BSC
.125 BSC
.250 BSC
.375 BSC
① REF
① SEE NOTE 7, 8 AND 10
⑤
.22 R 2 PLACES
.73 R, 2 PLACES
.75 2 PLACES
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.06, 2 PLACES
.145 2 PLACES
.19 R 2 PLACES
22 2 PLACES
.072 .073 DIA THRU
2556 HOLES
⊕ .004 DIA
2 SPACES AT .125 BSC = .250 BSC
.375 BSC 6 PLACES
.188 BSC 6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
13.125 BSC
13.750 BSC
12.125 BSC
11.125 BSC
10.125 BSC
9.500 BSC
8.500 BSC
7.875 BSC
6.875 BSC
5.875 BSC
4.875 BSC
4.250 BSC
3.250 BSC
2.625 BSC
1.625 BSC
.625 BSC
.750 BSC 12 PLACES
.375 BSC 12 PLACES
.35 12 PLACES
.185 .165 12 PLACES
D
.125 DIA, 12 HOLES
⊕ .008 DIA
.50 R 48 PLACES
.19 R TYP
1.94 2 PLACES
.22 2 PLACES
.118 BSC 6 PLACES
.125 DIA X .300 DP
24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
.200 6 PLACES
.100 6 PLACES
.25 R TYP
.44 15 PLACES
.22 16 PLACES
.305 BSC 6 PLACES
.50 TYP
.19 R
.25 D 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.22 2 PLACES
A
.062 R 2 PLACES
.156
.44 x 45° CHAMFER 4 PLACES
.156 TYP
.303
.250
② SEE NOTE 7, 8 AND 10
⊕ .005 DIA
9.250
9.812
11.068
.625
Ⓑ REPLACE

1	2008333-3
2	MS21209-C
	MS212C3 F1
36	MS21209C08
4	MS2 C8
QTY REQD	PART OR IDENTIFYING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XXX ± .005 ± 1/2
.XX ± .01
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007085	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION
CAMBRIDGE

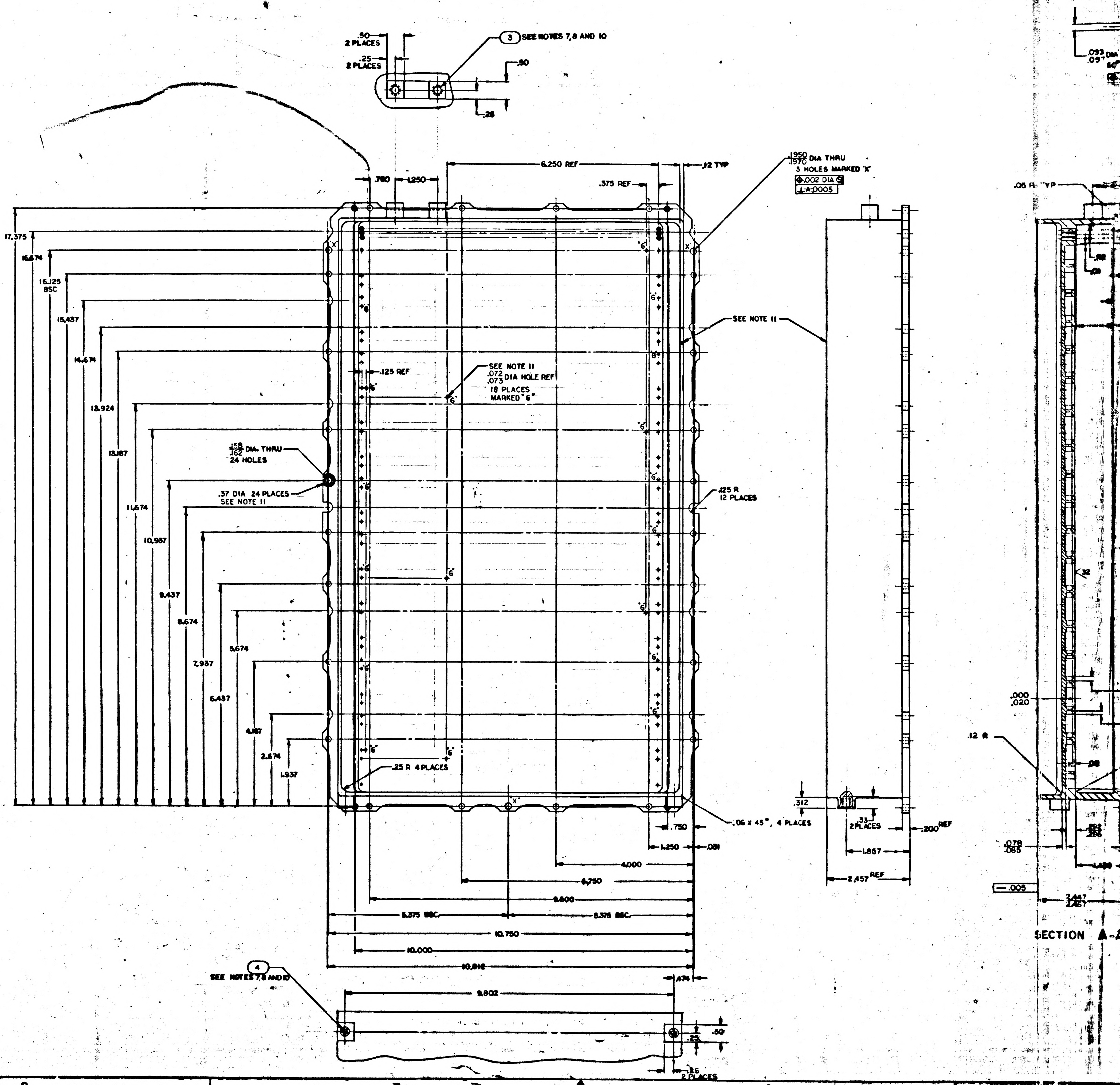
DRAWN De Zengo
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASC

MASTER

2008333 H

F-2

[illegible]

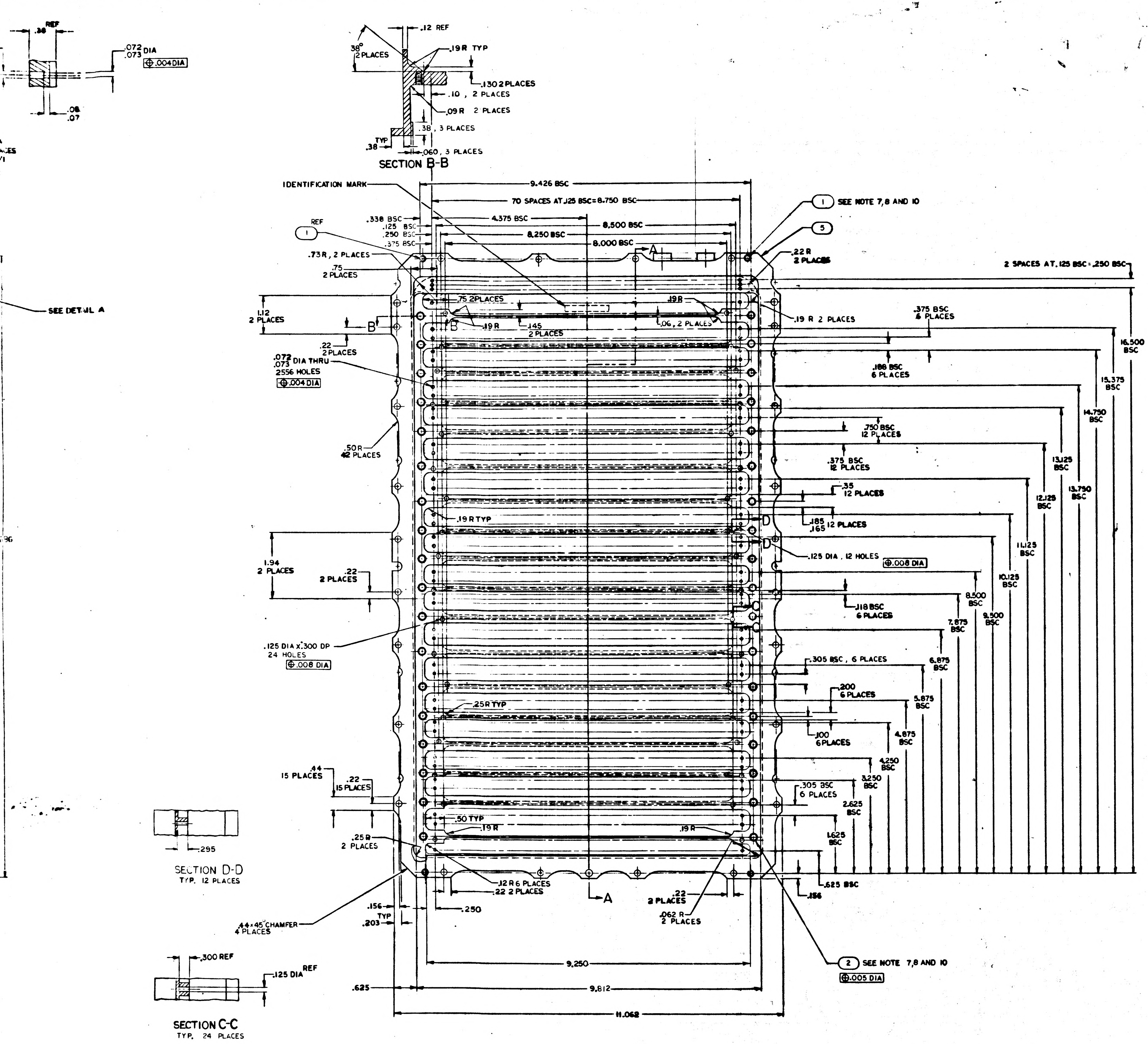

.50
2 PLACES
.25
2 PLACES
3 SEE NOTES 7,8 AND 10
.50
.25
.780
1.250
6.250 REF
.375 REF
.12 TYP
.1950
.1970 DIA THRU
3 HOLES MARKED 'X'
⊕ .002 DIA Ⓢ
⊥ A .0005
"X"
"6"
17.375
16.674
16.125
BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
.125 REF
SEE NOTE 11
.072
.073 DIA HOLE REF
18 PLACES
MARKED "6"
.158
.162 DIA. THRU
24 HOLES
.37 DIA 24 PLACES
SEE NOTE 11
SEE NOTE 11
.125 R
12 PLACES
.25 R 4 PLACES
.06 X 45°, 4 PLACES
.750
1.250
.081
4.000
6.750
9.600
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
.474
4
SEE NOTES 7,8 AND 10
9.802
.50
.25
.25
2 PLACES
.312
.33
2 PLACES
.200 REF
1.857
2.457 REF
.05 R TYP
.093
.097 DIA
60°
.000
.020
.12 R
.08
.078
.085
.005
2.447
2.467
SECTION A-A

NOTES:
1. INTERPERT DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1, 2, 3 AND 4 WET PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG THE SURFACES OF FIND NO. 1, 2, 3 AND 4 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1, 2, 3 AND 4 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED & DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1, 2, 3 & 4 THREADS
9. IDENTIFY WITH PART NO. PER ND1002019
10. HOLES FOR FIND NO. 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE
11. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE IRIDITE PER ND1002040 (DO NOT EPOXY COAT)

2008333	H

24970

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS						
F		REPLACES WORD DRAWING REV E PER TDRR 21455				
G		REVISED PER TDRR 22502			9-24-65	
H		REVISED PER TDRR 23112			1 Oct 65	
J		REVISED PER TDRR 24362				
K		REVISED PER TDRR 24970				



4
3
2
1
.38 REF
.072 .073 DIA
⊕ .004 DIA
.08 .07
SEE DETAIL A
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10, 2 PLACES
.09 R 2 PLACES
.38, 3 PLACES
.060, 3 PLACES
.38 TYP
SECTION B-B
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
IDENTIFICATION MARK
① SEE NOTE 7, 8 AND 10
⑤
① REF
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
1.12 2 PLACES
.75 2 PLACES
.19 R
B
.145 2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 .073 DIA THRU 2556 HOLES
⊕ .004 DIA
.188 BSC 6 PLACES
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50 R 42 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
.35 12 PLACES
12.125 BSC
.19 R TYP
.185 .165 12 PLACES
D
D
1.94 2 PLACES
.22 2 PLACES
.125 DIA, 12 HOLES
⊕ .008 DIA
11.125 BSC
10.125 BSC
.118 BSC 6 PLACES
8.500 BSC
9.500 BSC
7.875 BSC
.125 DIA x .300 DP 24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.200 6 PLACES
5.875 BSC
.25 R TYP
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
.305 BSC 6 PLACES
3.250 BSC
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
A
.625 BSC
.156
.295
SECTION D-D TYP. 12 PLACES
.44 x 45° CHAMFER 4 PLACES
.156 TYP .203
.250
.22 2 PLACES
.062 R 2 PLACES
② SEE NOTE 7, 8 AND 10
⊕ .005 DIA
.300 REF
.125 DIA REF
9.250
.625
9.812
11.062
SECTION C-C TYP. 24 PLACES

Ⓑ REPLACES WORD DRAWING REV A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, REW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, REW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, REW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, REW THREAD	1

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2007085	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.005 .XX ±.01 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN De Zengo 5/10/65
CHECKED
APPROVED
APPROVED 8/5/65
APPROVED MIT W Kupfer
APPROVED MSC
DATE

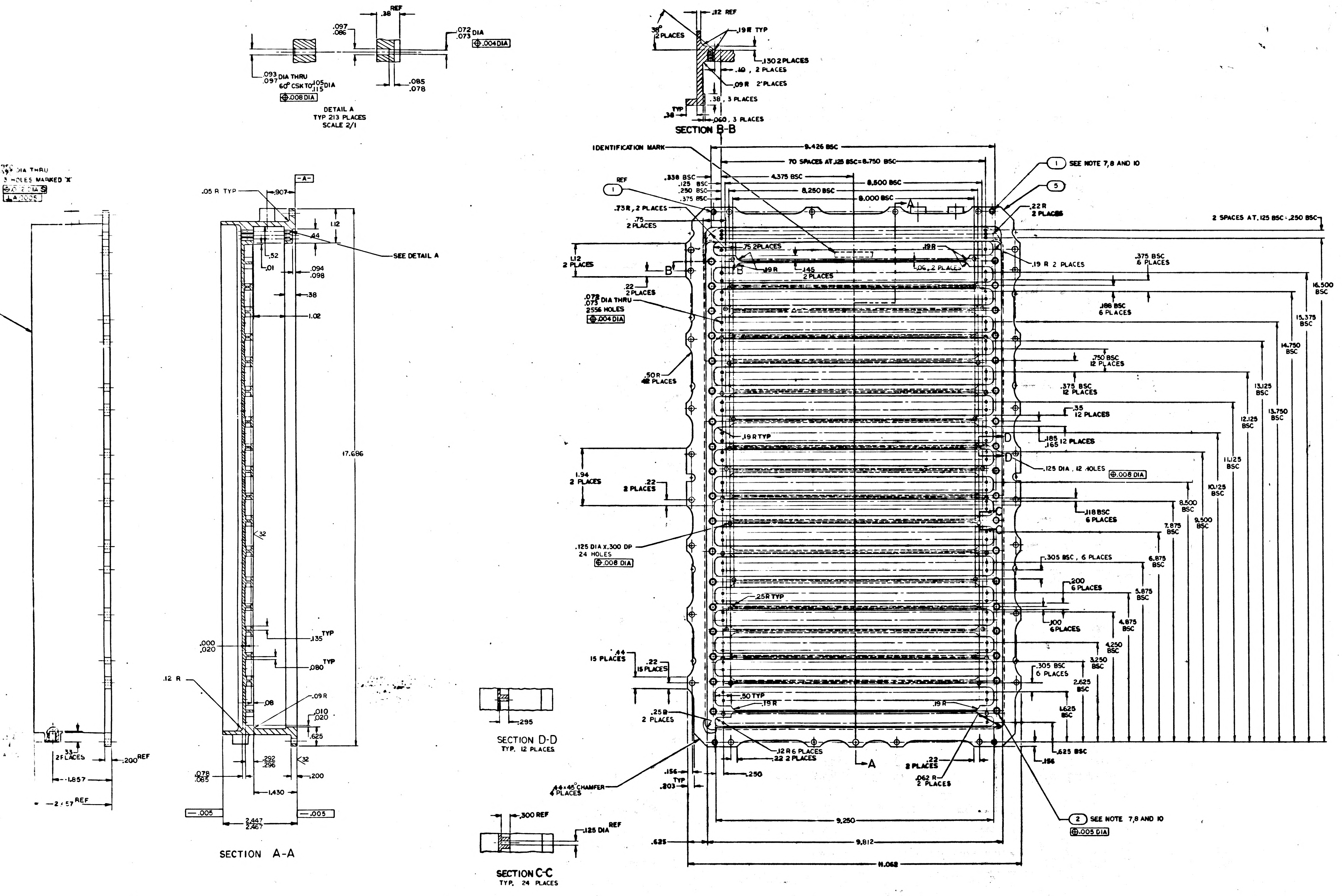
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY S, CDU
I SEPE ABL ASSEMBLY

CODE IDENT NO 8023
SIZE J
DRAWING NO. 20 8333
SCALE FUL
SHEET 1 OF 1

2008333 K

F-3



.097
.086
.38 REF
.072
.073 DIA
⊕ .004 DIA
.093
.097 DIA THRU
60° CSK TO .105
.115 DIA
⊕ .008 DIA
.085
.078
DETAIL A
TYP 213 PLACES
SCALE 2/1
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10, 2 PLACES
.09 R 2 PLACES
.38, 3 PLACES
TYP
.38
.060, 3 PLACES
SECTION B-B
DIA THRU
3 HOLES MARKED 'X'
.05 R TYP
.907
-A-
1.12
.44
SEE DETAIL A
.52
.01
.094
.098
.38
1.02
17.686
32
.000
.020
.135 TYP
.080 TYP
.12 R
.08
.09 R
.010
.020
.625
33
2 PLACES
.200 REF
-1.857
2.457 REF
.078
.085
.292
.296
32
.200
1.430
.005
2.447
2.467
.005
SECTION A-A
IDENTIFICATION MARK
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
① SEE NOTE 7,8 AND 10
⑤
REF
①
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.19 R
.145 2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
.22 2 PLACES
.078
.073 DIA THRU
2556 HOLES
⊕ .004 DIA
.188 BSC 6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
.50 R 48 PLACES
.750 BSC 12 PLACES
13.125 BSC
.375 BSC 12 PLACES
13.750 BSC
.35 12 PLACES
12.125 BSC
.19 R TYP
.185
.165 12 PLACES
D
D
.125 DIA, 12 HOLES
⊕ .008 DIA
11.125 BSC
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
8.500 BSC
.118 BSC 6 PLACES
7.875 BSC
9.500 BSC
C
C
.125 DIA X .300 DP
24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.25 R TYP
.200 6 PLACES
5.875 BSC
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
A
.22 2 PLACES
.062 R 2 PLACES
.625 BSC
.156
.156 TYP
.203
.250
.44 x 45° CHAMFER 4 PLACES
② SEE NOTE 7,8 AND 10
⊕ .005 DIA
9.250
.625
9.812
11.062
.295
SECTION D-D
TYP. 12 PLACES
.300 REF
.125 DIA REF
SECTION C-C
TYP. 24 PLACES
5
4
3
2

Ⓑ REPLA

1	2008333
2	MS 2.209
	MS 21209
16	MS 21209
QTY REQD	

MASTER

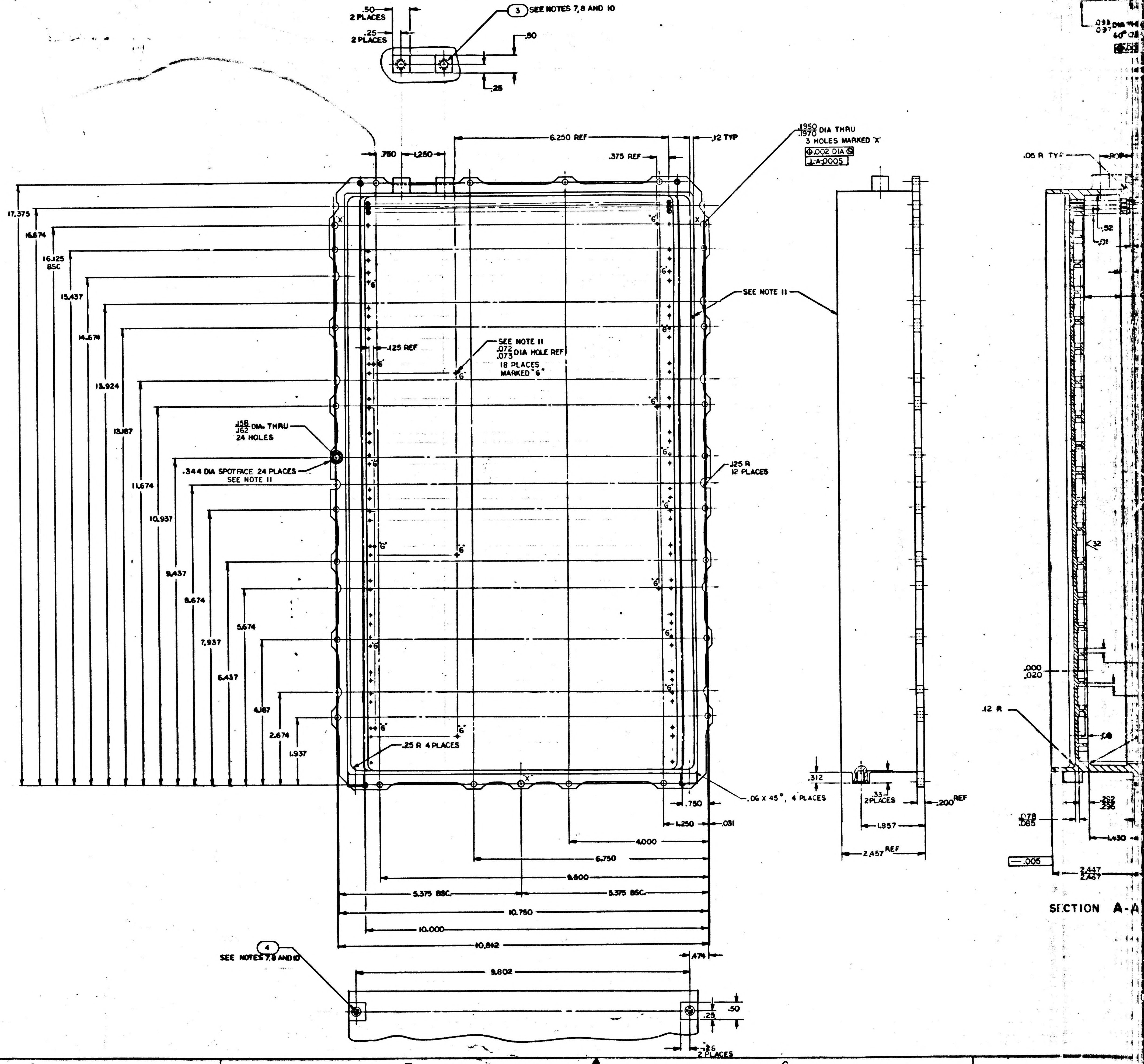
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — .XXX ± .XX ± ± 1/2 DO NOT SCALE THIS DRAWING
		MATERIAL SEE NOTE
2007085		
NEXT ASSY	USED ON	
APPLICATION		

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED
MIT
APPROVED
NASA

2008333 K

F2

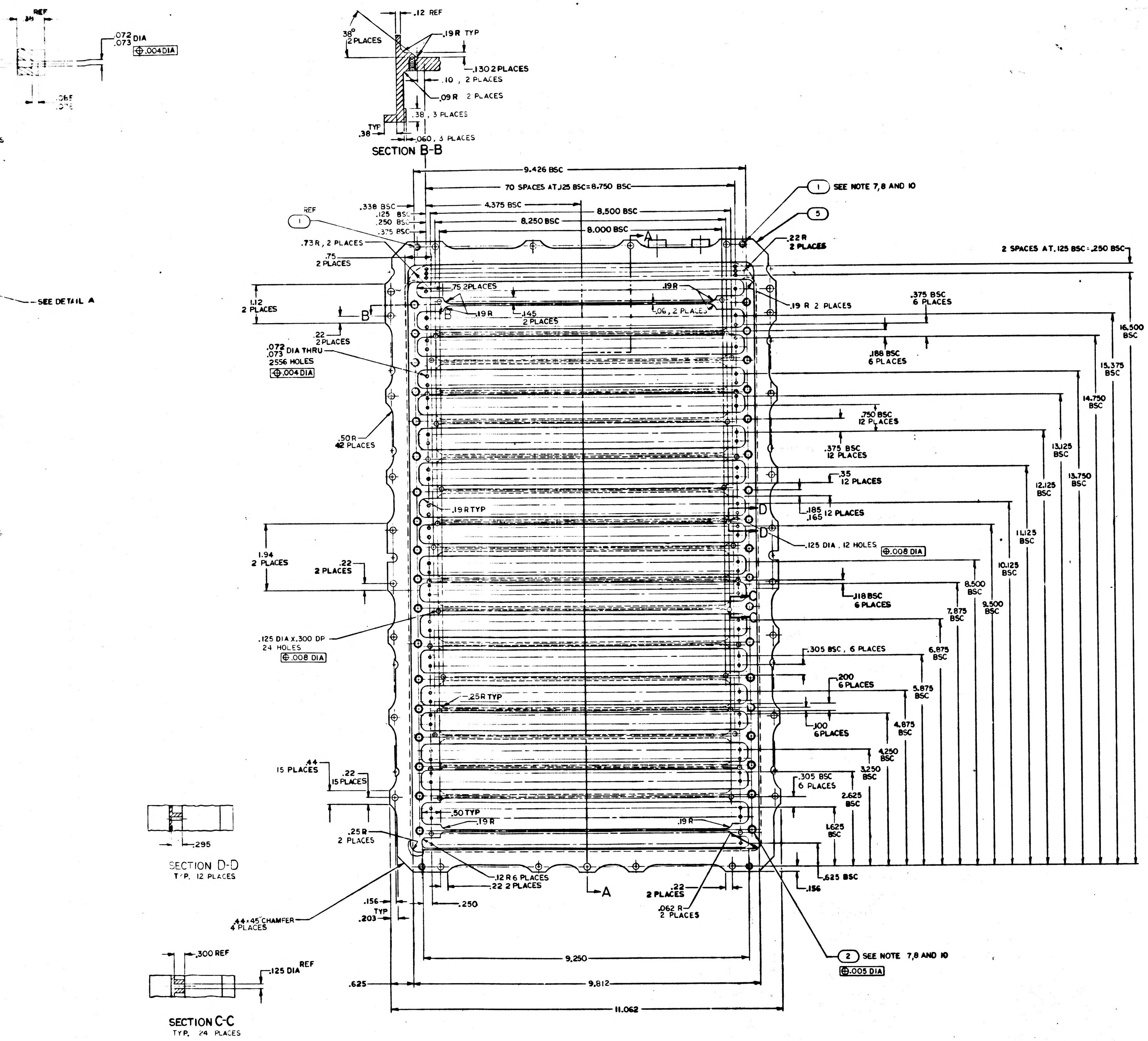
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



.50 2 PLACES
.25 2 PLACES
3 SEE NOTES 7,8 AND 10
.50
.25
6.250 REF
.12 TYP
.750
1.250
.375 REF
.1950 .1970 DIA THRU 3 HOLES MARKED 'X'
.002 DIA
A .0005
.05 R TYP
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
SEE NOTE 11
.125 REF
SEE NOTE 11 .072 .073 DIA HOLE REF 18 PLACES MARKED "6"
.158 .162 DIA. THRU 24 HOLES
.344 DIA SPOTFACE 24 PLACES SEE NOTE 11
.125 R 12 PLACES
.25 R 4 PLACES
.06 X 45°, 4 PLACES
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC
5.375 BSC
10.750
10.000
10.812
4 SEE NOTES 7,8 AND 10
9.802
.474
.50
.25
.25 2 PLACES
.52
.000 .020
.12 R
.32
.08
.078 .085
.292 .296
1.430
.005
2.447 2.457
SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1, 2, 3 AND 4 WET PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG THE SURFACES OF FIND NO. 1,2,3 AND 4 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3 AND 4 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED & DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3 & 4 THREADS
9. IDENTIFY WITH PART NO. PER ND1002019
10. HOLES FOR FIND NO. 1,2,3 AND 4 MUST BE FREE OF ANODIZE
11. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE IRIDITE PER ND1002040 (DO NOT EPOXY COAT)

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455				
G		REVISED PER TDRR 22502	RTS			
H		REVISED PER TDRR 23112			15 Oct 65	
J		REVISED PER TDRR 24362				
K		REVISED PER TDRR 24970				
L		REVISED PER TDRR 24971				


SECTION B-B
38° 2 PLACES
.12 REF
.19R TYP
.130 2 PLACES
.10, 2 PLACES
.09R 2 PLACES
.38, 3 PLACES
.38 TYP
.060, 3 PLACES
.072 .073 DIA
⊕ .004 DIA
REF
SEE DETAIL A
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
.73R, 2 PLACES
.75 2 PLACES
1
5
SEE NOTE 7,8 AND 10
.22R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19R
.145 2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 .073 DIA THRU 2556 HOLES ⊕ .004 DIA
.188 BSC 6 PLACES
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50R 42 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
12.125 BSC
.35 12 PLACES
.19R TYP
.185 .165 12 PLACES
D
.125 DIA, 12 HOLES ⊕ .008 DIA
11.125 BSC
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
.118 BSC 6 PLACES
8.500 BSC
9.500 BSC
7.875 BSC
C
.125 DIA x .300 DP 24 HOLES ⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.200 6 PLACES
5.875 BSC
.25R TYP
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.50 TYP
.19R
1.625 BSC
.25R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.625 BSC
.156
A
.22 2 PLACES
.062 R 2 PLACES
.156 TYP .203
.250
.44 x 45° CHAMFER 4 PLACES
2 SEE NOTE 7,8 AND 10 ⊕ .005 DIA
9.250
.625
9.812
11.062
.295
SECTION D-D TYP. 12 PLACES
.300 REF
.125 DIA REF
SECTION C-C TYP. 24 PLACES

Ⓑ REPLACES WORD DRAWING REV A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1

LIST OF MATERIALS

MASTER

2007085	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

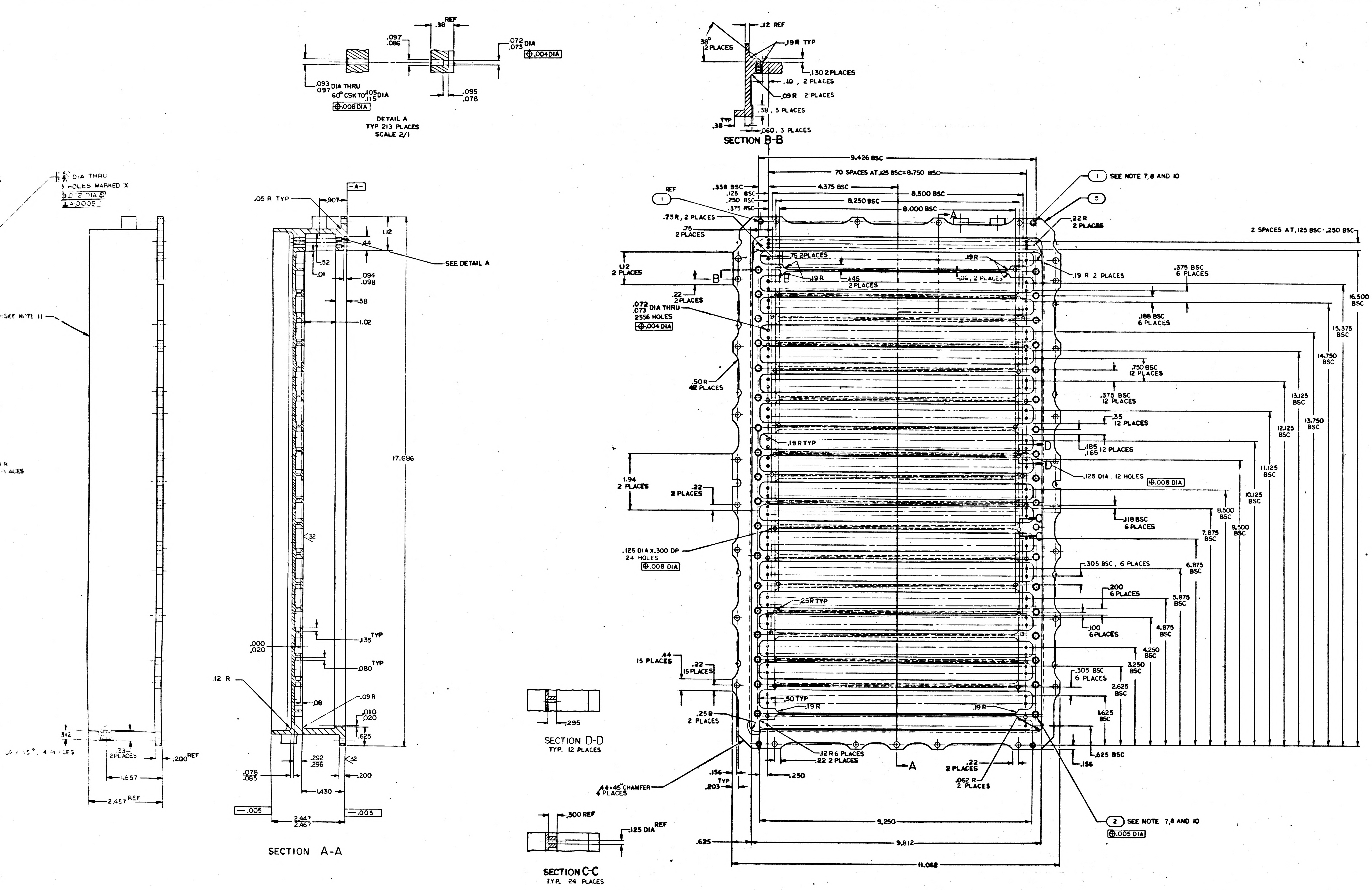
DRAWN De Zenzo 5/10/65
CHECKED
APPROVED
APPROVED 8/3/65
APPROVED MIT W Kupfer
APPROVED MSC
DATE

TRAY S, CDU
INSEPERABLE ASSEMBLY

CODE IDENT NO 80230 | SIZE J | DRAWING NO. 2008333
SCALE FULL | SHEET 1 OF 1

8333 L

F3


DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
.072 .073 DIA
⊕ .004 DIA
.097 .086
.38 REF
.085 .078
SECTION B-B
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10, 2 PLACES
.09 R 2 PLACES
.38, 3 PLACES
.38 TYP
.060, 3 PLACES
SECTION A-A
.05 R TYP
.907
-A-
1.12
.44
SEE DETAIL A
.52
.01
.094 .098
.38
1.02
17.686
.32
.135 TYP
.000 .020
.080 TYP
.12 R
.09 R
.08
.010 .020
.625
.292 .296
.32
.200
.078 .065
1.430
.005
2.447 2.467
.005
SEE NOTE 11
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
3 HOLES MARKED X
4 PLACES
SECTION D-D
TYP. 12 PLACES
.295
SECTION C-C
TYP. 24 PLACES
.300 REF
.125 DIA REF
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
① REF
① SEE NOTE 7,8 AND 10
⑤
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.145 2 PLACES
.19 R
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 .073 DIA THRU
2556 HOLES
⊕ .004 DIA
.188 BSC 6 PLACES
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50 R 42 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
.35 12 PLACES
12.125 BSC
.19 R TYP
.185 .165 12 PLACES
D
11.125 BSC
.125 DIA, 12 HOLES
⊕ .008 DIA
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
8.500 BSC
9.500 BSC
.118 BSC 6 PLACES
7.875 BSC
.125 DIA x .300 DP
24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.25 R TYP
.200 6 PLACES
5.875 BSC
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.22 2 PLACES
.625 BSC
.156
.062 R 2 PLACES
.156 TYP
.203
.250
.44 x 45° CHAMFER 4 PLACES
② SEE NOTE 7,8 AND 10
⊕ .005 DIA
9.250
.625
9.812
11.062

MASTER

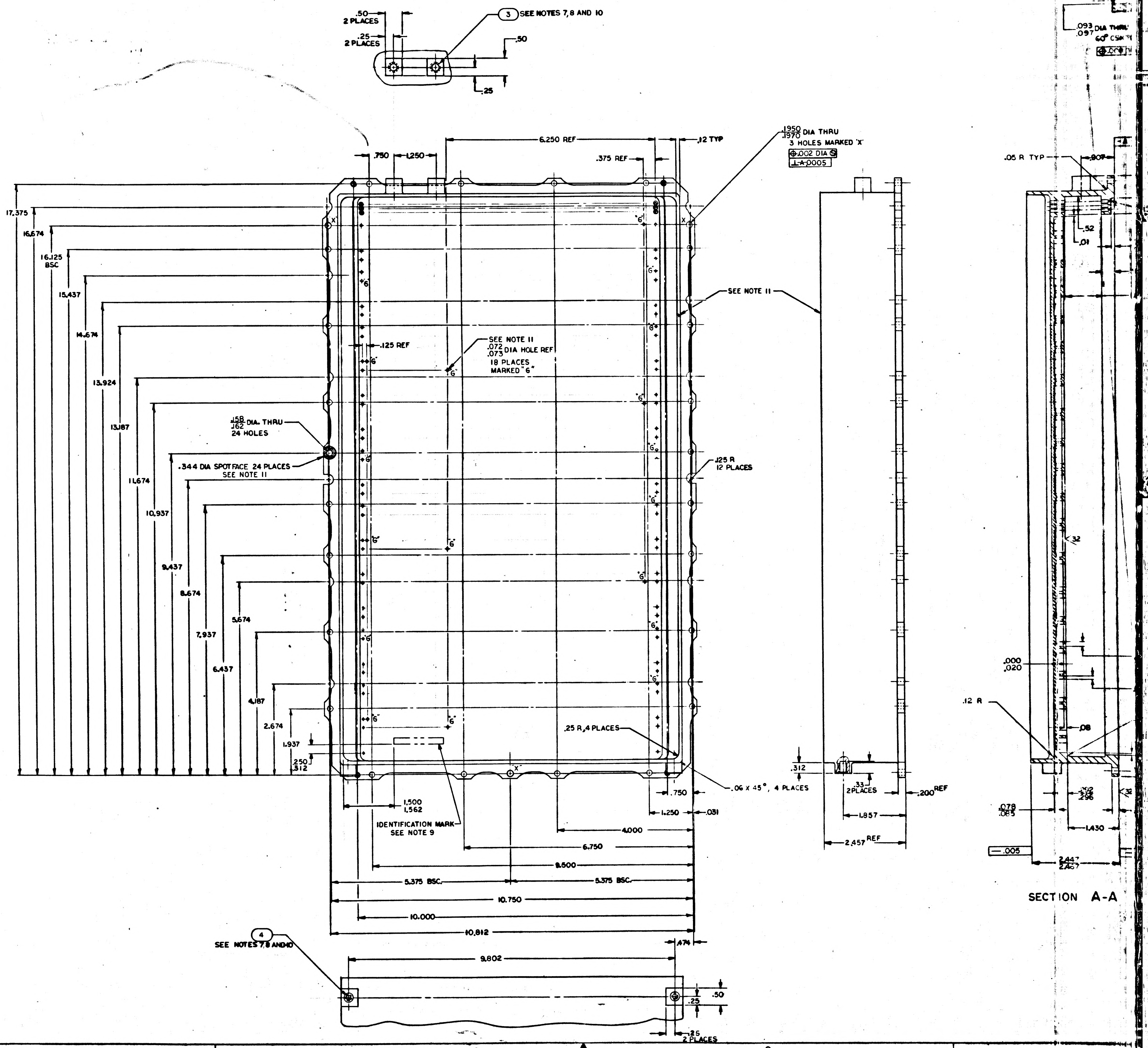
2007085	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN
RESISTOR VALUES ARE IN
TOLERANCES ON
FRACTIONS DECIMALS
.XXX ±
.XX ±
DO NOT SCALE THIS DRAWING
MATERIAL

SEE NOTE

2008333 · L

F-2

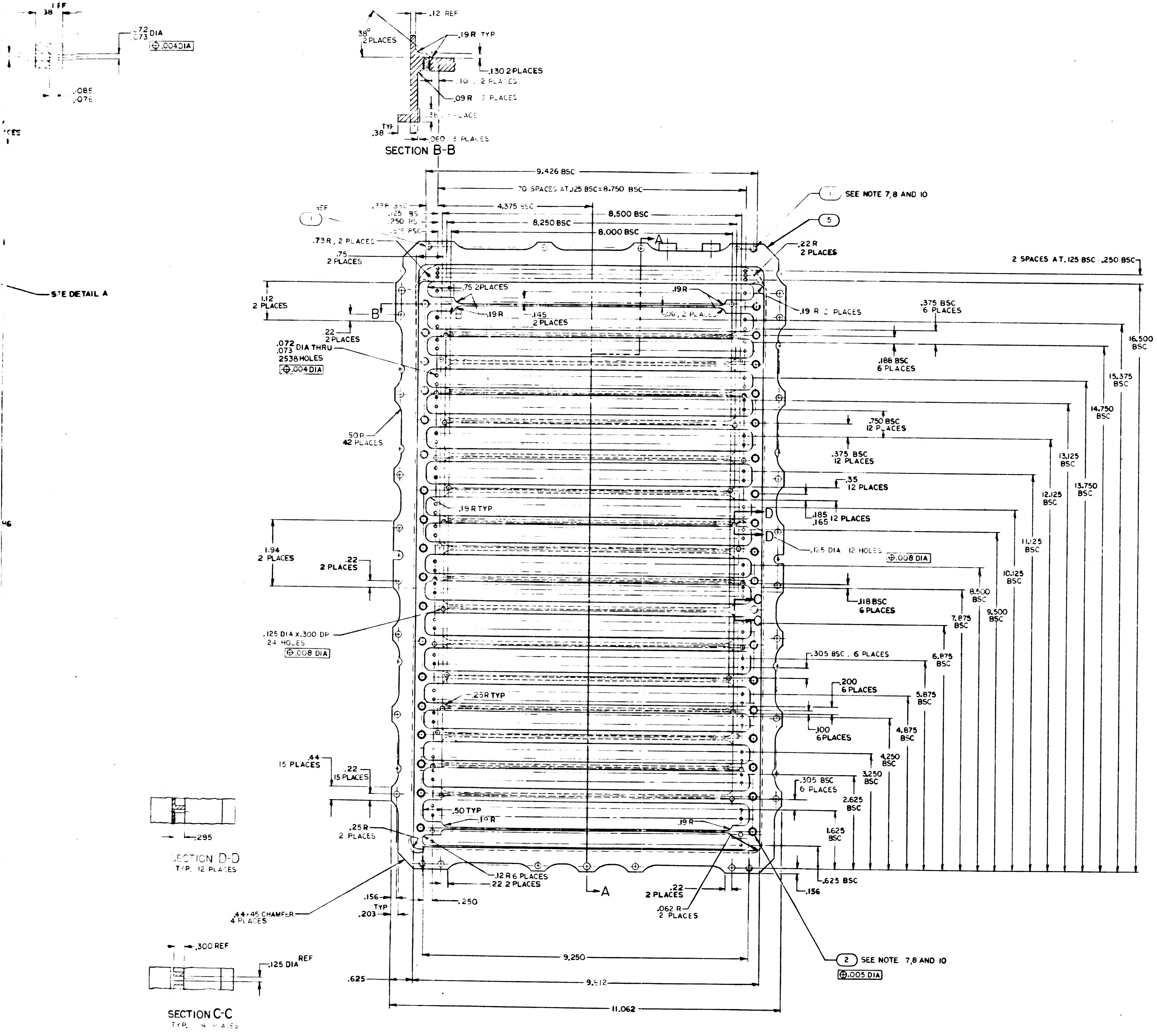

3 SEE NOTES 7,8 AND 10
.50 2 PLACES
.25 2 PLACES
.50
.25
6.250 REF
.750
1.250
.375 REF
.12 TYP
.1950 .1970 DIA THRU 3 HOLES MARKED "X"
.002 DIA S
A .0005
.05 R TYP
.093 .097 DIA THRU 60° CSK
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
5.674
6.437
4.187
2.674
1.937
.250 .312
SEE NOTE 11
.125 REF
SEE NOTE 11 .072 .073 DIA HOLE REF 18 PLACES MARKED "6"
.158 .162 DIA. THRU 24 HOLES
.344 DIA SPOTFACE 24 PLACES SEE NOTE 11
.125 R 12 PLACES
.25 R, 4 PLACES
.06 X 45°, 4 PLACES
1.500 1.562
IDENTIFICATION MARK SEE NOTE 9
.750
1.250
.031
4.000
6.750
8.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
.474
4 SEE NOTES 7,8 AND 10
9.802
.25
.50
.25 2 PLACES
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
.52
.01
.32
.000 .020
.12 R
.08
.078 .085
1.430
.005
2.447 2.457
SECTION A-A

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1, 2, 3 AND 4 WET PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG THE SURFACES OF FIND NO. 1,2,3 AND 4 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3 AND 4 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED & DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3 & 4 THREADS
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND1002019.
10. HOLES FOR FIND NO. 1,2,3 AND 4 MUST BE FREE OF ANODIZE
11. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE IRIDITE PER ND1002040 (DO NOT EPOXY COAT)

2008333 L

F-1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455				
G		REVISED PER TDRR 22502	RTS	LSB		
H		REVISED PER TDRR 23112				
J		REVISED PER TDRR 24362				
K		REVISED PER TDRR 24970				
L		REVISED PER TDRR 24971				
M		REVISED PER TDRR 28476	JMP	JRS	MAY 66	


SECTION B-B
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.060 3 PLACES
.38 TYP
.72 DIA
.073
.004 DIA
.085
.076
.38
SEE DETAIL A
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
REF
1
SEE NOTE 7,8 AND 10
5
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC .250 BSC
1.12 2 PLACES
.75 2 PLACES
.19 R
.145 2 PLACES
.06 2 PLACES
.19 R 2 PLACES
.22 2 PLACES
.072 .073 DIA THRU 2538 HOLES
.004 DIA
.375 BSC 6 PLACES
16.500 BSC
.186 BSC 6 PLACES
15.375 BSC
.50 R 42 PLACES
14.750 BSC
.750 BSC 12 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
.35 12 PLACES
12.125 BSC
.19 R TYP
.185 .165 12 PLACES
11.125 BSC
.125 DIA 12 HOLES
.008 DIA
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
8.500 BSC
9.500 BSC
.118 BSC 6 PLACES
7.875 BSC
.125 DIA x .300 DP 24 HOLES
.008 DIA
.305 BSC 6 PLACES
6.875 BSC
.25 R TYP
.200 6 PLACES
5.875 BSC
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.295
SECTION D-D TYP. 12 PLACES
.12 R 6 PLACES
.22 2 PLACES
.625 BSC
.156
.22 2 PLACES
.062 R 2 PLACES
.44 x 45 CHAMFER 4 PLACES
.156 TYP .203
.250
.300 REF
.125 DIA REF
2 SEE NOTE 7,8 AND 10
.005 DIA
9.250
.625
9.512
11.062
SECTION C-C TYP. 14 PLACES
A
B
D

Ⓑ REPLACES WORD DRAWING REV A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1

LIST OF MATERIALS

2007085	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN De Zenzo 5/10/65
CHECKED
APPROVED
APPROVED 8/9/65
APPROVED MIT W Kupfer
APPROVED MSC
DATE

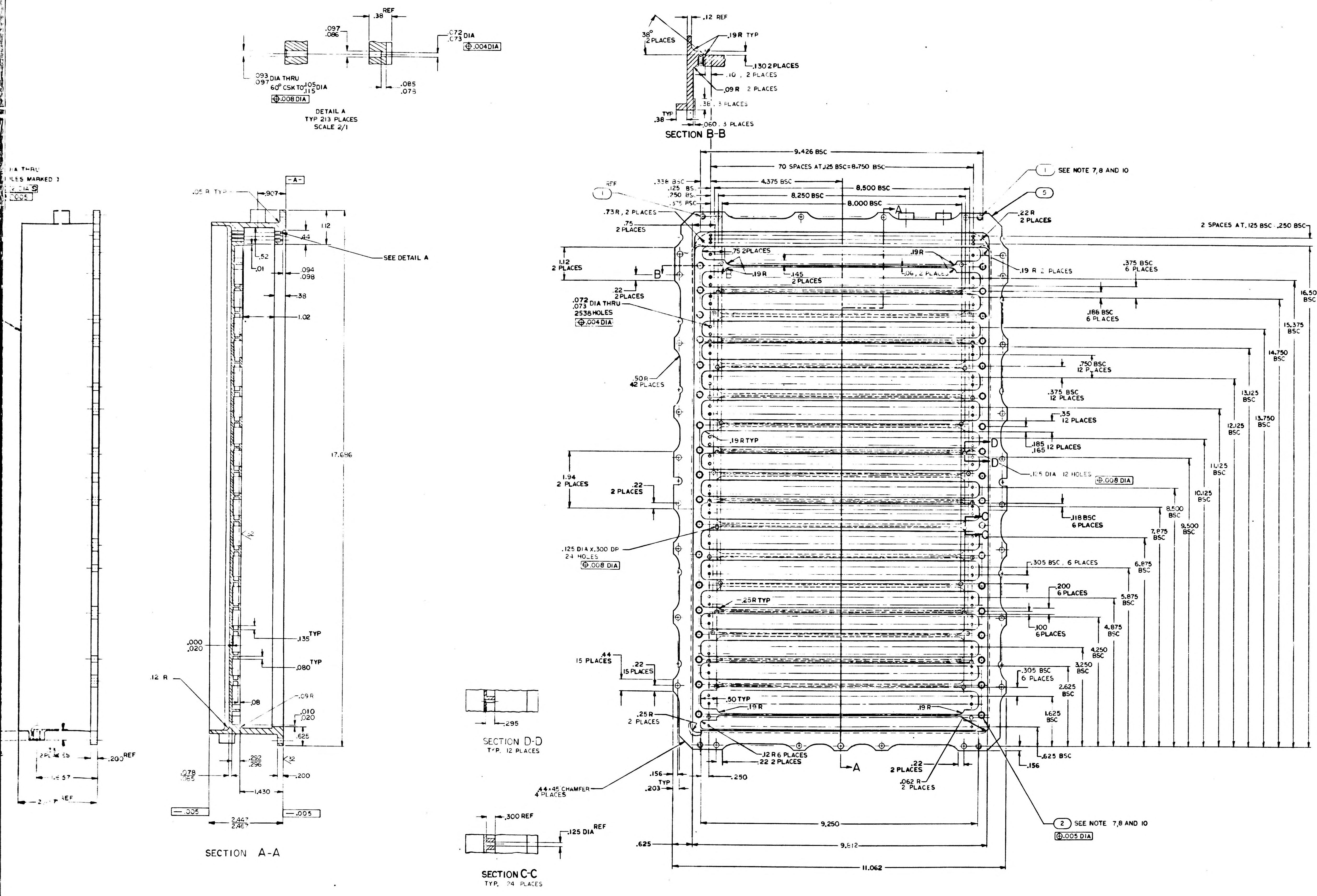
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY S, CDU INSEPERABLE ASSEMBLY

CODE IDENT NO 80230 SIZE J DRAWING NO. 2008333
SCALE FULL SHEET 1 OF 1

2008333 M

3/2008333


DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
.38 REF
.097 .086
.072 .073 DIA
.004 DIA
.085 .075
SECTION B-B
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10 , 2 PLACES
.09 R 2 PLACES
.38 , 3 PLACES
.060 , 3 PLACES
.38 TYP
SECTION A-A
SEE DETAIL A
17.696
.907
.05 R TYP
.12
.44
.52
.01
.094 .098
.38
1.02
.135 TYP
.080 TYP
.000 .020
.12 R
.08
.09 R
.010 .020
.625
.078 .065
.292 .296
.32
.200
1.430
.005
2.447 2.467
.200 REF
SECTION D-D
TYP. 12 PLACES
.295
SECTION C-C
TYP. 24 PLACES
.300 REF
.125 DIA REF
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.336 BSC
.125 BSC
.250 BSC
.375 BSC
SEE NOTE 7,8 AND 10
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC .250 BSC
1.12 2 PLACES
.75 2 PLACES
.19 R
.145 2 PLACES
.06 , 2 PLACES
.19 R 2 PLACES
.22 2 PLACES
.072 .073 DIA THRU
2538 HOLES
.004 DIA
.50 R 42 PLACES
.375 BSC 6 PLACES
.186 BSC 6 PLACES
.750 BSC 12 PLACES
.375 BSC 12 PLACES
.35 12 PLACES
.185 .165 12 PLACES
.125 DIA 12 HOLES
.008 DIA
.19 R TYP
1.94 2 PLACES
.22 2 PLACES
.118 BSC 6 PLACES
.125 DIA x .300 DP
24 HOLES
.008 DIA
.305 BSC, 6 PLACES
.200 6 PLACES
.25 R TYP
.100 6 PLACES
.44 15 PLACES
.22 15 PLACES
.305 BSC 6 PLACES
.50 TYP
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.22 2 PLACES
.062 R 2 PLACES
.625 BSC
.156
.156 TYP
.203
.250
.44 x 45 CHAMFER 4 PLACES
SEE NOTE 7,8 AND 10
.005 DIA
9.250
9.612
.625
11.062
16.500 BSC
15.375 BSC
14.750 BSC
13.750 BSC
13.125 BSC
12.125 BSC
11.125 BSC
10.125 BSC
9.500 BSC
8.500 BSC
7.875 BSC
6.875 BSC
5.875 BSC
4.875 BSC
4.250 BSC
3.250 BSC
2.625 BSC
1.625 BSC
A
B
D

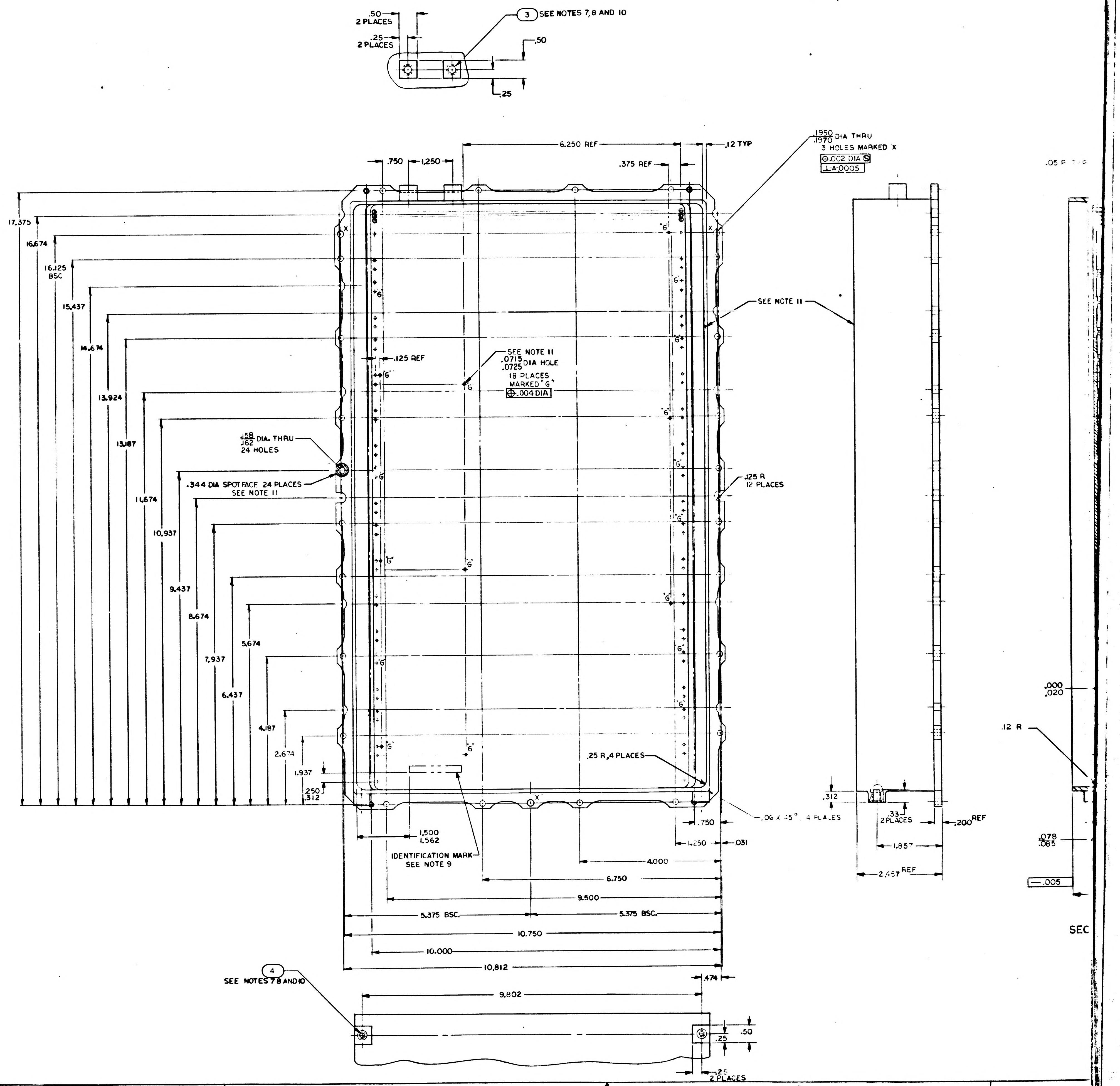
2008333 M

	20083
2	MS212
	MS212
36	MS212
1	MS

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± —— .XXX ± . ± .XX ± DO NOT SCALE THIS DRAWING
2007085		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

DRAWN De Zen

2/2008333



.50
2 PLACES
.25
2 PLACES
3 SEE NOTES 7, 8 AND 10
.50
.25
6.250 REF
.750
1.250
.375 REF
.12 TYP
.1950
.1970 DIA THRU
3 HOLES MARKED X
.002 DIA S
A .0005
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
.250
.312
.125 REF
SEE NOTE 11
.0715
.0725 DIA HOLE
18 PLACES
MARKED "G"
.004 DIA
.158
.162 DIA. THRU
24 HOLES
.344 DIA SPOTFACE 24 PLACES
SEE NOTE 11
SEE NOTE 11
.125 R
12 PLACES
.25 R, 4 PLACES
.06 X 45°, 4 PLACES
.750
1.250
.031
1.500
1.562
IDENTIFICATION MARK
SEE NOTE 9
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
4
SEE NOTES 7, 8 AND 10
.474
9.802
.50
.25
.25
2 PLACES
.312
.33
2 PLACES
.200 REF
1.857
2.457 REF
.05
.000
.020
.12 R
.078
.085
.005
SEC

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1, 2, 3 AND 4 WET PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG THE SURFACES OF FIND NO. 1, 2, 3 AND 4 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1, 2, 3 AND 4 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED & DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1, 2, 3 & 4 THREADS
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND1002019.
10. HOLES FOR FIND NO. 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE
11. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND ARES PER ND1002040 USING MATERIAL PER MIL-M-3171 TYPE VI, DO NOT EPOXY COAT.

2008333	M

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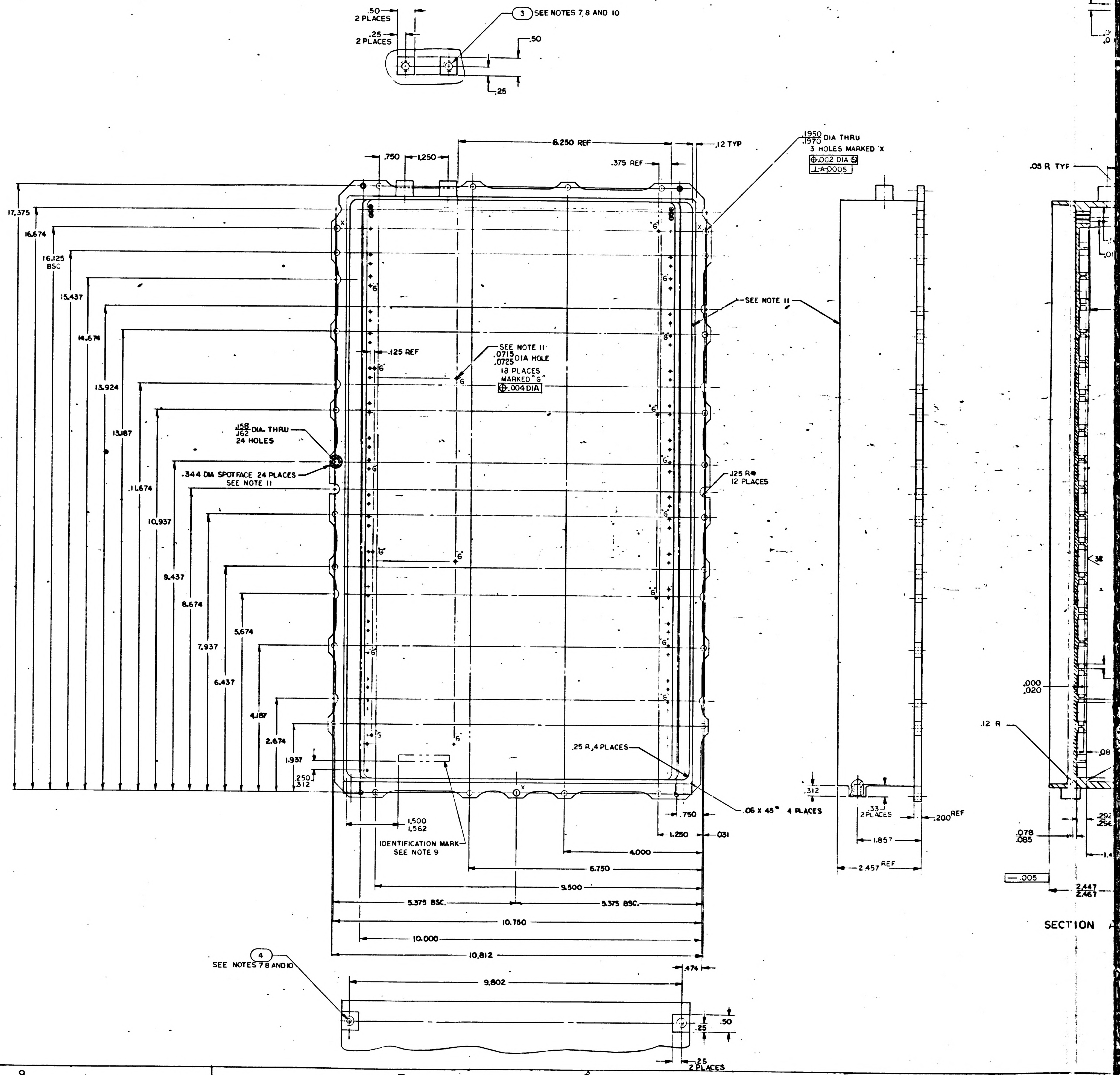

.50 2 PLACES
.25 2 PLACES
③ SEE NOTES 7,8 AND 10
.50
.25
6.250 REF
.750
1.250
.375 REF
.12 TYP
.1950 .1970 DIA THRU
3 HOLES MARKED X
⊕ .002 DIA Ⓢ
⊥ A .0005
.05 R TYP
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
5.674
6.437
4.187
2.674
1.937
.250 .312
SEE NOTE 11
.125 REF
SEE NOTE 11
.0715 .0725 DIA HOLE
18 PLACES
MARKED "G"
⊕ .004 DIA
.158 .162 DIA. THRU
24 HOLES
.344 DIA SPOTFACE 24 PLACES
SEE NOTE 11
.125 R
12 PLACES
.25 R, 4 PLACES
.06 X 45° 4 PLACES
1.500 1.562
IDENTIFICATION MARK
SEE NOTE 9
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
④ SEE NOTES 7,8 AND 10
.474
9.802
.50
.25
.25 2 PLACES
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
.000 .020
.12 R
.08
.078 .085
.292 .296
—.005
2.447 2.467
SECTION

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF HOLES FOR FIND NOS 1, 2, 3 AND 4 WITH MIL-P-8585 COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NOS. 1, 2, 3 AND 4 (SEE NOTE NO 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
9. IDENTIFY, USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. HOLES FOR FIND NOS 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE.
11. INDICATE HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171 TYPE VI, DO NOT EPOXY COAT.

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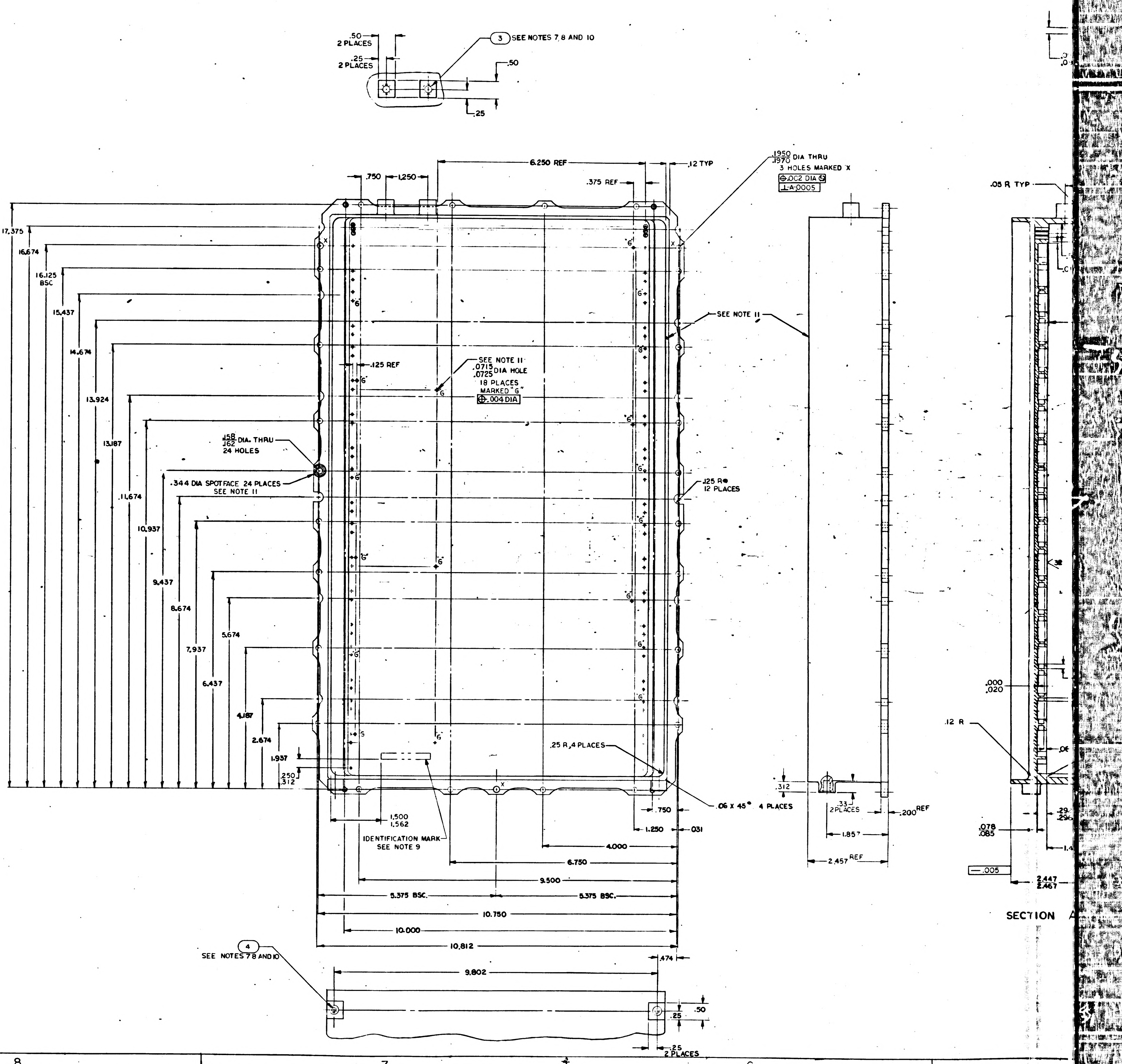
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



3 SEE NOTES 7,8 AND 10
.50 2 PLACES
.25 2 PLACES
.50
.25
6.250 REF
.750
1.250
.375 REF
.12 TYP
.1950/.1970 DIA THRU 3 HOLES MARKED X
⊕ .002 DIA Ⓢ
⊥ A .0005
.05 R TYP
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
.250/.312
SEE NOTE 11
.125 REF
SEE NOTE 11 .0715/.0725 DIA HOLE 18 PLACES MARKED "G"
⊕ .004 DIA
.158/.162 DIA. THRU 24 HOLES
.344 DIA SPOTFACE 24 PLACES SEE NOTE 11
.125 R 12 PLACES
.25 R, 4 PLACES
.06 X 45° 4 PLACES
1.500/1.562
IDENTIFICATION MARK SEE NOTE 9
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
4 SEE NOTES 7,8 AND 10
.474
9.802
.50
.25
.25 2 PLACES
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
.000/.020
.12 R
.078/.085
.005
2.447/2.467
SECTION A

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF HOLES FOR FIND NOS 1, 2, 3 AND 4 WITH MIL-P-8585 COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NOS. 1, 2, 3 AND 4 (SEE NOTE NO 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
9. IDENTIFY, USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. HOLES FOR FIND NOS 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE.
11. INDICATE HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171 TYPE VI, DO NOT EPOXY COAT.

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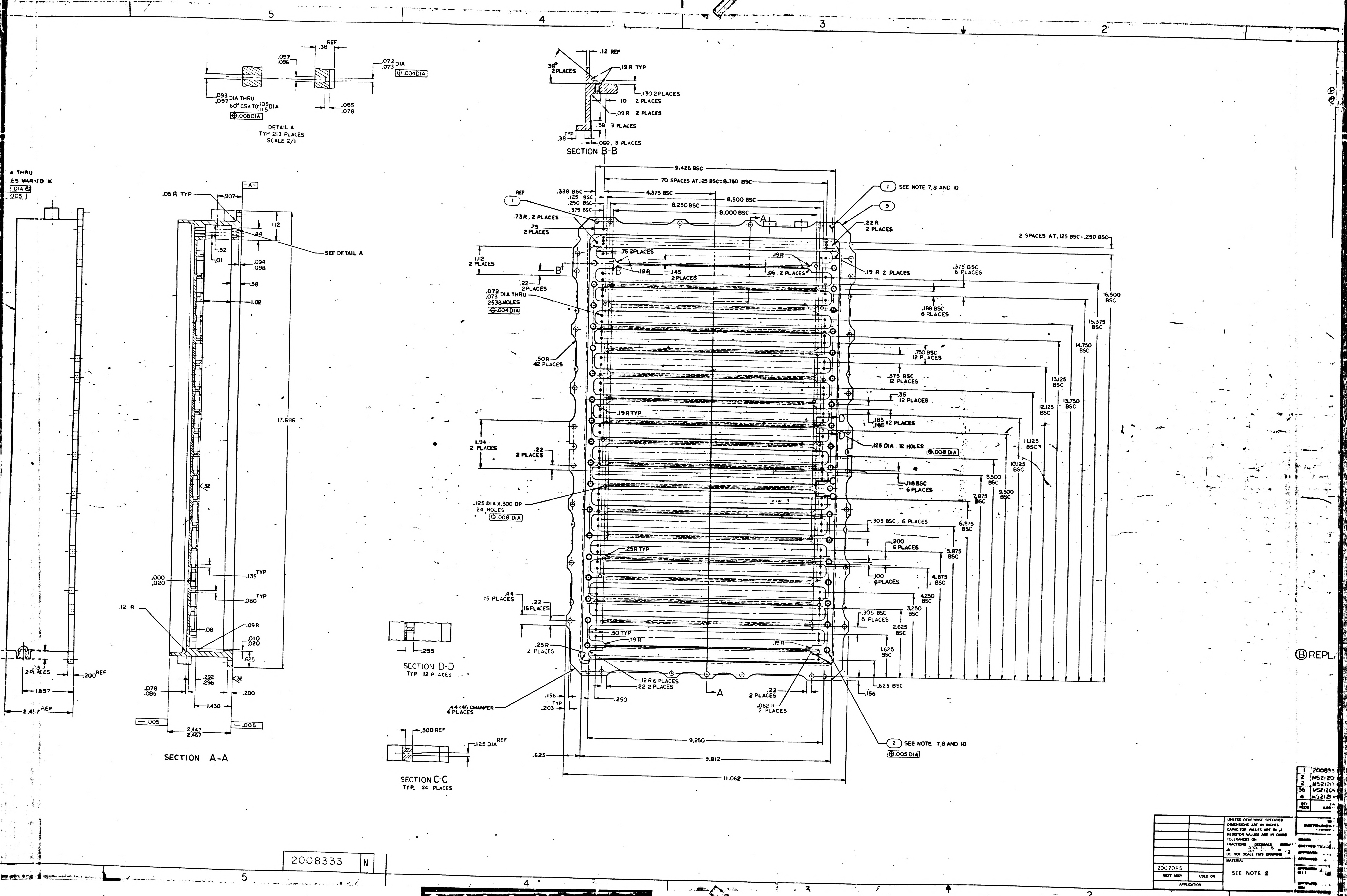
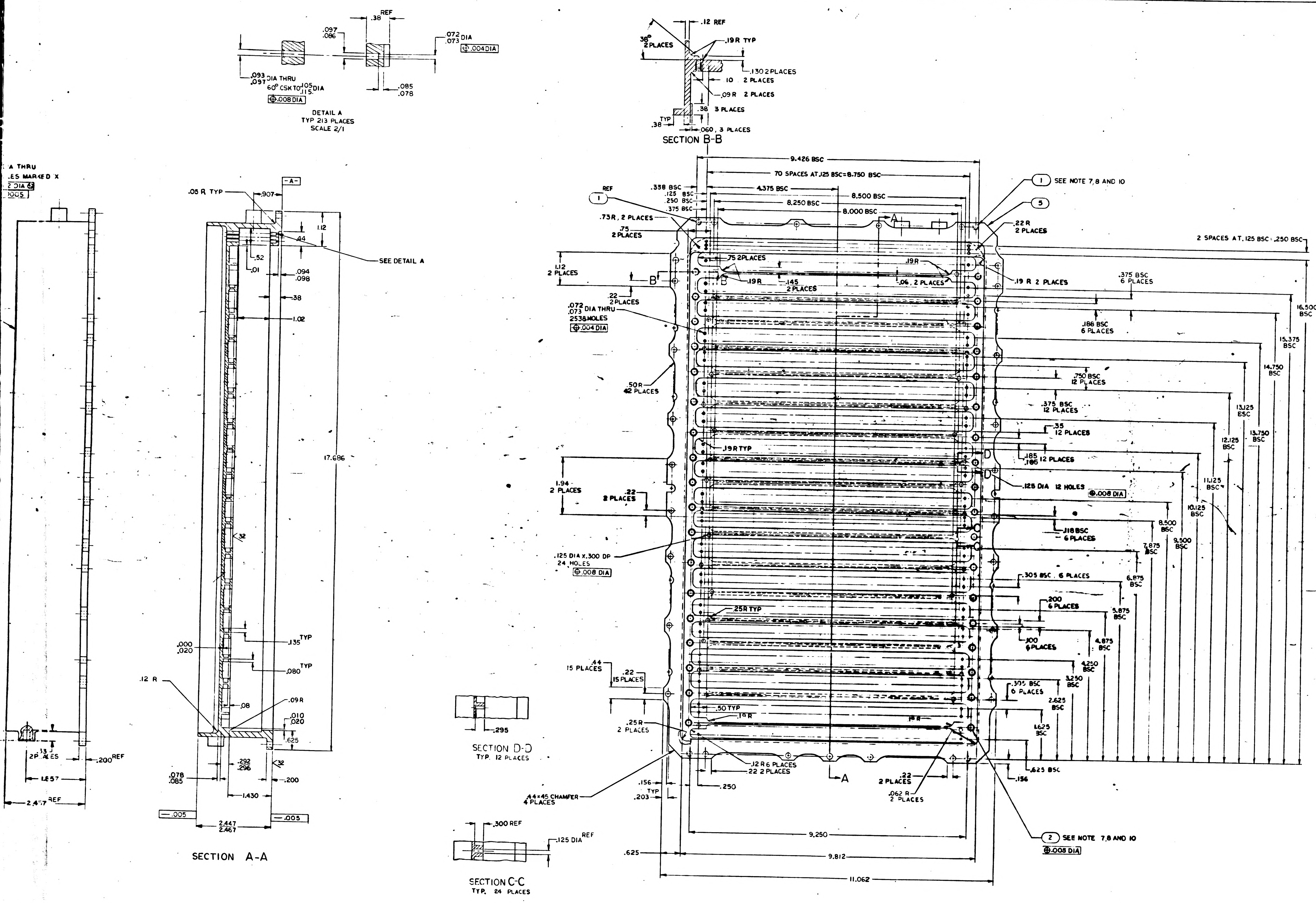

5
4
3
2
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
.097 .086
.38 REF
.072 .073 DIA
.004 DIA
.085 .078
SECTION B-B
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.38 3 PLACES
.060, 3 PLACES
.38 TYP
SECTION A-A
.05 R TYP
.907
A
1.12
.44
.52
.01
.094 .098
.38
1.02
SEE DETAIL A
17.686
32
.135 TYP
.000 .020
.080 TYP
.12 R
.08
.09 R
.010 .020
.625
.078 .085
.292 .296
.200
1.430
.005
2.447 2.467
.005
1.857
2.457 REF
.3 2 PLACES
.200 REF
SECTION D-D
TYP. 12 PLACES
.295
SECTION C-C
TYP. 24 PLACES
.300 REF
.125 DIA REF
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
1 REF
1 SEE NOTE 7,8 AND 10
5
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC=.250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.19 R
.145 2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
.22 2 PLACES
.072 .073 DIA THRU
2538 HOLES
.004 DIA
.188 BSC 6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50 R 42 PLACES
.375 BSC 12 PLACES
13.125 BSC
.35 12 PLACES
13.750 BSC
12.125 BSC
.19 R TYP
.185 .186 12 PLACES
D
.125 DIA 12 HOLES
.008 DIA
11.125 BSC
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
.118 BSC 6 PLACES
8.500 BSC
9.500 BSC
7.875 BSC
.125 DIA X .300 DP
24 HOLES
.008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.200 6 PLACES
5.875 BSC
.25 R TYP
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
.305 BSC 6 PLACES
3.250 BSC
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
A
.625 BSC
.156
.22 2 PLACES
.062 R 2 PLACES
.156 .203 TYP
.250
.44 X 45 CHAMFER 4 PLACES
9.250
2 SEE NOTE 7,8 AND 10
.008 DIA
.625
9.812
11.062
B REPL
1 | 200833
2 | MS2120
2 | MS2120
36 | MS2120
4 | MS212
QTY REQD
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XXX ± .5 ± 2
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
2007085
NEXT ASSY
USED ON
APPLICATION
2008333 N

2/2008333


DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
.072 .073 DIA
.004 DIA
.097 .086
.38 REF
.085 .078
SECTION B-B
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.38 3 PLACES
.38 TYP
.060, 3 PLACES
A THRU
ES MARKED X
2 DIA
.005
.05 R TYP
.907
-A-
.12
.44
SEE DETAIL A
.52
.01
.094 .098
.38
1.02
17.686
.32
.000 .020
.135 TYP
.080 TYP
.12 R
.08
.09 R
.010 .020
.625
.33 2 PLACES
.200 REF
1.657
2.457 REF
.078 .085
.292 .296
.200
1.430
.005
2.447 2.467
.005
SECTION A-A
SECTION D-D
TYP. 12 PLACES
.295
SECTION C-C
TYP. 24 PLACES
.300 REF
.125 DIA REF
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
REF
1
SEE NOTE 7,8 AND 10
5
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC=.250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.145 2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 .073 DIA THRU
2538 HOLES
.004 DIA
.186 BSC 6 PLACES
15.375 BSC
14.750 BSC
.50 R 42 PLACES
.750 BSC 12 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
12.125 BSC
.35 12 PLACES
.19 R TYP
.185 .186 12 PLACES
1.94 2 PLACES
.22 2 PLACES
D
.125 DIA 12 HOLES
.008 DIA
11.125 BSC
10.125 BSC
.118 BSC 6 PLACES
8.500 BSC
9.500 BSC
7.875 BSC
.125 DIA X .300 DP
24 HOLES
.008 DIA
6.875 BSC
.305 BSC, 6 PLACES
.25 R TYP
.200 6 PLACES
5.875 BSC
.100 6 PLACES
4.875 BSC
.44 15 PLACES
.22 15 PLACES
4.250 BSC
.305 BSC 6 PLACES
3.250 BSC
2.625 BSC
.50 TYP
.19 R
1.625 BSC
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
A
.22 2 PLACES
.062 R 2 PLACES
.625 BSC
.156
.156
.203 TYP
.250
.44 x 45 CHAMFER 4 PLACES
2
SEE NOTE 7,8 AND 10
.008 DIA
9.250
.625
9.812
11.062

Ⓑ REPLA

QTY REQD	PART OR IDENT
1	200833
2	MS21209
2	MS21203
36	MS21209
4	MS21205

2007085	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XXX ± .005 ± 1/2°
.XX
DO NOT SCALE THIS DRAWING

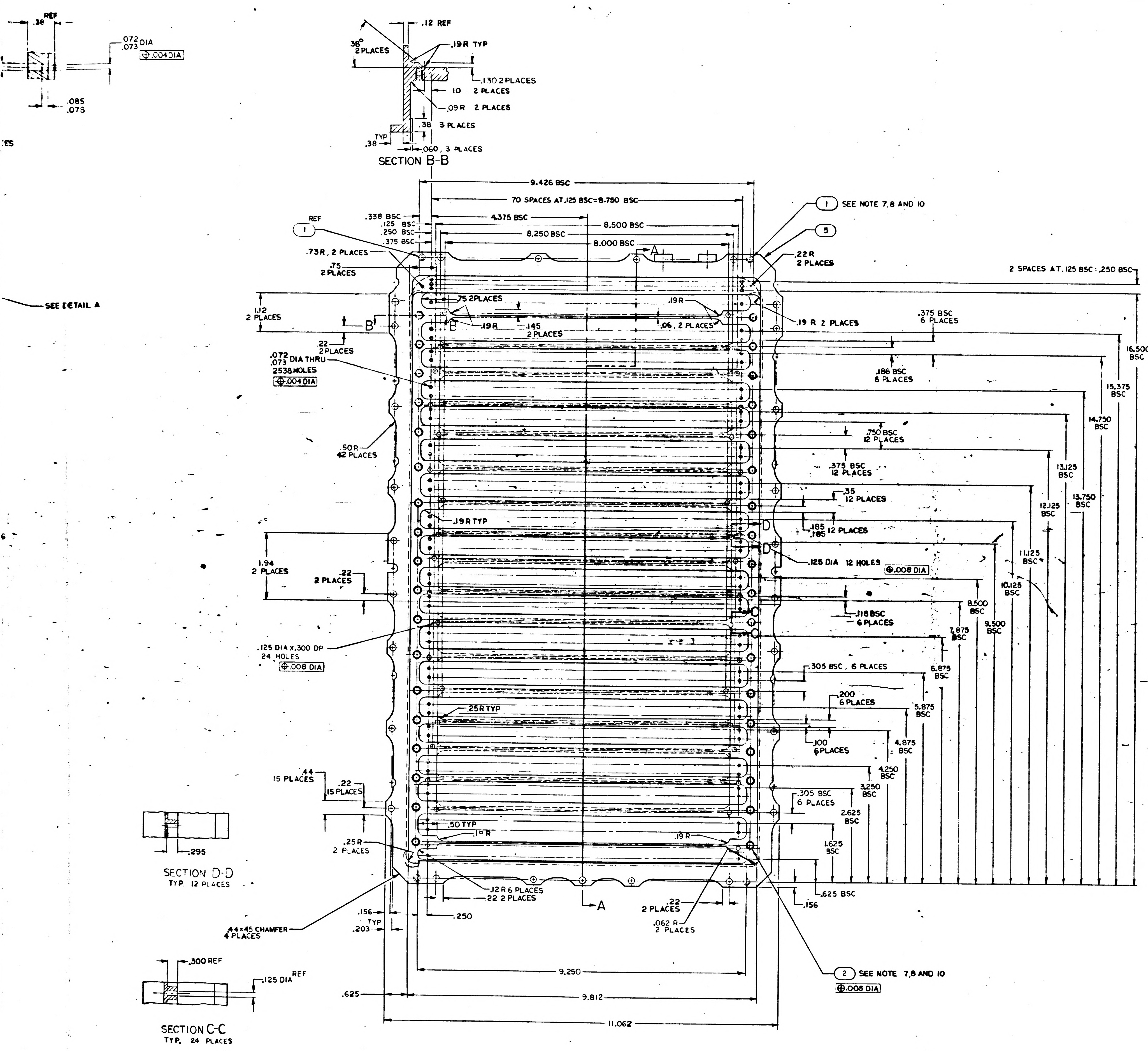
MATERIAL
SEE NOTE 2

MIT
INSTRUMENTA
CAMBRIDG

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

2008333 N

2/2008333


SECTION B-B
SECTION D-D
TYP. 12 PLACES
SECTION C-C
TYP. 24 PLACES
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
SEE NOTE 7,8 AND 10
SEE NOTE 7,8 AND 10
.73R, 2 PLACES
.75 2 PLACES
.22R 2 PLACES
2 SPACES AT .125 BSC=.250 BSC
SEE DETAIL A
1.12 2 PLACES
.19 R 2 PLACES
.22 2 PLACES
.072 .073 DIA THRU 2538 HOLES
.004 DIA
16.500 BSC
15.375 BSC
14.750 BSC
13.750 BSC
13.125 BSC
12.125 BSC
11.125 BSC
10.125 BSC
9.500 BSC
8.500 BSC
7.875 BSC
6.875 BSC
5.875 BSC
4.875 BSC
4.250 BSC
3.250 BSC
2.625 BSC
1.625 BSC
.625 BSC
.50R 42 PLACES
.125 DIA 12 HOLES
.008 DIA
1.94 2 PLACES
.125 DIA X.300 DP 24 HOLES
.008 DIA
.44 15 PLACES
.22 15 PLACES
.50 TYP
.25R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.250
.44×45 CHAMFER 4 PLACES
.156
.203
9.250
9.812
11.062
.625
.005 DIA
.300 REF
.125 DIA REF
.295

ⒷREPLACES WORD DRAWING REV. A.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455				
G		REVISED PER TDRR 22502	RTS	LSB		
H		REVISED PER TDRR 23112			15 Oct 65	WR
J		REVISED PER TDRR 24362				WR
K		REVISED PER TDRR 24970				WR
L		REVISED PER TDRR 24971				WR
M		REVISED PER TDRR 28476		JRS	8 MAY 66	
N		REVISED PER TDRR 32770	DR		2 FEB 67	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING.	2
4	MS21208C0610	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007085	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XXX ± .005 .XX ± ANGLES ± 1/2
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

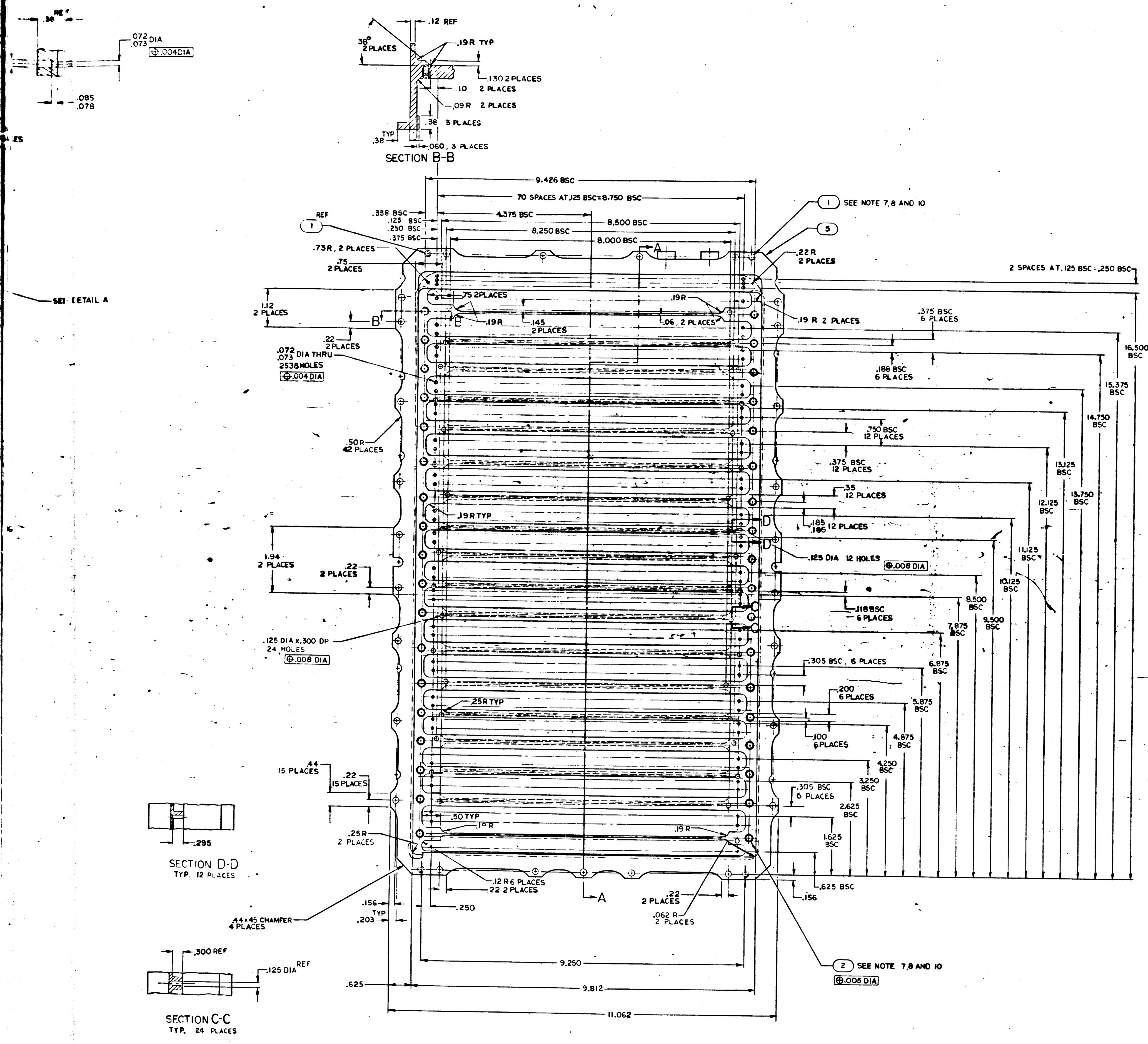
TRAY S, CDU
INSEPERABLE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008333
SCALE FULL
SHEET 1 OF 1

2008333 N

3/2008333

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455				
G		REVISED PER TDRR 22502	RTS			
H		REVISED PER TDRR 23112			13 Oct 65	WK
J		REVISED PER TDRR 24362				
K		REVISED PER TDRR 24970				WK
L		REVISED PER TDRR 24971				WK
M		REVISED PER TDRR 28476		JRS	9 MAY 66	
N		REVISED PER TDRR 32770	DR		2 FEB 67	



4
3
2
1
D
.38 REF
.072 DIA
.073
⊕ .004 DIA
.085
.078
.12 REF
38° 2 PLACES
.19 R TYP
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.38 3 PLACES
TYP
.38
.060, 3 PLACES
SECTION B-B
SEE DETAIL A
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
REF
1
1 SEE NOTE 7, 8 AND 10
5
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
A
2 SPACES AT .125 BSC = .250 BSC
1.12 2 PLACES
.75 2 PLACES
.19 R
.19 R 2 PLACES
B
.19 R
.145 2 PLACES
.06, 2 PLACES
.375 BSC 6 PLACES
.22 2 PLACES
.072 .073 DIA THRU 2538 HOLES
⊕ .004 DIA
16.500 BSC
.188 BSC 6 PLACES
15.375 BSC
14.750 BSC
.50 R 42 PLACES
.750 BSC 12 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
.35 12 PLACES
12.125 BSC
.19 R TYP
.185 .186 12 PLACES
D
1.94 2 PLACES
.22 2 PLACES
.125 DIA 12 HOLES
⊕ .008 DIA
11.125 BSC
10.125 BSC
8.500 BSC
.118 BSC 6 PLACES
9.500 BSC
7.875 BSC
.125 DIA X .300 DP 24 HOLES
⊕ .008 DIA
.305 BSC, 6 PLACES
6.875 BSC
.25 R TYP
.200 6 PLACES
5.875 BSC
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
.305 BSC 6 PLACES
3.250 BSC
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.295
SECTION D-D TYP. 12 PLACES
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.625 BSC
.156
.44 x 45 CHAMFER 4 PLACES
.156 TYP
.203
.250
A
.22 2 PLACES
.062 R 2 PLACES
.300 REF
.125 DIA REF
2 SEE NOTE 7, 8 AND 10
⊕ .005 DIA
9.250
.625
9.812
11.062
SECTION C-C TYP. 24 PLACES

Ⓑ REPLACES WORD DRAWING REV. A.

1	2008333-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING.	2
4	MS21208C0610	INSERT, SCREW THREAD	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007085	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XXX ± .005 ± 1/2
.XX
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DeLenzo
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY S, CDU
INSEPERABLE ASSEMBLY

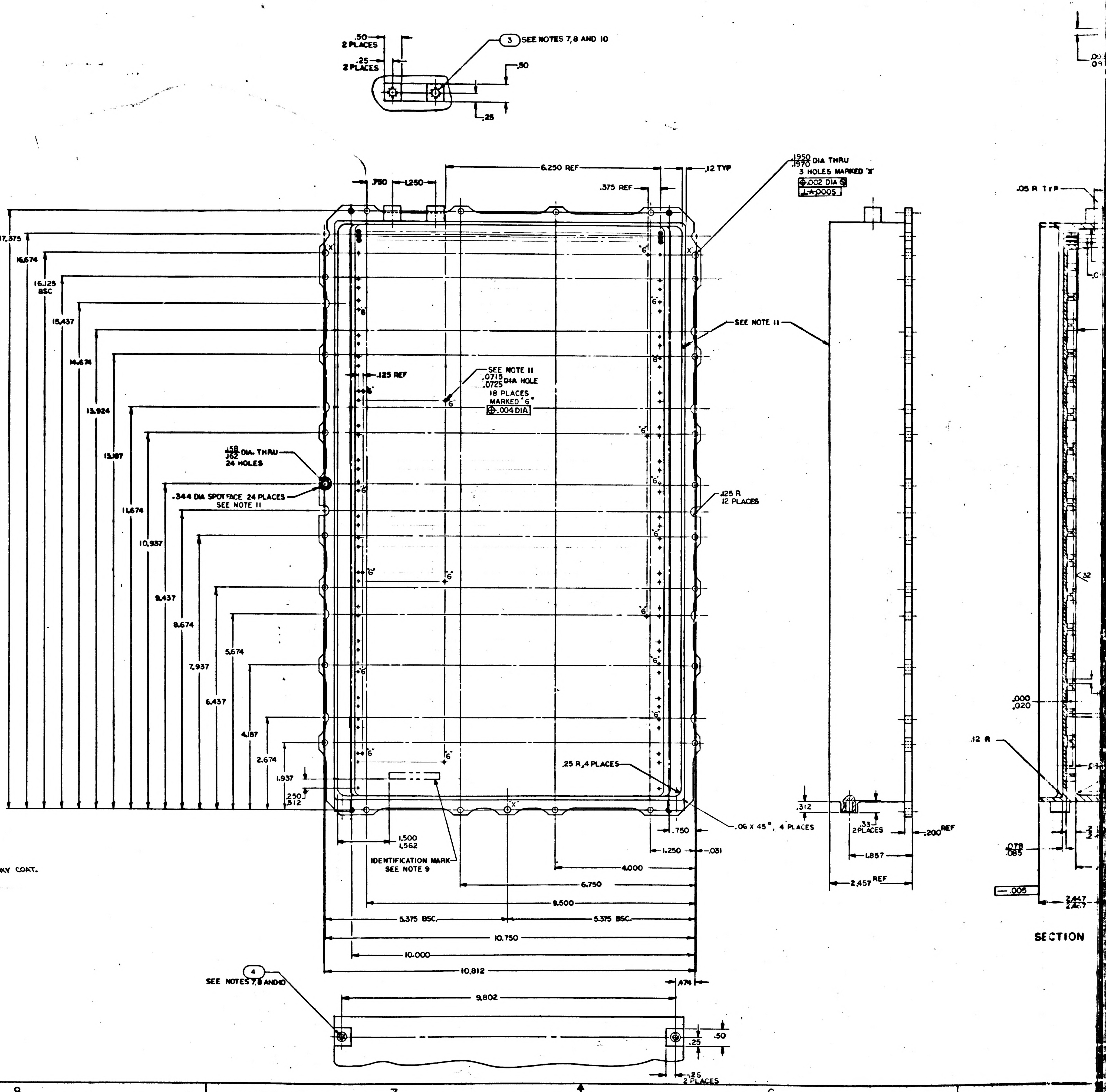
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008333

SCALE FULL SHEET 1 OF 1

2008333

2008333 N

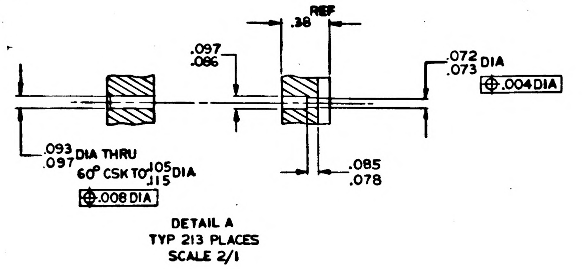
3/2008333


.50 2 PLACES
.25 2 PLACES
3 SEE NOTES 7,8 AND 10
.50
.25
6.250 REF
.750
1.250
.375 REF
.12 TYP
.1950 .1970 DIA THRU
3 HOLES MARKED "X"
⊕ .002 DIA S
⊥ A .0005
.05 R TYP
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
.250
.312
SEE NOTE 11
.125 REF
SEE NOTE 11
.0715 .0725 DIA HOLE
18 PLACES
MARKED "6"
⊕ .004 DIA
.458 .162 DIA THRU
24 HOLES
.344 DIA SPOTFACE 24 PLACES
SEE NOTE 11
.125 R
12 PLACES
.25 R, 4 PLACES
.06 X 45°, 4 PLACES
1.500
1.562
IDENTIFICATION MARK
SEE NOTE 9
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
4
SEE NOTES 7,8 AND 10
9.802
.474
.25
.50
.25 2 PLACES
.312
.33 2 PLACES
.200 REF
1.857
2.457 REF
.12 R
.000 .020
.078 .085
.005
2.447
.32
SECTION

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{}^{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
7. COAT THREADS OF HOLES FOR FIND NOS. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NOS. 1, 2, 3 AND 4 (SEE NOTE NO. 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
9. IDENTIFY, USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. HOLES FOR FIND NOS. 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
11. INDICATE HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171 TYPE VI, DO NOT EPOXY COAT.
12. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.

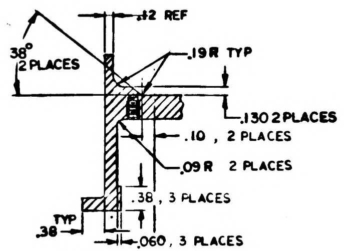
2008333	P

1/2008333



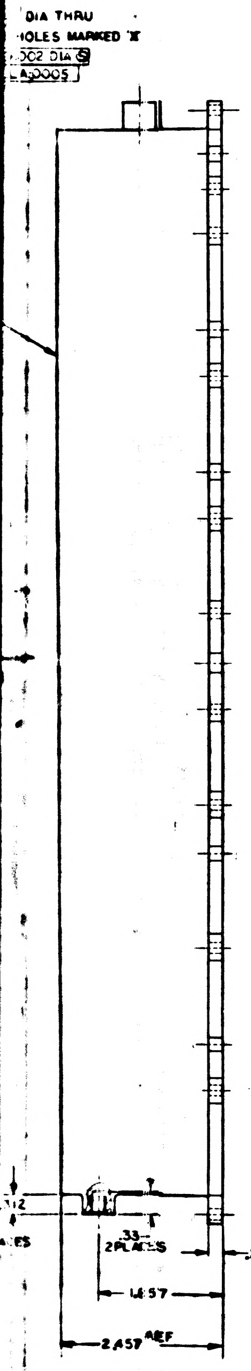
REF
.38
.097
.086
.072
.073 DIA
⊕ .004 DIA
.093
.097 DIA THRU
60° CSK TO .105
.115 DIA
⊕ .008 DIA
.085
.078

DETAIL A
TYP 213 PLACES
SCALE 2/1

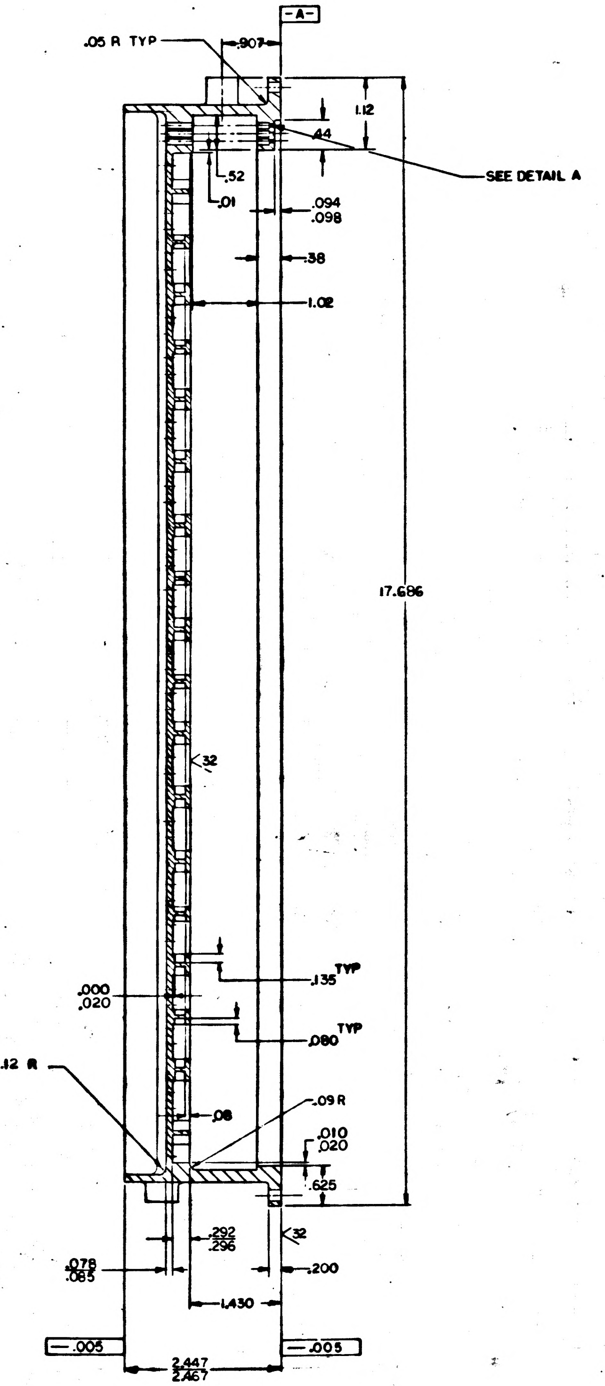


.12 REF
38°
2 PLACES
.19 R TYP
.130 2 PLACES
.10 , 2 PLACES
.09 R 2 PLACES
.38 , 3 PLACES
TYP
.38
.060 , 3 PLACES

SECTION B-B

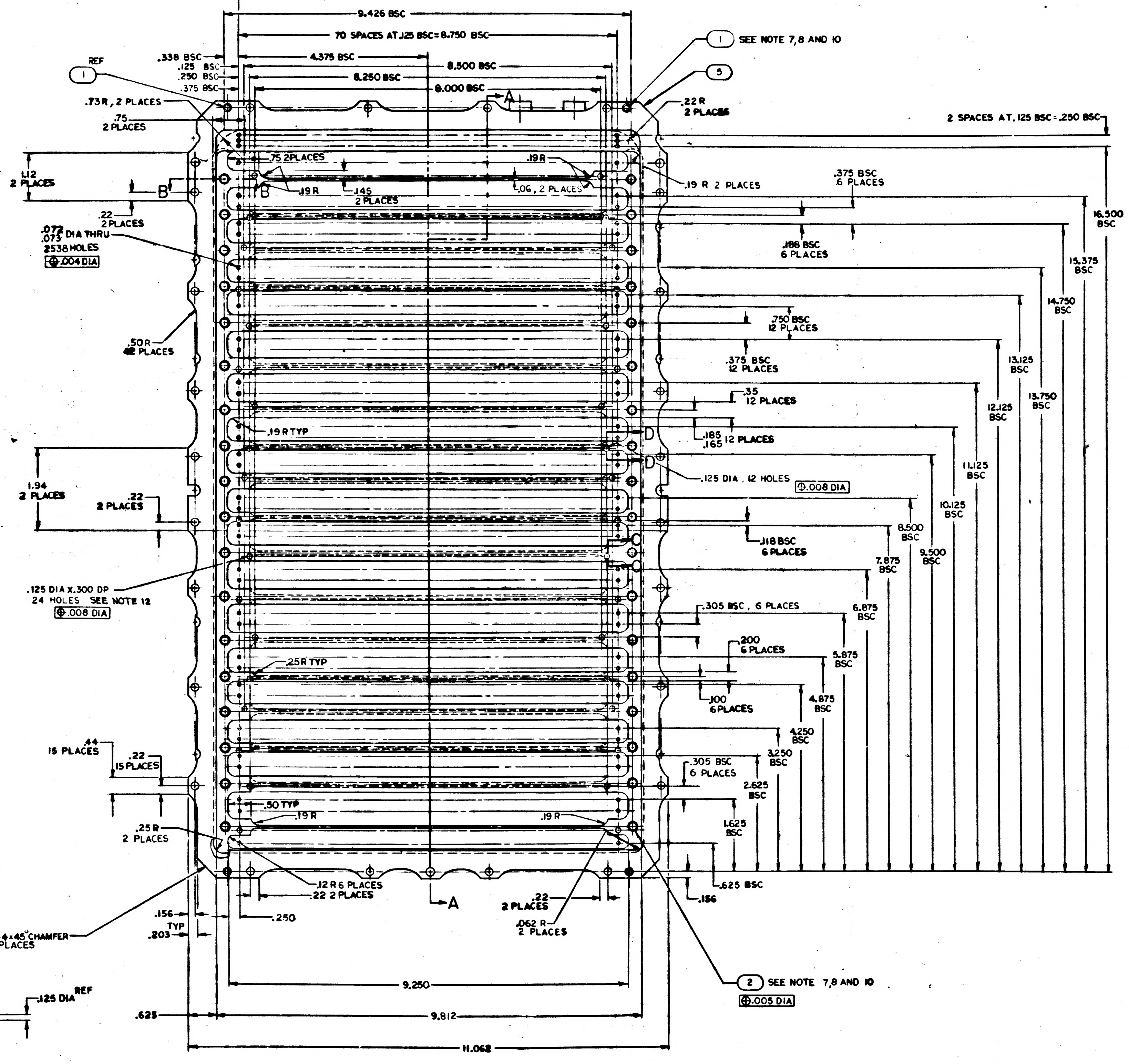


DIA THRU
HOLES MARKED 'X'
.002 DIA
.0005
.33
2 PLACES
.200 REF
1.457
2.457 REF

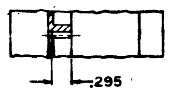


A
.05 R TYP
.907
1.12
.44
SEE DETAIL A
.52
.01
.094
.098
.38
1.02
17.686
32
.135 TYP
.000
.020
.080 TYP
.12 R
.08
.09 R
.010
.020
.625
32
.078
.085
.292
.296
.200
1.430
2.447
2.467
.005
.005

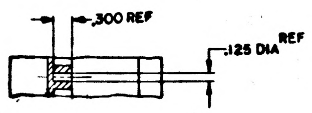
SECTION A-A



9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
① SEE NOTE 7,8 AND 10
⑤
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
REF
①
.73 R, 2 PLACES
.75
2 PLACES
.22 R
2 PLACES
2 SPACES AT .125 BSC = .250 BSC
1.12
2 PLACES
.75 2 PLACES
.19 R
.19 R 2 PLACES
.375 BSC
6 PLACES
B
.19 R
.145
2 PLACES
.06 , 2 PLACES
16.500
BSC
.22
2 PLACES
.072
.075 DIA THRU
2538 HOLES
⊕ .004 DIA
.188 BSC
6 PLACES
15.375
BSC
14.750
BSC
.750 BSC
12 PLACES
.50 R
42 PLACES
.375 BSC
12 PLACES
13.125
BSC
13.750
BSC
.35
12 PLACES
12.125
BSC
.19 R TYP
D
.185
.165 12 PLACES
D
11.125
BSC
1.94
2 PLACES
.22
2 PLACES
.125 DIA . 12 HOLES
⊕ .008 DIA
10.125
BSC
8.500
BSC
9.500
BSC
.118 BSC
6 PLACES
7.875
BSC
.125 DIA X .300 DP
24 HOLES SEE NOTE 12
⊕ .008 DIA
6.875
BSC
.305 BSC , 6 PLACES
.200
6 PLACES
5.875
BSC
.25 R TYP
4.875
BSC
.100
6 PLACES
4.250
BSC
.44
15 PLACES
.22
15 PLACES
3.250
BSC
.305 BSC
6 PLACES
2.625
BSC
.50 TYP
.19 R
.19 R
1.625
BSC
.25 R
2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.625 BSC
A
.22
2 PLACES
.156
.062 R
2 PLACES
.156
TYP
.203
.250
.44 x 45° CHAMFER
4 PLACES
② SEE NOTE 7,8 AND 10
⊕ .005 DIA
9.250
.625
9.812
11.062



SECTION D-D
TYP. 12 PLACES



.300 REF
.125 DIA REF

SECTION C-C
TYP. 24 PLACES

Ⓑ REPLA

1	20083
2	10109
2	10109
36	10109
4	MS21
QTY REQD	IDEN

2007085	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— .XXX ±.005 ± 1/2°
.XX ±.01
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

INSTRUME

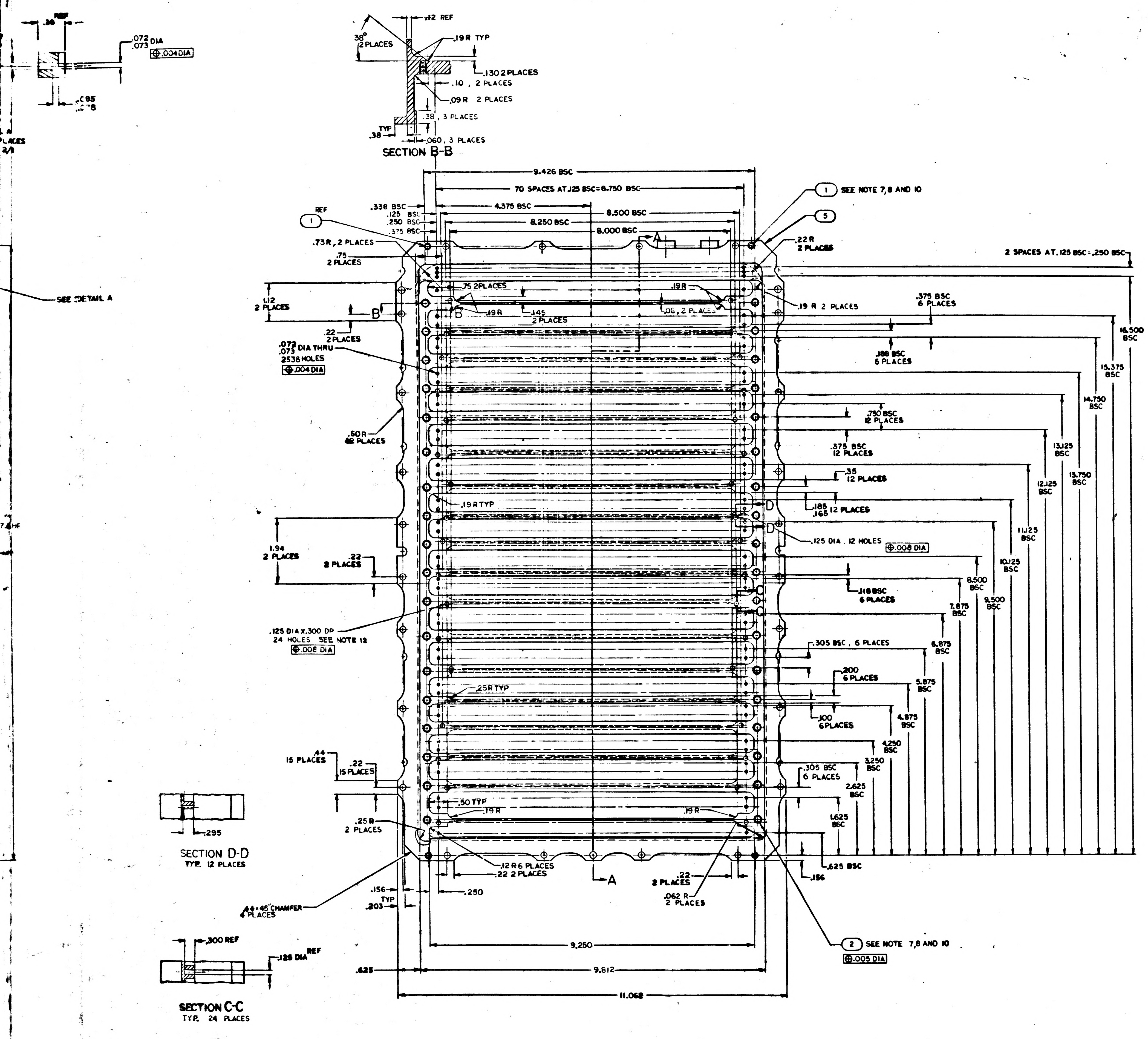
DRAWN De
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASC

MASTER

2008333 P

2/2008333

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
F		REPLACES WORD DRAWING REV E PER TDRR 21455			65	WR
G		REVISED PER TDRR 22502	RTS	[illegible]	[illegible]	[illegible]
H		REVISED PER TDRR 23112	[illegible]	[illegible]	15 Oct 65	WR
J		REVISED PER TDRR 24362	[illegible]	[illegible]		WR
K		REVISED PER TDRR 24970	RTS	[illegible]		WR
L		REVISED PER TDRR 24971	[illegible]	[illegible]	[illegible]	WR
M		REVISED PER TDRR 28476	[illegible]	JRS	9 MAY 66	
N		REVISED PER TDRR 32770	DR	n.w.	2 FEB 67	
P		REVISED PER TDRR 32790	DR	n.w.	2 FEB 67	



REF
.38
.072
.073 DIA
⊕.004 DIA
38°
2 PLACES
.12 REF
.19 R TYP
.130 2 PLACES
.10 , 2 PLACES
.09 R 2 PLACES
.38 , 3 PLACES
.38 TYP
.060, 3 PLACES
SECTION B-B
SEE DETAIL A
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
A
1 SEE NOTE 7,8 AND 10
5
1 REF
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
.75 2 PLACES
.19 R
.19 R
.145 2 PLACES
.06, 2 PLACES
.19 R 2 PLACES
1.12 2 PLACES
B
B
.22 2 PLACES
.072
.073 DIA THRU
2538 HOLES
⊕.004 DIA
2 SPACES AT .125 BSC=.250 BSC
.375 BSC 6 PLACES
.188 BSC 6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
12.125 BSC
.35 12 PLACES
.185
.165 12 PLACES
.50 R 42 PLACES
.19 R TYP
D
D
.125 DIA, 12 HOLES
⊕.008 DIA
11.125 BSC
10.125 BSC
8.500 BSC
9.500 BSC
7.875 BSC
.118 BSC 6 PLACES
1.94 2 PLACES
.22 2 PLACES
.125 DIA X .300 DP
24 HOLES SEE NOTE 12
⊕.008 DIA
C
C
.305 BSC, 6 PLACES
6.875 BSC
.200 6 PLACES
5.875 BSC
.25 R TYP
.100 6 PLACES
4.875 BSC
4.250 BSC
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.44 15 PLACES
.22 15 PLACES
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.625 BSC
.156
.12 R 6 PLACES
.22 2 PLACES
A
.22 2 PLACES
.062 R 2 PLACES
.250
.156
TYP
.203
.44 x 45° CHAMFER 4 PLACES
2 SEE NOTE 7,8 AND 10
⊕.005 DIA
9.250
.625
9.812
11.062
.295
SECTION D-D
TYP. 12 PLACES
.300 REF
.125 DIA REF
SECTION C-C
TYP. 24 PLACES

ⒷREPLACES WORD DRAWING REV A

1	2008333-001	TRAY S	5
2	1010957-009	INSERT, SCREW THREAD, SELF LOCKING	4
2	1010957-011	INSERT, SCREW THREAD, SELF LOCKING	3
36	1010957-010	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007085	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	De Zenzo	5/10/65
CHECKED	[illegible]	[illegible]
APPROVED	R. [illegible]	[illegible]
APPROVED	[illegible]	8/9/65
APPROVED MIT	W. Kupfer	10 Aug 65
APPROVED MSC	[illegible]	[illegible]
		DATE

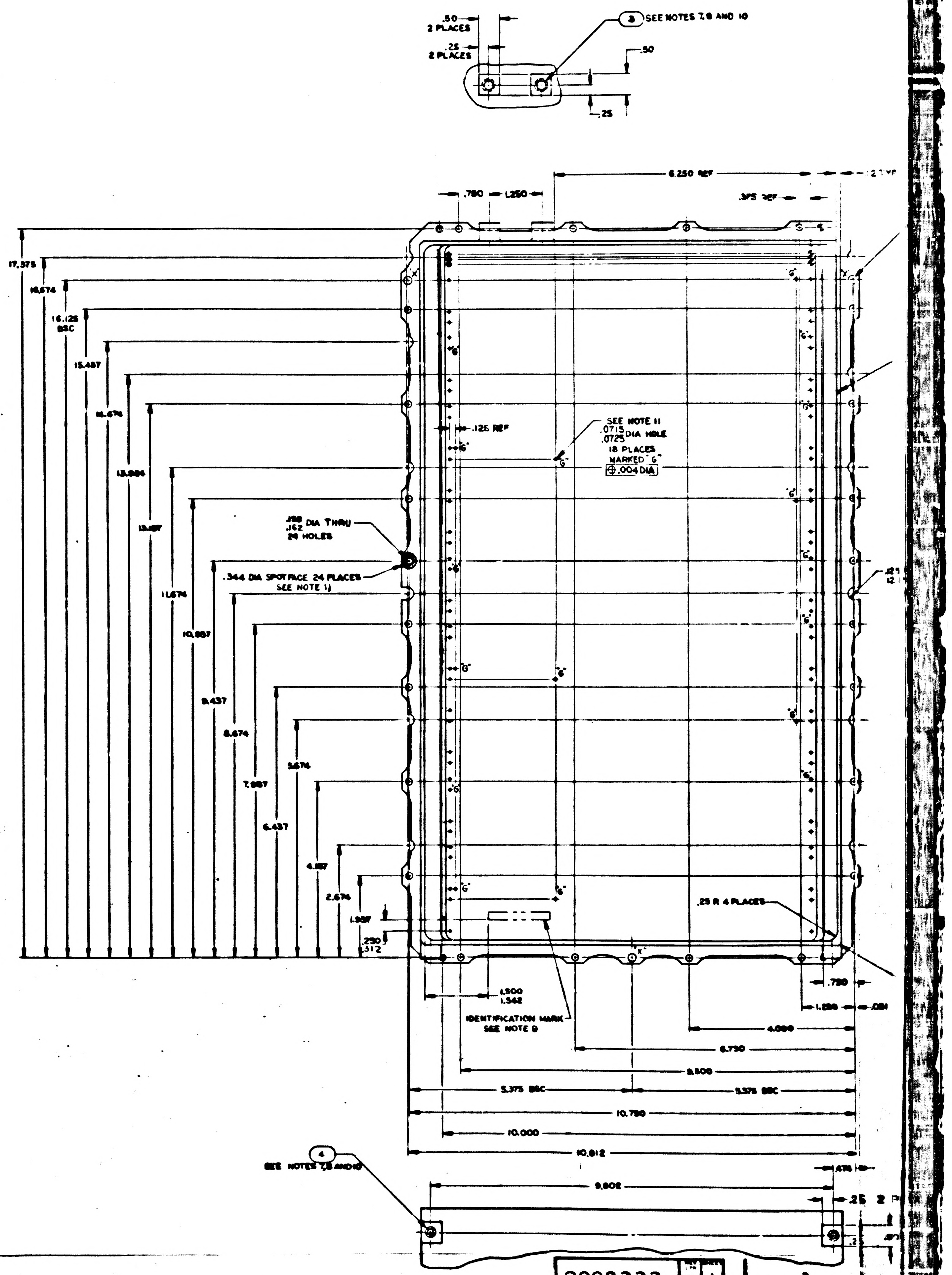
TRAY S, CDU
INSEPERABLE ASSEMBLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008333

SCALE FULL SHEET 1 OF 1

2008333 P

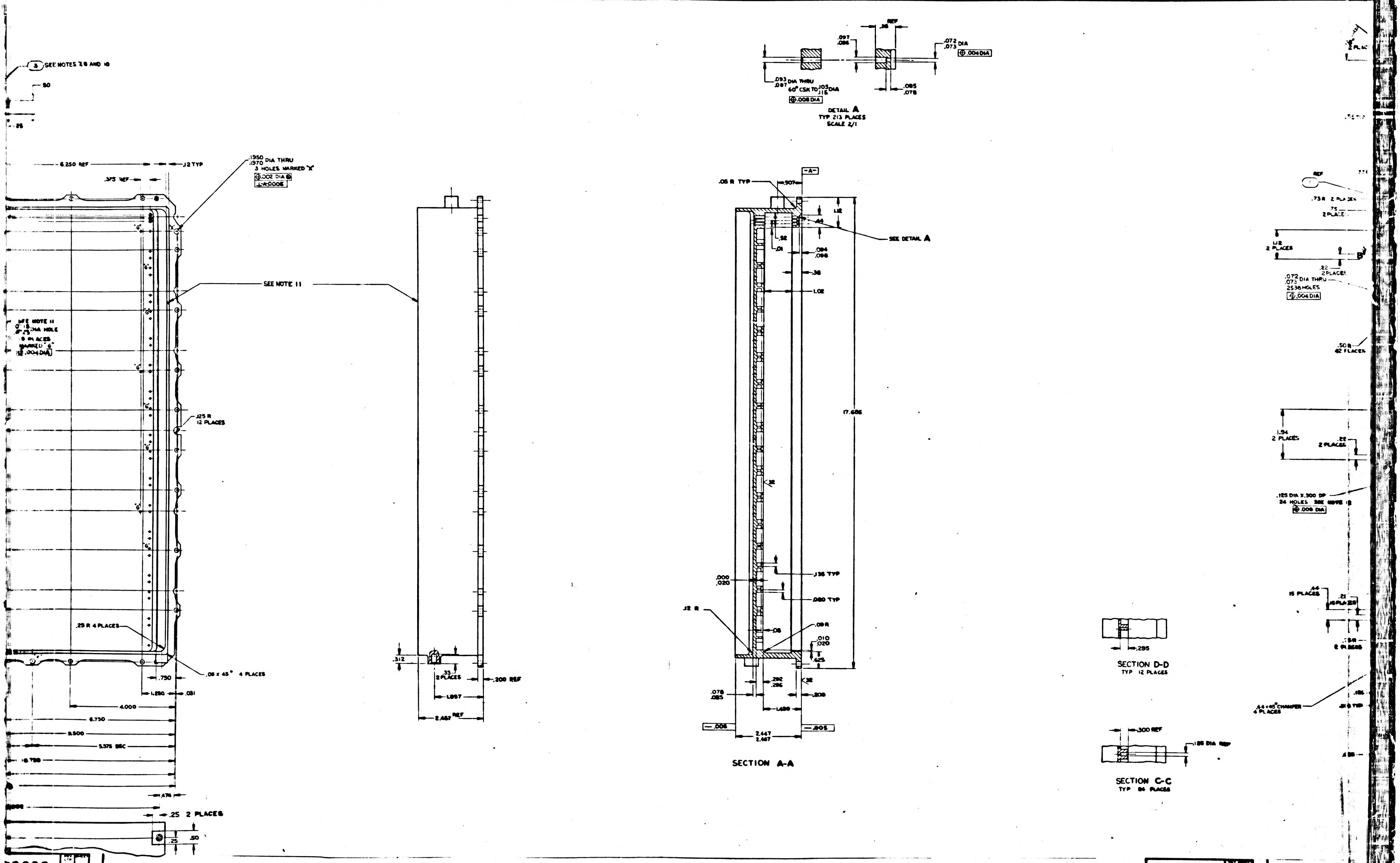
3/2008333


3 SEE NOTES 7, 8 AND 10
.50 2 PLACES
.25 2 PLACES
.50
.25
6.250 REF
.780
1.250
.375 REF
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
5.674
6.437
4.187
2.674
1.937
.250 .312
.125 REF
SEE NOTE 11 .0715 .0725 DIA HOLE 18 PLACES MARKED "G" ⊕ .004 DIA
.158 .162 DIA THRU 24 HOLES
.344 DIA SPOTFACE 24 PLACES SEE NOTE 11
.25 R 4 PLACES
1.500 1.562
IDENTIFICATION MARK SEE NOTE 9
.780
1.288
.081
4.000
6.750
9.500
5.375 BSC
5.375 BSC
10.750
10.000
10.812
4 SEE NOTES 7, 8 AND 10
9.802
.476
.25 2 P

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015.
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED.
6. FINISH: ANODIZE PER MIL-M-45202, TYPE 1, CLASS C. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
7. COAT THREADS OF HOLES FOR FIND NOS. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NOS. 1, 2, 3 AND 4 (SEE NOTE NO. 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
9. IDENTIFY, USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. HOLES FOR FIND NOS. 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
11. INDICATE HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171 TYPE II. DO NOT EPOXY COAT.
12. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND1002040.

2008333 | R | 1

1-2008333

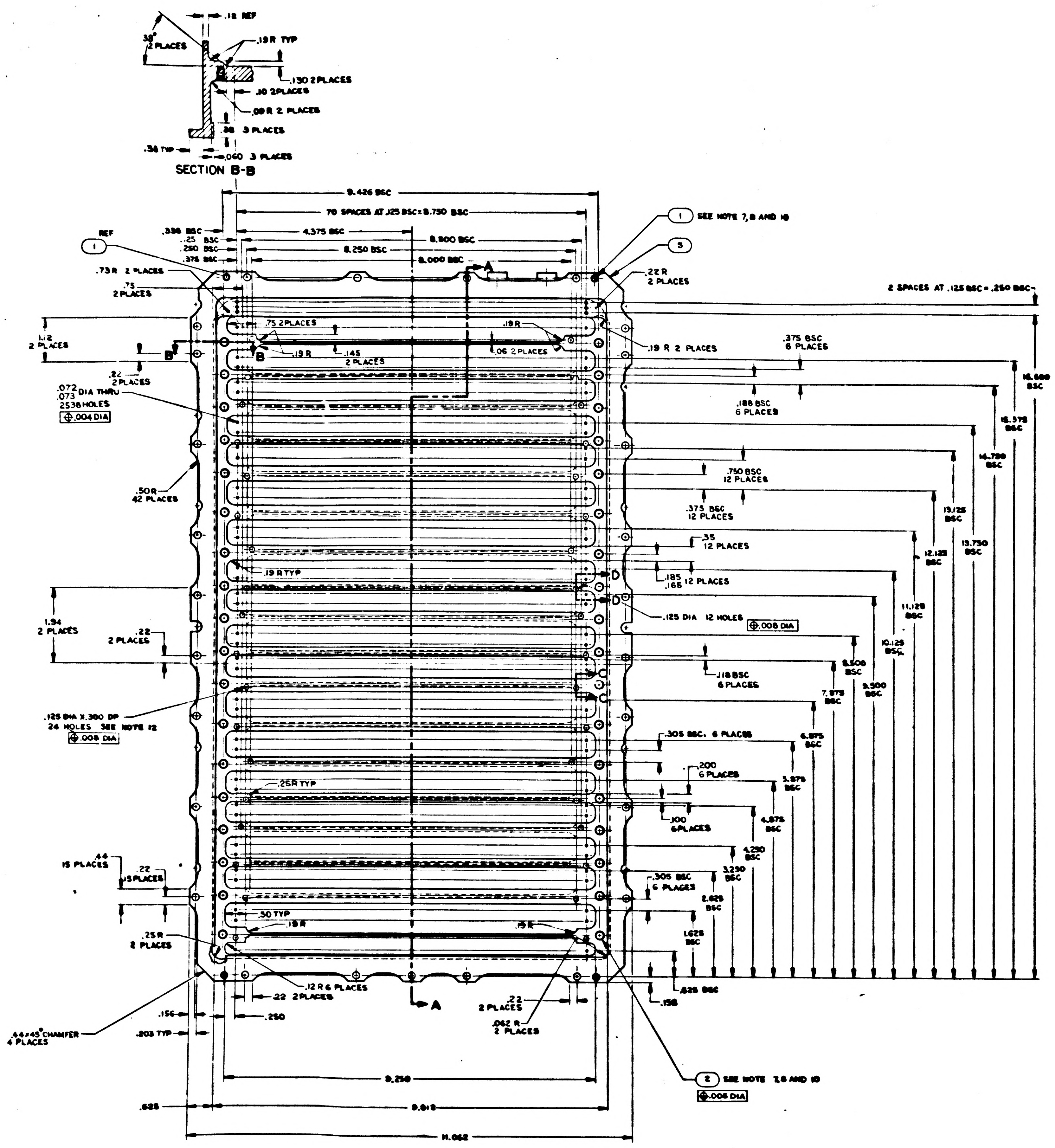


3 SEE NOTES 7,8 AND 10
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
.097 .086
.36 REF
.072 .073 DIA
⊕ .004 DIA
.085 .078
DETAIL A
TYP 213 PLACES
SCALE 2/1
6.250 REF
.12 TYP
.375 REF
.1950 .1970 DIA THRU
3 HOLES MARKED "X"
⊕ .002 DIA
⊥ A .0005
SEE NOTE 11
.125 R
12 PLACES
.25 R 4 PLACES
.06 X 45° 4 PLACES
.750
1.250
.031
4.000
6.750
9.500
5.375 BSC
.25 2 PLACES
.25
.50
.312
.33 2 PLACES
1.057
2.467 REF
.200 REF
.05 R TYP
.907
-A-
1.12
.44
.52
.01
SEE DETAIL A
.094 .098
.36
1.02
17.686
.32
.136 TYP
.080 TYP
.000 .020
.12 R
.08
.09 R
.010 .020
.625
.078 .085
.282 .286
1.438
.32
.308
.005
2.447 2.467
.005
SECTION A-A
.295
SECTION D-D
TYP 12 PLACES
.300 REF
.125 DIA REF
SECTION C-C
TYP 84 PLACES
.73 R 2 PLACES
.75 2 PLACES
1.12 2 PLACES
.22 2 PLACES
.072 .073 DIA THRU
2536 HOLES
⊕ .004 DIA
.50 R 42 PLACES
1.94 2 PLACES
.22 2 PLACES
.125 DIA X .300 DP
24 HOLES SEE NOTE 12
⊕ .008 DIA
.44 15 PLACES
.21 15 PLACES
.44 X 45° CHAMFER
4 PLACES
17
16
15
14
13
12
11
10
9
8

2008333 R 1

2/2008333

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	R	REDRAWN REV 'P' WITHOUT CHANGE PER TDRR 32931	CHG NO	25 FEB 67	


.12 REF
38° 2 PLACES
.19R TYP
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.38 3 PLACES
.38 TYP
.060 3 PLACES
SECTION B-B
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
.338 BSC
.25 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
REF
1
SEE NOTE 7, 8 AND 10
5
A
.73 R 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
1.12 2 PLACES
B
.75 2 PLACES
.19 R
.19 R
.145 2 PLACES
.06 2 PLACES
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
.22 2 PLACES
.072 .073 DIA THRU 2538 HOLES
.004 DIA
.188 BSC 6 PLACES
15.375 BSC
14.750 BSC
.750 BSC 12 PLACES
.50 R 42 PLACES
.375 BSC 12 PLACES
13.125 BSC
13.750 BSC
.35 12 PLACES
12.125 BSC
.19 R TYP
.185 .165 12 PLACES
D
D
.125 DIA 12 HOLES
.008 DIA
11.125 BSC
1.94 2 PLACES
.22 2 PLACES
10.125 BSC
8.500 BSC
.118 BSC 6 PLACES
C
C
9.500 BSC
7.875 BSC
.125 DIA X .300 DP 24 HOLES SEE NOTE 12
.008 DIA
.305 BSC. 6 PLACES
6.875 BSC
.200 6 PLACES
5.875 BSC
.25R TYP
.100 6 PLACES
4.875 BSC
4.250 BSC
.44 15 PLACES
.22 15 PLACES
3.250 BSC
.305 BSC 6 PLACES
2.625 BSC
.50 TYP
.19 R
.19 R
1.625 BSC
.25 R 2 PLACES
.625 BSC
.12 R 6 PLACES
.22 2 PLACES
A
.22 2 PLACES
.156
.062 R 2 PLACES
.156
.250
.44×45° CHAMFER 4 PLACES
.203 TYP
9.250
2
SEE NOTE 7, 8 AND 10
.005 DIA
.625
9.812
11.062

.125 DIA REF

QTY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	5	2008333-001	TRAY S
2	4	1010957-001	INSERT, SCREW THREAD, SELF LOCKING
2	3	1010957-011	INSERT, SCREW THREAD, SELF LOCKING
36	2	1010957-010	INSERT, SCREW THREAD, SELF LOCKING
4	1	MS21208C0610	INSERT, SCREW THREAD

LIST OF PARTS AND MATERIALS

2001986	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .01
3 PLACE DECIMALS ± .005
ANGLES ± ½°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN [illegible] DATE [illegible]
CHECKED R.P. [illegible] [illegible]
APPROVAL R.L. [illegible] [illegible]
CONTRACT
NASA APPROVAL [illegible]
MIT APPROVAL W. KUPFER 8-1-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY S, CDU
INSEPERABLE ASSEMBLY

SIZE J3
CODE IDENT NO. 80230
2008333
SCALE FULL
SHEET 1 OF 1

008333

3/2008333

2008333

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MIL-M-26075 (HK31A-H24 MAGNESIUM ALLOY).

LENGTH	WIDTH	THICKNESS	QTY
17.906	11.312	2.406	1
17.906	11.312	.296	1
17.906	11.312	.190	1

THE ABOVE SIZES ARE AS FINISHED OVERALL DIMENSIONS.

REVISIONS 19782				
SYM	DESCRIPTION	CHG NO.	DATE	APPD.

CONFIGURATION INCOMPLETE

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN R.J. Olson DATE 3 MAY 65
CHECKED Ed Foster 3 MAY 65
APPROVAL J. Ramare
APPROVAL D. R. Test 5/28/65
NASA APPROVAL W J Rhine 6-2-65
MIT APPROVAL M J Mundy 6-2-65

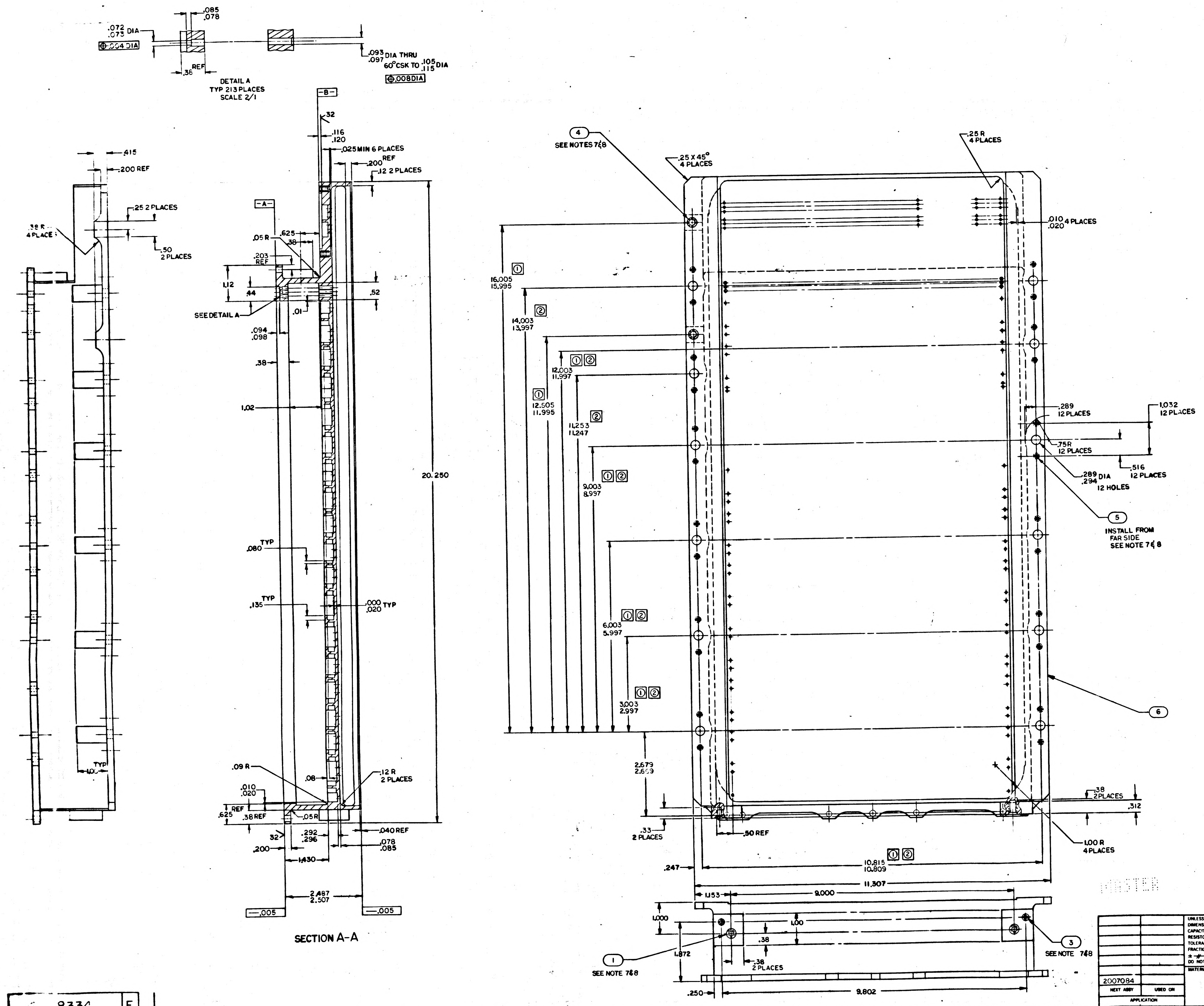
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY S
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE B
2008333
SCALE —
SHEET 1 OF 1

MIL 1077B-D 11-16-64

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
E		REPLACES WORD DWG REV D PER TDRR 2/454				



.072 .073 DIA
⊕ .004 DIA
.085 .078
.38 REF
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
-B-
32
.116 .120
.025 MIN 6 PLACES
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
-A-
.05 R
.625
.38
.203 REF
1.12
.44
.52
SEE DETAIL A
.01
.094 .098
.38
1.02
20.250
.080 TYP
.135 TYP
.000 .020 TYP
.09 R
.08
.12 R 2 PLACES
.010 .020
REF .625
.38 REF
.05 R
32
.292 .296
.040 REF
.078 .085
.200
1.430
2.487 2.507
—.005
—.005
SECTION A-A
TYP 1.0
4 SEE NOTES 7&8
.25 X 45° 4 PLACES
.25 R 4 PLACES
.010 .020 4 PLACES
16.005 15.995 ①
14.003 13.997 ②
12.003 11.997 ①②
12.505 11.995 ①
11.253 11.247 ②
9.003 8.997 ①②
6.003 5.997 ①②
3.003 2.997 ①②
2.679 2.669
.33 2 PLACES
.50 REF
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
5 INSTALL FROM FAR SIDE SEE NOTE 7&8
6
.38 2 PLACES
.312
1.00 R 4 PLACES
10.815 10.809 ①②
.247
11.307
1.153
9.000
1.000
1.00
.38
1.872
.38 2 PLACES
1 SEE NOTE 7&8
3 SEE NOTE 7&8
.250
9.802

MASTER

Ⓔ REPLACES WORD DWG REV D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21209-F4-10	INSERT, SCREW THREAD, SELF LOCKING	1

LIST OF MATERIALS

2007084	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .01 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

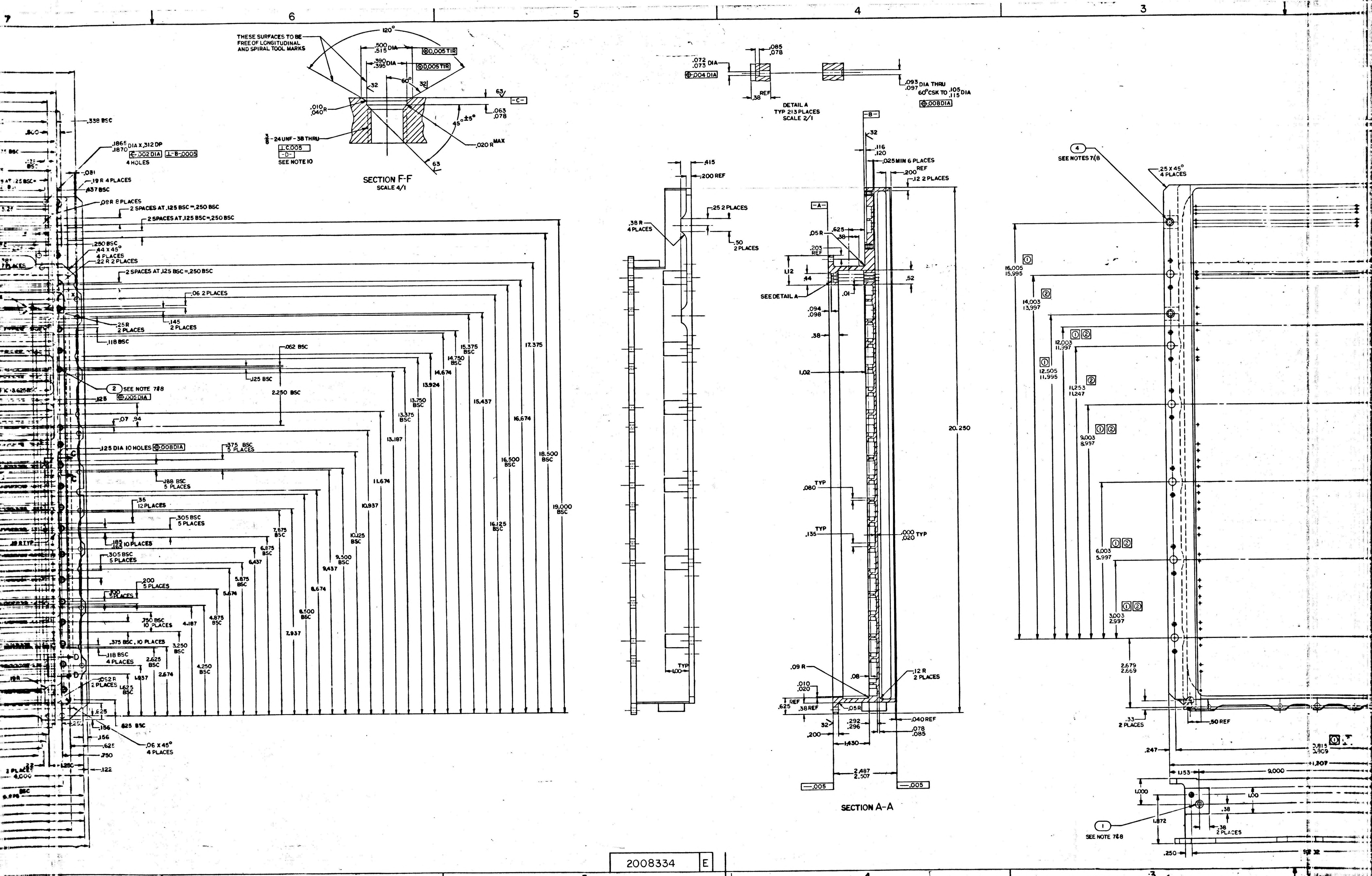
DRAWN W.F. Tracy 6/21/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

TRAY X CDU
INSEP ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008334
SCALE 1/1
SHEET OF 1

8334 E

F3


THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500/.515 DIA
⊕ D .005 TIR
.390/.395 DIA
60°
32
63
-C-
.010R/.040R
.063/.078
45° ±5°
3/8-24UNF-3B THRU
⊥ C .005
-D-
SEE NOTE 10
.020 R MAX
.072/.073 DIA
⊕ .004 DIA
.085/.078
.38 REF
.093/.097 DIA THRU 60° CSK TO .105/.115 DIA
⊕ .008 DIA
TYP 213 PLACES
SCALE 2/1
.338 BSC
.1865/.1870 DIA X .312 DP
⊕ .002 DIA ⊥ B .0005
4 HOLES
.031
.19 R 4 PLACES
.437 BSC
.09 R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.06 2 PLACES
.25R 2 PLACES
.145 2 PLACES
.118 BSC
.062 BSC
.125 BSC
2.250 BSC
② SEE NOTE 7&8
.125
⊕ .005 DIA
.07
.94
.125 DIA 10 HOLES ⊕ .008 DIA
.375 BSC 5 PLACES
.188 BSC 5 PLACES
.35 12 PLACES
.305 BSC 5 PLACES
.185/.125 10 PLACES
.305 BSC 5 PLACES
.200 5 PLACES
.100 5 PLACES
.750 BSC 10 PLACES
.375 BSC, 10 PLACES
.118 BSC 4 PLACES
.062 R 2 PLACES
.06 X 45° 4 PLACES
1.625
.156
.625
.750
.122
1.250
.625 BSC
1.625 BSC
1.937
2.625 BSC
2.674
3.250 BSC
4.187
4.250 BSC
4.875 BSC
5.674
5.875 BSC
6.437
6.875 BSC
7.875 BSC
7.937
8.500 BSC
8.674
9.437
9.500 BSC
10.125 BSC
10.937
11.674
13.187
13.375 BSC
13.750 BSC
13.924
14.674
14.750 BSC
15.375 BSC
15.437
16.125 BSC
16.500 BSC
16.674
17.375
18.500 BSC
19.000 BSC
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
1.00 TYP
-B-
32
.116/.120
.025 MIN 6 PLACES
.200 REF
.12 2 PLACES
-A-
.05R
.625
.38
.203 REF
1.12
.44
.52
SEE DETAIL A
.01
.094/.098
.38
1.02
20.250
.080 TYP
.135 TYP
.000/.020 TYP
.09 R
.08
.12 R 2 PLACES
.010/.020
REF .625
.38 REF
.05R
.040 REF
.078/.085
32
.292/.296
.200
1.430
2.487/2.507
⏥ .005
④ SEE NOTES 7&8
.25 X 45° 4 PLACES
16.005/15.995 ①
14.003/13.997 ②
12.003/11.997 ① ②
12.505/11.995 ①
11.253/11.247 ②
9.003/8.997 ① ②
6.003/5.997 ① ②
3.003/2.997 ① ②
2.679/2.669
.33 2 PLACES
.50 REF
.247
3.915/3.909
1.307
1.153
9.000
1.000
1.00
.38
1.872
.38 2 PLACES
① SEE NOTE 7&8
.250

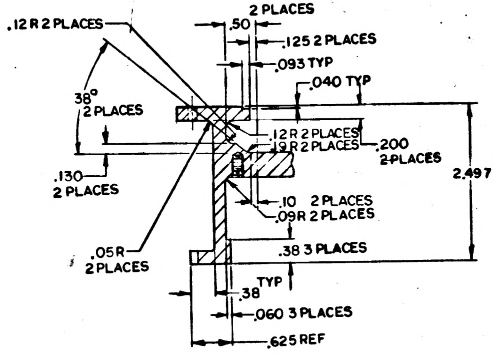
SECTION F-F
SCALE 4/1

DETAIL A
TYP 213 PLACES
SCALE 2/1

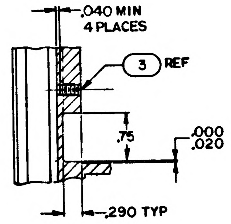
SECTION A-A

2008334 E

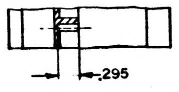
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.12 R 2 PLACES
.50
2 PLACES
.125 2 PLACES
.093 TYP
.040 TYP
38° 2 PLACES
.12 R 2 PLACES
.19 R 2 PLACES
.200 2 PLACES
2.497 REF
.130 2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R 2 PLACES
.38 3 PLACES
TYP
.38
.060 3 PLACES
.625 REF

SECTION B-B


.040 MIN 4 PLACES
3 REF
.75
.000 .020
.290 TYP

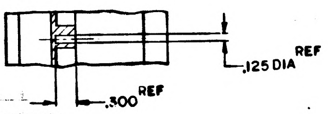
SECTION E-E



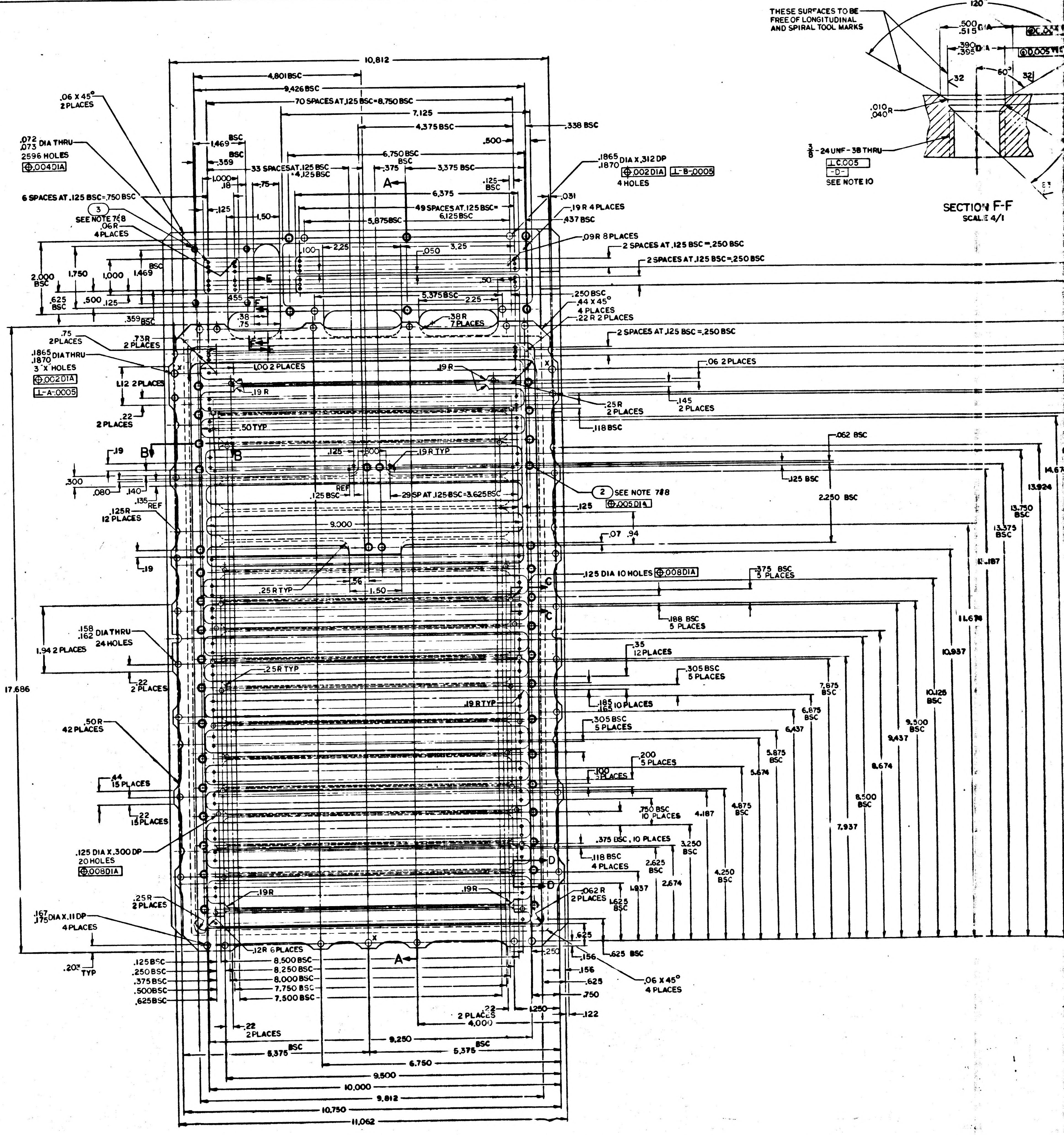
SECTION C-C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS 2
7. COAT THREADS OF FIND NO. 1,2,3,4 AND 5 WITH MIL-P-8585
8. INSTALL FIND NOS. 1,2,3,4 AND 5 PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG
9. IDENTIFY WITH PART NO. PER ND1002019
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DEMENSION IS CONTROLLED BY ICD LID-340-10000


.125 DIA REF
.300 REF

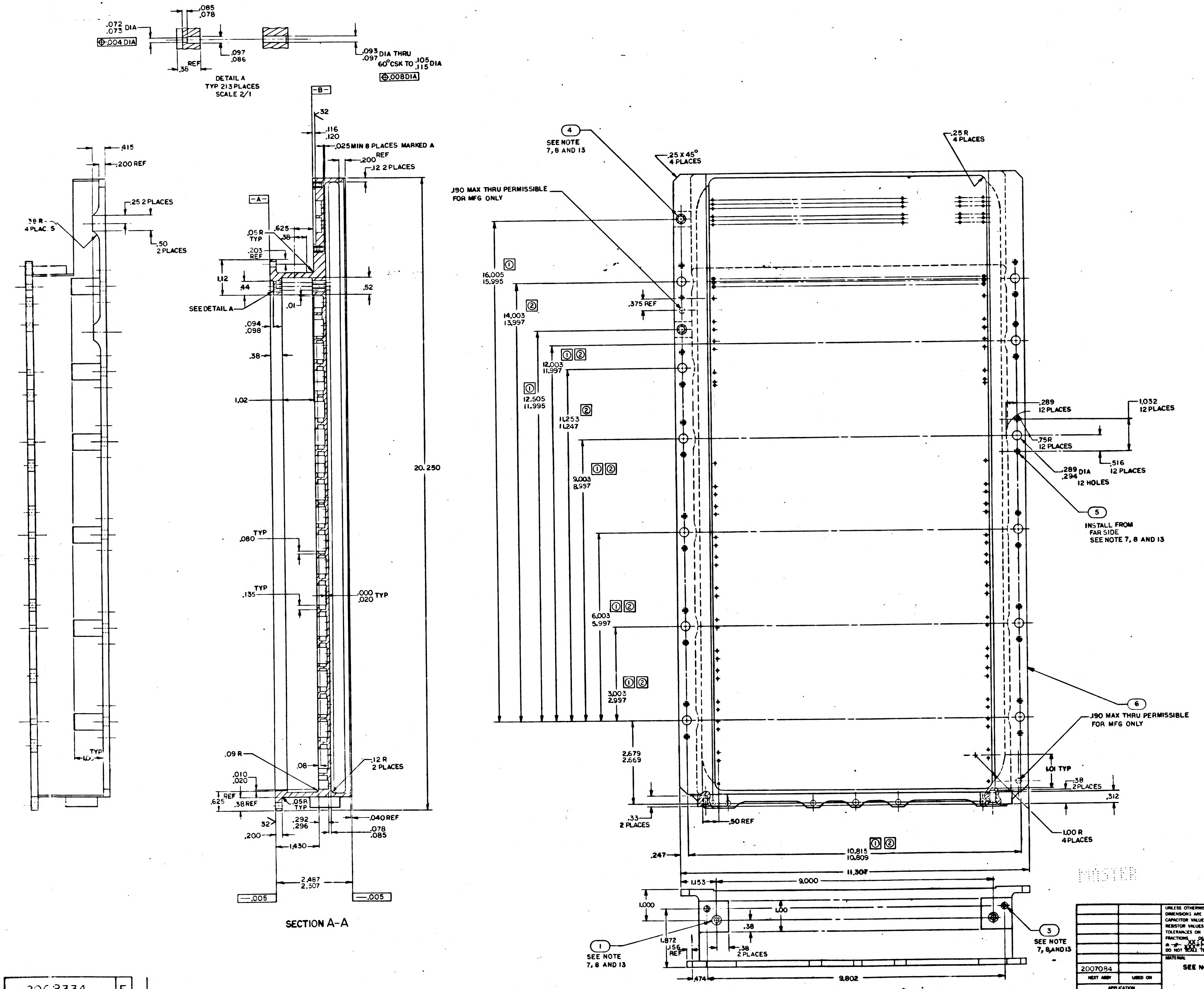
SECTION D-D


THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
.390 .395 DIA
.005
32
60°
32
.010 .040 R
3/8 - 24 UNF - 3B THRU
⊥ C .005
-D-
SEE NOTE 10
SECTION F-F
SCALE 4/1
10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.338 BSC
.500
.06 X 45° 2 PLACES
.072 .073 DIA THRU 2596 HOLES
⊕ .004 DIA
1.469
.359
33 SPACES AT .125 BSC = 4.125 BSC
6.750 BSC
.375
3.375 BSC
.1865 .1870 DIA X .312 DP 4 HOLES
⊕ .002 DIA
-B- .0005
1.000
.18
.75
A
.125 BSC
6.375
.031
6 SPACES AT .125 BSC = .750 BSC
3 SEE NOTE 7&8
.06R 4 PLACES
.125
1.50
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
.19 R 4 PLACES
.437 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
2 SPACES AT .125 BSC = .250 BSC
2.000 BSC
1.750
1.000
1.469 BSC
.100
2.25
.050
3.25
.50
E
.625 BSC
.500
.125
.455
F
5.375 BSC
2.25
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.359 BSC
.38 .75
.38R 7 PLACES
.75 2 PLACES
.73R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
.1865 .1870 DIA THRU 3 X HOLES
⊕ .002 DIA
-A- .0005
1.00 2 PLACES
.19R
.06 2 PLACES
1.12 2 PLACES
.19 R
.25R 2 PLACES
.145 2 PLACES
.22 2 PLACES
.118 BSC
.50 TYP
.062 BSC
.19
B
.125
.100
.19 R TYP
.300
.080
.140
.135 REF
REF .125 BSC
29 SP AT .125 BSC = 3.625 BSC
2 SEE NOTE 7&8
⊕ .005 DIA
.125
.125 BSC
2.250 BSC
14.67
13.924
13.750
13.375 BSC
.125R 12 PLACES
9.000
.07
.94
11.187
.19
.56
1.50
.25 R TYP
.125 DIA 10 HOLES
⊕ .008 DIA
.375 BSC 5 PLACES
C
.188 BSC 5 PLACES
11.676
.158 .162 DIA THRU 24 HOLES
1.94 2 PLACES
.35 12 PLACES
10.937
.25R TYP
.305 BSC 5 PLACES
17.686
.22 2 PLACES
7.875 BSC
.19 R TYP
.185 .162 10 PLACES
6.875 BSC
10.125 BSC
.305 BSC 5 PLACES
6.437
9.500 BSC
9.437
.50R 42 PLACES
5.875 BSC
.200 5 PLACES
8.674
.44 15 PLACES
.100 .15 PLACES
5.674
.22 15 PLACES
.750 BSC 10 PLACES
4.187
4.875 BSC
8.500 BSC
7.937
.375 BSC, 10 PLACES
3.250 BSC
.125 DIA X .300 DP 20 HOLES
⊕ .008 DIA
.118 BSC 4 PLACES
2.625 BSC
4.250 BSC
D
1.937
2.674
.25R 2 PLACES
.19R
.19R
.062 R 2 PLACES
1.625 BSC
.167 .175 DIA X .11 DP 4 PLACES
.625
.625 BSC
.12R 6 PLACES
.203 TYP
.250
.156
.156
.06 X 45° 4 PLACES
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.625
.750
2 PLACES .22
4.000
1.250
.122
.22 2 PLACES
9.250
8.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062

2008334 E

34

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	C'K	DATE	APPROVED
E		REPLACES WORD DWG REV D PER TDRR 21454				WK
F		REVISED PER TDRR 22500			7Sep65	



.085
.078
.072
.073 DIA
⊕.004 DIA
.097
.086
.38
REF
.093
.097 DIA THRU
60° CSK TO .105
.115 DIA
⊕.008 DIA
DETAIL A
TYP 213 PLACES
SCALE 2/1
-B-
32
.116
.120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R
4 PLACES
.50
2 PLACES
-A-
.05 R
TYP
.625
.38
.203
REF
1.12
.44
.52
SEE DETAIL A
.01
.094
.098
.38
1.02
20.250
.080 TYP
.135 TYP
.000
.020 TYP
1.00 TYP
.09 R
.08
.12 R
2 PLACES
.010
.020
REF
.625
.38 REF
.05 R
TYP
32
.292
.296
.040 REF
.078
.085
.200
1.430
2.487
2.507
.005
.005
SECTION A-A
4
SEE NOTE
7, 8 AND 13
.25 X 45°
4 PLACES
.25 R
4 PLACES
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
16.005
15.995
①
14.003
13.997
②
.375 REF
12.003
11.997
①②
12.505
11.995
①
11.253
11.247
②
9.003
8.997
①②
6.003
5.997
①②
3.003
2.997
①②
2.679
2.669
.33
2 PLACES
.50 REF
.289
12 PLACES
1.032
12 PLACES
.75 R
12 PLACES
.516
12 PLACES
.289
.294 DIA
12 HOLES
5
INSTALL FROM
FAR SIDE
SEE NOTE 7, 8 AND 13
6
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
1.01 TYP
.38
2 PLACES
.312
1.00 R
4 PLACES
10.815
10.809
①②
.247
11.307
1.153
9.000
1.000
1.00
.38
1.872
.156
REF
.38
2 PLACES
1
SEE NOTE
7, 8 AND 13
3
SEE NOTE
7, 8 AND 13
.474
9.802

Ⓔ REPLACES WORD DWG REV D

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21209-F4-10	INSERT, SCREW THREAD, SELF LOCKING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	W.F. Tracy	6/21/65
CHECKED		
APPROVED	R.J.	
APPROVED		7/9/65
APPROVED MIT		
APPROVED MSC		
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

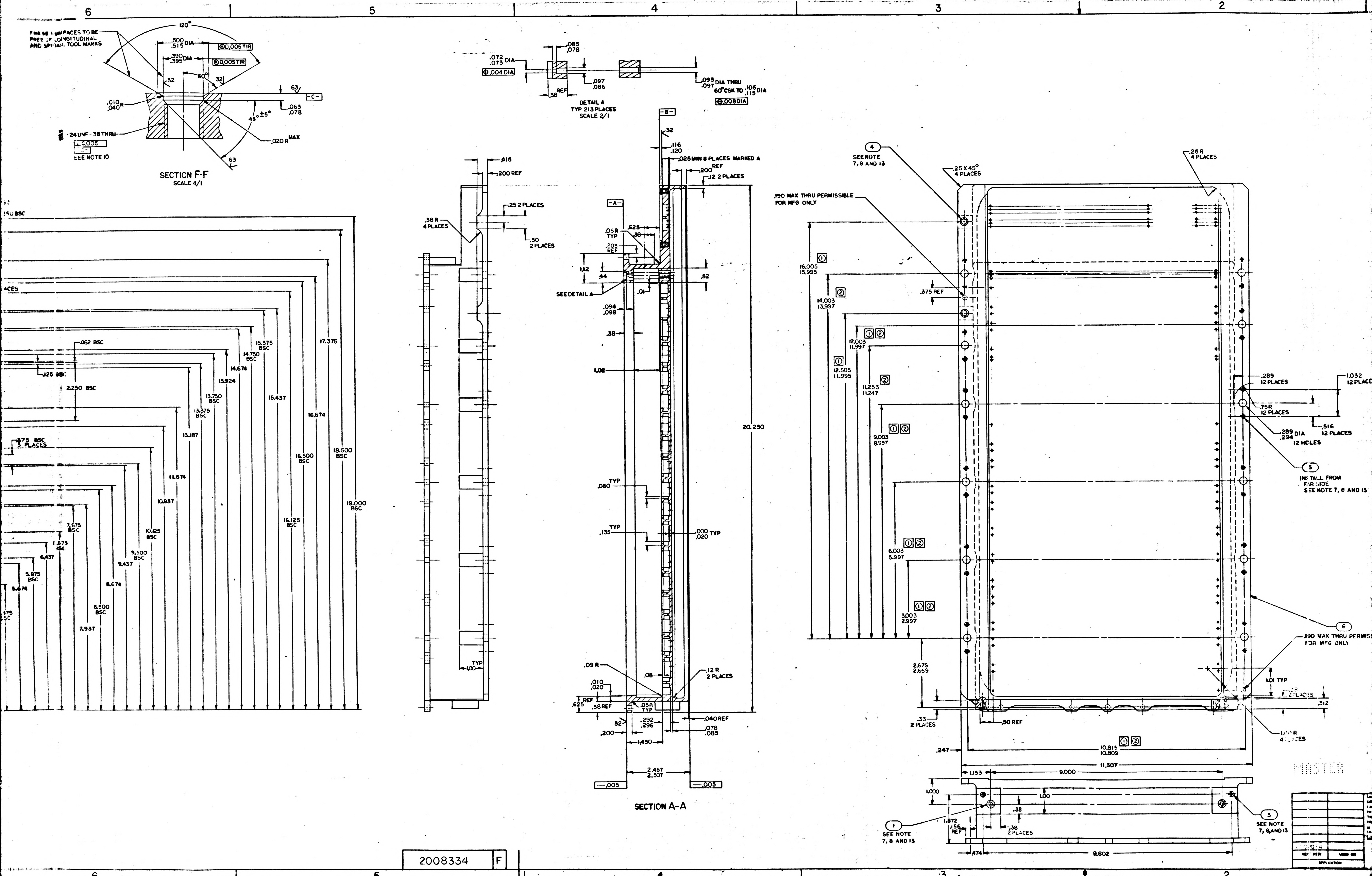
TRAY X CDU
INSEP ASSY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008334

SCALE 1/1 SHEET OF 1

2008334 F

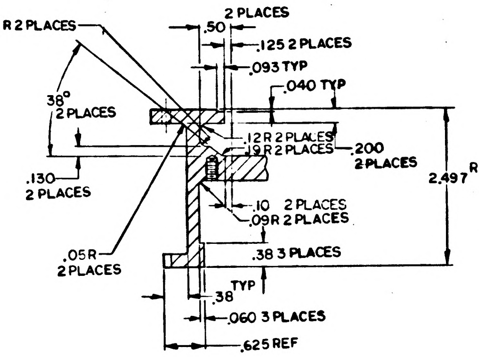
F-3


THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
.390 .395 DIA
D .005 TIR
60°
32
63
-C-
.010 .040 R
.063 .078
45° ±5°
.020 R MAX
.24 UNF-3B THRU
SEE NOTE 10
SECTION F-F
SCALE 4/1
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38 REF
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
-B-
.116 .120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
-A-
.05 R TYP
.625
.203 REF
1.12
.44
.52
SEE DETAIL A
.01
.094 .098
.38
1.02
.080 TYP
.135 TYP
.000 .020 TYP
20.250
.09 R
.08
.12 R 2 PLACES
.010 .020
.625 REF
.38 REF
.05 R TYP
.292 .296
.040 REF
.078 .085
.200
1.430
2.487 2.507
.005
SECTION A-A
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
1.00 TYP
.062 BSC
.125 BSC
2.250 BSC
.375 BSC 5 PLACES
17.375
18.500 BSC
19.000 BSC
16.674
16.500 BSC
16.125 BSC
15.437
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
11.674
10.937
10.125 BSC
9.500 BSC
9.437
8.674
8.500 BSC
7.937
7.675 BSC
6.875 BSC
6.437
5.875 BSC
5.674
SEE NOTE 7, 8 AND 13
.25 X 45° 4 PLACES
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
16.005 15.995
14.003 13.997
.375 REF
12.003 11.997
12.505 11.995
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
2.675 2.669
.33 2 PLACES
.50 REF
.289 12 PLACES
.75 R 12 PLACES
1.032 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.01 TYP
2 PLACES
.312
1.00 R 4 PLACES
.247
10.815 10.809
11.307
1.153
9.000
1.000
1.00
.38
1.872
.156 REF
.38 2 PLACES
.474
9.802
SEE NOTE 7, 8 AND 13
SEE NOTE 7, 8 AND 13
1
2
3
4
5
6
MASTER
NEXT ASSY
USED ON
APPLICATION

2008334 F

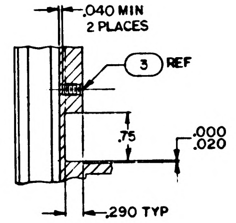
F-2

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO



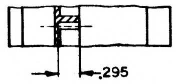
.12 R 2 PLACES
2 PLACES
.50
.125 2 PLACES
.093 TYP
.040 TYP
38°
2 PLACES
.12 R 2 PLACES
.19 R 2 PLACES
.200
2 PLACES
2.497 REF
.130
2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R
2 PLACES
.38 3 PLACES
.38 TYP
.060 3 PLACES
.625 REF

SECTION B-B

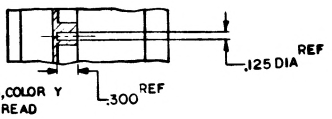


.040 MIN
2 PLACES
3 REF
.75
.000
.020
.290 TYP

SECTION E-E

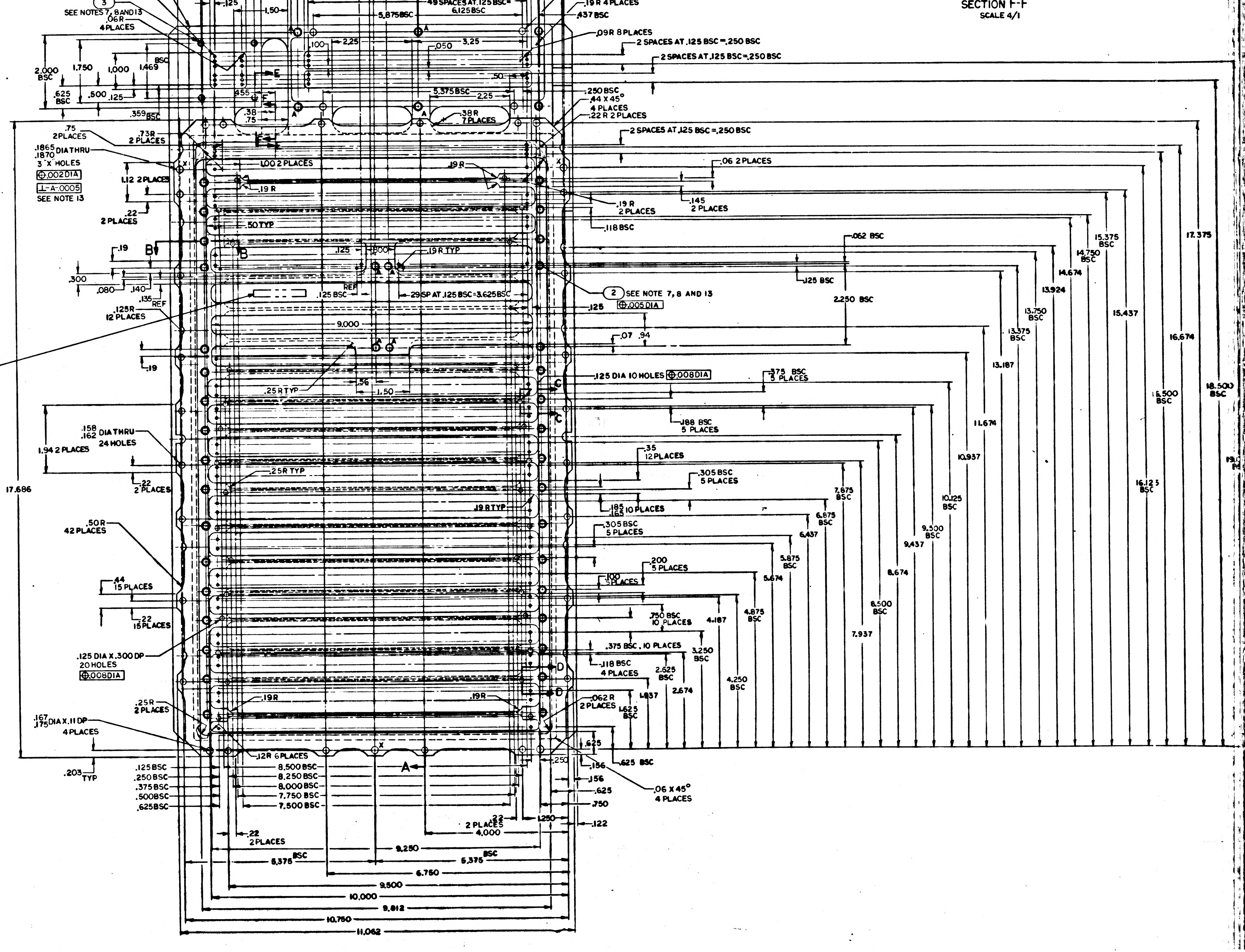


SECTION C-C

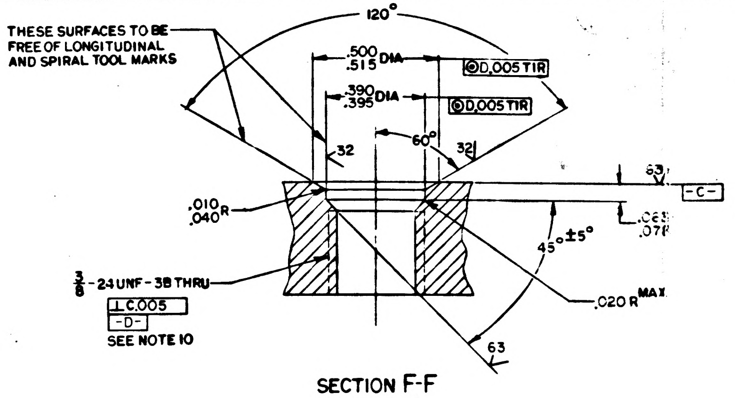


.125 DIA REF
.300 REF

SECTION D-D



9
8
7
6
D
C
B
A
10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
7.125
4.375 BSC
.338 BSC
.500
6.750 BSC
.375
3.375 BSC
1.469 BSC
.359
33 SPACES AT .125 BSC=4.125 BSC
1.000
.18
.75
.06 X 45°
2 PLACES
.072
.073 DIA THRU
2596 HOLES
⊕.004 DIA
6 SPACES AT .125 BSC=.750 BSC
3
SEE NOTES 7, 8 AND 13
.06R
4 PLACES
.125
1.50
6.375
49 SPACES AT .125 BSC=6.125 BSC
5.875 BSC
.1865
.1870 DIA X .312 DP
⊕.002 DIA ⊥-B-.0005
4 HOLES
.031
.19 R 4 PLACES
.437 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC=.250 BSC
2 SPACES AT .125 BSC=.250 BSC
2.000 BSC
1.750
1.000
1.469 BSC
.625 BSC
.500
.125
.100
2.25
.050
3.25
.455
E
F
.50
5.375 BSC
2.25
.250 BSC
.44 X 45°
4 PLACES
.22 R 2 PLACES
.359 BSC
.38
.75
.38R
7 PLACES
2 SPACES AT .125 BSC=.250 BSC
.75
2 PLACES
.73R
2 PLACES
.1865
.1870 DIA THRU
3 "X" HOLES
⊕.002 DIA
⊥-A-.0005
SEE NOTE 13
1.00 2 PLACES
.19R
.19 R
.12 2 PLACES
.22
2 PLACES
.50 TYP
.06 2 PLACES
.19 R
2 PLACES
.145
2 PLACES
.118 BSC
.19
B
.125
.200
.19R TYP
.062 BSC
.300
.080
.140
.135 REF
.125 BSC
REF
29 SP AT .125 BSC=3.625 BSC
2 SEE NOTE 7, 8 AND 13
⊕.005 DIA
.125
.125 BSC
2.250 BSC
.125R
12 PLACES
9.000
.07
.94
IDENTIFICATION MARK
.19
.56
1.50
.25 R TYP
C
.125 DIA 10 HOLES ⊕.008 DIA
.375 BSC
5 PLACES
.188 BSC
5 PLACES
.158
.162 DIA THRU
24 HOLES
1.94 2 PLACES
.35
12 PLACES
.25R TYP
.22
2 PLACES
.305 BSC
5 PLACES
17.686
.19 R TYP
.185
.165 10 PLACES
.305 BSC
5 PLACES
.50R
42 PLACES
.200
5 PLACES
.100
5 PLACES
.44
15 PLACES
.22
15 PLACES
.750 BSC
10 PLACES
.375 BSC, 10 PLACES
.118 BSC
4 PLACES
.125 DIA X .300 DP
20 HOLES
⊕.008 DIA
D
.25R
2 PLACES
.19R
.19R
.062 R
2 PLACES
.167
.175 DIA X .11 DP
4 PLACES
.12R 6 PLACES
.625
.625 BSC
.250
.156
.156
.625
.750
.06 X 45°
4 PLACES
.203 TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
A
x
.22
2 PLACES
.22
2 PLACES
4.000
1.250
.122
9.250
5.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
15.437
16.674
17.375
18.500 BSC
15.500 BSC
16.125 BSC
11.674
10.937
10.125 BSC
9.500 BSC
9.437
8.674
8.500 BSC
7.937
7.875 BSC
6.875 BSC
6.437
5.875 BSC
5.674
4.875 BSC
4.187
4.250 BSC
3.250 BSC
2.625 BSC
2.674
1.837
1.625 BSC



THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500
.515 DIA
◎D.005 TIR
.390
.395 DIA
◎D.005 TIR
32
60°
32
63
-C-
.010
.040 R
.063
.078
45°±5°
3/8-24 UNF-3B THRU
⊥C.005
-D-
SEE NOTE 10
.020 R MAX
63

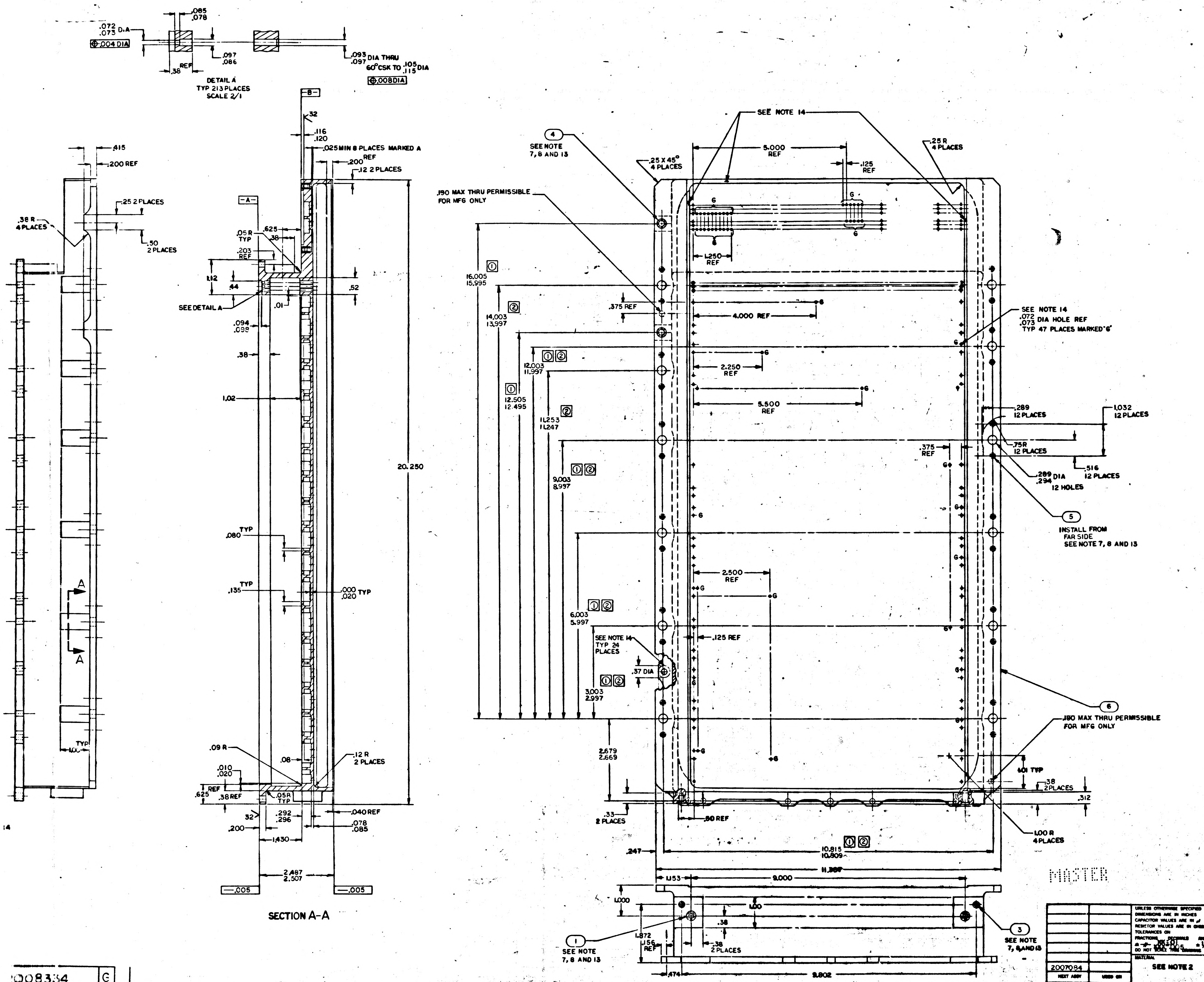
SECTION F-F
SCALE 4/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF FIND NO. 1,2,3,4 AND 5 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NOS. 1,2,3,4 AND 5 WET PER MS 33646 THREAD CLASS 2B REMOVE DRIVING TANG
9. IDENTIFY WITH PART NO. PER ND1002015
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DEMENSION IS CONTROLLED BY ICD LID-340-10000
13. HOLES FOR FIND NO. 1,2,3,4, AND 5, AND HOLES MARK "X" MUST BE FREE OF ANODIZE

2008334	F

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
E		REPLACES WORD DWG REV D PER TDRR 21454				
F		REVISED PER TDRR 22500				
G		REVISED PER TDRR 23111				



.072
.073 DIA
⊕.004 DIA
.085
.078
.097
.086
.38 REF
.093
.097 DIA THRU
60° CSK TO .105 .115 DIA
⊕.008 DIA
DETAIL A
TYP 213 PLACES
SCALE 2/1
-B-
32
.116
.120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R
4 PLACES
.50
2 PLACES
-A-
.625
.05 R
TYP
.38
.203
REF
1.12
.44
.52
SEE DETAIL A
.01
.094
.098
.38
1.02
20.250
.080 TYP
.135 TYP
.000
.020 TYP
A
A
TYP
1.00
.09 R
.08
.12 R
2 PLACES
.010
.020
REF
.625
.38 REF
.05 R
TYP
32
.292
.296
.040 REF
.078
.085
.200
1.430
2.487
2.507
-.005
-.005
SECTION A-A
SEE NOTE 14
5.000
REF
.125
REF
.25 R
4 PLACES
4
SEE NOTE
7, 8 AND 13
.25 X 45°
4 PLACES
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
G
1.250
REF
16.005
15.995
①
14.003
13.997
②
.375 REF
4.000 REF
12.003
11.997
①②
2.250
REF
12.505
12.495
5.500
REF
11.253
11.247
9.003
8.997
SEE NOTE 14
.072
.073 DIA HOLE REF
TYP 47 PLACES MARKED 'G'
.289
12 PLACES
1.032
12 PLACES
.75 R
12 PLACES
.375
REF
.516
12 PLACES
.289
.294 DIA
12 HOLES
5
INSTALL FROM
FAR SIDE
SEE NOTE 7, 8 AND 13
2.500
REF
6.003
5.997
SEE NOTE 14
TYP 24
PLACES
.125 REF
.37 DIA
3.003
2.997
6
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
2.679
2.669
.601 TYP
.38
2 PLACES
.312
.33
2 PLACES
.50 REF
1.00 R
4 PLACES
10.815
10.809
.247
11.307
1.153
9.000
1.000
1.00
.38
1.872
.156
REF
.38
2 PLACES
1
SEE NOTE
7, 8 AND 13
3
SEE NOTE
7, 8 AND 13
.474
9.802

MASTER

Ⓔ REPLACES WORD DWG REV D

1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD, SELF LOCKING	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007084	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± -/- .XX ± .01 .XXX ± .005 ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

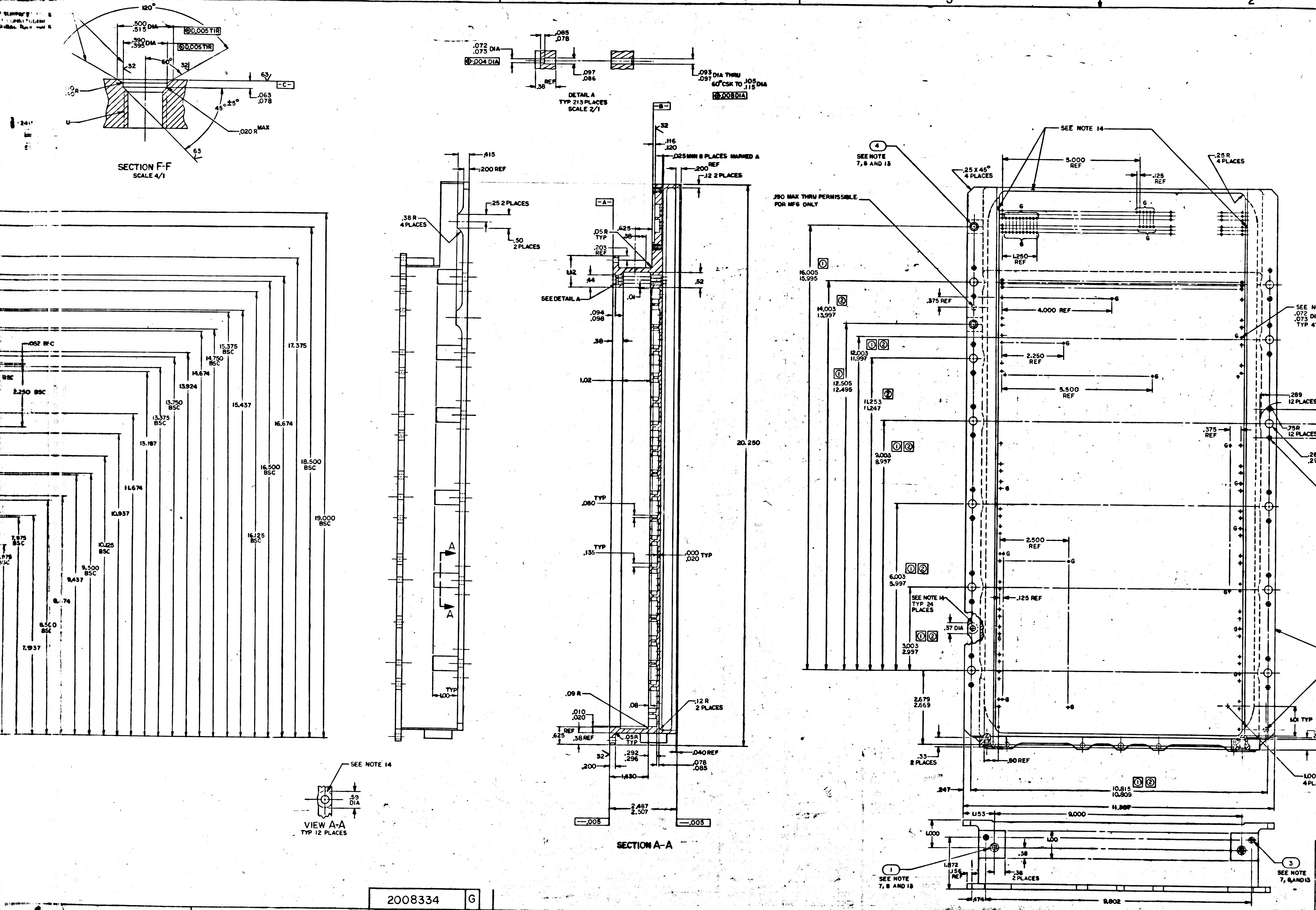
DRAWN W.F. Tonge 6/21/65
CHECKED
APPROVED R.F. Van Sta
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X CDU
INSEP ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008334
SCALE 1/1
SHEET OF 1

008334 G

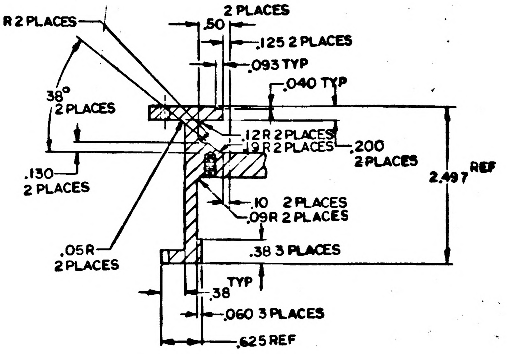

SECTION F-F
SCALE 4/1
120°
.500 .515 DIA
.390 .395 DIA
0.005 TIR
60°
45° ±5°
.020 R MAX
.063 .078
-C-
DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
.38 R 4 PLACES
.25 2 PLACES
.50 2 PLACES
.415
.200 REF
A
A
TYP
1.00
SEE NOTE 14
.59 DIA
VIEW A-A
TYP 12 PLACES
-B-
-A-
.025 MIN 8 PLACES MARKED A
.12 2 PLACES
SEE DETAIL A
20.250
.09 R
.12 R 2 PLACES
.040 REF
.078 .085
.292 .296
1.430
2.487 2.507
-.005
-.005
SECTION A-A
.062 BSC
2.250 BSC
17.375
18.500 BSC
19.000 BSC
16.500 BSC
16.125 BSC
15.375 BSC
14.750 BSC
SEE NOTE 14
5.000 REF
.125 REF
.25 R 4 PLACES
.25 X 45° 4 PLACES
SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
16.005 15.995
14.003 13.997
12.003 11.997
12.505 12.495
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
2.679 2.669
1.250 REF
.375 REF
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
.37 DIA
SEE NOTE 14 TYP 24 PLACES
SEE NOTE 14
.072 .073 DIA HOLE REF
TYP 47 PLACES MARKED "G"
.289 12 PLACES
1.032 12 PLACES
.75R 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE
SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.01 TYP
.38 2 PLACES
.312
1.00 R 4 PLACES
.33 2 PLACES
.50 REF
10.815 10.809
11.307
9.000
1.153
.247
1.000
1.00
.38
1.872
.156 REF
.38 2 PLACES
.474
9.802
SEE NOTE 7, 8 AND 13
SEE NOTE 7, 8 AND 13
1
3
4
5
6

MASTER

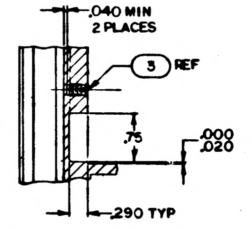
2007084	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN
RESISTOR VALUES ARE IN
TOLERANCES ON
FRACTIONS DECIMALS
DO NOT
MATERIAL
SEE NOTE 2

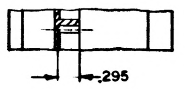
2008334 G


.12 R 2 PLACES
2 PLACES
.50
.125 2 PLACES
.093 TYP
.040 TYP
38° 2 PLACES
.12 R 2 PLACES
.19 R 2 PLACES
.200 2 PLACES
2.497 REF
.130 2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R 2 PLACES
.38 3 PLACES
TYP
.38
.060 3 PLACES
.625 REF

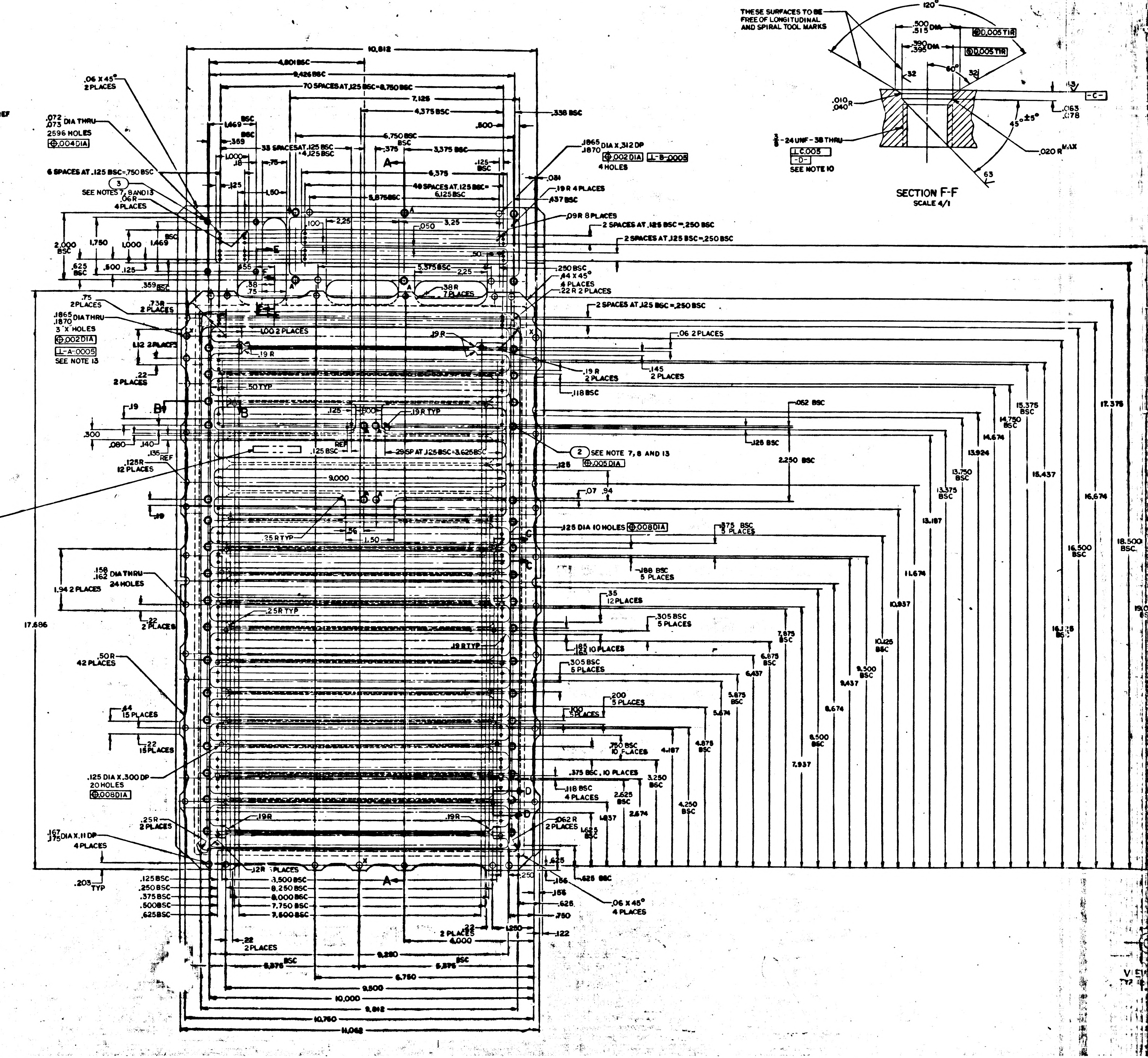
SECTION B-B

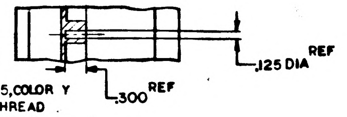

.040 MIN 2 PLACES
3 REF
.75
.000 .020
.290 TYP

SECTION E-E



SECTION C-C


IDENTIFICATION MARK
10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
7.125
4.375 BSC
.338 BSC
.06 X 45° 2 PLACES
.072 .073 DIA THRU 2596 HOLES ⊕.004 DIA
1.469 BSC
.369 BSC
33 SPACES AT .125 BSC=4.125 BSC
6.750 BSC
.375
3.375 BSC
.500
.1865 .1870 DIA X .312 DP ⊕.002 DIA ⊥ B .0005 4 HOLES
6 SPACES AT .125 BSC=.750 BSC
3 SEE NOTES 7, 8 AND 13
.06R 4 PLACES
6.375
46 SPACES AT .125 BSC=6.125 BSC
5.875 BSC
.081
.19 R 4 PLACES
.437 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC=.250 BSC
2.000 BSC
1.750
1.000
1.469
.625 BSC
.800
.125
5.375 BSC
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.38R 7 PLACES
.359 BSC
.75 2 PLACES
.738 2 PLACES
.1865 .1870 DIA THRU 3 "X" HOLES ⊕.002 DIA ⊥ A .0005 SEE NOTE 13
1.12 2 PLACES
1.00 2 PLACES
.19R
.06 2 PLACES
.145 2 PLACES
.22 2 PLACES
.50 TYP
.118 BSC
.19
.19R TYP
.300
.080
.140
.135 REF
.125R 12 PLACES
29 SP AT .125 BSC=3.625 BSC
2 SEE NOTE 7, 8 AND 13 ⊕.005 DIA
.062 BSC
.125 BSC
2.250 BSC
9.000
.07
.94
.25R TYP
.56
1.50
.125 DIA 10 HOLES ⊕.008 DIA
.375 BSC 5 PLACES
.188 BSC 5 PLACES
.158 .162 DIA THRU 24 HOLES
1.94 2 PLACES
17.686
.35 12 PLACES
.305 BSC 5 PLACES
.22 2 PLACES
.25R TYP
.19R TYP
.185 .184 10 PLACES
.50R 42 PLACES
.44 15 PLACES
.22 15 PLACES
.200 5 PLACES
.750 BSC 10 PLACES
.375 BSC, 10 PLACES
.118 BSC 4 PLACES
.125 DIA X .300 DP 20 HOLES ⊕.008 DIA
.25R 2 PLACES
.062R 2 PLACES
.167 .175 DIA X .11 DP 4 PLACES
.12R 5 PLACES
.203 TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
3.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.625
.156
.628
.750
.122
.06 X 45° 4 PLACES
.625 BSC
.22 2 PLACES
.250
4.000
9.250
6.875 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
17.375
18.500 BSC
16.500 BSC
16.674
15.437
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
11.674
10.937
10.125 BSC
9.500 BSC
9.437
8.674
8.500 BSC
7.937
7.875 BSC
6.875 BSC
6.437
5.875 BSC
5.674
4.875 BSC
4.187
4.250 BSC
3.250 BSC
2.625 BSC
2.674
1.937
1.625 BSC
THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA ⊕.005 TIR
.390 .395 DIA ⊕.005 TIR
.32
60°
.32
.010 .040 R
-C-
.063 .078
45° ±5°
3/8 - 24 UNF - 3B THRU
⊥ C .005
-D-
SEE NOTE 10
.020 R MAX
63
SECTION F-F
SCALE 4/1


.125 DIA REF
.300 REF

SECTION D-D

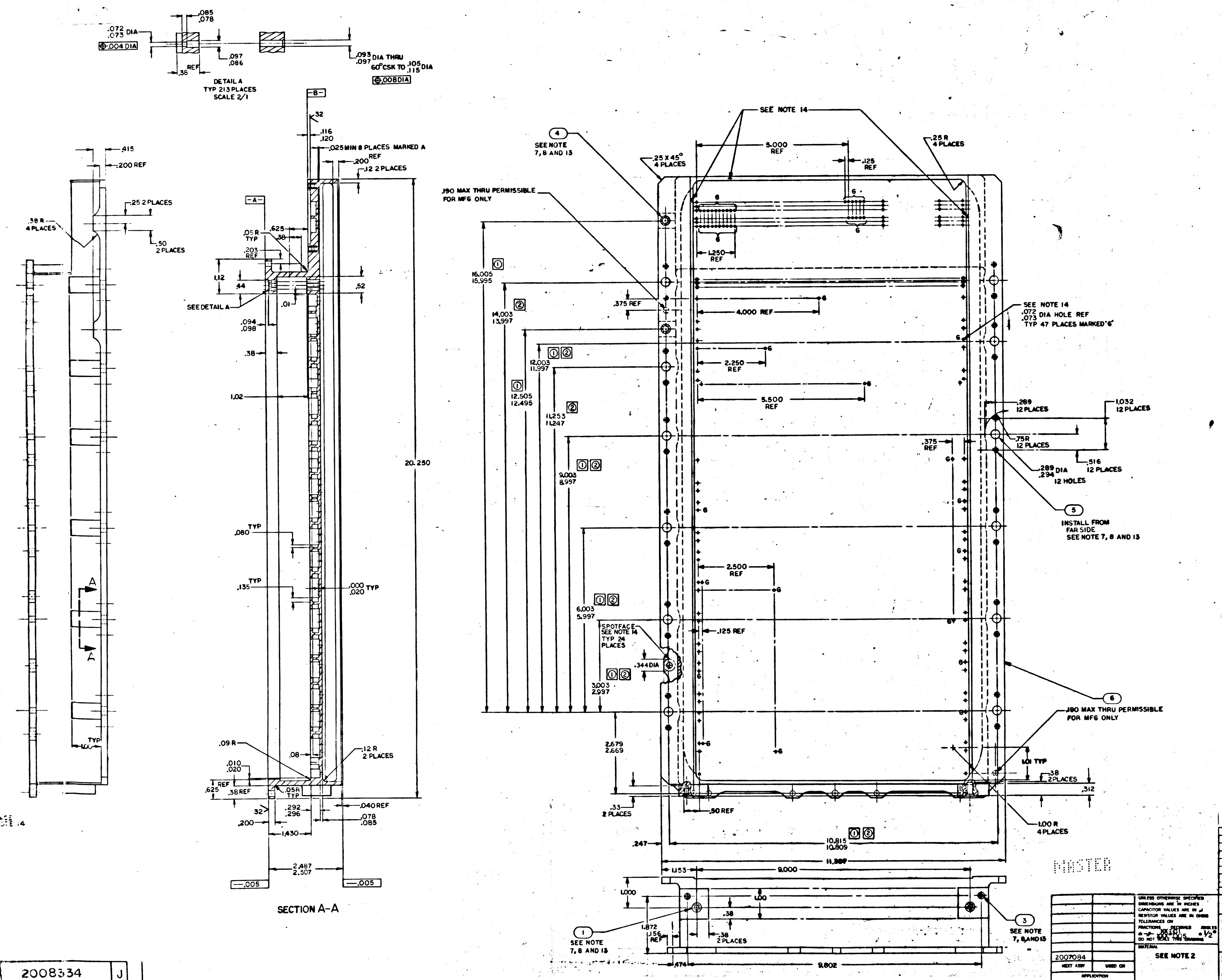
34

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF FIND NO. 1,2,3,4 AND 5 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NOS. 1,2,3,4 AND 5 WET PER MS 33646 THREAD CLASS 2B REMOVE DRIVING TANG. THE SURFACES OF FIND NO. 1,2,3,4 AND 5 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3,4 AND 5 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3,4 AND 5 THREADS
9. IDENTIFY WITH PART NO. PER ND1002019
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD LID-340-10000
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE IRIDITE PER ND1002040. (DO NOT EPOXY COAT)

2008334	G

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
E		REPLACES WORD DWG REV D PER TDRR 21454				
F		REVISED PER TDRR 22500				
G		REVISED PER TDRR 23111				
H		REVISED PER TDRR 24359				
J		REVISED PER TDRR 24969				



4
3
2
1
.085
.078
.072 DIA
.073
.004 DIA
.097
.086
REF
.36
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 DIA THRU
.097
60° CSK TO .105 DIA
.115
.008 DIA
B
32
.116
.120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R
4 PLACES
.50
2 PLACES
A
.05 R
TYP
.625
.38
.203
REF
1.12
.44
.52
SEE DETAIL A
.01
.094
.098
.38
1.02
20.250
.080 TYP
.135 TYP
.000
.020 TYP
A
A
TYP
1.00
.09 R
.08
.12 R
2 PLACES
.010
.020
.625 REF
.38 REF
.05 R
TYP
32
.292
.296
.040 REF
.078
.085
.200
1.430
2.487
2.507
.005
.005
SECTION A-A
SEE NOTE 14
5.000
REF
.125
REF
.25 R
4 PLACES
4
SEE NOTE
7, 8 AND 13
.25 X 45°
4 PLACES
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
6
1.250
REF
16.005
15.995
14.003
13.997
.375 REF
4.000 REF
12.003
11.997
12.505
12.495
2.250
REF
5.500
REF
11.253
11.247
9.003
8.997
2.500
REF
6.003
5.997
SPOTFACE
SEE NOTE 14
TYP 24
PLACES
.125 REF
.344 DIA
3.003
2.997
2.679
2.669
.33
2 PLACES
.50 REF
.247
10.815
10.809
11.307
1.153
9.000
1.000
1.00
.38
1.872
.156
REF
.38
2 PLACES
1
SEE NOTE
7, 8 AND 13
.474
9.802
3
SEE NOTE
7, 8 AND 13
SEE NOTE 14
.072 DIA HOLE REF
.073
TYP 47 PLACES MARKED "6"
.289
12 PLACES
1.032
12 PLACES
.375
REF
.75 R
12 PLACES
.289 DIA
.294
12 HOLES
.516
12 PLACES
5
INSTALL FROM
FAR SIDE
SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
.101 TYP
.38
2 PLACES
.312
1.00 R
4 PLACES
MASTER

Ⓔ REPLACES WORD DWG REV D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .01 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 6/21/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

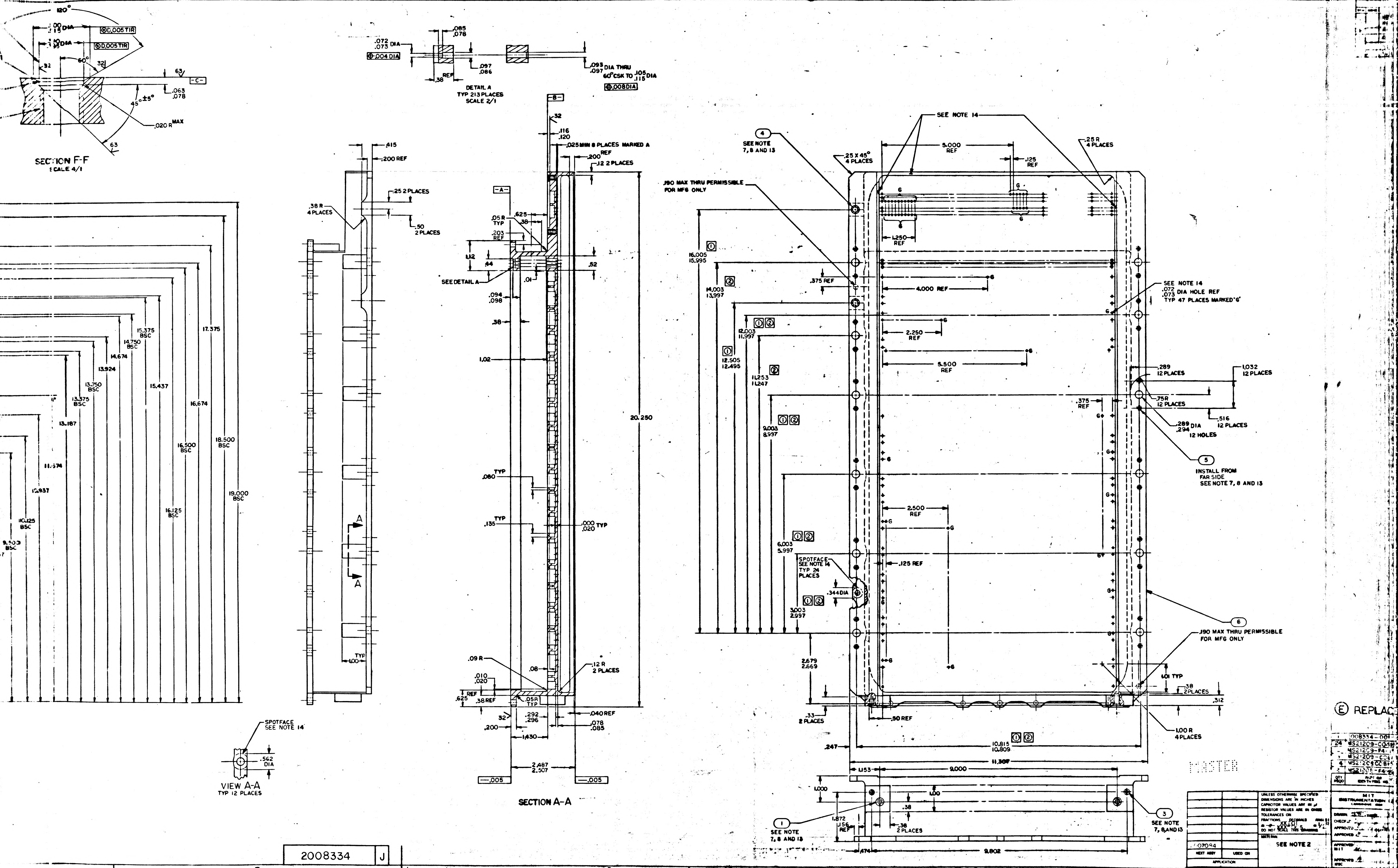
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X CDU
INSEP ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008334
SCALE 1/1
SHEET OF 1

2008334 J

F3


SECTION F-F
SCALE 4/1
120°
60°
45° ±5°
.020 R MAX
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
SECTION A-A
VIEW A-A
TYP 12 PLACES
SPOTFACE
SEE NOTE 14
.562 DIA
SEE DETAIL A
.025 MIN 8 PLACES MARKED A
20.250
SEE NOTE 14
SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
.25 X 45° 4 PLACES
.25 R 4 PLACES
5.000 REF
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
SEE NOTE 14
.072 .073 DIA HOLE REF
TYP 47 PLACES MARKED 'G'
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE
SEE NOTE 7, 8 AND 13
SPOTFACE
SEE NOTE 14
TYP 24 PLACES
.344 DIA
1.00 R 4 PLACES
10.815 10.809
11.307
9.000
9.802
SEE NOTE 7, 8 AND 13
MASTER
Ⓔ REPLAC

QTY REQD	PART OR IDENTIFYING NO.
1	2008334-00
24	MS21209-C04
	MS21209-F4-
	MS21209-C0
4	MS21209C08
2	MS21209-F4-

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ±½°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007094	

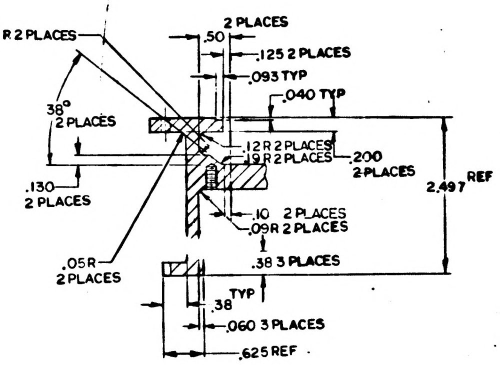
APPLICATION

MIT
INSTRUMENTATION
CAMBRIDGE

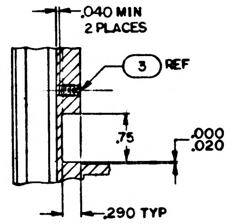
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASC

2008334 J

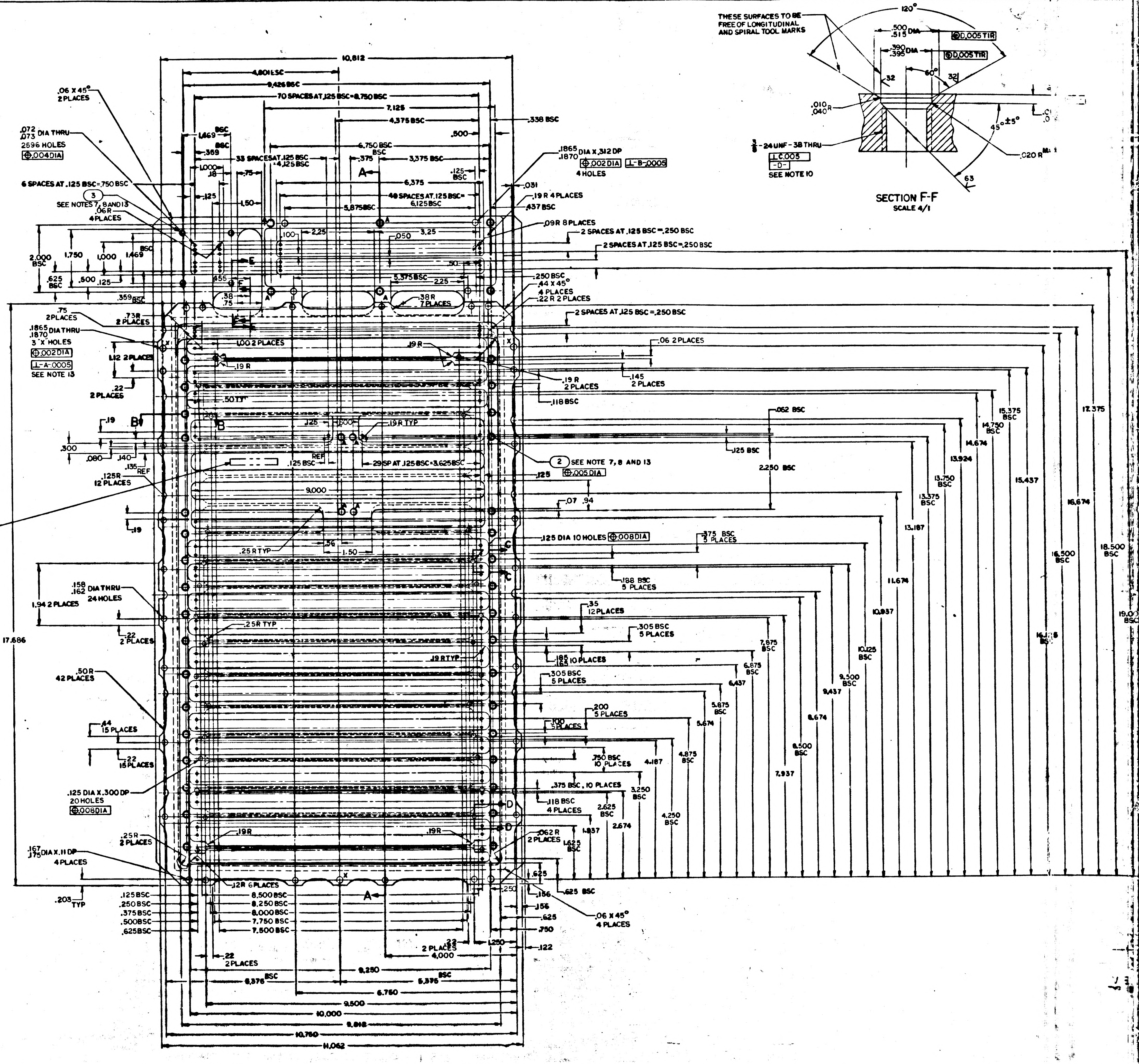
F-2


.12 R 2 PLACES
.50
2 PLACES
.125 2 PLACES
.093 TYP
.040 TYP
38°
2 PLACES
.12 R 2 PLACES
.19 R 2 PLACES
.200
2 PLACES
2.497 REF
.130
2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R
2 PLACES
.38 3 PLACES
.38
TYP
.060 3 PLACES
.625 REF

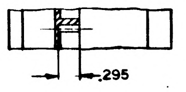
SECTION B-B


.040 MIN
2 PLACES
3
REF
.75
.000
.020
.290 TYP

SECTION E-E

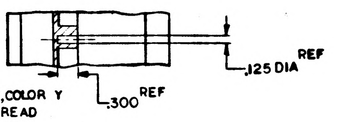

10.812
4.801 LSC
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
7.125
4.375 BSC
.338 BSC
.06 X 45°
2 PLACES
.072
.073 DIA THRU
2596 HOLES
⊕ .004 DIA
1.469
.369
33 SPACES AT .125 BSC =4.125 BSC
6.750 BSC
3.375 BSC
.500
.1865
.1870 DIA X .312 DP
⊕ .002 DIA
⊥ -B- .0005
4 HOLES
6 SPACES AT .125 BSC=.750 BSC
3
SEE NOTES 7, 8 AND 13
.06R
4 PLACES
6.375
48 SPACES AT .125 BSC=
6.125 BSC
5.875 BSC
.031
.19 R 4 PLACES
.437 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC =.250 BSC
2 SPACES AT .125 BSC=.250 BSC
2.000
BSC
1.750
1.000
1.469
.625
BSC
.500
.125
.359 BSC
5.375 BSC
2.25
.38R
7 PLACES
.250 BSC
.44 X 45°
4 PLACES
.22 R 2 PLACES
2 SPACES AT .125 BSC =.250 BSC
.75
2 PLACES
.73R
2 PLACES
.1865
.1870 DIA THRU
3 "X" HOLES
⊕ .002 DIA
⊥ -A- .0005
SEE NOTE 13
1.12 2 PLACES
1.00 2 PLACES
.19 R
.06 2 PLACES
.19 R
2 PLACES
.145
2 PLACES
.118 BSC
.22
2 PLACES
.19
.19 R TYP
.062 BSC
.125 BSC
.300
.080
.140
.135
REF
.125R
12 PLACES
.125 BSC
29 SP AT .125 BSC=3.625 BSC
2
SEE NOTE 7, 8 AND 13
⊕ .005 DIA
.125
2.250 BSC
9.000
IDENTIFICATION MARK
.07
.94
.25 R TYP
1.50
.125 DIA 10 HOLES ⊕ .008 DIA
.375 BSC
5 PLACES
.188 BSC
5 PLACES
.158
.162 DIA THRU
24 HOLES
1.94 2 PLACES
.35
12 PLACES
.25R TYP
.305 BSC
5 PLACES
17.686
.22
2 PLACES
.19 R TYP
.185
.165 10 PLACES
.305 BSC
5 PLACES
.50R
42 PLACES
.200
5 PLACES
.44
15 PLACES
.22
15 PLACES
.750 BSC
10 PLACES
.375 BSC, 10 PLACES
.118 BSC
4 PLACES
.125 DIA X .300 DP
20 HOLES
⊕ .008 DIA
.25R
2 PLACES
.19R
.062 R
2 PLACES
.167
.175 DIA X .11 DP
4 PLACES
.12R 6 PLACES
.625
.625 BSC
.156
.06 X 45°
4 PLACES
.203
TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.750
.122
.22
2 PLACES
2 PLACES
4.000
9.250
6.375 BSC
5.375 BSC
6.750
9.500
10.000
9.818
10.750
11.062
17.375
18.500
BSC
19.0
15.375
BSC
14.750
BSC
14.674
13.924
15.437
16.674
13.750
BSC
13.375
BSC
13.187
16.500
BSC
11.674
10.937
10.125
BSC
9.500
BSC
9.437
8.674
8.500
BSC
7.937
7.875
BSC
6.875
BSC
6.437
5.875
BSC
5.674
4.875
BSC
4.187
4.250
BSC
3.250
BSC
2.625
BSC
2.674
1.837
1.625
BSC
A
B
C
D
E
F
THESE SURFACES TO BE
FREE OF LONGITUDINAL
AND SPIRAL TOOL MARKS
120°
.500
.515 DIA
◎ D .005 TIR
.390
.395 DIA
◎ D .005 TIR
60°
32
32
.010
.040 R
3/8 - 24 UNF - 3B THRU
⊥ C .005
-D-
SEE NOTE 10
45° ±5°
.020 R MAX
63

SECTION F-F
SCALE 4/1



SECTION C-C

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF FIND NO. 1,2,3,4 AND 5 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NOS. 1,2,3,4 AND 5 WET PER MS 33646 THREAD CLASS 2B REMOVE DRIVING TANG. THE SURFACES OF FIND NO. 1,2,3,4 AND 5 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3,4 AND 5 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3,4 AND 5 THREADS
9. IDENTIFY WITH PART NO. PER ND1002019
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD LJD-340-10000
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE IRIDITE PER ND1002040. (DO NOT EPOXY COAT)

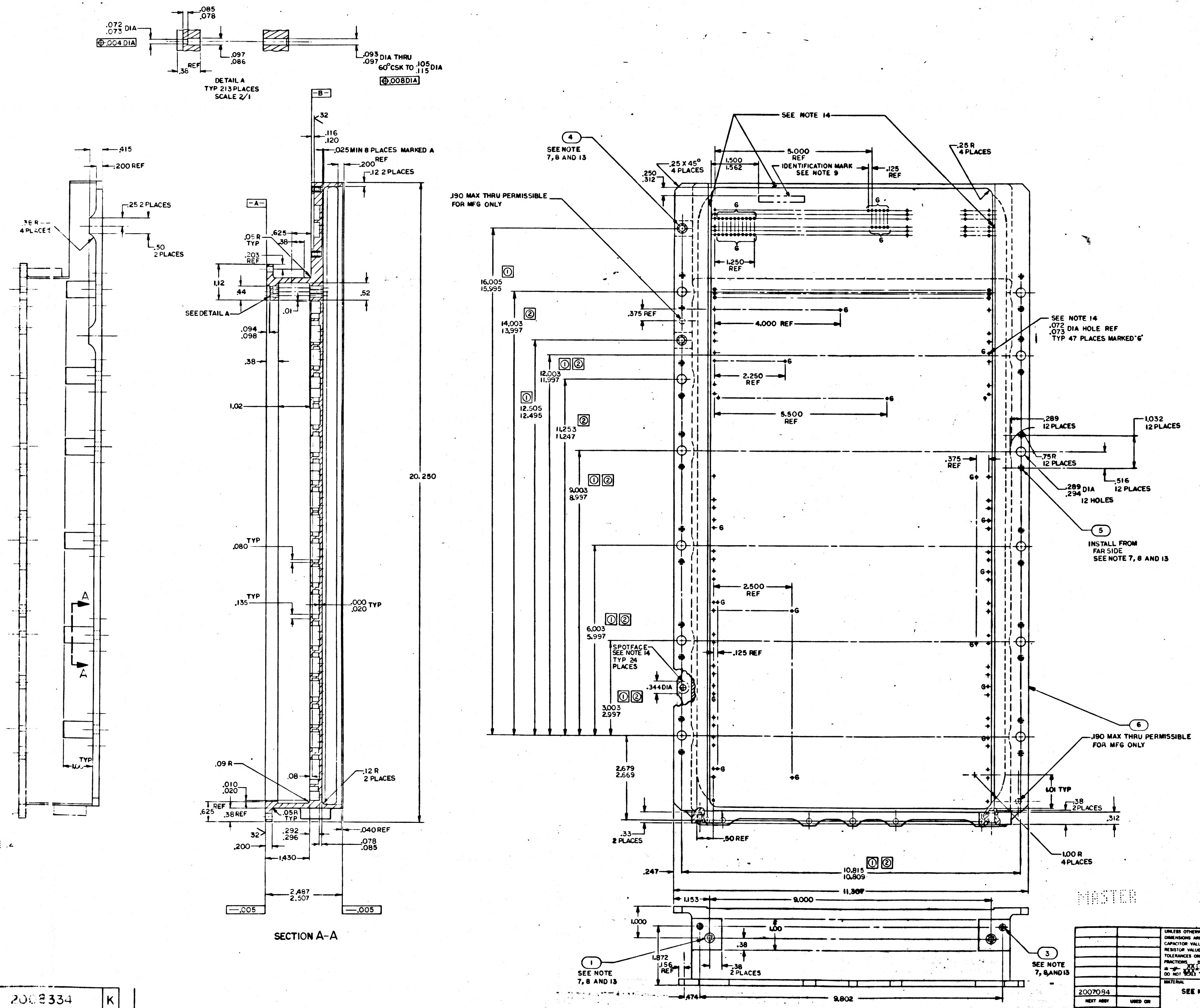

.125 DIA
REF
.300
REF

SECTION D-D

2008334	J

F-1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
E		REPLACES WORD DWG REV D PER TDRR 21454				WK
F		REVISED PER TDRR 22500				
G		REVISED PER TDRR 23111				WK
H		REVISED PER TDRR 24359				WK
J		REVISED PER TDRR 24969				WK
K		REVISED PER TDRR 24968				WK



DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
⊕ .004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
-B-
-A-
.025 MIN 8 PLACES MARKED A
.12 2 PLACES
SEE DETAIL A
20.250
SECTION A-A
.005
.005
.12 R 2 PLACES
.09 R
.05 R TYP
A
A
SEE NOTE 14
SEE NOTE 7, 8 AND 13
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
.25 X 45° 4 PLACES
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
SEE NOTE 14
.072 .073 DIA HOLE REF
TYP 47 PLACES MARKED "6"
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE
SEE NOTE 7, 8 AND 13
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.00 R 4 PLACES
10.815 10.809
11.307
9.000
9.802
SEE NOTE 7, 8 AND 13
SEE NOTE 7, 8 AND 13
MASTER

Ⓔ REPLACES WORD DWG REV D

1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

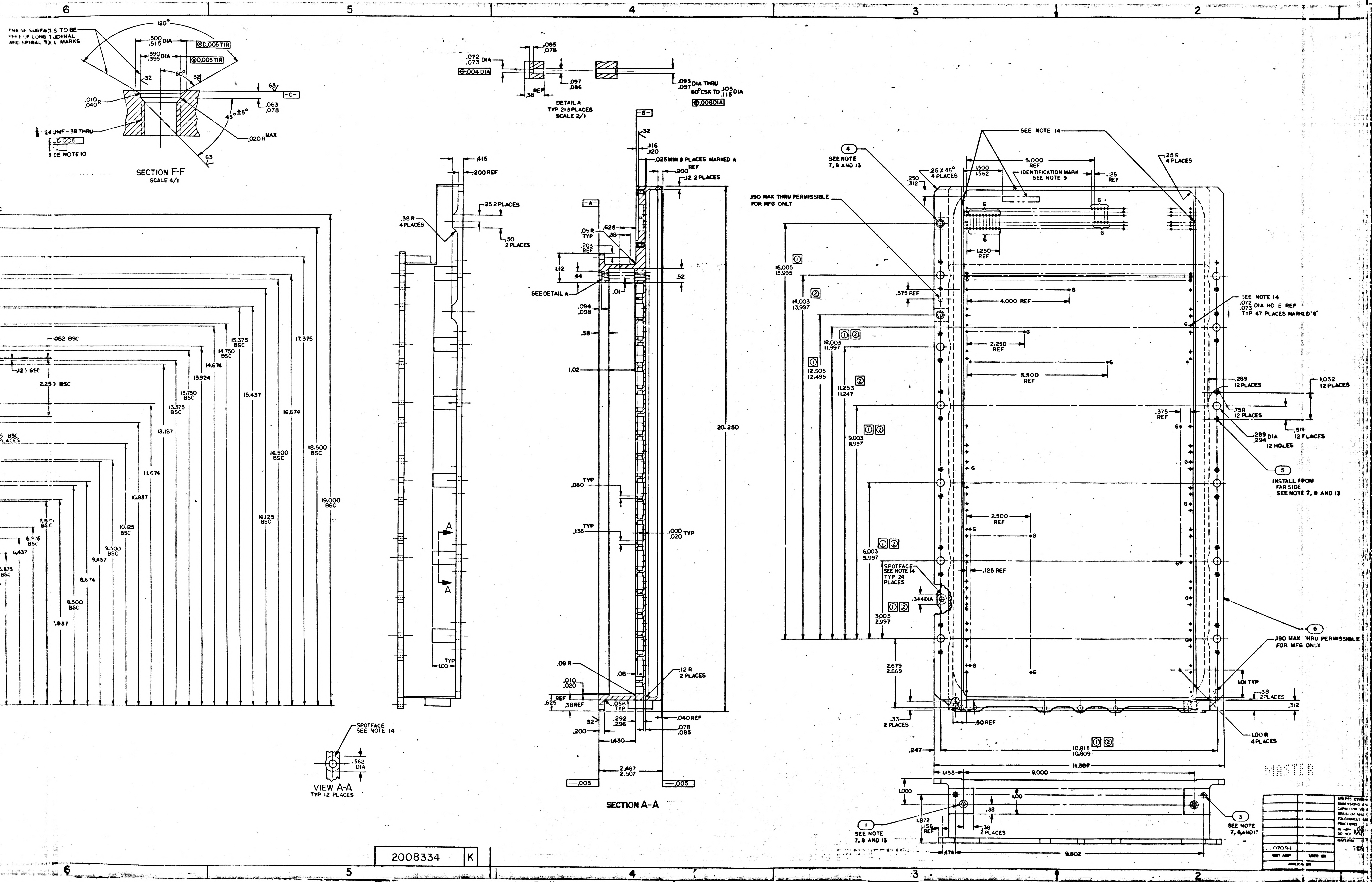
DRAWN W.F. Tracy 6/21/65
CHECKED
APPROVED K.T. [illegible]
APPROVED [illegible] 9/1/65
APPROVED MIT
APPROVED MSC
DATE

TRAY X CDU
INSEP ASSY

CODE IDENT NO. 80230 SIZE J DRAWING NO. 2008334
SCALE 1/1 SHEET 1 OF 1

2008334 K

F-3

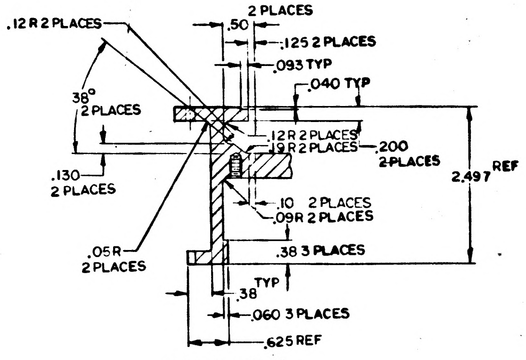


6
5
4
3
2
THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
.390 .395 DIA
.005 TIR
60°
32
.010 .040 R
.063 .078
45° ±5°
.020 R MAX
5/8-24 UNF-3B THRU
SEE NOTE 10
63
SECTION F-F
SCALE 4/1
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38
REF
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
-C-
-B-
-A-
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
TYP
1.00
A
A
.116 .120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.05 R TYP
.625
.203 REF
.38
1.12
.44
.52
SEE DETAIL A
.01
.094 .098
.38
1.02
TYP .080
TYP .135
.000 .020 TYP
20.250
.09 R
.010 .020
REF .625
.38 REF
.08
.12 R 2 PLACES
.05 R TYP
.292 .296
.040 REF
.078 .085
.200
32
1.430
2.487 2.507
.005
SECTION A-A
SPOTFACE SEE NOTE 14
.562 DIA
VIEW A-A
TYP 12 PLACES
.062 BSC
.125 BSC
2.250 BSC
17.375
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
15.437
16.674
11.674
10.937
16.500 BSC
18.500 BSC
19.000 BSC
16.125 BSC
10.125 BSC
9.500 BSC
9.437
8.674
8.500 BSC
7.937
SEE NOTE 14
SEE NOTE 7, 8 AND 13
.25 X 45° 4 PLACES
.250 .312
1.500 1.562
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.250 REF
16.005 15.995
14.003 13.997
.375 REF
4.000 REF
12.003 11.997
12.505 12.495
2.250 REF
5.500 REF
11.253 11.247
SEE NOTE 14
.072 .073 DIA HOLE REF
TYP 47 PLACES MARKED 'G'
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.375 REF
.514 12 PLACES
.289 .294 DIA 12 HOLES
9.003 8.997
INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
2.500 REF
6.003 5.997
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.125 REF
.344 DIA
3.003 2.997
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
2.679 2.669
1.01 TYP
.38 2 PLACES
.312
.33 2 PLACES
.50 REF
1.00 R 4 PLACES
10.815 10.809
.247
11.307
1.153
9.000
1.000
1.00
.38
1.872
1.156 REF
.38 2 PLACES
SEE NOTE 7, 8 AND 13
SEE NOTE 7, 8 AND 13
.474
9.802
MASTER
NEXT ASSY
USED ON
APPLICATION

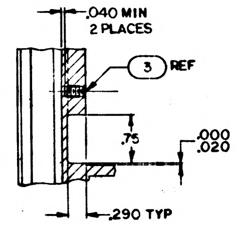
2008334 K

F2

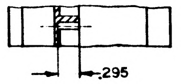
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.12 R 2 PLACES
2 PLACES
.50
.125 2 PLACES
.093 TYP
.040 TYP
38° 2 PLACES
.12 R 2 PLACES
.19 R 2 PLACES
.200 2 PLACES
2.497 REF
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.38 3 PLACES
.05 R 2 PLACES
.38 TYP
.060 3 PLACES
.625 REF

SECTION B-B

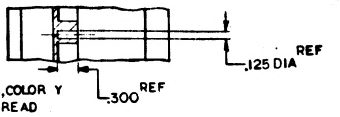

.040 MIN 2 PLACES
3 REF
.75
.000 .020
.290 TYP

SECTION E-E

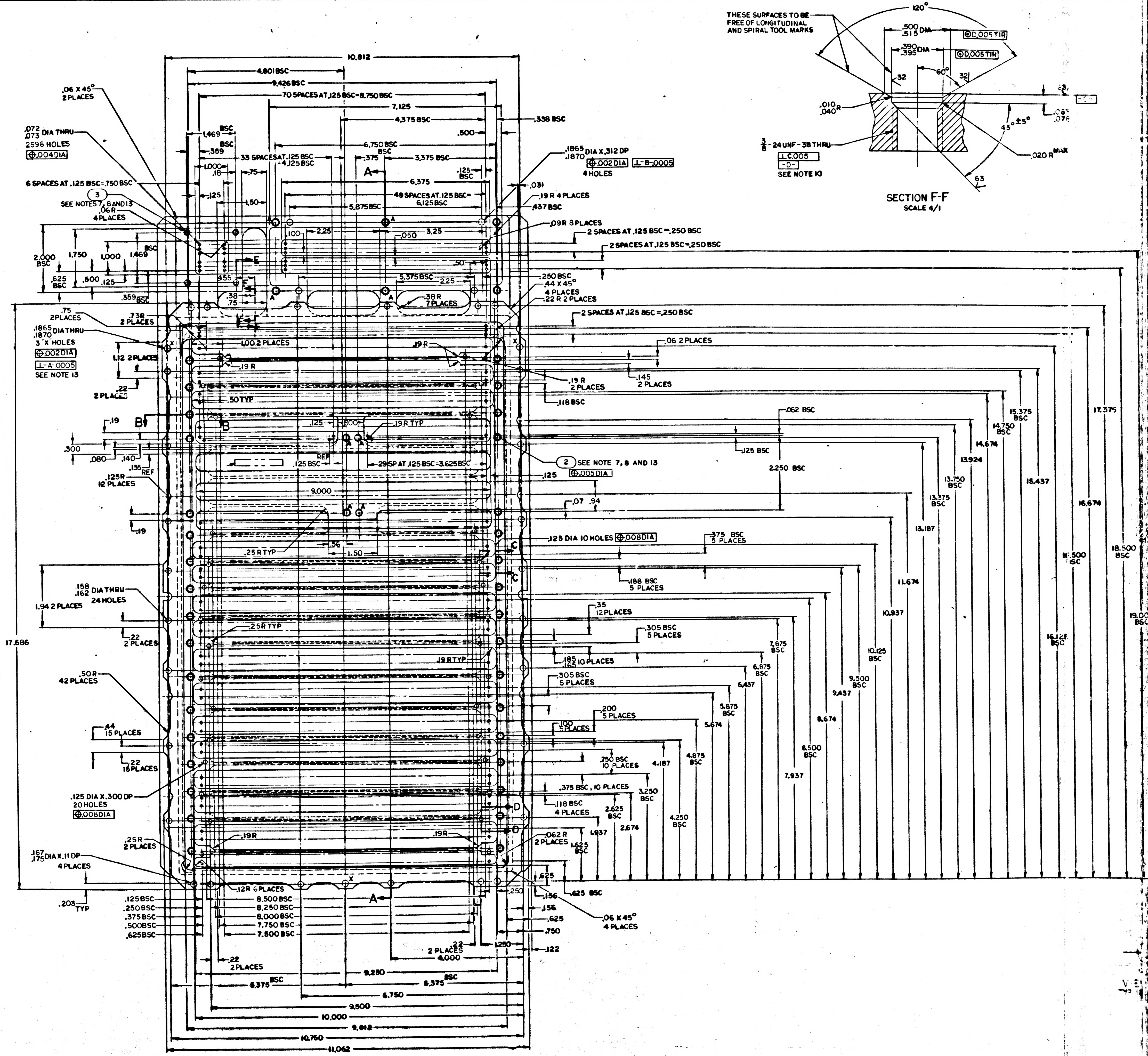


SECTION C-C

1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2 MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF FIND NO. 1,2,3,4 AND 5 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NOS. 1,2,3,4 AND 5 WET PER MS 33646 THREAD CLASS 2B REMOVE DRIVING TANG. THE SURFACES OF FIND NO. 1,2,3,4 AND 5 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3,4 AND 5 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3,4 AND 5 THREADS
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD LJD-340-10000
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE IRIDITE PER ND 1002040. (DO NOT EPOXY COAT)

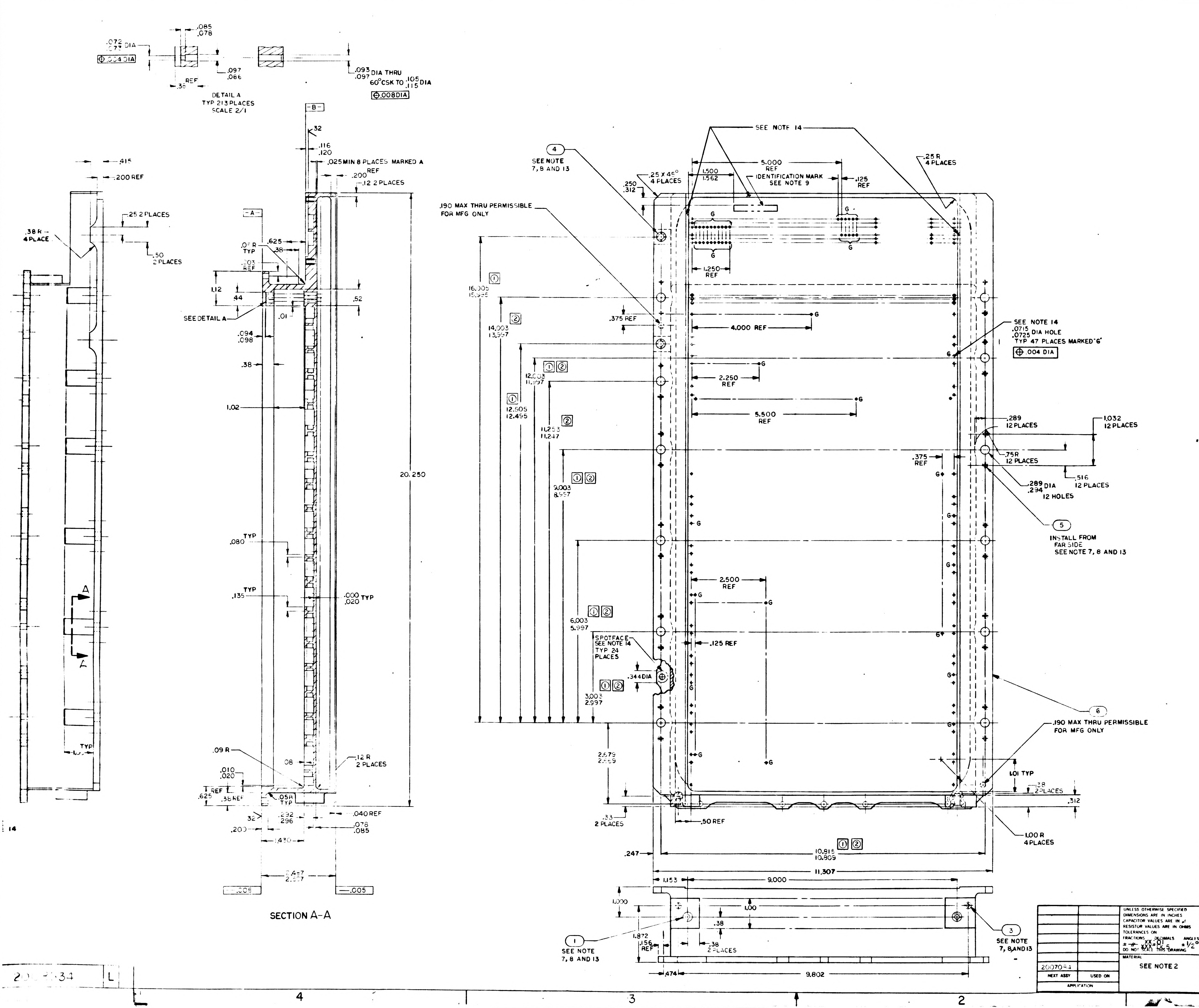

.125 DIA REF
.300 REF

SECTION D-D


10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
7.125
4.375 BSC
.338 BSC
.800
.06 X 45° 2 PLACES
.072 .073 DIA THRU 2596 HOLES ⊕.004 DIA
1.469 BSC
.359 BSC
6.750 BSC
33 SPACES AT .125 BSC=4.125 BSC
.375 BSC
3.375 BSC
.1865 .1870 DIA X .312 DP ⊕.002 DIA ⊥-B-.0005 4 HOLES
6 SPACES AT .125 BSC=.750 BSC
3 SEE NOTES 7, 8 AND 13
.06 R 4 PLACES
6.375
49 SPACES AT .125 BSC=6.125 BSC
5.875 BSC
.031
.19 R 4 PLACES
.437 BSC
.09 R 8 PLACES
2 SPACES AT .125 BSC=.250 BSC
2 SPACES AT .125 BSC=.250 BSC
2.000 BSC
1.750
1.000
1.469 BSC
.625 BSC
.500
.125
.359 BSC
5.375 BSC
2.25
3.25
.050
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.38 R 7 PLACES
.75 2 PLACES
.73 R 2 PLACES
.1865 .1870 DIA THRU 3 "X" HOLES ⊕.002 DIA ⊥-A-.0005 SEE NOTE 13
1.00 2 PLACES
.19 R
1.12 2 PLACES
.22 2 PLACES
.50 TYP
.06 2 PLACES
.145 2 PLACES
.19 R 2 PLACES
.118 BSC
.062 BSC
.19
B
.300
.080
.140
.135 REF
.125 R 12 PLACES
29 SP AT .125 BSC=3.625 BSC
.19 R TYP
2 SEE NOTE 7, 8 AND 13 ⊕.005 DIA
.125 BSC
2.250 BSC
9.000
.07 .94
.25 R TYP
.56
1.50
.125 DIA 10 HOLES ⊕.008 DIA
.375 BSC 5 PLACES
.188 BSC 5 PLACES
.158 .162 DIA THRU 24 HOLES
1.94 2 PLACES
17.686
.22 2 PLACES
.35 12 PLACES
.305 BSC 5 PLACES
.185 .165 10 PLACES
.19 R TYP
.50 R 42 PLACES
.305 BSC 5 PLACES
.200 5 PLACES
.100 5 PLACES
.44 15 PLACES
.22 15 PLACES
.750 BSC 10 PLACES
.375 BSC, 10 PLACES
.118 BSC 4 PLACES
.125 DIA X .300 DP 20 HOLES ⊕.008 DIA
.25 R 2 PLACES
.167 .175 DIA X .11 DP 4 PLACES
.062 R 2 PLACES
.12 R 6 PLACES
.203 TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.625 BSC
.06 X 45° 4 PLACES
.156
.625
.750
.122
.22 2 PLACES
4.000
9.250
6.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
A
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
11.674
10.937
10.125 BSC
9.500 BSC
9.437
8.674
8.500 BSC
7.937
7.675 BSC
6.875 BSC
6.437
5.875 BSC
5.674
4.875 BSC
4.250 BSC
4.187
3.250 BSC
2.625 BSC
2.674
1.937
1.625 BSC
15.437
16.674
16.500 BSC
16.125 BSC
17.375
18.500 BSC
THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA ◎0.005 TIR
.390 .395 DIA ◎0.005 TIR
60°
32
.010 .040 R
3/8-24 UNF-3B THRU ⊥C.005 -D- SEE NOTE 10
45°±5°
.020 R MAX
63
SECTION F-F SCALE 4/1

2008334	K

SYM	ZONE	DESCRIPTION	DR	CK	DATE	APPROVE
E		REPLACES WORD DWG REV D PER TDRR 21454				
F		REVISED PER TDRR 22500				
G		REVISED PER TDRR 23111				
H		REVISED PER TDRR 24359				
J		REVISED PER TDRR 24969				
K		REVISED PER TDRR 24968				
L		REVISED PER TDRR 28474	PHG		9MAY 66	


DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .075 DIA
.004 DIA
.085 .078
.097 .066
.38 REF
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
SECTION A-A
SEE DETAIL A
.25 2 PLACES
.38 R 4 PLACE
.50 2 PLACES
.415
.200 REF
.025 MIN 8 PLACES MARKED A
.12 2 PLACES
.625
1.12
.44
.094 .098
.38
1.02
.080 TYP
.135 TYP
.000 .020 TYP
20.250
.09 R
.12 R 2 PLACES
.05 R TYP
.040 REF
.078 .085
.200
1.430
2.457 2.557
.005
SEE NOTE 14
5.000 REF
1.500 1.562
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 R 4 PLACES
.25 X 45° 4 PLACES
.250 .312
4 SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.250 REF
16.005 15.995
14.003 13.997
12.003 11.997
12.505 12.495
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
2.679 2.659
.375 REF
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
SEE NOTE 14
.0715 .0725 DIA HOLE
TYP 47 PLACES MARKED 'G'
.004 DIA
.289 12 PLACES
1.032 12 PLACES
.75R 12 PLACES
.289 .294 DIA 12 HOLES
.516 12 PLACES
5 INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
6
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.01 TYP
.28 2 PLACES
.312
1.00 R 4 PLACES
.33 2 PLACES
.50 REF
.247
10.815 10.805
11.307
1.153
9.000
1.000
1.00
.38
1.872
.156 REF
.38 2 PLACES
.474
9.802
1 SEE NOTE 7, 8 AND 13
3 SEE NOTE 7, 8 AND 13

Ⓔ REPLACES WORD DWG REV D

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.01 XXX ±.005 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

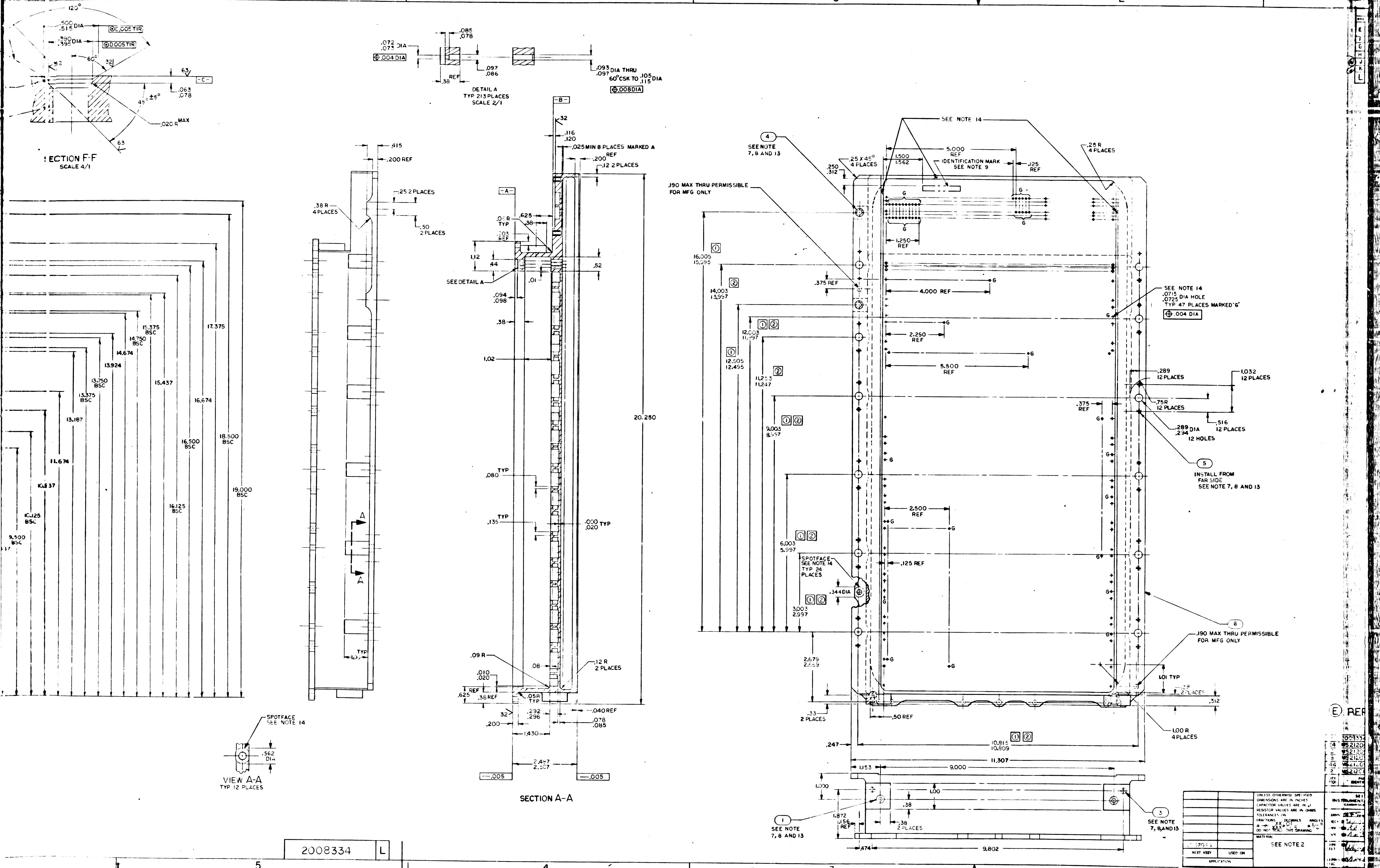
DRAWN W.F. Tracy 6/21/65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

TRAY X CDU
INSEP ASSY

CODE IDENT NO | SIZE J | DRAWING NO 2008334
SCALE 1/1 | SHEET 1 OF 1

3/2008334

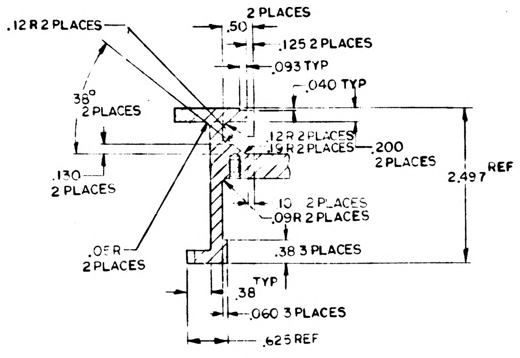

SECTION F-F
SCALE 4/1
120°
.500/.515 DIA
.390/.395 DIA
.005 TIR
60°
32
45° ±5°
.020 R MAX
.063/.078
63
-C-
.072/.073 DIA
.004 DIA
.085/.078
.097/.086
.38 REF
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093/.097 DIA THRU
60° CSK TO .105/.115 DIA
.008 DIA
-B-
.116/.120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
-A-
.05 R TYP
.625
.38
.03 REF
1.12
.44
.52
.01
SEE DETAIL A
.094/.098
.38
1.02
20.250
.080 TYP
.135 TYP
.000/.020 TYP
.09 R
.08
.12 R 2 PLACES
.010/.020
REF
.625
.38 REF
.05 R TYP
.292/.296
.040 REF
.078/.085
32
.200
1.430
2.447/2.507
.005
SECTION A-A
SPOTFACE SEE NOTE 14
.562 DIA
VIEW A-A
TYP 12 PLACES
19.000 BSC
18.500 BSC
17.375
16.674
16.500 BSC
16.125 BSC
15.437
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
11.674
10.937
10.125 BSC
9.500 BSC
SEE NOTE 14
4
SEE NOTE 7, 8 AND 13
.25 X 45° 4 PLACES
.250/.312
1.500/1.562
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
G
1.250 REF
16.005/15.995
14.003/13.997
12.003/11.997
12.505/12.495
11.253/11.247
9.003/8.997
6.003/5.997
3.003/2.997
.375 REF
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
SEE NOTE 14
.0715/.0725 DIA HOLE
TYP 47 PLACES MARKED 'G'
.004 DIA
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.516 12 PLACES
.289/.234 DIA 12 HOLES
.375 REF
5
INSTALL FROM FAR SIDE
SEE NOTE 7, 8 AND 13
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
6
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
2.679/2.669
1.01 TYP
.19 2 PLACES
.312
.33 2 PLACES
.50 REF
1.00 R 4 PLACES
10.815/10.809
.247
11.307
1.153
9.000
1.000
1.00
.38
1.872
1.156 REF
.38 2 PLACES
1
SEE NOTE 7, 8 AND 13
3
SEE NOTE 7, 8 AND 13
.474
9.802
E
REF

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2

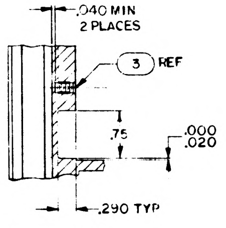
NEXT ASSY
USED ON
APPLICATION

2008334 L

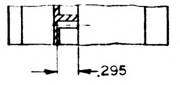
2/2008334


.12 R 2 PLACES
2 PLACES
.50
.125 2 PLACES
.093 TYP
.040 TYP
38° 2 PLACES
.12 R 2 PLACES
.15 R 2 PLACES
.200 2 PLACES
2.497 REF
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.38 3 PLACES
.06 R 2 PLACES
.38 TYP
.060 3 PLACES
.625 REF

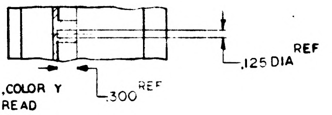
SECTION B-B


.040 MIN 2 PLACES
3 REF
.75
.000
.020
.290 TYP

SECTION E-E

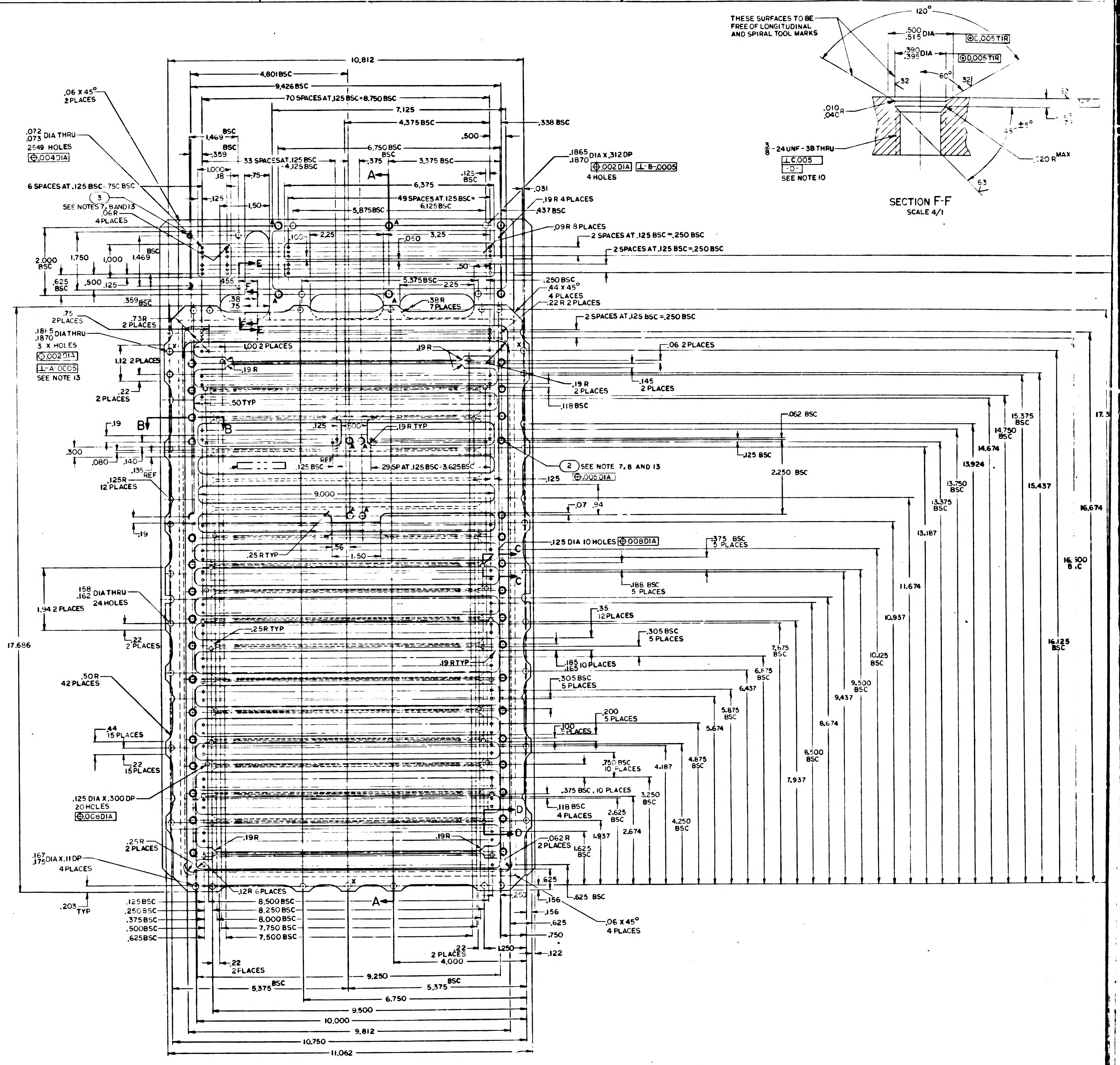


SECTION C-C


.125 DIA REF
.300 REF

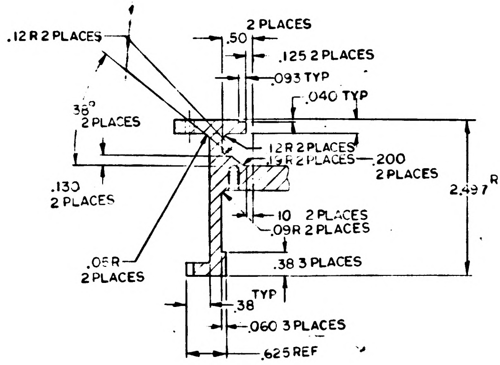
SECTION D-D

1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2 MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\surd}$ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF FIND NO. 1,2,3,4 AND 5 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NOS. 1,2,3,4 AND 5 WET PER MS 33646 THREAD CLASS 2B REMOVE DRIVING TANG. THE SURFACES OF FIND NO. 1,2,3,4 AND 5 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3,4 AND 5 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3,4 AND 5 THREADS
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742
11. Ⓒ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD LID-340-10000
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI, DO NOT EPOXY COAT.

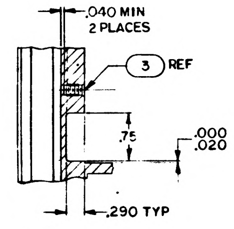

THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
.005 TIR
.390 .395 DIA
.005 TIR
60°
32
.010 .040 R
3/8-24 UNF-3B THRU
.005
-D-
SEE NOTE 10
45° ± 5°
.20 R MAX
63
SECTION F-F
SCALE 4/1
10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.338 BSC
.500
6.750 BSC
3.375 BSC
33 SPACES AT .125 BSC = 4.125 BSC
1.469 BSC
.359 BSC
.06 X 45° 2 PLACES
.072 .073 DIA THRU 2549 HOLES
.004 DIA
.1865 .1870 DIA X .312 DP 4 HOLES
.002 DIA
B .0005
6 SPACES AT .125 BSC = .750 BSC
3 SEE NOTES 7, 8 AND 13
.06 R 4 PLACES
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
.19 R 4 PLACES
.437 BSC
.09 R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
2.000 BSC
1.750
1.000
1.469 BSC
.625 BSC
.500
.125
.359 BSC
2.25
3.25
5.375 BSC
2.25
.38 R 7 PLACES
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.75 2 PLACES
.73 R 2 PLACES
.1865 .1870 DIA THRU 3 X HOLES
.002 DIA
A .0005
SEE NOTE 13
1.00 2 PLACES
.19 R
1.12 2 PLACES
.22 2 PLACES
.50 TYP
.06 2 PLACES
.145 2 PLACES
.118 BSC
.19 R TYP
29 SP AT .125 BSC = 3.625 BSC
.062 BSC
.125 BSC
2.250 BSC
2 SEE NOTE 7, 8 AND 13
.005 DIA
9.000
.07
.94
.25 R TYP
.56
1.50
.125 DIA 10 HOLES
.008 DIA
.375 BSC 5 PLACES
.188 BSC 5 PLACES
.158 .162 DIA THRU 24 HOLES
1.94 2 PLACES
.35 12 PLACES
.305 BSC 5 PLACES
17.686
.185 .165 10 PLACES
.50 R 42 PLACES
.200 5 PLACES
.100 5 PLACES
.44 15 PLACES
.22 15 PLACES
.750 BSC 10 PLACES
.375 BSC, 10 PLACES
.125 DIA X .300 DP 20 HOLES
.008 DIA
.118 BSC 4 PLACES
.25 R 2 PLACES
.062 R 2 PLACES
.167 .175 DIA X .11 DP 4 PLACES
.12 R 6 PLACES
.625 BSC
.06 X 45° 4 PLACES
.203 TYP
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
.22 2 PLACES
4.000
9.250
5.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
15.437
16.674
17.3
16.500 B.C
16.125 BSC
11.674
10.937
10.125 BSC
9.500 BSC
9.437
8.674
8.500 BSC
7.937
7.675 BSC
6.875 BSC
6.437
5.875 BSC
5.674
4.875 BSC
4.187
4.250 BSC
3.250 BSC
2.625 BSC
2.674
1.937
1.625 BSC

2008334 L

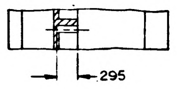
1/2008334


.12 R 2 PLACES
2 PLACES
.50
.125 2 PLACES
.093 TYP
.040 TYP
30° 2 PLACES
.12 R 2 PLACES
.200 2 PLACES
2.497 REF
.130 2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R 2 PLACES
.38 3 PLACES
.38 TYP
.060 3 PLACES
.625 REF

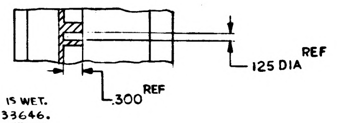
SECTION B-B


.040 MIN 2 PLACES
3 REF
.75
.000 .020
.290 TYP

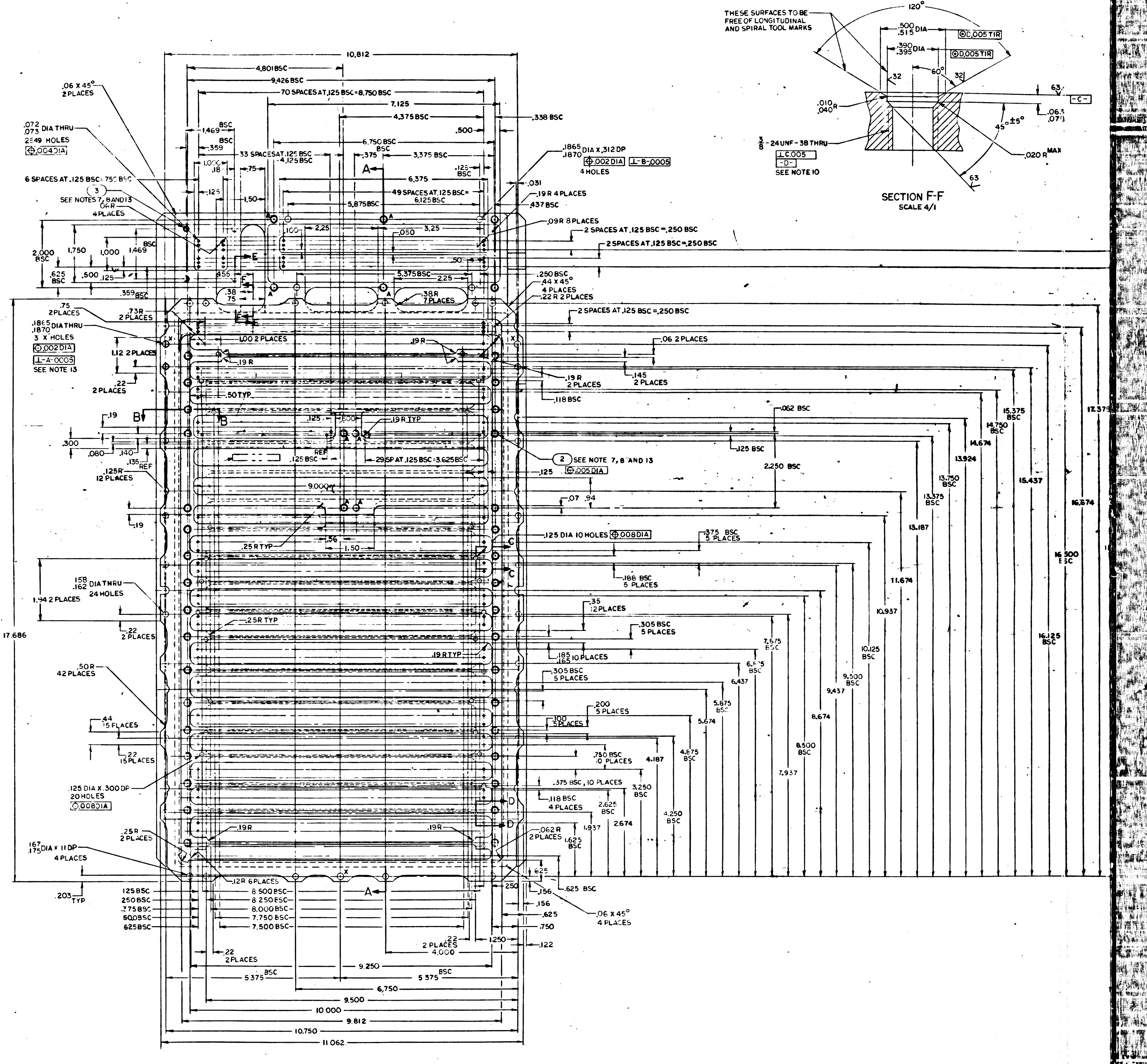
SECTION E-E



SECTION C-C


.125 DIA REF
.300 REF

SECTION D-D

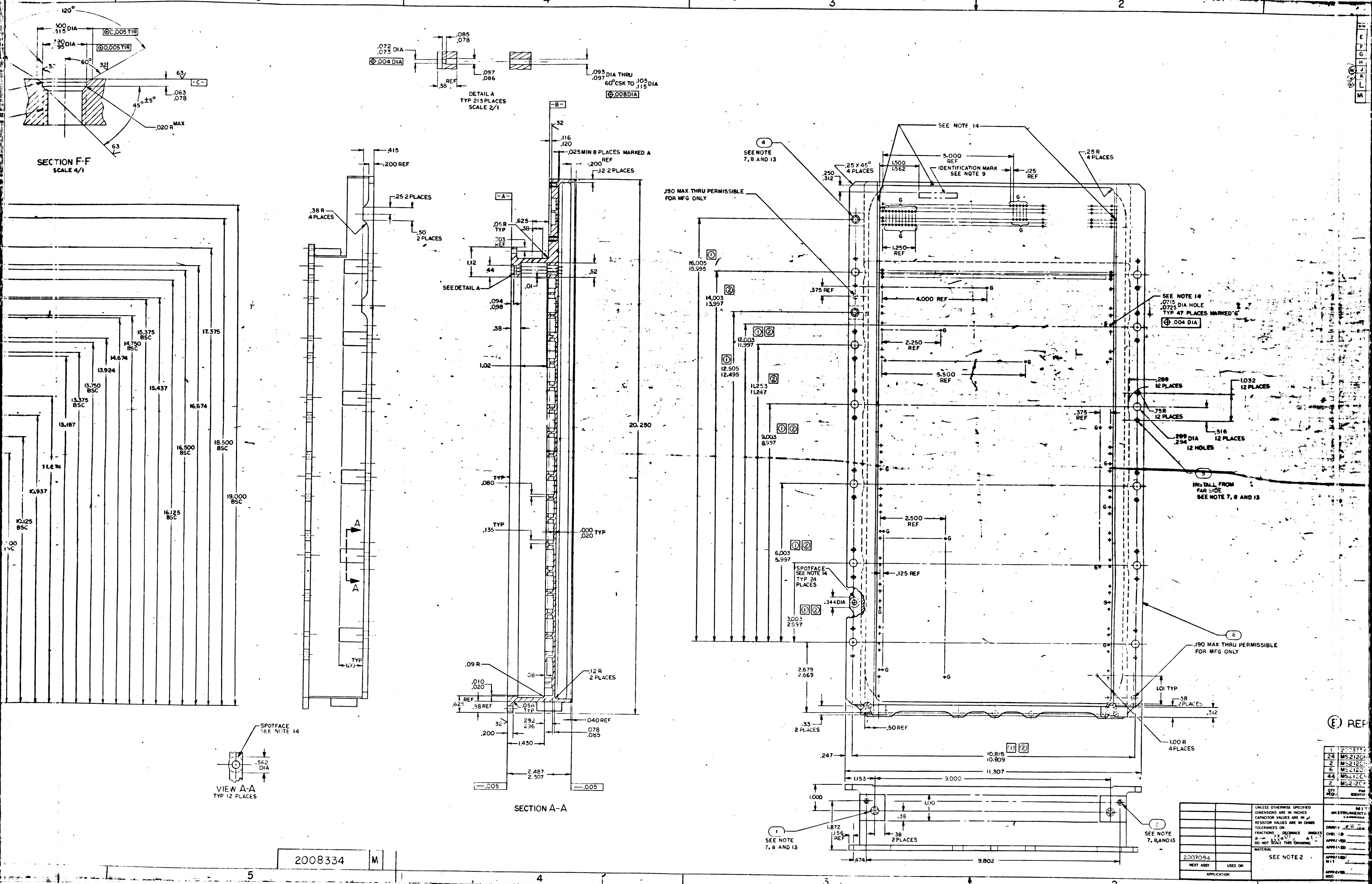

THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
.390 .395 DIA
⊚ 0.005 TIR
60°
.010R .040R
3/8 - 24 UNF - 3B THRU
⊥ C .005
-D-
SEE NOTE 10
45° ±5°
.020 R MAX
-C-
SECTION F-F
SCALE 4/1
10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.338 BSC
.06 X 45° 2 PLACES
.072 .073 DIA THRU 2549 HOLES
⊕ .004 DIA
1.469 BSC
.359 BSC
6.750 BSC
.500
33 SPACES AT .125 BSC = 4.125 BSC
.375
3.375 BSC
.1865 .1870 DIA X .312 DP
⊕ .002 DIA
⊥ -B- .0005
4 HOLES
6 SPACES AT .125 BSC = .750 BSC
6.375
49 SPACES AT .125 BSC = 6.125 BSC
.19 R 4 PLACES
.437 BSC
SEE NOTES 7, 8 AND 13
.06R 4 PLACES
5.875 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
2.000 BSC
1.750
1.000
.625 BSC
.500
.125
2.25
3.25
5.375 BSC
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.38R 7 PLACES
.73R 2 PLACES
.75 2 PLACES
.1865 .1870 DIA THRU 3 X HOLES
⊕ .002 DIA
⊥ -A- .0005
SEE NOTE 13
1.00 2 PLACES
1.12 2 PLACES
.22 2 PLACES
.19 R
.06 2 PLACES
.145 2 PLACES
.118 BSC
.50 TYP
.062 BSC
.19 R TYP
15.375 BSC
17.375
14.750 BSC
.300
.080
.140
.135 REF
.125R 12 PLACES
29 SP AT .125 BSC = 3.625 BSC
SEE NOTE 7, 8 AND 13
⊖ .005 DIA
.125 BSC
2.250 BSC
14.674
13.924
13.750 BSC
15.437
16.674
13.375 BSC
13.187
9.000
.07
.94
.25 R TYP
.56
1.50
.125 DIA 10 HOLES ⊕ .008 DIA
.375 BSC 5 PLACES
16.500 BSC
.158 .162 DIA THRU 24 HOLES
1.94 2 PLACES
.186 BSC 5 PLACES
11.674
.35 12 PLACES
10.937
.305 BSC 5 PLACES
17.686
.185 .165 10 PLACES
7.675 BSC
10.125 BSC
16.125 BSC
.50R 42 PLACES
6.675 BSC
6.437
9.500 BSC
9.437
8.674
.200 5 PLACES
5.875 BSC
5.674
.44 15 PLACES
.100 5 PLACES
.22 15 PLACES
.750 BSC 10 PLACES
4.187
4.675 BSC
8.500 BSC
.125 DIA X .300 DP 20 HOLES
⊕ .008 DIA
.375 BSC 10 PLACES
3.250 BSC
7.937
.118 BSC 4 PLACES
2.625 BSC
2.674
4.250 BSC
1.937
.062 R 2 PLACES
1.625 BSC
.25R 2 PLACES
.167 .175 DIA X .11 DP 4 PLACES
.12R 6 PLACES
.625 BSC
.06 X 45° 4 PLACES
.203 TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.156
.625
.750
.122
1.250
.22 2 PLACES
4.000
9.250
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
A
B
C
D
E
F
X

1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2 MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES 005/015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF HOLES FOR FIND NOS. 1, 2, 3, 4 AND 5 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NUMBERS 1, 2, 3, 4 AND 5 (SEE NOTE NO. 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.

9 IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD LID-340-10000
13. HOLES FOR FIND NO. 1, 2, 3, 4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI, DO NOT EPOXY COAT.

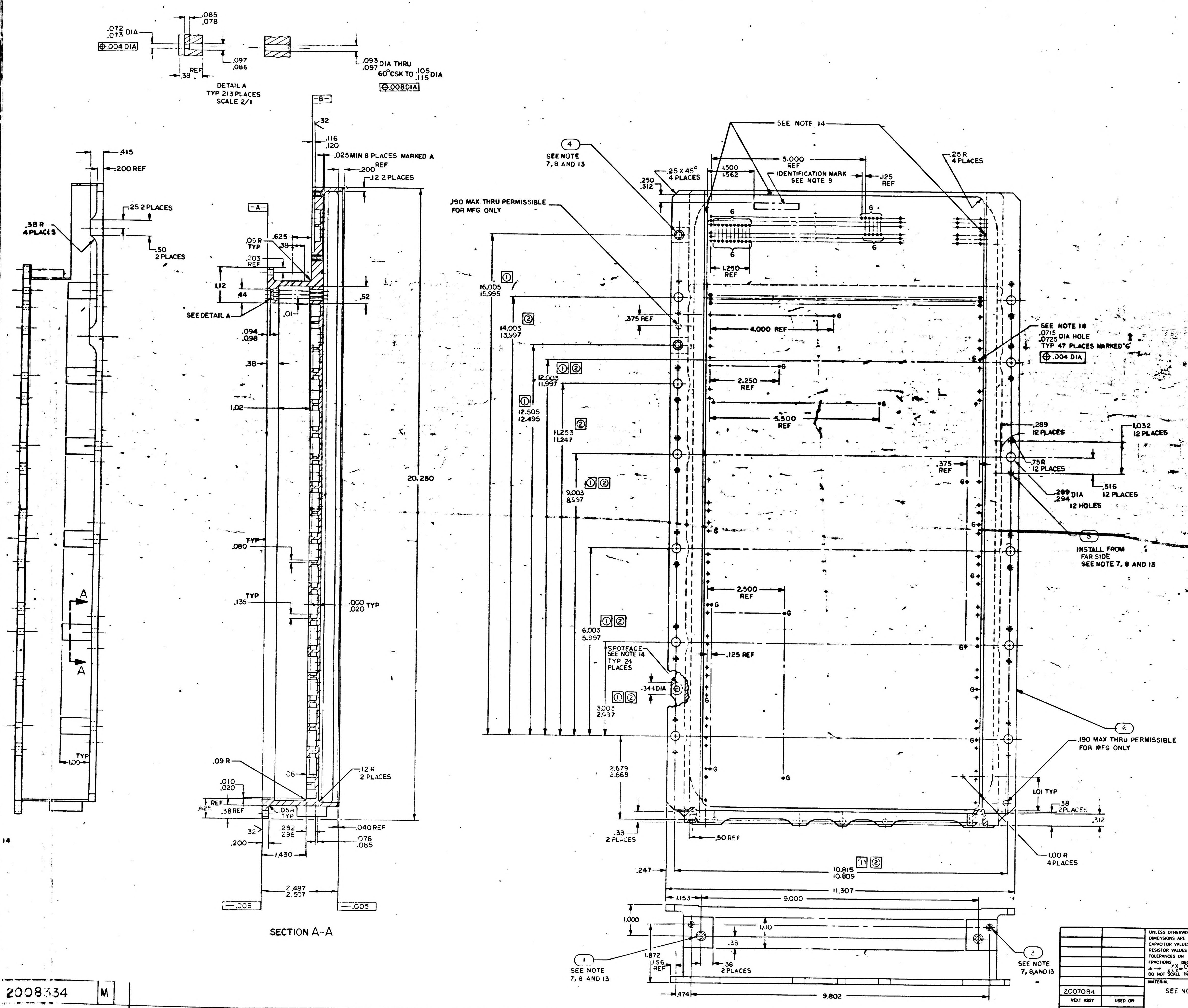
2008334	M

1/2008334


SECTION F-F
SCALE 4/1
120°
.300 .315 DIA
.290 .295 DIA
⊚ D .005 TIR
60°
32
63
-C-
.063 .078
45° ±5°
.020 R MAX
DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
⊕ .004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
-B-
.116 .120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
-A-
.05 R TYP
.625
SEE DETAIL A
.094 .098
1.02
20.250
.080 TYP
.135 TYP
.000 .020 TYP
.09 R
.12 R 2 PLACES
.040 REF
.078 .085
1.430
2.487 2.507
⎯ .005
SECTION A-A
VIEW A-A
TYP 12 PLACES
SPOTFACE SEE NOTE 14
.562 DIA
17.375
18.500 BSC
19.000 BSC
16.674
16.500 BSC
16.125 BSC
15.437
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
11.674
10.937
10.125 BSC
SEE NOTE 14
5.000 REF
1.500 1.562
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 X 45° 4 PLACES
.25 R 4 PLACES
SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
16.005 15.995
14.003 13.997
12.003 11.997
12.505 12.495
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
2.679 2.669
.375 REF
4.000 REF
2.250 REF
5.500 REF
2.500 REF
1.250 REF
.125 REF
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
SEE NOTE 14
.0715 .0725 DIA HOLE
TYP 47 PLACES MARKED "G"
⊕ .004 DIA
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.289 .294 DIA 12 HOLES
.516 12 PLACES
INSTALL FROM FAR SIDE
SEE NOTE 7, 8 AND 13
1.01 TYP
.38 2 PLACES
.312
1.00 R 4 PLACES
.33 2 PLACES
.50 REF
.247
10.815 10.809
11.307
1.153
9.000
1.000
1.00
.38
1.872
1.156 REF
.38 2 PLACES
.474
9.802
SEE NOTE 7, 8 AND 13
SEE NOTE 7, 8 AND 13
E REP
1 2008334
24 MS2120
2 MS2120
6 MS2120
44 MS2120
2 MS2120
QTY REQD
PART IDENTIF
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .01 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
2007094
NEXT ASSY
USED ON
APPLICATION
MIT INSTRUMENTATION CAMBRIDGE
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
2008334 M
5
4
3
2

2/2008334

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
E		REPLACES WORD DWG REV D PER TDRR 21454				
F		REVISED PER TDRR 22500				
G		REVISED PER TDRR 23111				
H		REVISED PER TDRR 24359				
J		REVISED PER TDRR 24969				
K		REVISED PER TDRR 24968				WK
L		REVISED PER TDRR 28474	PHG		5 MAY 66	
M		REVISED PER TDRR 32774			3 FEB 67	



DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
⊕ .004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕ .008 DIA
SECTION A-A
SEE DETAIL A
.025 MIN 8 PLACES MARKED A
20.250
2.487 2.507
.005
SEE NOTE 14
IDENTIFICATION MARK SEE NOTE 9
5.000 REF
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
SEE NOTE 7, 8 AND 13
SEE NOTE 14 .0715 .0725 DIA HOLE TYP 47 PLACES MARKED G
⊕ .004 DIA
INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
16.005 15.995
14.003 13.997
12.505 12.495
12.003 11.997
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
2.679 2.669
10.815 10.809
11.307
9.000
9.802
1.00 R 4 PLACES
.289 12 PLACES
1.032 12 PLACES
.75 R 12 PLACES
.289 .294 DIA 12 HOLES
.516 12 PLACES

Ⓔ REPLACES WORD DWG REV D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008334-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
44	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .01 XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

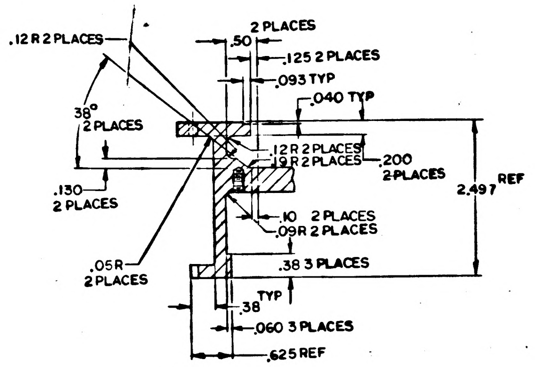
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X CDU
INSEP ASSY

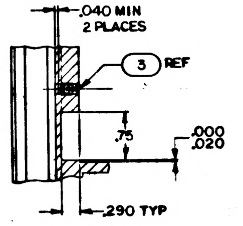
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008334

SCALE 1/1 SHEET 1 OF 1

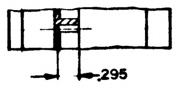
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.12 R 2 PLACES
38° 2 PLACES
.50
2 PLACES
.125 2 PLACES
.093 TYP
.040 TYP
.12 R 2 PLACES
.19 R 2 PLACES
.200 2 PLACES
2.497 REF
.130 2 PLACES
.10 2 PLACES
.09 R 2 PLACES
.05 R 2 PLACES
.38 3 PLACES
TYP
.38
.060 3 PLACES
.625 REF

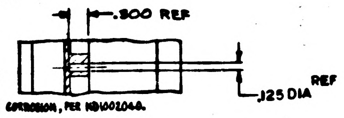
SECTION B-B


.040 MIN 2 PLACES
3 REF
.75
.000 .020
.290 TYP

SECTION E-E



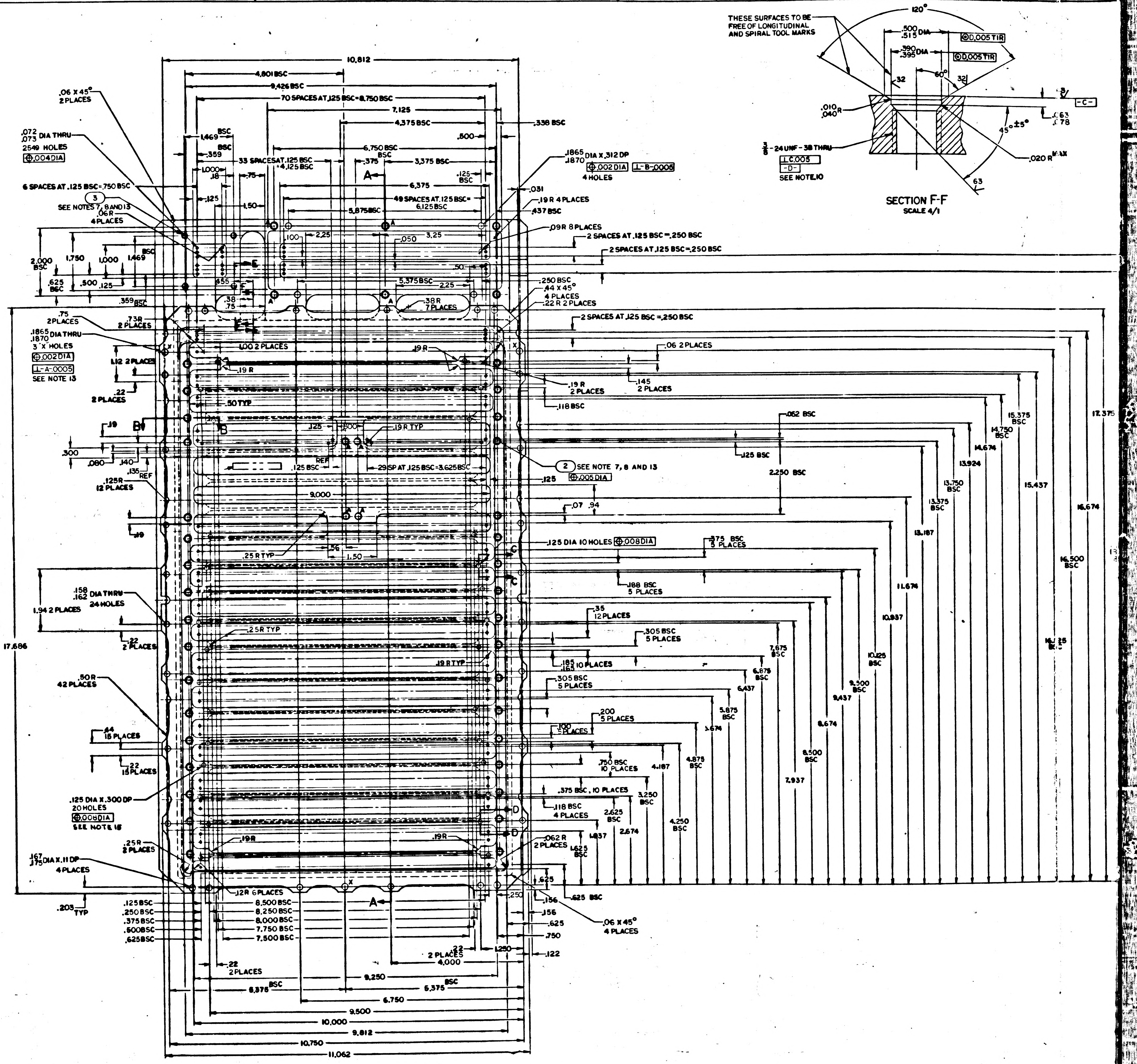
SECTION C-C


.800 REF
.125 DIA REF

SECTION D-D

THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
⊕ D .005 TIR
.390 .395 DIA
⊕ D .005 TIR
32
60°
32
-C-
.010 .040 R
.63 .78
45° ±5°
3/8-24 UNF-3B THRU
⊥ C .005
-D-
SEE NOTE 10
.020 R MAX
63

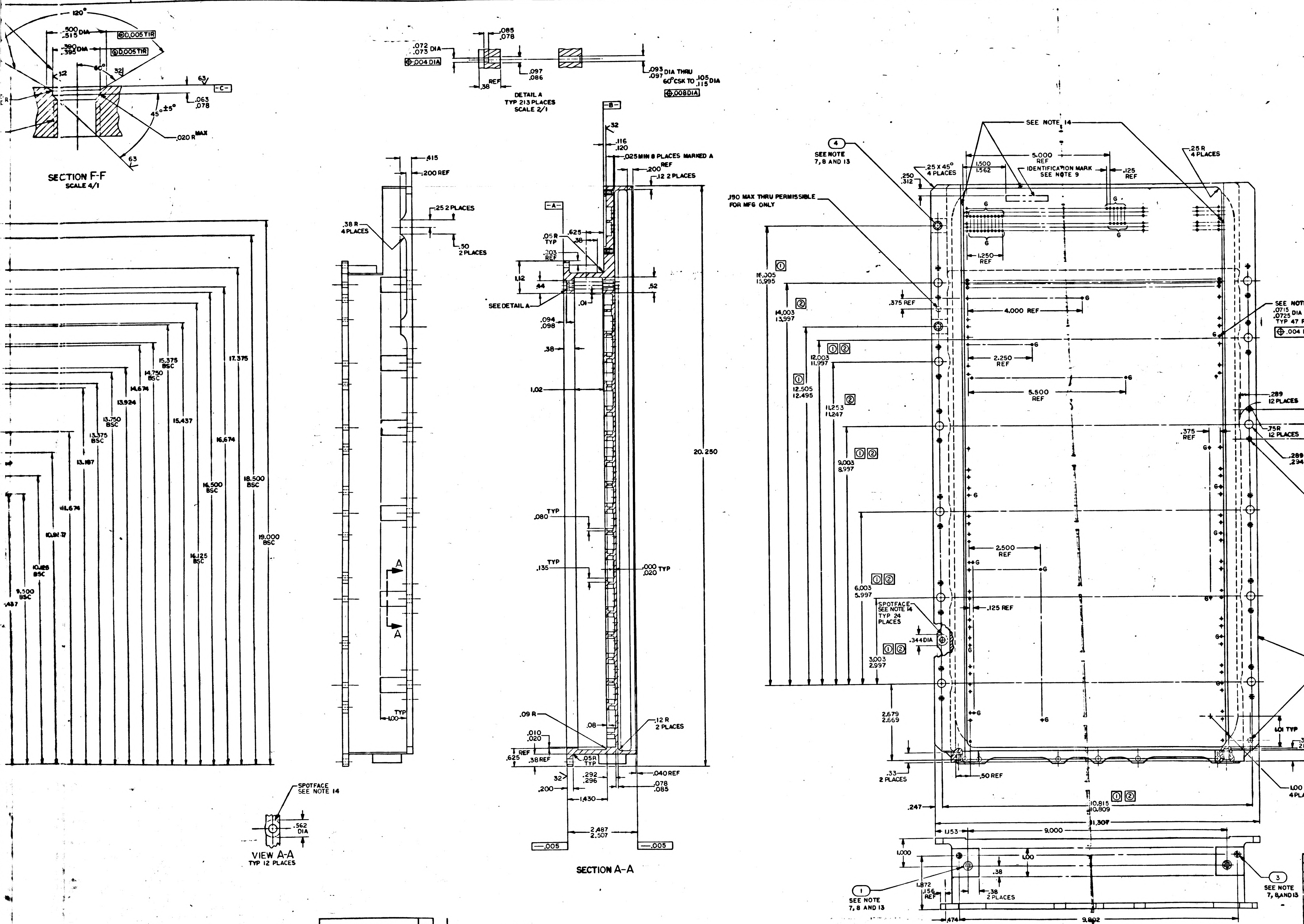
SECTION F-F
SCALE 4/1


10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.338 BSC
.06 X 45° 2 PLACES
.072 .073 DIA THRU 2549 HOLES ⊕ .004 DIA
.1865 .1870 DIA X .312 DP ⊕ .002 DIA ⊥ B .0005 4 HOLES
6 SPACES AT .125 BSC = .750 BSC
3 SEE NOTES 7, 8 AND 13
.06 R 4 PLACES
33 SPACES AT .125 BSC = 4.125 BSC
6.750 BSC
3.375 BSC
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
.19 R 4 PLACES
.437 BSC
.09 R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
5.375 BSC
.250 BSC
.44 X 45° 4 PLACES
.22 R 2 PLACES
.75 2 PLACES
.73 R 2 PLACES
.1865 .1870 DIA THRU 3 "X" HOLES ⊕ .002 DIA ⊥ A .0005 SEE NOTE 13
1.12 2 PLACES
1.00 2 PLACES
.06 2 PLACES
.145 2 PLACES
.19 R 2 PLACES
.118 BSC
.50 TYP
.062 BSC
.19 R TYP
29 SP AT .125 BSC = 3.625 BSC
2 SEE NOTE 7, 8 AND 13 ⊕ .005 DIA
2.250 BSC
9.000
.125 R 12 PLACES
.25 R TYP
.125 DIA 10 HOLES ⊕ .008 DIA
.375 BSC 5 PLACES
.188 BSC 5 PLACES
.158 .162 DIA THRU 24 HOLES
1.94 2 PLACES
17.686
.35 12 PLACES
.305 BSC 5 PLACES
.185 .165 10 PLACES
.19 R TYP
.50 R 42 PLACES
.200 5 PLACES
.100 5 PLACES
.64 15 PLACES
.22 15 PLACES
.750 BSC 10 PLACES
.375 BSC, 10 PLACES
.118 BSC 4 PLACES
.125 DIA X .300 DP 20 HOLES ⊕ .008 DIA SEE NOTE 15
.25 R 2 PLACES
.167 .175 DIA X .11 DP 4 PLACES
.062 R 2 PLACES
.12 R 6 PLACES
.06 X 45° 4 PLACES
.125 BSC .250 BSC .375 BSC .500 BSC .625 BSC
8.500 BSC 8.250 BSC 8.000 BSC 7.750 BSC 7.500 BSC
4.000
9.250
5.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
17.375 16.674 16.500 BSC 15.437 15.375 BSC 14.750 BSC 14.674 13.924 13.750 BSC 13.375 BSC 13.187 11.674 10.937 10.125 BSC 9.500 BSC 9.437 8.674 8.500 BSC 7.937 7.675 BSC 6.875 BSC 6.437 5.875 BSC 5.674 4.875 BSC 4.250 BSC 4.187 3.250 BSC 2.674 2.625 BSC 1.937 1.625 BSC
A A B B C C D D E E

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I, CLASS C. TOUCH UP, EXCLUDING CORROSION, PER ND1002040.
7. COAT THREADS OF HOLES FOR FIND NOS. 1, 2, 3, 4 AND 5 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NUMBERS 1, 2, 3, 4 AND 5 (SEE NOTE NO. 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD LJD-340-10000
13. HOLES FOR FIND NO. 1, 2, 3, 4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI, DO NOT EPOXY COAT.
15. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND1002040.

34

2008334	N


SECTION F-F
SCALE 4/1
120°
.500 .515 DIA
⊚0.005 TIR
.390 .395 DIA
60°
45° ±5°
.020 R MAX
-C-
.063 .078
DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
⊕.004 DIA
.085 .078
.097 .086
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
⊕.008 DIA
-B-
-A-
.025 MIN 8 PLACES MARKED A
.12 2 PLACES
.38 R 4 PLACES
.25 2 PLACES
.50 2 PLACES
.415
.200 REF
SEE DETAIL A
20.250
.000 .020 TYP
.09 R
.12 R 2 PLACES
.040 REF
.078 .085
1.430
2.487 2.507
SECTION A-A
VIEW A-A
TYP 12 PLACES
SPOTFACE SEE NOTE 14
.562 DIA
19.000 BSC
18.500 BSC
17.375
16.674
16.500 BSC
16.125 BSC
15.437
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.187
11.674
10.917
10.126 BSC
9.500 BSC
SEE NOTE 14
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
1.500 1.562
.25 X 45° 4 PLACES
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
SEE NOTE 7, 8 AND 13
16.005 15.995
14.003 13.997
12.003 11.997
12.505 12.495
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
SEE NOTE 14
.0715 .0725 DIA HOLE
TYP 47 PLACES MARKED 'G'
⊕.004 DIA
.289 12 PLACES
1.032 12 PLACES
.75R 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
1.00 R 4 PLACES
10.815 10.809
11.307
9.000
9.802
1.153
.474
1.872
2.679 2.669
.33 2 PLACES
.50 REF
.38 2 PLACES
SEE NOTE 7, 8 AND 13
①
②
③
④
⑤
⑥

ⓔ RE

1	20083
24	1010
2	1010
6	1010
44	1010
2	MS2
QTY REQD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007084	

APPLICATION

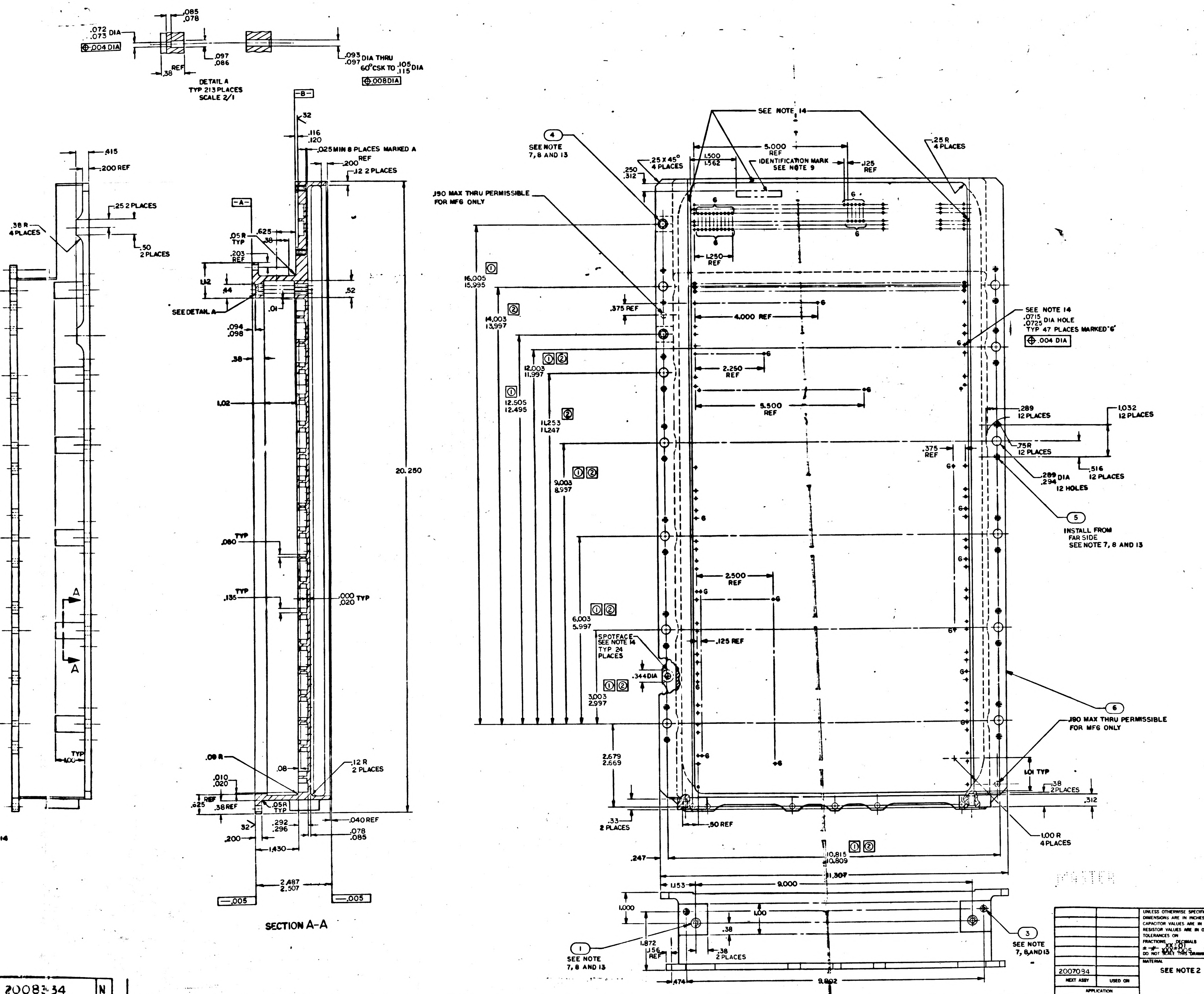
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED

MASTER

2008334 N

2/2008334

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPD
E		REPLACES WORD DWG REV D PER TDRR 21454				WK
F		REVISED PER TDRR 22500				
G		REVISED PER TDRR 23111				WK
H		REVISED PER TDRR 24359				WK
J		REVISED PER TDRR 24969				WK
K		REVISED PER TDRR 24968				WK
L		REVISED PER TDRR 28474	PHG		5 MAY 66	
M		REVISED PER TDRR 32774			3 FEB 67	
N		REVISED PER TDRR 32789			3 FEB 67	


DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
SEE DETAIL A
SECTION A-A
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
.025 MIN 8 PLACES MARKED A
.12 2 PLACES
20.250
.05 R TYP
.625
.203 REF
.000 .020 TYP
.09 R
.12 R 2 PLACES
.040 REF
.078 .085
.292 .296
1.430
2.487 2.507
.005
SEE NOTE 14
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
.25 X 45° 4 PLACES
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
SEE NOTE 7, 8 AND 13
16.005 15.995
14.003 13.997
12.003 11.997
12.505 12.495
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
SEE NOTE 14
.0715 .0725 DIA HOLE
TYP 47 PLACES MARKED "6"
.004 DIA
.289 12 PLACES
1.032 12 PLACES
.75R 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
.375 REF
1.01 TYP
.38 2 PLACES
.312
1.00 R 4 PLACES
2.679 2.669
.33 2 PLACES
.50 REF
10.815 10.809
11.307
.247
9.000
1.153
1.000
1.00
1.872
.156 REF
.38 2 PLACES
.474
9.802
SEE NOTE 7, 8 AND 13
SEE NOTE 7, 8 AND 13

Ⓔ REPLACES WORD DWG REV D

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008334-001	TRAY X	6
24	1010957-008	INSERT, SCREW THREAD, SELF LOCKING	5
2	1010957-012	INSERT, SCREW THREAD, SELF LOCKING	4
6	1010957-009	INSERT, SCREW THREAD, SELF LOCKING	3
44	1010957-010	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007034	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.

DRAWN W.F. Tracy 6/21/65
CHECKED
APPROVED K.D. Tuomita
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

TRAY X CDU
INSEP ASSY

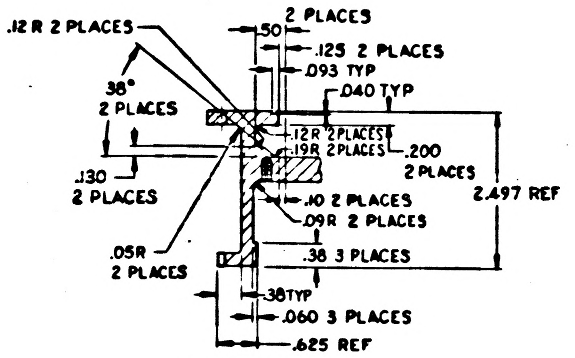
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008334
SCALE 1/1
SHEET 1 OF 1

2008334 N

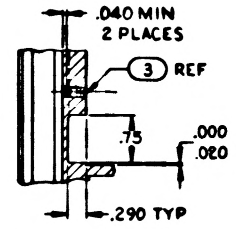
3/2008334

NOTES:

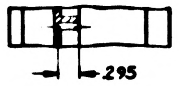
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015.
5. ALL SURFACES $^{125}\checkmark$ UNLESS OTHERWISE SPECIFIED.
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I, CLASS C. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
7. COAT THREADS OF HOLES FOR FIND NOS. 1,2,3,4 AN 5 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NOS 1,2,3,4 AND 5 (SEE NOTE 7) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT. BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
9. IDENTIFY USING DRAWING AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742.
11. $\boxed{1}$ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
12. $\boxed{2}$ THIS DIMENSION IS CONTROLLED BY ICD LID-340-10000.
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
15. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.


.12 R 2 PLACES
.50
2 PLACES
.125 2 PLACES
.093 TYP
.040 TYP
38°
2 PLACES
.12R 2 PLACES
.19R 2 PLACES
.200
2 PLACES
2.497 REF
.130
2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R
2 PLACES
.38 3 PLACES
.38 TYP
.060 3 PLACES
.625 REF

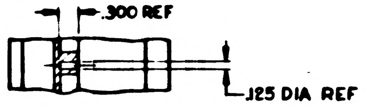
SECTION B-B


.040 MIN
2 PLACES
3 REF
.75
.000
.020
.290 TYP

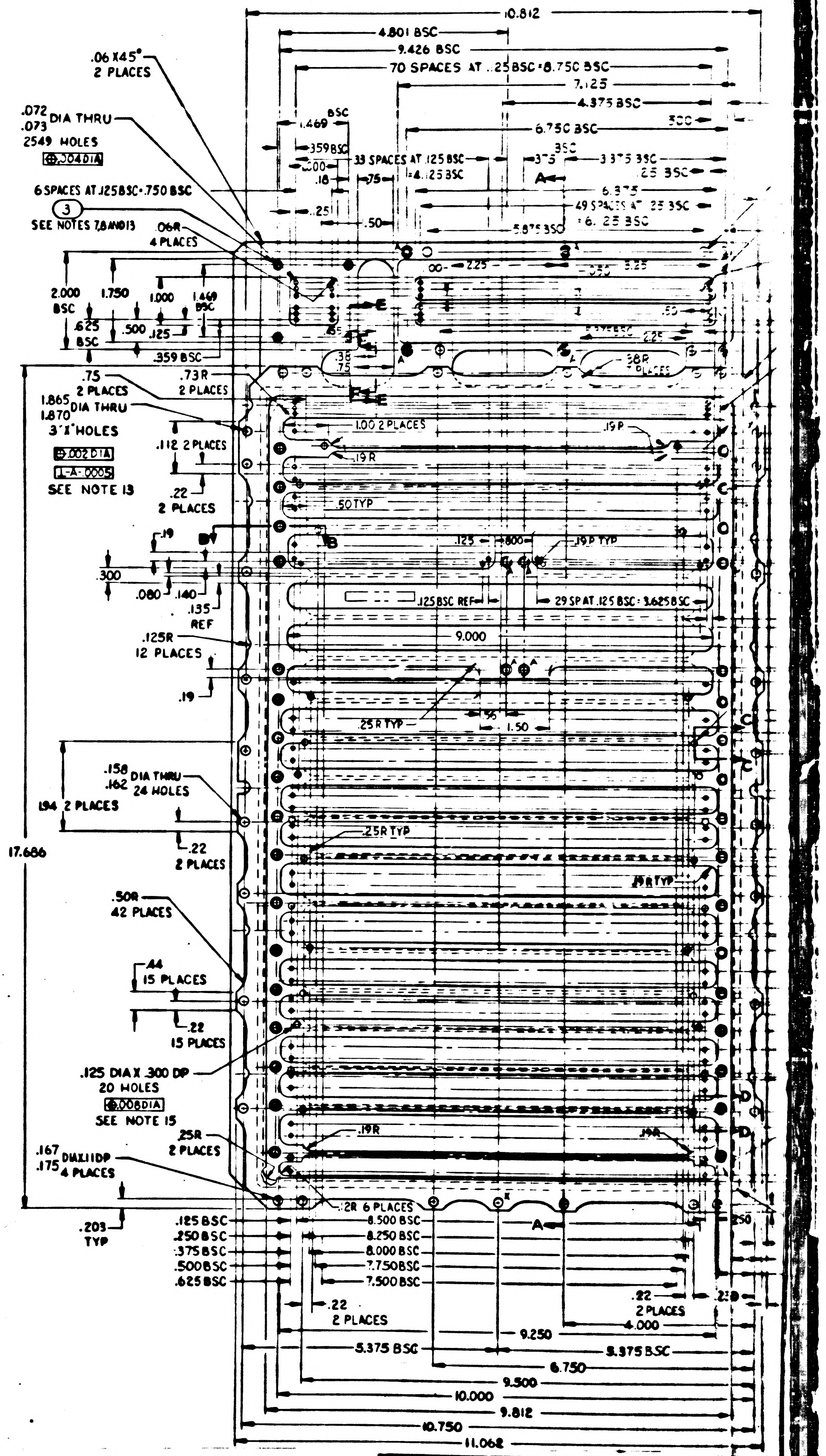
SECTION E-E



SECTION C-C


.300 REF
.125 DIA REF

SECTION D-D


10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.500
6.750 BSC
.06 X 45°
2 PLACES
.072
.073 DIA THRU
2549 HOLES
⊕ .004 DIA
1.469 BSC
.359 BSC
.000
.18
33 SPACES AT .125 BSC = 4.125 BSC
.75
.375 BSC
3.375 BSC
.25 BSC
A
6 SPACES AT .125 BSC = .750 BSC
3
SEE NOTES 7,8 AND 13
.25
.50
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
.06R
4 PLACES
2.000 BSC
1.750
1.000
1.469 BSC
.625 BSC
.500
.125
.359 BSC
.225
.050
3.25
E
.38
.75
.38R
2 PLACES
.75
2 PLACES
.73R
2 PLACES
1.865
1.870 DIA THRU
3 "X" HOLES
⊕ .002 DIA
⊥ -A- .0005
SEE NOTE 13
1.00 2 PLACES
.19R
.19R
.112 2 PLACES
.22
2 PLACES
.50 TYP
C
.19
B
.125
.800
.19R TYP
.300
.080
.140
.135
REF
.125 BSC REF
29 SP AT .125 BSC = 3.625 BSC
.125R
12 PLACES
9.000
.19
.25R TYP
.56
1.50
.158
.162 DIA THRU
24 HOLES
1.94 2 PLACES
17.686
.22
2 PLACES
.25R TYP
.19R TYP
.50R
42 PLACES
.44
15 PLACES
.22
15 PLACES
.125 DIA X .300 DP
20 HOLES
⊕ .008 DIA
SEE NOTE 15
D
.25R
2 PLACES
.19R
.19R
.167
.175 DIA X .11 DP
4 PLACES
.12R 6 PLACES
.203
TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
A
.250
.22
2 PLACES
.22
2 PLACES
4.000
9.250
5.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062

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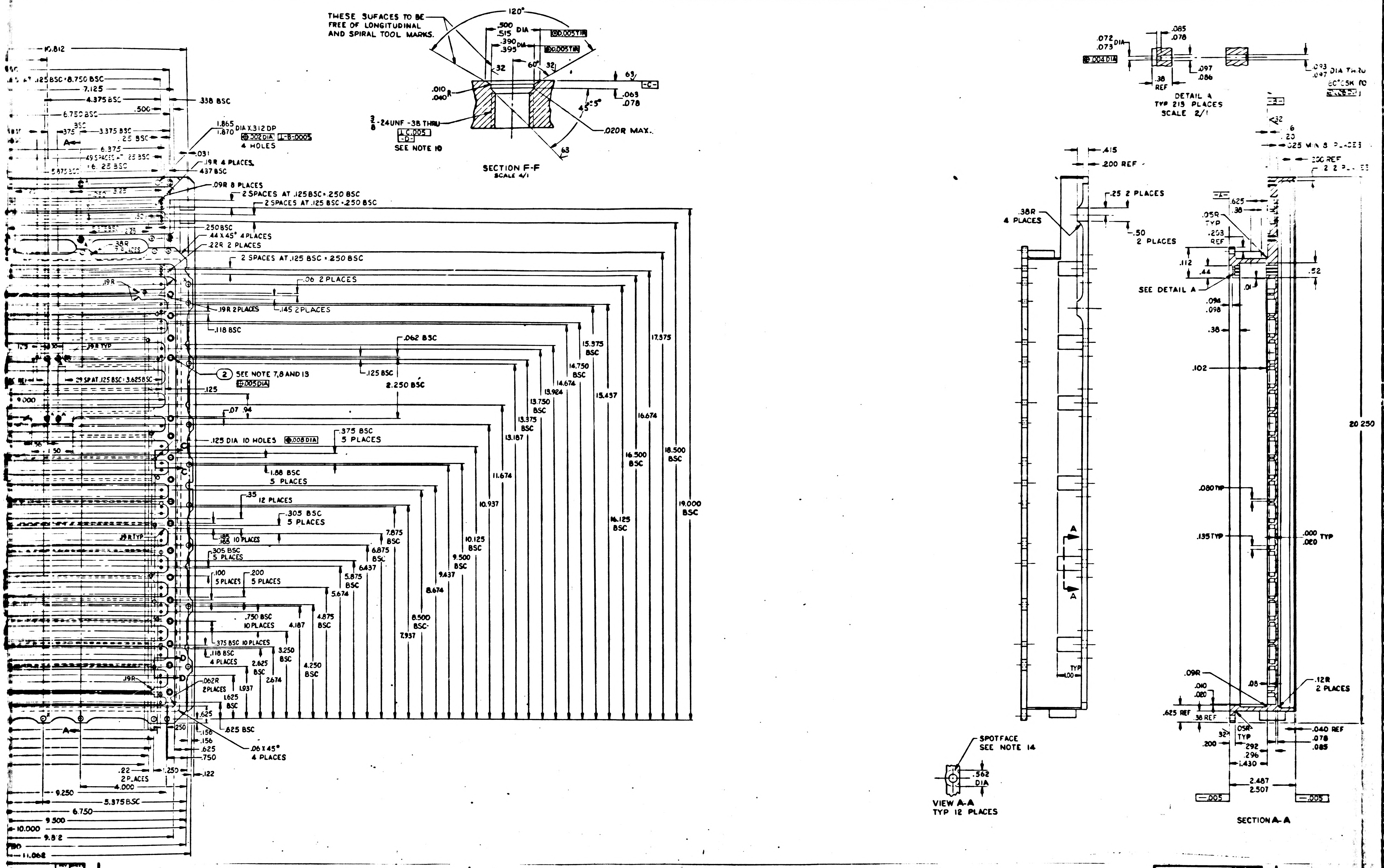
THESE SUFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS.
120°
.500 .515 DIA
.390 .395 DIA
0.005TIR
.32
60°
32
63
-C-
.010 .040 R
.063 .078
45°±5°
3/8-24UNF-3B THRU
⊥ C .005
-D-
SEE NOTE 10
.020R MAX.
63
SECTION F-F
SCALE 4/1
10.812
AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.338 BSC
.500
6.750 BSC
1.865 1.870 DIA X .312 DP
.002 DIA
⊥-B-.0005
4 HOLES
.375 BSC
3.375 BSC
.25 BSC
6.375
.031
49 SPACES AT .125 BSC = 6.125 BSC
.19R 4 PLACES
5.875 BSC
.437 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
2 SPACES AT .125 BSC = .250 BSC
.250 BSC
.44 X 45° 4 PLACES
.38R 7 PLACES
.22R 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
.06 2 PLACES
.19R
.19R 2 PLACES
.145 2 PLACES
.118 BSC
.19R TYP
.062 BSC
② SEE NOTE 7,8 AND 13
.005 DIA
.125 BSC
2.250 BSC
29 SP AT .125 BSC = 3.625 BSC
.125
9.000
.07 .94
.125 DIA 10 HOLES
.008 DIA
.375 BSC 5 PLACES
1.50
1.88 BSC 5 PLACES
C
.35 12 PLACES
.305 BSC 5 PLACES
.19R TYP
.185 .165 10 PLACES
.305 BSC 5 PLACES
.100 5 PLACES
.200 5 PLACES
.750 BSC 10 PLACES
.375 BSC 10 PLACES
.118 BSC 4 PLACES
D
.19R
.062R 2 PLACES
.625
.625 BSC
1.625 BSC
1.937
2.625 BSC
2.674
3.250 BSC
4.187
4.250 BSC
4.875 BSC
5.674
5.875 BSC
6.437
6.875 BSC
7.875 BSC
7.937
8.500 BSC
8.674
9.437
9.500 BSC
10.125 BSC
10.937
11.674
13.187
13.375 BSC
13.750 BSC
13.924
14.674
14.750 BSC
15.375 BSC
15.437
16.125 BSC
16.500 BSC
16.674
17.375
18.500 BSC
19.000 BSC
.250
.156
.156
.625
.750
.06 X 45° 4 PLACES
.22 2 PLACES
.250
.122
A
9.250
4.000
5.375 BSC
6.750
9.500
10.000
9.812
11.062
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK TO
DETAIL A
TYP 213 PLACES
SCALE 2/1
.415
.200 REF
.38R 4 PLACES
.25 2 PLACES
.50 2 PLACES
A
A
TYP
1.00
SPOTFACE SEE NOTE 14
.562 DIA
VIEW A-A
TYP 12 PLACES
-B-
32
.6
.20
.025 MIN 8 PLACES
.200 REF
2 PLACES
-A-
.625
.38
.05R TYP
.203 REF
.112
.44
.52
SEE DETAIL A
.01
.094 .098
.38
.102
20.250
.080 TYP
.135 TYP
.000 .020 TYP
.09R
.040 .020
.08
.12R 2 PLACES
.625 REF
.38 REF
32
.05R TYP
.200
.292 .296
.040 REF
.078 .085
1.430
2.487 2.507
.005
.005
SECTION A-A

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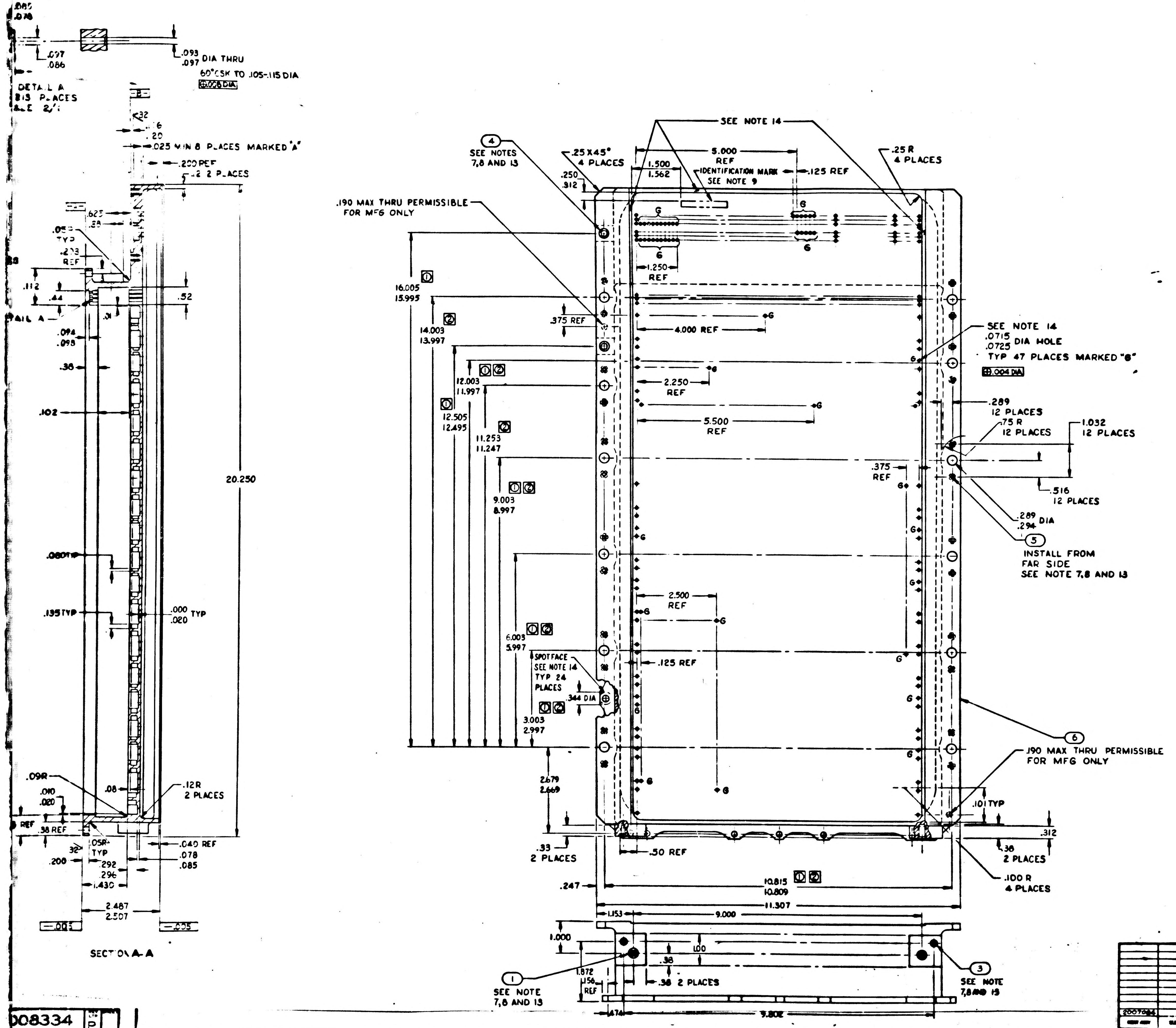
REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	P	REDRAWN REV "N" WITHOUT CHANGE PER TDRR 22931	CHG NO	26 FEB 67	481 / 525



.085
.078
.097
.086
.093
.097 DIA THRU
60° CSK TO .105-.115 DIA
⊕.008 DIA
DETAIL A
813 PLACES
SCALE 2/1
B
32
.16
.20
.025 MIN 8 PLACES MARKED "A"
.200 REF
.12 2 PLACES
.625
.38
.050 TYP
.203 REF
.112
.44
.01
.52
DETAIL A
.094
.098
.38
.102
20.250
.080 TYP
.135 TYP
.000
.020 TYP
.09R
.010
.020
.08
.12R
2 PLACES
REF
.38 REF
.05R TYP
32
.200
.292
.296
1.430
.040 REF
.078
.085
2.487
2.507
⊥.005
⊥.005
SECTION A-A
SEE NOTE 14
④
SEE NOTES 7,8 AND 13
.25 X 45°
4 PLACES
.250
.312
1.500
1.562
5.000 REF
IDENTIFICATION MARK
SEE NOTE 9
.125 REF
.25 R
4 PLACES
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
G
1.250 REF
16.005
15.995
①
14.003
13.997
②
.375 REF
4.000 REF
SEE NOTE 14
.0715
.0725 DIA HOLE
TYP 47 PLACES MARKED "G"
⊕.004 DIA
12.003
11.997
①②
2.250 REF
①
12.505
12.495
11.253
11.247
②
5.500 REF
.289
12 PLACES
.75 R
12 PLACES
1.032
12 PLACES
.375 REF
.516
12 PLACES
.289
.294 DIA
⑤
INSTALL FROM
FAR SIDE
SEE NOTE 7,8 AND 13
9.003
8.997
①②
2.500 REF
6.003
5.997
①②
SPOTFACE
SEE NOTE 14
TYP 24
PLACES
.344 DIA
.125 REF
3.003
2.997
①②
⑥
.190 MAX THRU PERMISSIBLE
FOR MFG ONLY
2.679
2.669
.101 TYP
.33
2 PLACES
.50 REF
.312
.38
2 PLACES
.100 R
4 PLACES
.247
10.815
10.809
①②
11.307
1.153
9.000
1.000
1.00
.38
1.872
.156 REF
.38 2 PLACES
①
SEE NOTE
7,8 AND 13
③
SEE NOTE
7,8 AND 13
.474
9.802

1	6	2008334-001	TRAY X
24	5	1010957-008	INSERT, SCREW THREAD, SELF LOCKING
2	4	1010957-012	INSERT, SCREW THREAD, SELF LOCKING
6	3	1010957-009	INSERT, SCREW THREAD, SELF LOCKING
44	2	1010957-010	INSERT, SCREW THREAD, SELF LOCKING
2	1	MS21208-F4-10	INSERT, SCREW THREAD, SELF LOCKING
QTY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

2007084	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.01
3 PLACE DECIMALS ±.005
ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN M.E. TROY DATE
CHECKED R.R. KLEMMER 9 AUG 65
APPROVAL R. KINGSBURY 9 AUG 65
CONTRACT
NASA APPROVAL
MIT APPROVAL W. KUPFER 8-10-65

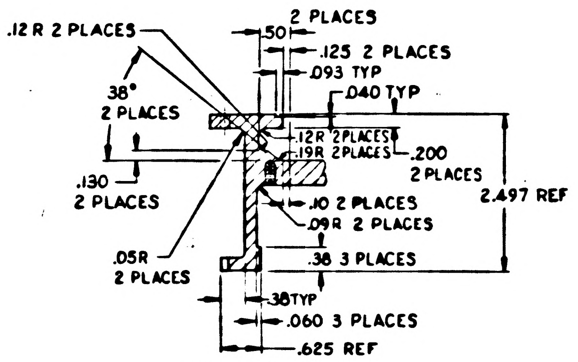
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X CDU
INSEP ASSY

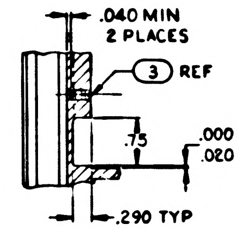
SIZE J3 CODE IDENT NO. 80230 2008334
SCALE 1/1 SHEET 1 OF 1

008334 REV LTR P

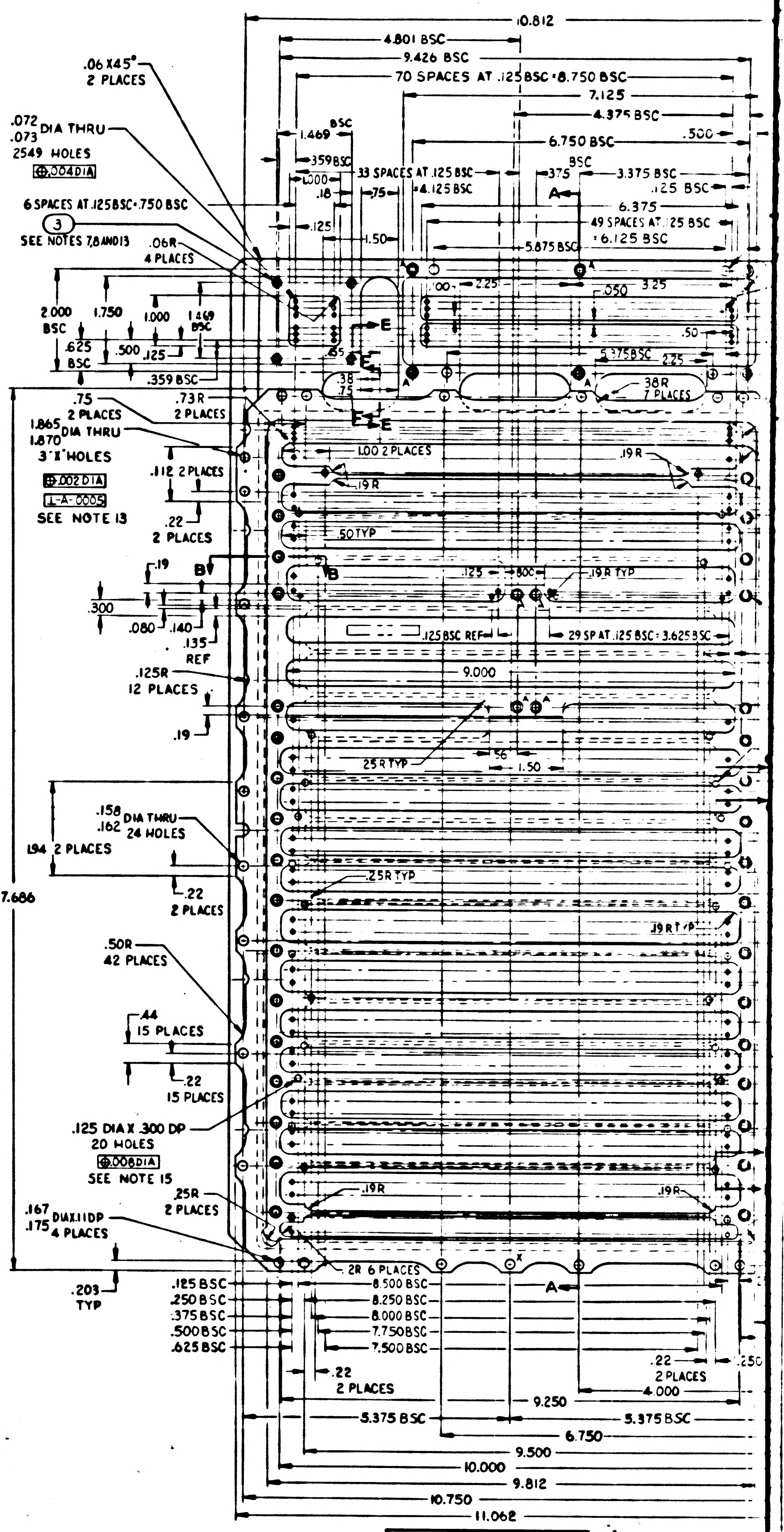
3/2008334


.12 R 2 PLACES
.50
2 PLACES
.125 2 PLACES
.093 TYP
.040 TYP
38°
2 PLACES
.12R 2 PLACES
.19R 2 PLACES
.200
2 PLACES
2.497 REF
.130
2 PLACES
.10 2 PLACES
.09R 2 PLACES
.05R
2 PLACES
.38 3 PLACES
.38 TYP
.060 3 PLACES
.625 REF

SECTION B-B

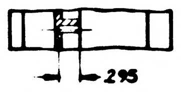

.040 MIN
2 PLACES
3
REF
.75
.000
.020
.290 TYP

SECTION E-E

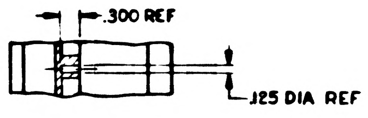

10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.500
6.750 BSC
.06 X45°
2 PLACES
.072
.073
DIA THRU
2549 HOLES
⊕.004DIA
1.469 BSC
.359BSC
1.000
.18
33 SPACES AT .125 BSC = 4.125 BSC
.75
.375 BSC
3.375 BSC
.125 BSC
A
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
6 SPACES AT .125BSC = .750 BSC
3
SEE NOTES 7,8 AND 13
.125
1.50
.06R
4 PLACES
2.000 BSC
1.750
1.000
1.469 BSC
.625 BSC
.500
.125
.359 BSC
E
.65
.38
.75
.100
2.25
.050
3.25
.50
5.375BSC
2.25
38R
7 PLACES
.75
2 PLACES
.73R
2 PLACES
1.865
1.870
DIA THRU
3 "X" HOLES
⊕.002 DIA
⊥-A-.0005
SEE NOTE 13
.112 2 PLACES
1.00 2 PLACES
.19R
.22
2 PLACES
.50 TYP
.19
B
.300
.080
.140
.135 REF
.125
.800
.19R TYP
.125 BSC REF
29 SP AT .125 BSC = 3.625 BSC
.125R
12 PLACES
9.000
.19
.56
.25R TYP
1.50
.158
.162
DIA THRU
24 HOLES
1.94 2 PLACES
17.686
.22
2 PLACES
.25R TYP
.19R TYP
.50R
42 PLACES
.44
15 PLACES
.22
15 PLACES
.125 DIA X .300 DP
20 HOLES
⊕.008DIA
SEE NOTE 15
.19R
.19R
.25R
2 PLACES
.167
.175
DIA X .11DP
4 PLACES
2R 6 PLACES
X
.203
TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
A
.22
2 PLACES
.22
2 PLACES
.250
4.000
9.250
5.375 BSC
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015.
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED.
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I, CLASS C. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
7. COAT THREADS OF HOLES FOR FIND NOS. 1,2,3,4 AN 5 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.
8. INSTALL FIND NOS.1,2,3,4 AND 5 (SEE NOTE 7) PER MS 33646. *REMOVE DRIVING TANG BY INSERTING TOOL FROM SAME SIDE OF HOLE THAT INSERT WAS INSTALLED. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT. BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.*
9. IDENTIFY USING DRAWING AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742.
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
12. ② THIS DIMENSION IS CONTROLLED BY ICD LID-340-10000.
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
15. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.



SECTION C-C


.300 REF
.125 DIA REF

SECTION D-D

2008334	R	1

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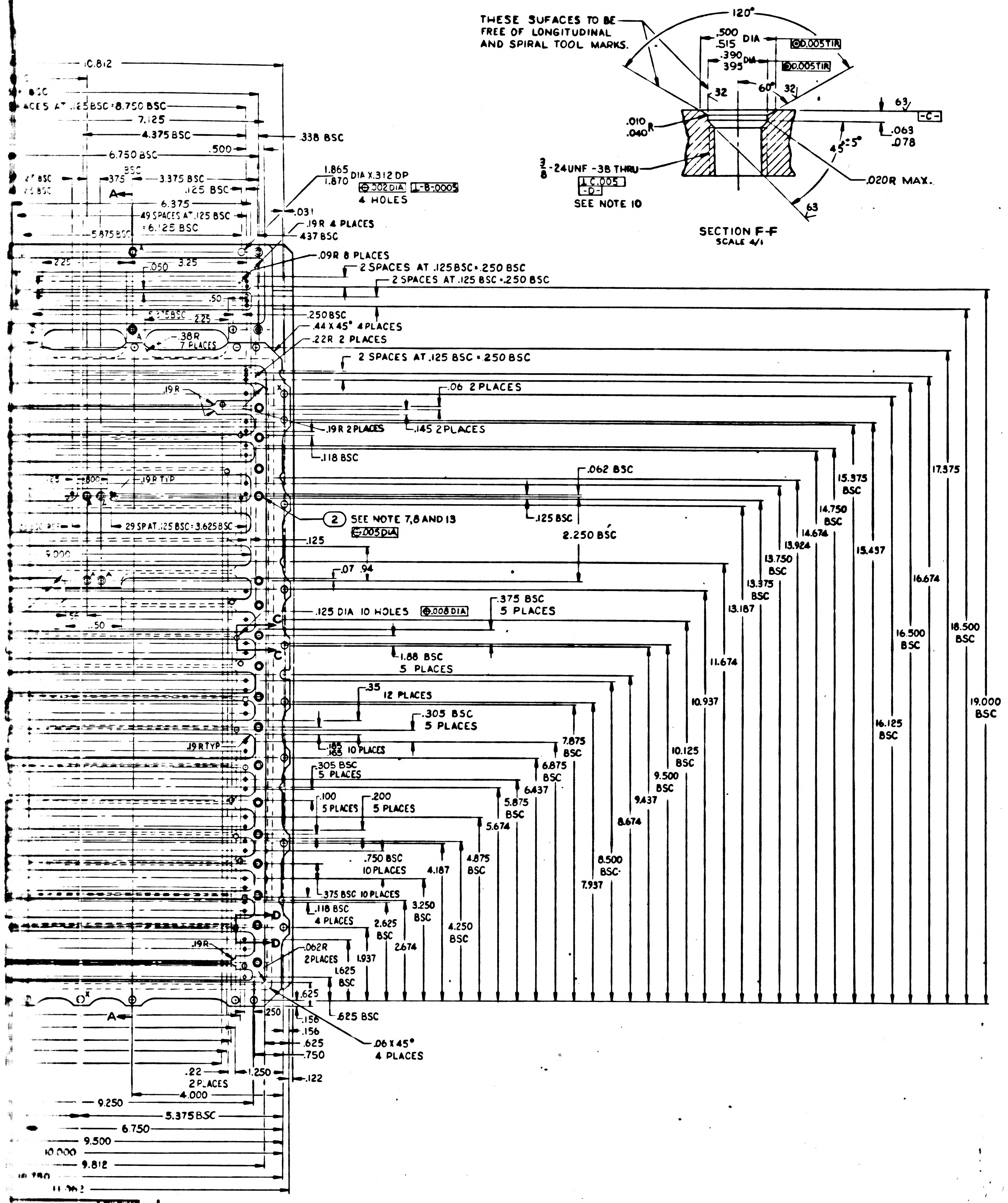
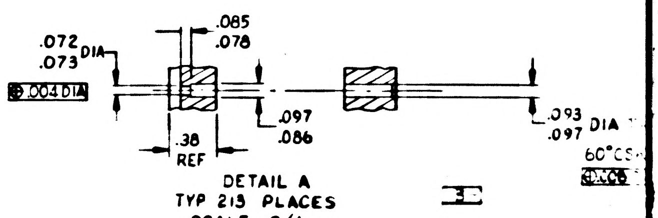
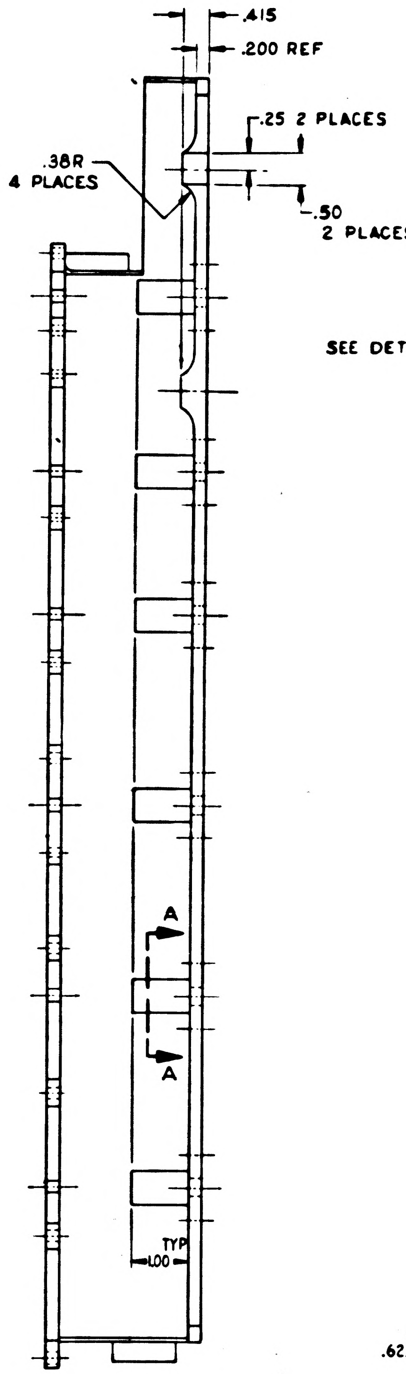
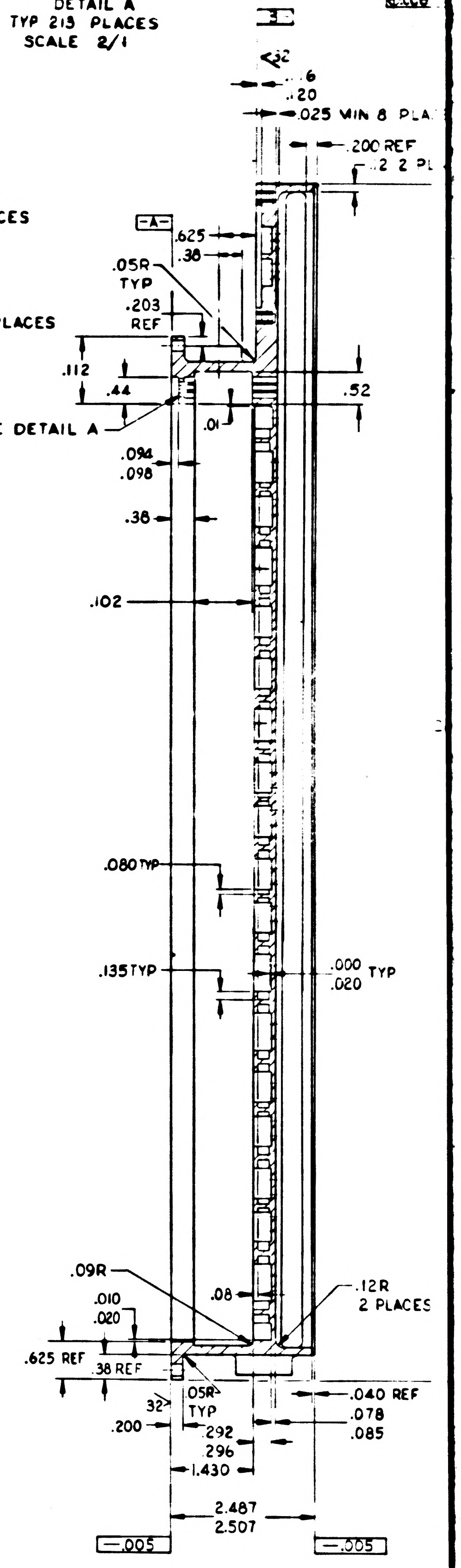

THESE SUFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS.
120°
.500 .515 DIA
.390 .395 DIA
⊚ 0.005 TIR
60°
32
63
-C-
.010 .040 R
.063 .078
45° ± 5°
3/8-24UNF-3B THRU
⊥ C .005
-D-
SEE NOTE 10
.020R MAX.
SECTION F-F
SCALE 4/1
10.812
8.750 BSC
7.125
4.375 BSC
.500
.338 BSC
6.750 BSC
3.375 BSC
.125 BSC
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
1.865 1.870 DIA X .312 DP
⊕ .002 DIA
4 HOLES
.031
.19R 4 PLACES
.437 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
2 SPACES AT .125 BSC = .250 BSC
.250 BSC
.44 X 45° 4 PLACES
.22R 2 PLACES
.38R 7 PLACES
2 SPACES AT .125 BSC = .250 BSC
.06 2 PLACES
.19R
.19R 2 PLACES
.145 2 PLACES
.118 BSC
.062 BSC
.19R TYP
29 SP AT .125 BSC = 3.625 BSC
② SEE NOTE 7, 8 AND 13
.005 DIA
.125 BSC
2.250 BSC
.125
9.000
.07 .94
.125 DIA 10 HOLES
⊕ .008 DIA
.375 BSC 5 PLACES
.50
1.88 BSC 5 PLACES
.35 12 PLACES
.305 BSC 5 PLACES
.19R TYP
.185 .165 10 PLACES
.305 BSC 5 PLACES
.100 5 PLACES
.200 5 PLACES
.750 BSC 10 PLACES
.375 BSC 10 PLACES
.118 BSC 4 PLACES
.19R
.062R 2 PLACES
1.937
1.625 BSC
.625
.625 BSC
2.625 BSC
2.674
3.250 BSC
4.187
4.250 BSC
4.875 BSC
5.674
5.875 BSC
6.437
6.875 BSC
7.875 BSC
7.937
8.500 BSC
8.674
9.437
9.500 BSC
10.125 BSC
10.937
11.674
13.187
13.375 BSC
13.750 BSC
13.924
14.674
14.750 BSC
15.375 BSC
15.437
16.125 BSC
16.500 BSC
16.674
17.375
18.500 BSC
19.000 BSC
A
.250
.156
.156
.625
.750
.06 X 45° 4 PLACES
1.250
.122
.22 2 PLACES
4.000
9.250
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062

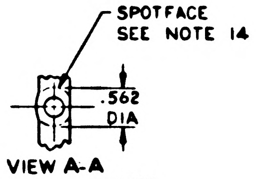

.072 .073 DIA
⊕ .004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA
60° CS

DETAIL A
TYP 213 PLACES
SCALE 2/1


.415
.200 REF
.25 2 PLACES
.38R 4 PLACES
.50 2 PLACES
A
A
TYP
1.00

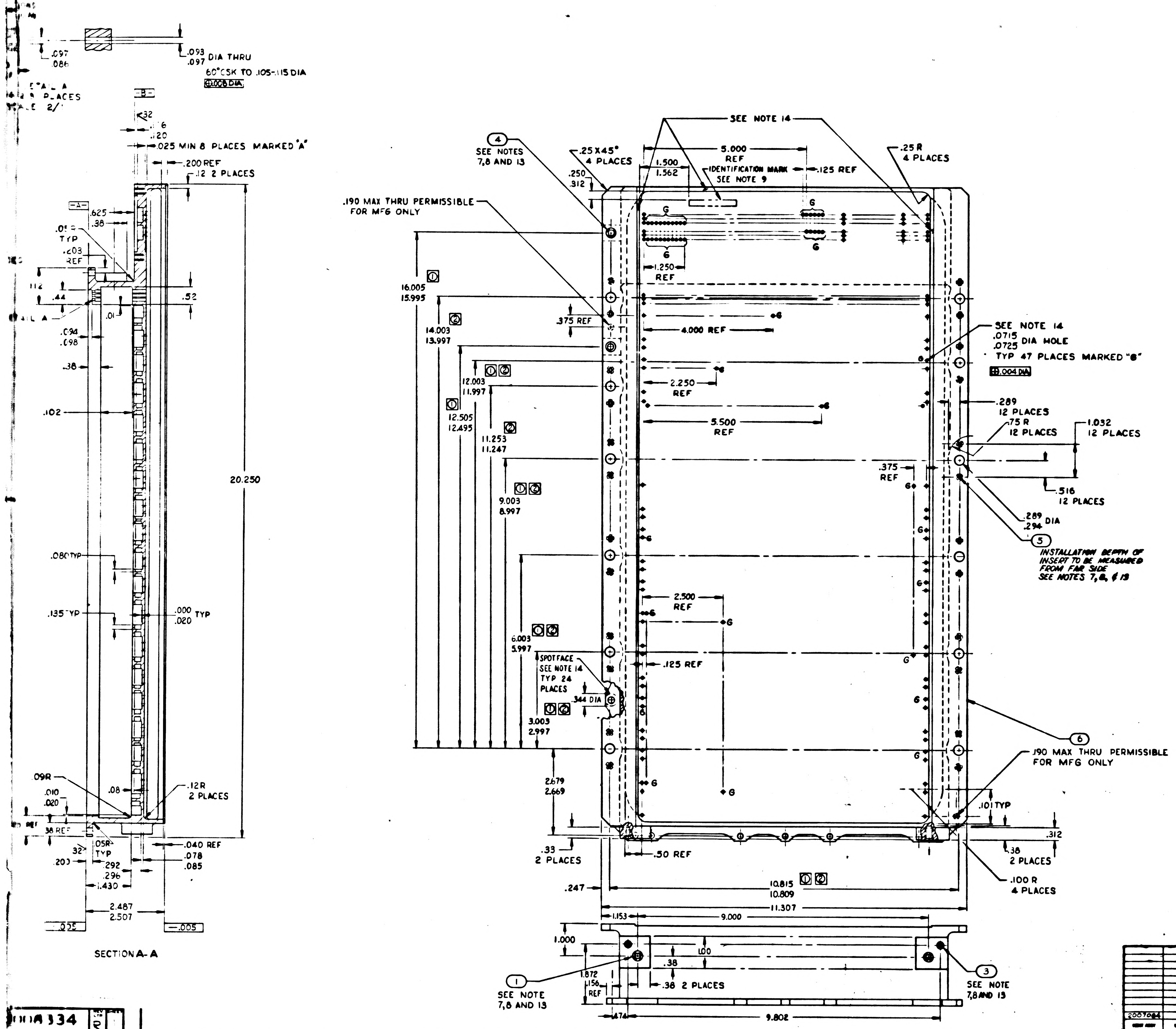

-B-
.6
.20
.025 MIN 8 PLA
.200 REF
.2 2 PL
-A-
.625
.38
.05R TYP
.203 REF
.112
.44
.52
SEE DETAIL A
.01
.094 .098
.38
.102
.080 TYP
.135 TYP
.000 .020 TYP
.09R
.010 .020
.08
.12R 2 PLACES
.625 REF
.38 REF
.05R TYP
32
.200
.292 .296
1.430
.040 REF
.078 .085
2.487 2.507
— .005
— .005

SECTION A-A


SPOTFACE SEE NOTE 14
.562 DIA

VIEW A-A
TYP 12 PLACES

ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	P	REDRAWN REV "N" WITHOUT CHANGE PER TDRR 32931		26 FEB 67	
	R	REVISED PER TDRR 34872		13 NOV 67	JKK RWH


.097
.086
.093
.097 DIA THRU
60°CSK TO .105-.115 DIA
.025 MIN 8 PLACES MARKED "A"
.200 REF
.12 2 PLACES
.625
.38
20.250
.102
.080 TYP
.135 TYP
.000
.020 TYP
.09R
.010
.020
.08
.12R
2 PLACES
.040 REF
.078
.085
.05R TYP
.292
.296
.430
2.487
2.507
.005
SECTION A-A
SEE NOTE 14
SEE NOTES 7,8 AND 13
.25 X 45° 4 PLACES
5.000 REF
1.500
1.562
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 R 4 PLACES
.250
.312
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.250 REF
16.005
15.995
14.003
13.997
.375 REF
4.000 REF
12.003
11.997
12.505
12.495
2.250 REF
5.500 REF
11.253
11.247
9.003
8.997
SEE NOTE 14
.0715
.0725 DIA HOLE
TYP 47 PLACES MARKED "G"
.004 DIA
.289 12 PLACES
.75 R 12 PLACES
1.032 12 PLACES
.375 REF
.516 12 PLACES
.289
.294 DIA
INSTALLATION DEPTH OF INSERT TO BE MEASURED FROM FAR SIDE SEE NOTES 7, 8, & 13
2.500 REF
6.003
5.997
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
.125 REF
3.003
2.997
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
2.679
2.669
.101 TYP
.312
.33 2 PLACES
.50 REF
.38 2 PLACES
.100 R 4 PLACES
.247
10.815
10.809
11.307
1.153
9.000
1.000
1.00
.38
.872
.156 REF
.38 2 PLACES
SEE NOTE 7,8 AND 13
SEE NOTE 7,8 AND 13
.474
9.802
①
②
③
④
⑤
⑥

QTY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	6	2008334-001	TRAY X
24	5	1010957-008	INSERT, SCREW THREAD, SELF LOCKING
2	4	1010957-012	INSERT, SCREW THREAD, SELF LOCKING
6	3	1010957-009	INSERT, SCREW THREAD, SELF LOCKING
44	2	1010957-010	INSERT, SCREW THREAD, SELF LOCKING
2	1	MS21208-F4-10	INSERT, SCREW THREAD, SELF LOCKING

LIST OF PARTS AND MATERIALS

2007084
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.01
3 PLACE DECIMALS ±.005
ANGLES ±1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2

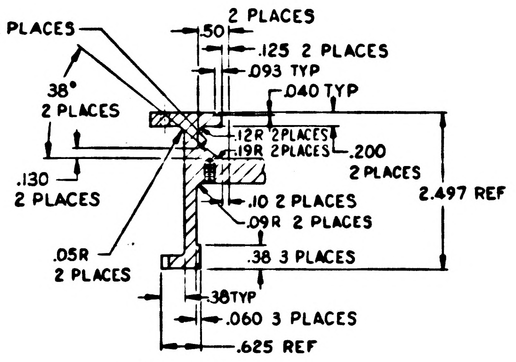
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN W.F. TROY
CHECKED R.P. KLESHNEY 9 AUG 65
APPROVAL R.K. MACDONALD 9 AUG 65
CONTRACT
NASA APPROVAL 8-10-65
MIT APPROVAL W. KUPFER 8-10-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

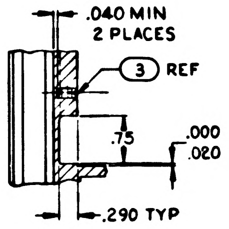
TRAY X CDU
INSEP ASSY

SIZE J3 | CODE IDENT NO. 80230 | 2008334
SCALE 1/1 | SHEET 1 OF 1

37/2008334


.12 R 2 PLACES
2 PLACES
.50
.125 2 PLACES
.093 TYP
.040 TYP
38°
2 PLACES
.12R 2 PLACES
.19R 2 PLACES
.200
2 PLACES
2.497 REF
.130
2 PLACES
.10 2 PLACES
.09R 2 PLACES
.38 3 PLACES
.05R
2 PLACES
.38TYP
.060 3 PLACES
.625 REF

SECTION B-B


.040 MIN
2 PLACES
3 REF
.75
.000
.020
.290 TYP

SECTION E-E

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.

3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015.

4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015.

5. ALL SURFACES $^{125}\checkmark$ UNLESS OTHERWISE SPECIFIED.

6. FINISH-ANODIZE PER MIL-M-45202 TYPE I, CLASS C. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.

7. COAT THREADS OF HOLES FOR FIND NOS. 1,2,3,4 AN 5 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 8 WHILE PRIMER IS WET.

8. INSTALL FIND NOS. 1,2,3,4 AND 5 (SEE NOTE 7) PER MS 33646. *REMOVE DRIVING TANG BY INSERTING TOOL FROM SAME SIDE OF HOLE THAT INSERT WAS INSTALLED. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT. BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.*

9. IDENTIFY USING DRAWING AND SERIAL NUMBER PER ND 1002019.

10. THREADS MUST CONFORM TO MIL-S-7742.

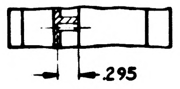
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.

12. ② THIS DIMENSION IS CONTROLLED BY ICD LID-340-10000.

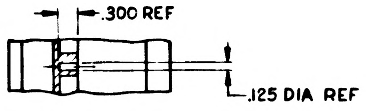
13. HOLES FOR FIND NO. 1,2,3,4 AND 5 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.

14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZING, COAT HOLES, SURFACES AND AREAS PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI, DO NOT EPOXY COAT.

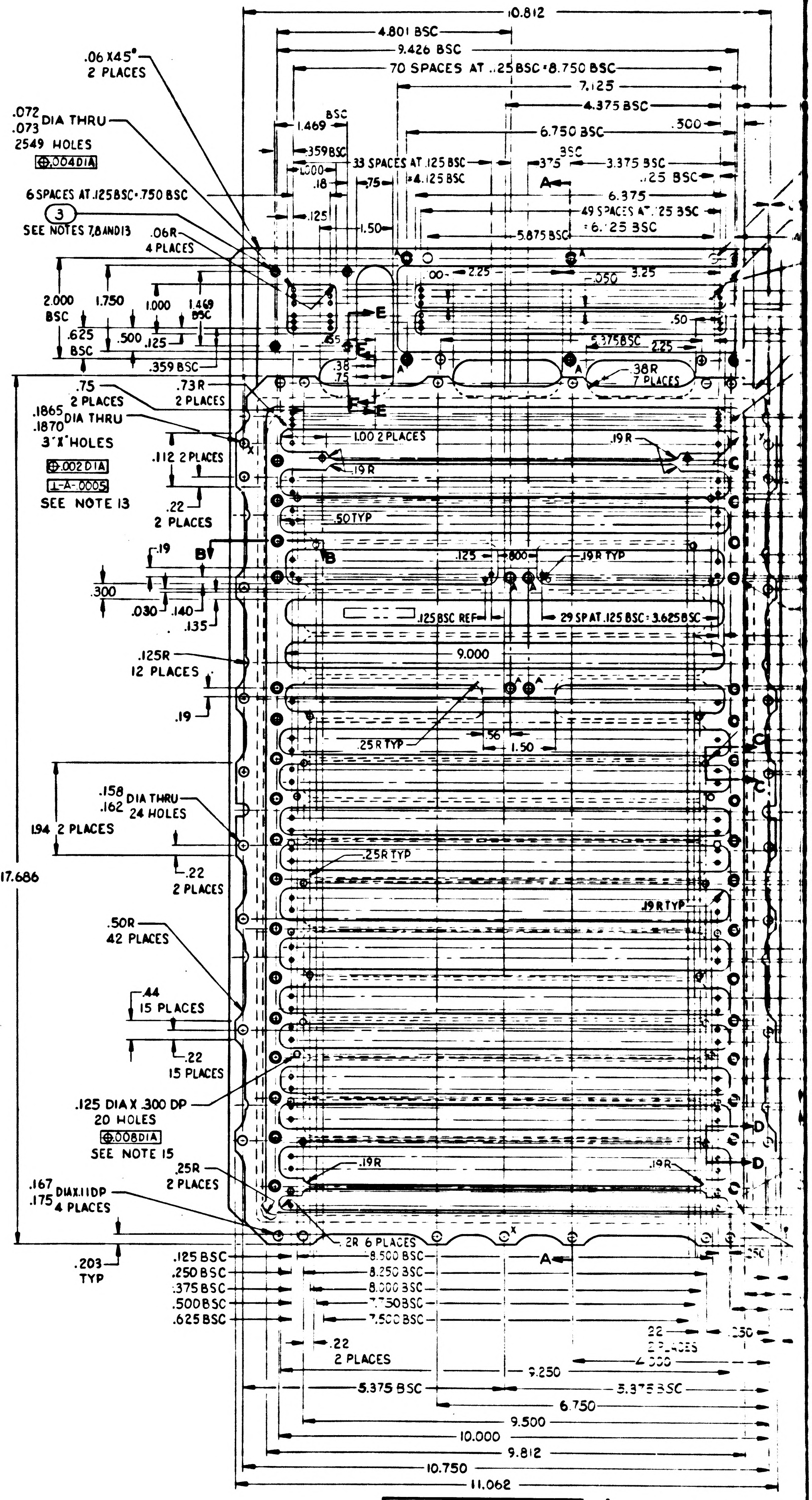
15. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.



SECTION C-C

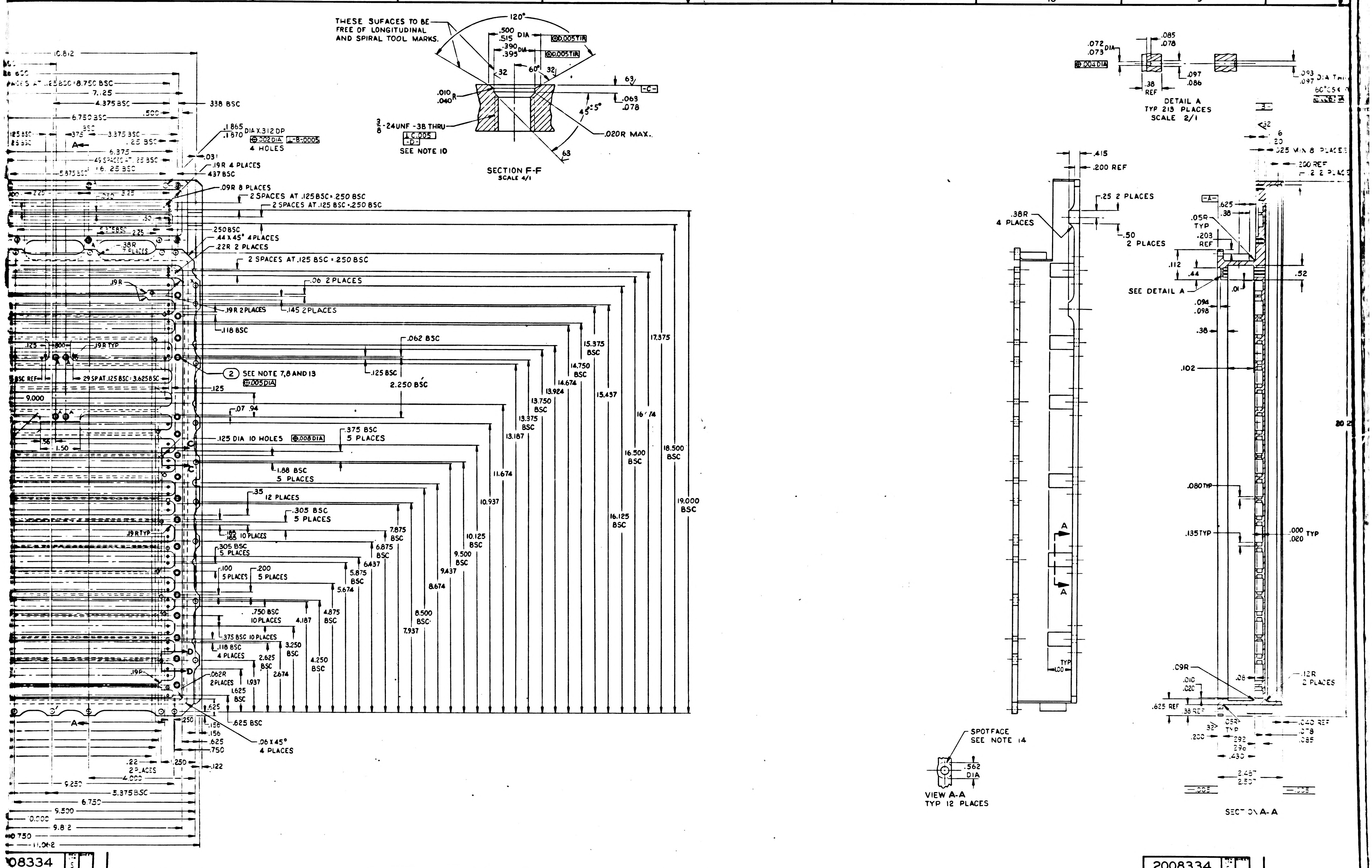

.300 REF
.125 DIA REF

SECTION D-D


10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.300
6.750 BSC
.06 X45°
2 PLACES
.072
.073 DIA THRU
2549 HOLES
⊕.004 DIA
1.469 BSC
.359 BSC
1.000
.18
.125
33 SPACES AT .125 BSC = 4.125 BSC
.75
1.50
.375 BSC
3.375 BSC
.125 BSC
A
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
6 SPACES AT .125 BSC = .750 BSC
3
SEE NOTES 7,8 AND 13
.06R
4 PLACES
2.000 BSC
1.750
1.000
1.469 BSC
.625 BSC
.500
.125
.359 BSC
E
2.25
3.25
.050
.50
5.375 BSC
.38
.75
.38R
7 PLACES
.75
2 PLACES
.73R
2 PLACES
.1865
.1870 DIA THRU
3 "X" HOLES
⊕.002 DIA
⊥ A .0005
SEE NOTE 13
.112 2 PLACES
1.00 2 PLACES
.19R
.22
2 PLACES
.50 TYP
.19
B
.300
.030
.140
.135
.125
.800
.19R TYP
.125 BSC REF
29 SP AT .125 BSC = 3.625 BSC
9.000
.125R
12 PLACES
.19
.25R TYP
.56
1.50
C
.158
.162 DIA THRU
24 HOLES
1.94 2 PLACES
.22
2 PLACES
17.686
.19R TYP
.50R
42 PLACES
.44
15 PLACES
.22
15 PLACES
.125 DIA X .300 DP
20 HOLES
⊕.008 DIA
SEE NOTE 15
D
.25R
2 PLACES
.167
.175 DIA X .11 DP
4 PLACES
.2R 6 PLACES
.203
TYP
.125 BSC
.250 BSC
.375 BSC
.500 BSC
.625 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
.250
.22
2 PLACES
4.000
9.250
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062

2008334 | REV LTR S | SHEET 1

1/2008334

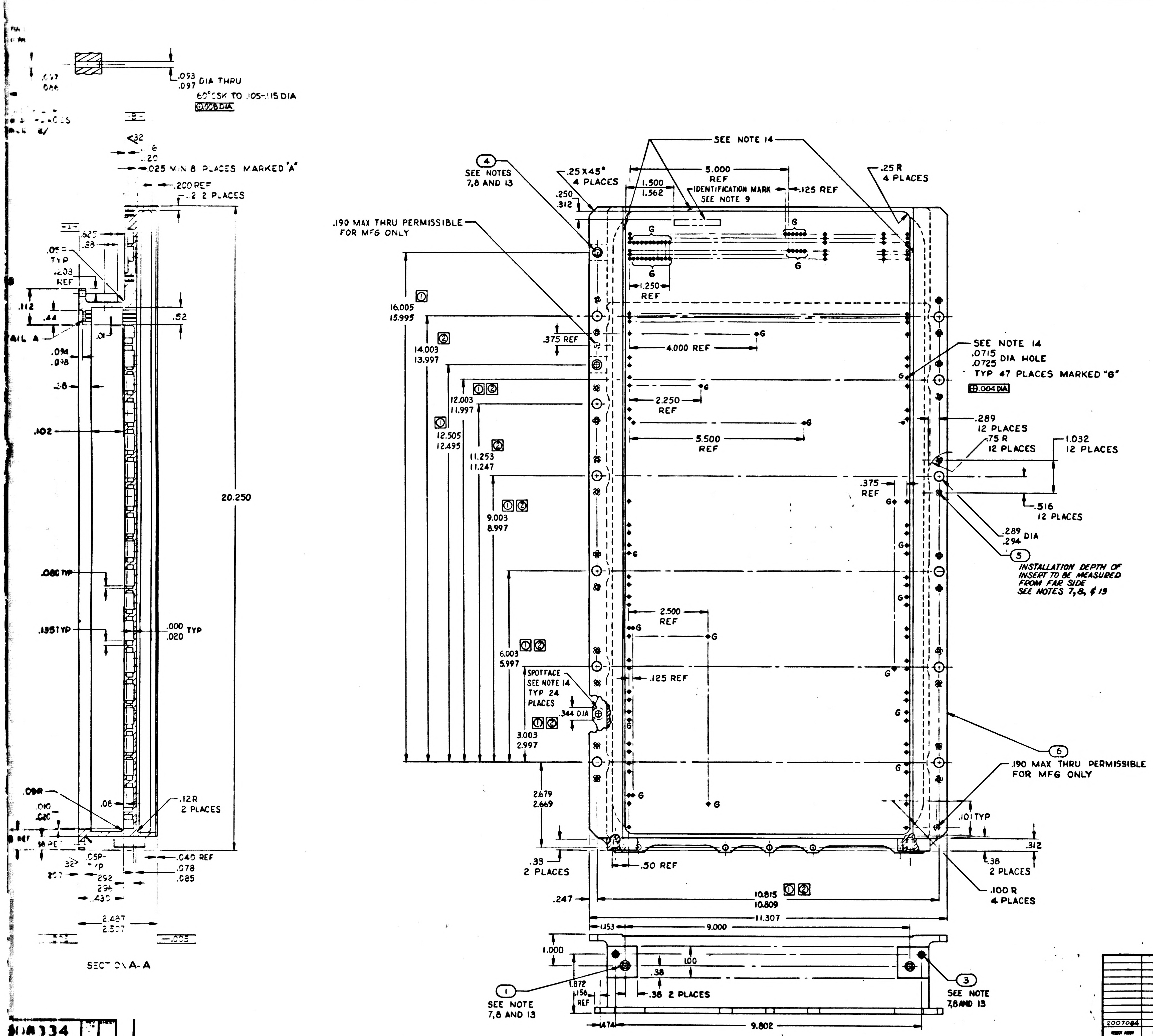


THESE SUFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS.
120°
.500 .515 DIA
.390 .395 DIA
0.005 TIR
60°
32
63
-C-
.010 .040 R
.063 .078
45°±5°
3/8-24UNF-3B THRU
⊥ C .005
-D-
SEE NOTE 10
.020R MAX.
SECTION F-F
SCALE 4/1
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK
DETAIL A
TYP 213 PLACES
SCALE 2/1
10.812
7.125
4.375 BSC
.500
6.750 BSC
338 BSC
3.375 BSC
.25 BSC
6.375
.1865 .1870 DIA X .312 DP
.002 DIA
⊥ -B- .0005
4 HOLES
.031
.19R 4 PLACES
.437 BSC
5.875 BSC
.09R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
2 SPACES AT .125 BSC = .250 BSC
.250 BSC
.44 X 45° 4 PLACES
.22R 2 PLACES
.38R 7 PLACES
2 SPACES AT .125 BSC = .250 BSC
.06 2 PLACES
.19R
.19R 2 PLACES
.145 2 PLACES
.118 BSC
.062 BSC
.19R TYP
29 SP AT .125 BSC = 3.625 BSC
② SEE NOTE 7, 8 AND 13
.005 DIA
.125 BSC
2.250 BSC
.125
9.000
.07
.94
.56
1.50
.125 DIA 10 HOLES
.008 DIA
.375 BSC 5 PLACES
1.88 BSC 5 PLACES
.35 12 PLACES
.305 BSC 5 PLACES
.19R TYP
.155 .165 10 PLACES
.305 BSC 5 PLACES
.100 5 PLACES
.200 5 PLACES
.750 BSC 10 PLACES
.375 BSC 10 PLACES
.118 BSC 4 PLACES
.19R
.062R 2 PLACES
1.625 BSC
1.937
2.625 BSC
2.674
3.250 BSC
4.187
4.250 BSC
4.875 BSC
5.674
5.875 BSC
6.437
6.875 BSC
7.875 BSC
7.937
8.500 BSC
8.674
9.437
9.500 BSC
10.125 BSC
10.937
11.674
13.187
13.375 BSC
13.750 BSC
13.924
14.674
14.750 BSC
15.375 BSC
15.457
16.125 BSC
16.500 BSC
16.74
17.375
18.500 BSC
19.000 BSC
.625
.625 BSC
.250
.156
.156
.625
.750
.06 X 45° 4 PLACES
.22 2 PLACES
.250
.122
4.000
9.250
5.375 BSC
6.750
9.500
10.000
9.812
10.750
11.062
A
.415
.200 REF
.25 2 PLACES
.38R 4 PLACES
.50 2 PLACES
A
A
TYP 1.00
SPOTFACE SEE NOTE 14
.562 DIA
VIEW A-A
TYP 12 PLACES
-B-
32
.6
.20
.025 MIN 8 PLACES
.200 REF
2 PLACES
-A-
.625
.38
.05R TYP
.203 REF
.112
.44
.52
SEE DETAIL A
.01
.094 .098
.38
.102
.080 TYP
.135 TYP
.000 .020 TYP
.09R
.010 .020
.08
.12R 2 PLACES
.625 REF
.38 REF
.05R TYP
.200
.292 .296
.430
.040 REF
.078 .085
2.487 2.507
.005
SECTION A-A
17 16 15 14 13 12 11 10 9

2008334 S

2/2008334

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	P	REDRAWN REV "N" WITHOUT CHANGE PER TDRR 32931	CHG NO	26 FEB 67	
	R	REVISED PER TDRR 34872		13 NOV 67	JRK RWH
	S	REVISED PER TDRR 3566		20 FEB 68	



.093
.097 DIA THRU
60° CSK TO .105-.115 DIA
.025 MIN 8 PLACES MARKED "A"
.200 REF
.2 2 PLACES
.05R TYP
.203 REF
.112
.44
.52
.01
.094
.098
.102
20.250
.080 TYP
.135 TYP
.000
.020 TYP
.09R
.010
.020
.08
.12R 2 PLACES
.040 REF
.078
.085
.292
.296
.430
2.487
2.507
SECTION A-A
SEE NOTE 14
④ SEE NOTES 7,8 AND 13
.25 X 45° 4 PLACES
.250
.312
1.500
1.562
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 R 4 PLACES
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
G
1.250 REF
16.005
15.995
14.003
13.997
12.003
11.997
12.505
12.495
11.253
11.247
9.003
8.997
6.003
5.997
3.003
2.997
.375 REF
4.000 REF
2.250 REF
5.500 REF
2.500 REF
.125 REF
SPOTFACE SEE NOTE 14 TYP 24 PLACES
.344 DIA
SEE NOTE 14
.0715
.0725 DIA HOLE
TYP 47 PLACES MARKED "G"
.004 DIA
.289 12 PLACES
.75 R 12 PLACES
1.032 12 PLACES
.375 REF
.516 12 PLACES
.289
.294 DIA
⑤ INSTALLATION DEPTH OF INSERT TO BE MEASURED FROM FAR SIDE SEE NOTES 7, 8, & 13
⑥
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
2.679
2.669
.101 TYP
.33 2 PLACES
.50 REF
.312
.38 2 PLACES
.100 R 4 PLACES
10.815
10.809
.247
11.307
1.153
9.000
1.000
.100
.38
.38 2 PLACES
1.872
.156 REF
.474
9.802
① SEE NOTE 7,8 AND 13
③ SEE NOTE 7,8 AND 13

QTY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	6	2008334-001	TRAY X
24	5	1010957-008	INSERT, SCREW THREAD, SELF LOCKING
2	4	1010957-012	INSERT, SCREW THREAD, SELF LOCKING
6	3	1010957-009	INSERT, SCREW THREAD, SELF LOCKING
44	2	1010957-010	INSERT, SCREW THREAD, SELF LOCKING
2	1	MS21208-F4-10	INSERT, SCREW THREAD, SELF LOCKING

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES
+.01	+.005	+1/2°
-.01	-.005	-1/2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W.F. TROY DATE 6/29/65
CHECKED R.P. KLESBURY 9 AUG 65
APPROVAL R.V. VAERUTIS 9 AUG 65
CONTRACT
NASA APPROVAL E.S. MARHAEH 8-10-65
MIT APPROVAL W. KUPFER 8-10-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X CDU
INSEP ASSY

SIZE J3 CODE IDENT NO. 80230 2008334

SCALE 1/1 SHEET 1 OF 1

2008334

31/2008334

2008334

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: MIL-M-26075 (HK31A-H24 MAGNESIUM ALLOY).

LENGTH	WIDTH	THICKNESS	QTY
20.562	11.312	2.406	1
20.562	11.312	.190	1

THE ABOVE SIZES ARE AS FINISHED OVERALL DIMENSIONS.

REVISIONS 19783

SYM	DESCRIPTION	CHG NO.	DATE	APPD.

CONFIGURATION INCOMPLETE

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± –	±.005	± –

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DWG. NO.
CONTRACT

DRAWN R G Olson DATE 3 MAY 65
CHECKED Ed Foster 3 MAY 65
APPROVAL
APPROVAL 5/28/65
NASA APPROVAL 6-7-65
MIT APPROVAL 6-2-65

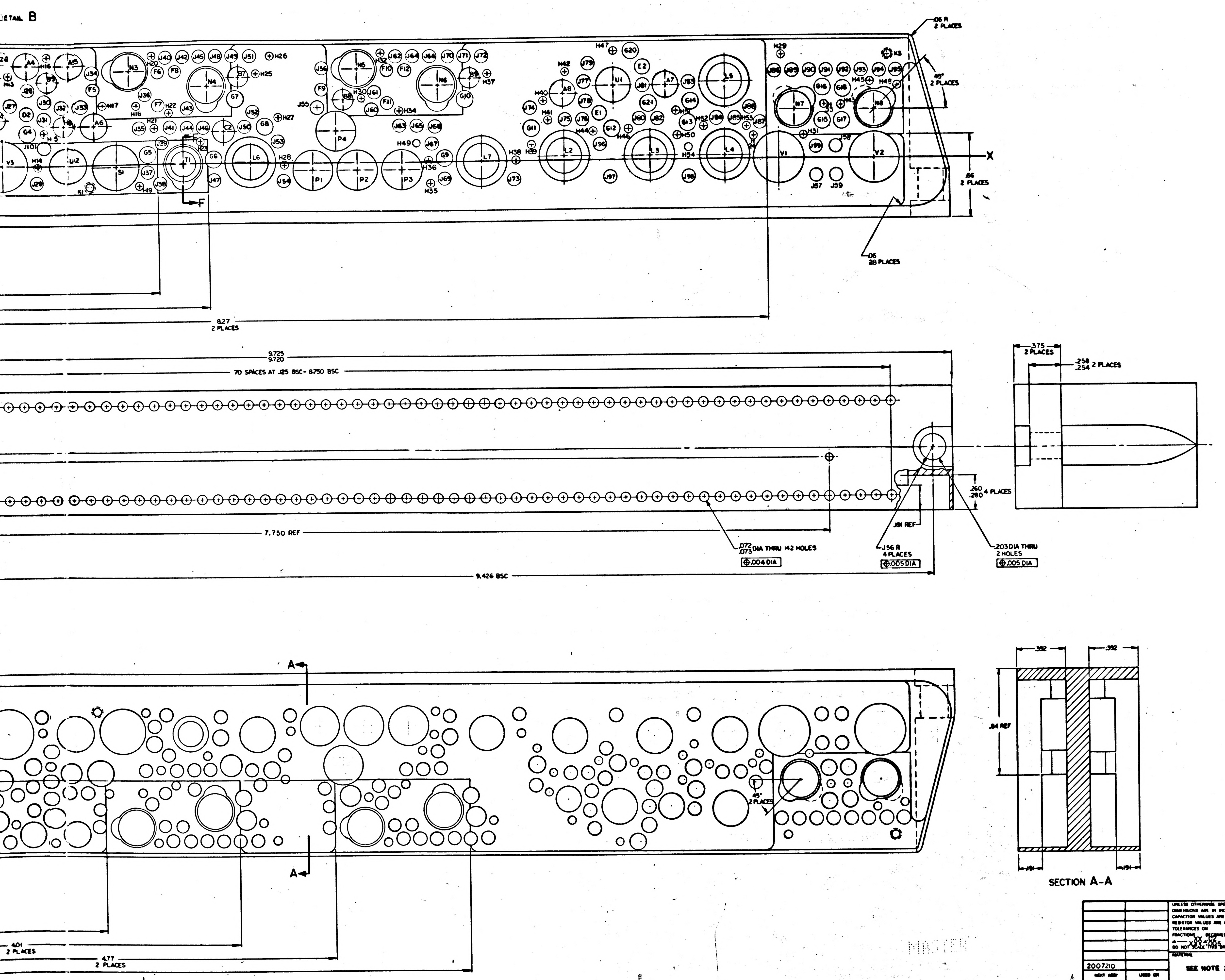
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X
INSEPARABLE ASSEMBLY

CODE IDENT NO. 80230
SIZE B
2008334
SCALE —
SHEET 1 OF 1

MIL 10778-D 11-16-64

REVISIONS		TORR 20-72				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TORR 23505				



DETAIL B
.06 R
2 PLACES
45°
2 PLACES
X
.46
2 PLACES
.06
28 PLACES
8.27
2 PLACES
9.725
9.720
70 SPACES AT .125 BSC = 8.750 BSC
.375
2 PLACES
.258
.254 2 PLACES
.260
.280 4 PLACES
.191 REF
7.750 REF
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.203 DIA THRU
2 HOLES
⊕ .005 DIA
9.426 BSC
A
A
45°
2 PLACES
.392
.392
.84 REF
.191
.191
.401
2 PLACES
4.77
2 PLACES

SECTION A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007210	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W. Merriam 11 MAY 65
CHECKED 2 Jun 65
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
INTERROGATE MODULE

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008335
SCALE 4/1
SHEET 1 OF 1

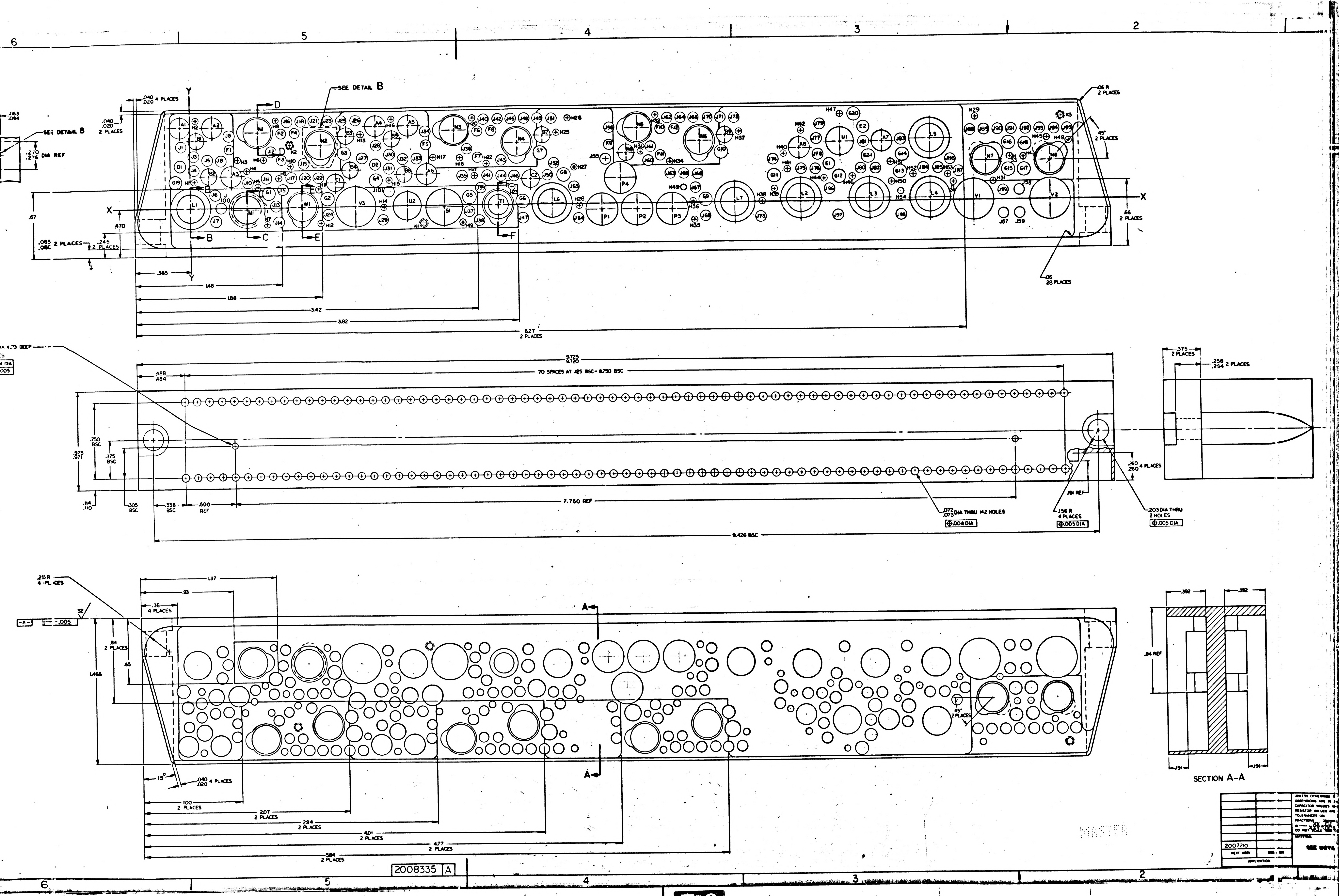
2008335 A

MASTER

2C08335 A

3 ti

F-3


6
5
4
3
2
SEE DETAIL B
.040 4 PLACES
.020
.040
.020 2 PLACES
.063
.094
SEE DETAIL B
.270
.276 DIA REF
Y
D
X
B
C
E
F
.67
.470
.085
.080 2 PLACES
.245 2 PLACES
.565
1.48
1.88
3.42
3.82
8.27 2 PLACES
.06 R 2 PLACES
45° 2 PLACES
.66 2 PLACES
.06 28 PLACES
A1 A2 A3 A4 A5 A6 A7 A8
B1 B2 B3 B4 B5 B6 B7 B8 B9
C1 C2
D1 D2
E1 E2
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12
G1 G2 G3 G4 G5 G6 G7 G8 G9 G10 G11 G12 G13 G14 G15 G16 G17 G18 G19 G20 G21
H1 – H54
J1 – J101
K1 K2 K3
L1 L2 L3 L4 L5 L6 L7
M1
N1 N2 N3 N4 N5 N6 N7 N8
P1 P2 P3 P4
S1
T1
U1 U2
V1 V2 V3
W1
9.725
9.720
.488
.484
70 SPACES AT .125 BSC = 8.750 BSC
.750 BSC
.375 BSC
.975
.971
.114
.110
.305 BSC
.338 BSC
.500 REF
7.750 REF
.072
.073 DIA THRU 142 HOLES
⌖ .004 DIA
.156 R 4 PLACES
⌖ .005 DIA
.181 REF
.203 DIA THRU 2 HOLES
⌖ .005 DIA
9.426 BSC
.375 2 PLACES
.258
.254 2 PLACES
.260
.280 4 PLACES
.25 R 4 PLACES
-A-
.005
32
1.37
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.36 4 PLACES
.84 2 PLACES
.65
1.455
15°
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.020 4 PLACES
1.00 2 PLACES
2.07 2 PLACES
2.94 2 PLACES
4.01 2 PLACES
4.77 2 PLACES
5.84 2 PLACES
A
A
45° 2 PLACES
.392
.392
.84 REF
.191
.191
SECTION A-A
UNLESS OTHERWISE
DIMENSIONS ARE IN
CAPACITOR VALUES
RESISTOR VALUES ARE
TOLERANCES ON
FRACTIONS
± — .XX .XXX
DO NOT SCALE
MATERIAL
SEE NOTE
2007210
NEXT ASSY
USED ON
APPLICATION
MASTER
2008335 A

F-2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

3H

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	-.100	.800	.202 .206	8
A2	.225	.800		
A3	.410	.312		
A4	1.840	.800		
A5	2.165	.800		
A6	2.350	.312		
A7	6.890	.590		
A8	6.070	.530		
B1	.062	.665	.153 .157	9
B2	.185	.312		
B3	1.555	.700		
B4	1.590	.365		
B5	2.000	.665		
B6	2.125	.312		
B7	3.500	.680		
B8	4.340	.500		
B9	5.335	.665		
C1	1.445	.240	.165 .169	2
C2	3.385	.250		
D1	-.100	.415	.112 .116	2
D2	1.840	.415		
E1	6.366	.375	.106 .110	2
E2	6.705	.735		
F1	.390	.580	.092 .096	12
F2	.915	.730		
F3	.915	.470		
F4	1.050	.730		
F5	2.345	.600		
F6	2.855	.730		
F7	2.855	.470		
F8	2.995	.730		
F9	4.165	.580		
F10	4.685	.730		
F11	4.685	.470		
F12	4.825	.730		
G1	.785	.145	.127 .131	21
G2	1.365	.080		
G3	1.535	.530		
G4	.845	.260		
G5	2.775	.080		
G6	3.305	.030		
G7	3.485	.510		
G8	3.715	.290		
G9	5.130	.030		
G10	5.295	.500		
G11	5.820	.260		
G12	6.465	.245		
G13	7.070	.290		
G14	7.095	.460		
G15	8.160	.290		
G16	8.160	.560		
G17	8.315	.290		
G18	8.325	.550		
G19	-.150	.260		
G20	6.615	.860		
G21	6.750	.445		
H1	.040	.260	.058 .062	18
H2	.060	.865		
H3	.475	.475		
H4	.565	.365		
H5	.680	.205		
H6	.735	.475		
H7	.770	-.165		
H8	.860	.865		
H9	.885	.290		
H10	1.000	.410		
H11	1.285	.175		
H12	1.305	-.165		
H13	1.695	.715		
H14	1.930	.010		
H15	1.980	.260		
H16	2.005	.865		
H17	2.420	.475		
H18	2.685	.465		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
H19	2.710	-.170	.058 .062	36
H20	2.810	.865		
H21	2.825	.290		
H22	2.945	.405		
H23	3.200	.175		
H24	7.600	.180		
H25	3.645	.710		
H26	3.760	.850		
H27	3.822	.365		
H28	3.865	-.020		
H29	7.825	.820		
H30	4.485	.510		
H31	8.005	.180		
H32	4.640	.865		
H33	8.170	.425		
H34	4.780	.410		
H35	5.025	-.170		
H36	5.005	.010		
H37	5.470	.700		
H38	5.695	.000		
H39	5.820	.125		
H40	5.915	.475		
H41	5.950	.320		
H42	6.095	.700		
H43	8.305	.420		
H44	6.315	.225		
H45	8.545	605		
H46	6.595	.245		
H47	6.470	.860		
H48	8.765	.575		
H49	4.915	.145		
H50	6.990	.190		
H51	6.975	.385		
H52	7.200	.260		
H53	7.541	.255		
H54	7.077	.093		
J1	-.090	.610	.100 .104	41
J2	—	—		
J3	.035	.510		
J4	.035	.375		
J5	.170	.475		
J6	.250	.135		
J7	.255	-.130		
J8	.312	.465		
J9	.395	.710		
J10	.575	.250		
J11	.765	.290		
J12	.812	.560		
J13	.860	.015		
J14	.885	-.140		
J15	.930	.180		
J16	.975	.850		
J17	1.015	.295		
J18	1.115	.850		
J19	1.140	.435		
J20	1.155	.290		
J21	1.245	.850		
J22	1.285	.290		
J23	1.380	.850		
J24	1.380	-.075		
J25	1.515	.850		
J26	1.650	.850		
J27	1.710	.480		
J28	1.845	.605		
J29	1.920	-.135		
J30	1.980	.512		
J31	1.975	.375		
J32	2.115	.465		
J33	2.255	.465		
J34	2.340	.735		
J35	2.705	.290		
J36	2.755	.555		
J37	2.775	-.060		
J38	2.875	-.150		
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J40	2.920	.850		
J41	2.955	.290		
J42	3.060	.850		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
J43	3.095	.440	.100 .104	53
J44	3.095	.290		
J45	3.195	.850		
J46	3.225	.290		
J47	3.310	-.130		
J48	3.325	.850		
J49	3.455	.850		
J50	3.555	.290		
J51	3.595	.850		
J52	3.615	.405		
J53	3.815	.170		
J54	3.860	-.140		
J55	4.125	.440		
J56	4.170	.750		
J57	8.102	-.130		
J58	8.262	.093		
J59	8.262	-.130		
J60	4.560	.420		
J61	4.585	.560		
J62	4.755	.840		
J63	4.780	.290		
J64	4.890	.840		
J65	4.915	.290		
J66	5.020	.840		
J67	5.030	.145		
J68	5.055	.290		
J69	5.125	-.130		
J70	5.160	.840		
J71	5.290	.840		
J72	5.430	.840		
J73	5.685	-.140		
J74	5.810	.420		
J75	6.090	.325		
J76	6.230	.325		
J77	6.245	.620		
J78	6.255	.470		
J79	6.275	.765		
J80	6.685	.325		
J81	6.705	.590		
J82	6.830	.325		
J83	7.080	.610		
J84	7.300	.325		
J85	7.450	.325		
J86	7.570	.400		
J87	7.655	.290		
J88	7.775	.695		
J89	7.915	.695		
J90	8.055	.695		
J91	8.190	.695		
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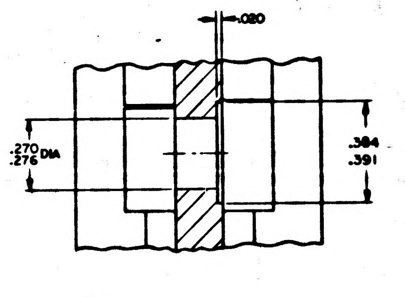
J93	8.475	.695		
J94	8.620	.695		
J95	8.755	.695		
K1	2.322	-.170	NO. 2(.086) -56 UNC-2B THRU SEE NOTE 8	3
K2	1.000	.620		
K3	8.687	.820		
L1	.000	.000	SEE SECT B-B	7
L2	6.080	.035		
L3	6.765	.035		
L4	7.365	.035		
L5	7.370	.615		
L6	3.595	.010		
L7	5.425	.000		
M1	.565	-.015	SEE SECT C-C	1
N1	.680	.745	SEE SECT D-D	8
N2	1.305	.620		
N3	2.625	.745		
N4	3.250	.620		
N5	4.450	.745		
N6	5.075	.615		
N7	7.930	.393		
N8	8.570	.393		
S1	2.525	-.015	.346 .353	1
T1	3.060	.000	SEE SECT F-F	1
U1	6.475	.590	.270 .277	2
U2	2.160	.000		
V1	7.800	.000	.384 .391	3
V2	8.570	.000		
V3	1.645	.000		
W1	1.120	.000	SEE SECT E-E	1
J96	6.370	.125	.100 .104	6
J97	6.452	-.130		
J98	7.077	-.130		
J99	8.102	.093		
J100	.305	.000		
J101	1.975	.145		
P1	4.085	-.055	.310 .317	4
P2	4.440	-.055		
P3	4.790	-.055		
P4	4.270	.250		

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040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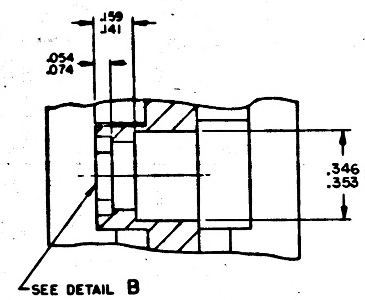
SECTION B-B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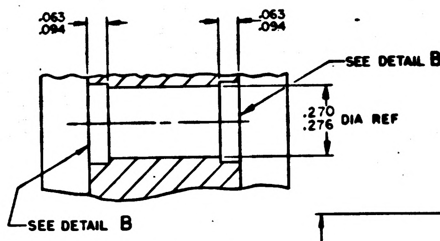
SEE DETAIL B

SECTION C-C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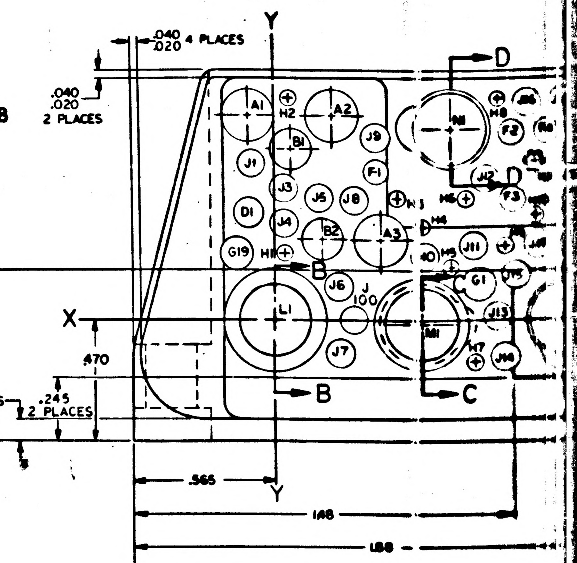
SEE DETAIL B

SECTION D-D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.040
.020
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H2
A2
B1
J9
N1
H8
F2
J1
F1
J3
J5
J8
H6
F3
D1
J4
B2
A3
D
H4
G19
H1
J11
B
J6
J
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G1
C
J13
X
L1
M1
J7
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2 PLACES
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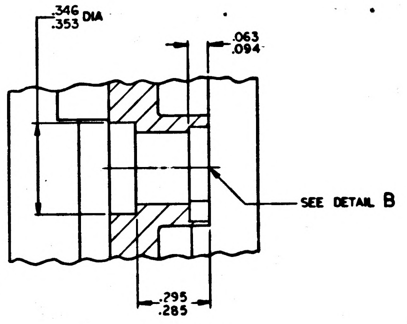
1.88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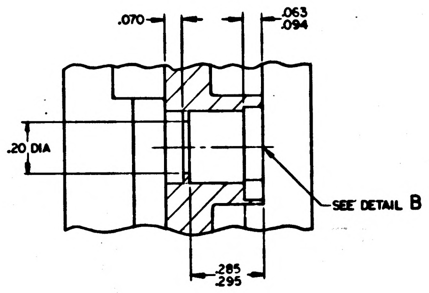
SECTION E-E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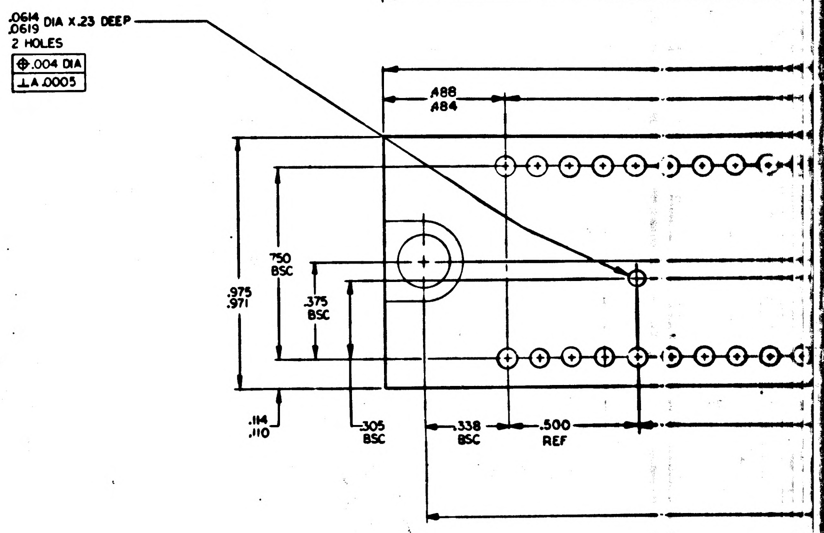
SECTION F-F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2 HOLES
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⊥ A .0005
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BSC
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BSC
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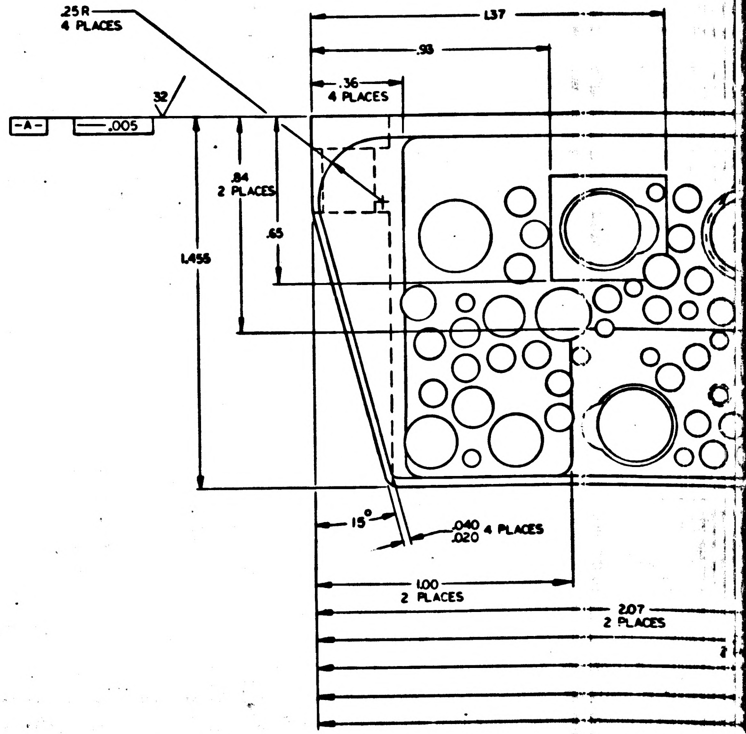
REF


.25R
4 PLACES
.137
.93
.36
4 PLACES
32
-A-
.005
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2 PLACES
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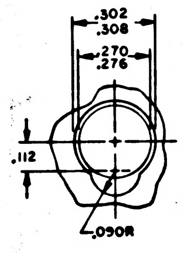
1.456
15°
.040
.020 4 PLACES
1.00
2 PLACES
2.07
2 PLACES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.090R

DETAIL B

2008335 | A

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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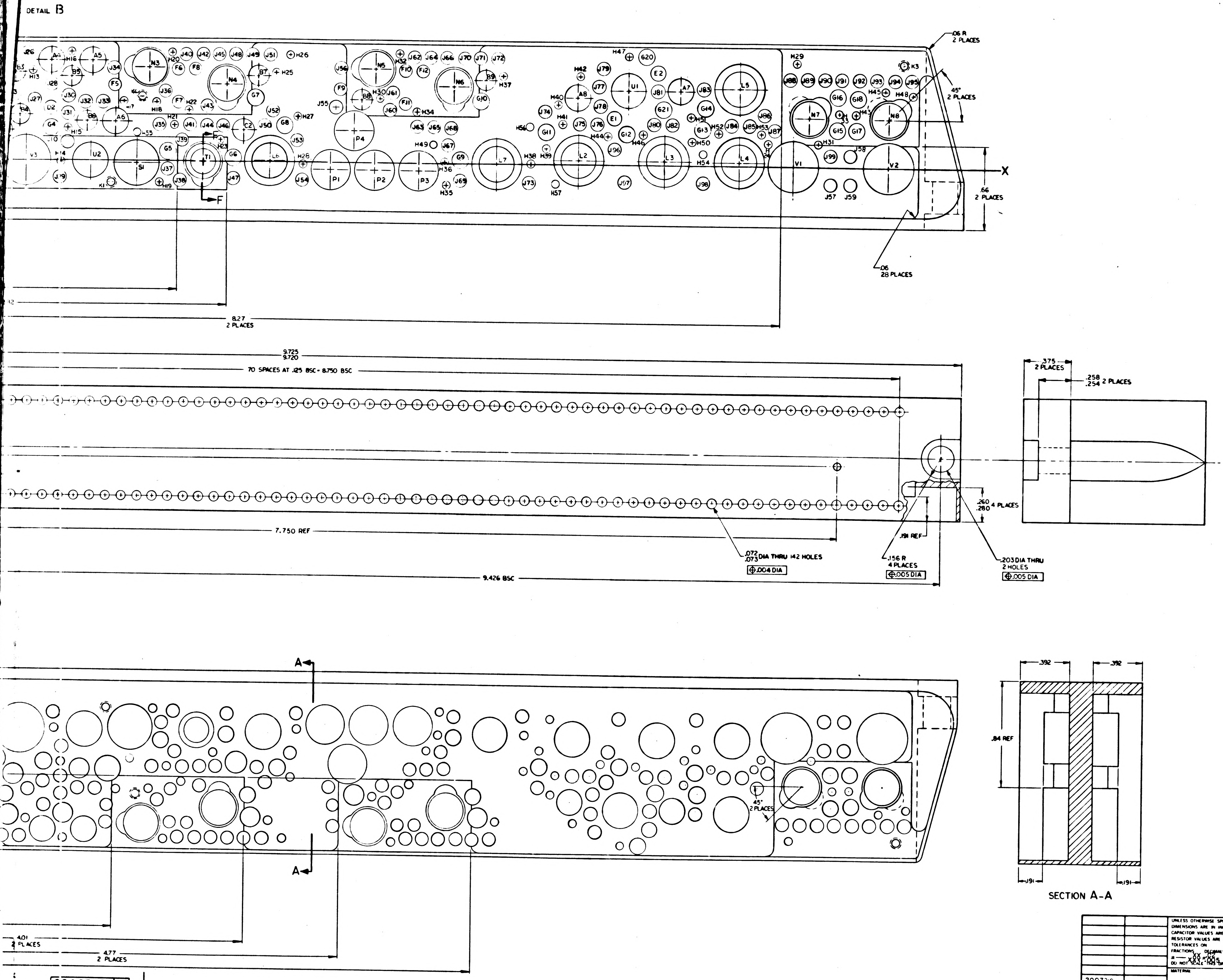
B		REVISED PER TDRR 27818				

REVISIONS TDRR 26-72



DETAIL B
.06 R
2 PLACES
45°
2 PLACES
X
.66
2 PLACES
.06
28 PLACES
8.27
2 PLACES
F
F
9.725
9.720
70 SPACES AT .125 BSC = 8.750 BSC
.375
2 PLACES
.258
.254 2 PLACES
.260
.280 4 PLACES
.191 REF
7.750 REF
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.203 DIA THRU
2 HOLES
⊕ .005 DIA
9.426 BSC
A
A
.392
.392
.84 REF
.191
.191
45°
2 PLACES
4.01
2 PLACES
4.77
2 PLACES

SECTION A-A

2008335

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007210	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W. Munson 11 MAY 65
CHECKED R. Kempelung 7 Jun 65
APPROVED 8 Jun 65
APPROVED
APPROVED MIT 12/4/65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

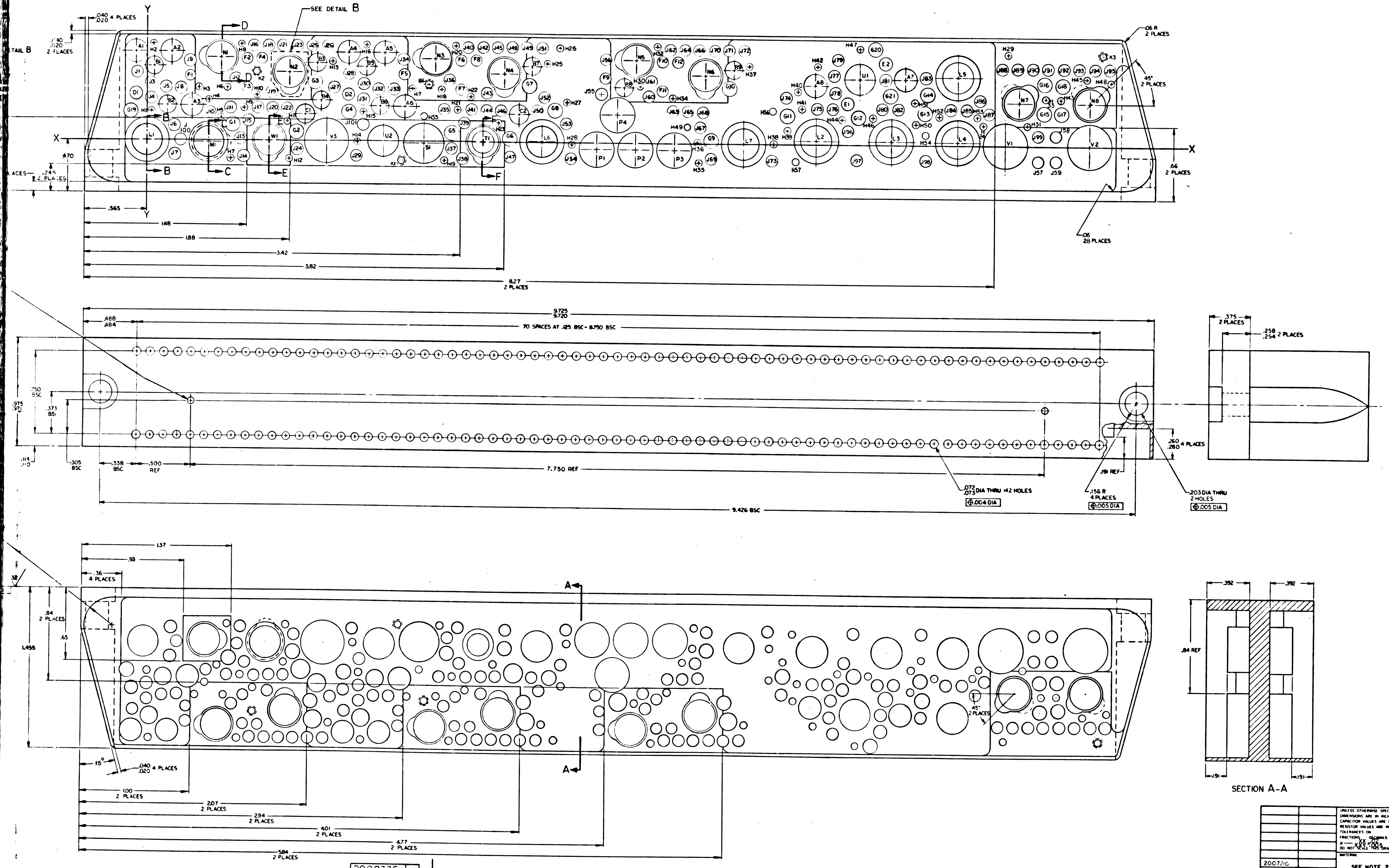
HEADER HOUSING
INTERROGATE MODULE

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008335
SCALE 4/1
SHEET 1 OF 1

2008335 B

3 H

372008335


SEE DETAIL B
DETAIL B
.040 .020 4 PLACES
.140 .020 2 PLACES
.06 R 2 PLACES
45° 2 PLACES
.66 2 PLACES
.06 28 PLACES
.470
.245 2 PLACES
.565
1.48
1.88
3.42
3.82
8.27 2 PLACES
X
Y
B
C
D
E
F
9.725 9.720
.488 .484
70 SPACES AT .125 BSC = 8.750 BSC
.750 BSC
.975 .971
.375 BSC
.114 .110
.305 BSC
.338 BSC
.500 REF
7.750 REF
9.426 BSC
.072 .073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R 4 PLACES
⊕ .005 DIA
.191 REF
.203 DIA THRU 2 HOLES
⊕ .005 DIA
.260 .280 4 PLACES
.375 2 PLACES
.258 .254 2 PLACES
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.93
.36 4 PLACES
.32
.84 2 PLACES
.65
1.455
15°
.040 .020 4 PLACES
1.00 2 PLACES
2.07 2 PLACES
2.94 2 PLACES
4.01 2 PLACES
4.77 2 PLACES
5.84 2 PLACES
A
45° 2 PLACES
.392
.84 REF
.191
SECTION A-A

2007210	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.02 XXX ±.005 ANGLES ± ½
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD

MIT
INSTRUMENT

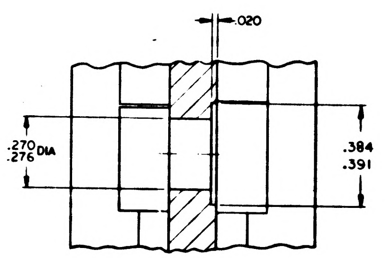
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

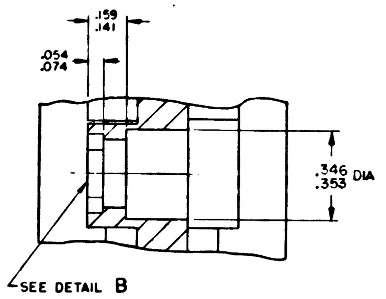
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	-.100	.800	.202 .206	8
A2	.225	.800		
A3	.410	.312		
A4	1.840	.800		
A5	2.165	.800		
A6	2.750	.312		
A7	6.890	.590		
A8	6.070	.530		
B1	.062	.665	.153 .157	9
B2	.185	.312		
B3	1.555	.700		
B4	1.590	.365		
B5	2.000	.665		
B6	2.125	.312		
B7	3.500	.680		
B8	4.340	.500		
B9	5.335	.665		
C1	1.445	.240	.165 .169	2
C2	3.385	.250		
D1	-.100	.415	.112 .116	2
D2	1.840	.415		
E1	6.366	.375	.106 .110	2
E2	6.705	.735		
F1	.390	.580	.092 .096	12
F2	.915	.730		
F3	.915	.470		
F4	1.050	.730		
F5	2.345	.600		
F6	2.855	.730		
F7	2.855	.470		
F8	2.995	.730		
F9	4.165	.580		
F10	4.685	.730		
F11	4.685	.470		
F12	4.825	.730		
G1	.785	.145	.127 .131	21
G2	1.365	.080		
G3	1.535	.530		
G4	1.845	.260		
G5	2.775	.080		
G6	3.305	.030		
G7	3.485	.510		
G8	3.715	.290		
G9	5.130	.030		
G10	5.295	.500		
G11	5.820	.260		
G12	6.465	.245		
G13	7.070	.290		
G14	7.095	.460		
G15	8.160	.290		
G16	8.160	.560		
G17	8.315	.290		
G18	8.325	.550		
G19	-.150	.260		
G20	6.615	.860		
G21	6.750	.445		
H1	.040	.260	.058 .062	18
H2	.060	.865		
H3	.475	.475		
H4	.565	.365		
H5	.680	.205		
H6	.735	.475		
H7	.770	-.165		
H8	.860	.865		
H9	.885	.290		
H10	1.000	.410		
H11	1.285	.175		
H12	1.305	-.165		
H13	1.695	.715		
H14	1.930	.010		
H15	1.980	.260		
H16	2.005	.865		
H17	2.420	.475		
H18	2.685	.465		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
H19	2.710	-.170	.058 .062	39
H20	2.810	.865		
H21	2.825	.290		
H22	2.945	.405		
H23	3.200	.175		
H24	7.600	.180		
H25	3.645	.710		
H26	3.760	.850		
H27	3.822	.365		
H28	3.865	-.020		
H29	7.825	.820		
H30	4.485	.510		
H31	8.005	.180		
H32	4.640	.865		
H33	8.170	.425		
H34	4.780	.410		
H35	5.025	-.170		
H36	5.005	.010		
H37	5.470	.700		
H38	5.695	.000		
H39	5.820	.125		
H40	5.915	.475		
H41	5.950	.320		
H42	6.095	.700		
H43	8.305	.420		
H44	6.315	.225		
H45	8.545	.605		
H46	6.595	.245		
H47	6.470	.860		
H48	8.765	.575		
H49	4.915	.145		
H50	6.990	.190		
H51	6.975	.385		
H52	7.200	.260		
H53	7.541	.255		
H54	7.077	.093		
H55	2.525	.220		
H56	5.685	.290		
H57	5.885	-.140		
J1	-.090	.610	.100 .104	41
J2	——	——		
J3	.035	.510		
J4	.035	.375		
J5	.170	.475		
J6	.250	.135		
J7	.255	-.130		
J8	.312	.465		
J9	.395	.710		
J10	.575	.250		
J11	.765	.290		
J12	.812	.560		
J13	.860	.015		
J14	.885	-.140		
J15	.930	.180		
J16	.975	.850		
J17	1.015	.295		
J18	1.115	.850		
J19	1.140	.435		
J20	1.155	.290		
J21	1.245	.850		
J22	1.285	.290		
J23	1.380	.850		
J24	1.380	-.075		
J25	1.515	.850		
J26	1.650	.850		
J27	1.710	.480		
J28	1.845	.605		
J29	1.920	-.135		
J30	1.980	.512		
J31	1.975	.375		
J32	2.115	.465		
J33	2.255	.465		
J34	2.340	.735		
J35	2.705	.290		
J36	2.755	.555		
J37	2.775	-.060		
J38	2.875	-.150		
J39	2.890	.165		
J40	2.920	.850		
J41	2.955	.290		
J42	3.060	.850		

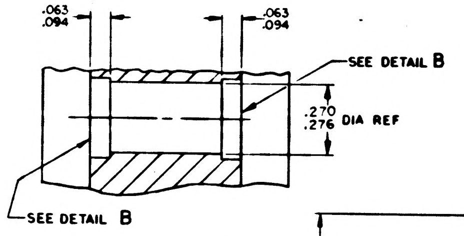
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
J43	3.095	.440	.100 .104	53
J44	3.095	.290		
J45	3.195	.850		
J46	3.225	.290		
J47	3.310	-.130		
J48	3.325	.850		
J49	3.455	.850		
J50	3.555	.290		
J51	3.595	.850		
J52	3.615	.405		
J53	3.815	.170		
J54	3.860	-.140		
J55	4.125	.440		
J56	4.170	.750		
J57	8.102	-.130		
J58	8.262	.093		
J59	8.262	-.130		
J60	4.560	.420		
J61	4.585	.560		
J62	4.755	.840		
J63	4.780	.290		
J64	4.890	.840		
J65	4.915	.290		
J66	5.020	.840		
J67	5.030	.145		
J68	5.055	.290		
J69	5.125	-.130		
J70	5.160	.840		
J71	5.290	.840		
J72	5.430	.840		
J73	5.685	-.140		
J74	5.810	.420		
J75	6.090	.325		
J76	6.230	.325		
J77	6.245	.620		
J78	6.255	.470		
J79	6.275	.765		
J80	6.685	.325		
J81	6.705	.590		
J82	6.830	.325		
J83	7.080	.610		
J84	7.300	.325		
J85	7.450	.325		
J86	7.570	.400		
J87	7.655	.290		
J88	7.775	.695		
J89	7.915	.695		
J90	8.055	.695		
J91	8.190	.695		
J92	8.340	.695		
J93	8.475	.695		
J94	8.620	.695		
J95	8.755	.695		
L1	.000	.000	SEE SECT B-B	7
L2	6.080	.035		
L3	6.765	.035		
L4	7.365	.035		
L5	7.370	.615		
L6	3.595	.010		
L7	5.425	.000		
M1	.565	-.015	SEE SECT C-C	1
N1	.680	.745	SEE SECT D-D	8
N2	1.305	.620		
N3	2.625	.745		
N4	3.250	.620		
N5	4.450	.745		
N6	5.075	.615		
N7	7.930	.393		
N8	8.570	.393		
S1	2.525	-.015	.346 .353	1
T1	3.060	.000	SEE SECT F-F	1
U1	6.475	.590	.270 .277	2
U2	2.160	.000		
V1	7.800	.000	.384 .391	3
V2	8.570	.000		
V3	1.645	.000		
W1	1.120	.000	SEE SECT E-E	1
J96	6.370	.125	.100 .104	6
J97	6.452	-.130		
J98	7.077	-.130		
J99	8.102	.093		
J100	.305	.000		
J101	1.975	.145		
P1	4.085	-.055	.310 .317	4
P2	4.440	-.055		
P3	4.790	-.055		
P4	4.270	.250		
K1	2.322	-.170	.069/.073 SEE NOTE 8&9	1
K2	1.000	.620	.069 .073 SEE NOTE 8&10	3
K3	8.687	.820		
K4	2.570	.515		


.020
.270
.276 DIA
.384
.391

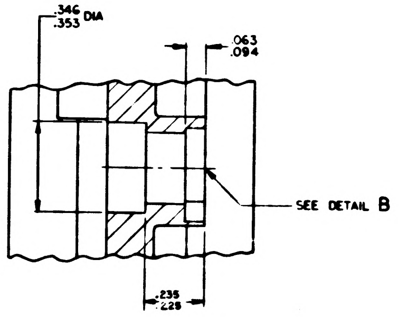
SECTION B-B


.159
.141
.054
.074
.346
.353 DIA
SEE DETAIL B

SECTION C-C


.063
.094
.063
.094
SEE DETAIL B
.270
.276 DIA REF
SEE DETAIL B

SECTION D-D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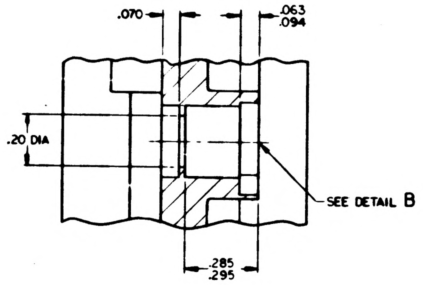
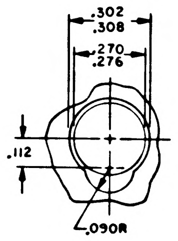
.353 DIA
.063
.094
SEE DETAIL B
.235
.225

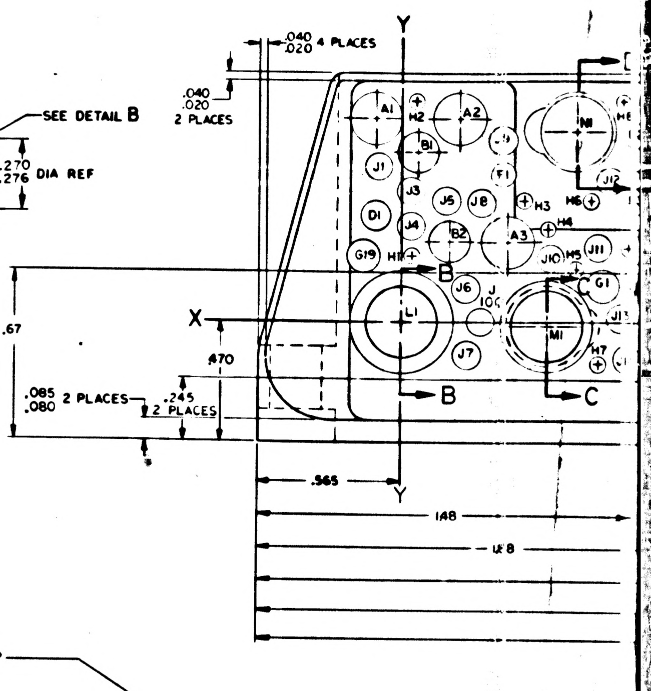
SECTION E-E

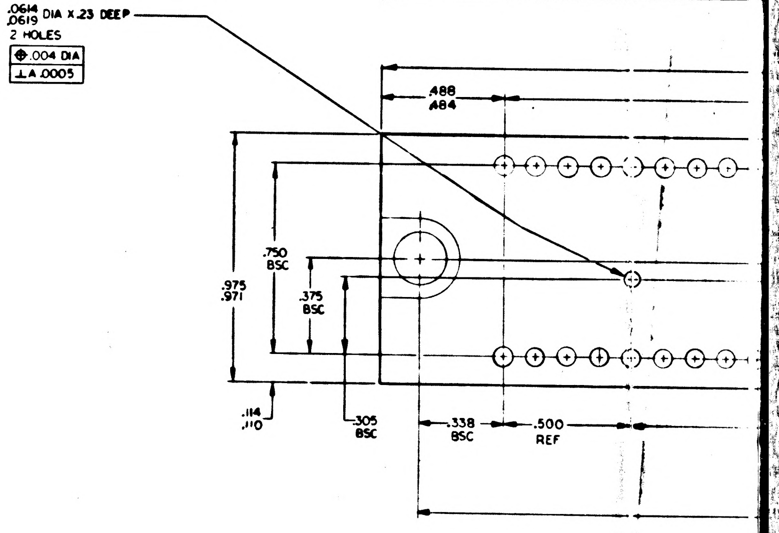

.070
.063
.094
.20 DIA
SEE DETAIL B
.285
.295

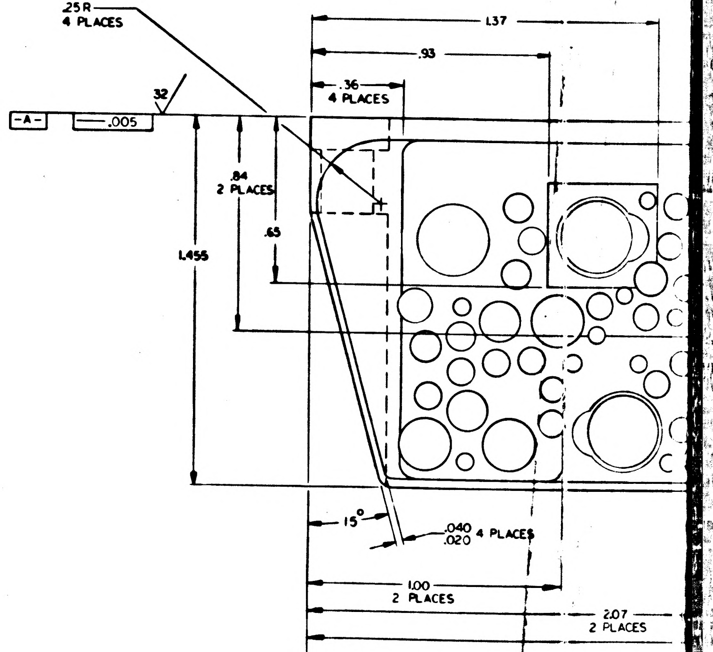
SECTION F-F


.302
.308
.270
.276
.112
.090R

DETAIL B


.040
.020 4 PLACES
Y
.040
.020
2 PLACES
A1
H2
A2
B1
J1
J3
J5
J8
H3
H6
D1
J4
B2
A3
H4
G19
H1
B
J10
H5
J11
J6
G1
J
.67
X
L1
.470
M1
J7
H7
.085
.080 2 PLACES
.245
2 PLACES
B
C
.565
Y
1.48
1.8

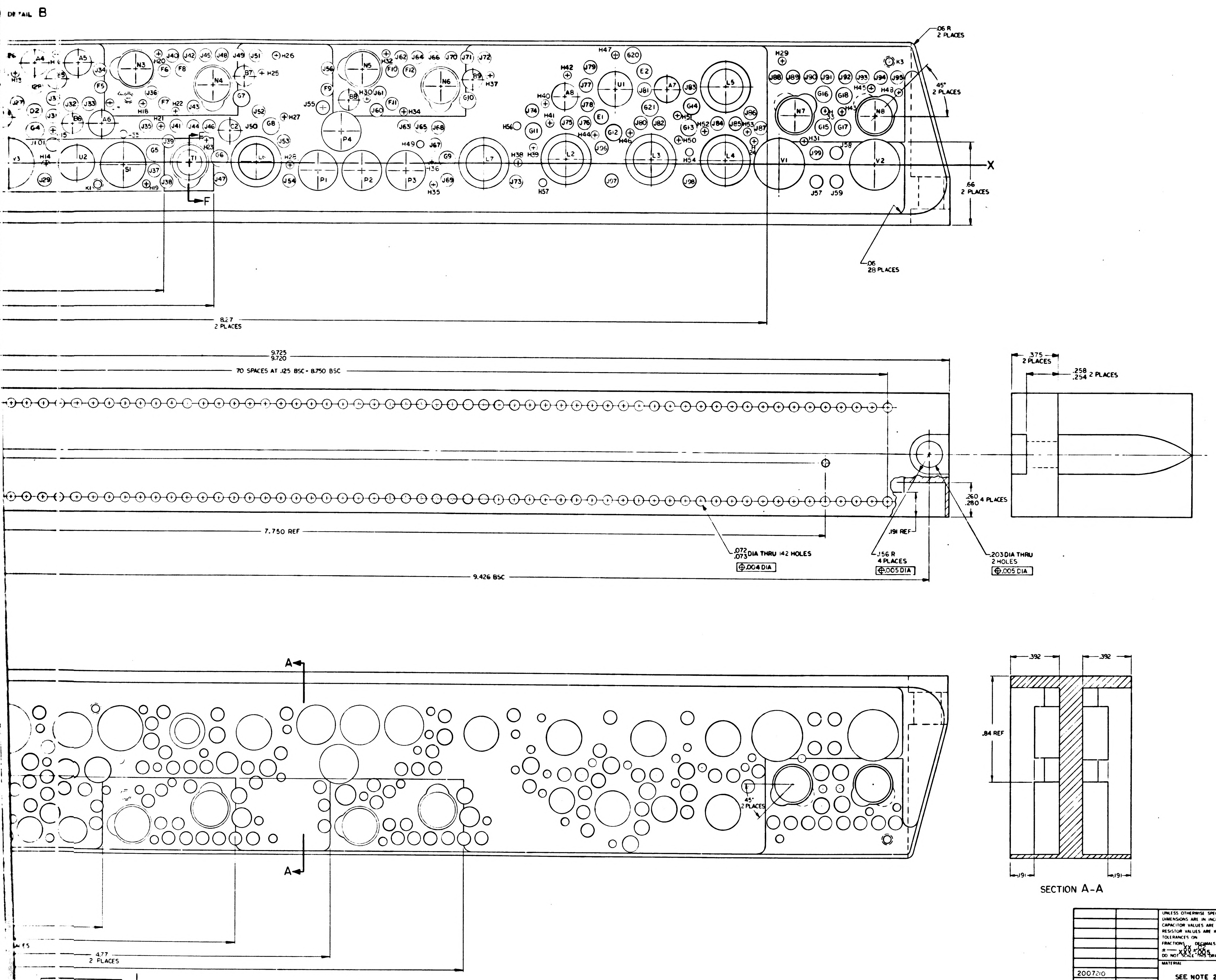

.0614
.0619 DIA X .23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005
.488
.484
.750
BSC
.975
.971
.375
BSC
.114
.110
.305
BSC
.338
BSC
.500
REF


.25R
4 PLACES
1.37
.93
.36
4 PLACES
32
-A-
.005
.84
2 PLACES
.65
1.455
15°
.040
.020 4 PLACES
1.00
2 PLACES
2.07
2 PLACES

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. TAP # 2-56UNC-2 THD THRU AND CSK TO MAJOR DIA OF THD.
10. TAP # 2-56UNC-2 THD (REF K2, K3 & K4) .28 DEEP BOTH SIDES AND C'SK TO MAJOR DIA OF THREAD

3H

REVISIONS	TDRR 26-72					
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23505				
B		REVISED PER TDRR 27818				
C		REVISED PER TDRR 29243				


DETAIL B
.06 R
2 PLACES
45°
2 PLACES
X
.66
2 PLACES
.06
28 PLACES
8.27
2 PLACES
F
9.725
9.720
70 SPACES AT .125 BSC = 8.750 BSC
.375
2 PLACES
.258
.254 2 PLACES
.260
.280 4 PLACES
.191 REF
7.750 REF
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.203 DIA THRU
2 HOLES
⊕ .005 DIA
9.426 BSC
A
A
45°
2 PLACES
.392
.392
.84 REF
.191
.191
4.77
2 PLACES
SECTION A-A

3H

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007210	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W. Munson 11 MAY 65
CHECKED 7 Jun 65
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

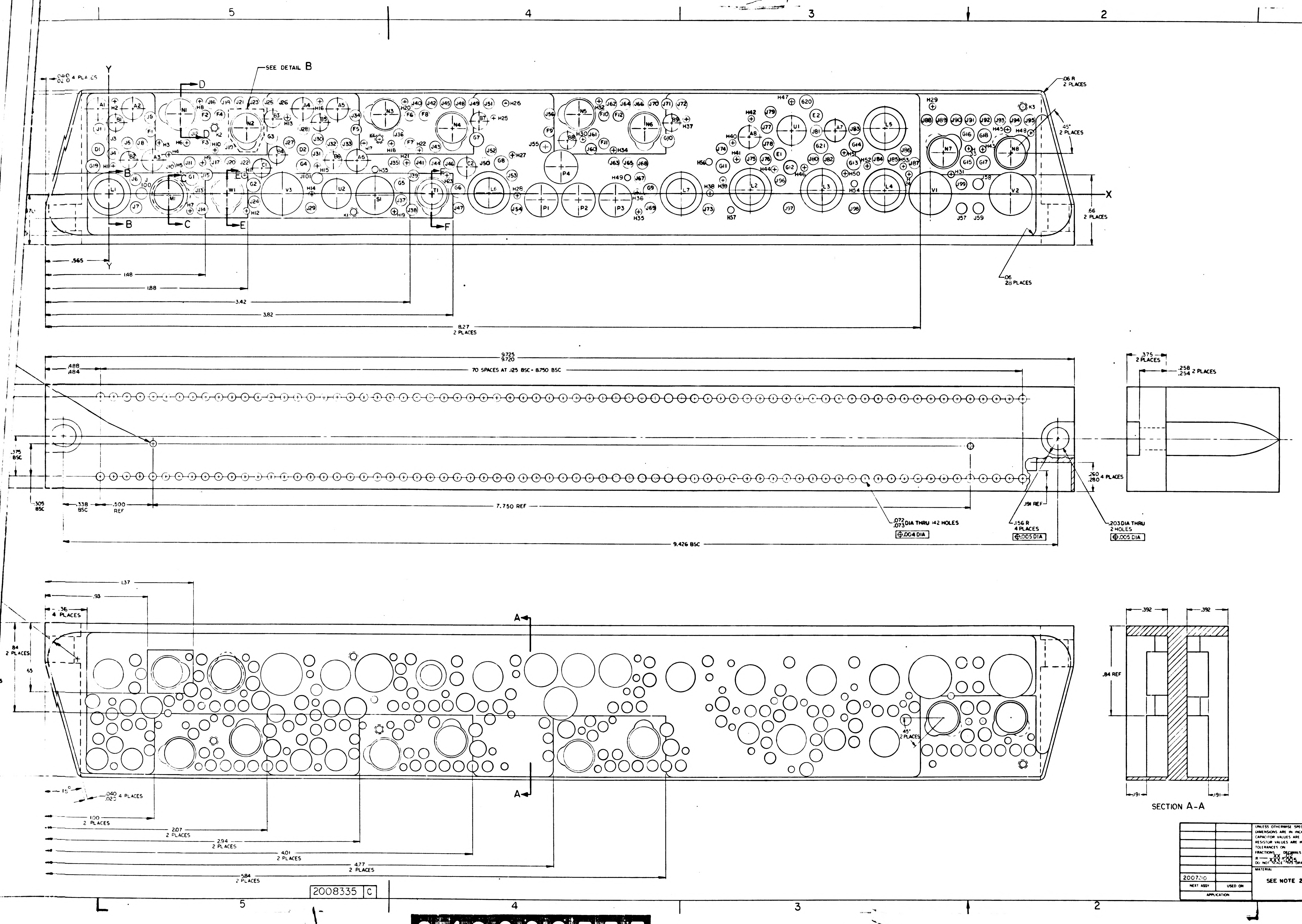
HEADER HOUSING
INTERROGATE MODULE

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008335
SCALE 4/1
SHEET 1 OF 1

2008335 C

2008335 C

3/2008335


5
4
3
2
SEE DETAIL B
.040 .020 4 PLACES
.06 R 2 PLACES
45° 2 PLACES
.66 2 PLACES
.06 28 PLACES
.565
1.48
1.88
3.42
3.82
8.27 2 PLACES
X
Y
B
C
D
E
F
9.725 9.720
.488 .484
70 SPACES AT .125 BSC - 8.750 BSC
.375 2 PLACES
.258 .254 2 PLACES
.175 BSC
.305 BSC
.338 BSC
.500 REF
7.750 REF
.260 .280 4 PLACES
.191 REF
.072 .073 DIA THRU 142 HOLES
.004 DIA
.156 R 4 PLACES
.005 DIA
.203 DIA THRU 2 HOLES
.005 DIA
9.426 BSC
1.37
.93
.36 4 PLACES
.84 2 PLACES
.65
A
45° 2 PLACES
15°
.040 .020 4 PLACES
1.00 2 PLACES
2.07 2 PLACES
2.94 2 PLACES
4.01 2 PLACES
4.77 2 PLACES
5.84 2 PLACES
.392
.392
.84 REF
.191
.191
SECTION A-A

2008335 C

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± — DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 1/2° DO NOT SCALE THIS DRAWING	QTY REQD
2007210		MATERIAL SEE NOTE 2	INSTR DRAWN CHECKED APPROVED APPROVED APPROVED MIT APPROVED MSC
NEXT ASSY	USED ON		
APPLICATION			

2/2008335

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

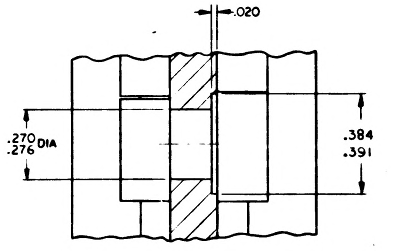
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	-.100	.800	.202 .206	8
A2	.225	.800		
A3	.410	.312		
A4	1.840	.800		
A5	2.165	.800		
A6	2.750	.312		
A7	6.890	.590		
A8	6.070	.530		
B1	.062	.665	.153 .157	9
B2	.185	.312		
B3	1.555	.700		
B4	1.590	.365		
B5	2.000	.665		
B6	2.125	.312		
B7	3.500	.680		
B8	4.340	.500		
B9	5.335	.665		
C1	1.445	.240	.165 .169	2
C2	3.385	.250		
D1	-.100	.415	.112 .116	2
D2	1.840	.415		
E1	6.366	.375	.106 .110	2
E2	6.705	.735		
F1	.390	.580	.092 .096	12
F2	.915	.730		
F3	.915	.470		
F4	1.050	.730		
F5	2.345	.600		
F6	2.855	.730		
F7	2.855	.470		
F8	2.995	.730		
F9	4.165	.580		
F10	4.685	.730		
F11	4.685	.470		
F12	4.825	.730		
G1	.785	.145	.127 .131	21
G2	1.365	.080		
G3	1.535	.530		
G4	1.845	.260		
G5	2.775	.080		
G6	3.305	.030		
G7	3.485	.510		
G8	3.715	.290		
G9	5.130	.030		
G10	5.295	.500		
G11	5.820	.260		
G12	6.465	.245		
G13	7.070	.290		
G14	7.095	.460		
G15	8.160	.290		
G16	8.160	.560		
G17	8.315	.290		
G18	8.325	.550		
G19	-.150	.260		
G20	6.615	.860		
G21	6.750	.445		
H1	.040	.260	.058 .062	18
H2	.060	.865		
H3	.475	.475		
H4	.565	.365		
H5	.680	.205		
H6	.735	.475		
H7	.770	-.165		
H8	.860	.865		
H9	.885	.290		
H10	1.000	.410		
H11	1.285	.175		
H12	1.305	-.165		
H13	1.695	.715		
H14	1.930	.010		
H15	1.980	.260		
H16	2.005	.865		
H17	2.420	.475		
H18	2.685	.465		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
H19	2.710	-.170	.058 .062	39
H20	2.810	.865		
H21	2.825	.290		
H22	2.945	.405		
H23	3.200	.175		
H24	7.600	.180		
H25	3.645	.710		
H26	3.760	.850		
H27	3.822	.365		
H28	3.865	-.020		
H29	7.825	.820		
H30	4.485	.510		
H31	8.005	.180		
H32	4.640	.865		
H33	8.170	.425		
H34	4.780	.410		
H35	5.025	-.170		
H36	5.005	.010		
H37	5.470	.700		
H38	5.695	.000		
H39	5.820	.125		
H40	5.915	.475		
H41	5.950	.320		
H42	6.095	.700		
H43	8.305	.420		
H44	6.315	.225		
H45	8.545	605		
H46	6.595	.245		
H47	6.470	.360		
H48	8.765	.575		
H49	4.915	.145		
H50	6.990	.190		
H51	6.975	.385		
H52	7.200	.260		
H53	7.541	.255		
H54	7.077	.093		
H55	2.525	.220		
H56	5.685	.290		
H57	5.885	-.140		
J1	-.090	.610	.100 .104	41
J2	—	—		
J3	.035	.510		
J4	.035	.375		
J5	.170	.475		
J6	.250	.135		
J7	.255	-.130		
J8	.312	.465		
J9	.395	.710		
J10	.575	.250		
J11	.765	.290		
J12	.812	.560		
J13	.860	.015		
J14	.885	-.140		
J15	.930	.180		
J16	.975	.850		
J17	1.015	.295		
J18	1.115	.850		
J19	1.140	.435		
J20	1.155	.290		
J21	1.245	.850		
J22	1.285	.290		
J23	1.380	.850		
J24	1.380	-.075		
J25	1.515	.850		
J26	1.650	.850		
J27	1.710	.480		
J28	1.845	.605		
J29	1.920	-.135		
J30	1.980	.512		
J31	1.975	.375		
J32	2.115	.465		
J33	2.255	.465		
J34	2.340	.735		
J35	2.705	.290		
J36	2.755	.555		
J37	2.775	-.060		
J38	2.875	-.150		
J39	2.890	.165		
J40	2.920	.850		
J41	2.955	.290		
J42	3.060	.850		

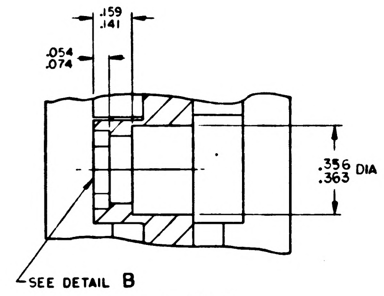
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
J43	3.095	.440	.100 .104	53
J44	3.095	.290		
J45	3.195	.850		
J46	3.225	.290		
J47	3.310	-.130		
J48	3.325	.850		
J49	3.455	.850		
J50	3.555	.290		
J51	3.595	.850		
J52	3.615	.405		
J53	3.815	.170		
J54	3.860	-.140		
J55	4.125	.440		
J56	4.170	.750		
J57	8.102	-.130		
J58	8.262	.093		
J59	8.262	-.130		
J60	4.560	.420		
J61	4.585	.560		
J62	4.755	.840		
J63	4.780	.290		
J64	4.890	.840		
J65	4.915	.290		
J66	5.020	.840		
J67	5.030	.145		
J68	5.055	.290		
J69	5.125	-.130		
J70	5.160	.840		
J71	5.290	.840		
J72	5.430	.840		
J73	5.685	-.140		
J74	5.810	.420		
J75	6.090	.325		
J76	6.230	.325		
J77	6.245	.620		
J78	6.255	.470		
J79	6.275	.765		
J80	6.685	.325		
J81	6.705	.590		
J82	6.830	.325		
J83	7.080	.610		
J84	7.300	.325		
J85	7.450	.325		
J86	7.570	.400		
J87	7.655	.290		
J88	7.775	.695		
J89	7.915	.695		
J90	8.055	.695		
J91	8.190	.695		
J92	8.340	.695		
J93	8.475	.695		
J94	8.620	.695		
J95	8.755	.695		
L1	.000	.000	SEE SECT B-B	7
L2	6.080	.035		
L3	6.765	.035		
L4	7.365	.035		
L5	7.370	.615		
L6	3.595	.010		
L7	5.425	.000		
M1	.565	-.015	SEE SECT C-C	1
N1	.680	.745	SEE SECT D-D	8
N2	1.305	.620		
N3	2.625	.745		
N4	3.250	.620		
N5	4.450	.745		
N6	5.075	.615		
N7	7.930	.393		
N8	8.570	.393		
S1	2.525	-.015	.356 .363	1
T1	3.060	.000	SEE SECT F-F	1
U1	6.475	.590	.270 .277	2
U2	2.160	.000		
V1	7.800	.000	.384 .391	3
V2	8.570	.000		
V3	1.645	.000		
W1	1.120	.000	SEE SECT E-E	1
J96	6.370	.125	.100 .104	6
J97	6.452	-.130		
J98	7.077	-.130		
J99	8.102	.093		
J100	.305	.000		
J101	1.975	.145		
P1	4.085	-.055	.310 .317	4
P2	4.440	-.055		
P3	4.790	-.055		
P4	4.270	.250		
K1	2.322	-.170	.069/.073 SEE NOTE 8&9	1
K2	1.000	.620	.069 .073 SEE NOTE 8&10	3
K3	8.687	.820		
K4	2.570	.515		

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
9. TAP #2-56 UNC-2 THD THRU AND CSK TO MAJOR DIA OF THD.
10. TAP #2-56 UNC-2 THD (REF K2 K3 & K4) .28 DEEP BOTH SIDES AND CSK TO MAJOR DIA OF THREAD


.020
.270
.276 DIA
.384
.391

SECTION B-B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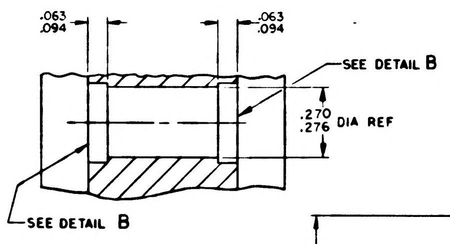
.363 DIA
SEE DETAIL B

SECTION C-C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SEE DETAIL B
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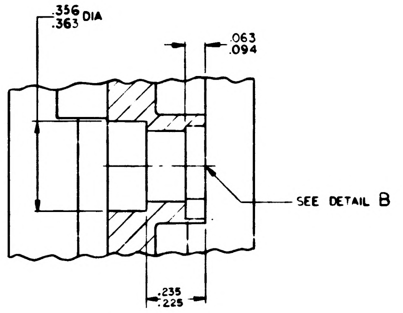
SEE DETAIL B

SECTION D-D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.363 DIA
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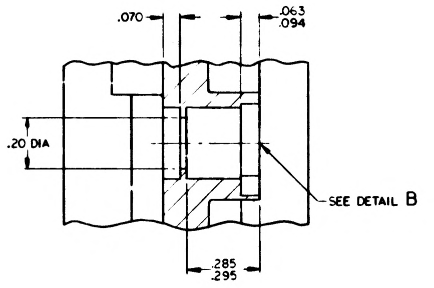
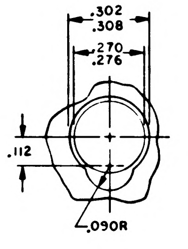
SEE DETAIL B
.235
.225

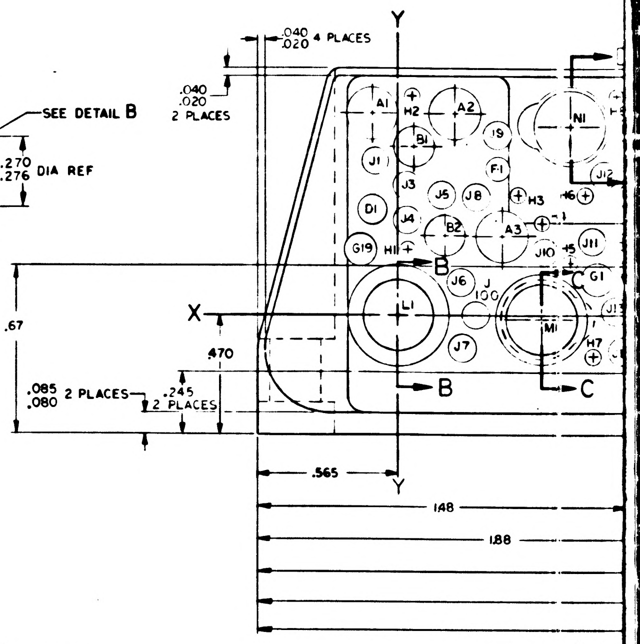
SECTION E-E

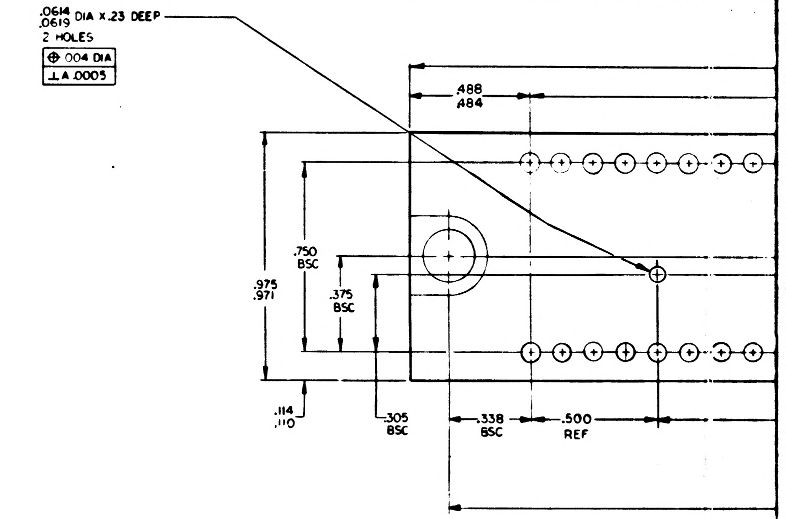

.070
.063
.094
.20 DIA
SEE DETAIL B
.285
.295

SECTION F-F


.302
.308
.270
.276
.112
.090R

DETAIL B


Y
.040
.020 4 PLACES
.040
.020
2 PLACES
SEE DETAIL B
.063
.094
.270
.276 DIA REF
A1
H2
A2
B1
I9
N1
J1
F1
J12
J3
J5
J8
H3
D1
J4
B2
A3
J11
G19
H1
J10
B
J6
J100
G1
C
X
L1
M1
J7
H7
.67
.470
.085
.080 2 PLACES
.245
2 PLACES
B
C
.565
Y
1.48
1.88


.0614
.0619 DIA X .23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005
.488
.484
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BSC
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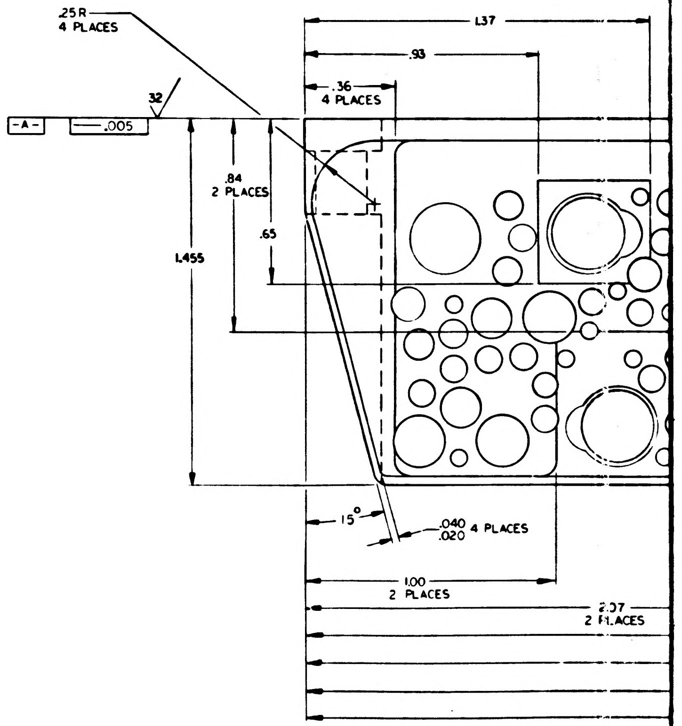
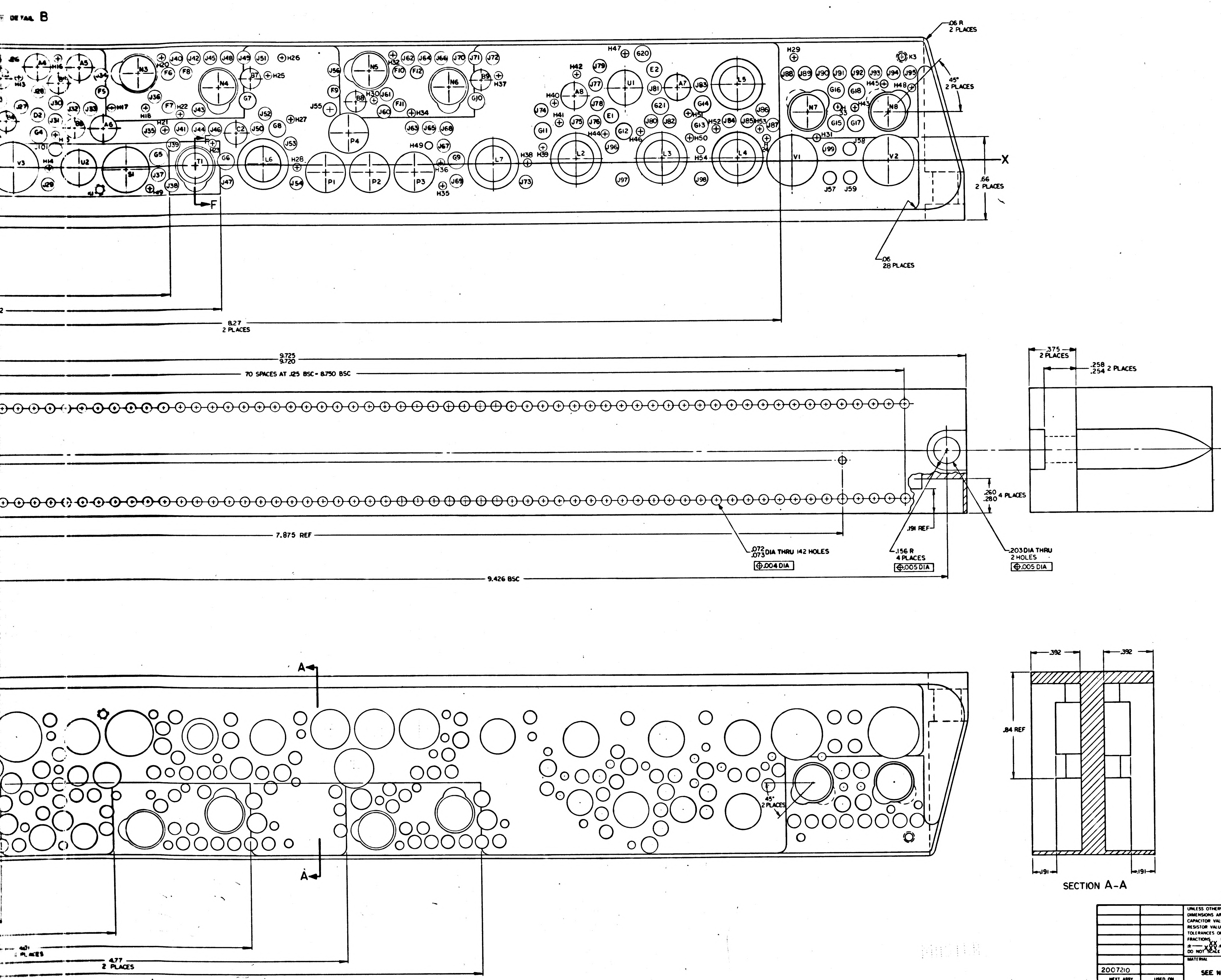
.971
.375
BSC
.114
.110
.305
BSC
.338
BSC
.500
REF


.25R
4 PLACES
1.37
.93
.36
4 PLACES
32
-A-
.005
.84
2 PLACES
.65
1.455
15°
.040
.020 4 PLACES
1.00
2 PLACES
2.07
2 PLACES

3H

SYM	ZONE	REVISIONS DESCRIPTION	DR	CHK	DATE	APPROVED

TOPP 2 72



DETAIL B
.06 R
2 PLACES
45°
2 PLACES
X
.66
2 PLACES
.06
28 PLACES
8.27
2 PLACES
F
9.725
9.720
70 SPACES AT .125 BSC = 8.750 BSC
7.875 REF
.072
.073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.191 REF
.203 DIA THRU
2 HOLES
⊕ .005 DIA
9.426 BSC
.375
2 PLACES
.258
.254 2 PLACES
.260
.280 4 PLACES
A
A
45°
2 PLACES
4.77
2 PLACES
.392
.392
.84 REF
.191
.191

SECTION A-A

3H

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007210	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W. Munson 11 MAY 65
CHECKED R.P. Kingsbury 7 Jun 65
APPROVED 8 Jun 65
APPROVED
APPROVED MIT W. Kupfer 13 Jul 65
APPROVED MSC 7-13-65
DATE

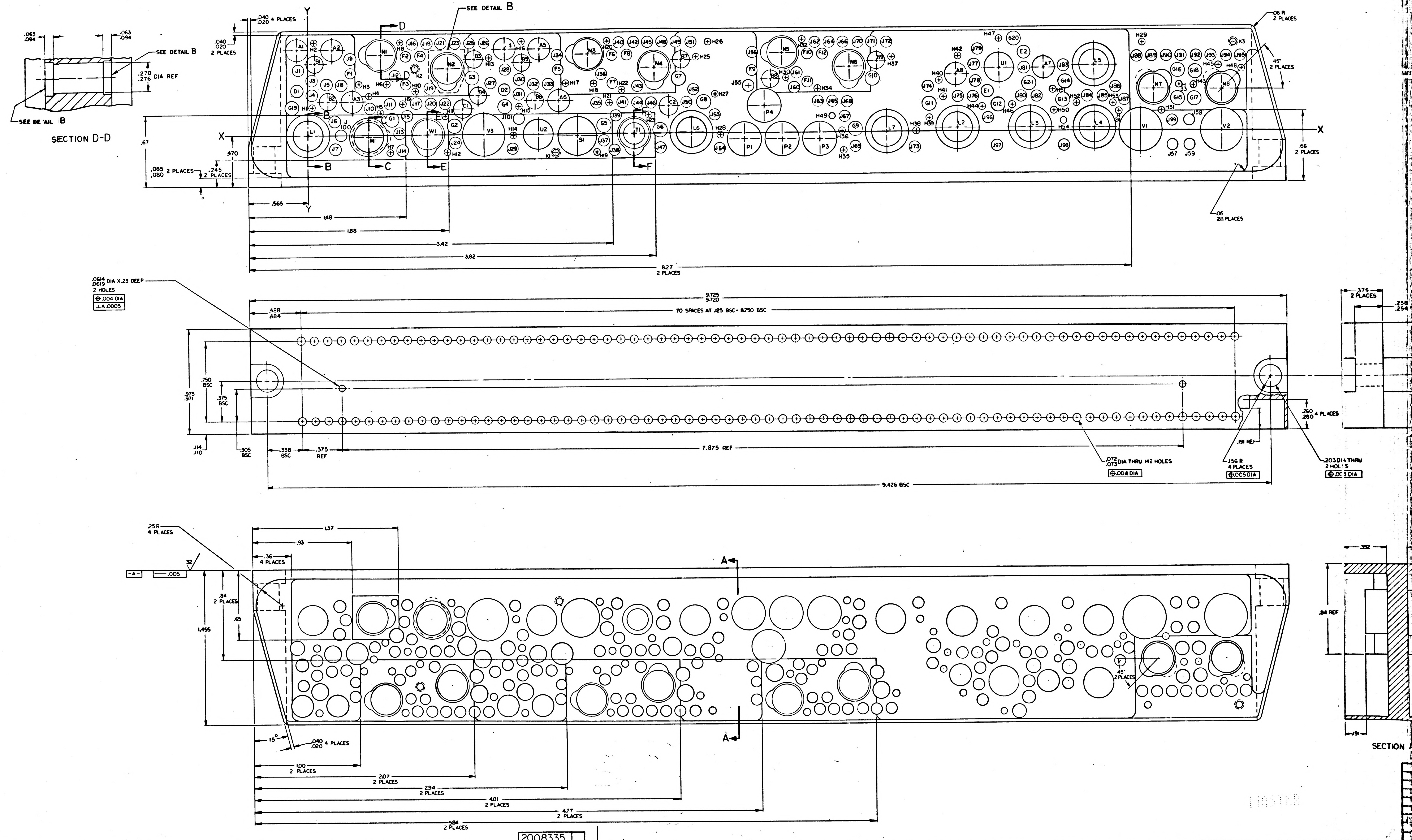
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
INTERROGATE MODULE

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2008335
SCALE 4/1 | SHEET 1 OF 1

2008335

2008335


SECTION D-D
SEE DETAIL B
SEE DETAIL B
.063 .094
.063 .094
.270 .276 DIA REF
.040 .020 4 PLACES
.040 .020 2 PLACES
.67
.470
.085 .080 2 PLACES
.245 2 PLACES
.565
1.48
1.88
3.42
3.82
8.27 2 PLACES
.06 R 2 PLACES
45° 2 PLACES
.66 2 PLACES
.06 28 PLACES
X
Y
.0614 .0619 DIA X.23 DEEP 2 HOLES
⊕ .004 DIA
⊥ A .0005
9.725 9.720
.488 .484
70 SPACES AT .125 BSC = 8.750 BSC
.750 BSC
.375 BSC
.975 .971
.114 .110
.305 BSC
.338 BSC
.375 REF
7.875 REF
.072 .073 DIA THRU 142 HOLES
⊕ .004 DIA
.156 R 4 PLACES
⊕ .005 DIA
.191 REF
.203 DIA THRU 2 HOLES
⊕ .005 DIA
.260 .280 4 PLACES
.375 2 PLACES
.258 .254
.25R 4 PLACES
-A-
.005
32
1.37
.93
.36 4 PLACES
.84 2 PLACES
.65
1.455
15°
.040 .020 4 PLACES
1.00 2 PLACES
2.07 2 PLACES
2.94 2 PLACES
4.01 2 PLACES
4.77 2 PLACES
5.84 2 PLACES
45° 2 PLACES
A
A
.392
.84 REF
.191
SECTION

2008335

F2

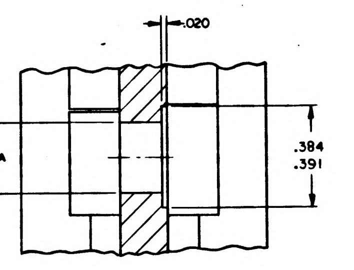
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	-.100	.800	.202 .206	8
A2	.225	.800		
A3	.410	.312		
A4	1.840	.800		
A5	2.165	.800		
A6	2.350	.312		
A7	6.890	.590		
A8	6.070	.530		
B1	.062	.665	.153 .157	9
B2	.185	.312		
B3	1.555	.700		
B4	1.590	.365		
B5	2.000	.665		
B6	2.125	.312		
B7	3.500	.680		
B8	4.340	.500		
B9	5.335	.665		
C1	1.445	.240	.165 .169	2
C2	3.385	.250		
D1	-.100	.415	.112 .116	2
D2	1.840	.415		
E1	6.366	.375	.106 .110	2
E2	6.705	.735		
F1	.390	.580	.092 .096	12
F2	.915	.730		
F3	.915	.470		
F4	1.050	.730		
F5	2.345	.600		
F6	2.855	.730		
F7	2.855	.470		
F8	2.995	.730		
F9	4.165	.580		
F10	4.685	.730		
F11	4.685	.470		
F12	4.825	.730		
G1	.785	.145	.127 .131	21
G2	1.365	.080		
G3	1.535	.530		
G4	1.845	.260		
G5	2.775	.080		
G6	3.305	.030		
G7	3.485	.510		
G8	3.715	.290		
G9	5.130	.030		
G10	5.295	.500		
G11	5.820	.260		
G12	6.465	.245		
G13	7.070	.290		
G14	7.095	.460		
G15	8.160	.290		
G16	8.160	.560		
G17	8.315	.290		
G18	8.325	.550		
G19	-.150	.260		
G20	6.615	.860		
G21	6.750	.445		
H1	.040	.260	.058 .062	18
H2	.060	.865		
H3	.475	.475		
H4	.565	.365		
H5	.680	.205		
H6	.735	.475		
H7	.770	-.165		
H8	.860	.865		
H9	.885	.290		
H10	1.000	.410		
H11	1.285	.175		
H12	1.305	-.165		
H13	1.695	.715		
H14	1.930	.010		
H15	1.980	.260		
H16	2.005	.865		
H17	2.420	.475		
H18	2.685	.465		

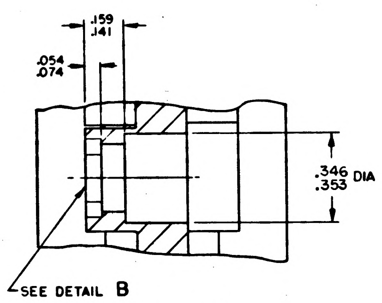
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
H19	2.710	-.170	.058 .062	36
H20	2.810	.865		
H21	2.825	.290		
H22	2.945	.405		
H23	3.200	.175		
H24	7.600	.180		
H25	3.645	.710		
H26	3.760	.850		
H27	3.822	.365		
H28	3.865	-.020		
H29	7.825	.820		
H30	4.485	.510		
H31	8.005	.180		
H32	4.640	.865		
H33	8.170	.425		
H34	4.780	.410		
H35	5.025	-.170		
H36	5.005	.010		
H37	5.470	.700		
H38	5.695	.000		
H39	5.820	.125		
H40	5.915	.475		
H41	5.950	.320		
H42	6.095	.700		
H43	8.305	.420		
H44	6.315	.225		
H45	8.545	605		
H46	6.595	.245		
H47	6.470	.860		
H48	8.765	.575		
H49	4.915	.145		
H50	6.990	.190		
H51	6.975	.385		
H52	7.200	.260		
H53	7.541	.255		
H54	7.077	.093		
J1	-.090	.610	.100 .104	41
J2	—	—		
J3	.035	.510		
J4	.035	.375		
J5	.170	.475		
J6	.250	.135		
J7	.255	-.130		
J8	.312	.465		
J9	.395	.710		
J10	.575	.250		
J11	.765	.290		
J12	.812	.560		
J13	.860	.015		
J14	.885	-.140		
J15	.930	.180		
J16	.975	.850		
J17	1.015	.295		
J18	1.115	.850		
J19	1.140	.435		
J20	1.155	.290		
J21	1.245	.850		
J22	1.285	.290		
J23	1.380	.850		
J24	1.380	-.075		
J25	1.515	.850		
J26	1.650	.850		
J27	1.710	.480		
J28	1.845	.605		
J29	1.920	-.135		
J30	1.980	.512		
J31	1.975	.375		
J32	2.115	.465		
J33	2.255	.465		
J34	2.340	.735		
J35	2.705	.230		
J36	2.755	.555		
J37	2.775	-.060		
J38	2.875	-.150		
J39	2.890	.165		
J40	2.920	.850		
J41	2.955	.290		
J42	3.060	.850		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
J43	3.095	.440	.100 .104	53
J44	3.095	.290		
J45	3.195	.850		
J46	3.225	.290		
J47	3.310	-.130		
J48	3.325	.850		
J49	3.455	.850		
J50	3.555	.290		
J51	3.595	.850		
J52	3.615	.405		
J53	3.815	.170		
J54	3.860	-.140		
J55	4.125	.440		
J56	4.170	.750		
J57	8.102	-.130		
J58	8.262	.093		
J59	8.262	-.130		
J60	4.560	.420		
J61	4.585	.560		
J62	4.755	.840		
J63	4.780	.290		
J64	4.890	.840		
J65	4.915	.290		
J66	5.020	.840		
J67	5.030	.145		
J68	5.055	.290		
J69	5.125	-.130		
J70	5.160	.840		
J71	5.290	.840		
J72	5.430	.840		
J73	5.685	-.140		
J74	5.810	.420		
J75	6.090	.325		
J76	6.230	.325		
J77	6.245	.620		
J78	6.255	.470		
J79	6.275	.765		
J80	6.685	.325		
J81	6.705	.590		
J82	6.830	.325		
J83	7.080	.610		
J84	7.300	.325		
J85	7.450	.325		
J86	7.570	.400		
J87	7.655	.290		
J88	7.775	.695		
J89	7.915	.695		
J90	8.055	.695		
J91	8.190	.695		
J92	8.340	.695		
J93	8.475	.695		
J94	8.620	.695		
J95	8.755	.695		
K1	2.322	-.170	NO. 2(.086)-56 UNC-2B THRU SEE NOTE 8	3
K2	1.000	.620		
K3	8.687	.820		
L1	.000	.000	SEE SECT B-B	7
L2	6.080	.035		
L3	6.765	.035		
L4	7.365	.035		
L5	7.370	.615		
L6	3.595	.010		
L7	5.425	.000		
M1	.565	-.015	SEE SECT C-C	1
N1	.680	.745	SEE SECT D-D	8
N2	1.305	.620		
N3	2.625	.745		
N4	3.250	.620		
N5	4.450	.745		
N6	5.075	.615		
N7	7.930	.393		
N8	8.570	.393		
S1	2.525	-.015	.346 .353	1
T1	3.060	.000	SEE SECT F-F	1
U1	6.475	.590	.270 .277	2
U2	2.160	.000		
V1	7.800	.000	.384 .391	3
V2	8.570	.000		
V3	1.645	.000		
W1	1.120	.000	SEE SECT E-E	1
J96	6.370	.125	.100 .104	6
J97	6.452	-.130		
J98	7.077	-.130		
J99	8.102	.093		
J100	.305	.000		
J101	1.975	.145		
P1	4.085	-.055	.310 .317	4
P2	4.440	-.055		
P3	4.790	-.055		
P4	4.270	.250		

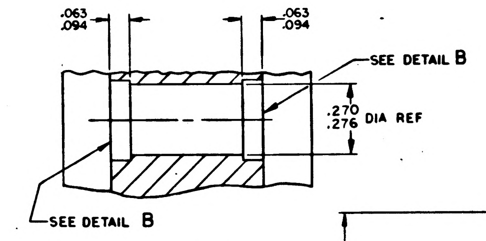
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. REMOVE BURRS AND SHARP EDGES .005/.015
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019
8. TAP HOLE AFTER ANODIZE. COAT PER ND1002040


.020
.270
.276 DIA
.384
.391

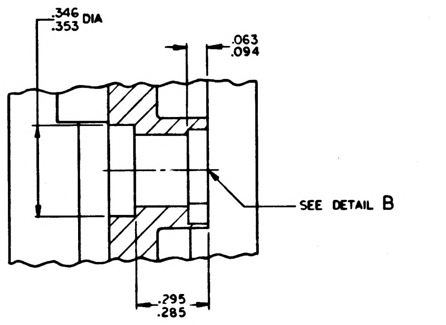
SECTION B-B


.159
.141
.054
.074
.346
.353 DIA
SEE DETAIL B

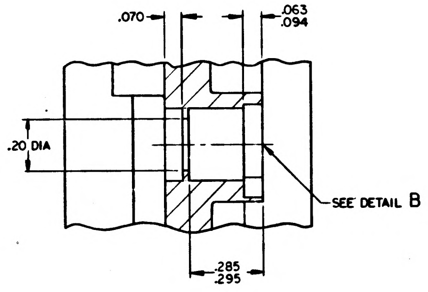
SECTION C-C


.063
.094
.063
.094
SEE DETAIL B
.270
.276 DIA REF
SEE DETAIL B

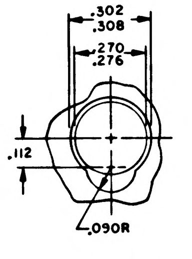
SECTION D-D


.346
.353 DIA
.063
.094
SEE DETAIL B
.295
.285

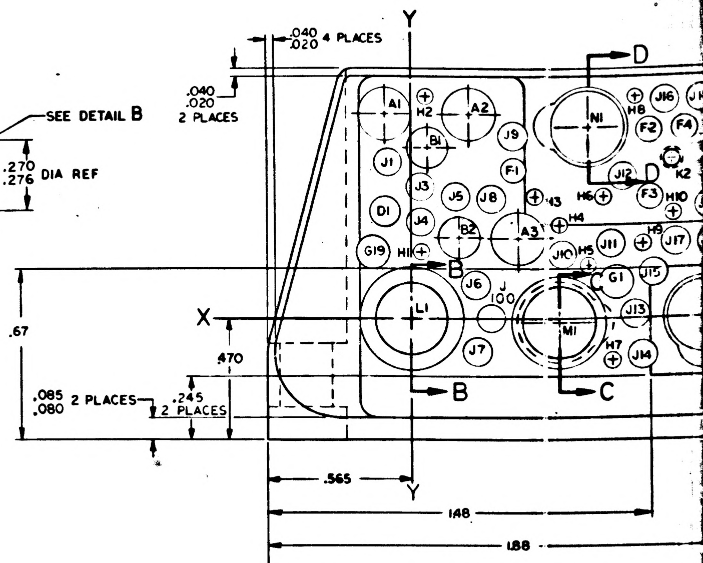
SECTION E-E

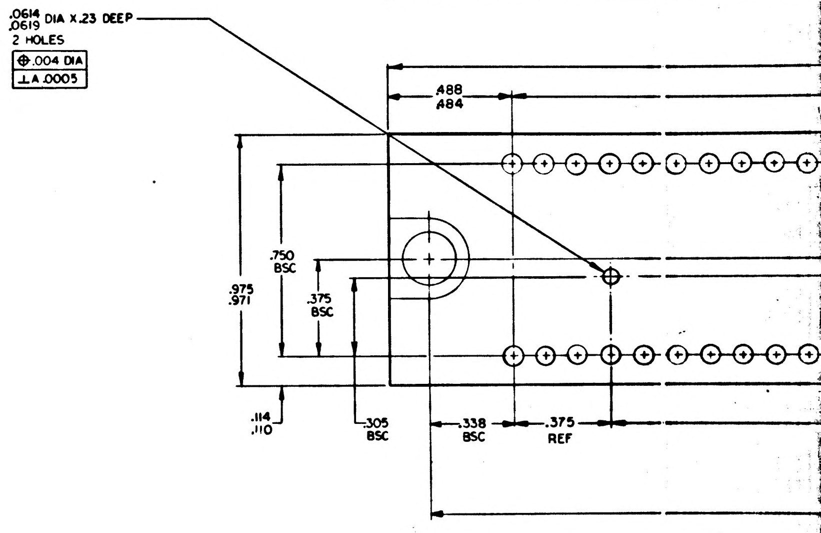

.070
.063
.094
.20 DIA
SEE DETAIL B
.285
.295

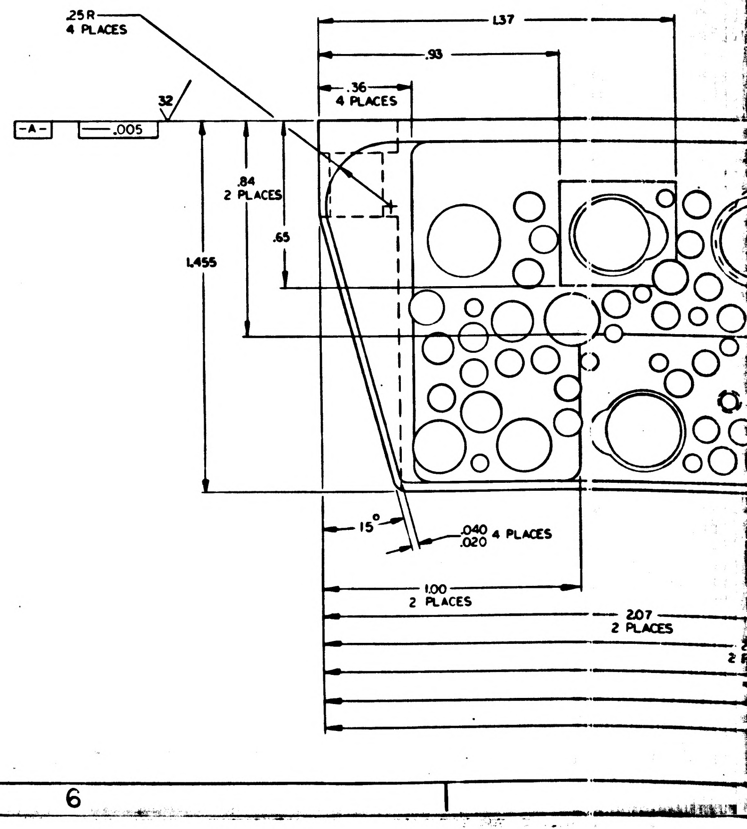
SECTION F-F


.302
.308
.270
.276
.112
.090R

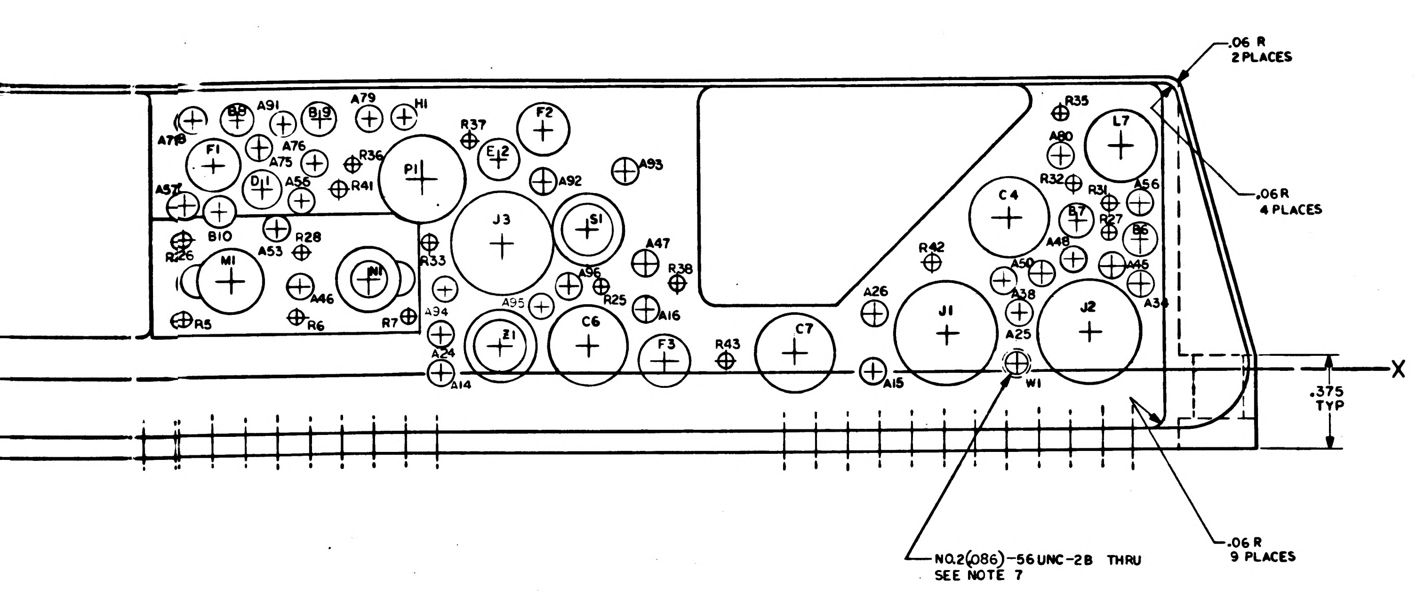
DETAIL B

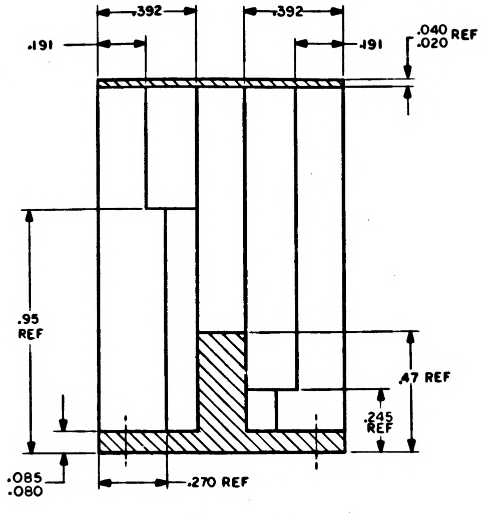

.040
.020 4 PLACES
Y
D
.040
.020
2 PLACES
SEE DETAIL B
A1
H2
A2
B1
J1
J9
N1
H8
J16
F2
F4
D1
J5
J8
F1
H3
J12
D
H10
B2
A3
H6
F3
J4
H4
G19
H11
B
J10
H5
J11
J17
J15
J3
J6
J
100
G1
X
L1
M1
J13
J7
H7
J14
.67
.470
→B
→C
.085
.080 2 PLACES
.245
2 PLACES
.565
Y
1.48
1.88


.0614
.0619 DIA X.23 DEEP
2 HOLES
⊕ .004 DIA
⊥ A .0005
.488
.484
.750
BSC
.975
.971
.375
BSC
.114
.110
.305
BSC
.338
BSC
.375
REF

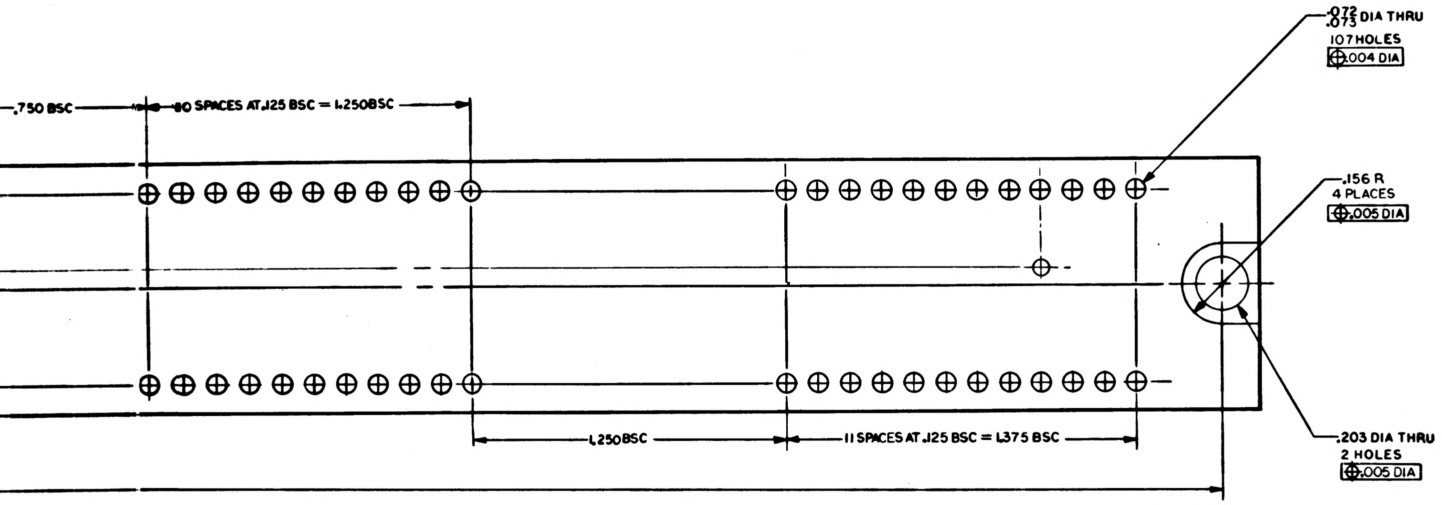

.25R
4 PLACES
1.37
.93
.36
4 PLACES
32
-A-
.005
.84
2 PLACES
.65
1.455
15°
.040
.020 4 PLACES
1.00
2 PLACES
2.07
2 PLACES

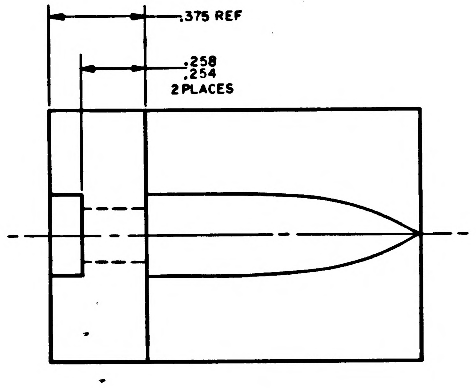
A	REVISED PER TDRR #1764

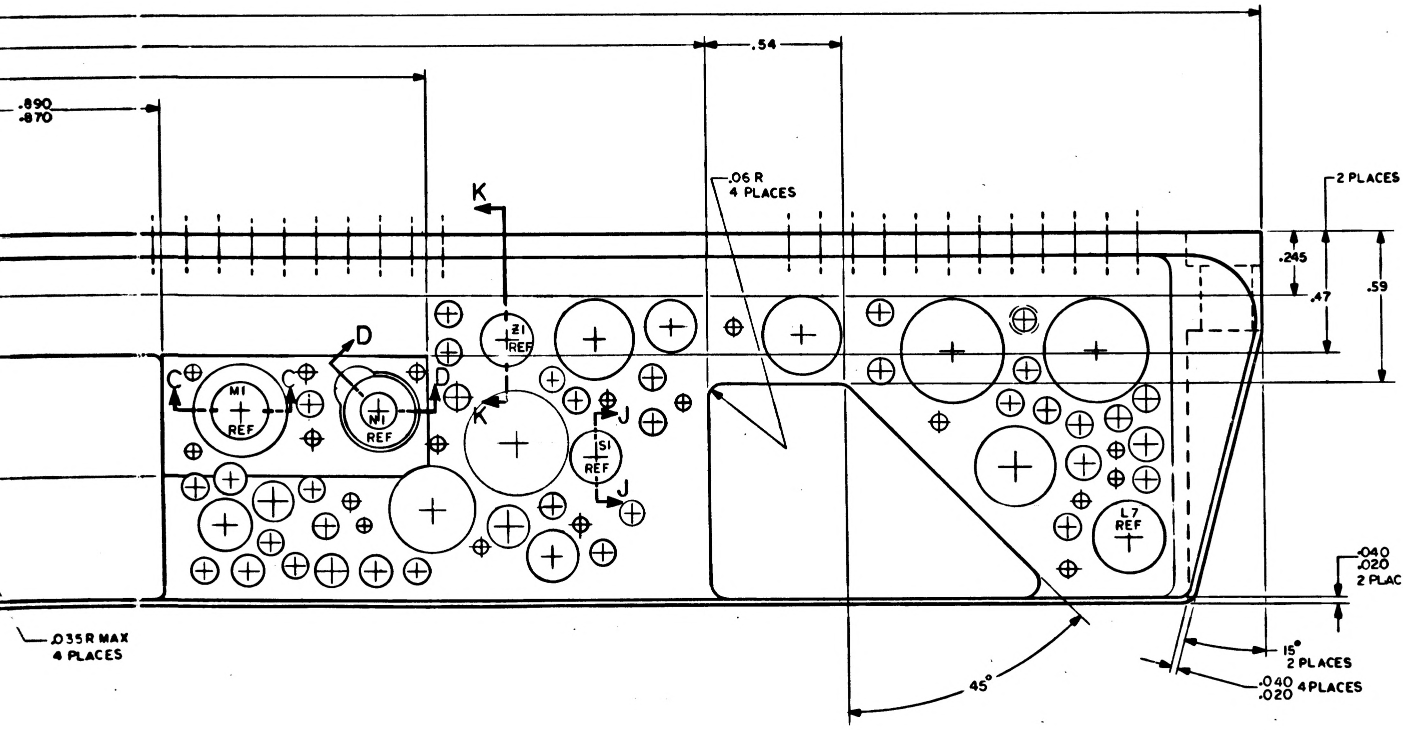

.06 R
2 PLACES
.06 R
4 PLACES
.375
TYP
X
.06 R
9 PLACES
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7
F1
F2
F3
P1
J1
J2
J3
C4
C6
C7
L7
S1
Z1
M1
N1
E12
W1
B10

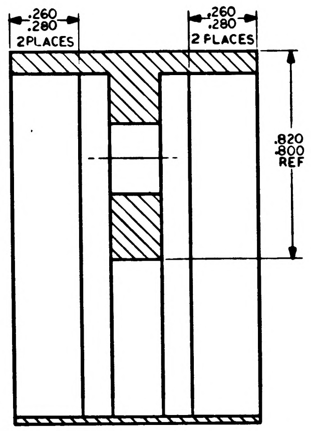

.392
.392
.191
.191
.040
.020 REF
.95
REF
.47 REF
.245
REF
.085
.080
.270 REF

SECTION A-A

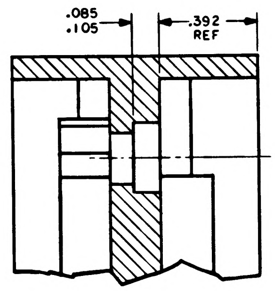

.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.072
.073 DIA THRU
107 HOLES
.004 DIA
.156 R
4 PLACES
.005 DIA
.203 DIA THRU
2 HOLES
.005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC


.375 REF
.258
.254
2 PLACES

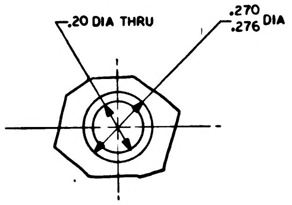

.54
.890
.870
K
.06 R
4 PLACES
2 PLACES
.245
.47
.59
D
C
C
D
K
J
J
M1
REF
N1
REF
Z1
REF
S1
REF
L7
REF
.040
.020
2 PLACES
15°
2 PLACES
.040
.020 4 PLACES
45°
.035 R MAX
4 PLACES


.260
.280
2 PLACES
.260
.280
2 PLACES
.820
.800
REF

SECTION G-G


.085
.105
.392
REF

PARTIAL SECTION K-K


.20 DIA THRU
.270
.276 DIA

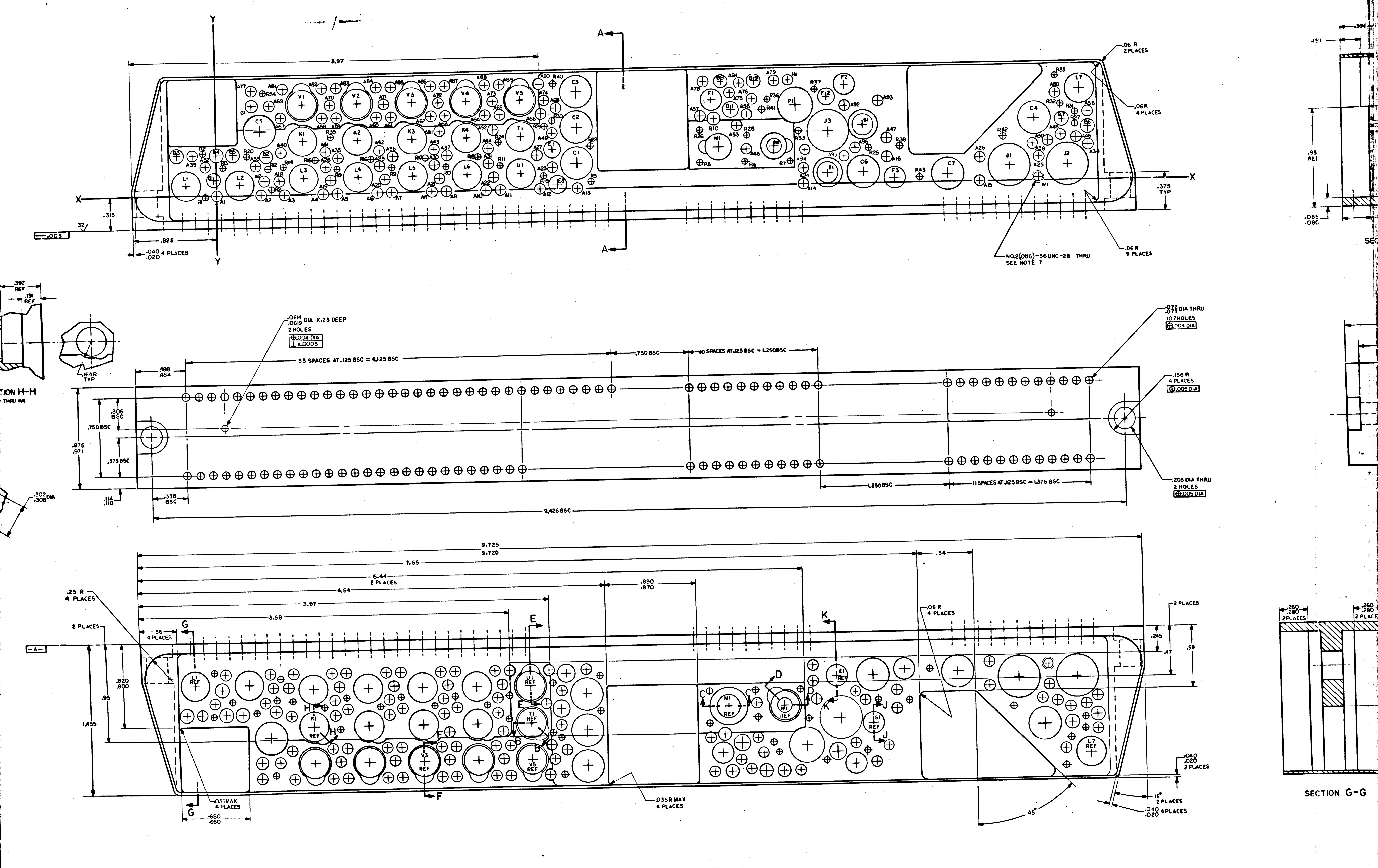
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007212		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS .XXX ±.005 .XX .02 ANGLES ± 1/2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	DRAWN DATE CHECKED A. Lindstrom APPROVAL RV Vecchi APPROVAL	HEADER HOUSING D/A CONVERTER
APPLICATION		HEAT TREATMENT ___	NASA APPROVAL 7-13-65	CODE IDENT NO. 80230 · SIZE J · NASA DRAWING NO. 2008336
		FINAL FINISH SEE NOTE 6	MIT APPROVAL 13 Jul 65	SCALE 4/1 · WT ___ · SHEET 1 OF 1

2008336 | A

4 3 2


3.97
A
.06 R 2 PLACES
.06 R 4 PLACES
.95 REF
.375 TYP
X
Y
.315
.825
.040 .020 4 PLACES
.005
32
NO.2(.086)-56 UNC-2B THRU SEE NOTE 7
.06 R 9 PLACES
.085 .080
.392 REF
.191 REF
.164R TYP
SECTION H-H
.302 .308 DIA
.0614 .0619 DIA X.23 DEEP 2 HOLES
⊕.004 DIA
⊥.0005
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.072 .073 DIA THRU 107 HOLES
⊕.004 DIA
.156 R 4 PLACES
⊕.005 DIA
.488 .484
.305 BSC
.750 BSC
.975 .971
.375 BSC
.114 .110
.338 BSC
9.426 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU 2 HOLES
⊕.005 DIA
9.725 9.720
7.55
6.44 2 PLACES
4.54
3.97
3.58
.890 .870
.54
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
-A-
.820 .800
.95
1.455
.06 R 4 PLACES
2 PLACES
.245
.47
.59
.035 MAX 4 PLACES
.680 .660
.035 R MAX 4 PLACES
45°
.040 .020 2 PLACES
15° 2 PLACES
.040 .020 4 PLACES
.260 .280 2 PLACES
SECTION G-G
G
E
F
H
B
C
D
K
J

2008336 A

[illegible] GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA [illegible] RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

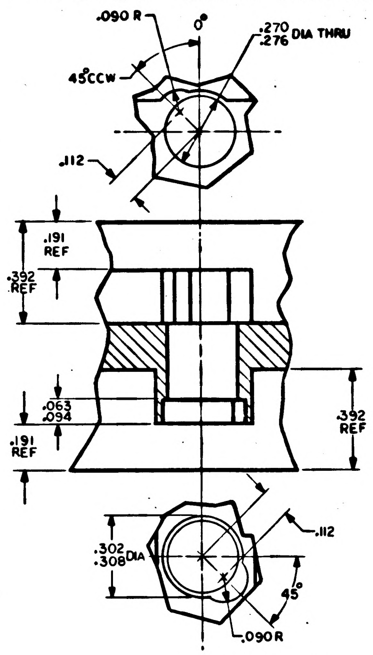
HOLE IDENT	X–DIM.	Y–DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	67
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	–.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	.350		
A37	2.235	.350		
A38	7.910	.350		
A39	–.235	.385		
A40	.635	.400		
A41	1.060	↓		
A42	1.585	↓		
A43	2.110	↓		
A44	2.635	.400		
A45	8.335	.410		
A46	5.150	.345		
A47	6.500	.425		
A48	8.185	.425		
A49	3.260	.535		
A50	8.060	.375		
A51	2.160	.575		
A52	2.685	.575		
A53	5.050	.575		
—	—	—		
A55	5.145	.680		
A56	8.450	.650		
A57	4.690	.675		
A58	1.035	.725		
A59	1.175	↓		
A60	1.560	↓		
A61	1.700	↓		
A62	2.085	↓		
A63	2.225	↓		
A64	2.160	↓		
A65	2.750	↓		
A66	3.150	.725		
A67	.635	.735		
A68	3.300	.775		

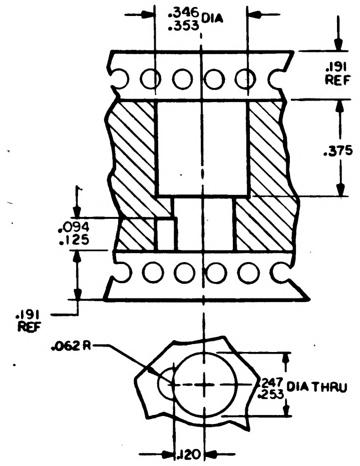
HOLE IDENT	X–DIM.	Y–DIM.	HOLE DIA	QTY
A69	.525	.850	.100 .104	28
A70	1.110	↓		
A71	1.635	↓		
A72	2.160	↓		
A73	2.685	↓		
A74	3.185	.850		
A75	4.985	.890		
A76	5.200	.830		
A77	.350	1.000		
A78	4.735	1.000		
A79	5.415	1.000		
A80	8.135	.835		
A81	.655	1.010		
A82	1.035	↓		
A83	1.175	↓		
A84	1.560	↓		
A85	1.700	↓		
A86	2.065	↓		
A87	2.225	↓		
A88	2.610	↓		
A89	2.750	↓		
A90	3.140	1.010		
A91	5.080	.980		
A92	6.100	.750		
A93	6.425	.785		
A94	5.725	.325		
A95	6.085	.261		
A96	6.200	.335		
B1	–.025	.150	.127 .131	10
B2	.485	.375		
B3	–.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	4.830	.630		
C1	3.500	.235	.310 .317	7
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
C7	7.100	.075		
			.153 .157	1
D1	4.995	.730		
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	1
J1	7.685	.150	.395 .402	3
J2	8.250	.150		
J3	5.931	.505		

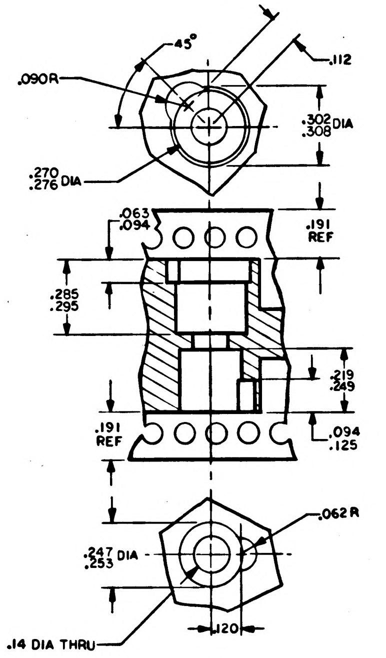
HOLE IDENT	X–DIM.	Y–DIM.	HOLE DIA	QTY
K1	.845	.510	SEE SECTION H–H	4
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
T1	2.945	.510	SEE SECTION B–B	1
L1	–.300	.100	.270 .276	7
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	8.375	.875		
V1	.845	.860	SEE SECTION F–F	5
V2	1.375	↓		
V3	1.900	↓		
V4	2.420	↓		
V5	2.945	.860		
			SEE SECTION K–K	1
Z1	5.925	.100		
			SEE SECTION C–C	1
M1	4.870	.375		
			SEE SECTION D–D	1
N1	5.400	.375		
			.346 .353	1
P1	5.625	.760		
R1	–.110	–.010	.058 .062	41
R2	.535	.050		
R3	3.635	.060		
—	—	—		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	–.125	.400		
R22	3.635	.400		
—	—	—		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.664	.350		
R39	1.115	.545		
R40	3.280	1.010		
R41	5.230	.730		
R42	7.640	.425		
R43	6.835	.050		
			SEE SECTION J–J	1
S1	6.275	.560		
			SEE SECTION E–E	1
U1	2.945	.150		
W1	7.960	.025		1

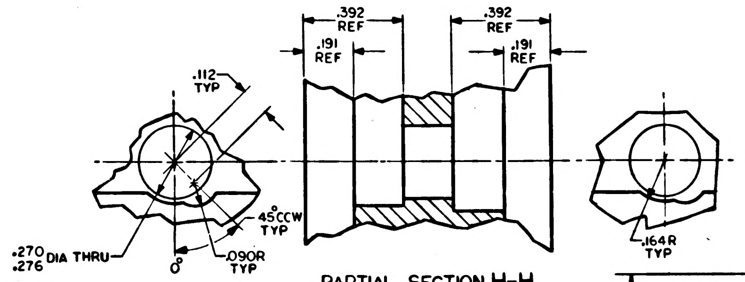
NOTES

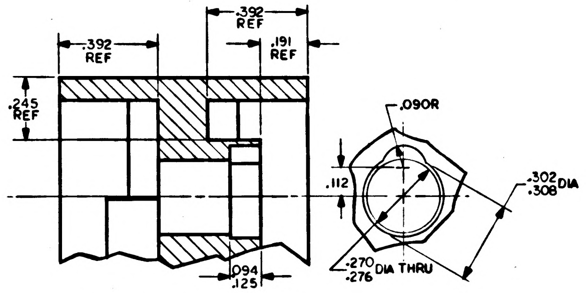
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO AND REVISION PER ND1002019.

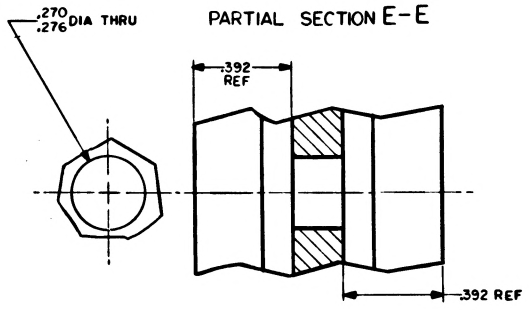

PARTIAL SECTION B–B
.090 R
0°
.270 .276 DIA THRU
45°CCW
.112
.191 REF
.392 REF
.063 .094
.191 REF
.392 REF
.302 .308 DIA
.112
45°
.090 R

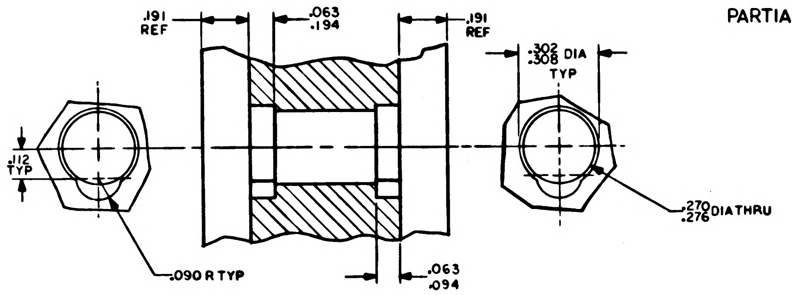

PARTIAL SECTION C–C
.346 .353 DIA
.191 REF
.375
.094 .125
.191 REF
.062 R
.247 .253 DIA THRU
.120

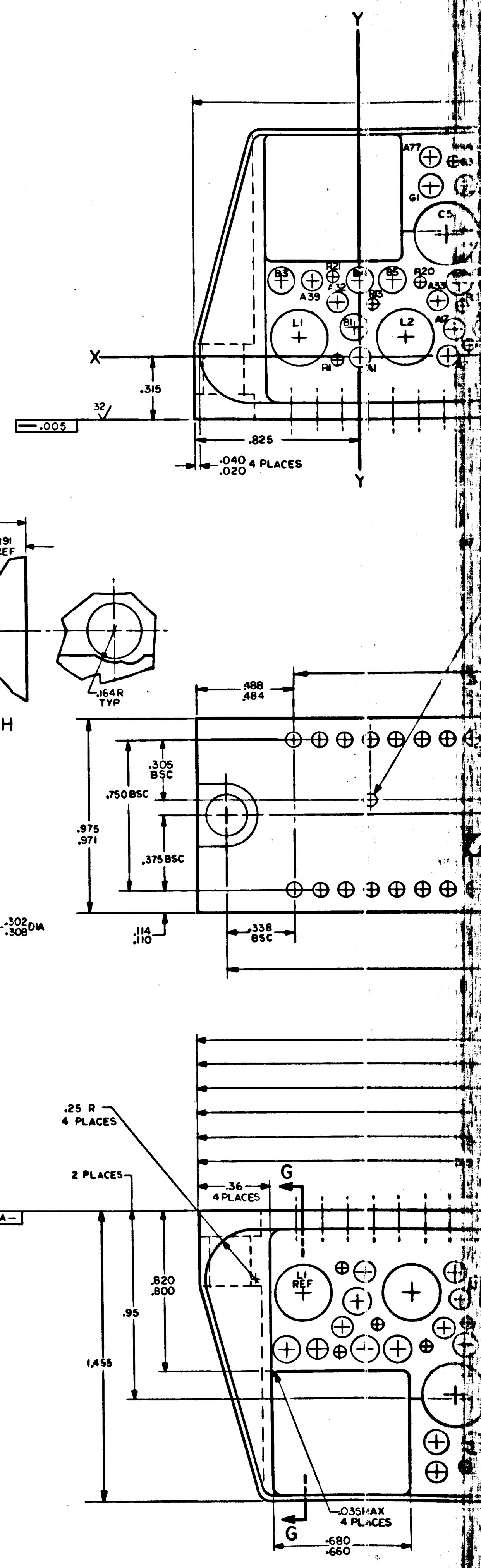

PARTIAL SECTION D–D
.090R
45°
.112
.302 .308 DIA
.270 .276 DIA
.063 .094
.191 REF
.285 .295
.219 .249
.191 REF
.094 .125
.062 R
.247 .253 DIA
.120
.14 DIA THRU


PARTIAL SECTION H–H
TYPICAL FOR K1 THRU K4
.112 TYP
.392 REF
.191 REF
.392 REF
.191 REF
.270 .276 DIA THRU
0°
45°CCW TYP
.090R TYP
.164R TYP


PARTIAL SECTION E–E
.392 REF
.392 REF
.191 REF
.245 REF
.090R
.112
.302 .308 DIA
.270 .276 DIA THRU
.094 .125


PARTIAL SECTION J–J
.270 .276 DIA THRU
.392 REF
.392 REF


PARTIAL SECTION F–F
TYP FOR V1 THRU V5
.191 REF
.063 .194
.191 REF
.302 .308 DIA TYP
.112 TYP
.090 R TYP
.063 .094
.270 .276 DIA THRU


Y
A77
G1
C5
B3
R21
B4
B5
R20
A39
B1
L1
L2
R1
X
.315
32
.005
.825
.040 .020 4 PLACES
Y
.488 .484
.305 BSC
.750 BSC
.975 .971
.375 BSC
.114 .110
.338 BSC
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
G
A
L1 REF
.820 .800
.95
1.455
.035 MAX 4 PLACES
G
.680 .660

SYM	DESCRIPTION	DATE	APPROVAL
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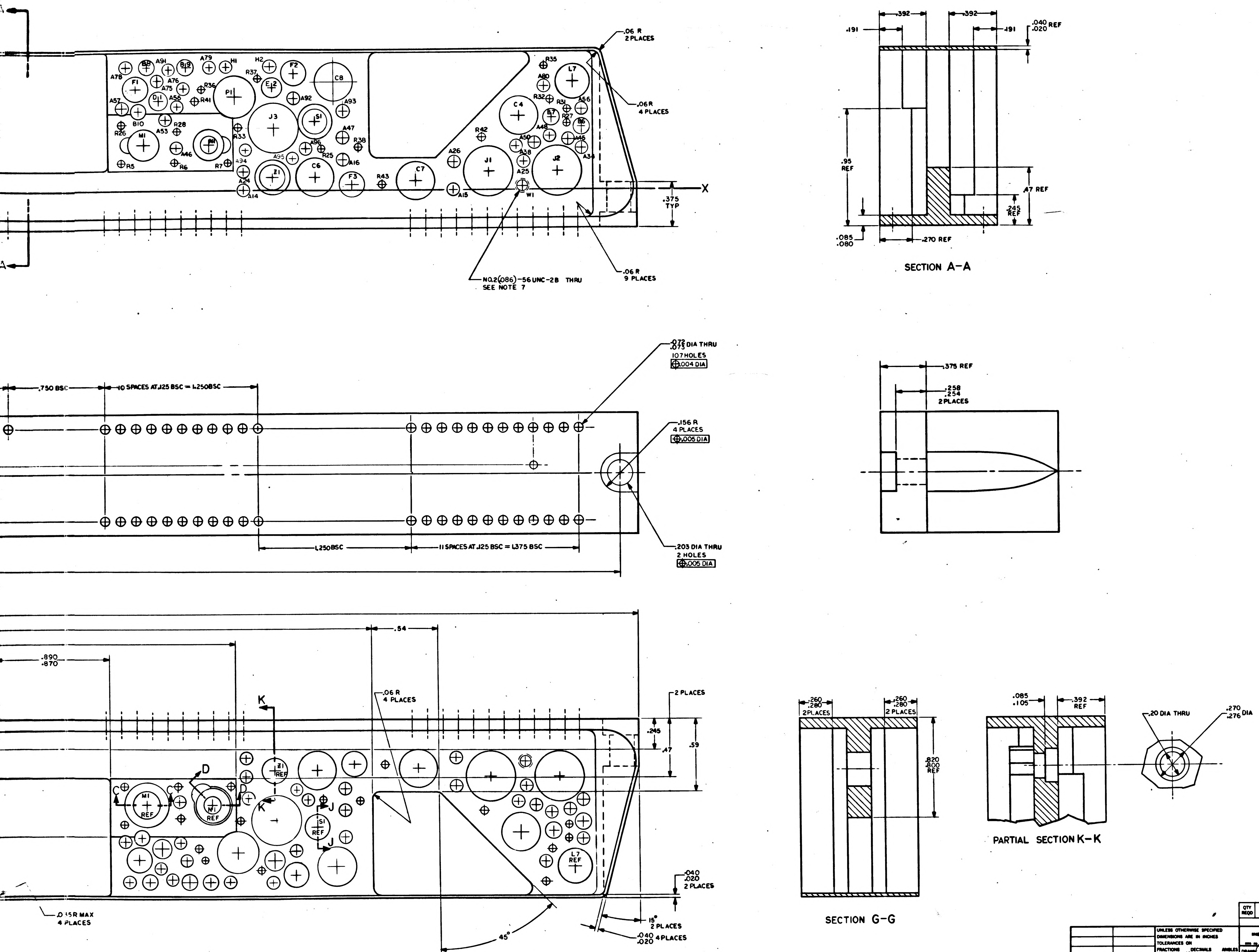
B	REVISED PER TDRR 22514	[illegible]	[illegible]



.06 R 2 PLACES
.06R 4 PLACES
X
.375 TYP
NO.2(086)-56UNC-2B THRU SEE NOTE 7
.06 R 9 PLACES
A91 A79 H1 H2 F2 C8 R35 L7 A78 F1 A76 A75 B19 R37 E12 P1 R36 R41 A92 A93 D11 A57 B10 R28 R26 M1 A53 J3 S1 C4 R32 R31 A56 S7 R27 A47 R42 B6 A48 A50 A45 N1 R33 A46 R6 R7 R38 A58 J1 J2 A34 R5 A94 A95 A96 R25 A16 A26 A25 C6 C7 Z1 F3 R43 A24 A14 A15 W1
.392 .191 .040 .020 REF
.95 REF
.47 REF
.245 REF
.085 .080
.270 REF
SECTION A-A
.072 .073 DIA THRU 107 HOLES .004 DIA
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.156 R 4 PLACES .005 DIA
.203 DIA THRU 2 HOLES .005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.375 REF
.258 .254 2 PLACES
.890 .870
.54
.06 R 4 PLACES
K
2 PLACES
.245
.47
.59
D
C
M1 REF
N1 REF
Z1 REF
S1 REF
L7 REF
J
.040 .020 2 PLACES
15° 2 PLACES
.040 .020 4 PLACES
45°
.015R MAX 4 PLACES
.260 .280 2 PLACES
.820 .800 REF
SECTION G-G
.085 .105
.392 REF
PARTIAL SECTION K-K
.20 DIA THRU
.270 .276 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007212	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XXX ± .005 XX ± .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT —

FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] DATE [illegible] 65
CHECKED A. Lindstrom 6 July 65
APPROVAL R V [illegible] 8 [illegible] 65
APPROVAL [illegible] 9 [illegible] 65
NASA APPROVAL [illegible] 7-13-65
MIT APPROVAL [illegible] 13 Jul 65

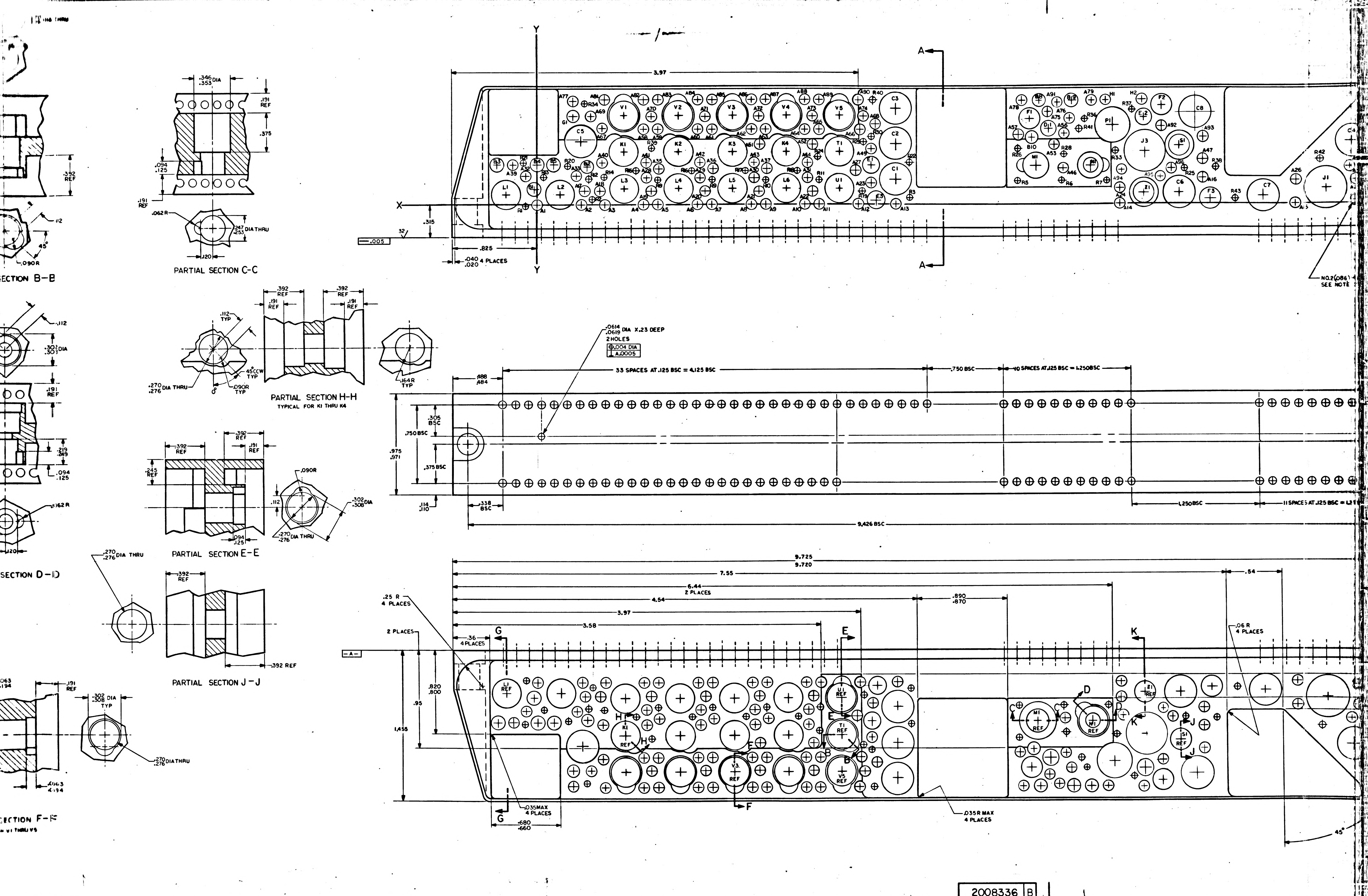
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
D/A CONVERTER

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2008336
SCALE 4/1 WT — SHEET 1 OF 1

2008336 B

4 3 2



SECTION B-B
PARTIAL SECTION C-C
SECTION D-D
PARTIAL SECTION E-E
SECTION F-F
V1 THRU V5
PARTIAL SECTION H-H
TYPICAL FOR K1 THRU K4
PARTIAL SECTION J-J
.346 DIA .353
.191 REF
.375
.392 REF
.094 .125
.191 REF
.062 R
.247 .253 DIA THRU
.120
.112
45°
.090 R
.302 .303 DIA
.219 .249
.062 R
.270 .276 DIA THRU
.112 TYP
45° CCW TYP
.090 R TYP
.164 R TYP
.245 REF
.090 R
.302 .308 DIA
.094 .125
.270 .276 DIA THRU
.302 .308 DIA TYP
.063 .194
3.97
.315
.825
.040 .020 4 PLACES
.005
32
X
Y
A
NO.2(.086) SEE NOTE
.0614 .0619 DIA X .23 DEEP 2 HOLES
.004 DIA
A .0005
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.488 .484
.305 BSC
.750 BSC
.375 BSC
.975 .971
.114 .110
.338 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375
9.426 BSC
9.725 9.720
7.55
.54
6.44 2 PLACES
4.54
.890 .870
3.97
3.58
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
.820 .800
.95
1.455
.06 R 4 PLACES
.035 MAX 4 PLACES
.680 .660
.035 R MAX 4 PLACES
45°
G
E
H
K
C
D
J
B
F
V1 V2 V3 V4 V5
K1 K2 K3 K4
L1 L2 L3 L4 L5 L6
T1 U1
C1 C2 C3 C4 C5 C6 C7 C8
P1 J1 J3 M1 N1 S1 Z1 F1 F2 F3 E1 E2 E3 D1 G1 H1 H2
L1 REF
K1 REF
V3 REF
U1 REF
T1 REF
V5 REF
M1 REF
N1 REF
Z1 REF
S1 REF

2008336 B

8 7 6 5 4

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

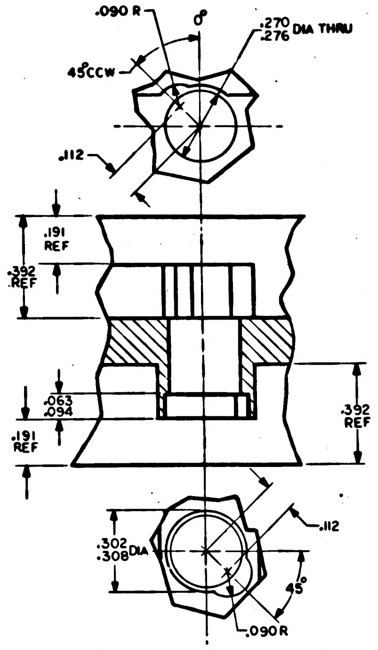
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	67
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.050	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	–.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	.350		
A37	2.235	.350		
A38	7.910	.350		
A39	–.235	.385		
A40	.635	.400		
A41	1.060	↓		
A42	1.585	↓		
A43	2.110	↓		
A44	2.635	.400		
A45	8.335	.410		
A46	5.150	.345		
A47	6.500	.425		
A48	8.185	.425		
A49	3.260	.535		
A50	8.060	.375		
A51	2.160	.575		
A52	2.685	.575		
A53	5.050	.575		
—	—	—		
A55	5.145	.680		
A56	8.450	.650		
A57	4.690	.675		
A58	1.035	.725		
A59	1.175	↓		
A60	1.560	↓		
A61	1.700	↓		
A62	2.085	↓		
A63	2.225	↓		
A64	2.160	↓		
A65	2.750	↓		
A66	3.150	.725		
A67	.635	.735		
A68	3.300	.775		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A69	.525	.850	.100 .104	28
A70	1.110	↓		
A71	1.635	↓		
A72	2.160	↓		
A73	2.685	↓		
A74	3.185	.850		
A75	4.985	.890		
A76	5.200	.830		
A77	.350	1.000		
A78	4.735	1.000		
A79	5.415	1.000		
A80	8.135	.835		
A81	.655	1.010		
A82	1.035	↓		
A83	1.175	↓		
A84	1.560	↓		
A85	1.700	↓		
A86	2.085	↓		
A87	2.225	↓		
A88	2.610	↓		
A89	2.750	↓		
A90	3.140	1.010		
A91	5.080	.980		
A92	6.100	.750		
A93	6.500	.644		
A94	5.725	.325		
A95	6.085	.261		
A96	6.200	.335		
B1	–.025	.150	.127 .131	10
B2	.485	.375		
B3	–.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	4.830	.630		
C1	3.500	.235	.310 .317	8
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
C7	7.100	.075		
C8	6.425	.880		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	2
H2	5.907	1.000		
J1	7.685	.150	.395 .402	3
J2	8.250	.150		
J3	5.931	.505		

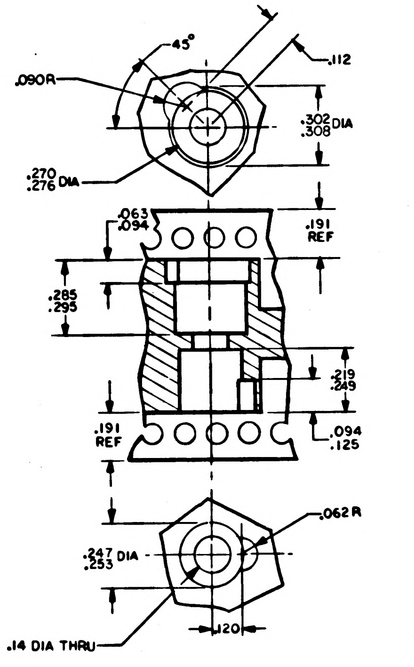
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
K1	.845	.510	SEE SECTION H–H	4
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
T1	2.945	.510	SEE SECTION B–B	1
L1	–.300	.100	.270 .276	7
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	8.375	.875		
V1	.845	.860	SEE SECTION F–F	5
V2	1.375	↓		
V3	1.900	↓		
V4	2.420	↓		
V5	2.945	.860		
			SEE SECTION K–K	1
Z1	5.925	.100		
			SEE SECTION C–C	1
M1	4.870	.375		
			SEE SECTION D–D	1
N1	5.400	.375		
			.346 .353	1
P1	5.625	.760		
R1	–.110	–.010	.058 .062	41
R2	.535	.050		
R3	3.635	.060		
—	—	—		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	–.125	.400		
R22	3.635	.400		
—	—	—		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.664	.350		
R39	1.115	.545		
R40	3.280	1.010		
R41	5.230	.730		
R42	7.640	.425		
R43	6.835	.050		
			SEE SECTION J–J	1
S1	6.275	.560		
			SEE SECTION E–E	1
U1	2.945	.150		
W1	7.960	.025		1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\surd}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE.COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO AND REVISION PER ND1002019

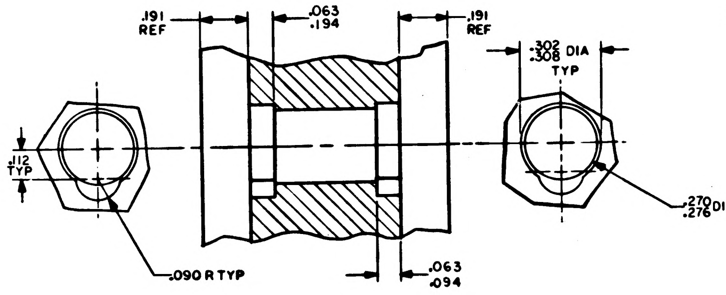
BH


.090 R
0°
.270
.276 DIA THRU
45°CCW
.112
.191 REF
.392 REF
.063
.094
.191 REF
.392 REF
.302
.308 DIA
.112
45°
.090 R

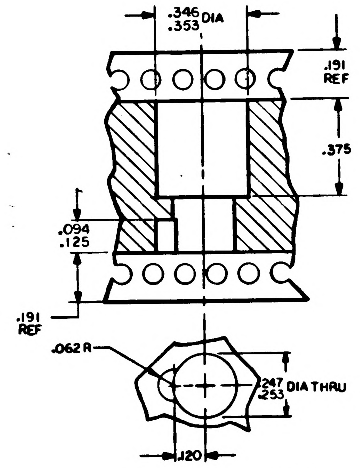
PARTIAL SECTION B–B


45°
.112
.090R
.302
.308 DIA
.270
.276 DIA
.063
.094
.191 REF
.285
.295
.219
.249
.191 REF
.094
.125
.062 R
.247
.253 DIA
.14 DIA THRU
.120

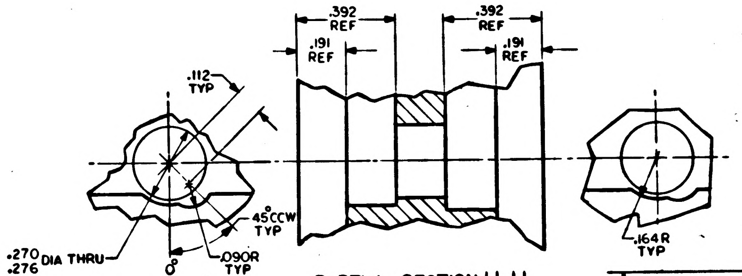
PARTIAL SECTION D–D


.191 REF
.063
.194
.191 REF
.302
.308 DIA TYP
.112 TYP
.090 R TYP
.063
.094
.270
.276 DIA THRU

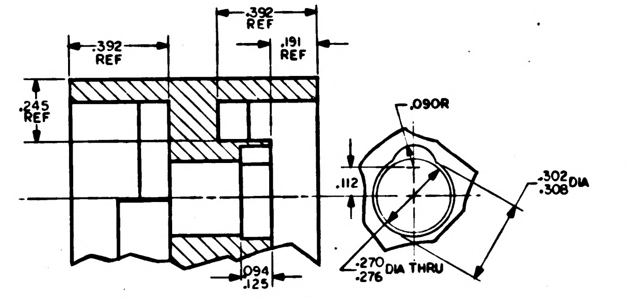
PARTIAL SECTION F–F
TYP FOR V1 THRU V5


.346
.353 DIA
.191 REF
.375
.094
.125
.191 REF
.062 R
.247
.253 DIA THRU
.120

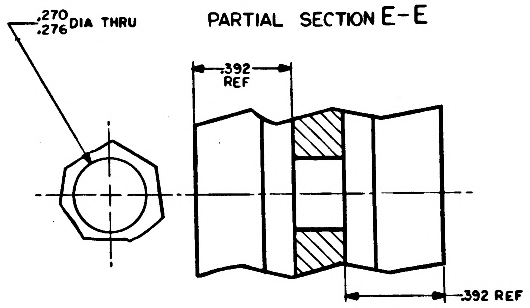
PARTIAL SECTION C–C


.392 REF
.392 REF
.191 REF
.191 REF
.112 TYP
.270
.276 DIA THRU
45°CCW TYP
0°
.090R TYP
.164R TYP

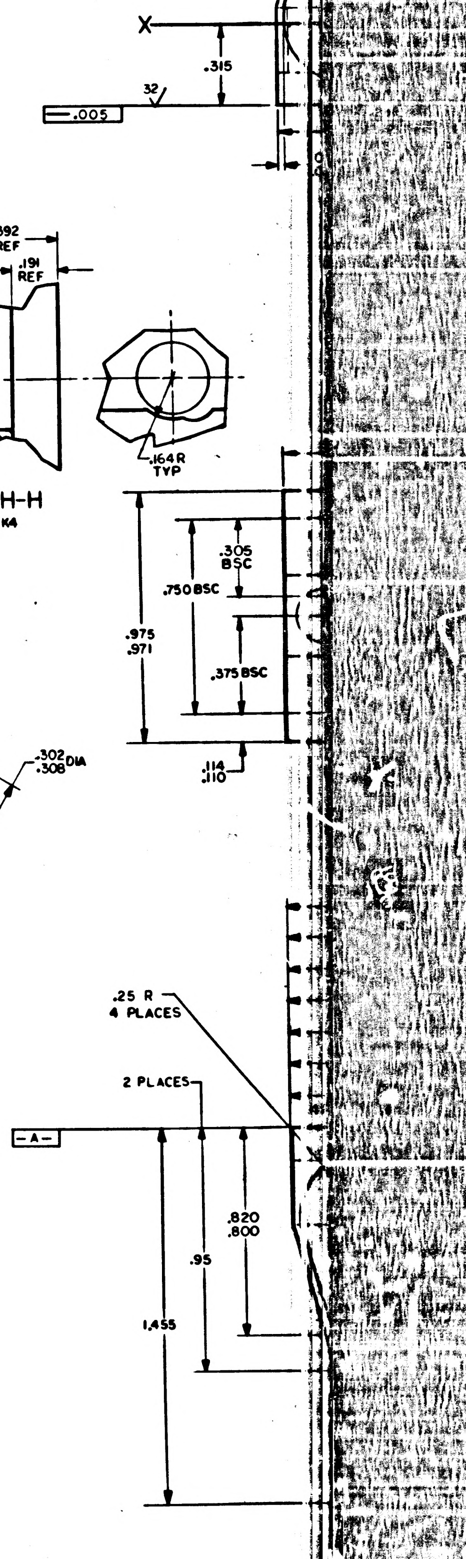
PARTIAL SECTION H–H
TYPICAL FOR K1 THRU K4


.392 REF
.392 REF
.191 REF
.245 REF
.090R
.112
.302
.308 DIA
.270
.276 DIA THRU
.094
.125

PARTIAL SECTION E–E


.270
.276 DIA THRU
.392 REF
.392 REF

PARTIAL SECTION J–J


X
.315
32
.005
.305 BSC
.750 BSC
.975
.971
.375 BSC
.114
.110
.25 R 4 PLACES
2 PLACES
A
.820
.800
.95
1.455

2008336 B

SYM	DESCRIPTION	DATE	APPROVAL
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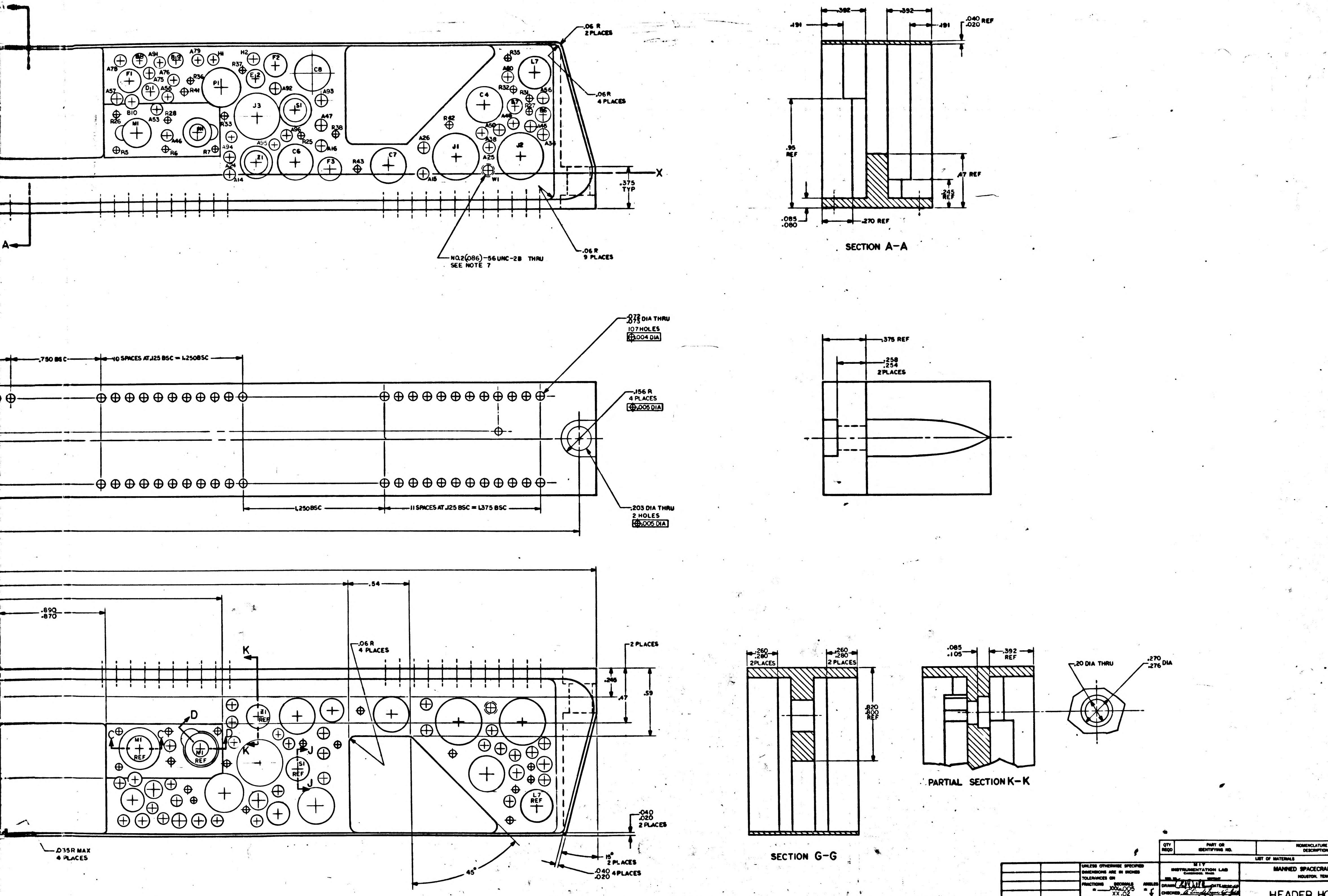
B	REVISED PER TDRR 22514		
C	REVISED PER TDRR 23167		



.06 R 2 PLACES
.06R 4 PLACES
.375 TYP
X
A
NO.2(.086)-56UNC-2B THRU SEE NOTE 7
.06 R 9 PLACES
W1
J1
J2
J3
C4
C6
C7
C8
P1
S1
E1
E2
F1
F2
F3
L7
M1
D1
B10
.491
.392
.040 .020 REF
.95 REF
.47 REF
.245 REF
.085 .080
.270 REF
SECTION A-A
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.078 .073 DIA THRU 107 HOLES
.004 DIA
.156 R 4 PLACES
.005 DIA
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU 2 HOLES
.005 DIA
.375 REF
.258 .254 2 PLACES
.890 .870
.54
.06 R 4 PLACES
2 PLACES
.246
.47
.59
K
D
C
J
REF
.040 .020 2 PLACES
.035R MAX 4 PLACES
45°
15° 2 PLACES
.040 .020 4 PLACES
.260 .280 2 PLACES
.820 .800 REF
SECTION G-G
.085 .105
.392 REF
PARTIAL SECTION K-K
.20 DIA THRU
.270 .276 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS .XXX±.005 .XX.02 ANGLES ± ½
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

HEAT TREATMENT

FINAL FINISH SEE NOTE 6

2007212	
NEXT ASSY	USED ON
APPLICATION	

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

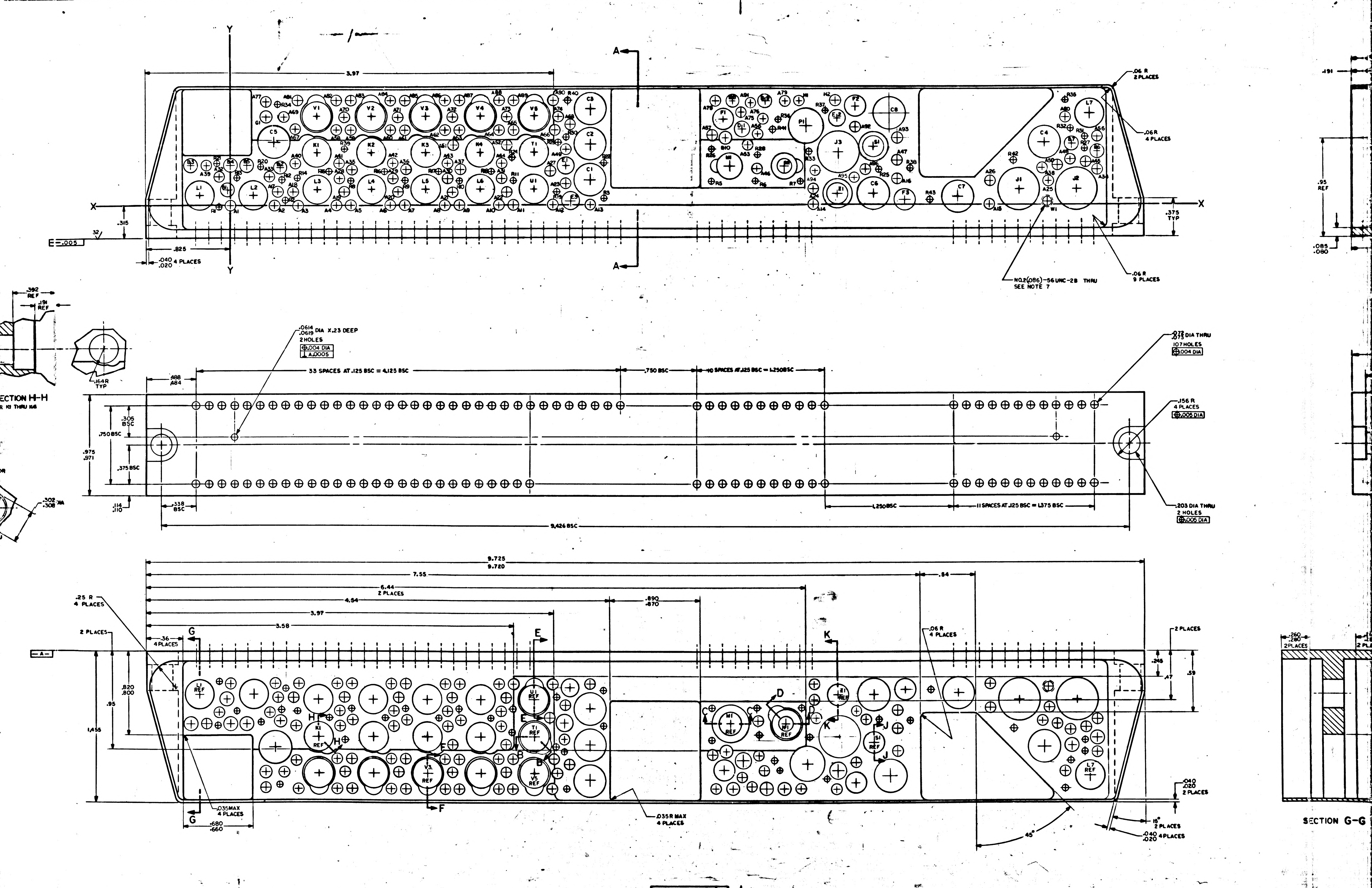
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 7-13-65
MIT APPROVAL 13 Jul 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER HOUSING
D/A CONVERTER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008336
SCALE 4/1
WT
SHEET 1 OF 1

MASTER



A
Y
X
3.97
.06 R 2 PLACES
.06 R 4 PLACES
.06 R 9 PLACES
NO.2(.086)-56 UNC-2B THRU SEE NOTE 7
.315
.825
.040 .020 4 PLACES
.375 TYP
.95 REF
.085 .080
.191
.392 REF
.191 REF
.164R TYP
SECTION H-H
.302 .308
.0614 .0619 DIA X.23 DEEP 2 HOLES
.004 DIA
.0005
.488 .484
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.073 .075 DIA THRU 107 HOLES .004 DIA
.156 R 4 PLACES .005 DIA
.306 BSC
.750 BSC
.375 BSC
.975 .971
.114 .110
.338 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU 2 HOLES .005 DIA
9.426 BSC
9.725 9.720
7.55
6.44 2 PLACES
4.54
3.97
3.58
.890 .870
.84
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
.06 R 4 PLACES
.820 .800
.95
1.455
.245
.47
.59
.040 .020 2 PLACES
.035 MAX 4 PLACES
.680 .660
.035 R MAX 4 PLACES
45°
15° 2 PLACES
.040 .020 4 PLACES
.260 .280 2 PLACES
SECTION G-G
G
E
F
H
K
D
C
J
B
L1 REF
K1 REF
V3 REF
U1 REF
T1 REF
V5 REF
M1 REF
N1 REF
E1 REF
S1 REF
L7 REF

F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

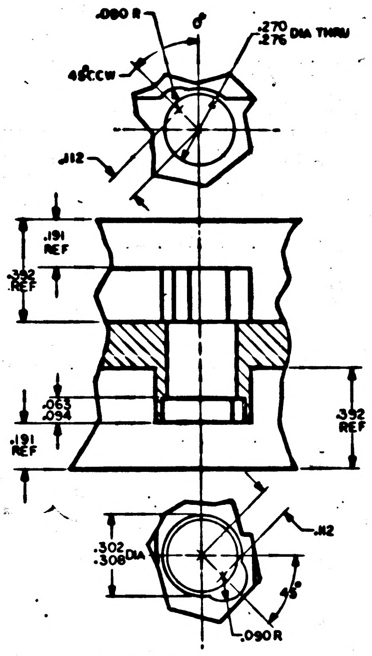
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000		
A2	.435			
A3	.660			
A4	1.035			
A5	1.175			
A6	1.570			
A7	1.700			
A8	2.090			
A9	2.225			
A10	2.610			
A11	2.750			
A12	3.140			
A13	3.500			
A14	5.685			
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610			
A19	1.110			
A20	1.635			
A21	2.160			
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	-.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350	.100 .104	67
A36	1.710	.350		
A37	2.235	.350		
A38	7.910	.350		
A39	-.235	.385		
A40	.635	.400		
A41	1.060			
A42	1.585			
A43	2.110			
A44	2.635	.400		
A45	8.335	.410		
A46	5.150	.345		
A47	6.500	.425		
A48	8.185	.425		
A49	3.260	.535		
A50	8.060	.375		
A51	2.160	.575		
A52	2.685	.575		
A53	5.050	.575		
—	—	—		
A55	5.145	.680		
A56	8.450	.650		
A57	4.690	.675		
A58	1.035	.725		
A59	1.175			
A60	1.560			
A61	1.700			
A62	2.085			
A63	2.225			
A64	2.610			
A65	2.750			
A66	3.150	.725		
A67	.635	.735		
A68	3.300	.775		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A69	.525	.850		
A70	1.110			
A71	1.635			
A72	2.160			
A73	2.685			
A74	3.185	.850		
A75	4.985	.890		
A76	5.200	.830		
A77	.350	1.000		
A78	4.735	1.000		
A79	5.415	1.000		
A80	8.135	.835	.100 .104	28
A81	.655	1.010		
A82	1.035			
A83	1.175			
A84	1.560			
A85	1.700			
A86	2.085			
A87	2.225			
A88	2.610			
A89	2.750			
A90	3.140	1.010		
A91	5.080	.980		
A92	6.100	.750		
A93	6.500	.644		
A94	5.725	.325		
A95	6.085	.261		
A96	6.200	.335		
B1	-.025	.150		
B2	.485	.375		
B3	-.385	.385	.127 .131	10
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	4.830	.630		
C1	3.500	.235		
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600	.310 .317	8
C5	.425	.610		
C6	6.275	.100		
C7	7.100	.075		
C8	6.425	.880		
D1	4.995	.730	.153 .157	1
E1	3.260	.375		
E2	5.925	.830	.165 .169	3
E3	3.310	.035		
F1	4.810	.825		
F2	6.100	.950	.202 .206	3
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	2
H2	5.907	1.000		
J1	7.685	.150		
J2	8.250	.150	.395 .402	3
J3	5.931	.505		

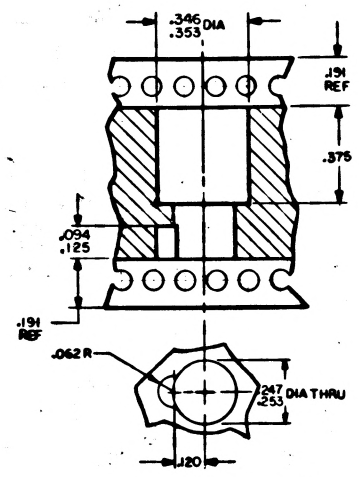
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
K1	.845	.510	SEE SECTION H—H	4
K2	1.375			
K3	1.900			
K4	2.420			
T1	2.945	.510	SEE SECTION B—B	1
L1	-.300	.100	.270 .276	7
L2	.225	.100		
L3	.845	.150		
L4	1.375			
L5	1.900			
L6	2.420			
L7	8.375	.875		
V1	.845	.860	SEE SECTION F—F	5
V2	1.375			
V3	1.900			
V4	2.420			
V5	2.945	.860		
			SEE SECTION K—K	1
Z1	5.925	.100		
			SEE SECTION C—C	1
M1	4.870	.375		
			SEE SECTION D—D	1
N1	5.400	.375		
			.346 .353	1
P1	5.625	.760		
R1	-.110	-.010		
R2	.535	.050		
R3	3.635	.060		
—	—	—		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325	.058 .062	41
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	-.125	.400		
R22	3.635	.400		
—	—	—		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.664	.350		
R39	1.115	.545		
R40	3.280	1.010		
R41	5.230	.730		
R42	7.640	.425		
R43	6.835	.050		
			SEE SECTION J—J	1
S1	6.275	.560		
			SEE SECTION E-E	1
U1	2.945	.150		
W1	7.960	.025		1

NOTES

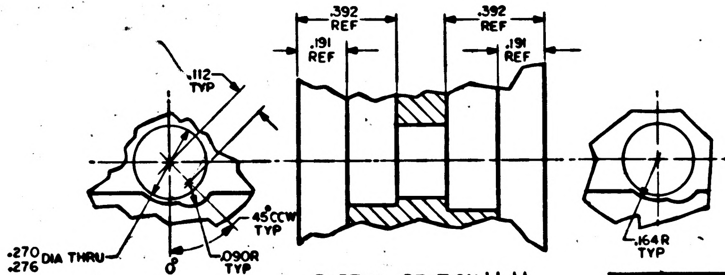
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE.COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO AND REVISION PER ND1002019.


.090 R
8°
.270
.276 DIA THRU
45°CCW
.112
.191 REF
.392 REF
.063
.094
.191 REF
.392 REF
.302
.306 DIA
.112
45°
.090 R

PARTIAL SECTION B-B

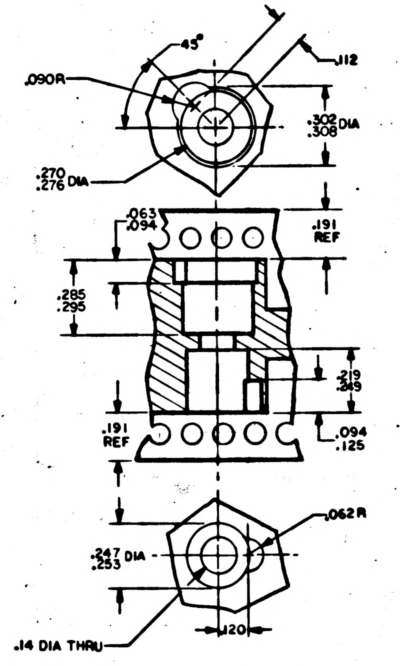

.346
.353 DIA
.191 REF
.375
.094
.125
.191 REF
.062 R
.247
.253 DIA THRU
.120

PARTIAL SECTION C-C

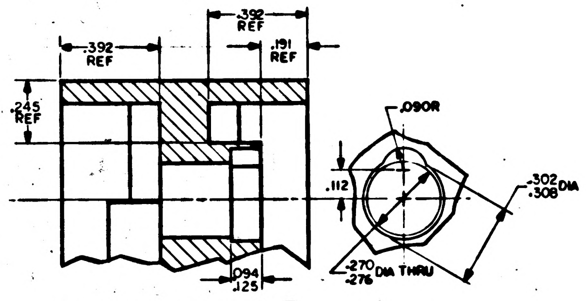

.112 TYP
.392 REF
.191 REF
.392 REF
.191 REF
45°CCW TYP
.270
.276 DIA THRU
8°
.090R TYP
.164R TYP

PARTIAL SECTION H-H

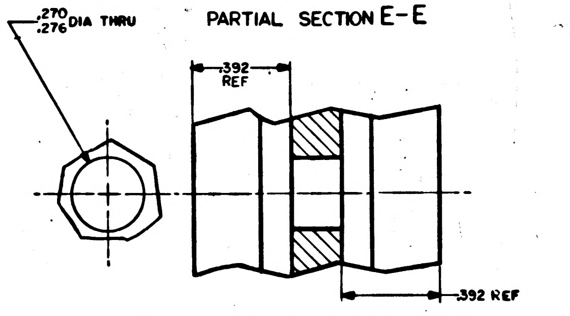
TYPICAL FOR K1 THRU K4


45°
.112
.090R
.302
.308 DIA
.270
.276 DIA
.063
.094
.191 REF
.285
.295
.219
.249
.191 REF
.094
.125
.062 R
.247
.253 DIA
.14 DIA THRU
.120

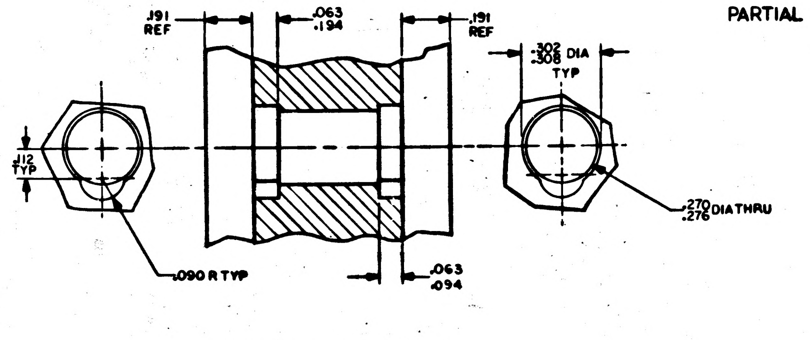
PARTIAL SECTION D-D


.392 REF
.191 REF
.392 REF
.245 REF
.090R
.112
.302
.308 DIA
.270
.276 DIA THRU
.094
.125

PARTIAL SECTION E-E

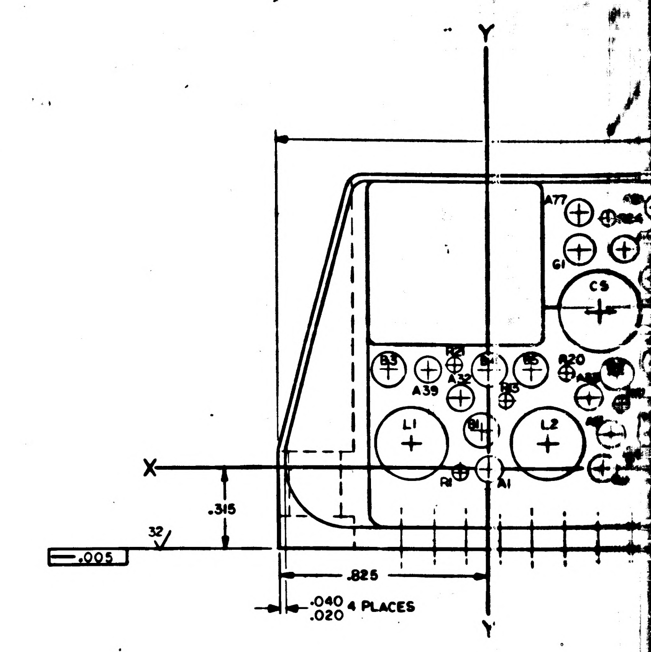

.270
.276 DIA THRU
.392 REF
.392 REF

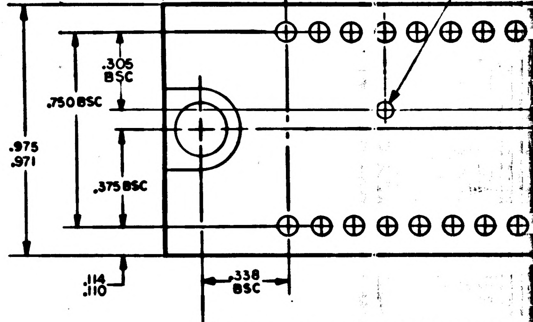
PARTIAL SECTION J-J

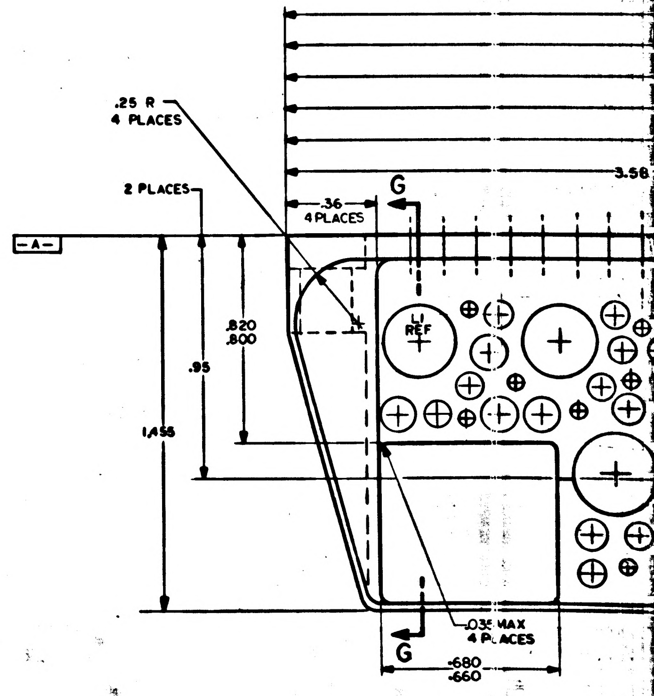

.191 REF
.063
.194
.191 REF
.302
.308 DIA TYP
.112 TYP
.090 R TYP
.063
.094
.270
.276 DIA THRU

PARTIAL SECTION F-F

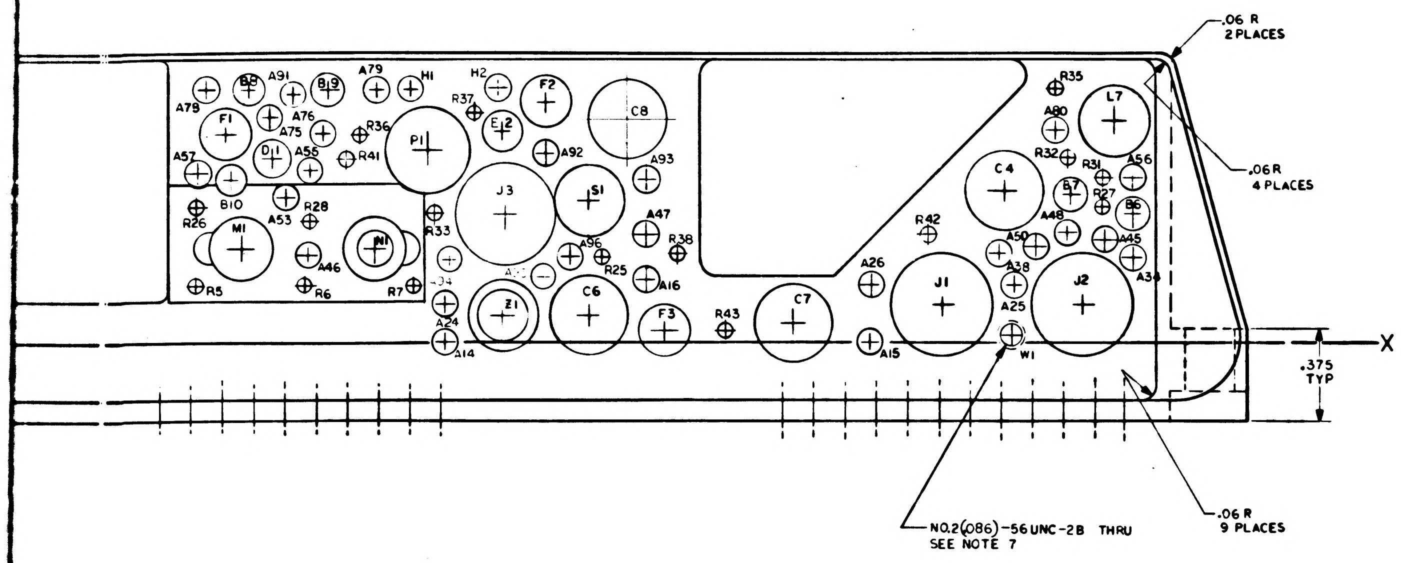
TYP FOR V1 THRU V5


Y
A77
G1
C5
B3
A39
R21
A32
B4
B5
R20
R15
L1
B1
L2
R1
A1
X
.315
32
.005
.825
.040
.020 4 PLACES
Y

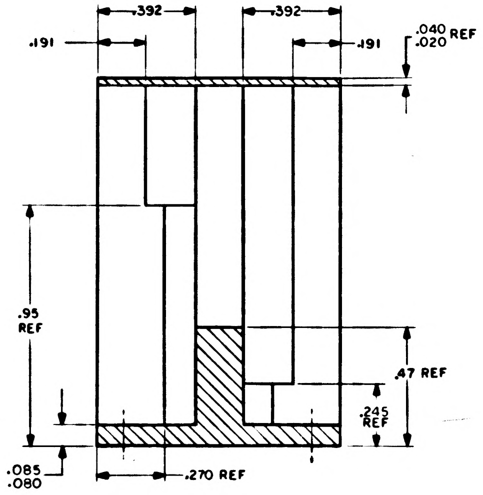

.488
.484
.305 BSC
.750 BSC
.975
.971
.375 BSC
.114
.110
.338 BSC


.25 R
4 PLACES
2 PLACES
.36
4 PLACES
G
A
3.58
.820
.800
.95
1.455
L1 REF
.035 MAX
4 PLACES
G
.680
.660

REVISIONS TDRR 20773			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 21764		WR
B	REVISED PER TDRR 22514	2 Sep 65	
C	REVISED PER TDRR 23167	Oct 65	
D	REVISED PER TDRR 24958	4 JAN 66	

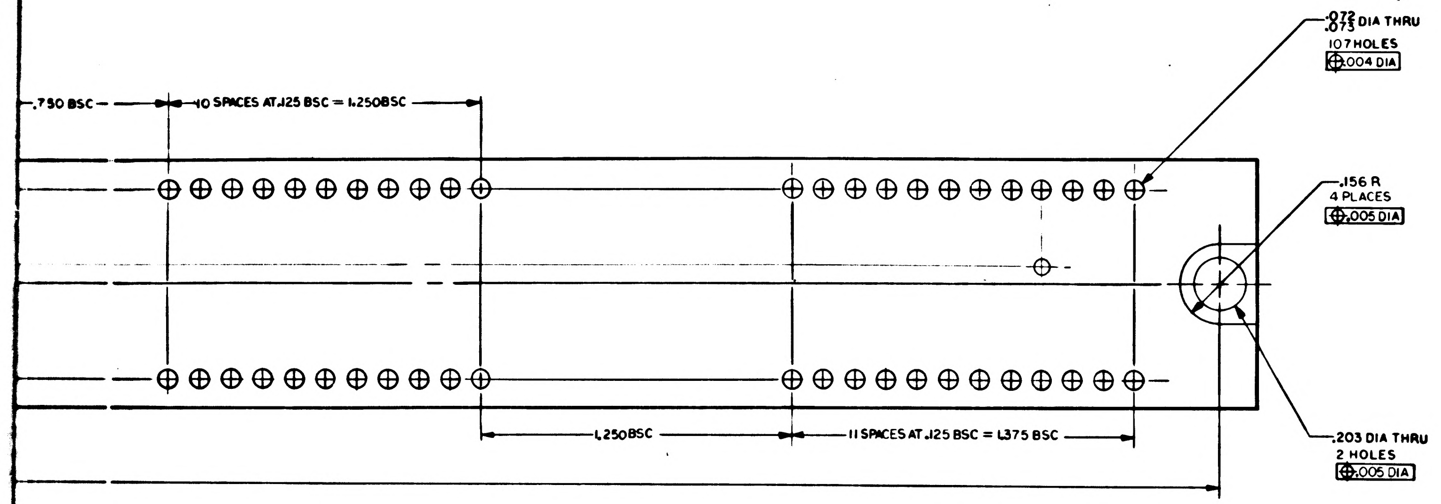


.06 R 2 PLACES
.06R 4 PLACES
.06 R 9 PLACES
NO.2(.086)-56UNC-2B THRU SEE NOTE 7
.375 TYP
X
A79 B9 A91 B19 A79 H1 H2 F2 C8 R35 L7 A80
F1 A76 A75 D1 A55 R36 R41 P1 R37 E2 A92 A93
A57 B10 R28 A53 M1 N1 R26 R33 J3 S1 A47 R38
A46 R5 R6 R7 A24 A14 Z1 C6 F3 R43 C7 A26 A15 J1 A25 W1 J2
C4 R32 R31 A56 B7 R27 B6 A48 A50 A45 A38 A34 R42 A96 R25 A16

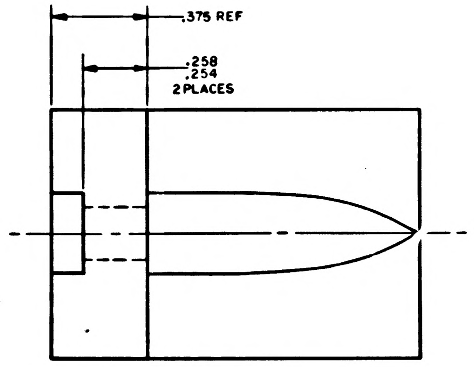


.392
.392
.191
.191
.040 REF
.020
.95 REF
.47 REF
.245 REF
.085
.080
.270 REF

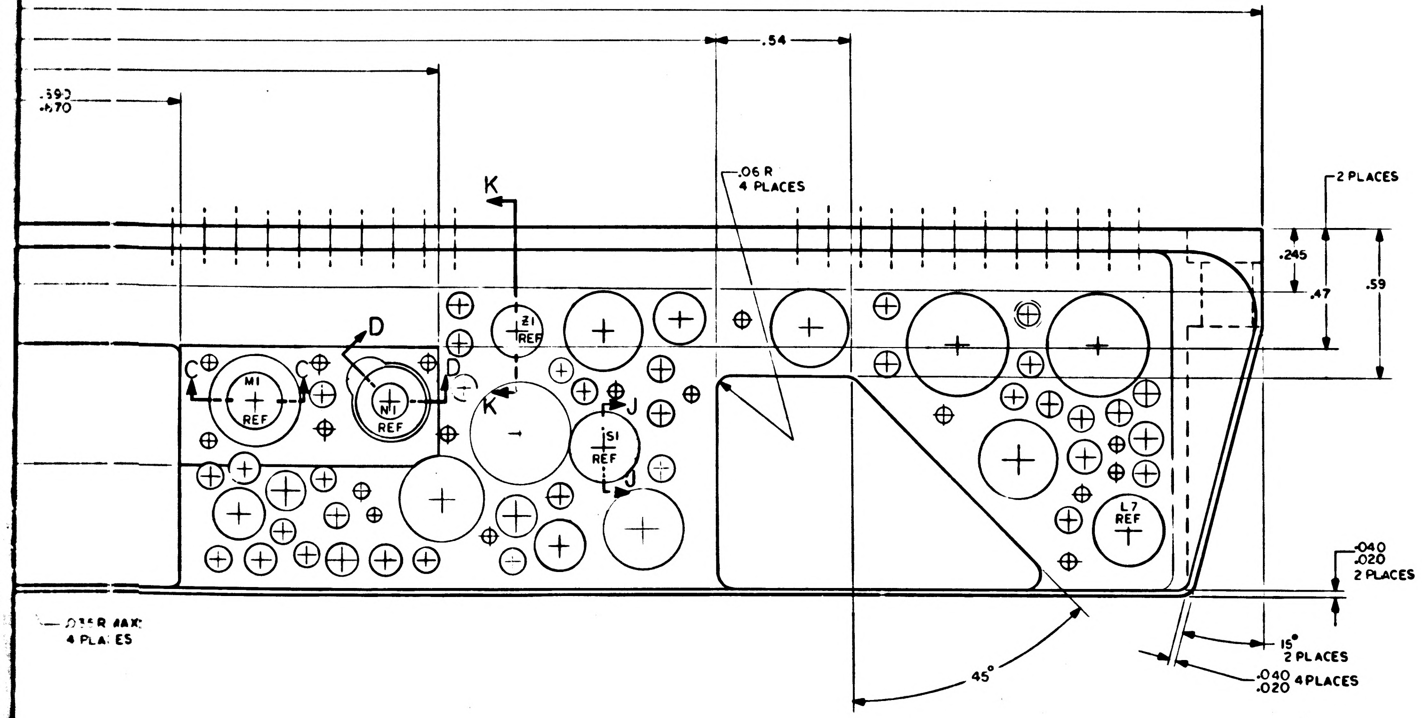
SECTION A-A



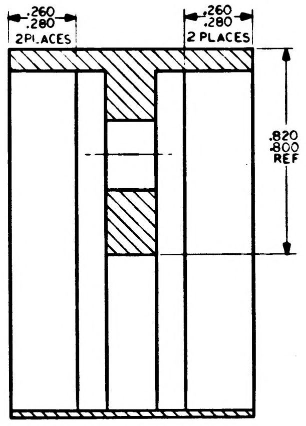
.750 BSC
10 SPACES AT .125 BSC = 1.250BSC
.072
.073 DIA THRU
107 HOLES
⊕.004 DIA
.156 R
4 PLACES
⊕.005 DIA
.203 DIA THRU
2 HOLES
⊕.005 DIA
1.250BSC
11 SPACES AT .125 BSC = 1.375 BSC



.375 REF
.258
.254
2 PLACES

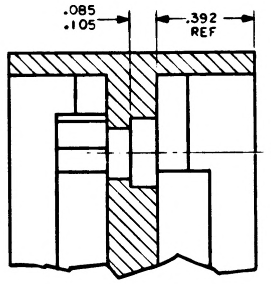


.54
.590
.570
.06 R 4 PLACES
2 PLACES
.245
.47
.59
K
K
D
D
C
C
J
J
M1 REF
N1 REF
Z1 REF
S1 REF
L7 REF
.040
.020
2 PLACES
.035 R MAX
4 PLACES
45°
15°
2 PLACES
.040
.020 4 PLACES



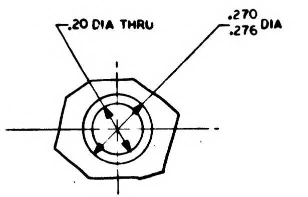
.260
.280
2PLACES
.260
.280
2 PLACES
.820
.800
REF

SECTION G-G



.085
.105
.392
REF

PARTIAL SECTION K-K



.20 DIA THRU
.270
.276 DIA

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007212	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX±.005 XX±.02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE May 12 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 7-13-65
MIT APPROVAL 7/13/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

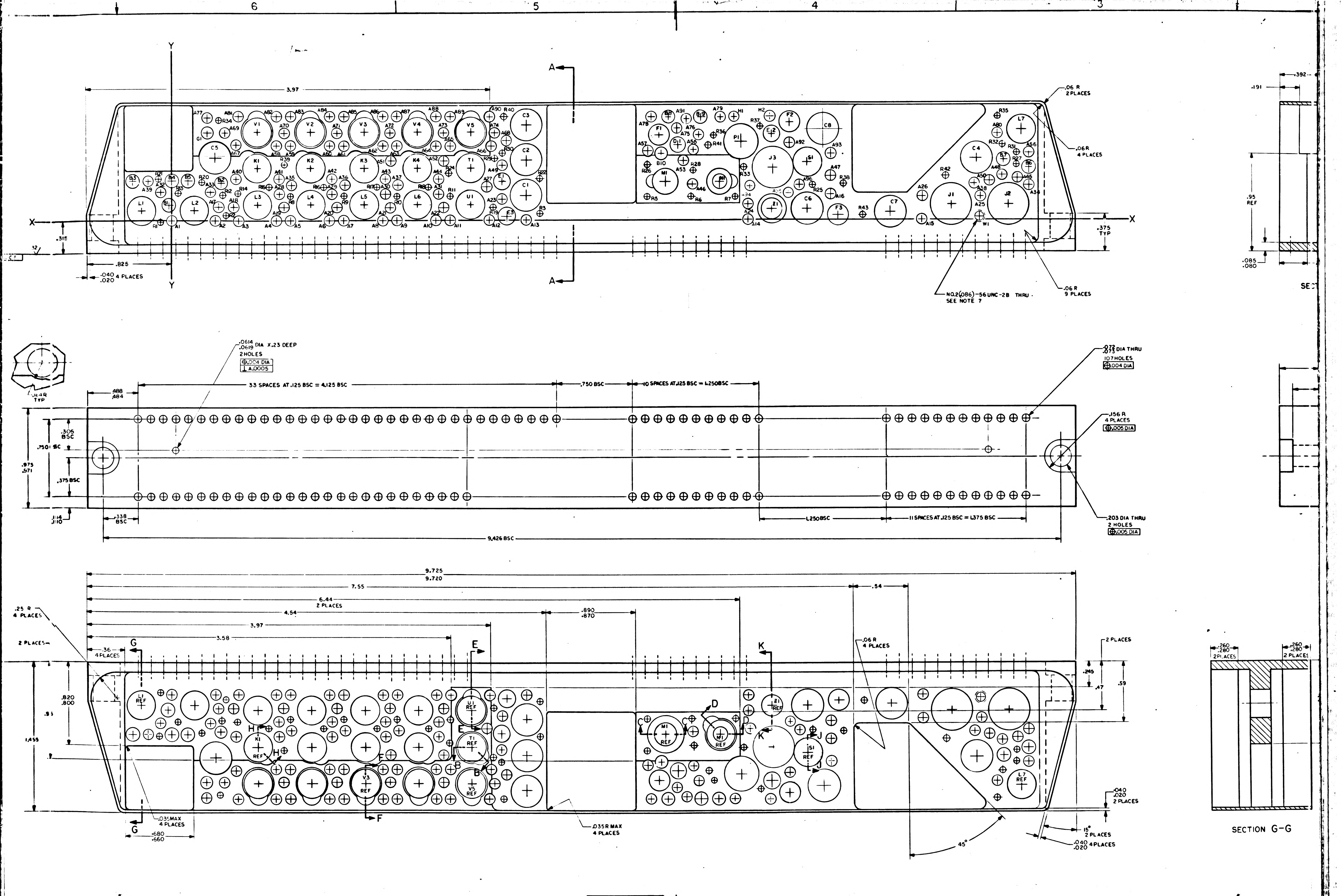
HEADER HOUSING
D/A CONVERTER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008336
SCALE 4/1
WT
SHEET 1 OF 1

2008336

2008336 D

3/2008336



6
5
4
3
A
A
X
X
Y
Y
3.97
.06 R 2 PLACES
.06R 4 PLACES
.06R 9 PLACES
NO.2(.086)-56UNC-2B THRU · SEE NOTE 7
.315
.825
.040 .020 4 PLACES
.375 TYP
.191
.392
.95 REF
.085 .080
.0614 .0619 DIA X.23 DEEP 2 HOLES
⊕.004 DIA
⊥.0005
.114R TYP
.488 .484
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.072 .073 DIA THRU 107 HOLES ⊕.004 DIA
.156 R 4 PLACES ⊕.005 DIA
.305 BSC
.750 BSC
.975 .971
.375 BSC
.114 .110
.338 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.203 DIA THRU 2 HOLES ⊕.005 DIA
9.426 BSC
9.725 9.720
7.55
6.44 2 PLACES
4.54
3.97
3.58
.890 .870
.54
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
.06 R 4 PLACES
.820 .800
.93
1.455
.035MAX 4 PLACES
.680 .660
.035R MAX 4 PLACES
45°
15° 2 PLACES
.040 .020 4 PLACES
2 PLACES
.245
.47
.59
.040 .020 2 PLACES
.260 .280 2 PLACES
SECTION G-G
G
E
F
H
B
C
D
K
J

2008336 D

27/2008336

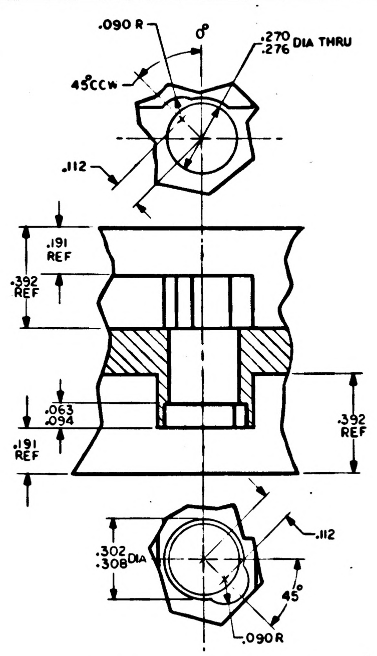
HOLE IDENT	X- DIM.	Y- DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	67
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	-.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	.350		
A37	2.235	.350		
A38	7.910	.350		
A39	-.235	.385		
A40	.635	.400		
A41	1.060	↓		
A42	1.585	↓		
A43	2.110	↓		
A44	2.635	.400		
A45	8.335	.410		
A46	5.150	.345		
A47	6.500	.425		
A48	8.185	.425		
A49	3.260	.535		
A50	8.060	.375		
A51	2.160	.575		
A52	2.685	.575		
A53	5.050	.575		
—	—	—		
A55	5.145	.680		
A56	8.450	.650		
A57	4.690	.675		
A58	1.035	.725		
A59	1.175	↓		
A60	1.560	↓		
A61	1.700	↓		
A62	2.085	↓		
A63	2.225	↓		
A64	2.610	↓		
A65	2.750	↓		
A66	3.150	.725		
A67	.635	.735		
A68	3.300	.775		

HOLE IDENT	X- DIM.	Y- DIM.	HOLE DIA	QTY
A69	.525	.850	.100 .104	28
A70	1.110	↓		
A71	1.635	↓		
A72	2.160	↓		
A73	2.685	↓		
A74	3.185	.850		
A75	4.985	.890		
A76	5.200	.830		
A77	.350	1.000		
A78	4.735	1.000		
A79	5.415	1.000		
A80	8.135	.835		
A81	.655	1.010		
A82	1.035	↓		
A83	1.175	↓		
A84	1.560	↓		
A85	1.700	↓		
A86	2.085	↓		
A87	2.225	↓		
A88	2.610	↓		
A89	2.750	↓		
A90	3.140	1.010		
A91	5.080	.980		
A92	6.100	.750		
A93	6.500	.644		
A94	5.725	.325		
A95	6.035	.251		
A96	6.200	.335		
B1	-.025	.150	.127 .131	10
B2	.455	.375		
B3	-.385	.335		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	4.830	.630		
C1	3.500	.235	.310 .317	8
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
C7	7.100	.075		
C8	6.425	.880		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	2
H2	5.907	1.000		
J1	7.685	.150	.395 .402	3
J2	8.250	.150		
J3	5.931	.305		

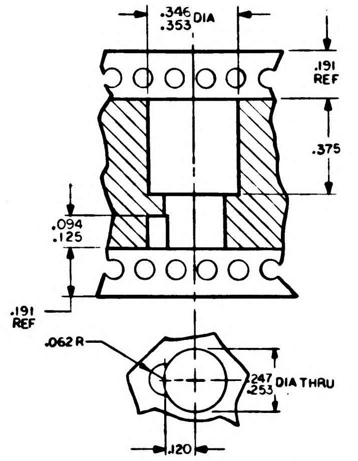
HOLE IDENT	X- DIM.	Y- DIM.	HOLE DIA	QTY
K1	.845	.510	SEE SECTION H—H	4
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
T1	2.945	.510	SEE SECTION B—B	1
L1	-.300	.100	.270 .276	7
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	8.375	.875		
V1	.845	.860	SEE SECTION F—F	5
V2	1.375	↓		
V3	1.900	↓		
V4	2.420	↓		
V5	2.945	.860		
			SEE SECTION K—K	1
Z1	5.925	.100		
			SEE SECTION C—C	1
M1	4.870	.375		
			SEE SECTION D—D	1
N1	5.400	.375		
			.346 .353	1
P1	5.625	.760		
R1	-.110	-.010	.058 .062	41
R2	.535	.050		
R3	3.635	.060		
—	—	—		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	-.125	.400		
R22	3.635	.400		
—	—	—		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.664	.350		
R39	1.115	.545		
R40	3.280	1.010		
R41	5.320	.730		
R42	7.640	.425		
R43	6.835	.050		
			SEE SECTION J—J	1
S1	6.275	.560		
			SEE SECTION E—E	1
U1	2.945	.150		
W1	7.960	.025		1

NOTES

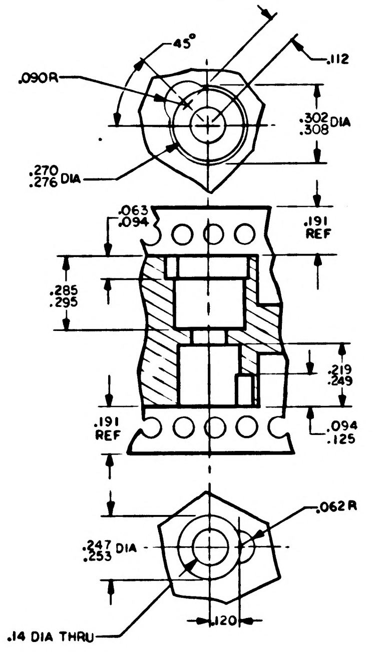
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{}^{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE.COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO AND REVISION PER ND1002019


.090 R
8°
.270 .276 DIA THRU
45°CCW
.112
.191 REF
.392 REF
.063 .094
.191 REF
.392 REF
.112
.302 .308 DIA
45°
.090 R

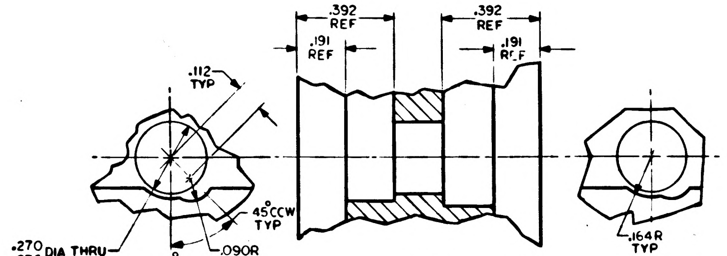
PARTIAL SECTION B-B


.346 .353 DIA
.191 REF
.375
.094 .125
.191 REF
.062 R
.247 .253 DIA THRU
.120

PARTIAL SECTION C-C

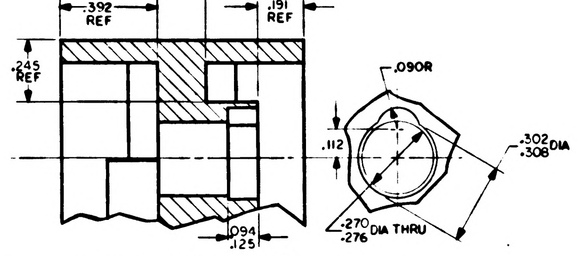

45°
.112
.090R
.302 .308 DIA
.270 .276 DIA
.063 .094
.191 REF
.285 .295
.219 .249
.191 REF
.094 .125
.062 R
.247 .253 DIA
.14 DIA THRU
.120

PARTIAL SECTION D-D

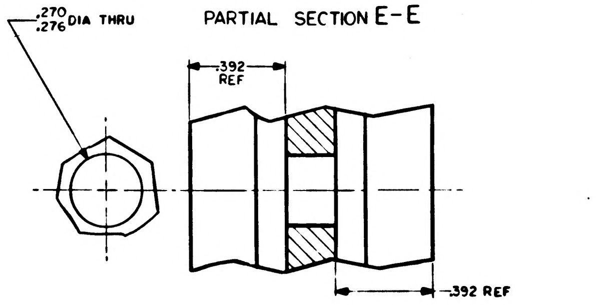

.392 REF
.392 REF
.191 REF
.191 REF
.112 TYP
.270 .276 DIA THRU
8°
45°CCW TYP
.090R TYP
.164R TYP

PARTIAL SECTION H-H

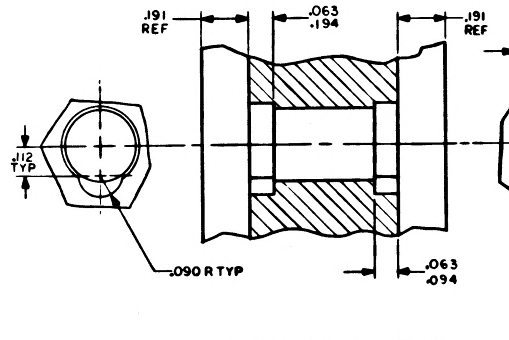
TYPICAL FOR K1 THRU K4


.392 REF
.392 REF
.191 REF
.245 REF
.090R
.112
.302 .308 DIA
.270 .276 DIA THRU
.094 .125

PARTIAL SECTION E-E

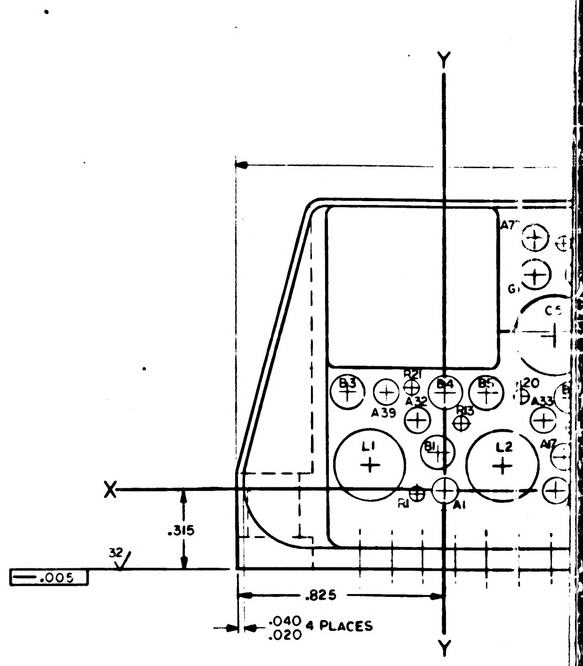

.270 .276 DIA THRU
.392 REF
.392 REF

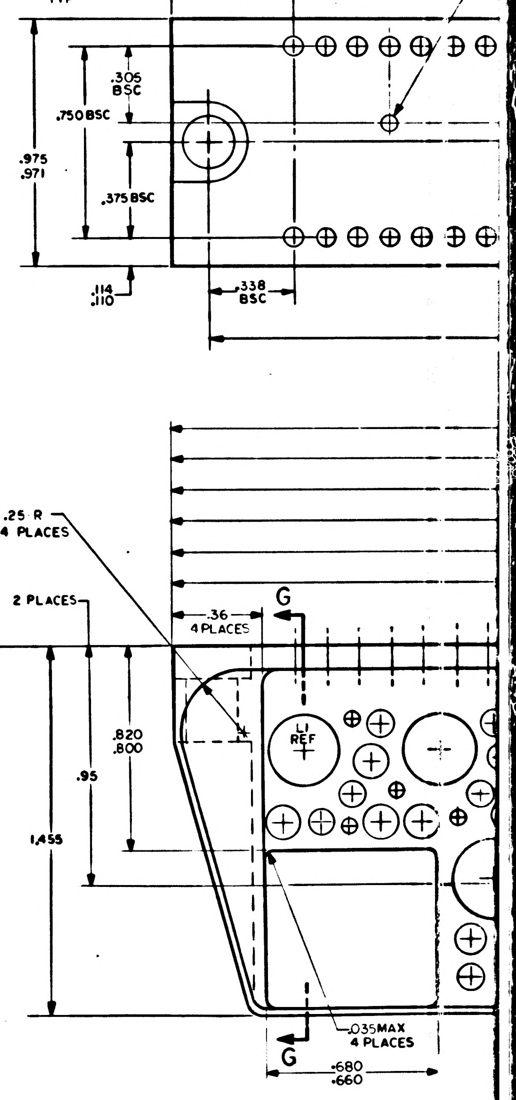
PARTIAL SECTION J-J


.191 REF
.063 .194
.191 REF
.302 .308 DIA TYP
.112 TYP
.270 .276 DIA THRU
.090 R TYP
.063 .094

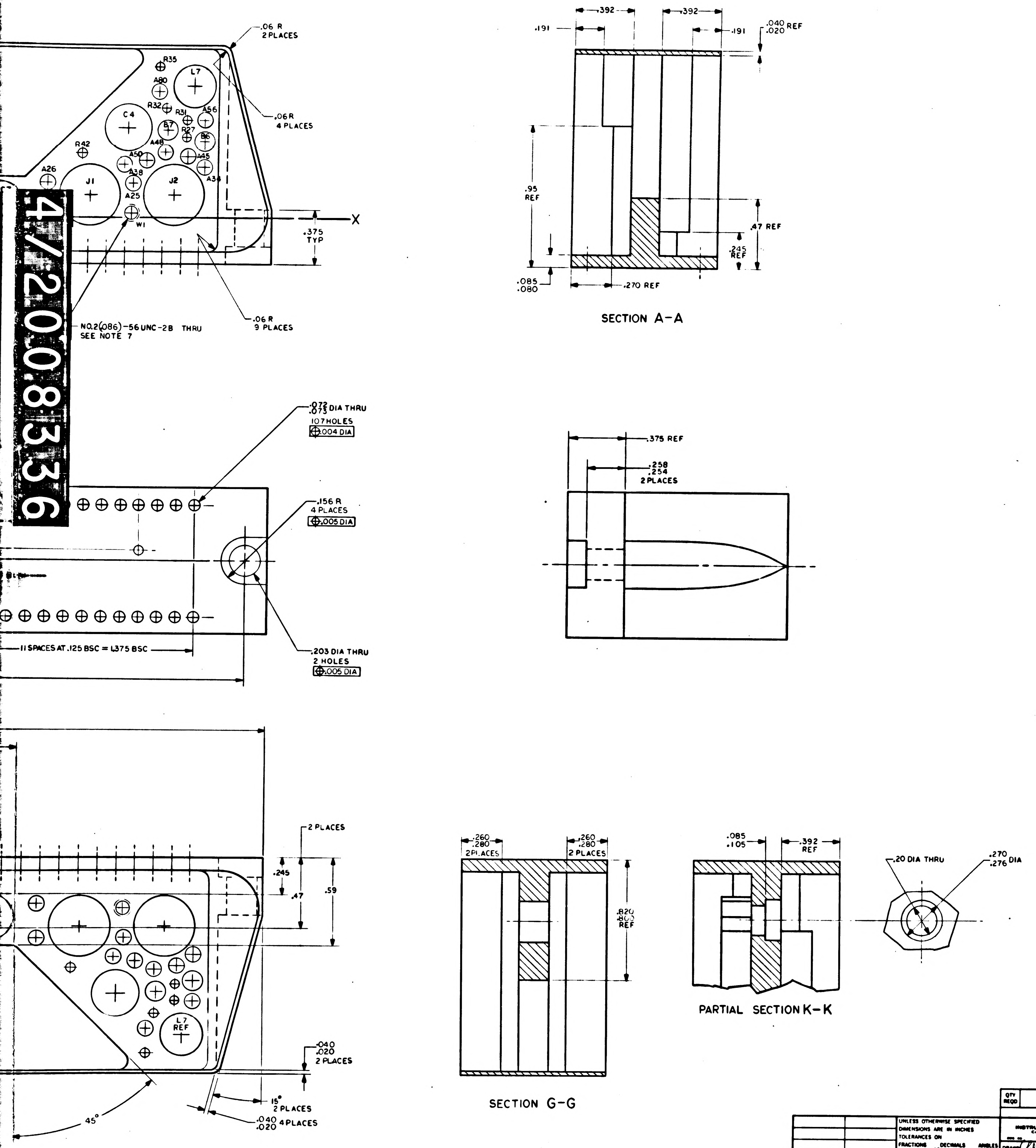
PARTIAL SECTION F-F

TYP FOR V1 THRU V5

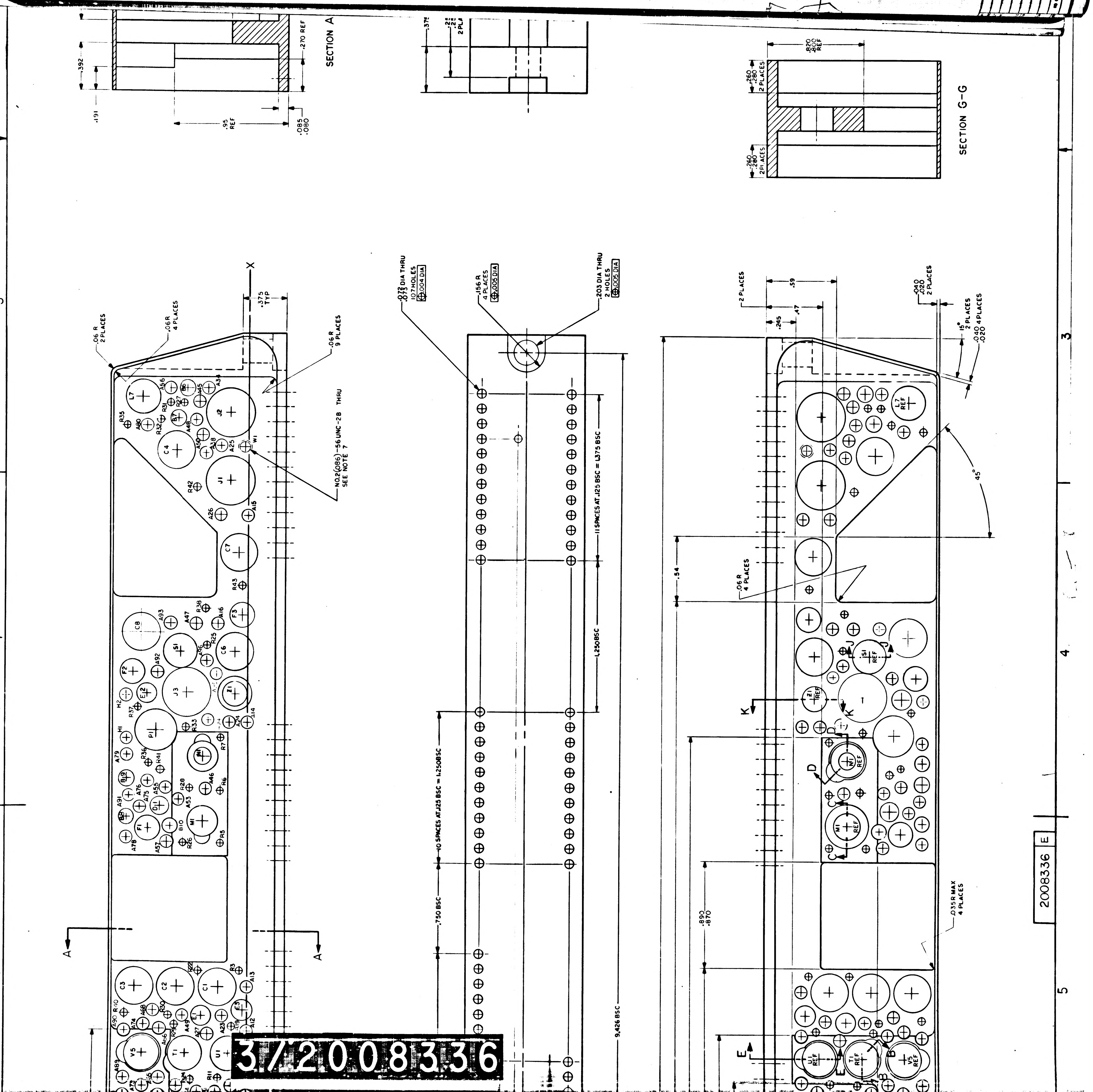

Y
A7
G1
C5
B3
R21
B4
B5
D1
A33
A39
A32
R13
A7
L1
L2
X
A1
.315
.005
32
.825
.040 .020 4 PLACES
Y


.975 .971
.750 BSC
.305 BSC
.375 BSC
.114 .110
.338 BSC
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
G
A
.820 .800
.95
1.455
L1 REF
.035MAX 4 PLACES
G
.680 .660

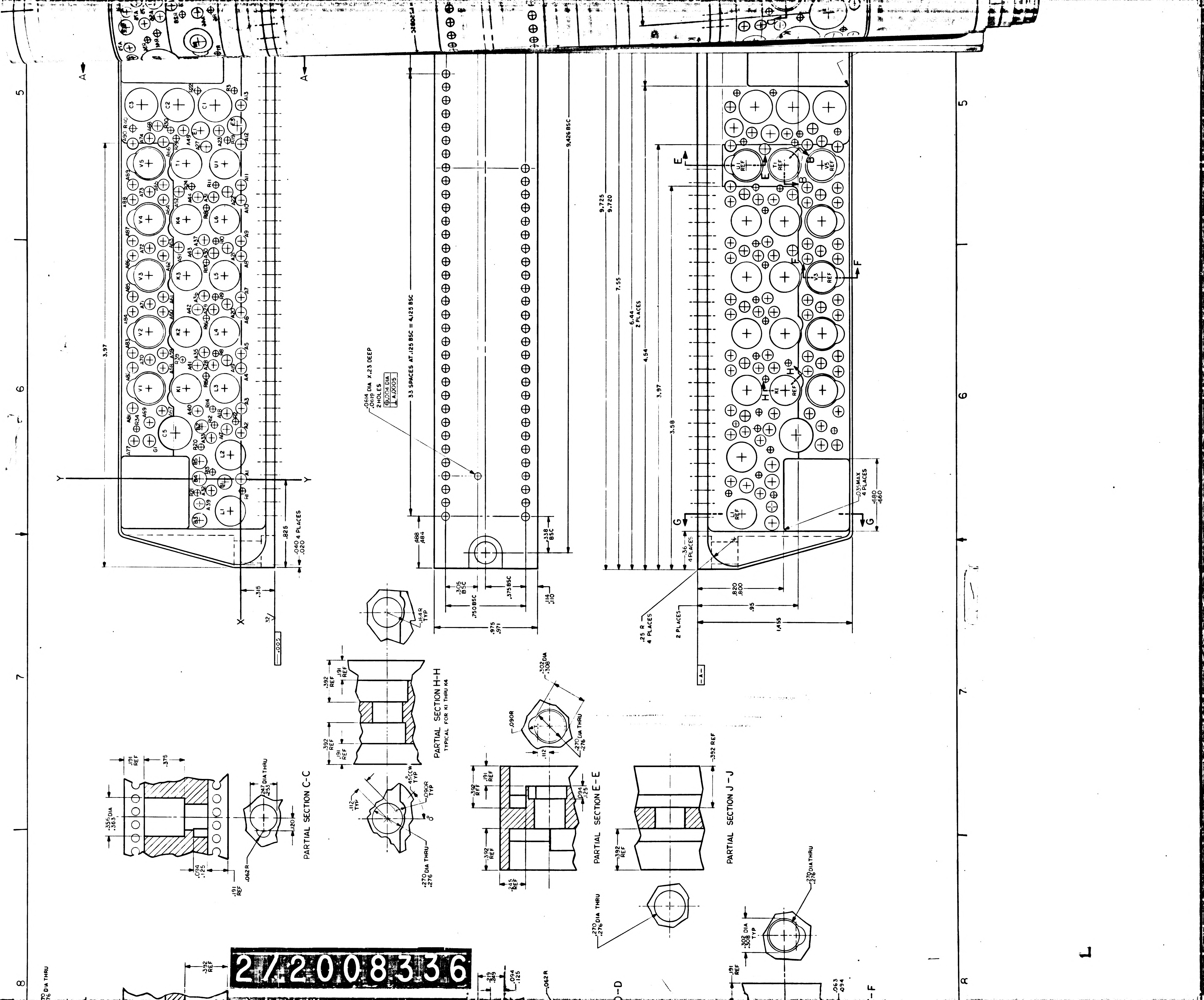
REVISIONS	TDRR 20173		
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 21764	[illegible]	WK
B	REVISED PER TDRR 22514	21 Sep 65	[illegible]
C	REVISED PER TDRR 23167	18 Oct 65	WK
D	REVISED PER TDRR 24958	4 JAN 66	JWP
E	REVISED PER TDRR 29245	7 JUN 66	JimP


4/2008336
.06 R
2 PLACES
.06 R
4 PLACES
.06 R
9 PLACES
R35
A80
L7
C4
R32
R31
A56
B7
R27
B6
A48
A45
R42
A50
A38
A34
A26
J1
A25
J2
W1
X
.375
TYP
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7
.392
.392
.191
.191
.040
.020 REF
.95
REF
.47 REF
.245
REF
.085
.080
.270 REF
SECTION A-A
.076
.073 DIA THRU
107 HOLES
⊕ .004 DIA
.156 R
4 PLACES
⊕ .005 DIA
.203 DIA THRU
2 HOLES
⊕ .005 DIA
11 SPACES AT .125 BSC = 1.375 BSC
.375 REF
.258
.254
2 PLACES
2 PLACES
.245
.47
.59
.040
.020
2 PLACES
15°
2 PLACES
.040
.020 4 PLACES
45°
L7
REF
.260
.280
2 PLACES
.260
.280
2 PLACES
.820
.800
REF
SECTION G-G
.085
.105
.392
REF
PARTIAL SECTION K-K
.20 DIA THRU
.270
.276 DIA
3
2
1
A
2008336 E

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS XXX ±.005 XX .02 ANGLES ± ½° DO NOT SCALE THIS DRAWING	QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION			FIND NO
			LIST OF MATERIALS					
			MIT INSTRUMENTATION LAB CAMBRIDGE MASS		MANNED SPACECRAFT CENTER HOUSTON, TEXAS			
		MATERIAL SEE NOTE 2	DRAWN [illegible] DATE [illegible] CHECKED [illegible] APPROVAL [illegible] APPROVAL [illegible]		HEADER HOUSING D/A CONVERTER			
2007212		HEAT TREATMENT ___	NASA APPROVAL [illegible] 7-13-65		CODE IDENT NO. 80230	SIZE J	NASA DRAWING NO. 2008336	
NEXT ASSY	USED ON	FINAL FINISH SEE NOTE 6	MIT APPROVAL [illegible] 7/13/65		SCALE 4/1	WT ___	SHEET 1 OF 1	
APPLICATION								


SECTION A
.392
.191
.270 REF
.95 REF
.085
.080
SECTION G-G
.820
.800 REF
.260
.280 2 PLACES
.260
.280 2 PLACES
.06 R 2 PLACES
.06 R 4 PLACES
.06 R 9 PLACES
.375 TYP
X
NO.2(.086)-56 UNC-28 THRU SEE NOTE 7
.073 .075 DIA THRU 107 HOLES ⊕.004 DIA
.156 R 4 PLACES ⊕.005 DIA
.203 DIA THRU 2 HOLES ⊕.005 DIA
11 SPACES AT .125 BSC = 1.375 BSC
1.250 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.750 BSC
9.426 BSC
2 PLACES
.59
.47
.245
.040 .020 2 PLACES
15° 2 PLACES
.040 .020 4 PLACES
45°
.54
.06 R 4 PLACES
.890 .870
.035 R MAX 4 PLACES
A
A
K
K
D
C
E
B
J
L7
J2
C4
J1
C7
C8
S1
C6
F2
J3
Z1
P1
M1
F1
C3
C2
C1
V5
T1
U1
3
4
5
2008336
E

3/2008336

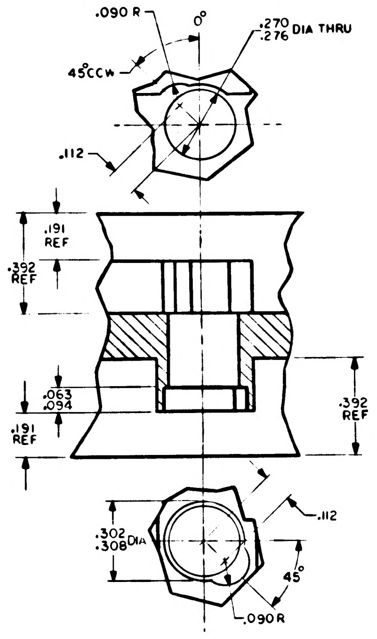

PARTIAL SECTION C-C
PARTIAL SECTION H-H
TYPICAL FOR K1 THRU K4
PARTIAL SECTION E-E
PARTIAL SECTION J-J
33 SPACES AT .125 BSC = 4.125 BSC
9.426 BSC
.0614 DIA X .23 DEEP
.0619
2 HOLES
9.725
9.720
7.55
6.44
2 PLACES
4.54
3.97
3.58
.825 4 PLACES
.040
.020
.315
.488
.484
.338 BSC
.305 BSC
.750 BSC
.375 BSC
.975
.971
.114
.110
.25 R
4 PLACES
2 PLACES
.820
.800
.95
1.455
.36 4 PLACES
.680
.660
.051 MAX 4 PLACES
.392 REF
.191 REF
.375
.356 DIA
.363
.094
.125
.247 DIA THRU
.253
.120
.062 R
.270 DIA THRU
.276
.302 DIA
.308
.090 R
.112
45° CCW TYP
.114 R TYP
.245 REF
.063
.094
.219
.249
X
Y
A
E
F
G
H
5
6
7
8

2/2008336

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	67
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	-.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	.350		
A37	2.235	.350		
A38	7.910	.350		
A39	-.235	.385		
A40	.635	.400		
A41	1.060	↓		
A42	1.585	↓		
A43	2.110	↓		
A44	2.635	.400		
A45	8.335	.410		
A46	5.150	.345		
A47	6.500	.425		
A48	8.185	.425		
A49	3.260	.535		
A50	8.060	.375		
A51	2.160	.575		
A52	2.685	.575		
A53	5.050	.575		
—	—	—		
A55	5.145	.680		
A56	8.450	.650		
A57	4.690	.675		
A58	1.035	.725		
A59	1.175	↓		
A60	1.560	↓		
A61	1.700	↓		
A62	2.085	↓		
A63	2.225	↓		
A64	2.610	↓		
A65	2.750	↓		
A66	3.150	.725		
A67	.635	.735		
A68	3.300	.775		

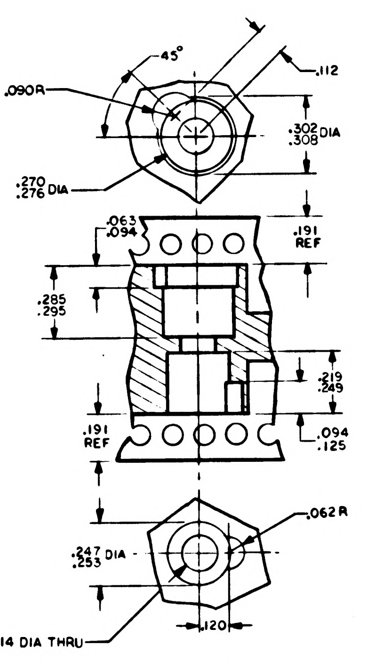
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A69	.525	.850	.100 .104	28
A70	1.110	↓		
A71	1.635	↓		
A72	2.160	↓		
A73	2.685	↓		
A74	3.185	.850		
A75	4.985	.890		
A76	5.200	.830		
A77	.350	1.000		
A78	4.735	1.000		
A79	5.415	1.000		
A80	8.135	.835		
A81	.655	1.010		
A82	1.035	↓		
A83	1.175	↓		
A84	1.560	↓		
A85	1.700	↓		
A86	2.085	↓		
A87	2.225	↓		
A88	2.610	↓		
A89	2.750	↓		
A90	3.140	1.010		
A91	5.080	.980		
A92	6.100	.750		
A93	6.500	.644		
A94	5.725	.325		
A95	6.085	.251		
A96	6.200	.335		
B1	-.025	.150	.127 .131	10
B2	.485	.375		
B3	-.385	.385		
B4	.000	.385		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	4.830	.630		
C1	3.500	.235	.310 .317	8
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
C7	7.100	.075		
C8	6.425	.880		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	2
H2	5.907	1.000		
J1	7.685	.150	.395 .402	3
J2	8.250	.150		
J3	5.331	.505		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
K1	.845	.510	SEE SECTION H-H	4
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
T1	2.945	.510	SEE SECTION B-B	1
L1	-.300	.100	.270 .276	7
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	8.375	.875		
V1	.845	.860	SEE SECTION F-F	5
V2	1.375	↓		
V3	1.900	↓		
V4	2.420	↓		
V5	2.945	.860		
			SEE SECTION K-K	1
Z1	5.925	.100		
			SEE SECTION C-C	1
M1	4.870	.375		
			SEE SECTION D-D	1
N1	5.400	.375		
			.356 .363	1
P1	5.625	.760		
R1	-.110	-.010	.058 .062	41
R2	.535	.050		
R3	3.635	.060		
—	—	—		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	-.125	.400		
R22	3.635	.400		
—	—	—		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.664	.350		
R39	1.115	.545		
R40	3.280	1.010		
R41	5.320	.730		
R42	7.640	.425		
R43	6.835	.050		
			SEE SECTION J-J	1
S1	6.275	.560		
			SEE SECTION E-E	1
U1	2.945	.150		
W1	7.960	.025		1



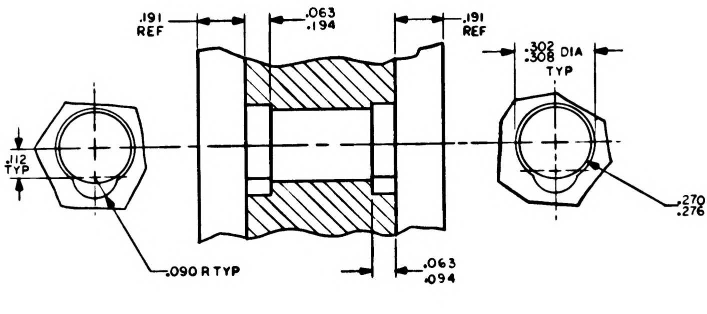
.090 R
0°
.270 .276 DIA THRU
45°CCW
.112
.191 REF
.392 REF
.063 .094
.191 REF
.392 REF
.112
.302 .308 DIA
45°
.090 R

PARTIAL SECTION B-B



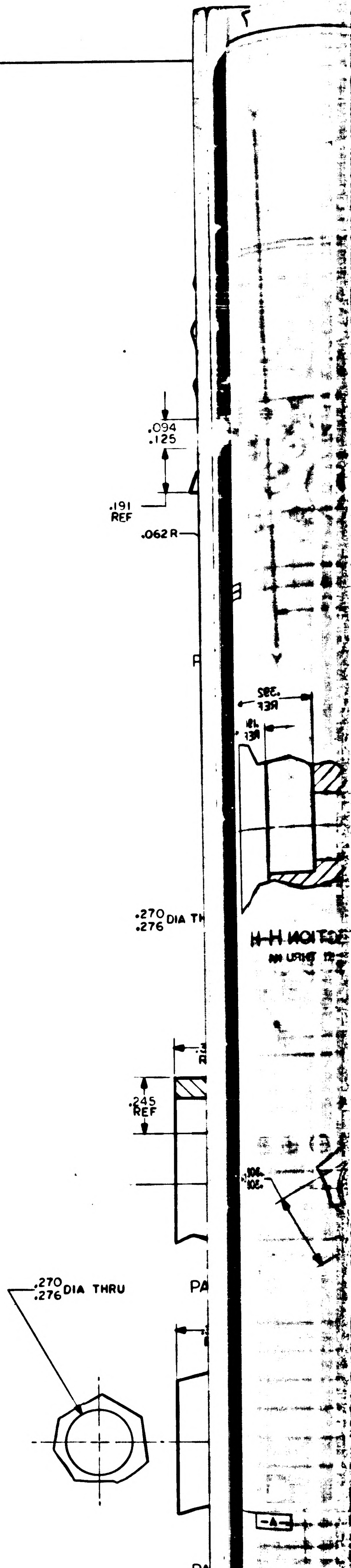
45°
.112
.090R
.302 .308 DIA
.270 .276 DIA
.063 .094
.191 REF
.285 .295
.219 .249
.191 REF
.094 .125
.062 R
.247 .253 DIA
.14 DIA THRU
.120

PARTIAL SECTION D-D



.191 REF
.063 .194
.191 REF
.302 .308 DIA TYP
.112 TYP
.090 R TYP
.063 .094
.270 .276 DIA THRU

PARTIAL SECTION F-F
TYP FOR V1 THRU V5

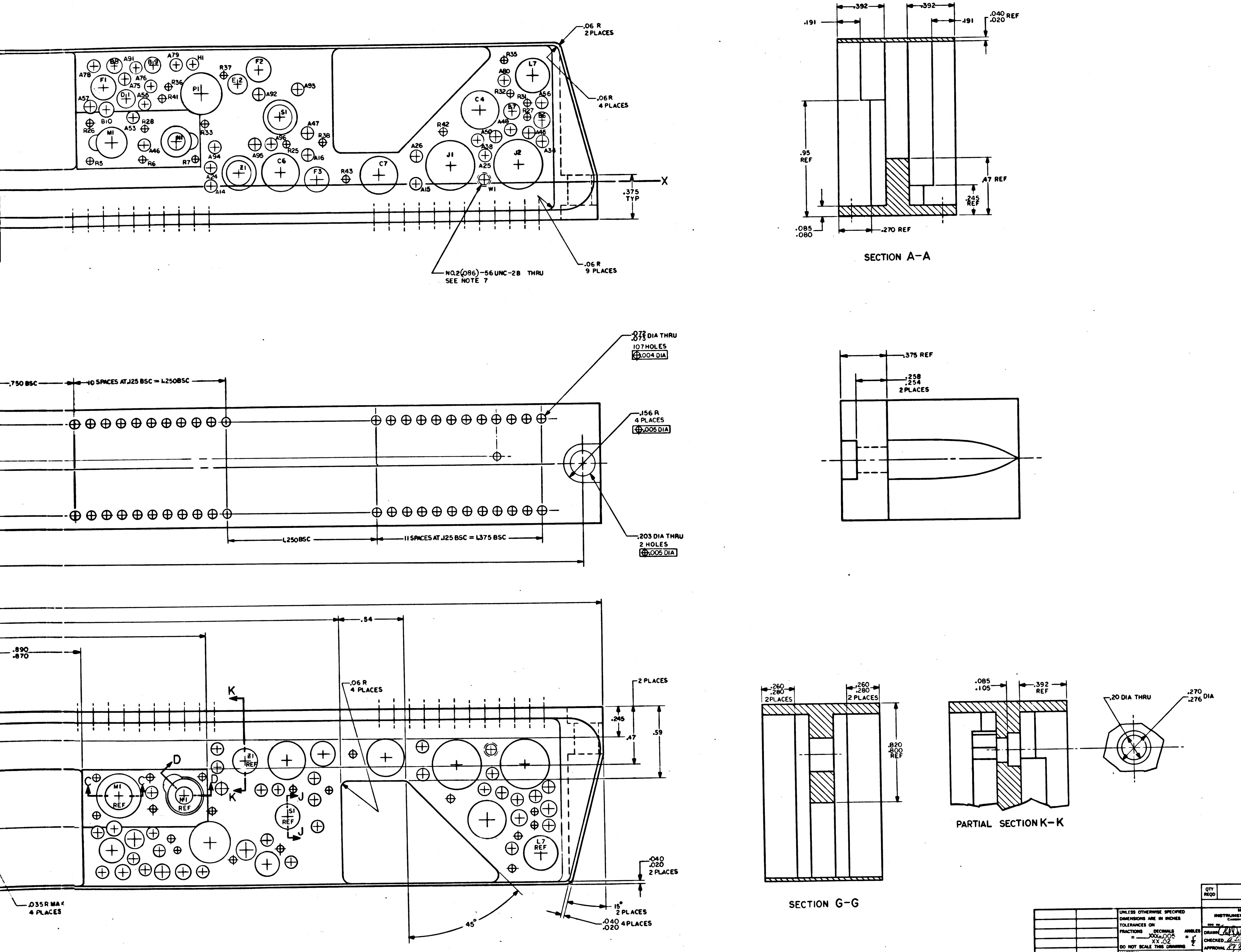


.094 .125
.191 REF
.062 R
.270 .276 DIA TH
H-H
.245 REF
.270 .276 DIA THRU
PA
PA

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO AND REVISION PER ND1002019

2008336 | E

1/2008336


.06 R
2 PLACES
.06 R
4 PLACES
.06 R
9 PLACES
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7
.375
TYP
X
F1
F2
F3
P1
S1
M1
N1
Z1
C4
C6
C7
J1
J2
L7
W1
.072/.073 DIA THRU
107 HOLES
.004 DIA
.156 R
4 PLACES
.005 DIA
.203 DIA THRU
2 HOLES
.005 DIA
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
.890
.870
.54
.06 R
4 PLACES
2 PLACES
.245
.47
.59
K
D
C
J
M1 REF
N1 REF
Z1 REF
S1 REF
L7 REF
.040
.020
2 PLACES
15°
2 PLACES
.040
.020 4 PLACES
45°
.035 R MAX
4 PLACES
.392
.392
.191
.191
.040
.020 REF
.95
REF
.47 REF
.245
REF
.085
.080
.270 REF
SECTION A-A
.375 REF
.258
.254
2 PLACES
.260
.280
2 PLACES
.260
.280
2 PLACES
.820
.800
REF
SECTION G-G
.085
.105
.392
REF
PARTIAL SECTION K-K
.20 DIA THRU
.270
.276 DIA

QTY REQD | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | FIND NO

LIST OF MATERIALS

2007212
NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS XXX ±.005 XX .02 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT ——
FINAL FINISH SEE NOTE 6

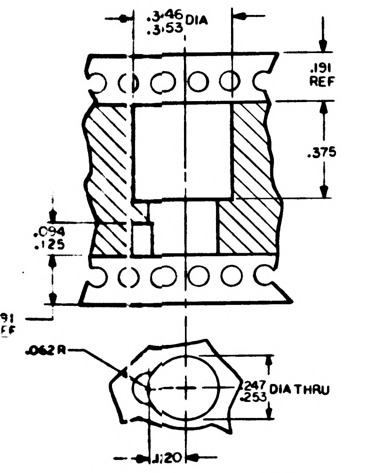
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN C. P. Dell DATE May 12 65
CHECKED A. Lindstrom 6 July 65
APPROVAL R V Vezzali Aug 65
APPROVAL 9 July 65
NASA APPROVAL 7-13-65
MIT APPROVAL 13 Jul 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

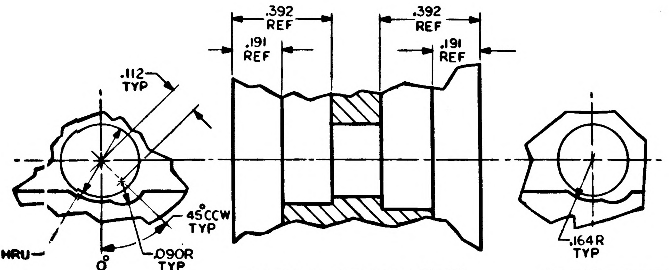
HEADER HOUSING
D/A CONVERTER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2008336
SCALE 4/1
WT ——
SHEET 1 OF 1

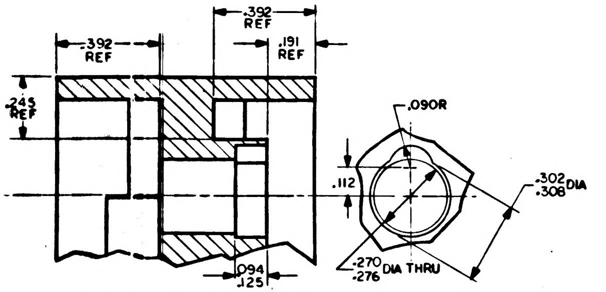
F-3


.346 DIA
.353
.191 REF
.375
.094
.125
.062 R
.247 DIA THRU
.253
.120

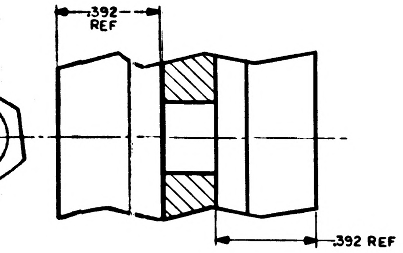
PARTIAL SECTION C-C


.392 REF
.191 REF
.112 TYP
45° CCW TYP
.270 DIA THRU
.276
.090R TYP
.164R TYP

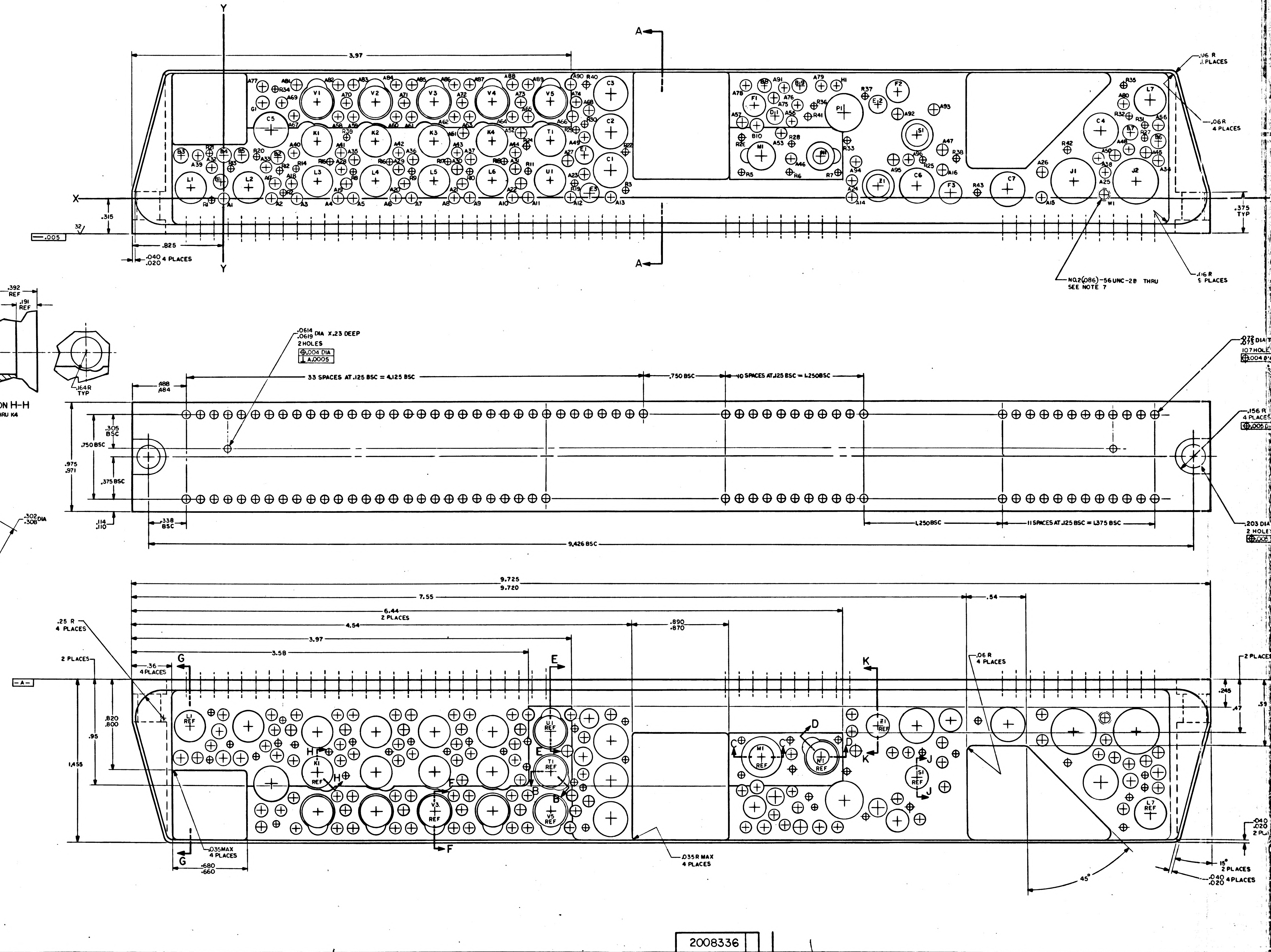
PARTIAL SECTION H-H
TYPICAL FOR K1 THRU K4


.392 REF
.191 REF
.245 REF
.090R
.112
.302 DIA
.308
.270 DIA THRU
.276
.094
.125

PARTIAL SECTION E-E


.392 REF
.392 REF

PARTIAL SECTION J-J


A
A
Y
Y
X
3.97
.315
.825
.040 4 PLACES
.020
.005
32
.06 R 2 PLACES
.06R 4 PLACES
.375 TYP
.16 R 5 PLACES
NO.2(.086)-56UNC-2B THRU SEE NOTE 7
V1
V2
V3
V4
V5
C1
C2
C3
C4
C5
C6
C7
K1
K2
K3
K4
L1
L2
L3
L4
L5
L6
L7
T1
U1
M1
N1
P1
S1
J1
J2
Z1
F1
F2
F3
D1
E1
E2
E3
H1
G1
W1
.0614 DIA X.23 DEEP
.0619
2 HOLES
.004 DIA
A.0005
33 SPACES AT .125 BSC = 4.125 BSC
.750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
.488
.484
.305 BSC
.750 BSC
.975
.971
.375 BSC
.114
.110
.338 BSC
1.250 BSC
11 SPACES AT .125 BSC = 1.375 BSC
9.426 BSC
.276 DIA
107 HOLES
.004
.156 R
4 PLACES
.005
.203 DIA
2 HOLES
.005
9.725
9.720
7.55
.54
6.44
2 PLACES
4.54
.890
.870
3.97
3.58
.25 R
4 PLACES
2 PLACES
.36
4 PLACES
-A-
.820
.800
.95
1.455
.270 DIA THRU
.276
G
G
E
E
F
F
H
H
B
B
C
C
D
D
K
K
J
J
L1 REF
K1 REF
U1 REF
T1 REF
V3 REF
V5 REF
M1 REF
N1 REF
Z1 REF
S1 REF
L7 REF
.06 R
4 PLACES
.035MAX
4 PLACES
.680
.660
.035R MAX
4 PLACES
45°
15°
2 PLACES
.040
.020 4 PLACES
2 PLACES
.245
.47
.53
.040
.020
2 PL

2008336

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

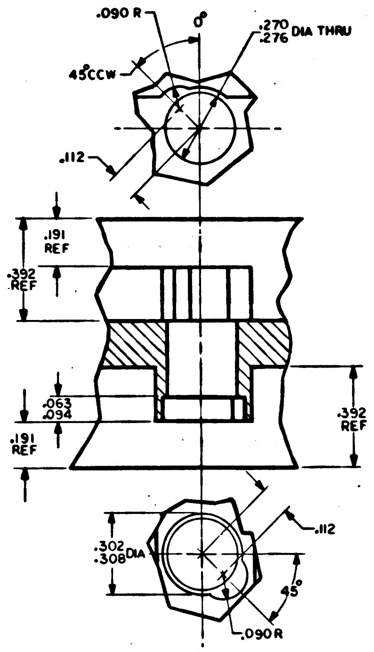
HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A1	.000	.000	.100 .104	67
A2	.435	↓		
A3	.660	↓		
A4	1.035	↓		
A5	1.175	↓		
A6	1.570	↓		
A7	1.700	↓		
A8	2.090	↓		
A9	2.225	↓		
A10	2.610	↓		
A11	2.750	↓		
A12	3.140	↓		
A13	3.500	↓		
A14	5.685	↓		
A15	7.400	.000		
A16	6.500	.250		
A17	.460	.135		
A18	.610	↓		
A19	1.110	↓		
A20	1.635	↓		
A21	2.160	↓		
A22	2.685	.135		
A23	3.260	.200		
A24	5.685	.150		
A25	7.975	.225		
A26	7.400	.225		
A27	3.110	.325		
A28	1.060	.260		
A29	1.585	.260		
A30	2.110	.260		
A31	2.635	.260		
A32	−.110	.275		
A33	.385	.275		
A34	8.450	.335		
A35	1.185	.350		
A36	1.710	.350		
A37	2.235	.350		
A38	7.910	.350		
A39	−.235	.385		
A40	.635	.400		
A41	1.060	↓		
A42	1.585	↓		
A43	2.110	↓		
A44	2.635	.400		
A45	8.335	.410		
A46	5.150	.345		
A47	6.500	.425		
A48	8.185	.425		
A49	3.260	.535		
A50	8.060	.375		
A51	2.160	.575		
A52	2.685	.575		
A53	5.050	.575		
—	—	—		
A55	5.145	.680		
A56	8.450	.650		
A57	4.690	.675		
A58	1.035	.725		
A59	1.175	↓		
A60	1.560	↓		
A61	1.700	↓		
A62	2.085	↓		
A63	2.225	↓		
A64	2.160	↓		
A65	2.750	↓		
A66	3.150	.725		
A67	.635	.735		
A68	3.300	.775		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
A69	.525	.850	.100 .104	28
A70	1.110	↓		
A71	1.635	↓		
A72	2.160	↓		
A73	2.685	↓		
A74	3.185	.850		
A75	4.985	.890		
A76	5.200	.830		
A77	.350	1.000		
A78	4.735	1.000		
A79	5.415	1.000		
A80	8.135	.835		
A81	.655	1.010		
A82	1.035	↓		
A83	1.175	↓		
A84	1.560	↓		
A85	1.700	↓		
A86	2.085	↓		
A87	2.225	↓		
A88	2.610	↓		
A89	2.750	↓		
A90	3.140	1.010		
A91	5.080	.980		
A92	6.100	.750		
A93	6.425	.785		
A94	5.725	.325		
A95	6.060	.335		
A96	6.200	.335		
B1	−.025	.150	.127 .131	10
B2	.485	.375		
B3	−.385	.385		
B4	.000	.335		
B5	.160	.385		
B6	8.450	.510		
B7	8.200	.585		
B8	4.900	1.000		
B9	5.220	1.000		
B10	4.830	.630		
C1	3.500	.235	.310 .317	7
C2	3.500	.585		
C3	3.500	.930		
C4	7.935	.600		
C5	.425	.610		
C6	6.275	.100		
C7	7.100	.075		
D1	4.995	.730	.153 .157	1
E1	3.260	.375	.165 .169	3
E2	5.925	.830		
E3	3.310	.035		
F1	4.810	.825	.202 .206	3
F2	6.100	.950		
F3	6.565	.050		
G1	.350	.850	.112 .116	1
H1	5.550	1.000	.105 .109	1
J1	7.685	.150	.395 .402	2
J2	8.250	.150		

HOLE IDENT	X-DIM.	Y-DIM.	HOLE DIA	QTY
K1	.845	.510	SEE SECTION H—H	4
K2	1.375	↓		
K3	1.900	↓		
K4	2.420	↓		
T1	2.945	.510	SEE SECTION B—B	1
L1	−.300	.100	.270 .276	7
L2	.225	.100		
L3	.845	.150		
L4	1.375	↓		
L5	1.900	↓		
L6	2.420	↓		
L7	8.375	.875		
V1	.845	.860	SEE SECTION F—F	5
V2	1.375	↓		
V3	1.900	↓		
V4	2.420	↓		
V5	2.945	.860		
Z1	5.925	.100	SEE SECTION K—K	1
M1	4.870	.375	SEE SECTION C—C	1
N1	5.400	.375	SEE SECTION D—D	1
P1	5.625	.760	.346 .353	1
R1	−.110	−.010	.058 .062	41
R2	.535	.050		
R3	3.635	.060		
—	—	—		
R5	4.685	.225		
R6	5.125	.225		
R7	5.565	.225		
R8	1.175	.235		
R9	1.700	.235		
R10	2.225	.235		
R11	2.750	.235		
R12	.500	.250		
R13	.060	.260		
R14	.650	.265		
R15	.960	.325		
R16	1.500	.325		
R17	2.025	.325		
R18	2.535	.325		
R19	3.175	.125		
R20	.300	.375		
R21	−.125	.400		
R22	3.635	.400		
—	—	—		
R24	2.735	.460		
R25	6.325	.340		
R26	4.685	.555		
R27	8.325	.535		
R28	5.150	.495		
R29	3.160	.585		
R30	3.260	.650		
R31	8.325	.650		
R32	8.185	.725		
R33	5.650	.510		
R34	.475	.975		
R35	8.135	1.000		
R36	5.350	.820		
R37	5.810	.905		
R38	6.664	.350		
R39	1.115	.545		
R40	3.280	1.010		
R41	5.230	.730		
R42	7.640	.425		
R43	6.835	.050		
S1	6.275	.560	SEE SECTION J—J	1
U1	2.945	.150	SEE SECTION E-E	1
W1	7.960	.025		1

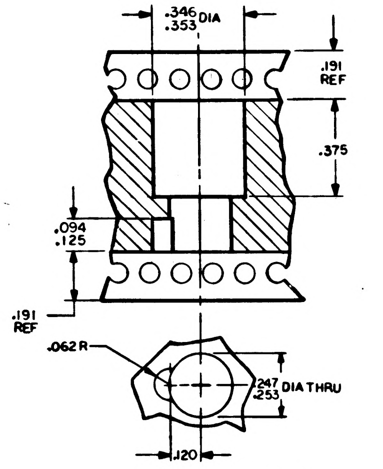
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK 60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt[125]{}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH DRAWING NO AND REVISION PER ND1002019.



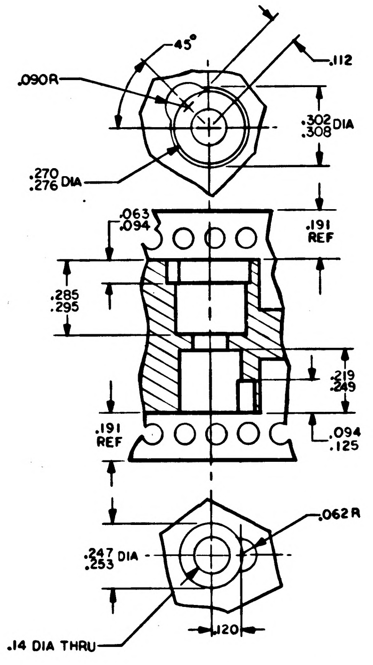
.090 R
0°
.270 .276 DIA THRU
45° CCW
.112
.191 REF
.392 REF
.063 .094
.191 REF
.392 REF
.302 .308 DIA
.112
45°
.090 R

PARTIAL SECTION B-B



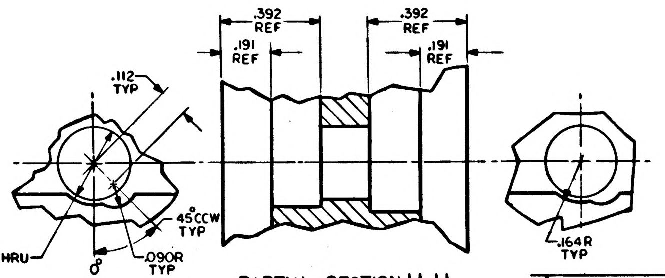
.346 .353 DIA
.191 REF
.375
.094 .125
.191 REF
.062 R
.247 .253 DIA THRU
.120

PARTIAL SECTION C-C



45°
.112
.090 R
.302 .308 DIA
.270 .276 DIA
.063 .094
.191 REF
.285 .295
.219 .249
.191 REF
.094 .125
.062 R
.247 .253 DIA
.14 DIA THRU
.120

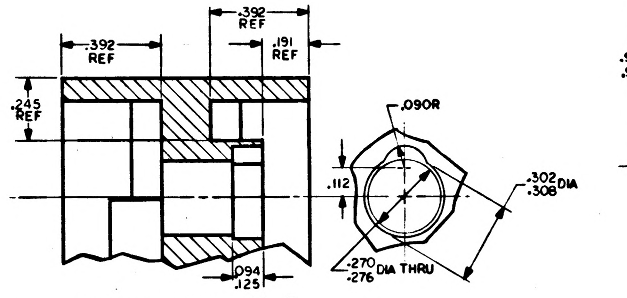
PARTIAL SECTION D-D



.392 REF
.191 REF
.392 REF
.191 REF
.112 TYP
.270 DIA THRU .276
45° CCW TYP
.090 R TYP
0°
.164 R TYP

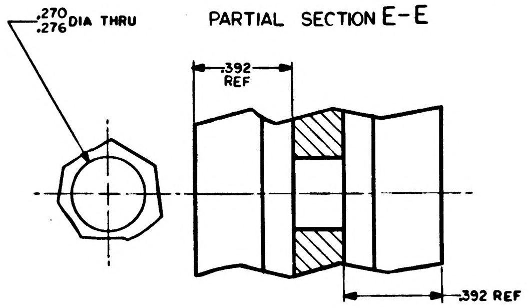
PARTIAL SECTION H-H

TYPICAL FOR K1 THRU K4



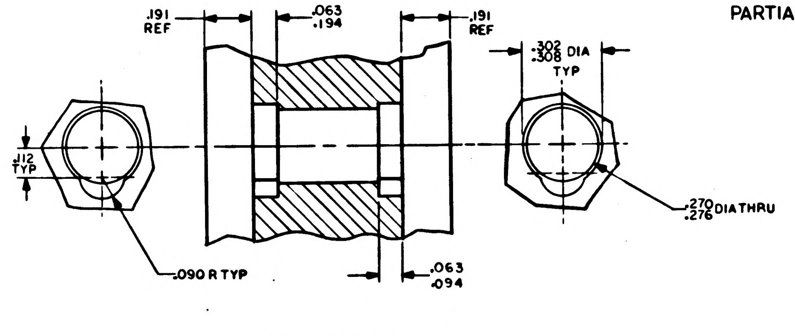
.392 REF
.392 REF
.191 REF
.245 REF
.090 R
.112
.302 .308 DIA
.094 .125
.270 .276 DIA THRU

PARTIAL SECTION E-E



.270 .276 DIA THRU
.392 REF
.392 REF

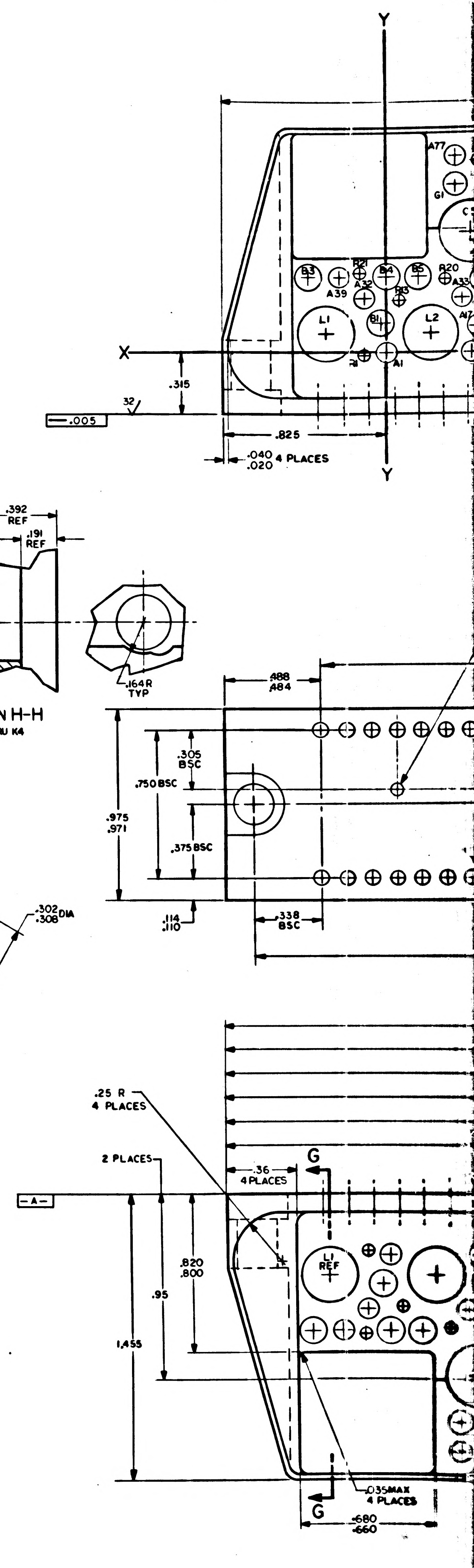
PARTIAL SECTION J-J



.191 REF
.063 .194
.191 REF
.112 TYP
.302 .308 DIA TYP
.270 .276 DIA THRU
.090 R TYP
.063 .094

PARTIAL SECTION F-F

TYP FOR V1 THRU V5

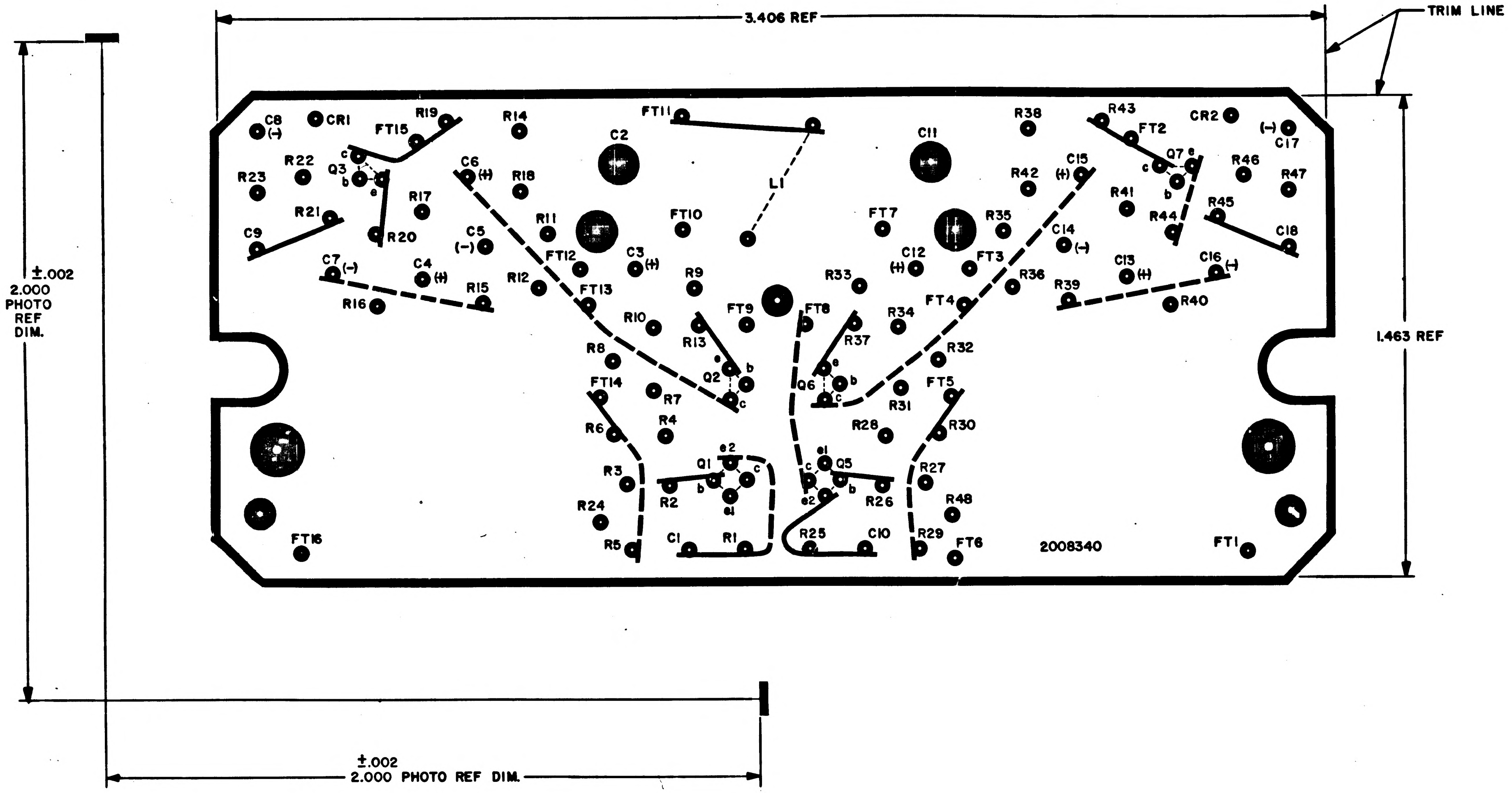


Y
A77
G1
B3
A39
A32
B1
B4
B5
R20
A33
L1
L2
A1
X
.315
32
.005
.825
.040 .020 4 PLACES
Y
.488 .484
.305 BSC
.750 BSC
.975 .971
.375 BSC
.114 .110
.338 BSC
.25 R 4 PLACES
2 PLACES
.36 4 PLACES
G
A
.820 .800
.95
1.455
L1 REF
.035 MAX 4 PLACES
G
.680 .660

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19902

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.406 REF
TRIM LINE
±.002
2.000
PHOTO
REF
DIM.
1.463 REF
±.002
2.000 PHOTO REF DIM.
C8
(–)
CR1
R19
FT15
R14
FT11
C2
C11
R38
R43
FT2
CR2
(–)
C17
R22
R23
c
Q3
b
e
C6
(+)
R18
L1
R42
C15
(+)
Q7
e
c
b
R46
R47
R21
R17
R11
FT10
FT7
R35
R41
R44
R45
C9
R20
C5
(–)
FT12
C3
(+)
C12
(+)
FT3
C14
(–)
C13
(+)
C16
(–)
C18
C7
(–)
C4
(+)
R15
R12
FT13
R9
R33
R36
R39
R40
R16
R10
FT9
FT8
R34
FT4
R13
R37
R32
R8
e
b
Q2
c
Q6
e
b
c
FT14
R7
FT5
R31
R4
R28
R30
R6
e2
Q1
c
b
e1
e1
c
Q5
b
e2
R27
R3
R2
R26
R48
R24
C1
R1
R25
C10
R29
FT6
R5
FT16
2008340
FT1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	J.F. Welch	14 May 65
CHECKED	A. Lindstrom	4 June 65
APPROVED	E.F. Sivlak	4 Jun 65
APPROVED	D.G. Fest	7 Jun 65
APPROVED MIT	W. Kupfer	8/6/65
APPROVED MSC	[illegible]	6/1/65
		DATE

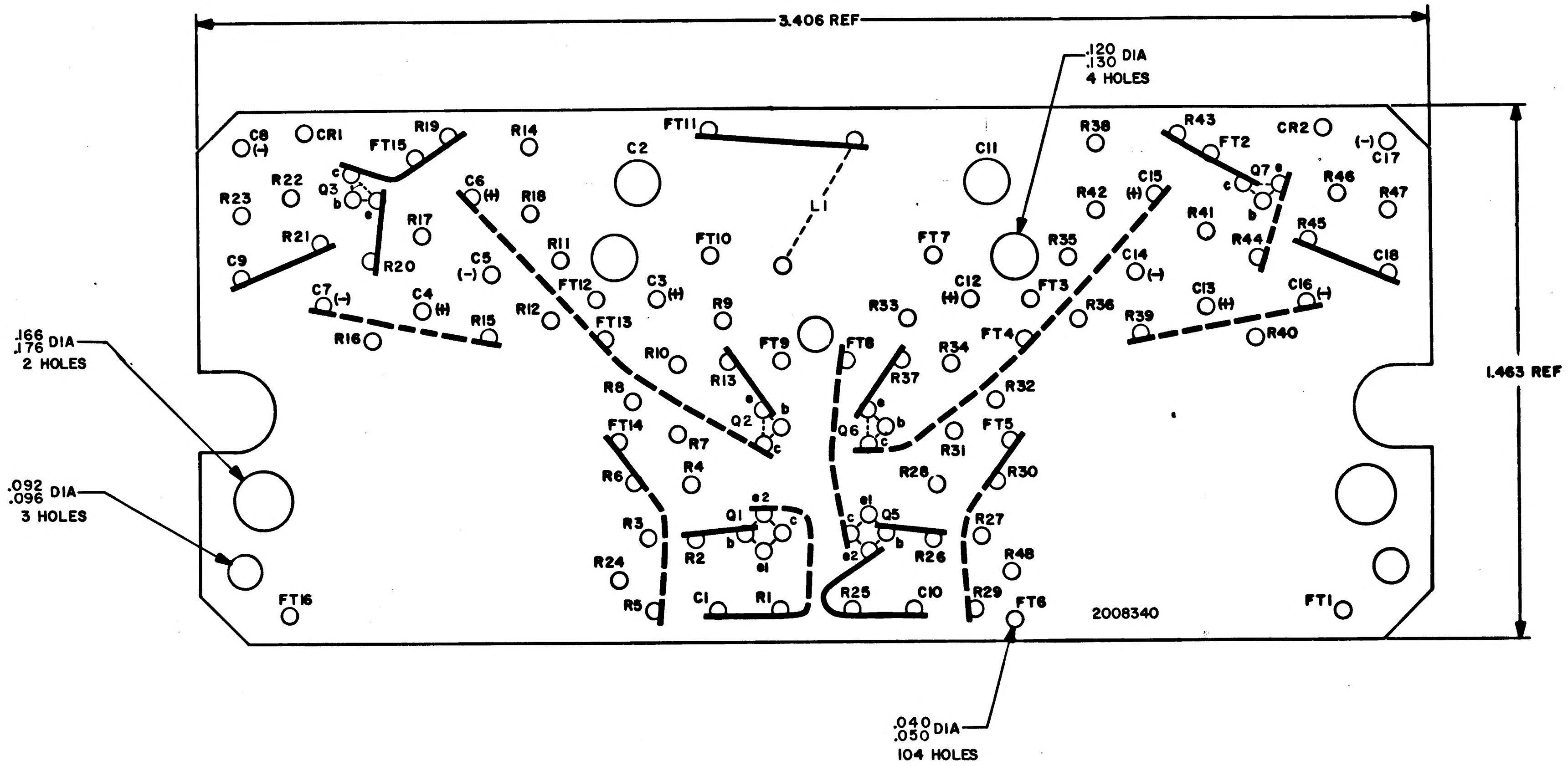
PHOTOGRAPHIC MASTER WIRING BOARD, BOTTOM
MODULATOR AND LOOP COMPENSATION MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008339

SCALE 5/1 — SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19902						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.406 REF
.120 DIA
.130
4 HOLES
1.463 REF
.166 DIA
.176
2 HOLES
.092 DIA
.096
3 HOLES
.040 DIA
.050
104 HOLES
2008340
C8 (-)
CR1
FT15
R19
R14
C2
FT11
C11
R38
R43
FT2
CR2
(-) C17
R22
Q3
c
b
e
R23
C6 (+)
R18
L1
R42 (+)
C15
Q7
e
c
b
R46
R47
R17
R11
FT10
FT7
R35
R41
R44
R45
R21
R20
C5 (-)
C9
FT12
C3 (+)
C14 (-)
C18
C7 (-)
C4 (+)
R12
FT13
R9
R33
C12 (+)
FT3
R36
C13 (+)
C16 (-)
R15
R16
FT9
FT8
FT4
R34
R39
R40
R10
R13
R37
R32
R8
Q2
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R3
R27
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R25
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C10
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R5
FT6
FT16
FT1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DWG
DWG NO. 2008339 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007125	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MASTER

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J.F. Walsh 14 May 65
CHECKED A. Lindstrom 4 June 65
APPROVED [illegible] 4 JUN 65
APPROVED D. R. Test 7 JUN 65
APPROVED MIT W Kupfer 8 Jun 65
APPROVED MSC [illegible] 6/8/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD, BOTTOM
MODULATOR AND LOOP COMPENSATION MODULE

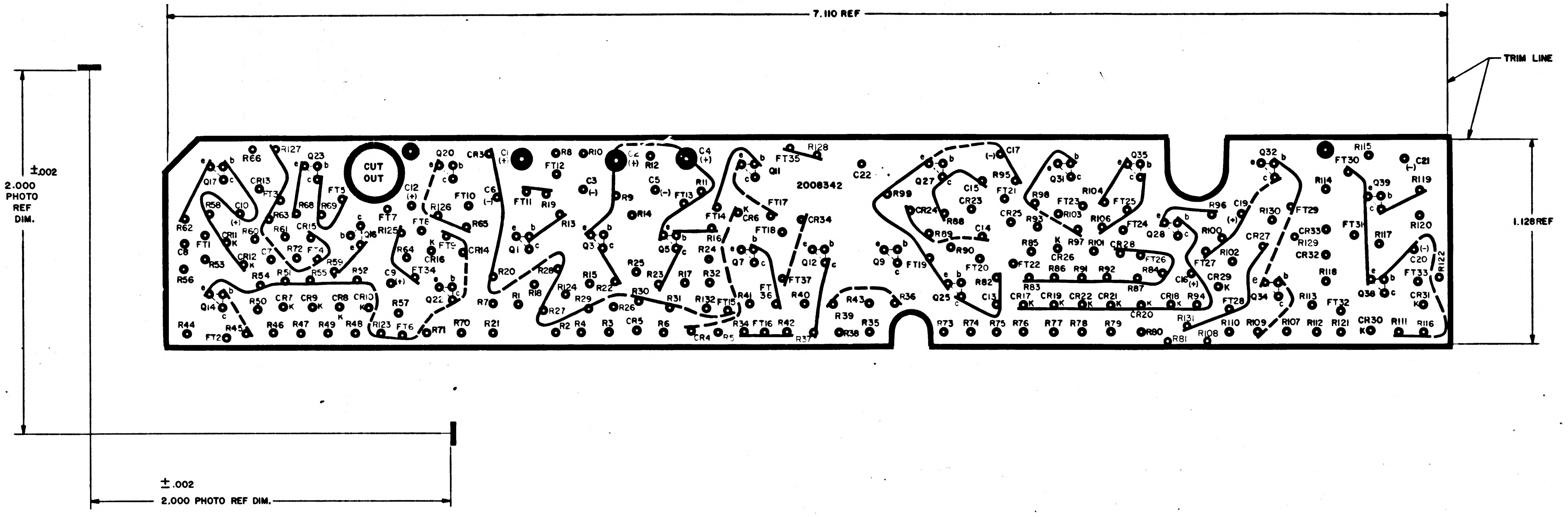
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008340
SCALE 5/1
SHEET 1 OF 1

2008340

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 21079

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27207	A.N.		22 MAR 66	



7.110 REF
TRIM LINE
1.128REF
±.002
2.000 PHOTO REF DIM.
±.002
2.000 PHOTO REF DIM.
CUT OUT
2008342
C1 (+)
C4 (+)
C12 (+)
C22
Q17
Q20
Q23
Q31
Q32
Q35
Q39
R127
R128
R115
R119
R120
R122
FT35
FT30
FT1
FT2
CR34
CR30
R44
R116

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	B J Papia	12 May 65
CHECKED	Liedemann	7 JUN 65
APPROVED	E V Cognato	7 JUN 65
APPROVED		
APPROVED MIT	W Kupfer	22 Jun 65
APPROVED MSC		7/2/65
		DATE

PHOTOGRAPHIC MASTER WIRING BOARD A
MODE MODULE

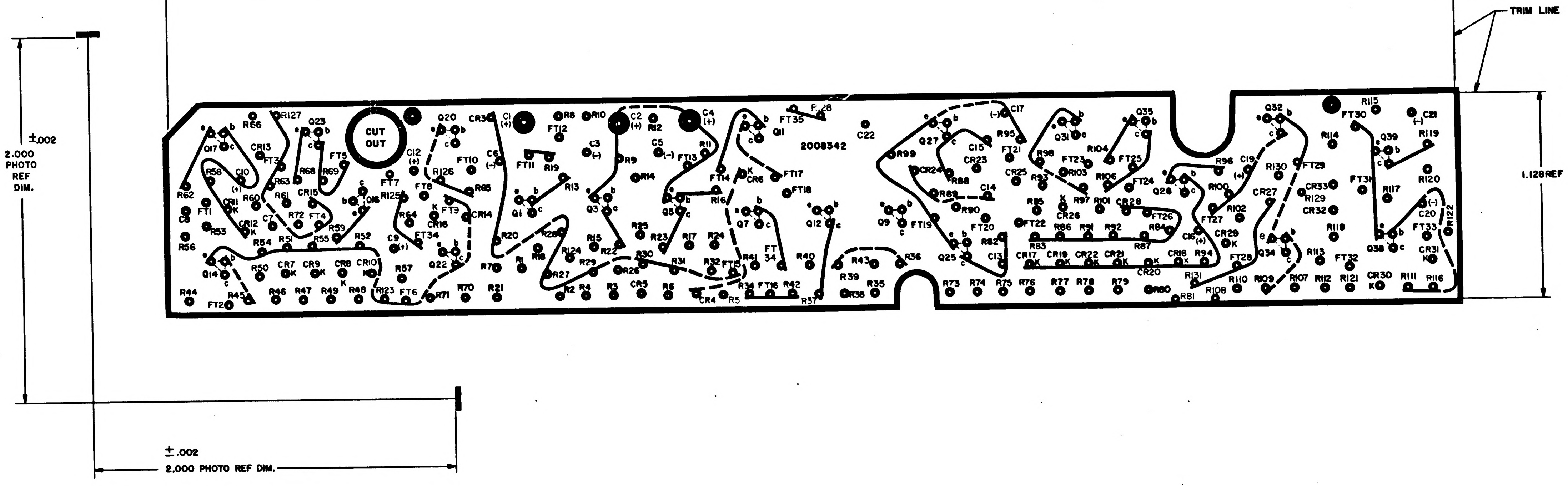
CODE IDENT NO	SIZE	DRAWING NO
80230	E	2008341
SCALE 4/1		SHEET 1 OF 1

2008341 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 21079

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
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4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN B Lapia 12 May 65
CHECKED R Liedum 7 JUNE 65
APPROVED
APPROVED
APPROVED MIT W Kupfer 22/6/65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

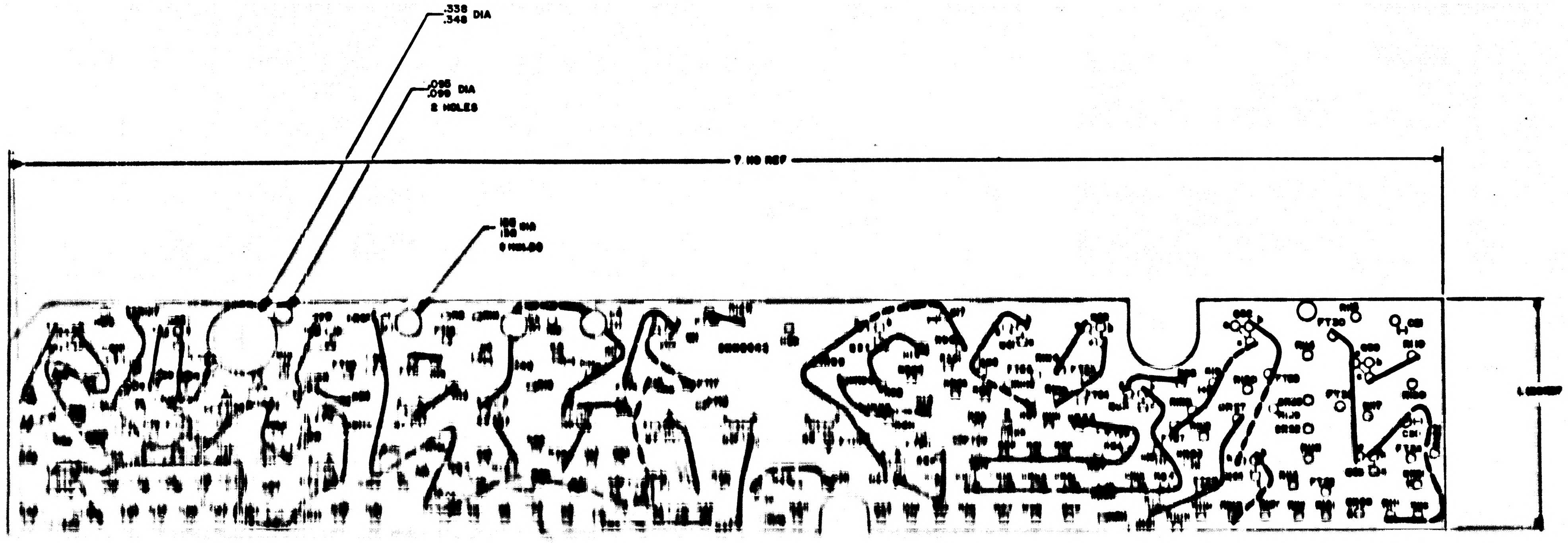
PHOTOGRAPHIC MASTER WIRING BOARD A
MODE MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008341
SCALE 4/1
SHEET 1 OF 1

2008341

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

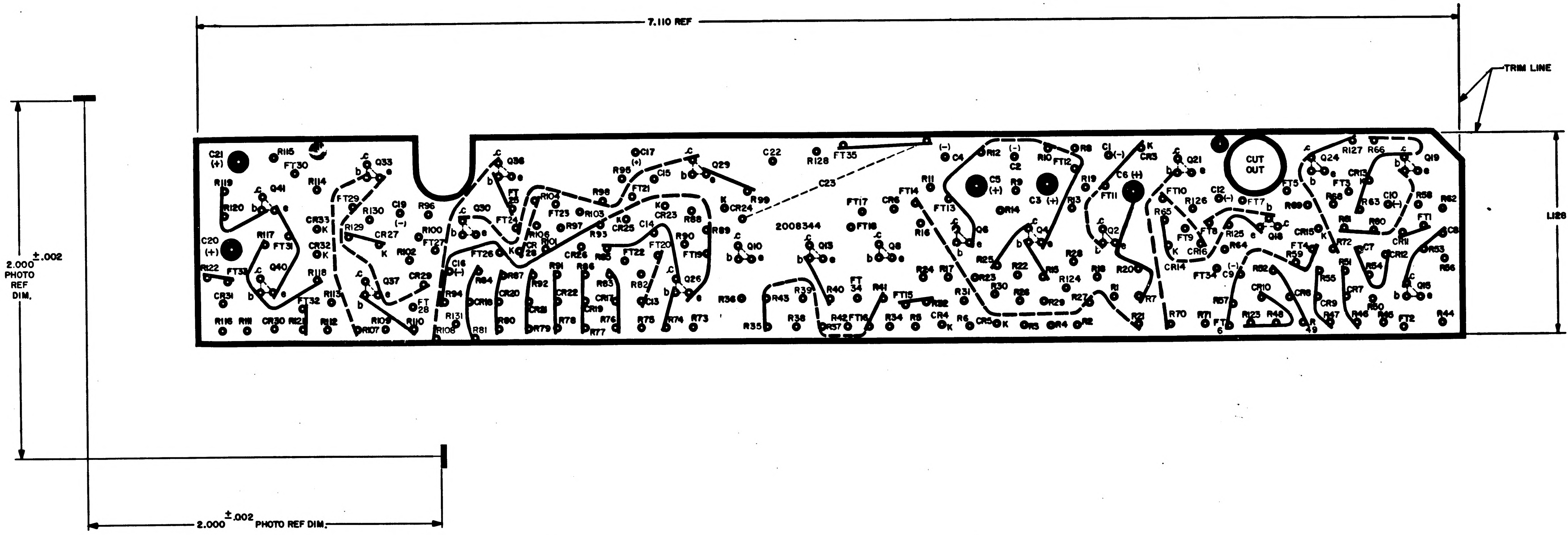
REVISIONS 21079						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 21099

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TCRR 22170	LAL		3 65	



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. F. Troy 5/18/65
CHECKED 7 JUN 65
APPROVED
APPROVED 7 Jun 65
APPROVED MIT 22/6/65
APPROVED MSC 7/24/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD B
MODE MODULE

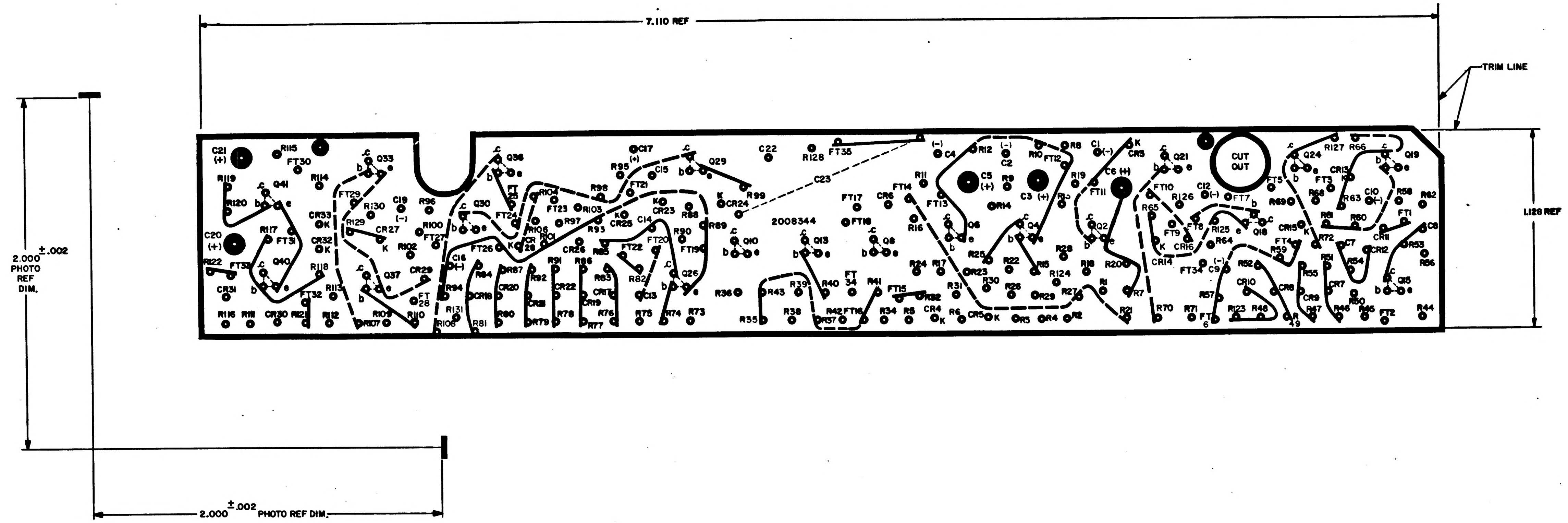
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008343
SCALE 4/1
SHEET 1 OF 1

2008343 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. F. Troy 5/12/66
CHECKED 7JUN65
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD B
MODE MODULE

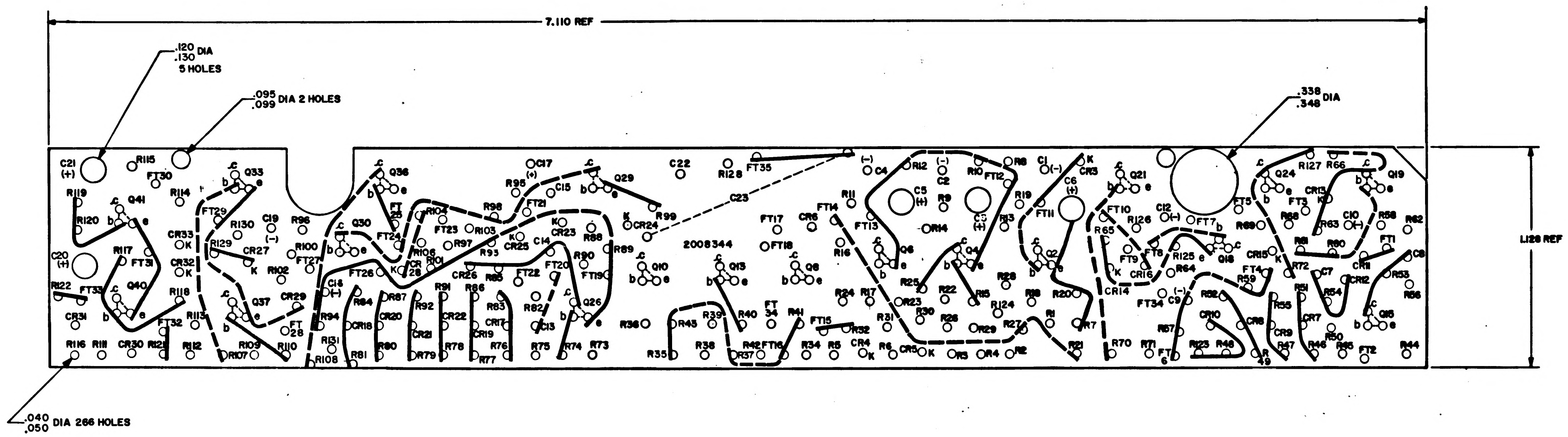
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008343
SCALE 4/1
SHEET 1 OF 1

2008343

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 21079

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 22170	LAL		3 Oct 65	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MARK BLACK CHARACTERS PER ND1002019
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
NO. 2008343 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007254	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

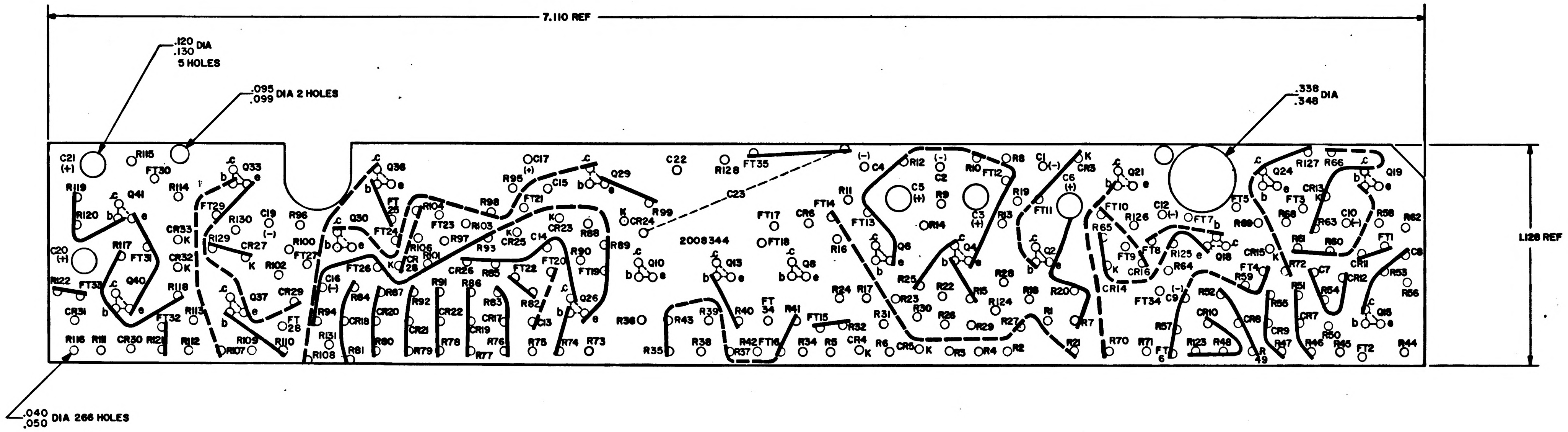
DRAWN W. F. Tong 6/11/65
CHECKED
APPROVED
APPROVED
APPROVED MIT W. Kupfer
APPROVED MSC 7/14/65
DATE

WIRING BOARD B
MODE MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008344
SCALE 4/1
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 21079						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MARK BLACK CHARACTERS PER ND1002019
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
NO. 2008343 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007254	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. F. Troy 6/4/65
CHECKED R. Liodomi 7 JUN 65
APPROVED 8 JUN 65
APPROVED
APPROVED MIT W. Kupfer 2/4/65
APPROVED MSC 11/24/66
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
MODE MODULE

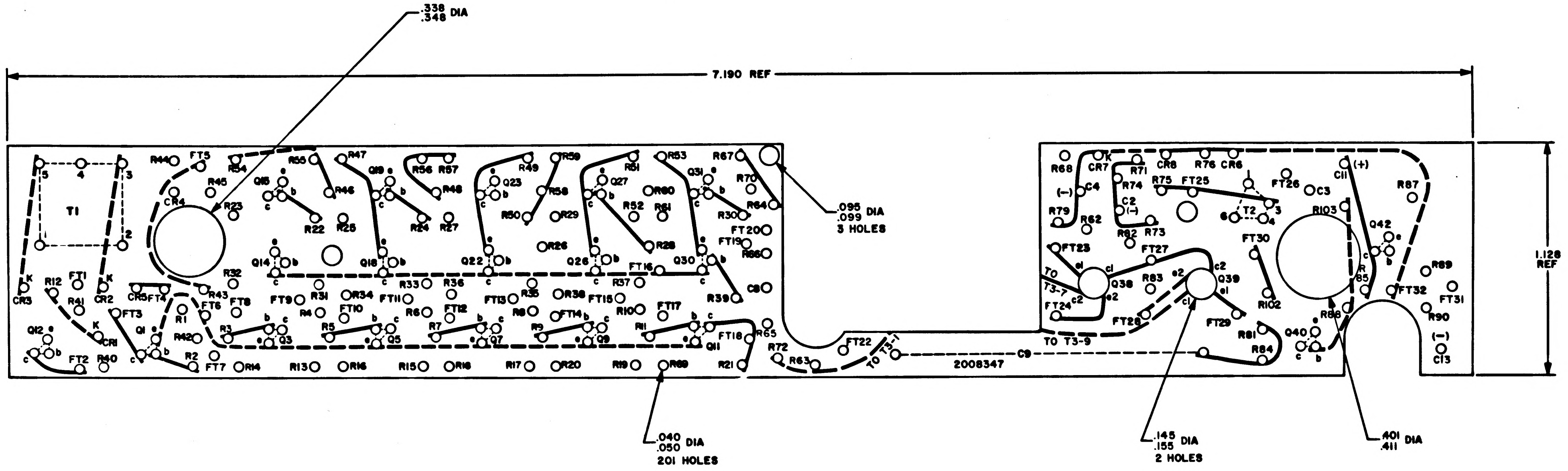
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008344

SCALE 4/1 SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 8764				


.338
.348 DIA
7.190 REF
T1
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4
3
1
2
CR3
K
R12
FT1
R41
CR2
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CR1
Q12
e
c
b
FT2
R40
R44
FT5
R54
R45
CR4
R23
R55
Q15
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b
c
R46
R22
R25
R47
Q19
e
b
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R24
R27
R56
R57
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R49
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b
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R58
R59
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R29
R26
R51
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Q18
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c
Q22
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b
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Q26
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Q30
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FT4
FT3
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FT6
Q1
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FT8
FT9
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R34
R33
R36
FT11
FT10
R4
R3
b
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Q5
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R7
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c
e
Q7
FT13
R35
R38
R8
FT14
R9
b
c
e
Q9
R37
FT15
R10
FT17
R11
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c
e
Q11
FT18
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R14
R13
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R15
R18
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R21
R72
R63
FT22
TO T3-1
C9
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.099 DIA
3 HOLES
.040
.050 DIA
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CR7
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C4
(–)
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R71
R74
C2
(–)
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CR8
R76
CR6
R75
FT25
FT23
TO
T3-7
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Q38
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e2
FT24
FT27
R83
e2
c2
Q39
e1
c1
FT28
TO T3-9
FT29
R81
R84
T2
6
3
4
FT26
C3
FT30
R102
R103
C11
(+)
Q42
e
c
b
R
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R88
Q40
e
c
b
R87
FT32
R89
FT31
R90
(–)
C13
1.128
REF
.145
.155 DIA
2 HOLES
.401
.411 DIA

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008348 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007237	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

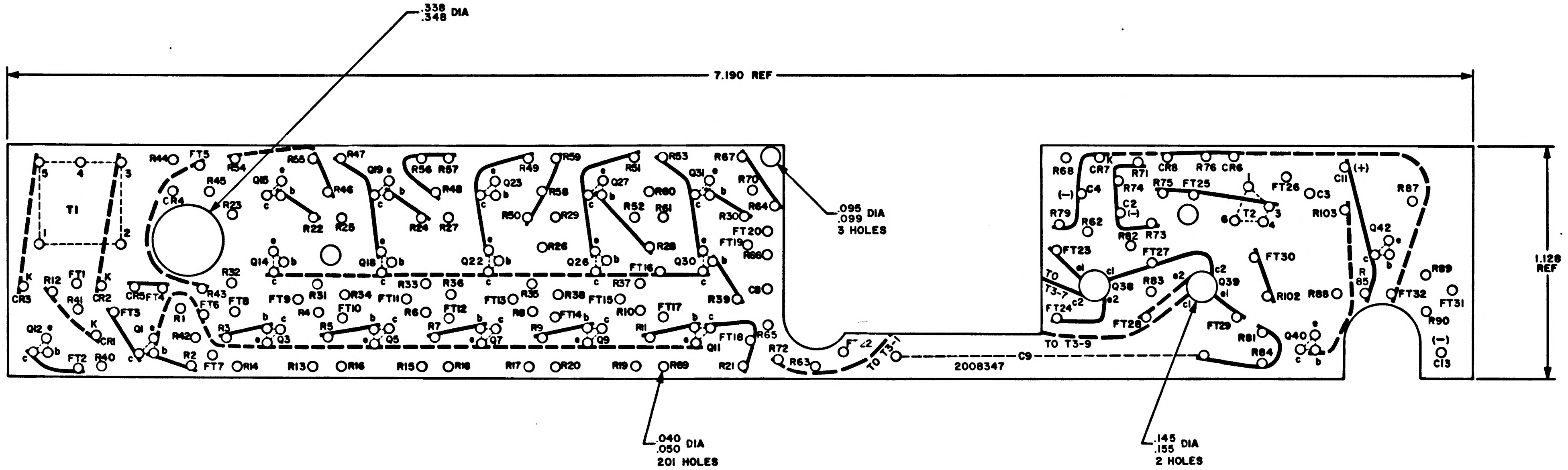
WIRING BOARD A
D/A CONVERTER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008347
SCALE 4/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20773

SYM	ZONE	DESCRIPTION	BR	CHK	DATE	APPROVED



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3
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R12
FT1
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R41
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Q12
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c
FT2
R40
CR5
FT4
FT3
Q1
e
b
c
R1
R42
R2
FT7
R44
FT5
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R45
CR4
R23
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R14
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R31
R34
FT11
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Q23
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R28
Q26
FT16
R37
FT13
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Q9
R10
FT17
R11
Q11
R17
R20
R19
R69
R53
Q31
R67
R70
R64
R30
FT20
FT19
R66
Q30
R39
C8
FT18
R65
R21
R72
R63
FT22
TO T3-1
C9
2008347
.095
.099 DIA
3 HOLES
.040
.050 DIA
201 HOLES
R68
CR7
K
R71
CR8
R76
CR6
C4
(–)
R74
R75
FT25
C2
(–)
R79
R62
R82
R73
T2
6
3
4
FT26
C3
C11
(+)
R103
R87
Q42
FT23
FT27
FT30
TO
T3-7
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c1
Q38
c2
e2
R83
e2
c2
Q39
e1
c1
FT24
FT28
FT29
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R88
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R89
FT31
R90
R81
R84
Q40
(–)
C13
TO T3-9
1.128
REF
.145
.155 DIA
2 HOLES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008348 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007237	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED A. Lindstrom
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
D/A CONVERTER

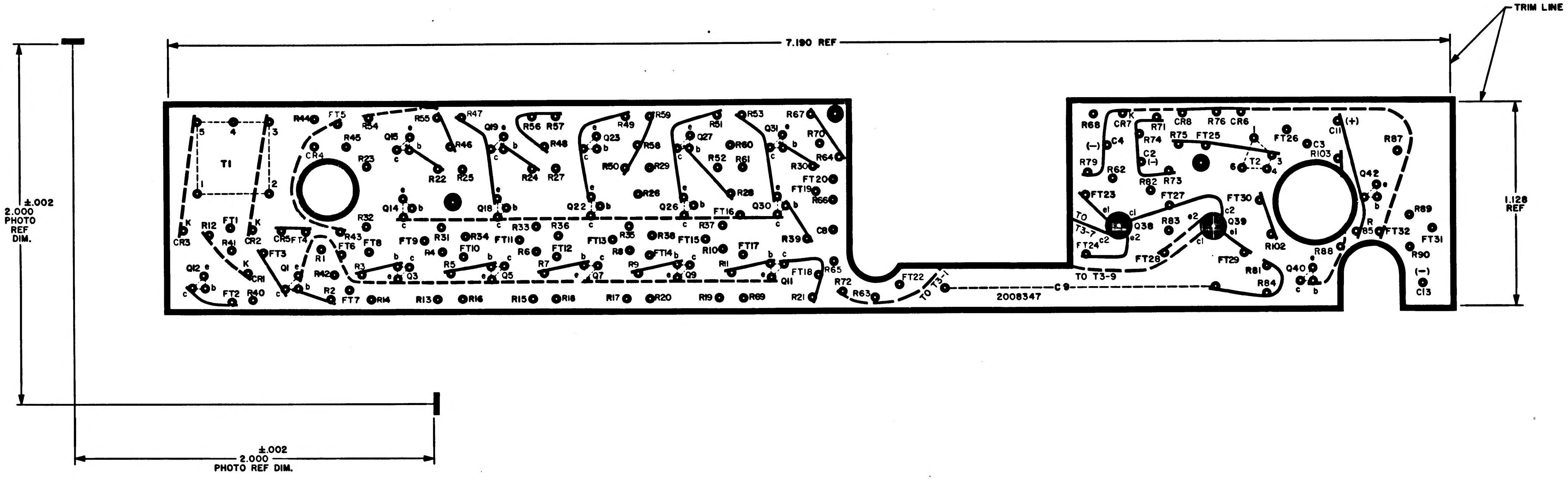
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008347
SCALE 4/1
SHEET 1 OF 1

2008347

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21769			27Aug65	



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 30 Jun 65
CHECKED 7 July 65
APPROVED
APPROVED
APPROVED MIT 13 July 65
APPROVED MSC 7-13-61
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

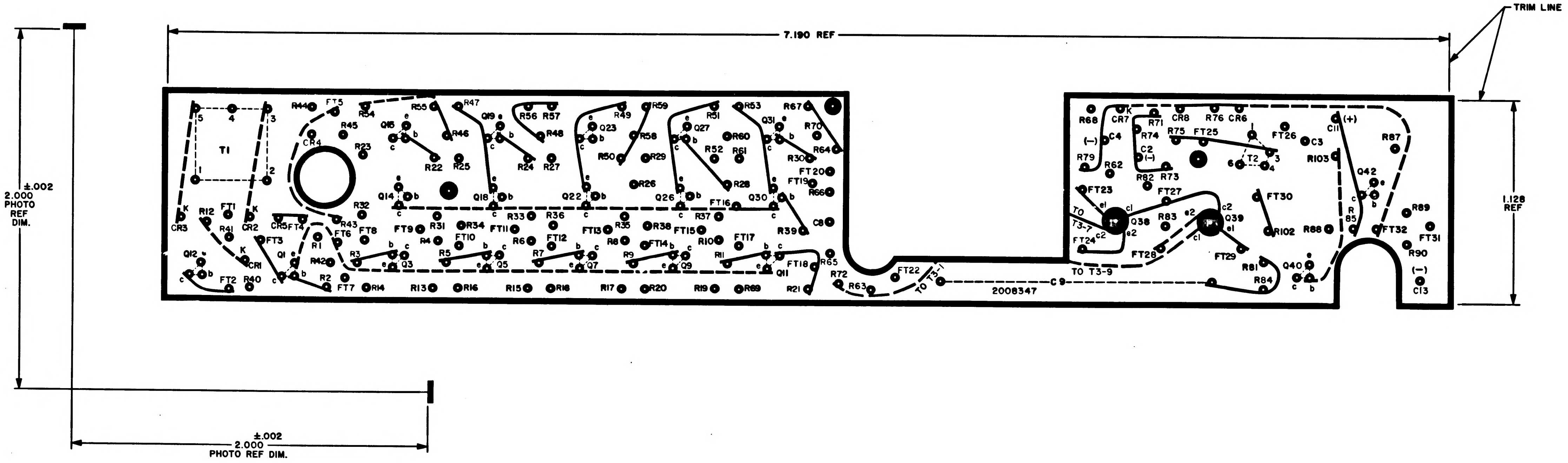
PHOTOGRAPHIC MASTER WIRING BOARD A
D/A CONVERTER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008348
SCALE 4/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20---3

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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1.128 REF
±.002
2.000
PHOTO
REF
DIM.
±.002
2.000
PHOTO REF DIM.
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1
2
CR4
R44
FT5
R54
R55
R47
Q19
R56
R57
R49
R59
R51
R53
R67
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Q16
R46
R48
Q23
R58
Q27
R60
Q31
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R64
R23
R22
R25
R24
R27
R50
R29
R52
R61
R30
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R33
R36
R37
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CR3
R12
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CR2
CR5
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FT13
R35
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FT15
R39
R41
FT6
FT8
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FT10
FT12
FT14
R10
FT17
R4
R6
R8
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Q7
Q9
Q11
FT18
R65
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R63
FT22
TO T3-1
C9
2008347
TO T3-9
R68
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R71
CR8
R76
CR6
(–)
C4
R74
R75
FT25
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C3
C11
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R87
C2
(–)
R79
R62
T2
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R103
R82
R73
Q42
FT23
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FT30
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T3-7
Q38
R83
Q39
R89
FT24
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e2
c1
e1
R
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R102
R88
FT32
FT31
FT28
FT29
R90
R81
Q40
R84
(–)
C13
e
b
c
K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 11 Jun 65
CHECKED 7 July 65
APPROVED R.Y. 8 July 65
APPROVED
APPROVED MIT 13 July 65
APPROVED MSC 7-26
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
D/A CONVERTER

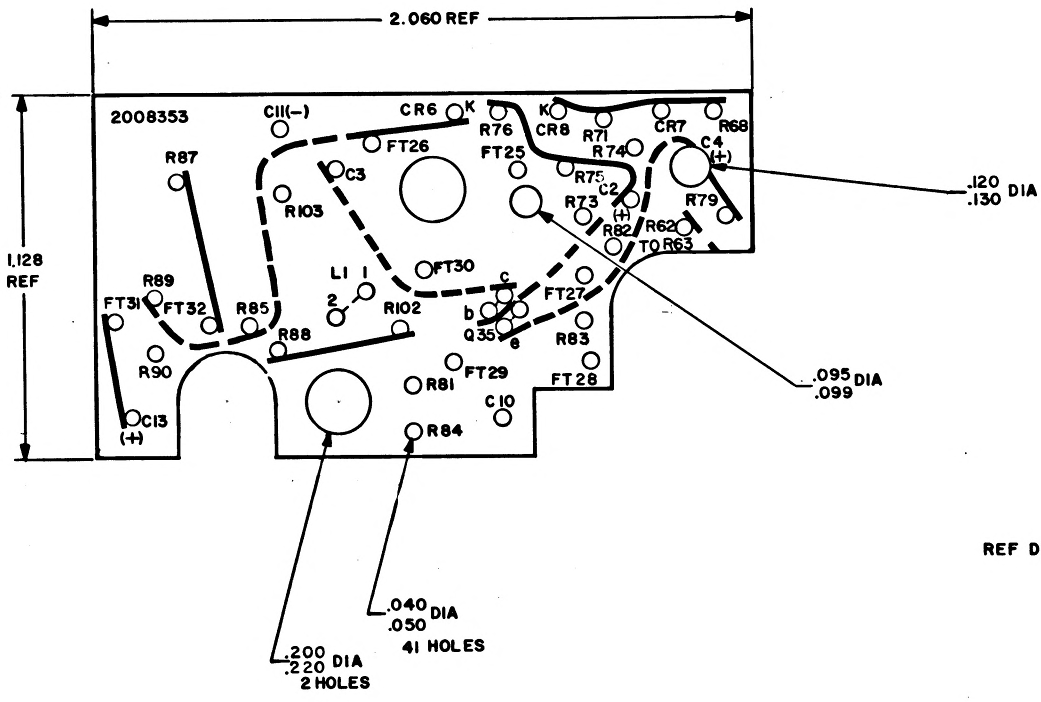
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2008348
SCALE 4/1
SHEET 1 OF 1

2008348

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20173

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21764	RR	RDK	28Aug65	WK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1.128 REF
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CR6
K
R76
K
CR8
R71
CR7
R68
R74
C4
(+)
FT25
R75
C2
(+)
R73
R79
R82
R62
TO R63
FT26
C3
R87
R103
FT30
L1
1
2
R89
FT31
FT32
R85
R88
R102
c
b
Q35
e
FT27
R83
R90
FT29
R81
FT28
C10
C13
(+)
R84
.120
.130 DIA
.095
.099 DIA
.040
.050 DIA
41 HOLES
.200
.220 DIA
2 HOLES

REF DRAWING:

2008354 PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007237	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	[illegible]	1-65
CHECKED	A. Lindstrom	7 July 65
APPROVED	R. V. [illegible]	8 July '65
APPROVED	[illegible]	9 July 65
APPROVED MIT	W. Kupfer	13 July 65
APPROVED MSC	W. J. Rhine	7-13-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
D/A CONVERTER

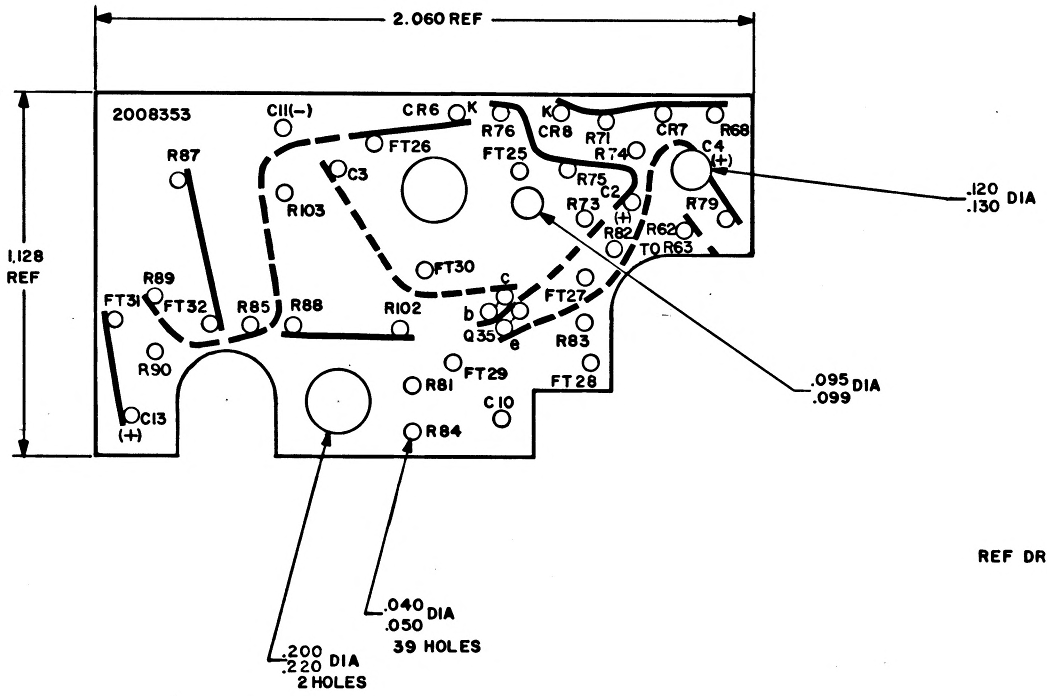
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008353
SCALE 4/1		SHEET 1 OF 1

2008353 A

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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CR6
K
R76
K
CR8
R71
CR7
R68
FT26
FT25
R74
C4 (+)
R87
C3
R75
C2
R103
R73
(+)
R79
R82
R62
TO R63
FT30
R89
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FT27
FT31
FT32
R85
R88
R102
b
Q35
e
R83
R90
FT29
FT28
R81
C10
C13 (+)
R84
.120 .130 DIA
.095 .099 DIA
.040 .050 DIA 39 HOLES
.200 .220 DIA 2 HOLES

REF DRAWING:

2008354 PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007237	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED A. Lindstrom 7 July 65
APPROVED 8 July '65
APPROVED 9 July 65
APPROVED MIT 13 July 65
APPROVED MSC 7-13-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
D/A CONVERTER

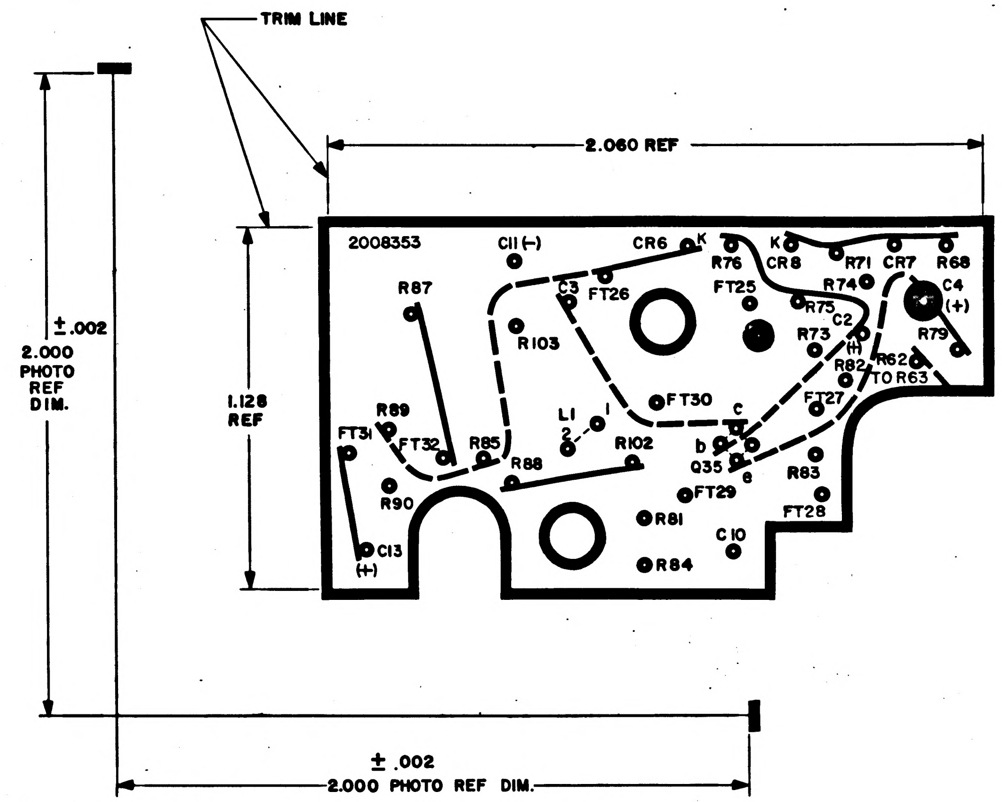
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008353
SCALE 4/1
SHEET 1 OF 1

2008353

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 20773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR C1764	ER	RPK	28Aug65	WK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±.002
2.000 PHOTO REF DIM.
1.128 REF
±.002
2.000 PHOTO REF DIM.
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CR6
K
R76
K
CR8
R71
CR7
R68
R87
C3
FT26
FT25
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C4
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R75
C2
R103
R73
(+)
R79
R82
R62
TO R63
FT30
FT27
R89
L1
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2
c
FT31
FT32
R85
R102
b
R88
Q35
e
R83
R90
FT29
FT28
R81
C10
C13
(+)
R84

NOTES:
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3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN		June 4-65
CHECKED	A. Lindstrom	7 July 65
APPROVED	R.V.	27 Jul 65
APPROVED		9 July
APPROVED MIT	W. Kupfer	13 Jul 65
APPROVED MSC	W J	7-13-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

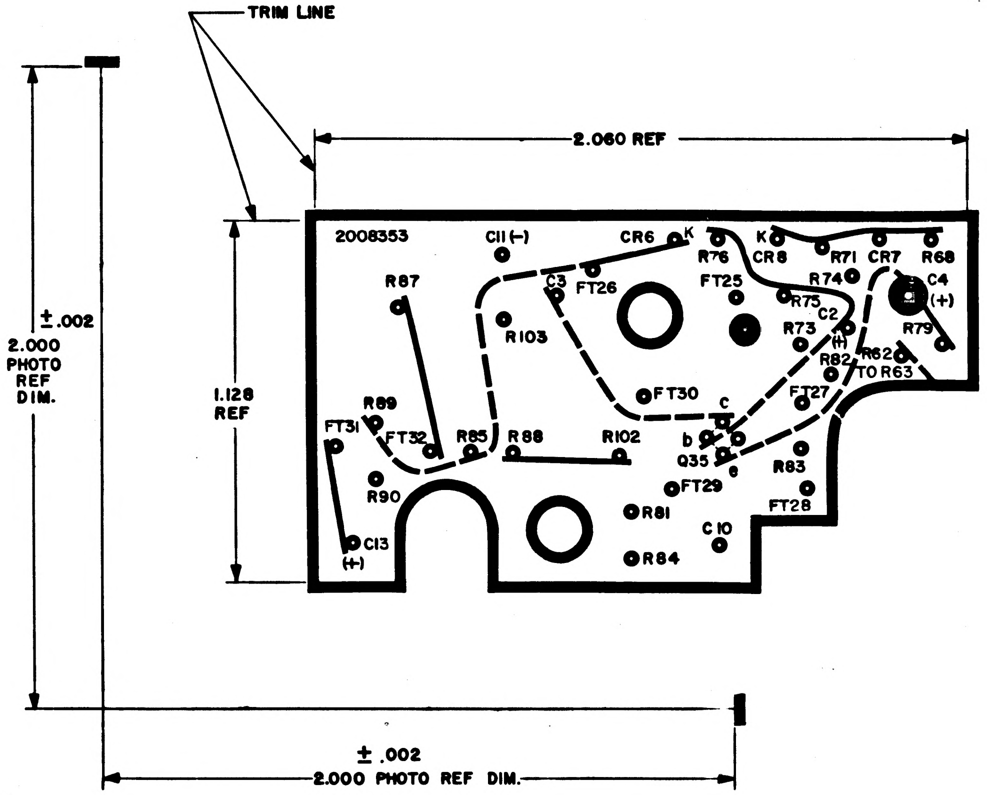
PHOTOGRAPHIC MASTER
WIRING BOARD D
D/A CONVERTER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008354
SCALE 4/1		SHEET 1 OF 1

NOTICE -- WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 20773

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TRIM LINE
2.060 REF
±.002
2.000 PHOTO REF DIM.
1.128 REF
±.002
2.000 PHOTO REF DIM.
2008353
C11 (−)
CR6
K
R76
K
CR8
R71
CR7
R68
R87
C3
FT26
FT25
R74
C4
(+)
R75
C2
(+)
R73
R79
R103
R82
R62
TO R63
FT30
FT27
c
R89
FT31
FT32
R85
R88
R102
b
Q35
e
R83
R90
FT29
FT28
R81
C10
C13
(+)
R84

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED A. Lindstrom 9 Jul 65
APPROVED 21 Jul 65
APPROVED 9 Jul 65
APPROVED MIT 13 Jul 65
APPROVED MSC 7-13-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD D
D/A CONVERTER

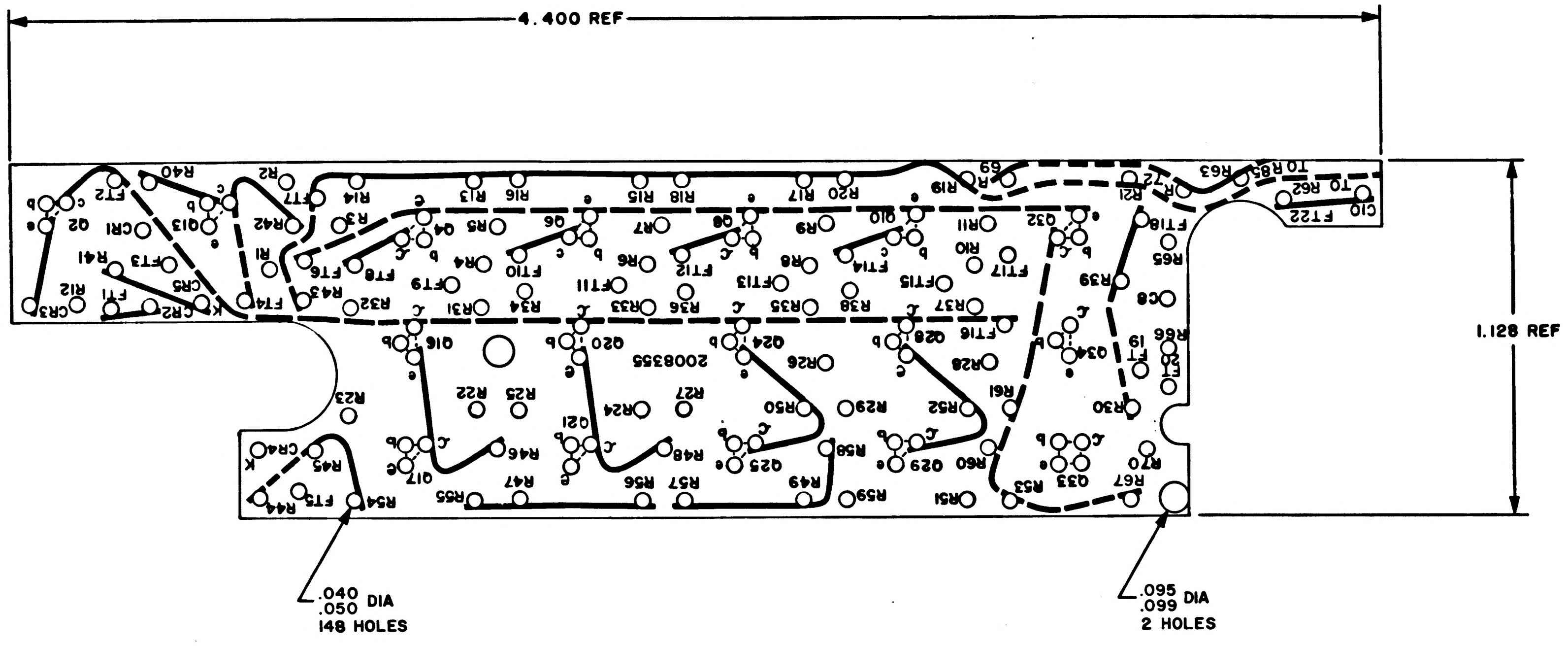
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008354
SCALE 4/1
SHEET 1 OF 1

2008354

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20773

SYM	DESCRIPTION	DATE	APPROVAL



REF DRAWING:
2008356 PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007237
NEXT ASSY
USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN Ken Healy DATE 10 Jun 65
CHECKED A. Lindstrom 7 July 65
APPROVAL RV [illegible] 8 July 65
APPROVAL [illegible] 7 July
NASA APPROVAL [illegible] 07-13-65
MIT APPROVAL [illegible] 13 July 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD E

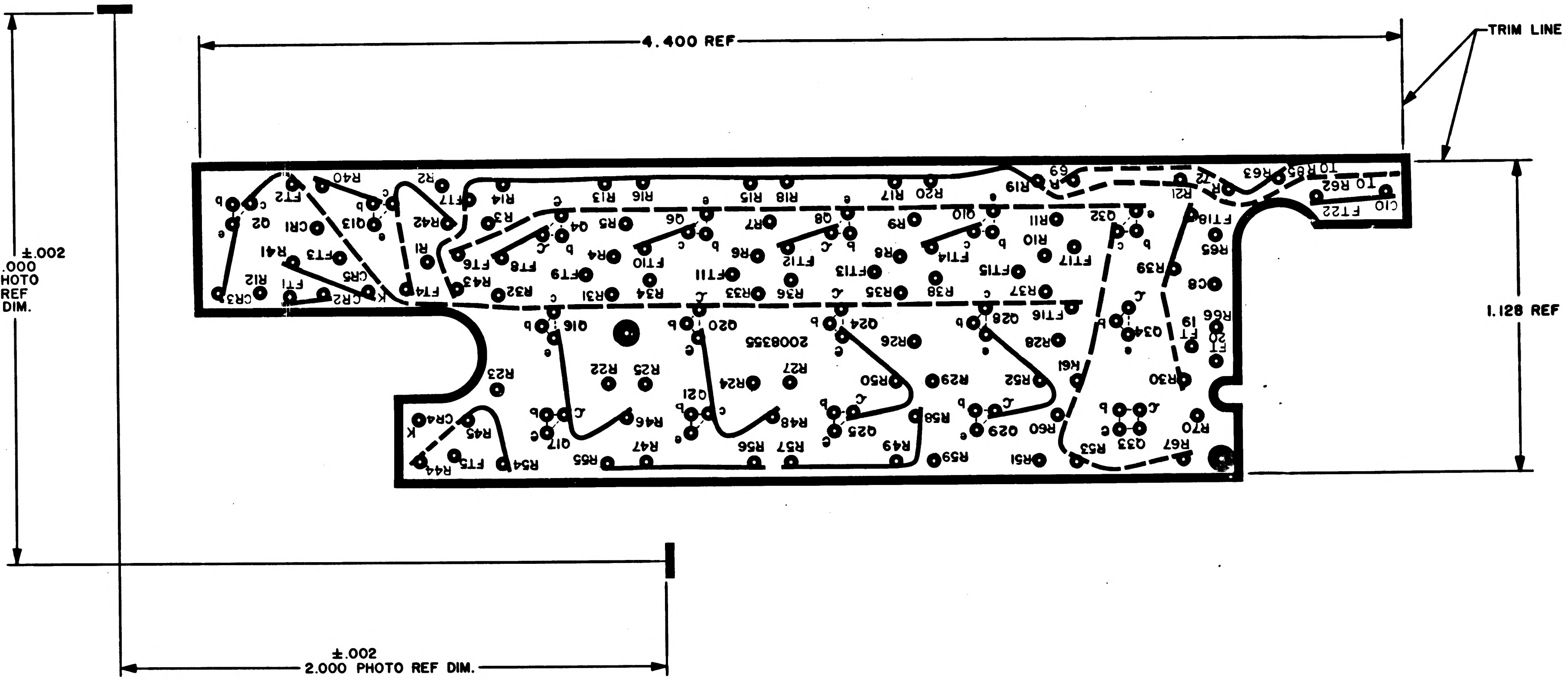
D/A CONVERTER

CODE IDENT NO 80230
SIZE D
NASA DRAWING NO 2008355
SCALE 4/1
WT —
SHEET 1 OF 1

2008355

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TGGC 70773			
SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN Ken Healy DATE 9 Jun 65
CHECKED A. Lindstrom 7 July 65
APPROVAL R V Vanstrand 8 July 65
APPROVAL [illegible] 9 July 65
NASA APPROVAL W J Rhine 07-13-65
MIT APPROVAL [illegible] 13 July 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

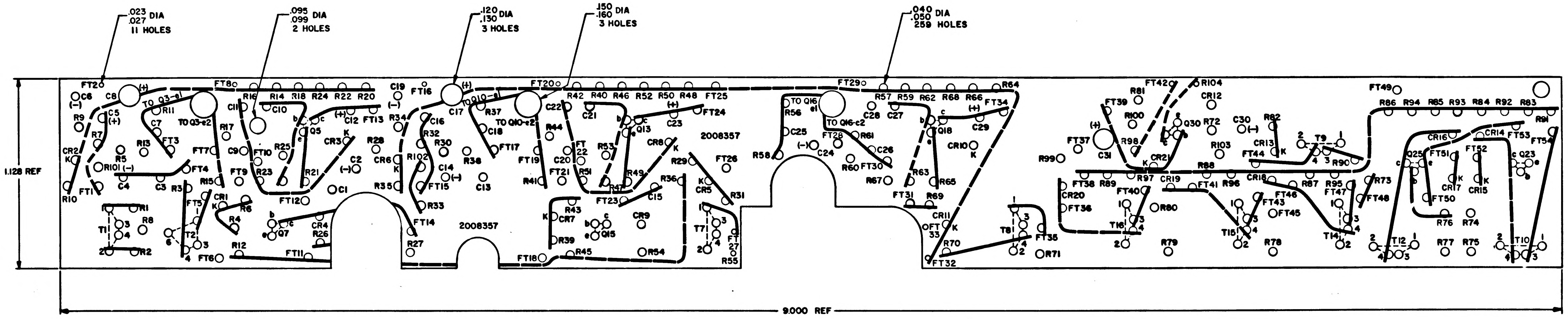
PHOTOGRAPHIC MASTER WIRING BOARD E
D/A CONVERTER

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2008356
SCALE 4/1
WT —
SHEET 1 OF 1

2008356

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TCR# 20772						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.023
.027 DIA
11 HOLES
.095
.099 DIA
2 HOLES
.120
.130 DIA
3 HOLES
.150
.160 DIA
3 HOLES
.040
.050 DIA
259 HOLES
1.128 REF
9.000 REF
2008357
2008357
FT2
C6
(−)
C8
(+)
R9
C5
(+)
R7
CR2
K
R10
FT1
R5
R101 (−)
R13
C4
C3
TO Q3-e1
R11
C7
FT3
TO Q3-e2
R17
FT7
FT4
R15
R3
FT5
CR1
K
R6
R4
T1
R1
R8
R2
T2
FT6
R12
FT8
R16
C11
C10
R14
R18
R24
R22
R20
C9
FT10
FT9
R23
R25
Q5
b
c
e
R21
C12
FT13
(+)
CR3
K
C2
(−)
C1
R28
FT12
Q7
CR4
R26
FT11
C19
(−)
FT16
R34
C16
R32
R30
CR6
K
R102
R35
C14
(−)
FT15
C13
R33
FT14
R27
C17
TO Q10-e1
R37
C18
TO Q10-e2
R38
FT17
FT19
R44
R41
FT20
R42
R40
R46
R52
R50
R48
FT25
C22
C21
C20
FT 22
FT21
R51
R53
Q13
C23
FT24
CR8
K
R29
R49
R47
R36
C15
FT23
FT26
CR5
R31
R43
CR7
Q15
R39
R45
CR9
R54
FT18
T7
FT 27
R55
R58
TO Q16 e1
R56
C25
(−)
C24
TO Q16-c2
FT28
R61
C26
R60
FT30
R67
FT29
R57
R59
R62
R68
R66
R64
C28
C27
Q18
C29
FT34
CR10
K
R63
R65
FT31
R69
CR11
K
FT 33
R70
FT32
T8
FT35
R71
R99
FT37
C31
FT39
R81
R100
R98
FT42
R104
CR12
Q30
R72
C30
(−)
R103
CR21
K
R97
FT38
R89
CR20
FT36
FT40
T16
R80
R79
CR19
FT41
R96
R88
T15
FT43
FT45
FT46
R78
CR13
K
FT44
R82
T9
R90
CR18
R87
R95
FT47
T14
R73
FT48
FT49
R86
R94
R85
R93
R84
R92
R83
R91
CR16
CR14
FT53
FT54
Q25
FT51
FT52
Q23
CR17
CR15
FT50
R76
R74
T12
R77
R75
T10

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008358 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
		LIST OF MATERIALS	

2007263	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L. Kraglin	4 JUN 65
CHECKED	[illegible]	8 Jul 65
APPROVED	[illegible]	[illegible]
APPROVED	[illegible]	[illegible]
APPROVED MIT	W Kupfer	13 Jul 65
APPROVED MSC	W J Rhine	7-26-65
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
INTERROGATE MODULE

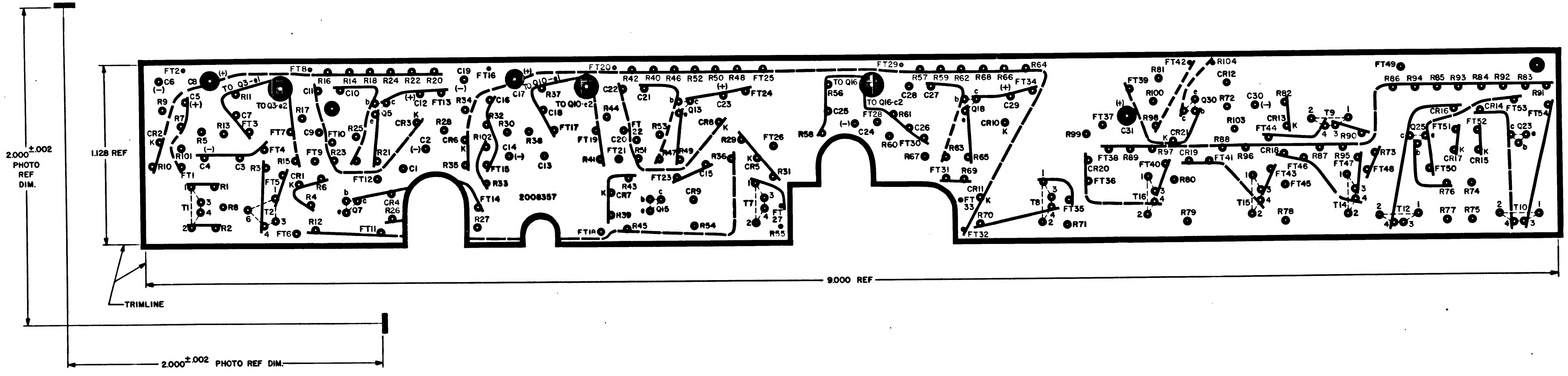
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008357
SCALE 4/1		SHEET 1 OF 1

2008357

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TCRR 2077?

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.000 ±.002 PHOTO REF DIM.
1.128 REF
TRIMLINE
9.000 REF
2.000 ±.002 PHOTO REF DIM.
2008357
FT2 C6 (−) C8 (+) TO Q3-e1 TO Q3-e2 R9 C5 (+) R7 R11 C7 FT3 R13 CR2 K R5 R101 (−) C4 C3 R3 FT4 R10 FT1 T1 1 2 3 4 R1 R2 R8 FT5 T2 6 FT6
FT8 R16 R14 R18 R24 R22 R20 C11 C10 R17 b c e Q5 C12 (+) FT13 FT7 C9 FT10 R25 CR3 K R28 R15 FT9 R23 R21 C2 (−) CR1 K R6 R4 C1 FT12 R12 b c e Q7 CR4 R26 FT11
C19 (−) FT16 R34 CR6 K R35 C17 (+) TO Q10-e1 TO Q10-e2 C16 R32 R30 R102 C14 (−) FT15 R33 FT14 R27 R37 C18 R38 C13 FT17 FT19 R41 FT18 R39 CR7 K R43 R45
FT20 R42 R40 R46 R52 R50 R48 FT25 C22 C21 R44 FT 22 C20 FT21 R51 R53 b c e Q13 C23 (+) FT24 CR8 K R47 R49 FT23 C15 R36 R29 K CR5 R31 FT26 b c e Q16 CR9 R54 T7 1 2 3 4 FT 27 R55
R58 TO Q16 R56 C25 TO Q16-c2 (−) C24 FT29 R57 R59 R62 R68 R66 R64 C28 C27 FT28 R61 C26 R60 FT30 R67 b c e Q18 C29 (+) FT34 CR10 K R63 R65 FT31 R69 CR11 K FT 33 R70 FT32 T8 1 2 3 4 FT35 R71 R99
FT42 R104 R81 FT39 R100 e c b Q30 CR12 FT37 (+) C31 R98 CR21 K R72 C30 (−) R82 R103 CR13 K FT44 T9 1 2 3 4 R90 FT38 R89 R97 CR19 R88 CR18 R96 R87 R95 FT47 CR20 FT36 FT40 T16 1 2 3 4 R80 R79 FT41 FT43 FT46 FT45 T15 R78 T14 R73 FT48
FT49 R86 R94 R85 R93 R84 R92 R83 R91 CR16 CR14 FT53 FT54 Q25 c e b FT51 FT52 c Q23 e b CR17 K CR15 K FT50 R76 R74 T12 1 2 3 4 R77 R75 T10 1 2 3 4

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	L Krahn	2 Jun 65
CHECKED	R.P. Kungelman	2 Jul 65
APPROVED	R.T. Wunsch	2 Jul 65
APPROVED		
APPROVED MIT	W. Kupfer	1 Jul 65
APPROVED MSC		7-13-61
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD B
INTERROGATE MODULE

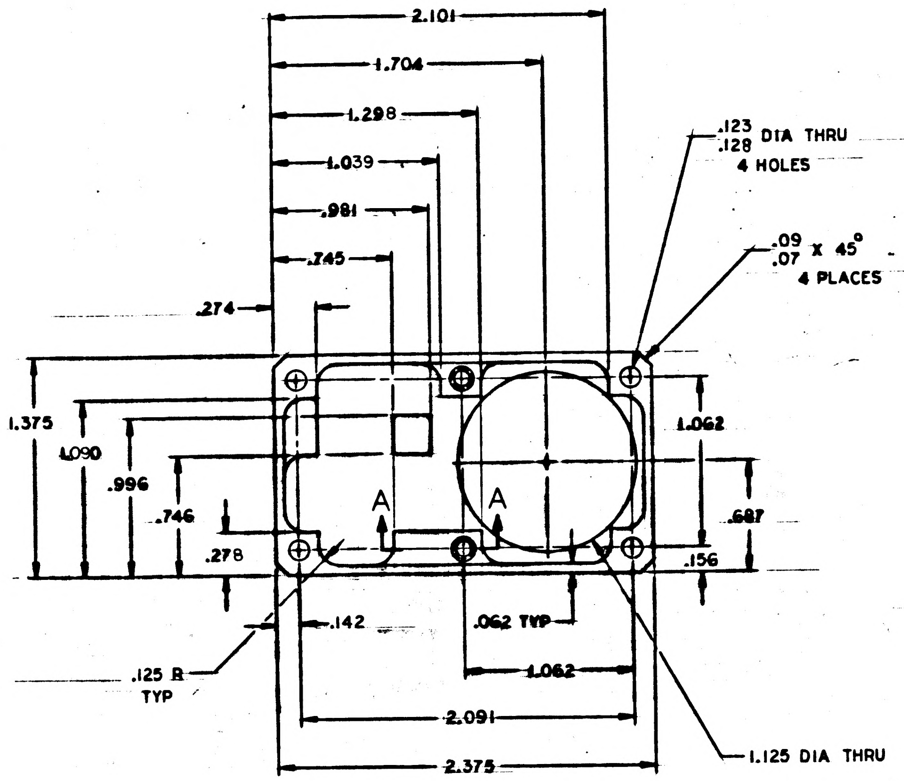
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008358
SCALE 4/1	—	SHEET 1 OF 1

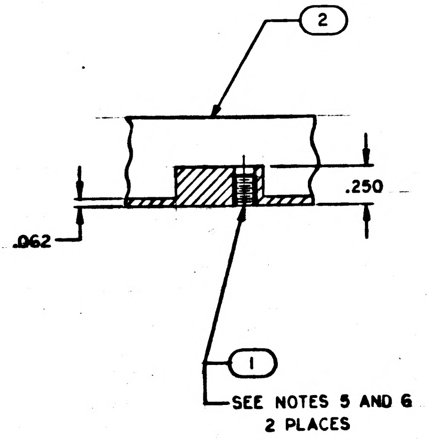
2008358

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

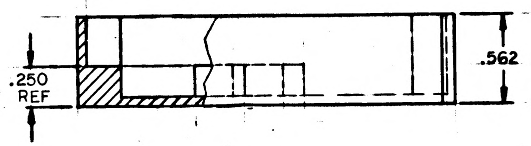
REVISIONS 21746

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED





PARTIAL SECTION A-A



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: AL 6061-T6 PER QQ-A-250/11, TEMP-T6
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. FINISH: ANODIZE PER MIL-A-8625 TYPE II, CLEAR
5. COAT THREADS OF FIND NO. 1 WITH MIL-P-8585, COLOR Y
6. INSTALL FIND NO. 1 PER MS33646. REMOVE DRIVING TANG
7. ALL SURFACES .125√
8. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
9. IDENTIFY WITH PART NO. PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008362-001	BRACKET	2
2	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007201	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powero	9 Jun 65
CHECKED	R. Bongalusy	19 Aug 65
APPROVED		
APPROVED	D. R. Fat	8/23/65
APPROVED MIT	W. Kaufer	2 Sep 65
APPROVED MSC		8/14/61
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

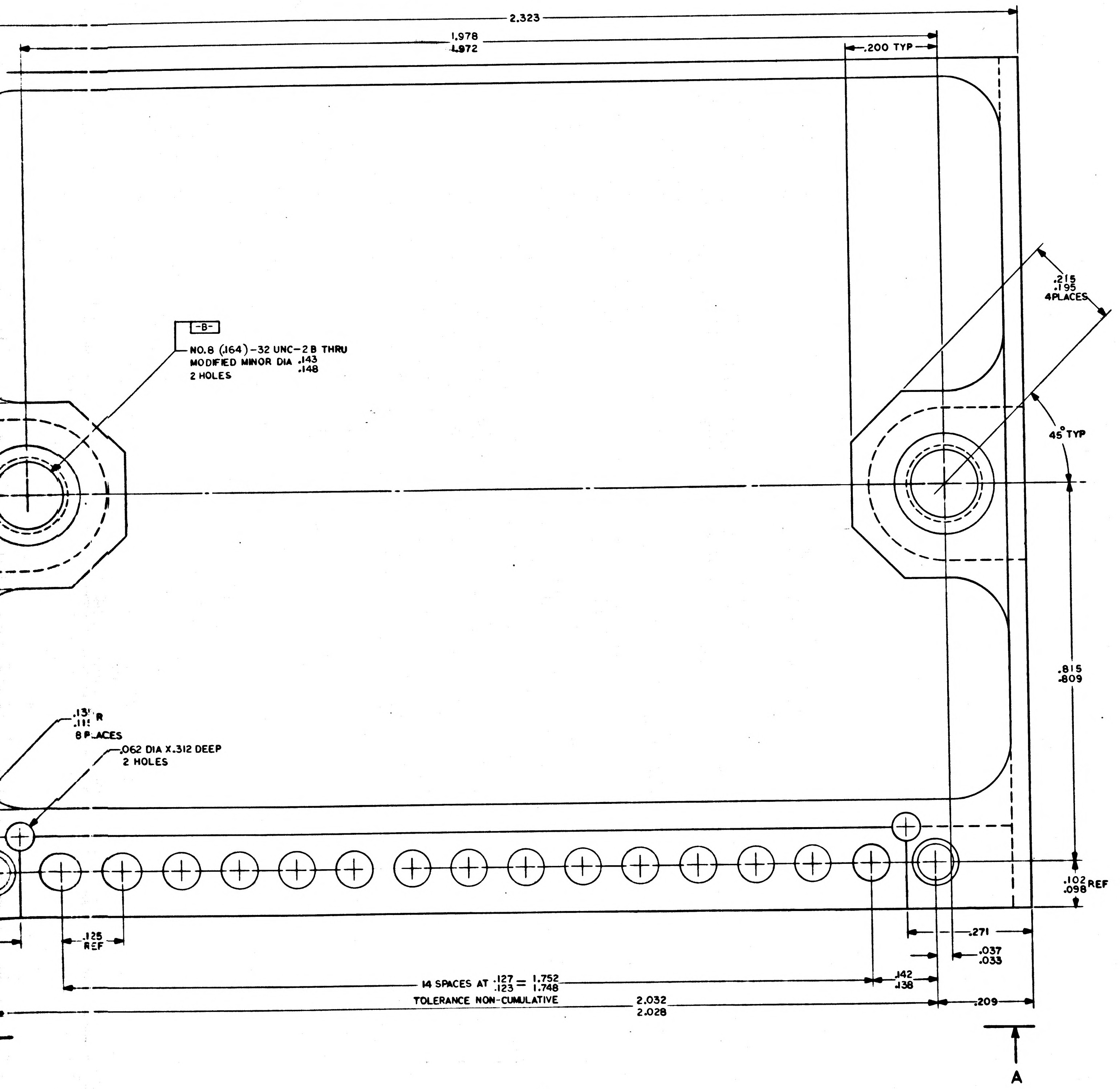
BRACKET, CONNECTORS
INSEPARABLE ASSEMBLY
PIPA ELECTRONICS

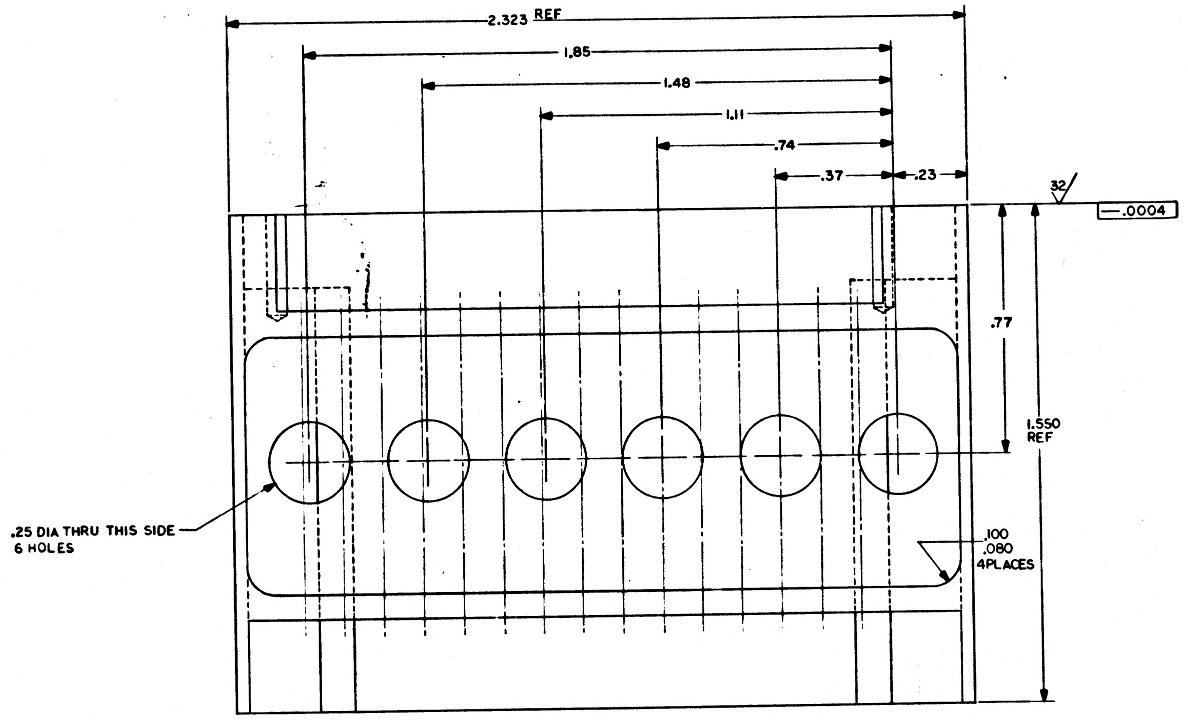
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008362

SCALE 2/1 SHEET 1 OF 1

REVISIONS TORR 20771-

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.323
1.978
1.972
.200 TYP
.215
.195
4PLACES
-B-
NO.8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
45° TYP
.815
.809
.135 R
.115
8 PLACES
.062 DIA X.312 DEEP
2 HOLES
.102
.098 REF
.125
REF
.271
.037
.033
14 SPACES AT .127/.123 = 1.752/1.748
TOLERANCE NON-CUMULATIVE
.142
.138
2.032
2.028
.209
A


2.323 REF
1.85
1.48
1.11
.74
.37
.23
32
.0004
.77
1.550
REF
.25 DIA THRU THIS SIDE
6 HOLES
.100
.080
4PLACES

VIEW A-A
SCALE: 5/1

2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007124	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN JUN 16-65
CHECKED 1 JUL 65
APPROVED 1 JUL 65
APPROVED
APPROVED MIT 13 JUL 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

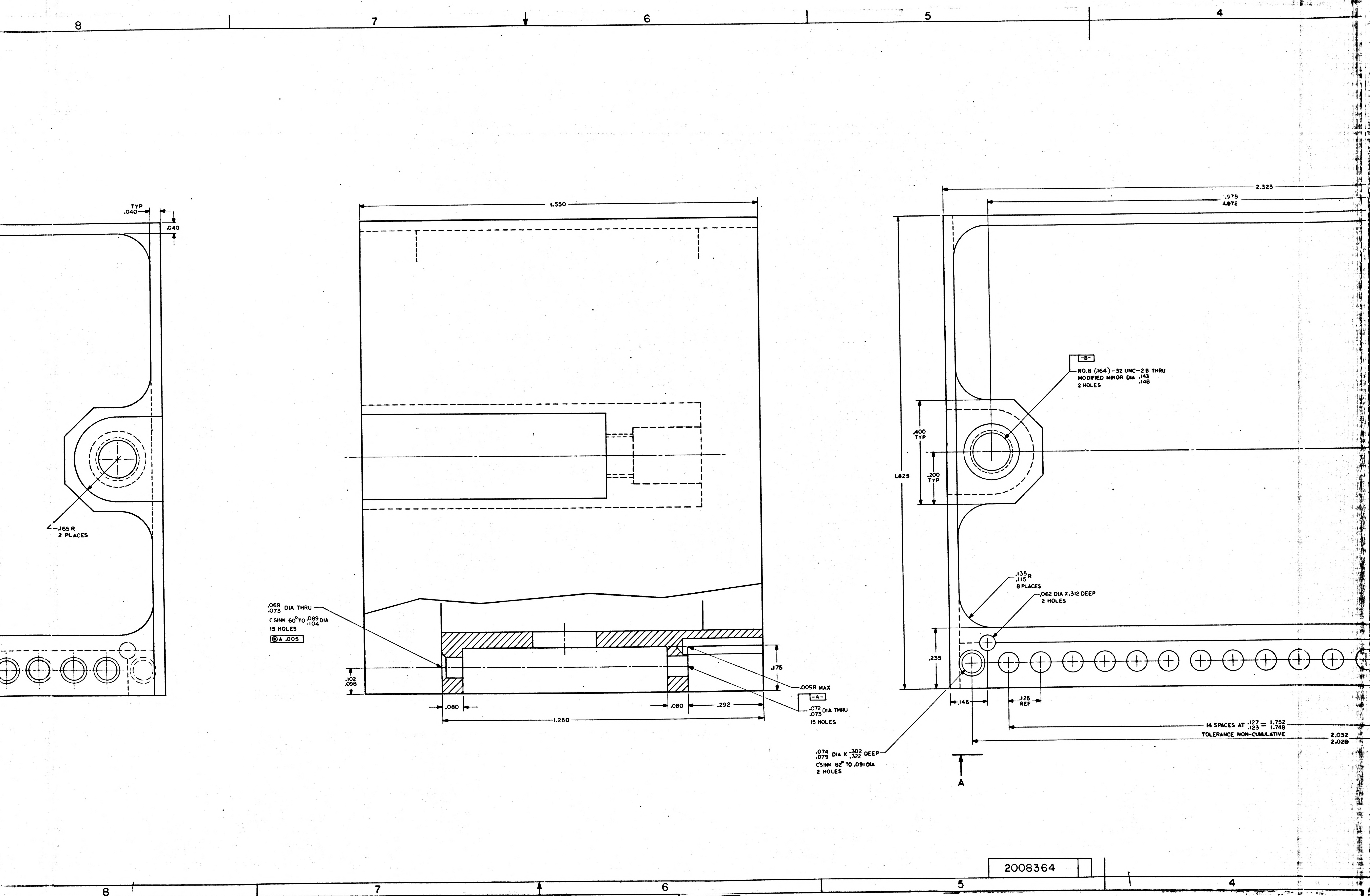
FRAME
ANTI CREEP

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008364
SCALE 10/1
SHEET 1 OF 1

2008364

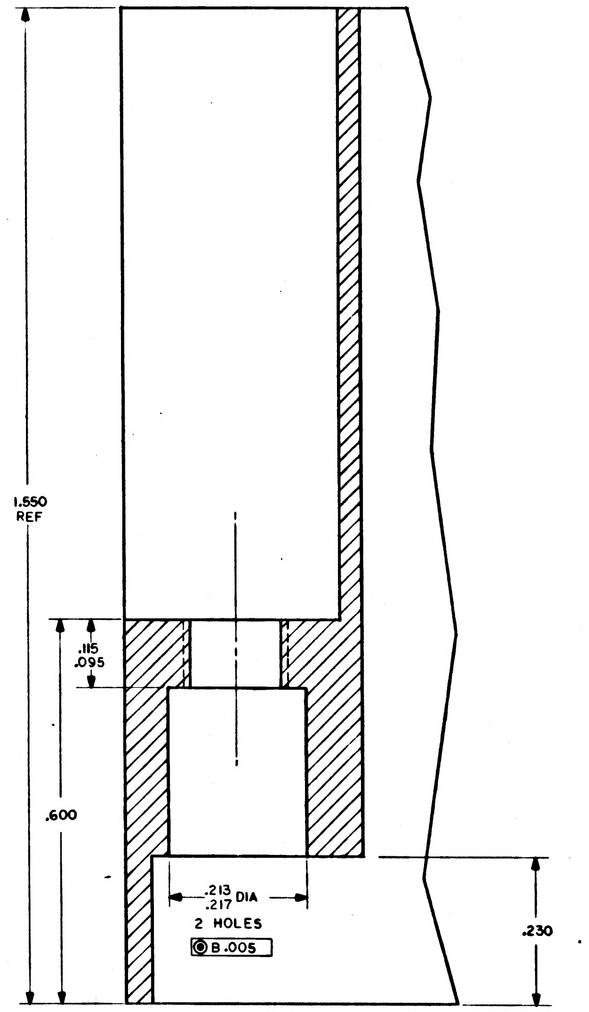
2008364

E3

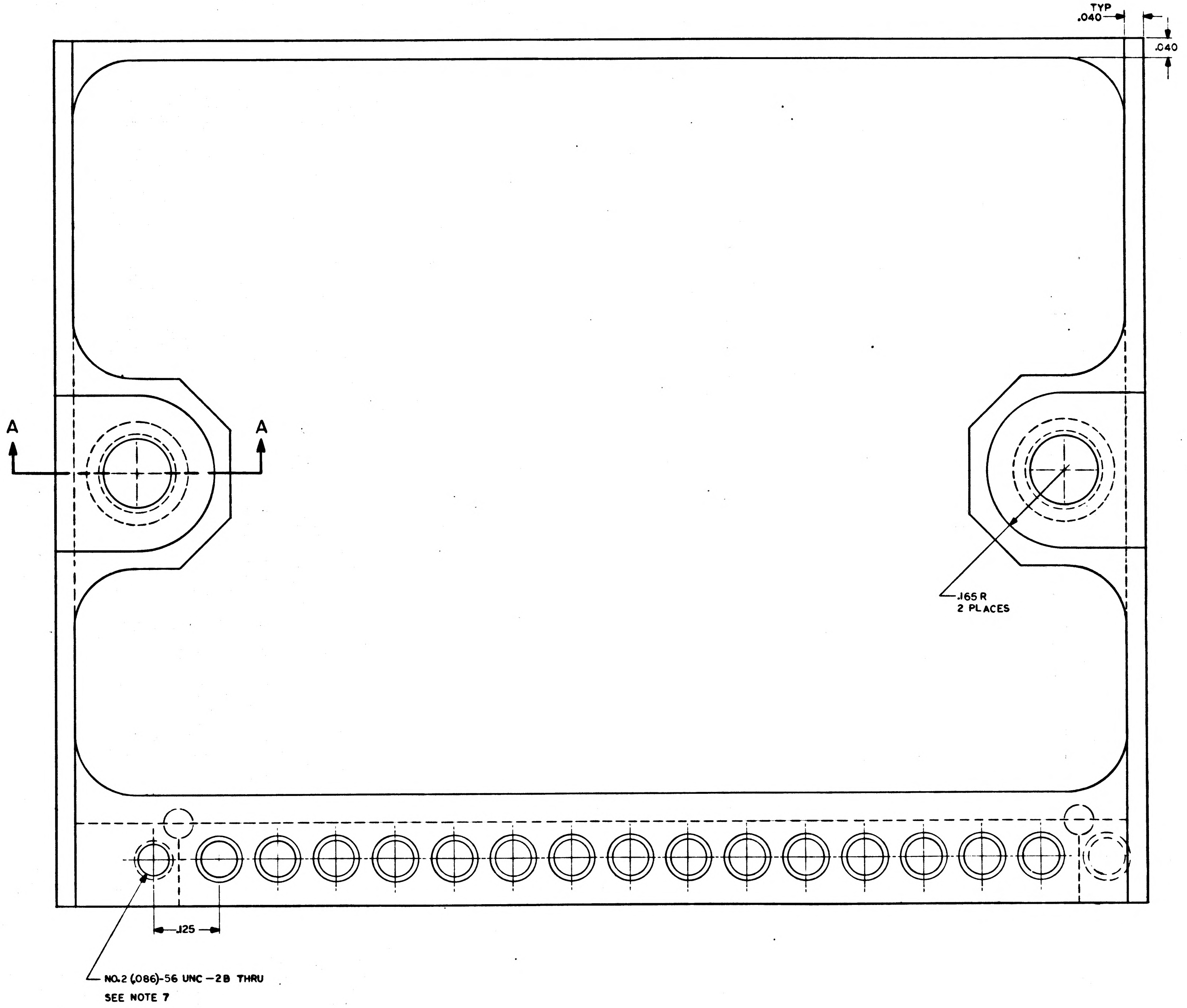
8
7
6
5
4
TYP
.040
.040
.165 R
2 PLACES
1.550
.069
.073 DIA THRU
CSINK 60° TO .089
.104 DIA
15 HOLES
◎ A .005
.102
.098
.080
.080
.292
1.250
.175
.005R MAX
-A-
.072
.073 DIA THRU
15 HOLES
2.323
1.978
1.972
-B-
NO.8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
.400
TYP
.200
TYP
1.825
.135
.115 R
8 PLACES
.062 DIA X.312 DEEP
2 HOLES
.235
.146
.125
REF
14 SPACES AT .127
.123 = 1.752
1.748
TOLERANCE NON-CUMULATIVE
2.032
2.028
.074
.079 DIA X .302
.322 DEEP
C'SINK 82° TO .091 DIA
2 HOLES
A
2008364
8
7
6
5
4

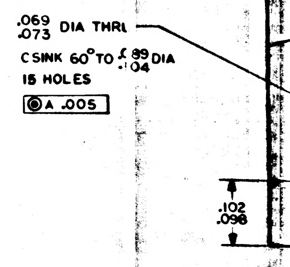
F-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


1.550
REF
.115
.095
.600
.213
.217 DIA
2 HOLES
◎ B .005
.230

PARTIAL SECTION A—A


TYP
.040
.040
A
A
.165 R
2 PLACES
.125
NO.2 (.086)-56 UNC-2B THRU
SEE NOTE 7


.069
.073 DIA THRU
CSINK 60° TO .089
.104 DIA
15 HOLES
◎ A .005
.102
.098

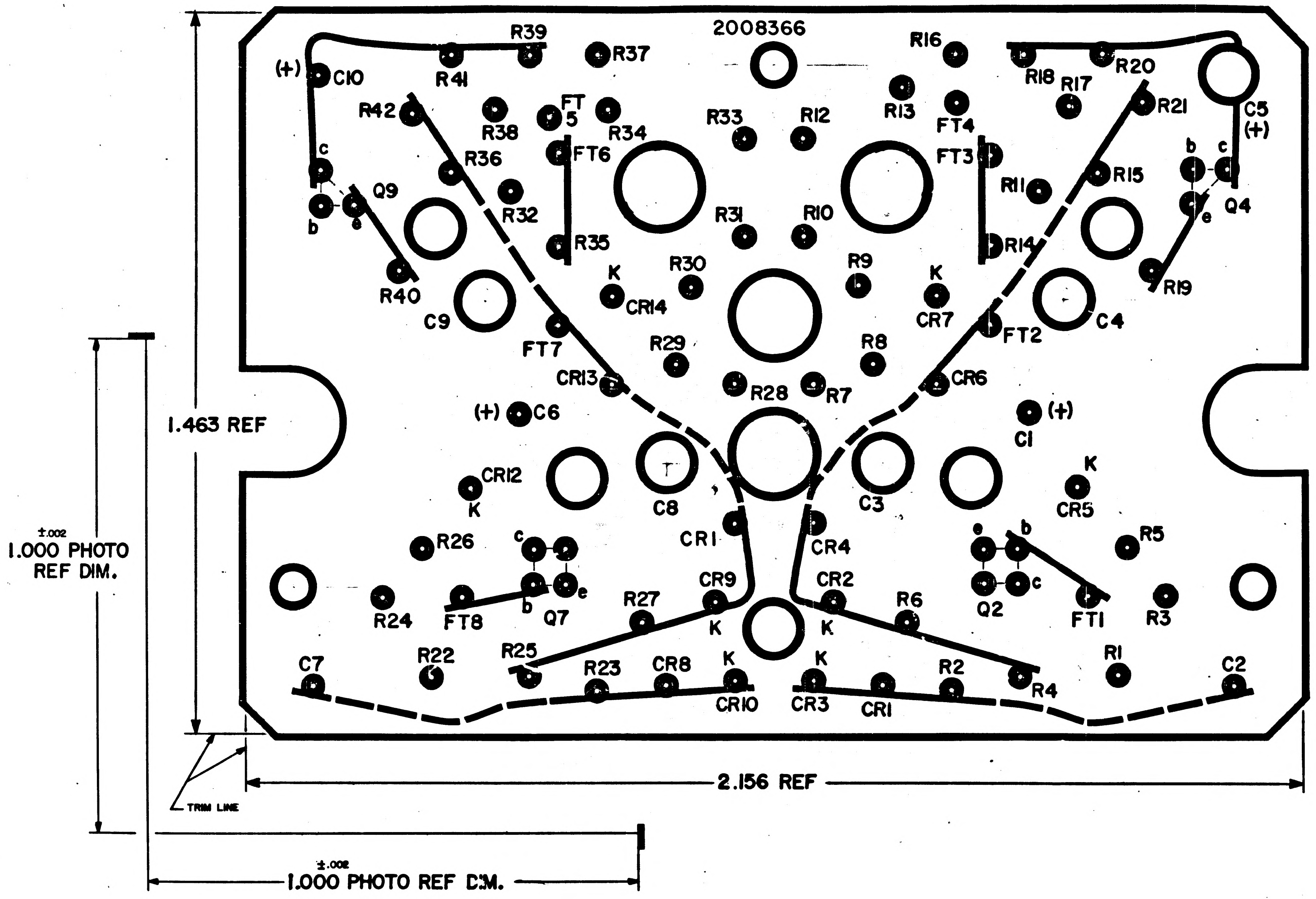
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\bigtriangledown}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040
8. IDENTIFY WITH DRAWING NO. AND REVISION PER ND 1002019

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20771

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23906				


2008366
R39
R37
R16
(+)
C10
R41
R18
R17
R20
R21
C5
(+)
R42
R38
FT
5
R34
R33
R12
R13
FT4
R36
FT6
FT3
R15
c
b
c
Q9
R11
Q4
b
e
e
R32
R31
R10
R35
R14
R19
R40
K
CR14
R30
R9
K
CR7
C9
C4
FT7
R29
R8
FT2
CR13
R28
R7
CR6
(+)
C6
C1
(+)
1.463 REF
K
CR12
K
C8
C3
CR5
±.002
1.000 PHOTO
REF DIM.
CR1
CR4
R26
c
e
b
R5
R24
FT8
b
Q7
e
R27
CR9
CR2
R6
Q2
c
FT1
R3
R25
K
K
R22
R1
C7
R23
CR8
K
K
R2
R4
C2
CR10
CR3
CR1
2.156 REF
TRIM LINE
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

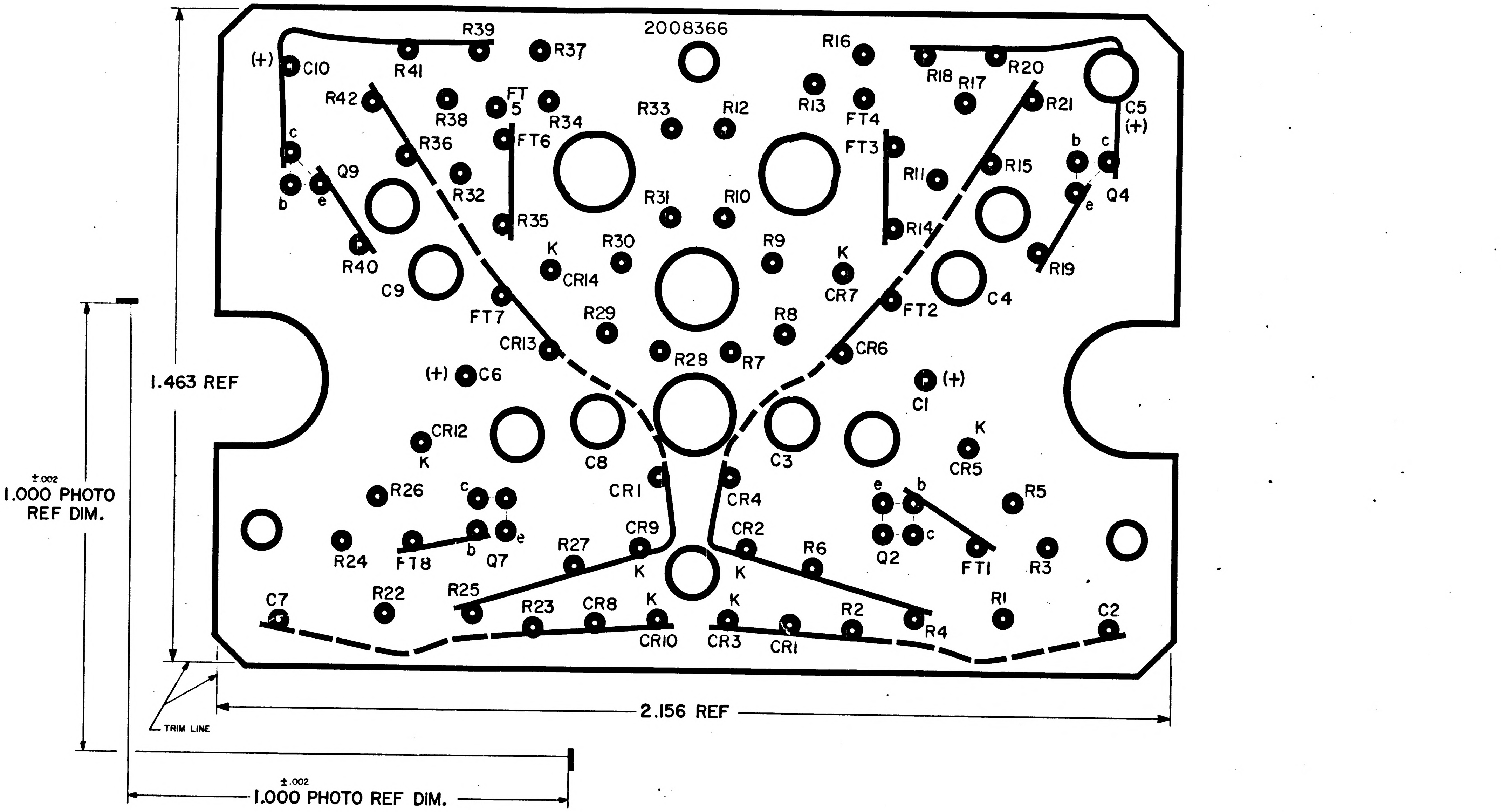
DRAWN	[illegible]	
CHECKED	[illegible]	JUL 65
APPROVED	[illegible]	JUL 65
APPROVED	[illegible]	JUL 65
APPROVED MIT	[illegible]	
APPROVED MSC	[illegible]	
		DATE

PHOTOGRAPHIC MASTER WIRING BOARD BOTTOM
ANTI CREEP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008365

SCALE 10/1 SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISED PER TDRR 23906				W
B		REVISED PER TDRR 27826			8 APR 66	



2008366
(+)
C10
R41
R39
R37
R42
R38
FT 5
R34
FT6
R36
c
Q9
b
e
R32
R35
R40
C9
FT7
CR13
K
CR14
R30
R33
R12
R31
R10
R29
R28
R7
R8
R9
R16
R13
FT4
FT3
R18
R17
R20
R21
C5
(+)
R11
R15
b
c
Q4
e
R14
R19
K
CR7
FT2
C4
CR6
(+)
C6
CR12
K
C8
C3
C1
(+)
K
CR5
R26
c
b
e
Q7
R24
FT8
CR1
CR4
CR9
CR2
R27
K
K
R6
e
b
c
Q2
FT1
R5
R3
C7
R22
R25
R23
CR8
K
CR10
K
CR3
CR1
R2
R4
R1
C2
1.463 REF
±.002
1.000 PHOTO REF DIM.
TRIM LINE
2.156 REF
±.002
1.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Louis A Lowe
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

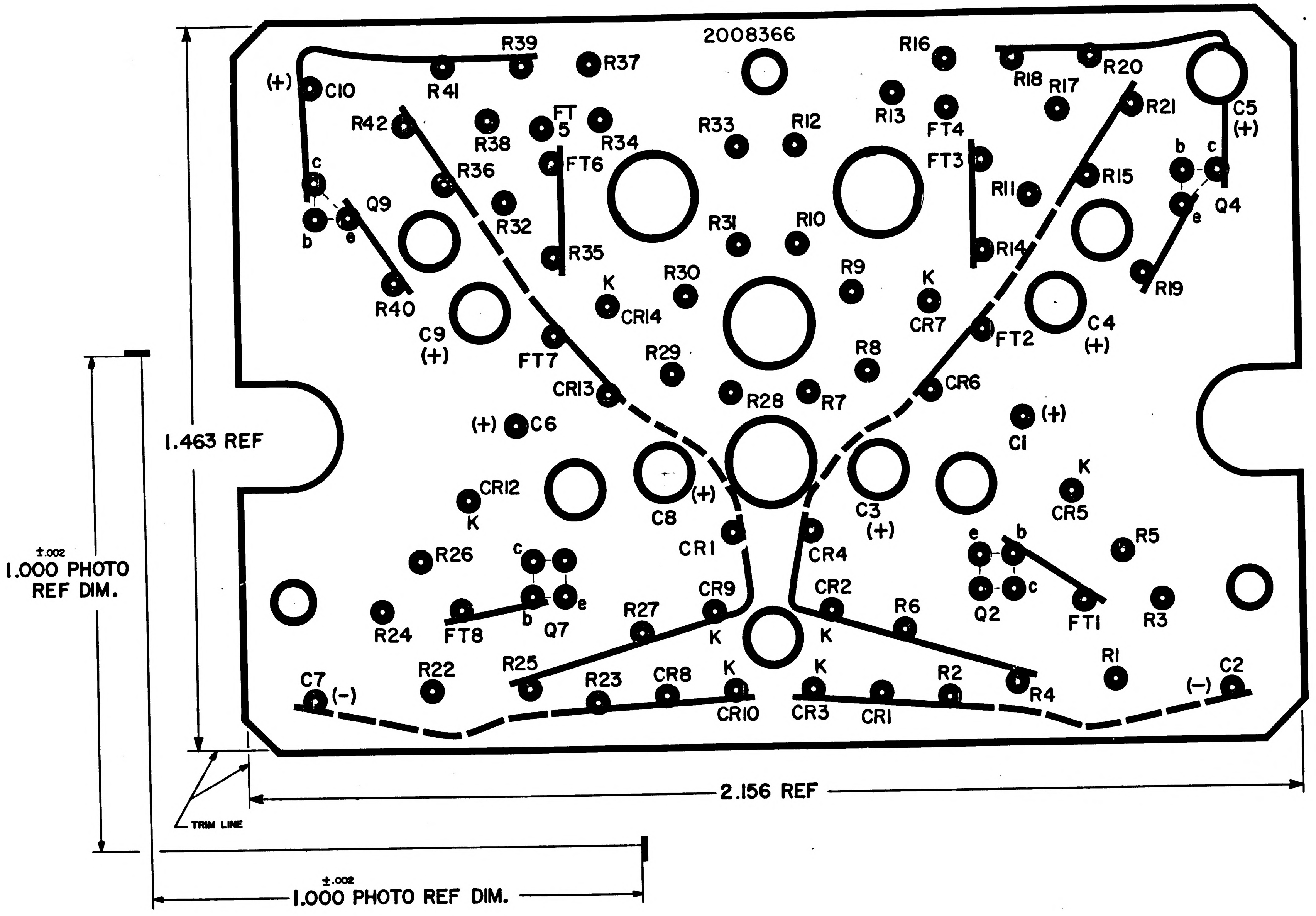
PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM
ANTI CREEP

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2008365
SCALE 10/1
SHEET 1 OF 1

2008365 B

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS [illegible]						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2008366
R39
R37
R16
R18
R17
R20
(+)
C10
R41
R42
R38
FT
5
R34
R33
R12
R13
FT4
R21
C5
(+)
FT6
R36
FT3
R15
b
c
c
Q9
R32
R11
Q4
b
e
e
R31
R10
R35
R14
R40
K
R30
R9
K
R19
C9
(+)
CR14
CR7
C4
(+)
FT7
R29
R8
FT2
CR13
R28
R7
CR6
(+)
C6
(+)
C1
1.463 REF
K
CR12
K
(+)
C8
C3
(+)
CR5
CR1
CR4
R5
±.002
1.000 PHOTO
REF DIM.
R26
c
e
b
R24
FT8
b
Q7
e
R27
CR9
CR2
R6
Q2
c
FT1
R3
K
K
R25
R23
CR8
K
K
R1
R2
C7
(−)
R22
CR10
CR3
CR1
R4
(−)
C2
2.156 REF
TRIM LINE
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED 9 JUL 65
APPROVED 11 JUL 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD BOTTOM
ANTI CREEP

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008365
SCALE 10/1
SHEET 1 OF 1

2008365

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 20771

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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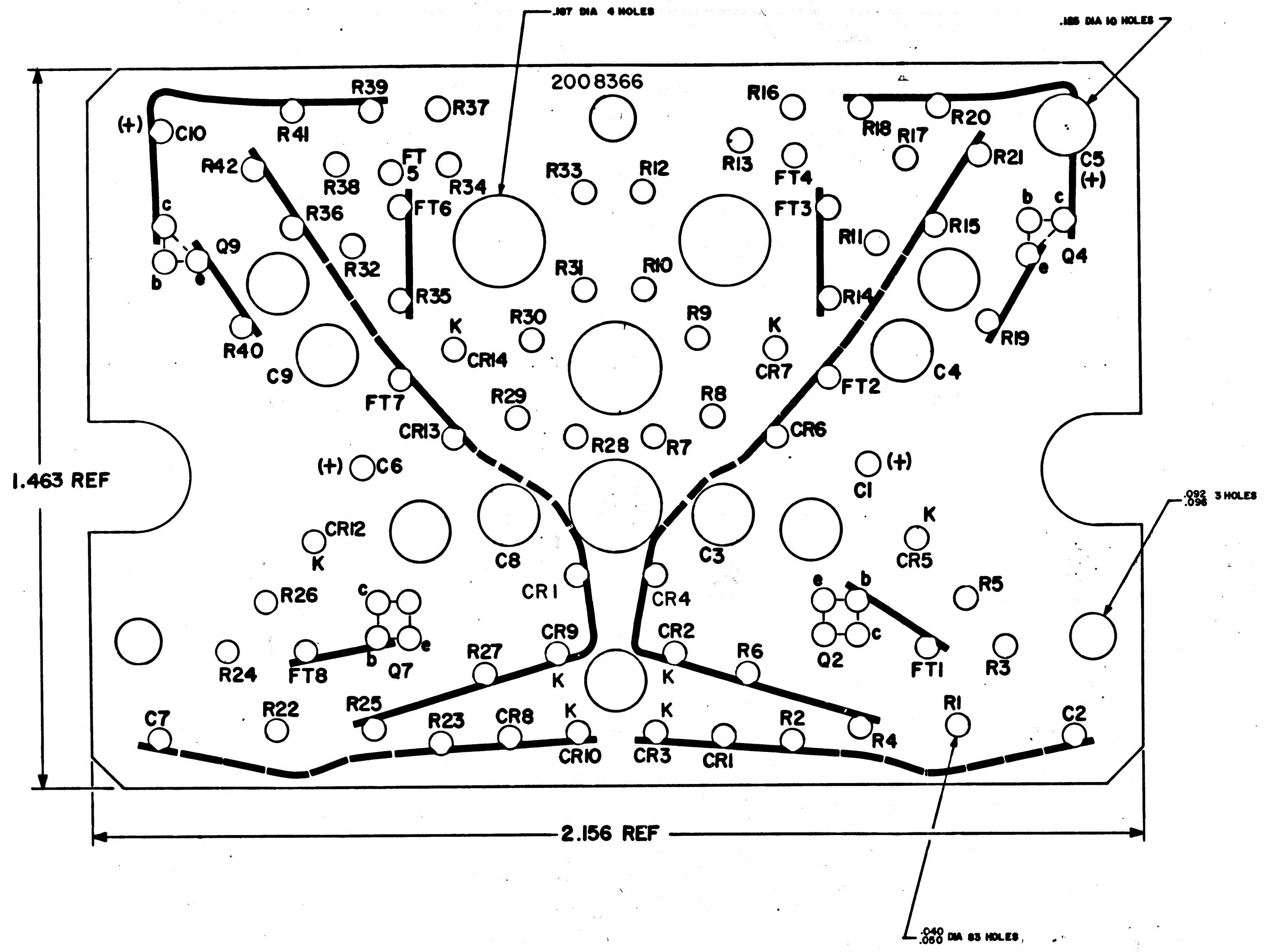

.187 DIA 4 HOLES
.185 DIA 10 HOLES
2008366
R39
R37
R16
(+)
C10
R41
R18
R17
R20
R42
R38
FT 5
R34
R33
R12
R13
FT4
R21
C5 (+)
R36
FT6
FT3
R15
c
b
Q9
R32
R31
R10
R11
b c
e
Q4
b e
R35
R14
R19
R40
K
CR14
R30
R9
K
CR7
C9
C4
FT7
R29
R8
FT2
CR13
CR6
R28
R7
(+) C6
(+)
C1
1.463 REF
.092 .096 3 HOLES
CR12
K
K
CR5
C8
C3
CR1
CR4
R26
c
e b
R5
b
c
CR9
CR2
R27
R6
R24
FT8
Q7
e
K
K
Q2
FT1
R3
R25
R22
C7
R23
CR8
K
K
R2
R1
C2
R4
CR10
CR3
CR1
2.156 REF
.040 .050 DIA 65 HOLES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008365 PHOTOGRAPHIC MASTER

2008366 A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007124	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Louis A Lewis
CHECKED R. Lindaml 9.21.65
APPROVED 9.26.65
APPROVED D. J. Boes
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD BOTTOM
ANTI CREEP

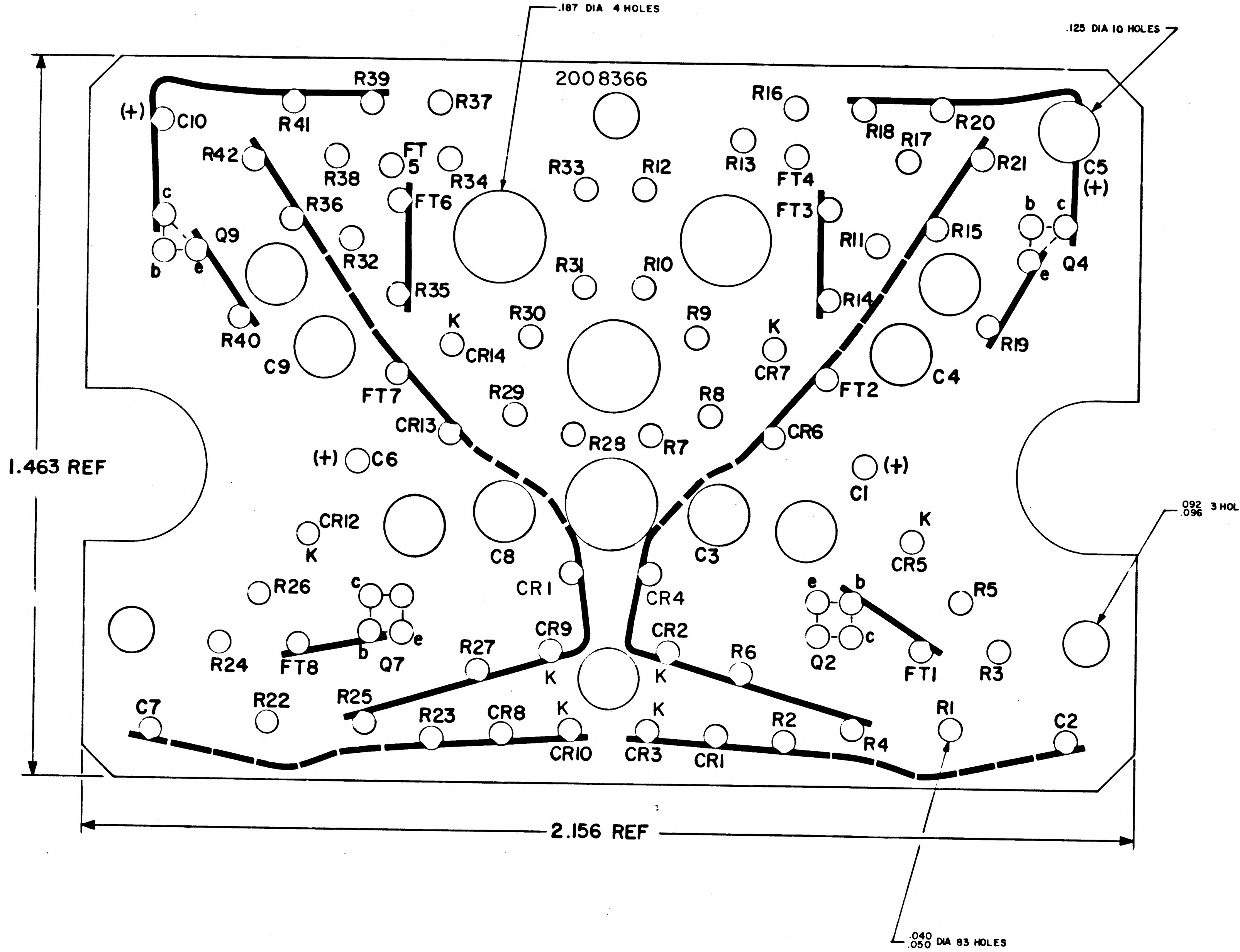
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008366
SCALE 10/1
SHEET 1 OF 1

MASTER

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23906				
B		REVISED PER TDRR 27826			18 APR 66	


.187 DIA 4 HOLES
.125 DIA 10 HOLES
2008366
.092
.096 3 HOLES
.040
.050 DIA 83 HOLES
1.463 REF
2.156 REF
(+) C10
R39
R41
R37
R42
R38
FT 5
R34
FT6
R36
c
Q9
b
e
R32
R35
R40
C9
K
CR14
R30
FT7
R29
CR13
(+) C6
R28
R7
R33
R12
R31
R10
R9
R8
R16
R13
FT4
FT3
R11
R14
R18
R17
R20
R21
C5 (+)
b c
Q4
e
R15
R19
C4
K
CR7
FT2
CR6
(+)
C1
K
CR5
CR12
K
C8
C3
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CR4
R26
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b
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R3
C7
R22
R25
R23
CR8
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CR10
K
CR3
CR1
R2
R4
R1
C2

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008365 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007124	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

WIRING BOARD BOTTOM
ANTI CREEP

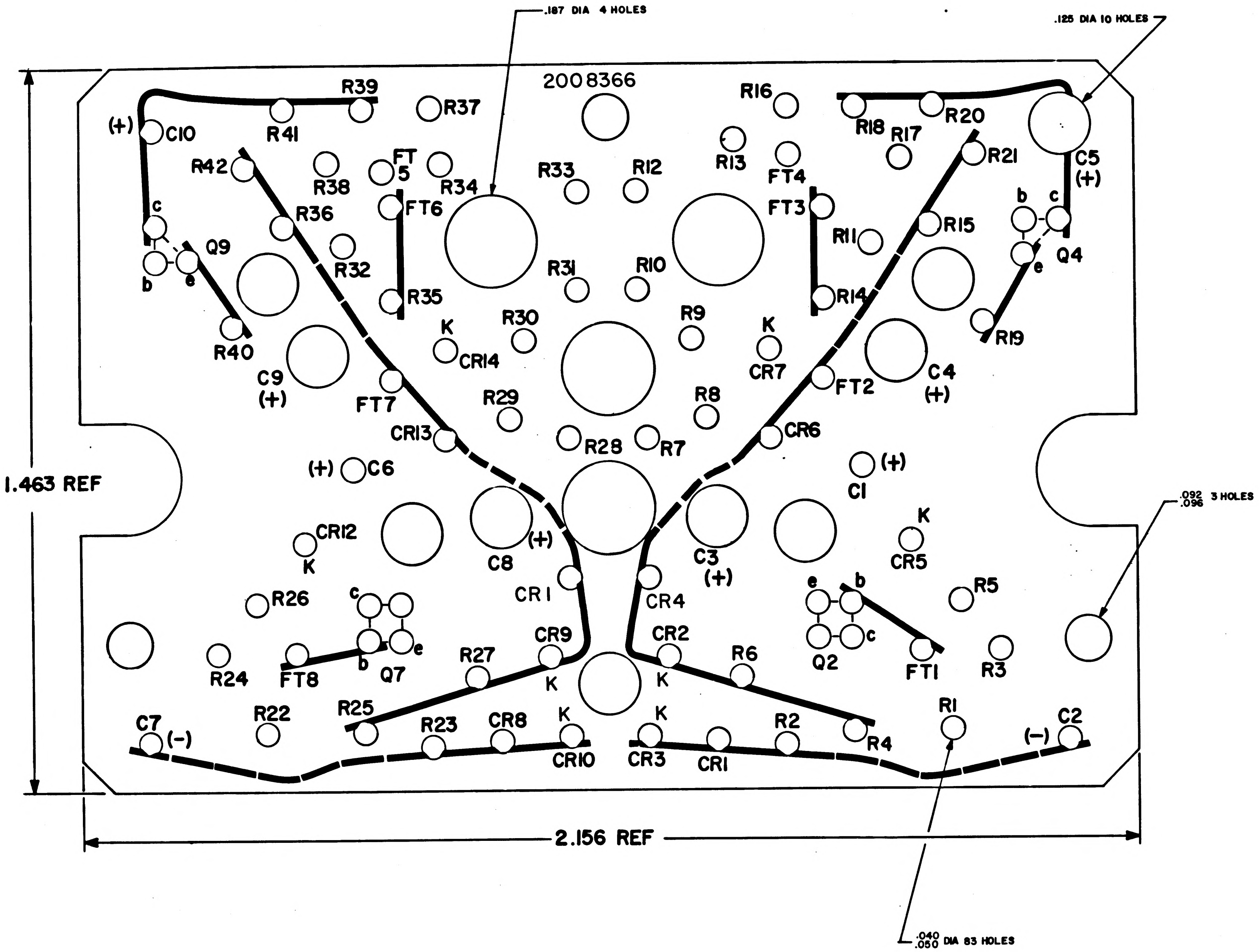
CODE IDENT NO 80230
SIZE E
DRAWING NO 2008366
SCALE 10/1
SHEET 1 OF 1

2008366 B

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS [illegible]

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



.187 DIA 4 HOLES
.125 DIA 10 HOLES
2008366
R39
R37
R16
R18
R17
R20
R21
(+)
C10
R41
C5
(+)
R42
R38
FT
5
R34
R33
R12
R13
FT4
FT3
R36
FT6
R11
R15
b
c
c
b
e
Q4
Q9
e
R32
R31
R10
R14
R35
R19
R40
K
CR14
R30
R9
K
CR7
C9
(+)
FT7
R29
R8
FT2
C4
(+)
CR13
CR6
R28
R7
(+)
C6
C1
(+)
1.463 REF
.092
.096
3 HOLES
CR12
K
(+)
C8
C3
(+)
K
CR5
CR1
CR4
R26
c
e
b
R5
R24
FT8
b
e
Q7
R27
CR9
K
CR2
K
R6
c
Q2
FT1
R3
R22
R25
R23
CR8
K
K
R2
R4
R1
C7
(-)
(-)
C2
CR10
CR3
CR1
2.156 REF
.040
.050
DIA 83 HOLES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .051 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008365 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007124	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD BOTTOM
ANTI CREEP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008366

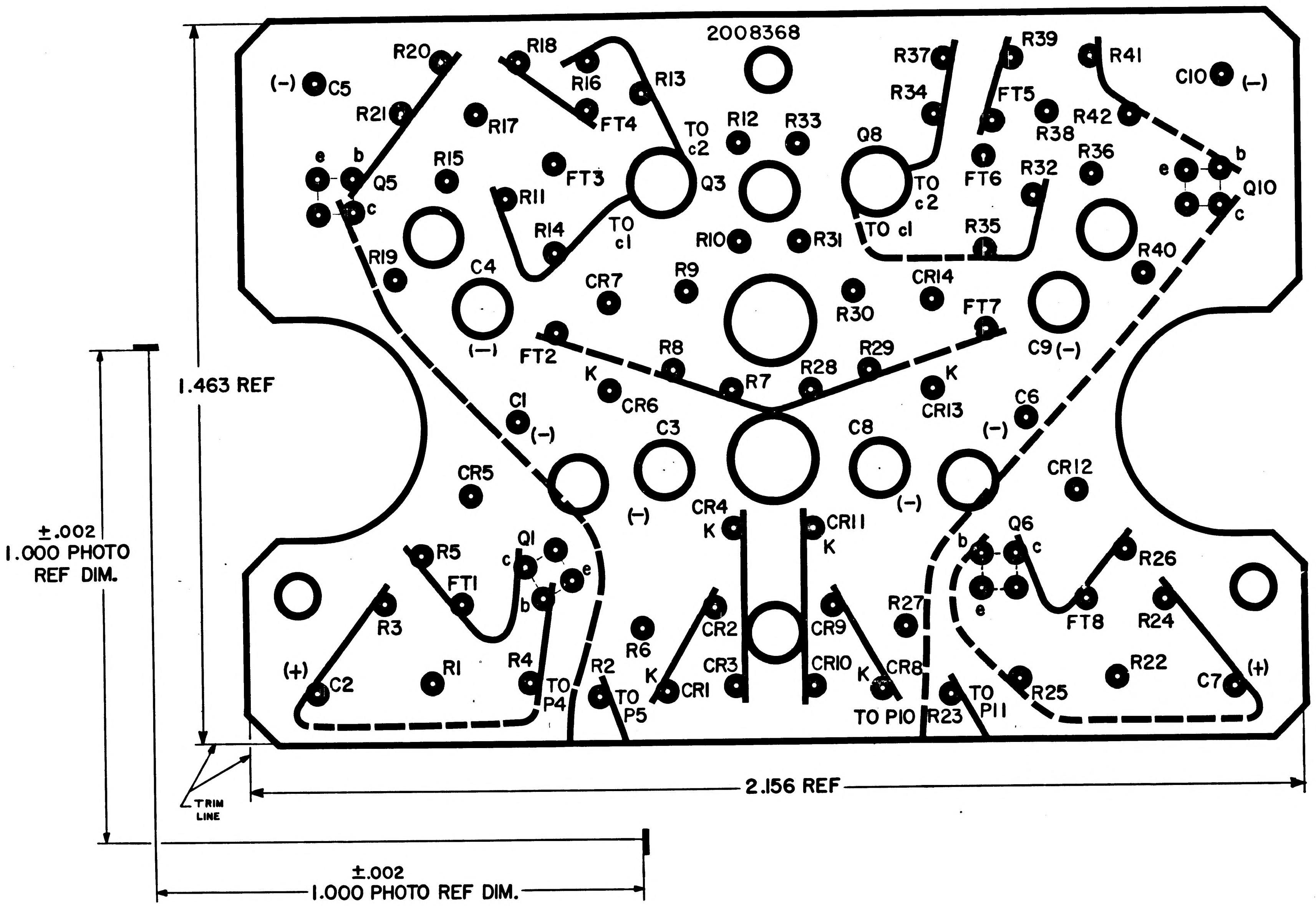
SCALE 10/1
SHEET 1 OF 1

2008366

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS -398 2077.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2008368
R20
R18
R16
R13
(−) C5
R21
R17
FT4
TO c2
R12
R33
Q8
R37
R39
R34
FT5
R41
C10 (−)
R38
R42
e
b
Q5
c
R15
FT3
Q3
TO c2
FT6
R32
R36
e
b
Q10
c
R11
R14
TO c1
R10
R31
TO c1
R35
R40
R19
C4
CR7
R9
CR14
R30
FT7
(−)
FT2
R8
R7
R28
R29
C9 (−)
K
CR6
K
CR13
C1
(−)
C3
C8
(−)
C6
CR12
CR5
(−)
(−)
CR4
K
CR11
K
Q1
c
R5
FT1
e
b
Q6
c
b
e
R26
R3
FT8
R24
R27
R6
CR2
CR9
(+)
C2
R1
R4
TO P4
R2
TO P5
K
CR1
CR3
CR10
K
CR8
TO P10
R23
TO P11
R25
R22
C7
(+)
1.463 REF
±.002
1.000 PHOTO
REF DIM.
TRIM LINE
2.156 REF
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTEN POSITIVE FILMS TO DEMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Louis Alvarez 17 June 65
CHECKED 9 Jul 65
APPROVED 11 Jul 65
APPROVED 13 Jul 65
APPROVED MIT 13 Jul 65
APPROVED MSC 7-13-65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

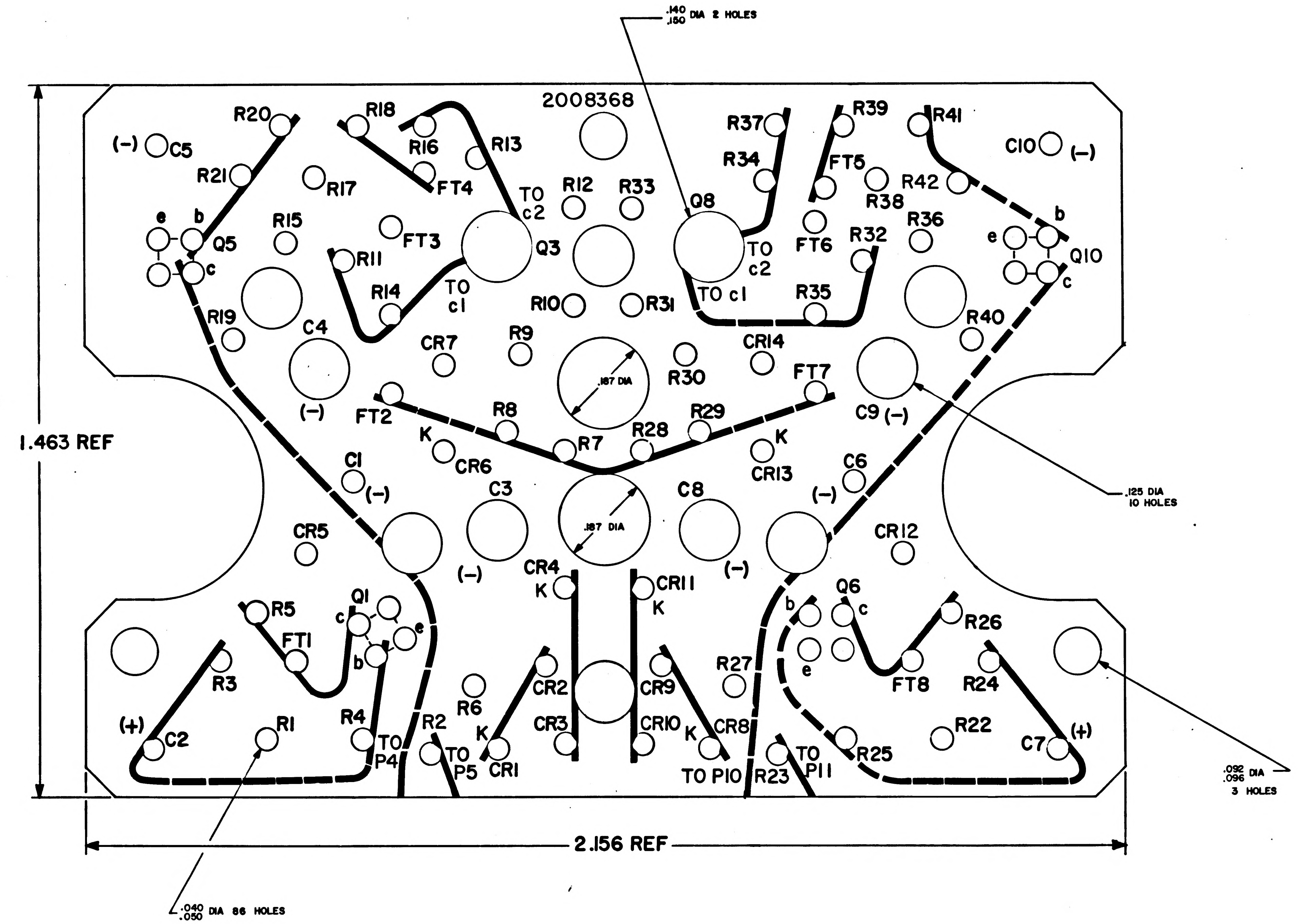
PHOTOGRAPHIC MASTER
WIRING BOARD TOP
ANTI CREEP

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008367
SCALE 10/1
SHEET 1 OF 1

2008367

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



.140
.150 DIA 2 HOLES
2008368
R20
R18
R16
R13
R37
R39
R41
(−) C5
C10 (−)
R21
R17
FT4
TO c2
R12
R33
Q8
R34
FT5
R42
R38
e
b
Q5
c
R15
FT3
Q3
TO c2
FT6
R32
R36
e
b
Q10
c
R11
R14
TO c1
R10
R31
TO c1
R35
R19
C4
R40
CR7
R9
.187 DIA
CR14
R30
FT7
(−)
FT2
R8
R7
R28
R29
C9 (−)
K
CR6
K
CR13
C1
(−)
C3
.187 DIA
C8
(−)
C6
.125 DIA
10 HOLES
1.463 REF
CR5
(−)
CR4
K
CR11
K
(−)
CR12
R5
Q1
c
e
b
FT1
b
Q6
c
R26
e
R3
R6
CR2
CR9
R27
FT8
R24
(+)
C2
R1
R4
TO P4
R2
TO P5
K
CR1
CR3
CR10
K
CR8
TO P10
R23
TO P11
R25
R22
C7
(+)
.092
.096 DIA
3 HOLES
2.156 REF
.040
.050 DIA 86 HOLES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
2008367 PHOTOGRAPHIC MASTER

2008368

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Louis Alonzo	19 [illegible]
CHECKED	[illegible]	9 JUL 65
APPROVED	[illegible]	11 JUL 65
APPROVED	[illegible]	12 Jul [illegible]
APPROVED MIT	W Ragan	[illegible]
APPROVED MSC	[illegible]	[illegible]
		DATE

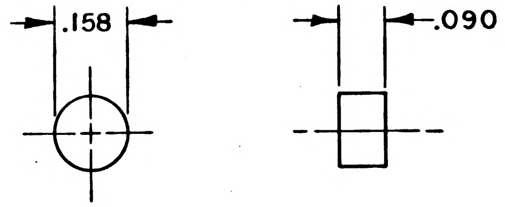
WIRING BOARD TOP
ANTI CREEP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008368
SCALE 10/1		SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA [illegible] RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22197

SYM	ZONE	DESCRIPTION	DR	CHK	DATE



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6 AL PER QQ-A-250/11, T6
3. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS AND SHARP EDGES .005/.015.
5. NICKEL PLATE .003/.004 THICK PER MIL-F-14072, FINISH M212
6. IDENTIFY WITH PART NO. PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007084	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.005 ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN		7/7/65
CHECKED		27 Aug 65
APPROVED		
APPROVED		8/30/65
APPROVED MIT		9/65
APPROVED MSC		9/1/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DISK, THRUST
CDU

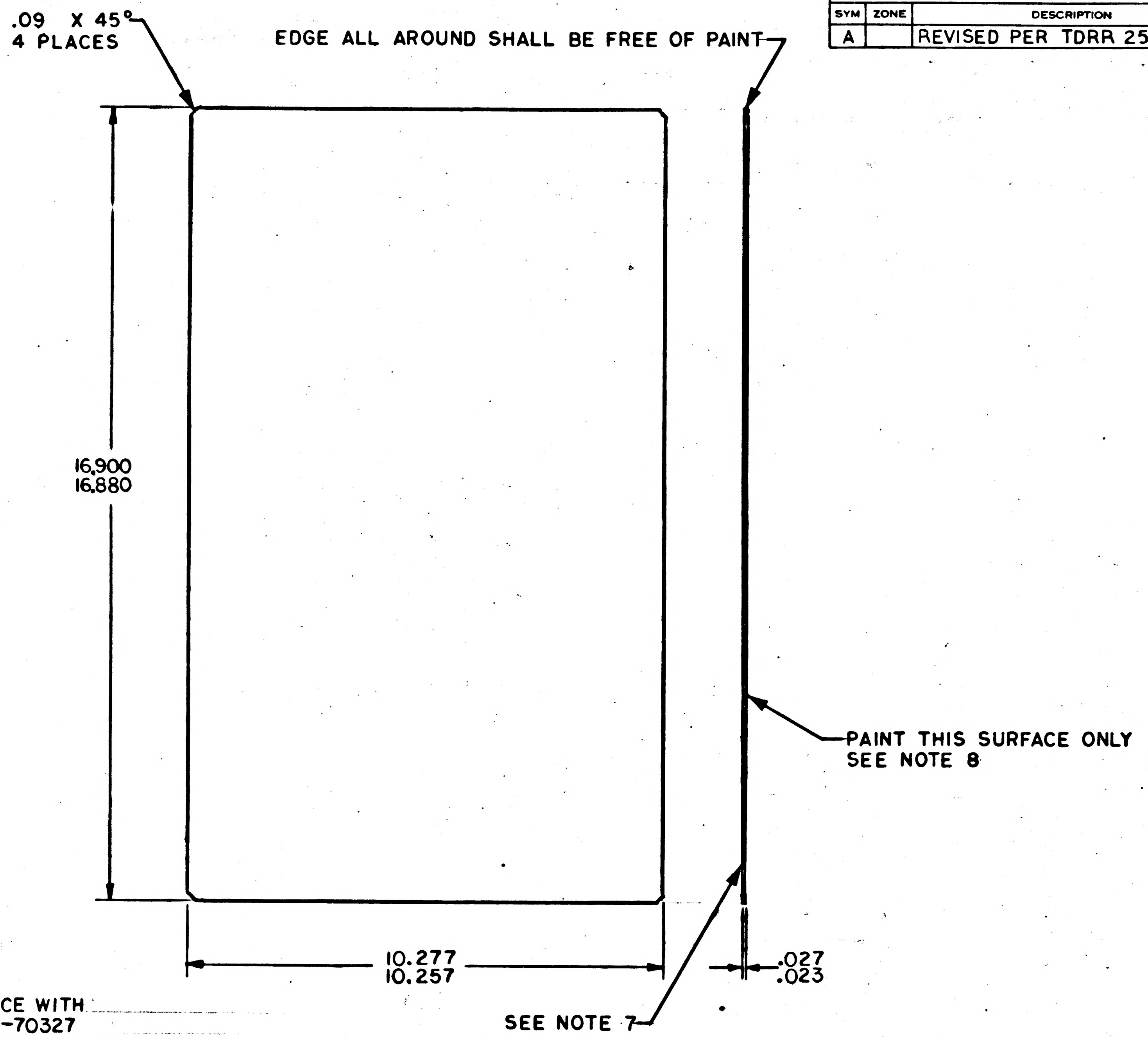
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008369

SCALE 4/1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25792	AA	EPK	2FEB66	WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B–H24 PER QQ-M-44
3. REMOVE BURRS AND SHARP EDGES .005 MAX
4. ALL SURFACES √125
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C. UNLESS OTHERWISE SPECIFIED
6. IDENTIFY WITH PART NO. PER ND1002019
7. FINISH PER ND1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND1002289

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007091	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.01 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN		7Sep65
CHECKED		17Sep65
APPROVED		30Sept65
APPROVED	D.A. Test	9/30/65
APPROVED MIT		
APPROVED MSC		
		DATE

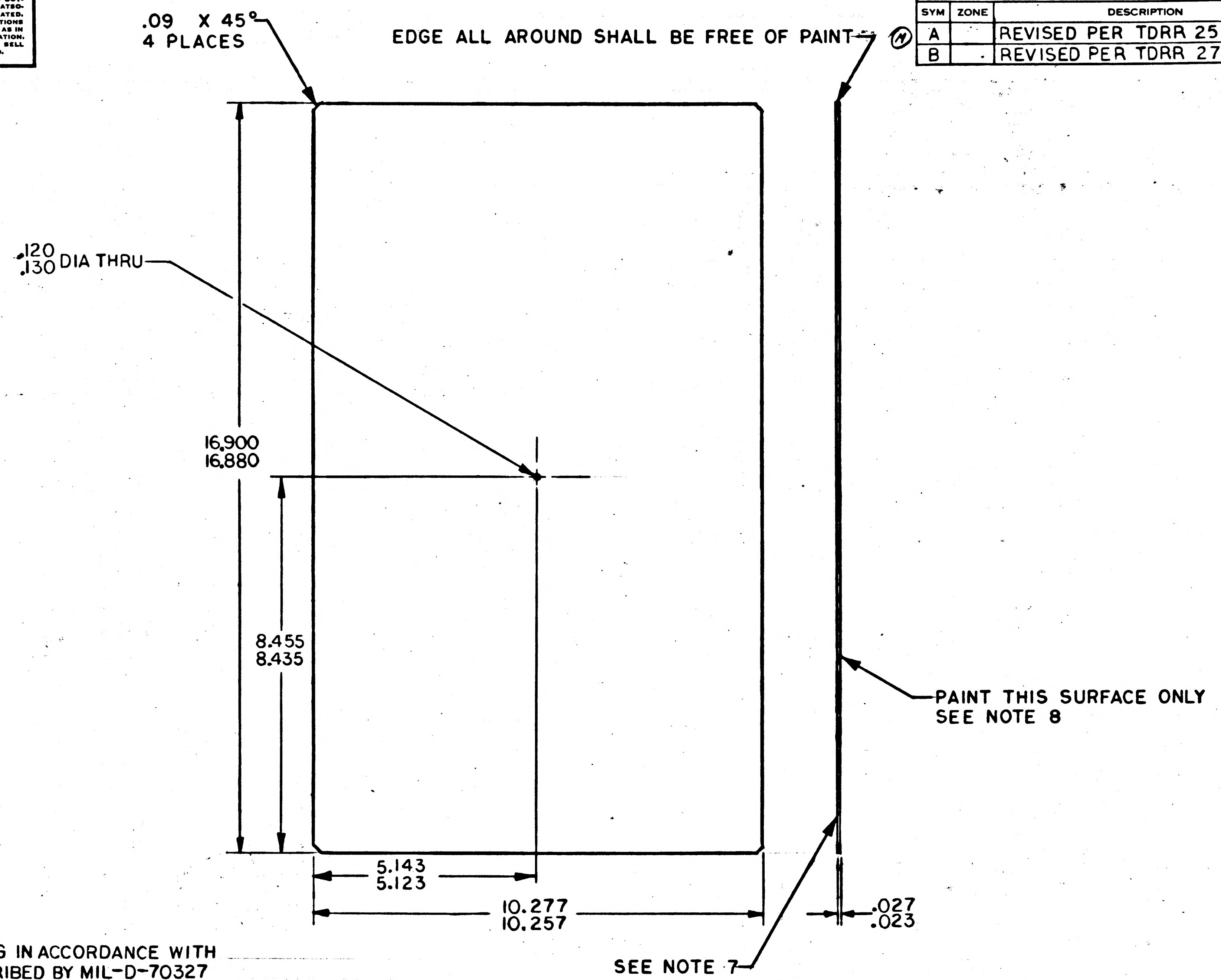
COVER, TOP
TRAY "S"
CDU

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008370
SCALE 1/2		SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25792	AA	RPK	2FEB66	WK
B		REVISED PER TDRR 27147	JWP	LTB	3/16/66	WK



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. REMOVE BURRS AND SHARP EDGES .005 MAX
4. ALL SURFACES √125
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C. UNLESS OTHERWISE SPECIFIED
6. IDENTIFY WITH PART NO. PER ND1002019
7. FINISH PER ND1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND1002289

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007091	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± ——	±.01	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L. Pellini	7Sep65
CHECKED	R.P. Kungsbury	17Sep65
APPROVED	R.V. Barada	20Sept65
APPROVED	D.G. Test	9/20/65
APPROVED MIT	W Kupfer Arthur J. Fitzgerald	2/1/66
APPROVED MSC		
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, TOP
TRAY "S"
CDU

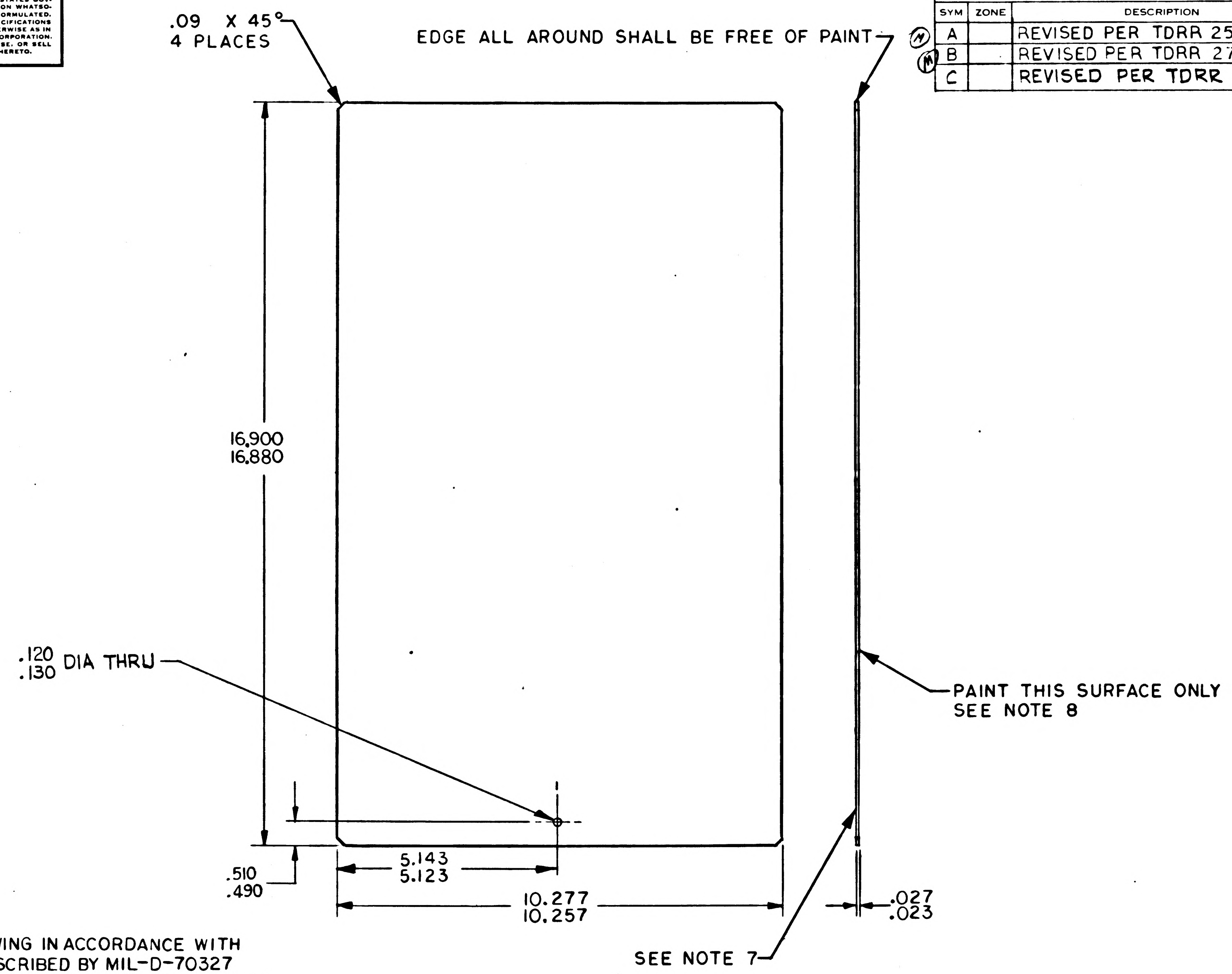
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008370

SCALE 1/2   SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 25792	AA	RPK	2 Feb 66	WK
Ⓜ B		REVISED PER TDRR 27147		LTB	3/14/66	WK
C		REVISED PER TDRR 28512		JRS	6 MAY 66	



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B–H24 PER QQ-M-44
3. REMOVE BURRS AND SHARP EDGES .005 MAX
4. ALL SURFACES $\sqrt{125}$
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C, UNLESS OTHERWISE SPECIFIED
6. IDENTIFY WITH PART NO. PER ND1002019
7. FINISH PER ND1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND1002289

2007091	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± ——	±.01	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	7Sep65
CHECKED	17Sep65
APPROVED	20Sept65
APPROVED	9/20/65
APPROVED MIT	21Sep65
APPROVED MSC	DATE

COVER, TOP
TRAY "S"
CDU

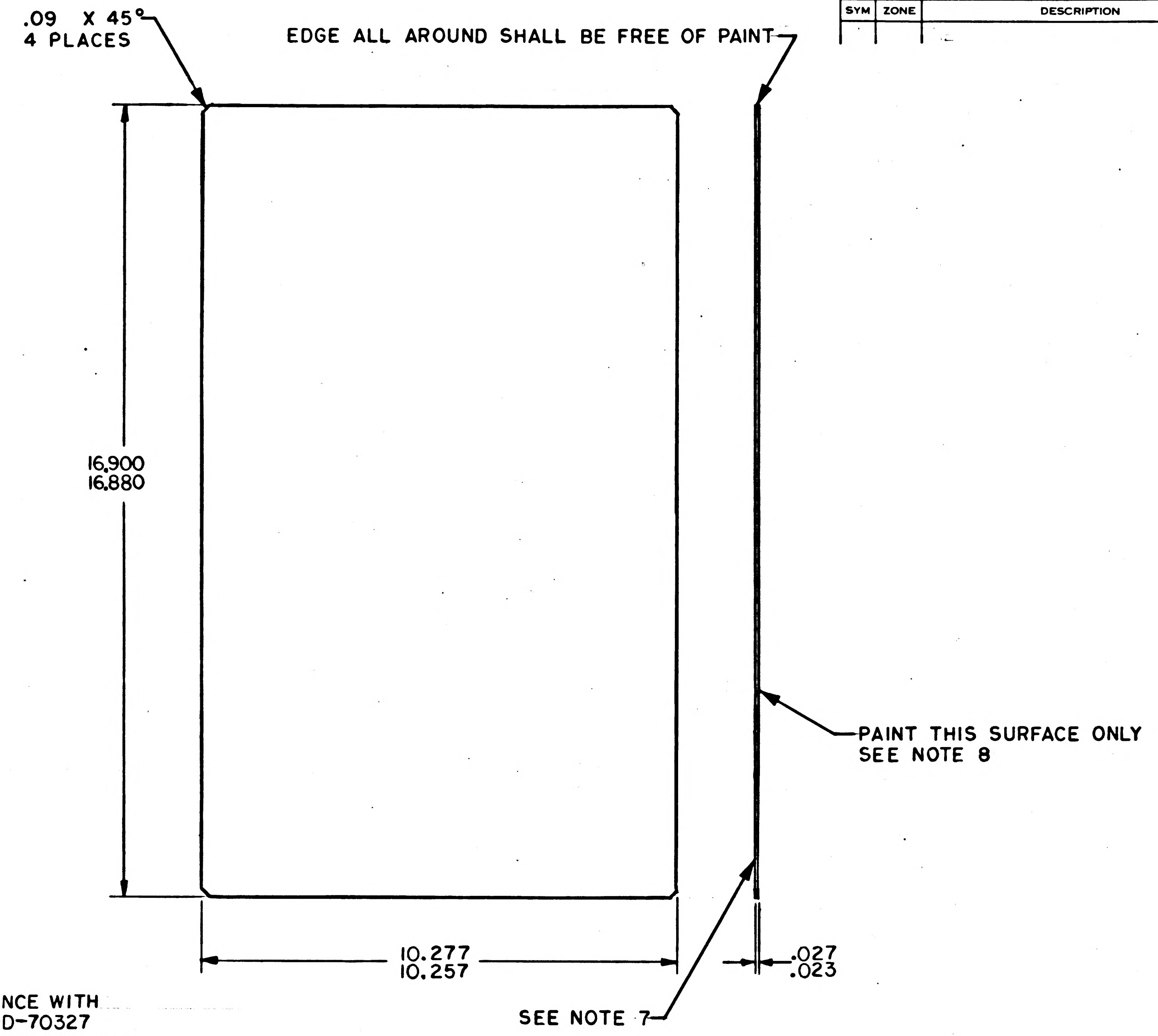
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008370
SCALE 1/2		SHEET 1 OF 1

2008370 | C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B–H24 PER QQ-M-44
3. REMOVE BURRS AND SHARP EDGES .005 MAX
4. ALL SURFACES $\sqrt{125}$
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I CLASS C, UNLESS OTHERWISE SPECIFIED
6. IDENTIFY WITH PART NO. PER ND 1002019
7. FINISH PER ND 1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007091	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.01 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 7Sep65
CHECKED 17Sep65
APPROVED 20Sept65
APPROVED 9/20/65
APPROVED MIT 21Sep65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, TOP
TRAY "S"
CDU

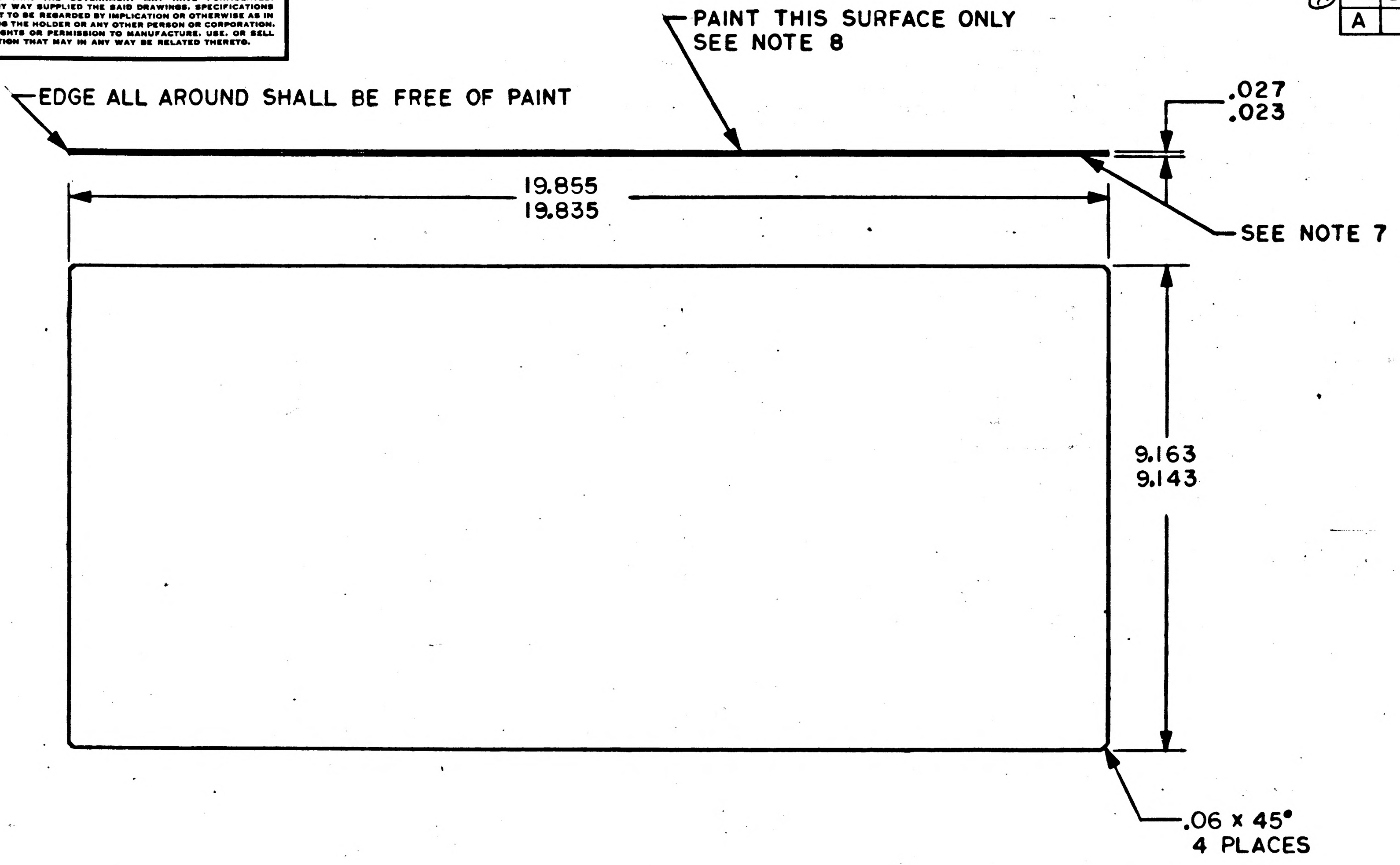
CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008370
SCALE 1/2
SHEET 1 OF 1

2008370

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25825	Ab	PK	3Feb66	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ 31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS AND SHARP EDGES .005 MAX
5. ALL SURFACES 125/
6. IDENTIFY WITH PART NO. PER ND 1002019
7. FINISH PER ND 1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND 1002289

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007090	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± ——	±.01	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Edw. Gross	9 Jun 65
CHECKED	R.P. Kingsbury	17 Sep 65
APPROVED	R.V. Varadi	20 Sep 65
APPROVED	D. Atest	9/20/65
APPROVED MIT	W Ruffer	21 Sep 65
APPROVED MSC	Arthur A. Metzger	
		DATE

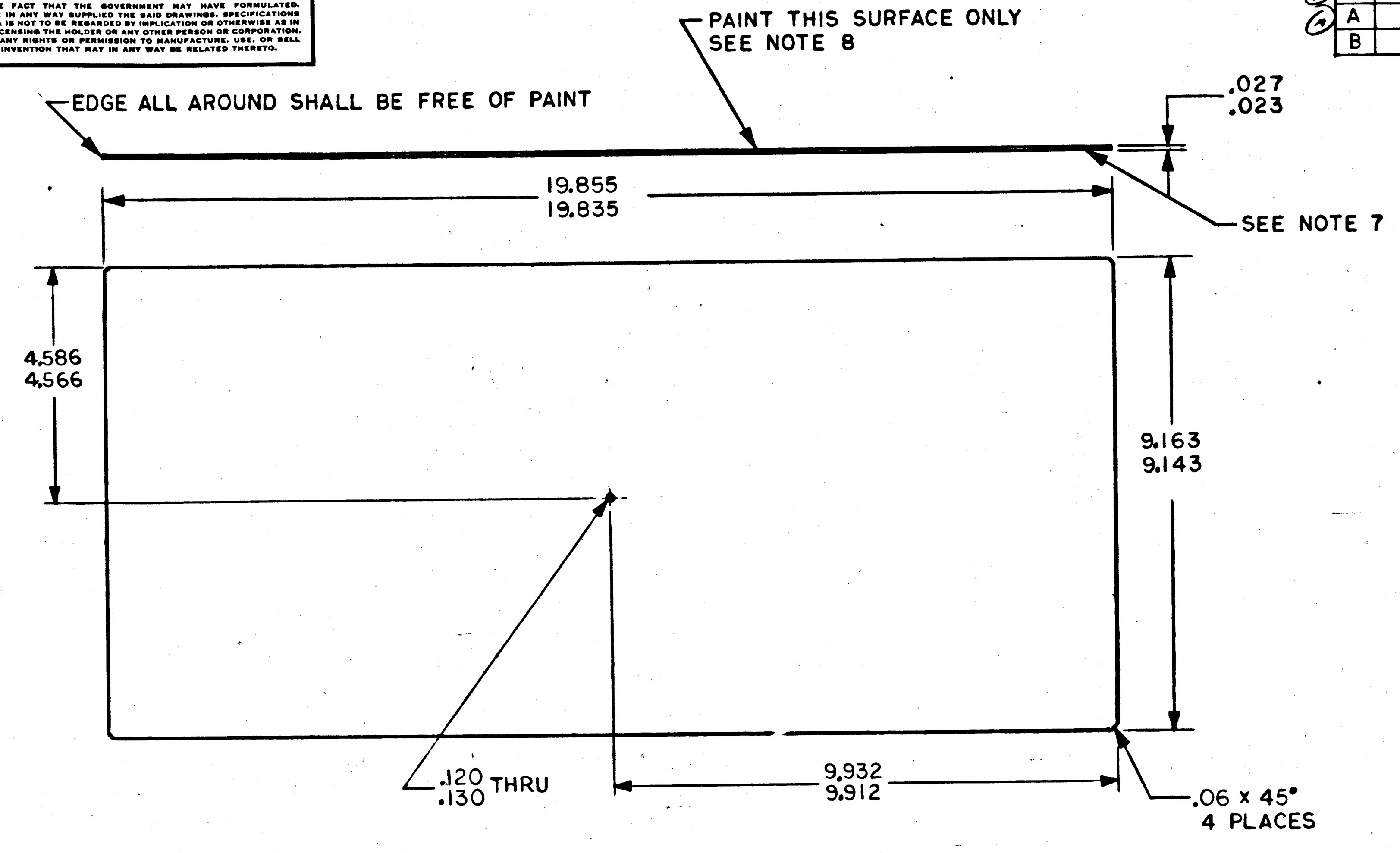
COVER, BOTTOM
TRAY X CDU

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008371
SCALE 1/2		SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25825		RPK	3FEB66	WK
B		REVISED PER TDRR 27148		LTB	3/16/66	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS AND SHARP EDGES .005 MAX
5. ALL SURFACES $\overset{125}{\surd}$
6. IDENTIFY WITH PART NO. PER ND1002019
7. FINISH PER ND1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND1002289

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007090	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.01 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9 Jul 65
CHECKED 17 Sep 65
APPROVED 20 Sep 65
APPROVED 9/20/65
APPROVED MIT 21 Jul 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

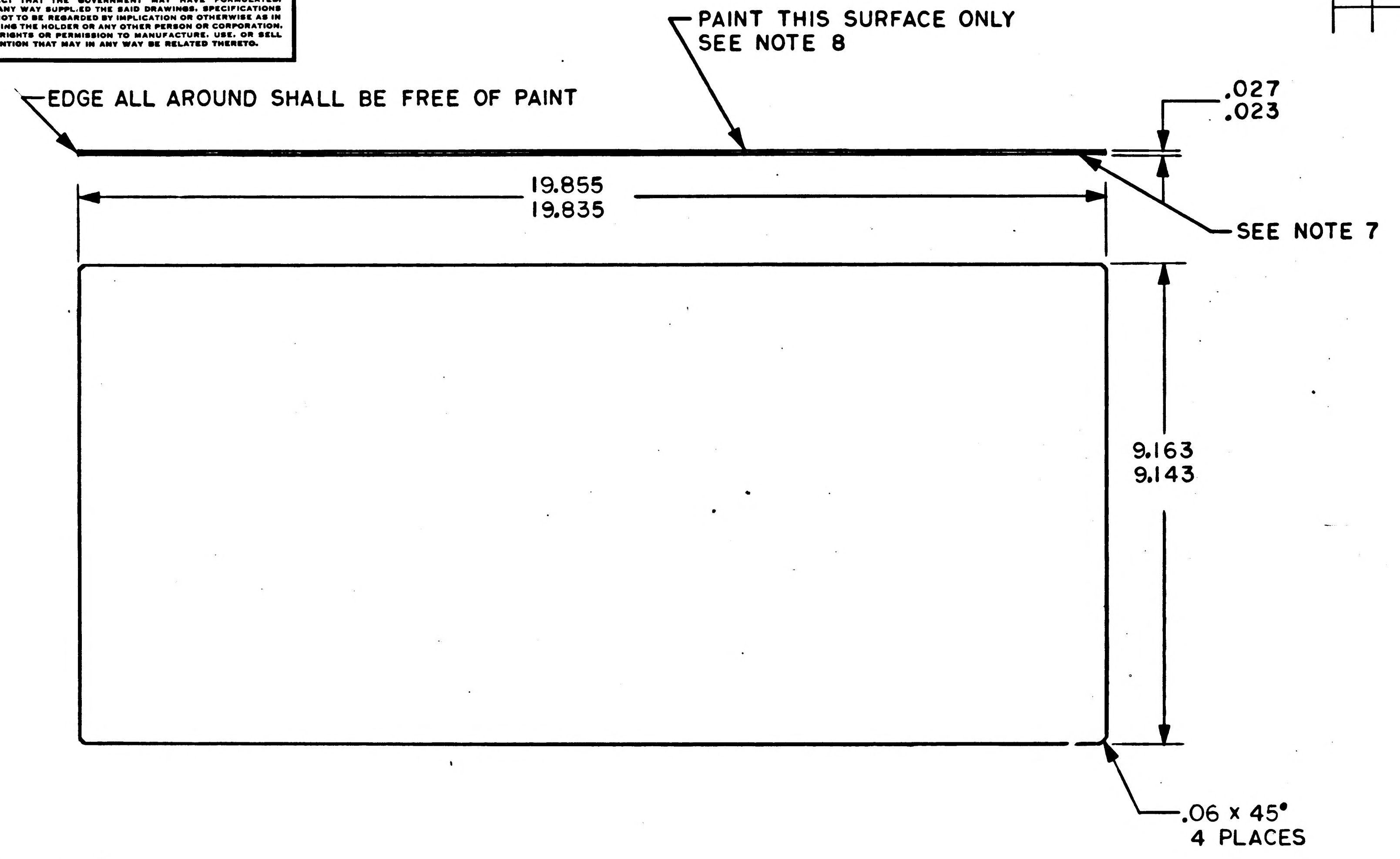
COVER, BOTTOM
TRAY X CDU

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008371
SCALE 1/2
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C UNLESS OTHERWISE SPECIFIED
4. REMOVE BURRS AND SHARP EDGES .005 MAX
5. ALL SURFACES $\sqrt{}^{125}$
6. IDENTIFY WITH PART NO. PER ND1002019
7. FINISH PER ND 1002040. DO NOT COAT WITH EPOXY
8. PAINT PER ND

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007090	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.01 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Edw. Gross 9 Jul 65
CHECKED 17 Sep 65
APPROVED 20 Sep 65
APPROVED 9/20/65
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

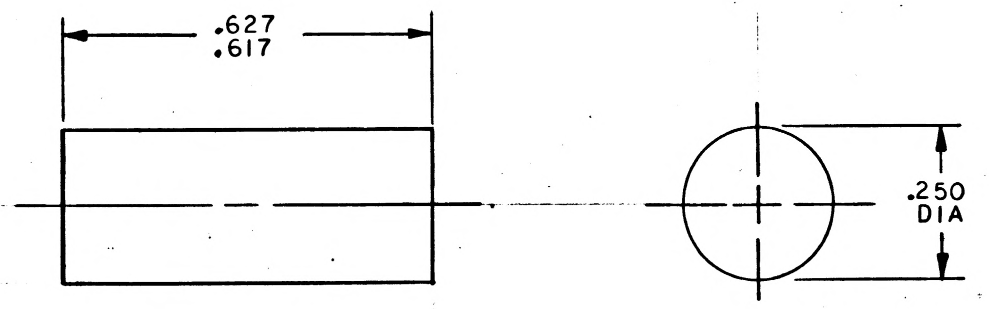
COVER, BOTTOM
TRAY X CDU

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008371
SCALE 1/2
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: LAMINATED PLASTIC ROD PER 1010692-8
3. REMOVE BURRS AND SHARP EDGES .010 MAX
4. ALL SURFACES 125✓
5. IDENTIFY WITH PART NO. PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007091	
2007090	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 17 Sep 65
CHECKED 17 Sep 65
APPROVED R. V. Vicenti 20 Sep 65
APPROVED 9/20/65
APPROVED MIT 21 Sep 65
Arthur C. Metzger
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SPACER
CDU

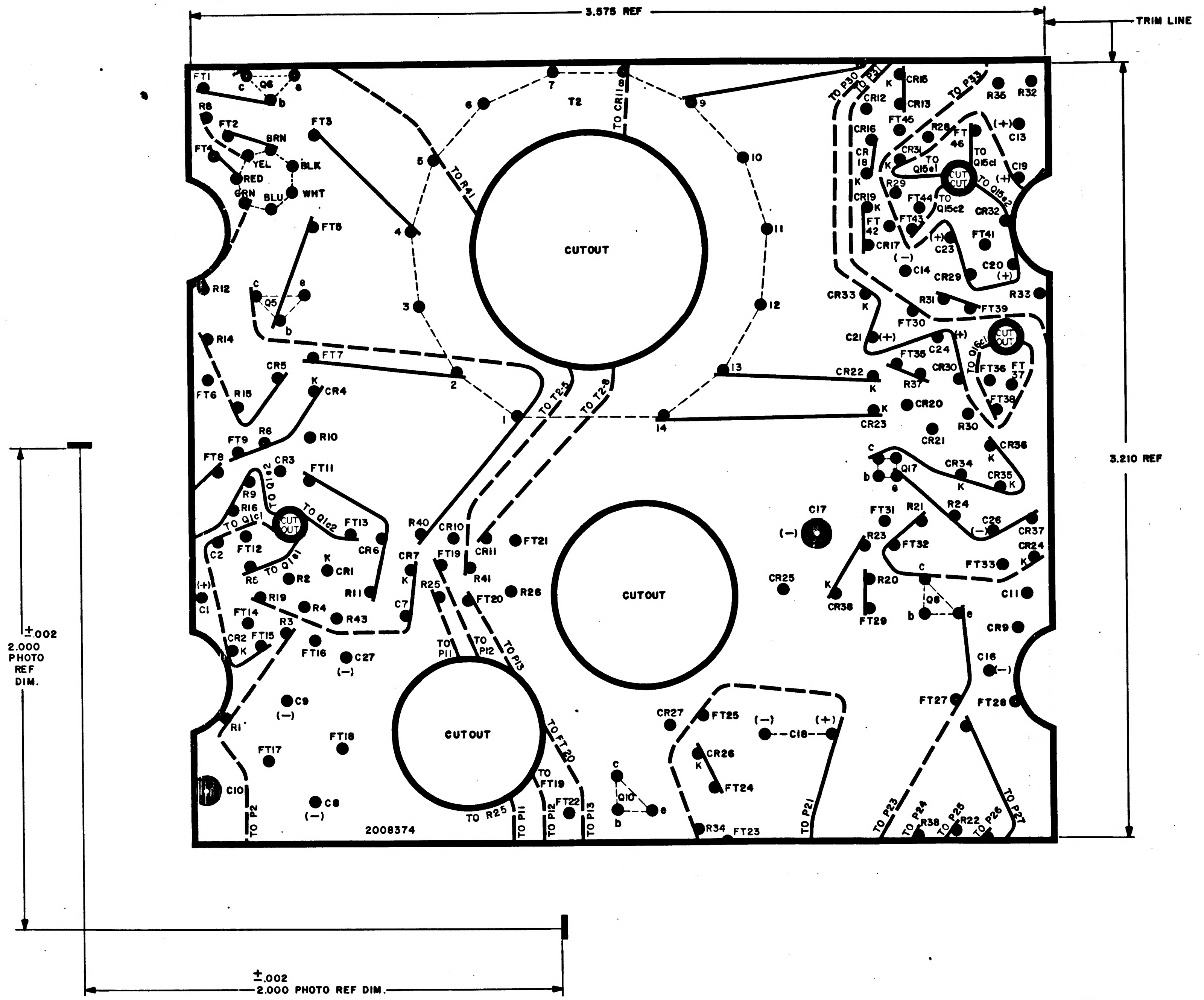
CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008373
SCALE 5/1
SHEET 1 OF 1

2008373

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2259

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.575 REF
TRIM LINE
3.210 REF
±.002
2.000
PHOTO
REF
DIM.
±.002
2.000 PHOTO REF DIM.
CUTOUT
CUTOUT
CUTOUT
CUTOUT
CUT OUT
CUT OUT
CUT OUT
T2
1
2
3
4
5
6
7
8
9
10
11
12
13
14
TO CR11
TO R41
TO T2-5
TO T2-8
FT1
c
Q6
e
b
R8
FT2
BRN
FT4
YEL
BLK
RED
GRN
BLU
WHT
FT3
FT5
R12
c
e
Q5
b
R14
FT7
CR5
K
CR4
FT6
R15
R6
FT9
R10
FT8
CR3
FT11
R9
R16
TO Q1c2
TO Q1c1
TO Q1e1
FT13
C2
FT12
K
CR1
CR6
R5
R2
R19
R11
(+)
C1
FT14
R4
R43
R3
CR2
K
FT15
FT16
C27
(−)
C9
(−)
R1
FT17
FT18
C10
C8
(−)
TO P2
2008374
R40
CR10
CR7
FT19
CR11
FT21
K
R25
R41
FT20
R26
C7
TO P11
TO P12
TO P13
TO FT20
TO FT19
TO R25
FT22
TO P11
TO P12
TO P13
C17
(−)
CR25
CR27
FT25
(−)
C18
(+)
CR26
K
FT24
c
Q10
b
e
R34
FT23
TO P21
TO P30
TO P31
CR15
K
CR12
CR13
TO P33
R35
R32
FT45
R28
FT 46
(+)
C13
CR16
CR 18
CR31
K
TO Q15e1
TO Q15c1
C19
(+)
K
R29
TO Q15e2
CR19
K
FT44
TO Q15c2
CR32
FT 42
FT43
(+)
C23
FT41
CR17
(−)
C14
CR29
C20
(+)
CR33
K
R31
FT39
R33
FT30
C21
(+)
C24
(+)
TO Q16c1
FT35
CR30
FT36
FT 37
CR22
K
R37
CR20
FT38
K
CR23
R30
CR21
CR36
K
c
Q17
b
e
CR34
K
CR35
K
FT31
R21
R24
(−)
C26
CR37
R23
FT32
FT33
K
CR24
K
CR38
R20
c
FT29
b
Q8
e
C11
CR9
C16
(−)
FT27
FT26
TO P23
TO P24
R38
TO P25
R22
TO P26
TO P27

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE
5. BROKEN LINE DENOTES SLEEVING
6. MATERIAL: .006/.008 THICK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
7. ● .125/.135 DIA HOLE
8. ● .040/.050 DIA HOLE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007106	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Bonarrigo 19 Aug 65
CHECKED R.P. Kingsbury 30 Aug 65
APPROVED Rinker 30 AUG 65
APPROVED
APPROVED MIT McMurtry 9/15/65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

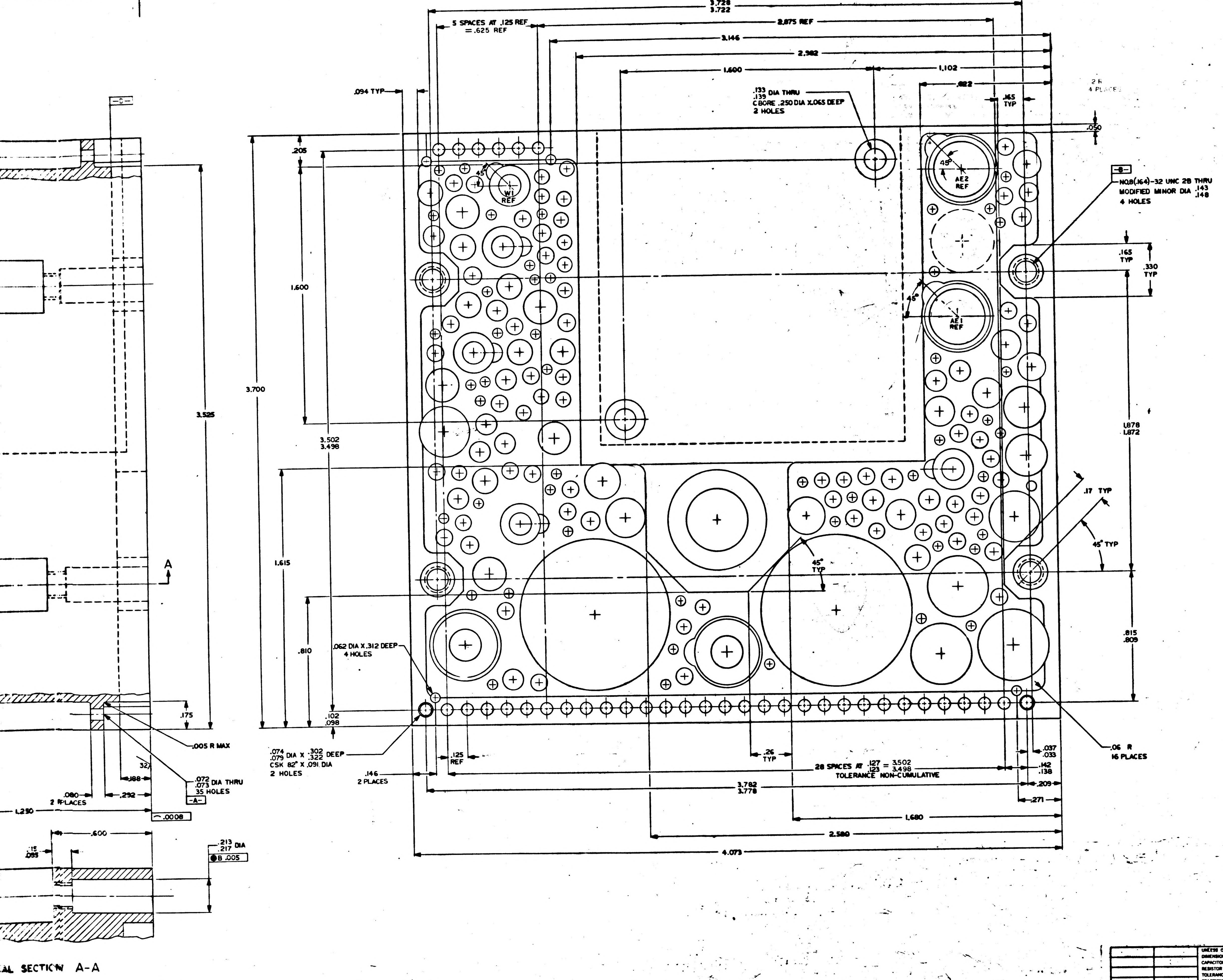
INSULATOR, TOP
PHOTOGRAPHIC MASTER
PULSE TORQUE POWER SUPPLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008374

SCALE 5/1 SHEET 1 OF 1

2008374

SYM	ZONE	DESCRIPTION	BR	CHK	DATE	APPROVED
REVISIONS 22519						
A		REVISED PER TDRR 23947			15	



4
3
2
1
D
C
B
A
3.728
3.722
5 SPACES AT .125 REF = .625 REF
2.875 REF
3.146
2.982
1.600
1.102
.822
.094 TYP
.133 .139 DIA THRU C BORE .250 DIA X .065 DEEP 2 HOLES
.165 TYP
.050
-B-
NO.8(.164)-32 UNC 2B THRU MODIFIED MINOR DIA .143 .148 4 HOLES
W1 REF
AE2 REF
AE1 REF
45°
.165 TYP
.330 TYP
.205
1.600
3.700
3.525
3.502 3.498
1.878 1.872
1.615
.810
.815 .809
.17 TYP
45° TYP
45° TYP
.062 DIA X .312 DEEP 4 HOLES
.102 .098
.175
.005 R MAX
.074 .079 DIA X .302 .322 DEEP CSK 82° X .091 DIA 2 HOLES
.125 REF
.146 2 PLACES
.26 TYP
28 SPACES AT .127 .123 = 3.502 3.498 TOLERANCE NON-CUMULATIVE
.037 .033
.142 .138
.209
.271
.06 R 16 PLACES
3.782 3.778
1.680
2.580
4.073
.072 .075 DIA THRU 35 HOLES
-A-
.188
.292
.080 2 PLACES
1.250
.0008
.600
.15 .055
.213 .217 DIA
B .005
-C-
A
AL SECTION A-A

MASTER

2007106	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
NOT REQUIRED PER LETTER
DATE

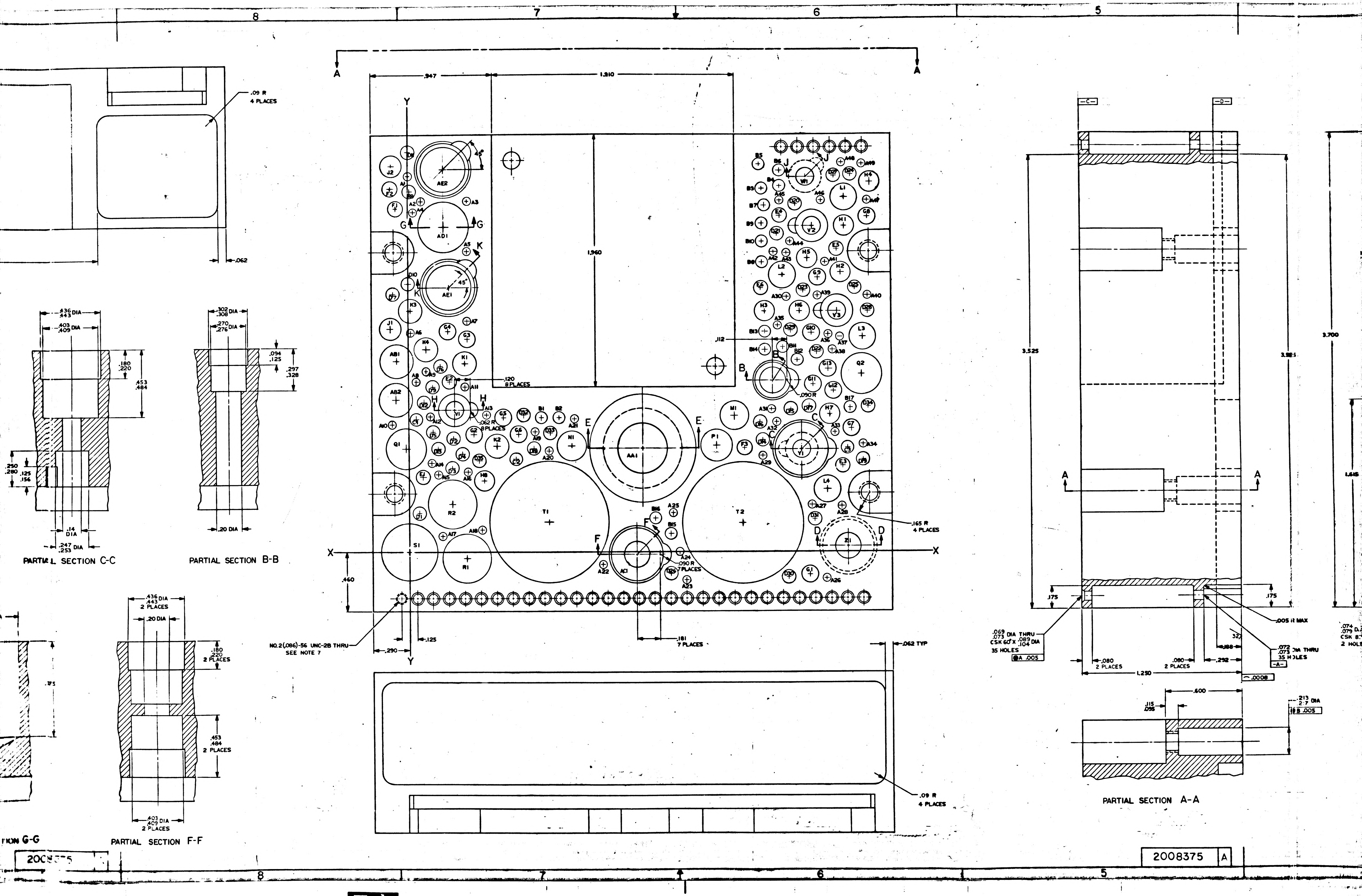
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008375
SCALE 1/1
SHEET 1 OF 1

2008375 A

2008375 A


8
7
6
5
A
A
.947
1.310
1.960
3.525
3.585
3.700
1.615
.09 R
4 PLACES
.062
.436
.443 DIA
.403
.409 DIA
.180
.220
.453
.484
.250
.280
.125
.156
.14
DIA
.247
.253 DIA
PARTIAL SECTION C-C
.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
.20 DIA
PARTIAL SECTION B-B
.120
8 PLACES
.112
.062 R
8 PLACES
.090 R
.165 R
4 PLACES
.090 R
7 PLACES
.460
.125
.290
.181
7 PLACES
NO.2(.086)-56 UNC-2B THRU
SEE NOTE 7
.062 TYP
.09 R
4 PLACES
X
Y
AE2
AD1
AE1
AB1
AB2
AA1
AC1
V1
V2
V3
W1
Y1
Z1
Q1
Q2
R1
R2
S1
T1
T2
N1
M1
P1
.175
.069
.073 DIA THRU
CSK 60° X .089 .104 DIA
35 HOLES
A .005
.080
2 PLACES
1.250
.080
2 PLACES
.292
.188
.005 R MAX
.072
.075 DIA THRU
35 HOLES
-A-
.0008
-C-
-D-
.600
.115
.095
.213
.217 DIA
B .005
PARTIAL SECTION A-A
.436
.443 DIA
2 PLACES
.20 DIA
.180
.220
2 PLACES
.453
.484
2 PLACES
.403
.409 DIA
2 PLACES
PARTIAL SECTION F-F
.75
TION G-G
2008375
2008375
A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

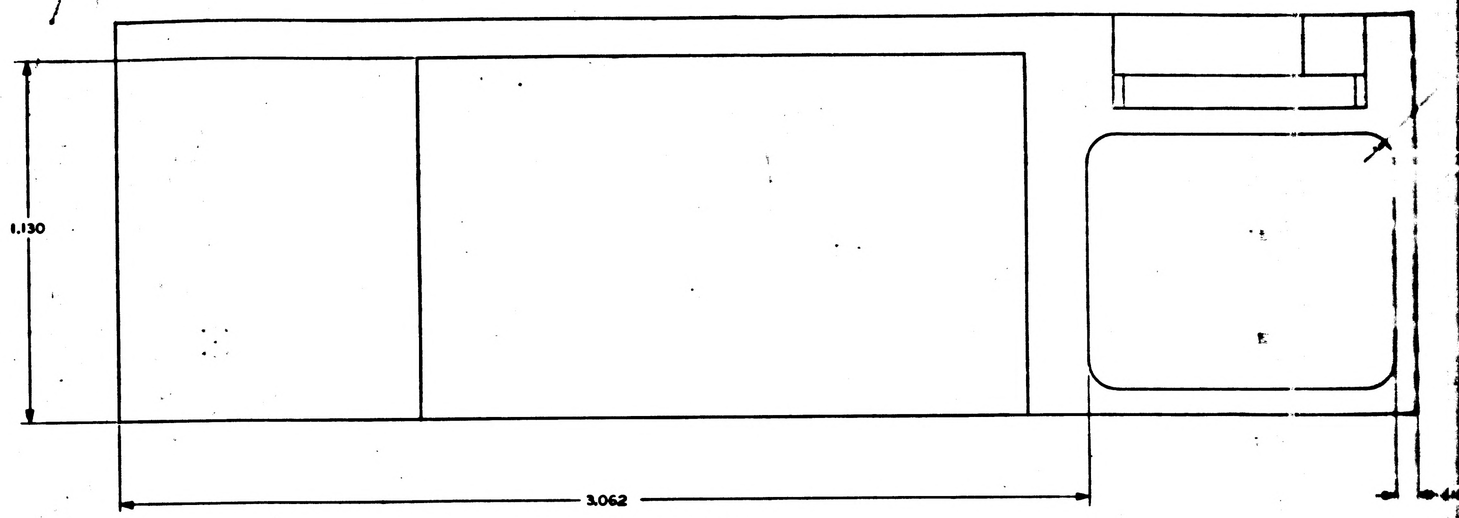
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.000	2.924	.058/.062	49
A2	.104	2.726		
A3	.464	2.726		
A4	.040	2.640		
A5	.460	2.330		
A6	.020	1.700		
A7	.460	1.790		
A8	.060	1.320		
A9	.140	1.400		
A10	−.130	.990		
A11	.440	1.280		
A12	.170	1.050		
A13	.610	1.060		
A14	.180	.690		
A15	.230	.600		
A16	.460	.620		
A17	.260	.120		
A18	.570	.170		
A19	.990	.930		
A20	1.100	.780		
A21	1.300	1.030		
A22	1.520	−.100		
A23	2.180	−.220		
A24	2.130	.000		
A25	2.080	.300		
A26	3.270	−.210		
A27	3.140	.360		
A28	3.390	.350		
A29	2.780	.740		
A30	2.970	1.970		
A31	2.850	1.100		
A32	2.890	1.000		
A33	3.340	.920		
A34	3.560	.830		
A35	2.900	1.750		
A36	3.290	1.680		
A37	3.380	1.660		
A38	3.320	1.560		
A39	3.210	1.980		
A40	3.600	1.980		
A41	3.270	2.240		
A42	2.870	2.320		
A43	2.970	2.310		
A44	3.000	2.400		
A45	2.920	2.720		
A46	3.240	2.720		
A47	3.600	2.720		
A48	3.400	3.010		
A49	3.560	3.000		
B1	1.040	1.040	.088/.092	17
B2	1.180	1.040		
B3	2.780	2.810		
B4	2.920	2.830		
B5	2.760	3.000		
B6	2.920	2.950		
B7	2.800	2.680		
B8	2.780	2.240		
B9	2.780	2.540		
B10	2.780	2.400		
B11	2.940	1.580		
B12	3.050	1.480		
B13	2.800	1.700		
B14	2.800	1.560		
B15	2.060	.140		
B16	1.940	.260		
B17	3.460	1.110		
C1	.060	1.030	.093/.097	3
C2	.840	.720		
C3	3.440	.800		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
D1	.080	.300	.100/.104	35
D2	.350	.880		
D3	.340	.650		
D4	.420	.760		
D5	.190	.930		
D6	.250	1.440		
D7	−.120	2.000		
D8	.014	2.804		
D9	.190	1.280		
D10	.000	2.080		
D11	.000	3.110		
D12	.120	1.160		
D13	.230	.800		
D14	2.780	.860		
D15	3.000	1.100		
D16	2.760	1.000		
D17	3.140	1.120		
D18	.980	.800		
D19	3.560	.710		
D20	3.040	2.690		
D21	2.900	2.460		
D22	3.200	1.540		
D23	3.100	2.020		
D24	3.470	2.920		
D25	3.500	2.040		
D26	2.060	−.170		
D27	3.340	2.910		
D28	3.600	1.860		
D29	3.000	1.710		
D30	2.980	−.200		
D31	3.180	.250		
D32	.900	1.060		
D33	1.110	.920		
D34	3.600	1.120		
D35	.550	.710		
E1	.110	.580	.106/.110	6
E2	.320	1.320		
E3	3.400	.660		
E4	2.920	2.600		
E5	3.360	2.340		
E6	2.770	2.040		
F1	−.096	2.670	.112/.116	3
F2	−.140	2.826		
F3	2.640	.800		
G1	3.140	.180	.127/.131	13
G2	.510	.910		
G3	.460	1.650		
G4	.310	1.710		
G5	.740	1.040		
G6	.860	.910		
G7	3.470	.950		
G8	3.600	2.590		
G9	3.210	2.120		
G10	3.160	1.690		
G11	3.170	1.290		
G12	3.330	1.240		
G13	3.290	1.410		
H1	3.420	2.520	.153/.157	8
H2	3.390	2.160		
H3	2.800	1.860		
H4	3.620	2.860		
H5	3.130	2.270		
H6	3.070	1.860		
H7	3.300	1.060		
H8	.590	.550		

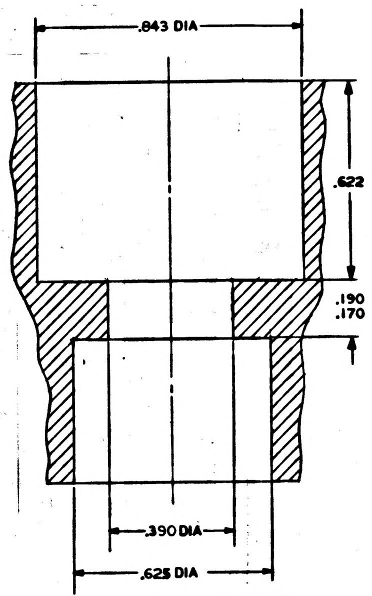
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
J1	−.140	1.730	.165/.169	2
J2	−.130	3.000		
K1	.440	1.460	.181/.185	4
K2	.690	.820		
K3	.020	1.870		
K4	.140	1.590		
L1	3.420	2.740	.202/206	4
L2	2.940	2.140		
L3	3.560	1.660		
L4	3.280	.480		
M1	2.560	1.050	.220/.224	1
N1	1.280	.820	.227/.231	1
P1	2.420	.820	.241/.245	1
Q1	−.020	.800	.310/.317	2
Q2	3.550	1.370		
R1	.450	−.050	.373/.380	2
R2	.340	.370		
S1	.000	.000	.436/.443	1
T1	1.100	.230	.936/.943	2
T2	2.620	.220		
U1	2.860	1.320	SEE SECTION B-B	1
V1	.360	1.100	SEE SECTION H-H	3
V2	3.170	2.520		
V3	3.360	1.860		
W1	3.120	2.900	SEE SECTION J-J	1
Y1	3.080	.790	SEE SECTION C-C	1
Z1	3.440	.040	SEE SECTION D-D	1
AA1	1.840	.800	SEE SECTION E-E	1
AB1	−.090	1.480	.255/.262	2
AB2	−.090	1.180		
AC1	1.790	−.020	SEE SECTION F-F	1
AD1	.280	2.630	SEE SECTION G-G	1
AE1	.320	2.050	SEE SECTION K-K	2
AE2	.280	2.976		

NOTES:

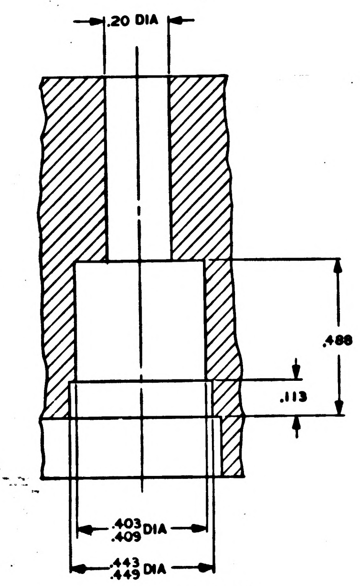
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6-AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES .125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH PART NO. PER ND1002019
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE TO SURFACE [−C−] AND ENTIRE SURFACE [−D−] PER ND1002187 TYPE II



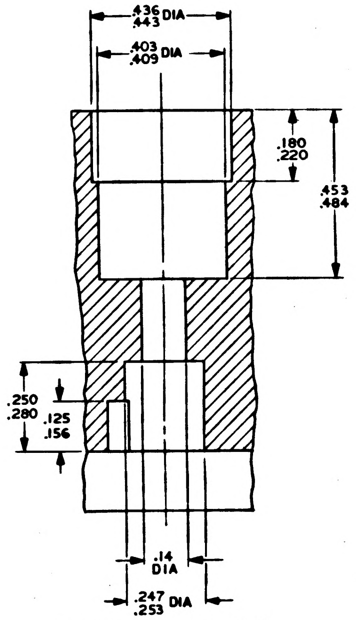
VIEW A-A


.843 DIA
.622
.190
.170
.390 DIA
.625 DIA

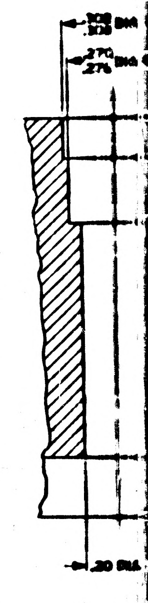
PARTIAL SECTION E-E


.20 DIA
.488
.113
.403
.409 DIA
.443
.449 DIA

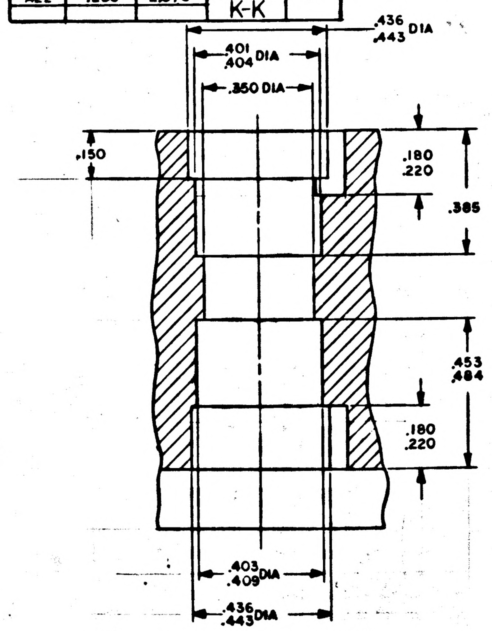
PARTIAL SECTION D-D


.436
.443 DIA
.403
.409 DIA
.180
.220
.453
.484
.250
.280
.125
.156
.14 DIA
.247
.253 DIA

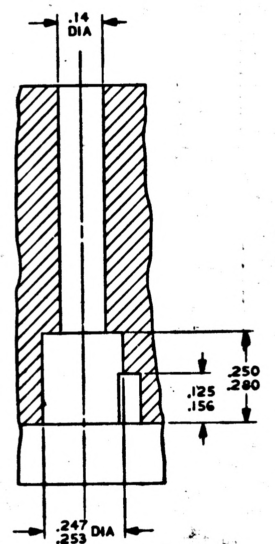
PARTIAL SECTION C-C


.270
.276 DIA
.20 DIA

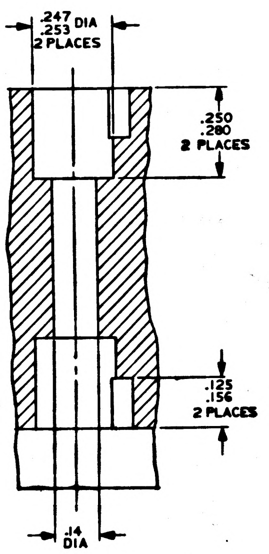
PARTIAL SEC


.436
.443 DIA
.401
.404 DIA
.350 DIA
.150
.180
.220
.385
.453
.484
.180
.220
.403
.409 DIA
.436
.443 DIA

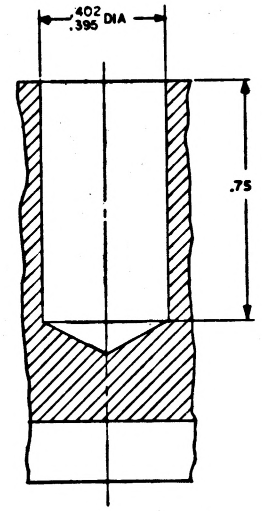
PARTIAL SECTION K-K


.14 DIA
.250
.280
.125
.156
.247
.253 DIA

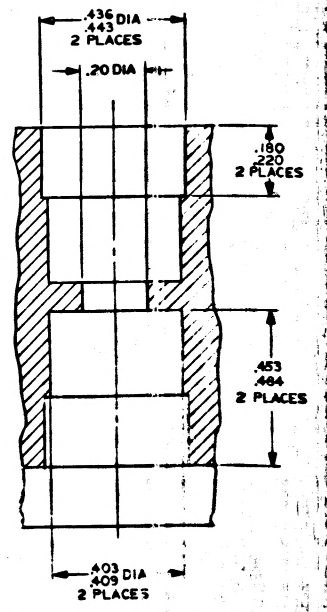
PARTIAL SECTION J-J


.247
.253 DIA
2 PLACES
.250
.280
2 PLACES
.125
.156
2 PLACES
.14 DIA

PARTIAL SECTION H-H


.402
.395 DIA
.75

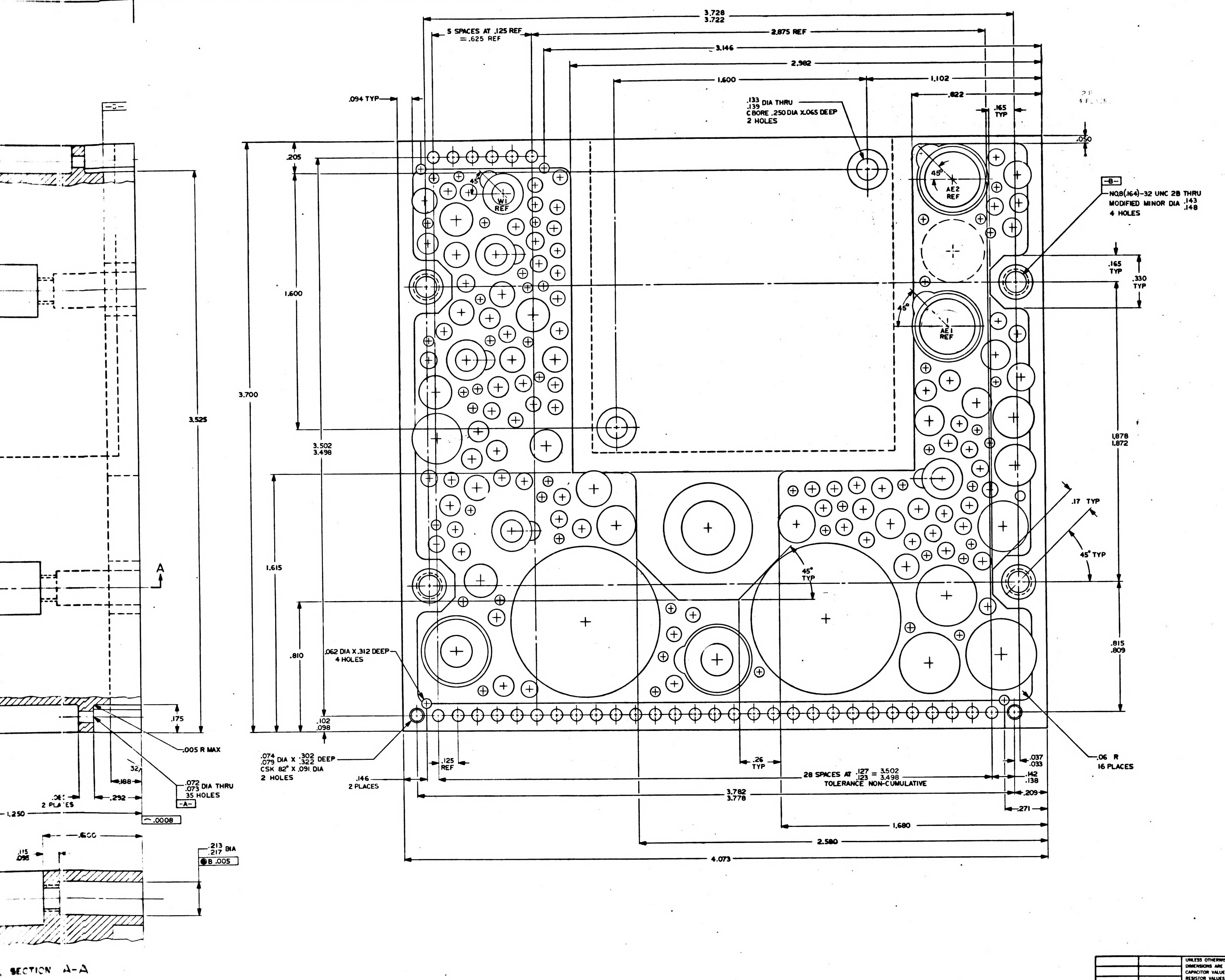
PARTIAL SECTION G-G


.436
.443 DIA
2 PLACES
.20 DIA
.180
.220
2 PLACES
.453
.484
2 PLACES
.403
.409 DIA
2 PLACES

PARTIAL SECTION F-F

REVISIONS 22519

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.728
3.722
5 SPACES AT .125 REF = .625 REF
2.875 REF
3.146
2.982
1.600
1.102
.822
.094 TYP
.133 .139 DIA THRU
C BORE .250 DIA X .065 DEEP
2 HOLES
.165 TYP
.050
-B-
NO.8(.164)-32 UNC 2B THRU
MODIFIED MINOR DIA .143 .148
4 HOLES
.165 TYP
.330 TYP
45°
W1 REF
AE2 REF
AE1 REF
.205
1.600
3.700
3.525
3.502 3.498
1.615
.810
.102 .098
.062 DIA X .312 DEEP
4 HOLES
1.878 1.872
.17 TYP
45° TYP
45° TYP
.815 .809
.175
.005 R MAX
.072 .073 DIA THRU
35 HOLES
-A-
32
.188
.292
2 PLACES
1.250
⌒ .0008
.600
.115 .095
.213 .217 DIA
⊕ B .005
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146
2 PLACES
.125 REF
.26 TYP
28 SPACES AT .127 .123 = 3.502 3.498
TOLERANCE NON-CUMULATIVE
.037 .033
.142 .138
.209
.271
.06 R
16 PLACES
3.782
3.778
1.680
2.580
4.073
A
SECTION A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007106	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. J. Lap
CHECKED
APPROVED 30 AUG 65
APPROVED

APPROVED MIT
NOT REQUIRED PER LETTER
~~APPROVED NASA~~ ~~MSC~~ ~~PP7-65-512~~
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

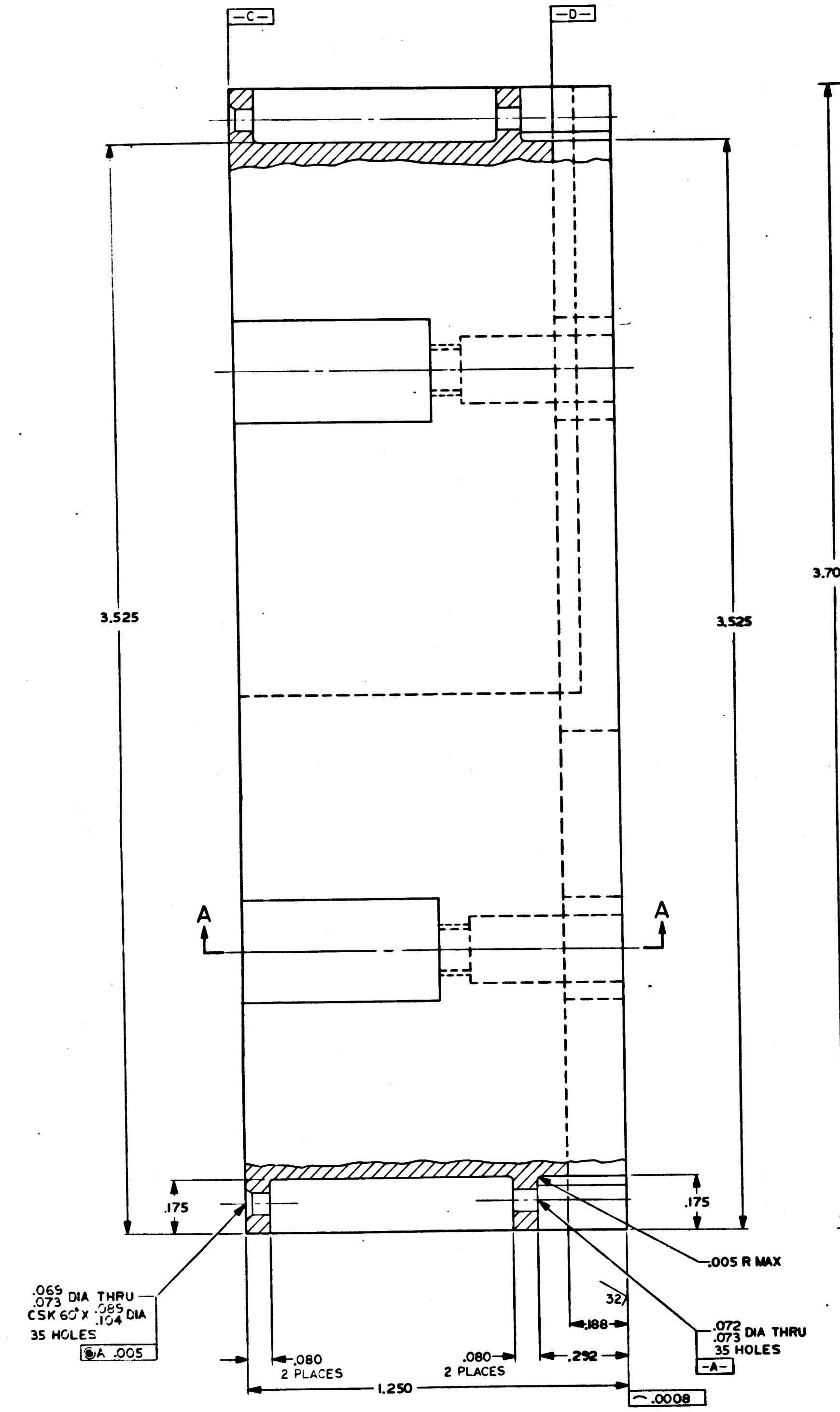
HEATSINK
PULSE TORQUE POWER SUPPLY

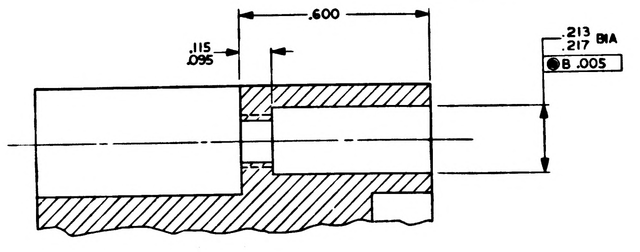
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008375
SCALE 5/1
SHEET 1 OF 1

2008375

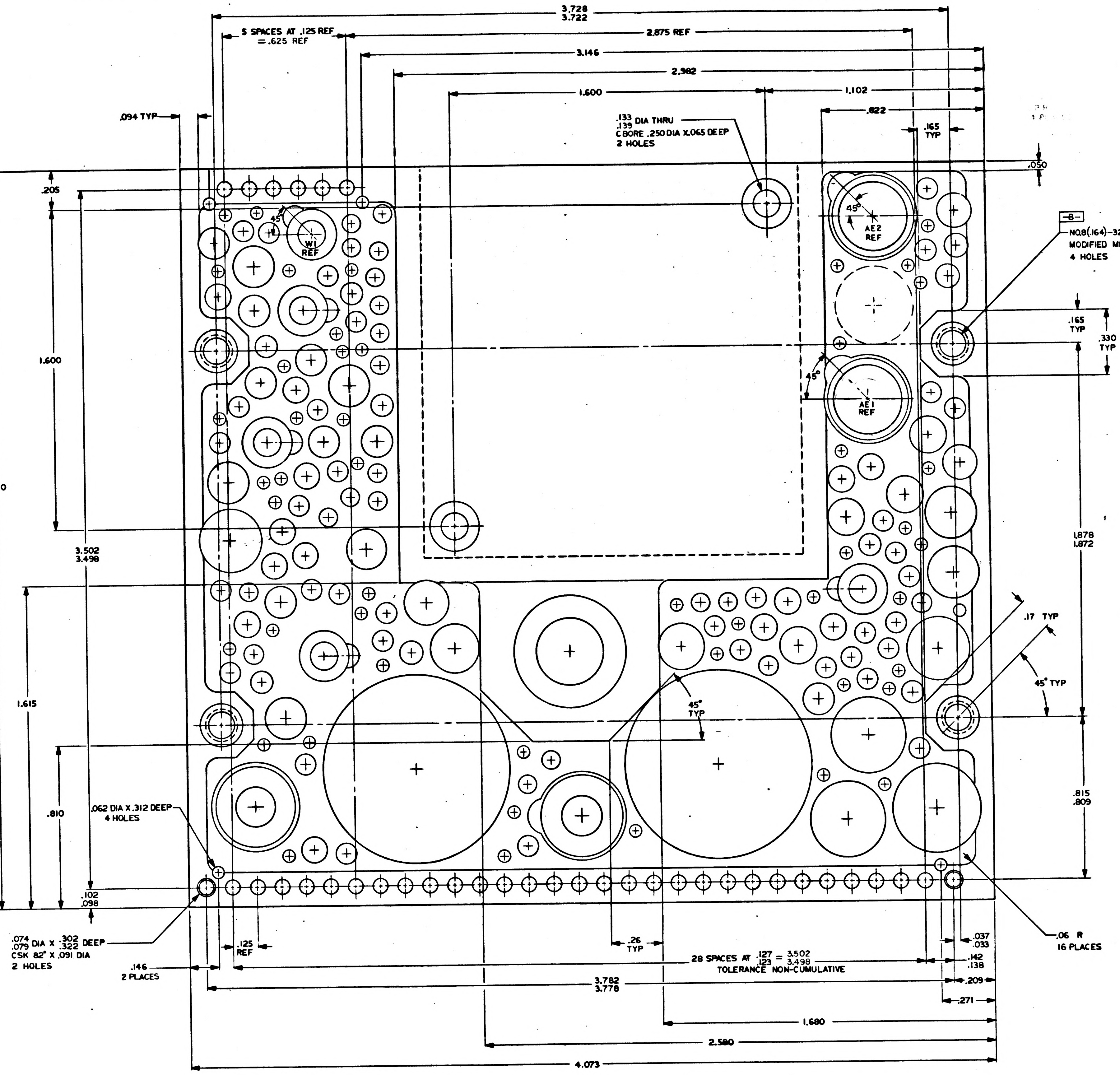
2008375

E-4


-C-
-D-
3.525
3.525
A
A
.175
.175
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
35 HOLES
◉A .005
.005 R MAX
32/
.188
.072 .073 DIA THRU
35 HOLES
-A-
.080 2 PLACES
.080 2 PLACES
.292
1.250
⌒.0008


.600
.115 .095
.213 .217 DIA
◉B .005

PARTIAL SECTION A-A


3.728 3.722
5 SPACES AT .125 REF = .625 REF
2.875 REF
3.146
2.982
1.600
1.102
.822
.094 TYP
.133 .139 DIA THRU
C BORE .250 DIA X .065 DEEP
2 HOLES
.165 TYP
.050
.205
45°
W1 REF
45°
AE2 REF
-B-
NO.8(.164)-32 UNC 2B THRU
MODIFIED MINOR DIA .143 .148
4 HOLES
.165 TYP
.330 TYP
45°
AE1 REF
1.600
3.700
3.502 3.498
1.878 1.872
.17 TYP
45° TYP
45° TYP
1.615
.810
.815 .809
.062 DIA X .312 DEEP
4 HOLES
.102 .098
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.125 REF
.146 2 PLACES
.26 TYP
28 SPACES AT .127 .123 = 3.502 3.498
TOLERANCE NON-CUMULATIVE
.037 .033
.142 .138
.209
.271
.06 R
16 PLACES
3.782 3.778
1.680
2.580
4.073

QTY REQD	PART OR IDENTIFYING NO.

2007106	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XX ±.01 .XXX ±.005 ± ½°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED 10 Aug 65
APPROVED
APPROVED MIT
NOT REQUIRED PER LETTER
NASA
MSC

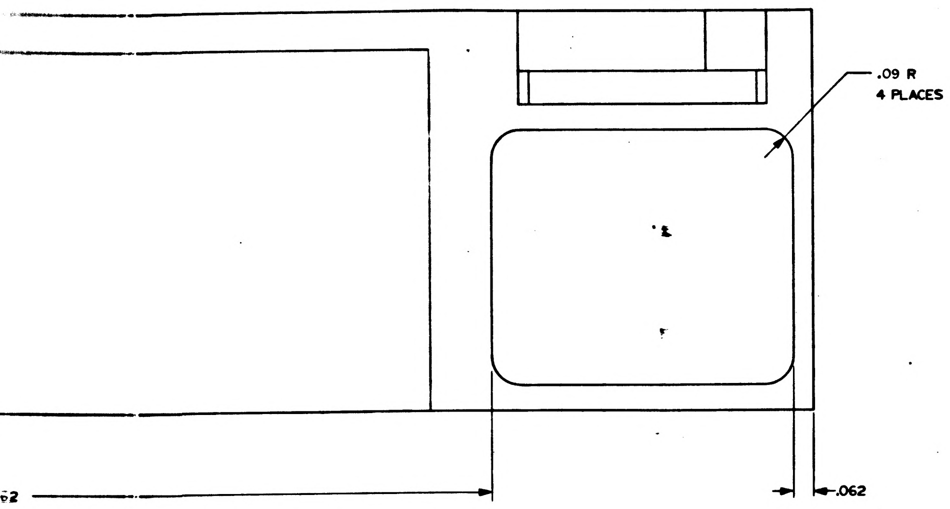
PULSE

CODE IDENT NO
8023

DATE
SHEET

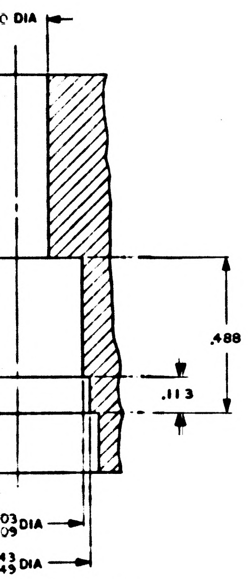
2008375

E3



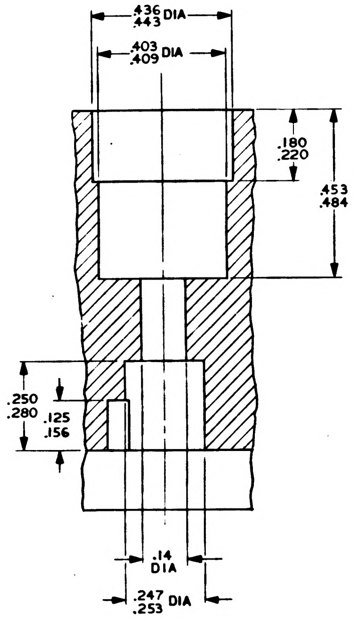
.09 R
4 PLACES
.062
62

VIEW A-A



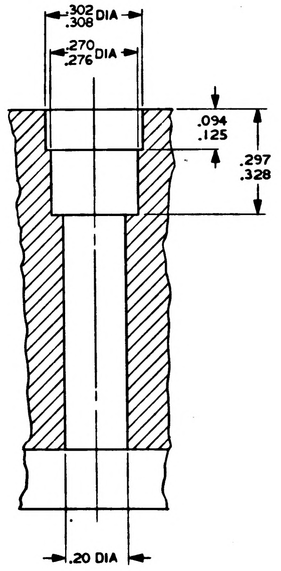
DIA
.488
.113
DIA
DIA

SECTION D-D



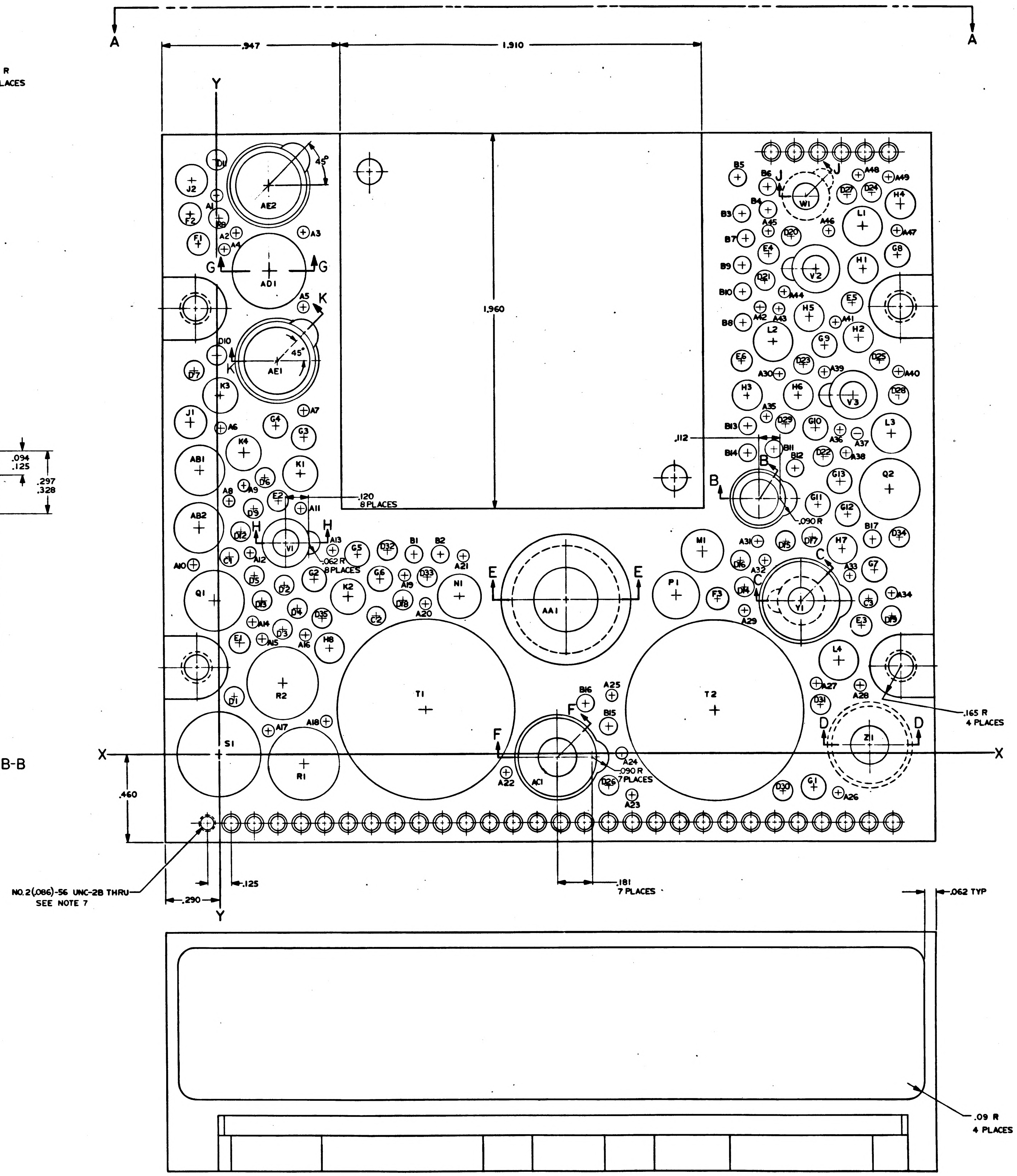
.436 .443 DIA
.403 .409 DIA
.180 .220
.453 .484
.250 .280
.125 .156
.14 DIA
.247 .253 DIA

PARTIAL SECTION C-C

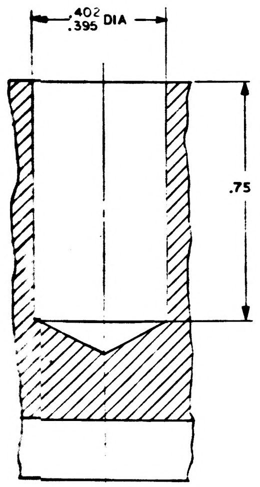


.302 .308 DIA
.270 .276 DIA
.094 .125
.297 .328
.20 DIA

PARTIAL SECTION B-B

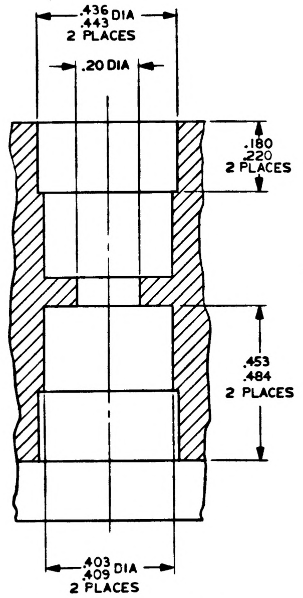


A
A
.947
1.910
1.960
Y
Y
X
X
G
G
K
K
45°
45°
B
B
C
C
D
D
E
E
F
F
H
H
J
J
.112
.120
8 PLACES
.062 R
8 PLACES
.090 R
.090 R
7 PLACES
.165 R
4 PLACES
.460
.290
.125
.181
7 PLACES
.062 TYP
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7
.09 R
4 PLACES
AE2
AD1
AE1
AA1
AC1
T1
T2
S1
R1
R2
Q1
Q2
Z1
Y1
V1
V2
V3
W1
L1
L2
L3
L4
M1
N1
P1



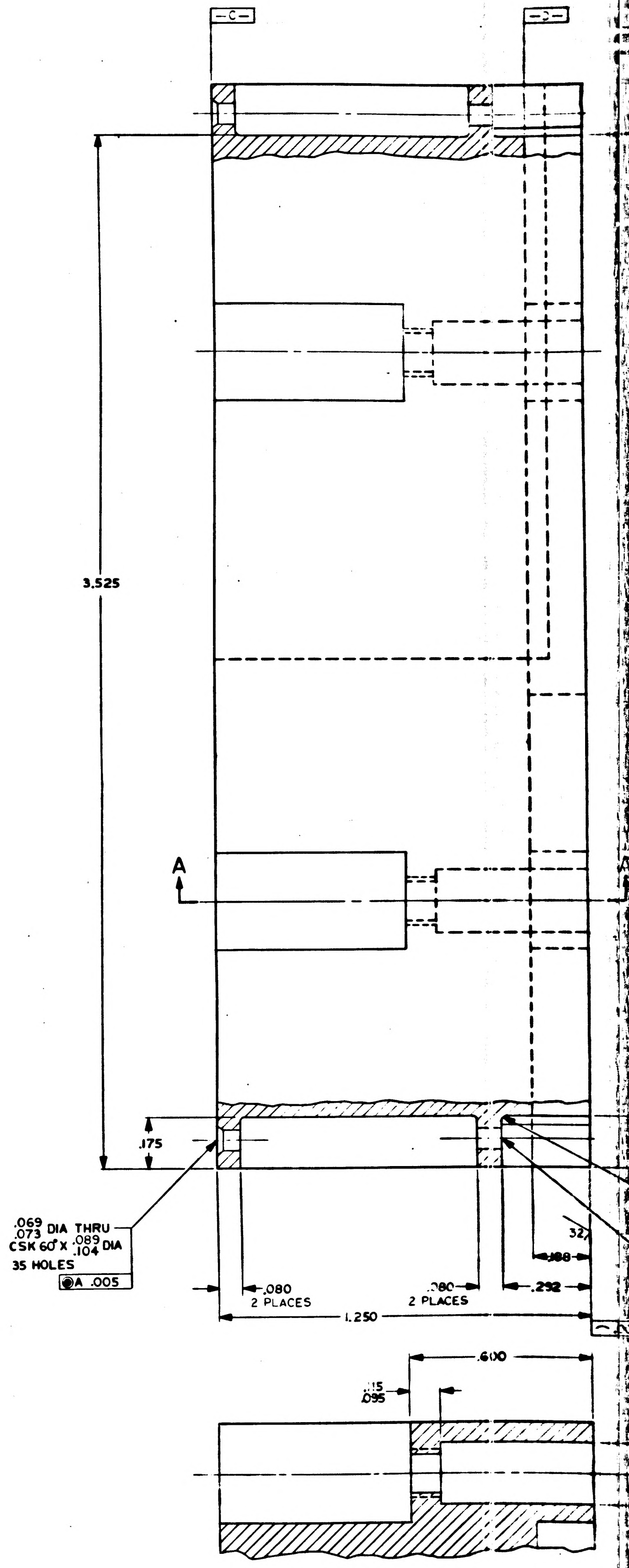
.402 .395 DIA
.75

ARTIAL SECTION G-G



.436 .443 DIA
2 PLACES
.20 DIA
.180 .220
2 PLACES
.453 .484
2 PLACES
.403 .409 DIA
2 PLACES

PARTIAL SECTION F-F



-C-
-D-
3.525
A
.175
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
35 HOLES
A .005
.080
2 PLACES
.080
2 PLACES
1.250
.188
.292
.600
.15 .095

PARTIAL SECTION A-A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

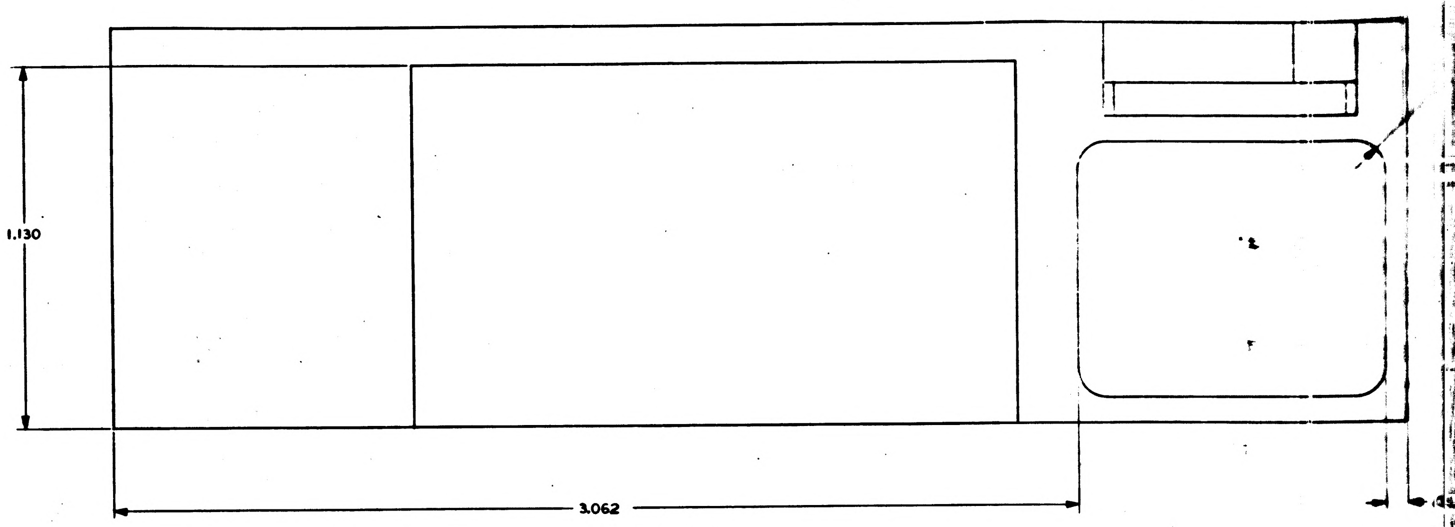
HOLE IDENT	X DIM.	Y CIM.	HOLE DIA	QTY
A1	.000	2.924	.058/.062	49
A2	.104	2.726		
A3	.464	2.726		
A4	.040	2.640		
A5	.460	2.330		
A6	.020	1.700		
A7	.460	1.790		
A8	.060	1.320		
A9	.140	1.400		
A10	–.130	.990		
A11	.440	1.280		
A12	.170	1.050		
A13	.610	1.060		
A14	.180	.690		
A15	.230	.600		
A16	.460	.620		
A17	.260	.120		
A18	.570	.170		
A19	.990	.930		
A20	1.100	.780		
A21	1.300	1.030		
A22	1.520	–.100		
A23	2.180	–.220		
A24	2.130	.000		
A25	2.080	.300		
A26	3.270	–.210		
A27	3.140	.360		
A28	3.390	.350		
A29	2.780	.740		
A30	2.970	1.970		
A31	2.850	1.100		
A32	2.890	1.000		
A33	3.340	.920		
A34	3.560	.830		
A35	2.900	1.750		
A36	3.290	1.680		
A37	3.380	1.660		
A38	3.320	1.560		
A39	3.210	1.980		
A40	3.600	1.980		
A41	3.270	2.240		
A42	2.870	2.320		
A43	2.970	2.310		
A44	3.000	2.400		
A45	2.920	2.720		
A46	3.240	2.720		
A47	3.600	2.720		
A48	3.400	3.010		
A49	3.560	3.000		
B1	1.040	1.040	.088/.092	17
B2	1.180	1.040		
B3	2.780	2.810		
B4	2.920	2.830		
B5	2.760	3.000		
B6	2.920	2.950		
B7	2.800	2.680		
B8	2.780	2.240		
B9	2.780	2.540		
B10	2.780	2.400		
B11	2.940	1.580		
B12	3.050	1.480		
B13	2.800	1.700		
B14	2.800	1.560		
B15	2.060	.140		
B16	1.940	.260		
B17	3.460	1.110		
C1	.060	1.030	.093/.097	3
C2	.840	.720		
C3	3.440	.800		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
D1	.080	.300	.100/.104	35
D2	.350	.880		
D3	.340	.650		
D4	.420	.760		
D5	.190	.930		
D6	.250	1.440		
D7	–.120	2.000		
D8	.014	2.804		
D9	.190	1.280		
D10	.000	2.080		
D11	.000	3.110		
D12	.120	1.160		
D13	.230	.800		
D14	2.780	.860		
D15	3.000	1.100		
D16	2.760	1.000		
D17	3.140	1.120		
D18	.980	.800		
D19	3.560	.710		
D20	3.040	2.690		
D21	2.900	2.460		
D22	3.200	1.540		
D23	3.100	2.020		
D24	3.470	2.920		
D25	3.500	2.040		
D26	2.060	–.170		
D27	3.340	2.910		
D28	3.600	1.860		
D29	3.000	1.710		
D30	2.980	–.200		
D31	3.180	.250		
D32	.900	1.060		
D33	1.110	.920		
D34	3.600	1.120		
D35	.550	.710		
E1	.110	.580	.106/.110	6
E2	.320	1.320		
E3	3.400	.660		
E4	2.920	2.600		
E5	3.360	2.340		
E6	2.770	2.040		
F1	–.096	2.670	.112/.116	3
F2	–.140	2.826		
F3	2.640	.800		
G1	3.140	.180	.127/.131	13
G2	.510	.910		
G3	.460	1.650		
G4	.310	1.710		
G5	.740	1.040		
G6	.860	.910		
G7	3.470	.950		
G8	3.600	2.590		
G9	3.210	2.120		
G10	3.160	1.690		
G11	3.170	1.290		
G12	3.330	1.240		
G13	3.290	1.410		
H1	3.420	2.520	.153/.157	8
H2	3.390	2.160		
H3	2.800	1.860		
H4	3.620	2.860		
H5	3.130	2.270		
H6	3.070	1.860		
H7	3.300	1.060		
H8	.590	.550		

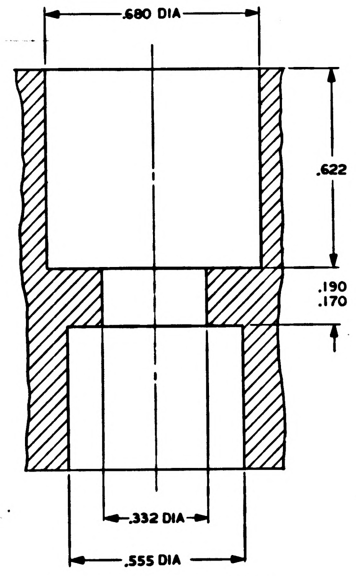
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
J1	–.140	1.730	.165/.169	2
J2	–.130	3.000		
K1	.440	1.460	.181/.185	4
K2	.690	.820		
K3	.020	1.870		
K4	.140	1.590		
L1	3.420	2.740	.202/206	4
L2	2.940	2.140		
L3	3.560	1.660		
L4	3.280	.480		
M1	2.560	1.050	.220/.224	1
N1	1.280	.820	.227/.231	1
P1	2.420	.820	.241/.245	1
Q1	–.020	.800	.310/.317	2
Q2	3.550	1.370		
R1	.450	–.050	.373/.380	2
R2	.340	.370		
S1	.000	.000	.436/.443	1
T1	1.100	.230	.936/.943	2
T2	2.620	.220		
U1	2.860	1.320	SEE SECTION B-B	1
V1	.360	1.100	SEE SECTION H-H	3
V2	3.170	2.520		
V3	3.360	1.860		
W1	3.120	2.900	SEE SECTION J-J	1
Y1	3.080	.790	SEE SECTION C-C	1
Z1	3.[illegible]40	.040	SEE SECTION D-D	1
AA1	1.840	.800	SEE SECTION E-E	1
AB1	–.090	1.480	.255/.262	2
AB2	–.090	1.180		
AC1	1.790	–.020	SEE SECTION F-F	1
AD1	.280	2.530	SEE SECTION G-G	1
AE1	.320	2.050	SEE SECTION K-K	2
AE2	.280	2.976		

NOTES:

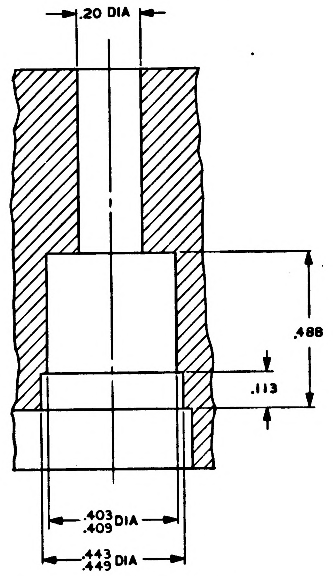
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6-AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES $\sqrt{.125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625 TYPE II DYED BLACK
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH PART NO. PER ND1002019
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE TO SURFACE $\boxed{-C-}$ AND ENTIRE SURFACE $\boxed{-D-}$ PER ND1002187 TYPE II



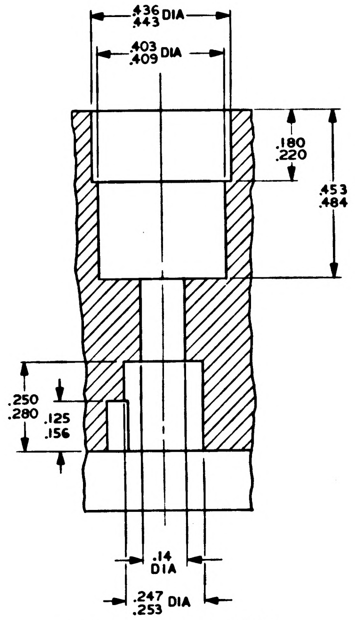
VIEW A-A



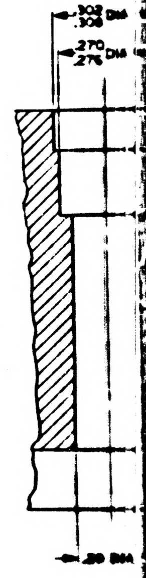
PARTIAL SECTION E-E



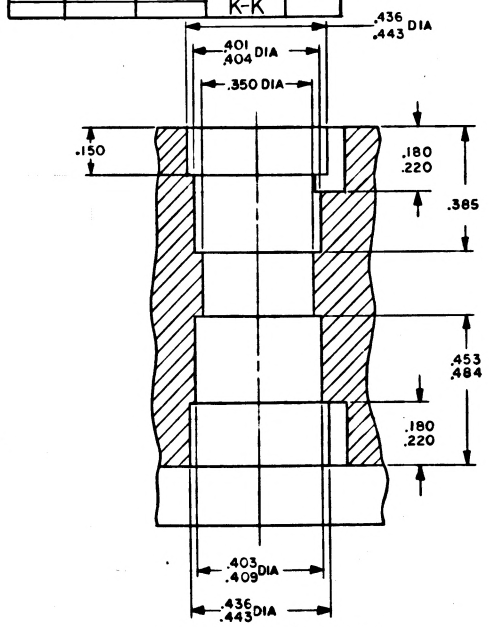
PARTIAL SECTION D-D



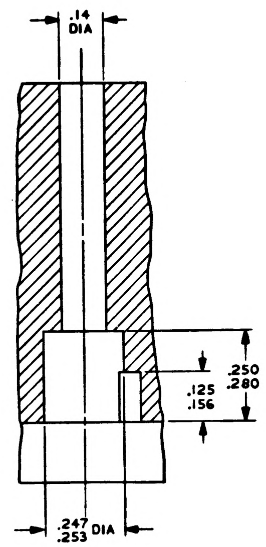
PARTIAL SECTION C-C



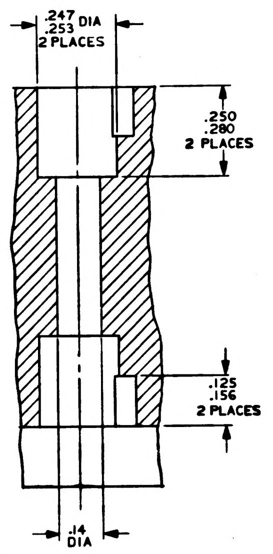
PARTIAL



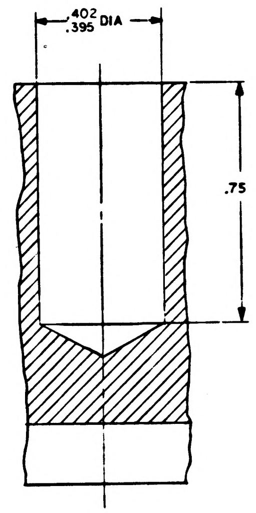
PARTIAL SECTION K-K



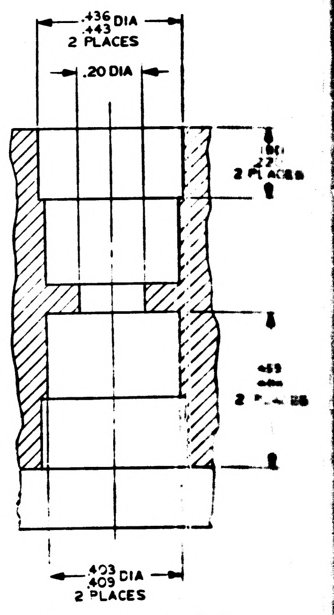
PARTIAL SECTION J-J



PARTIAL SECTION H-H



PARTIAL SECTION G-G

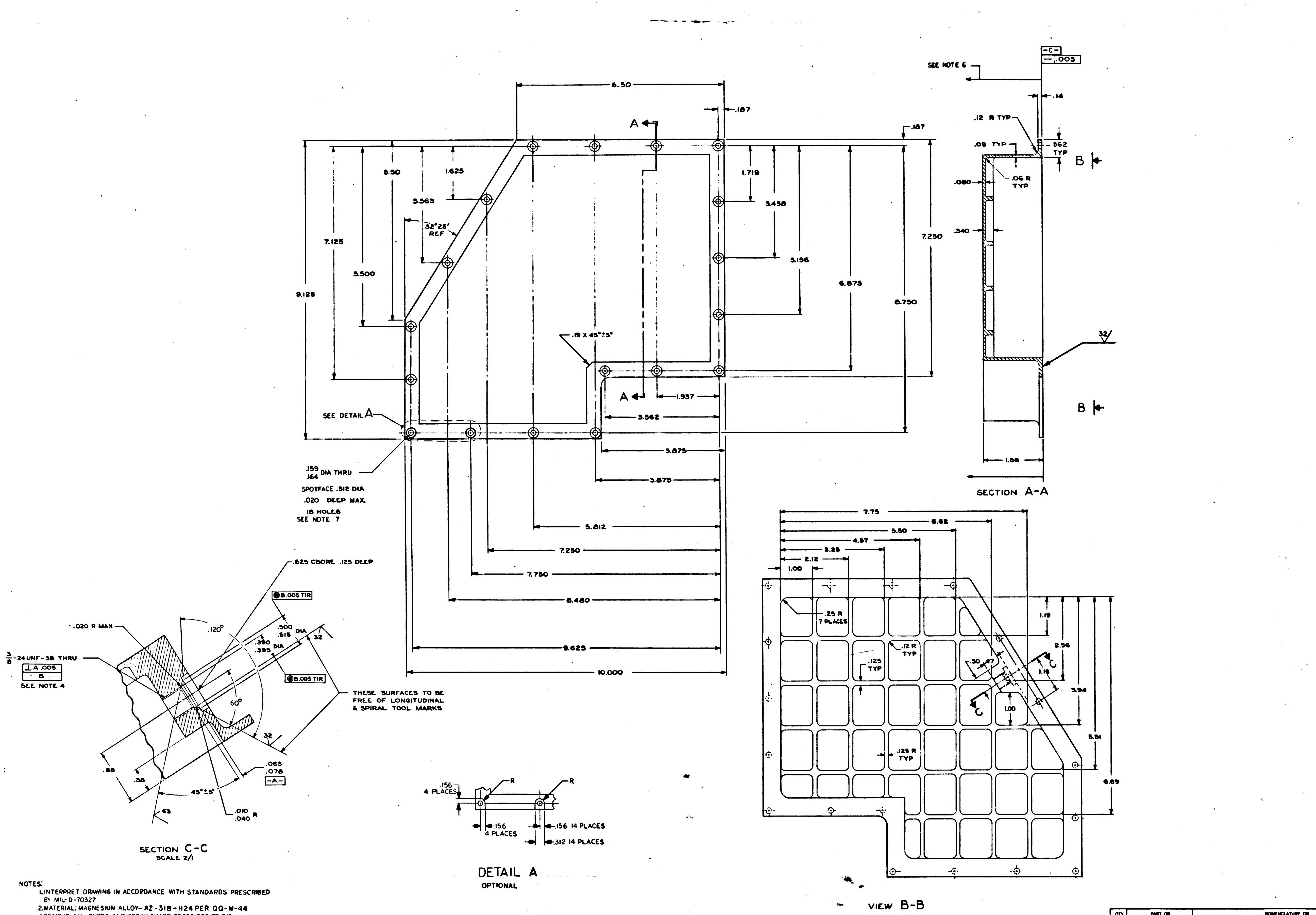


PARTIAL SECTION F-F

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22792

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23693	KCH	KAL	8 Nov 65	


SEE NOTE 6
-C-
.005
.14
.12 R TYP
.09 TYP
.562 TYP
.080
.06 R TYP
.340
B
32
1.88
SECTION A-A
6.50
.187
.187
A
5.50
1.625
3.563
32°25' REF
7.125
5.500
9.125
1.719
3.438
5.156
6.875
7.250
8.750
.19 X 45° ± 5°
SEE DETAIL A
1.937
3.562
3.875
3.875
.159 / .164 DIA THRU
SPOTFACE .312 DIA
.020 DEEP MAX.
18 HOLES
SEE NOTE 7
5.812
7.250
7.750
8.480
9.625
10.000
.625 CBORE .125 DEEP
B .005 TIR
.020 R MAX
3/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 4
120°
.500 / .515 DIA
.390 / .395 DIA
32
60°
32
.88
.38
45° ± 5°
63
.063 / .078
-A-
.010 / .040 R
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
SECTION C-C
SCALE 2/1
.156 4 PLACES
R
R
.156 4 PLACES
.156 14 PLACES
.312 14 PLACES
DETAIL A
OPTIONAL
7.75
6.62
5.50
4.37
3.25
2.12
1.00
.25 R 7 PLACES
.12 R TYP
.125 TYP
.50
.47
C
C
1.00
.125 R TYP
1.19
2.56
1.16
3.94
5.31
6.69
VIEW B-B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY-AZ-31B-H24 PER QQ-M-44
3. REMOVE ALL BURRS AND BREAK SHAPP EDGES .005 TO .015
4. UNLESS OTHERWISE SPECIFIED 63/ ALL OVER
5. ANODIZE PER MIL-M-45202 TYPE I CLASS C
6. PAINT EXTERIOR SURFACES ABOVE PLANE -C- PER ND UNLESS OTHERWISE SPECIFIED; ALL HOLES SHALL BE FREE OF PAINT
7. SPOTFACE DIA SHOWN SHALL BE FREE OF FINISH MATERIALS. TREAT PER ND1002040 DO NOT EPOXY COAT.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007201	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .010 .XXX ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R. Lonney 22 Sept 65
CHECKED R. Kingsbury 26 Sept 65
APPROVED
APPROVED D. A. Stout 9/27/65
APPROVED MIT W. Snyder 24 Sept
NOT REQUIRED PER LETTER
NASA PP7-65-612
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
PIPA ELECTRONICS

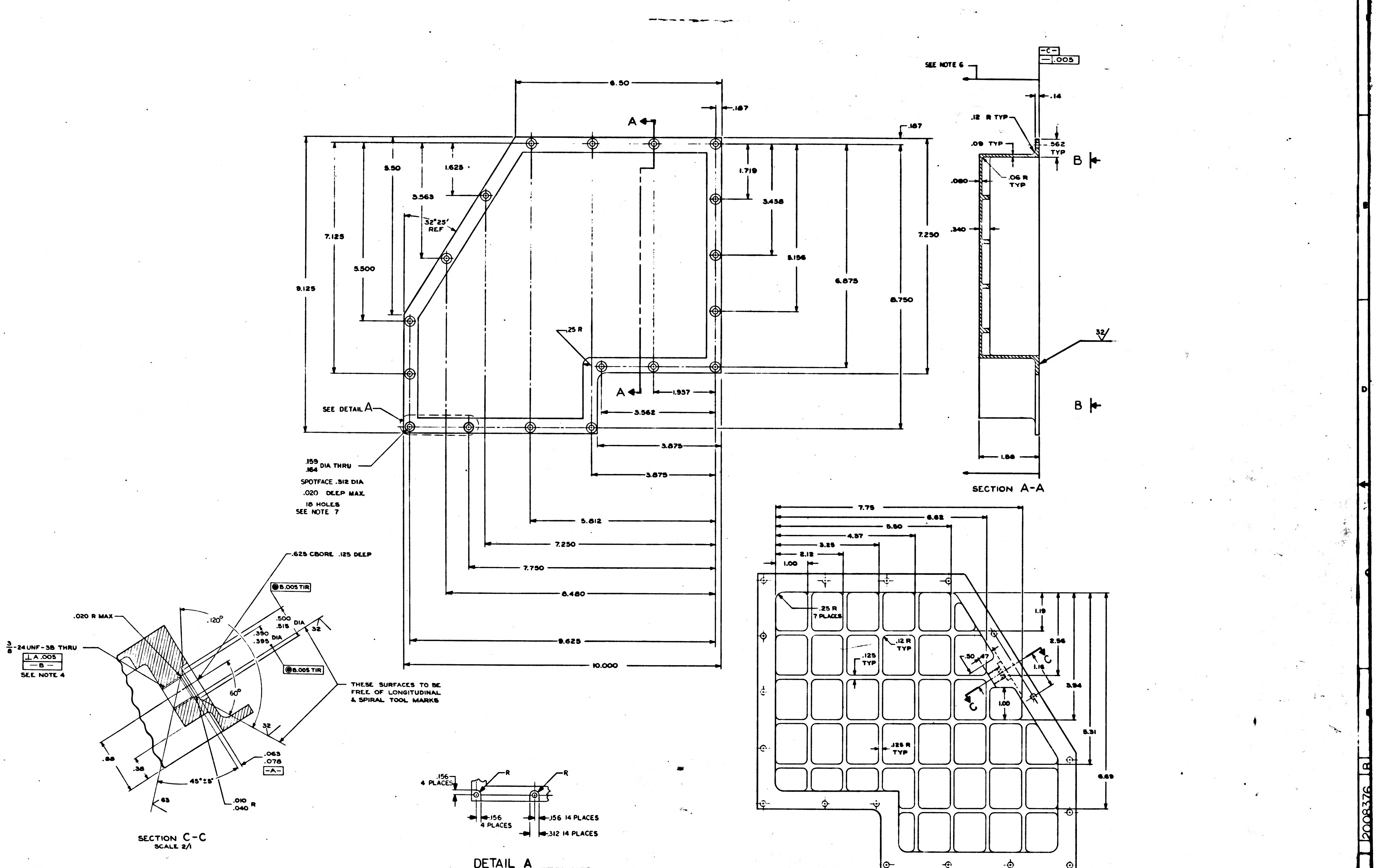
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008376
SCALE 1/1
SHEET 1 OF 1

2008376

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 22797

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23693	KCH	KPK	3 Nov 65	
B		REVISED PER TDRR 24324				



SEE NOTE 6
-C-
.005
.14
.12 R TYP
.187
6.50
A
.187
.562 TYP
.09 TYP
.080
.06 R TYP
B
.340
1.625
3.50
3.563
1.719
3.438
32°25' REF
7.125
7.250
5.156
5.500
6.875
8.750
9.125
.25 R
32
SEE DETAIL A
1.937
3.562
B
3.875
3.875
1.88
.159 .164 DIA THRU
SPOTFACE .312 DIA
.020 DEEP MAX
18 HOLES
SEE NOTE 7
SECTION A-A
5.812
7.250
7.750
8.480
9.625
10.000
.625 CBORE .125 DEEP
B .005 TIR
.020 R MAX
120°
.500 .515 DIA
.390 .395 DIA
32
3/8-24UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 4
B .005 TIR
60°
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
32
.88
.38
.063 .078
-A-
45°±5°
63
.010 .040 R
SECTION C-C
SCALE 2/1
.156 4 PLACES
R
R
.156 4 PLACES
.156 14 PLACES
.312 14 PLACES
DETAIL A
OPTIONAL
7.75
6.62
5.50
4.37
3.25
2.12
1.00
.25 R 7 PLACES
1.19
2.56
.12 R TYP
.125 TYP
.50
.47
C
1.16
3.94
C
1.00
5.31
.125 R TYP
6.69

VIEW B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY-AZ-31B-H24 PER QQ-M-44
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015
4. UNLESS OTHERWISE SPECIFIED 63√ ALL OVER
5. ANODIZE PER MIL-M-45202 TYPE I CLASS C
6. PAINT EXTERIOR SURFACES ABOVE PLANE -C- PER ND UNLESS OTHERWISE SPECIFIED, ALL HOLES SHALL BE FREE OF PAINT
7. SPOTFACE DIA SHOWN SHALL BE FREE OF FINISH MATERIALS. TREAT PER ND1002040 DO NOT EPOXY COAT.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007201	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.010 .XXX ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 22 Sept 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
NOT REQUIRED PER LETTER NASA PP7-65-612
DATE

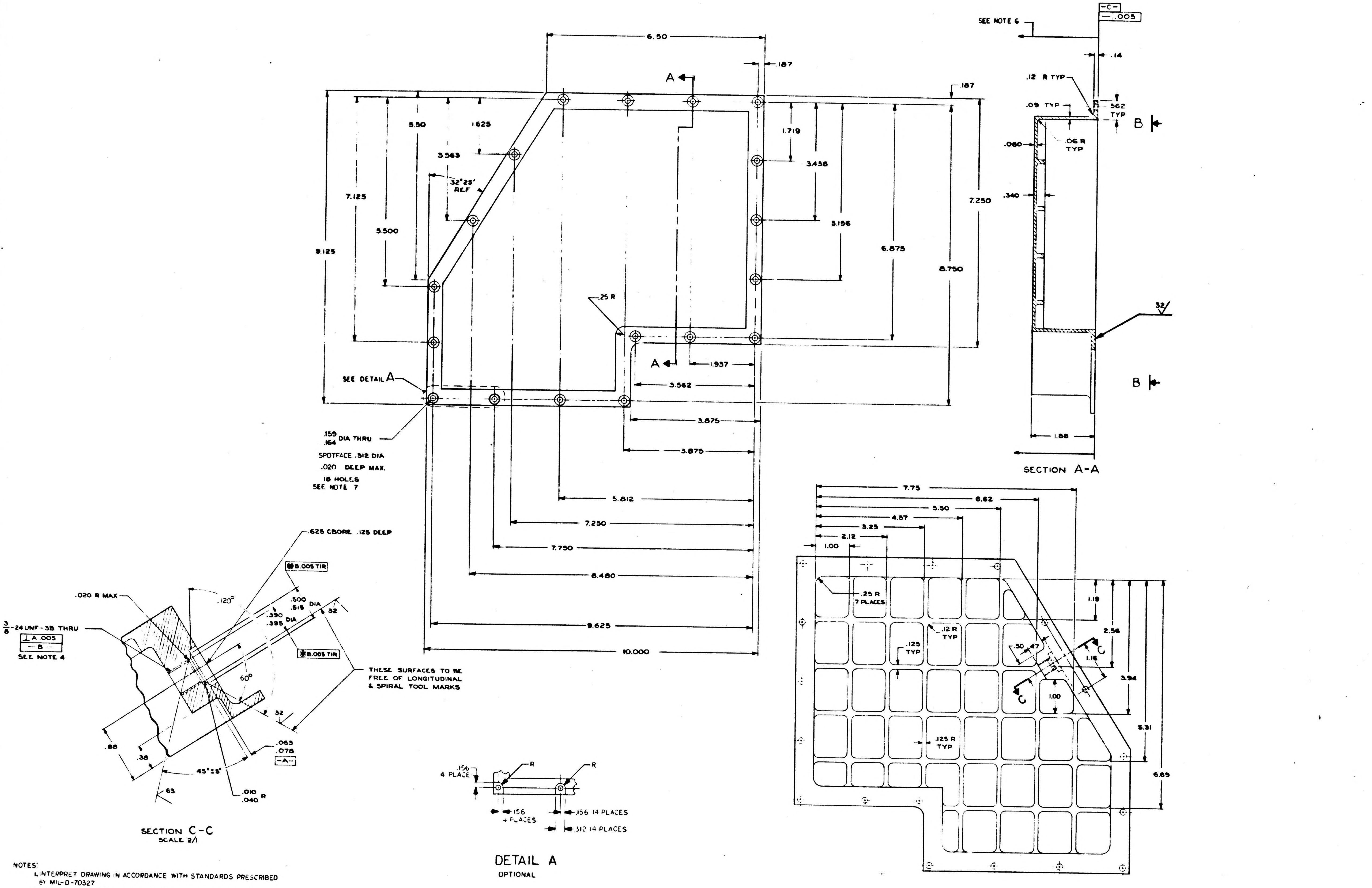
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
PIPA ELECTRONICS

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008376
SCALE 1/1
SHEET 1 OF 1

2008376 B

REVISIONS 22792						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23693	KCN		3 Nov 65	
B		REVISED PER TDRR 24324				
C		REVISED PER TDRR 27980		EF		



SEE NOTE 6
-C-
.005
A
B
SECTION A-A
SEE DETAIL A
.159 .164 DIA THRU
SPOTFACE .312 DIA
.020 DEEP MAX.
18 HOLES
SEE NOTE 7
.625 CBORE .125 DEEP
3/8-24UNF-3B THRU
SEE NOTE 4
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
SECTION C-C
SCALE 2/1
DETAIL A
OPTIONAL
.156 14 PLACES
.312 14 PLACES
.25 R 7 PLACES
VIEW B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY-AZ-31B-H24 PER QQ-M-44
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015
4. UNLESS OTHERWISE SPECIFIED 63/ ALL OVER
5. ANODIZE PER MIL-M-45202 TYPE I CLASS C
6. PAINT EXTERIOR SURFACES ABOVE PLANE -C- PER ND UNLESS OTHERWISE SPECIFIED. ALL HOLES SHALL BE FREE OF PAINT
7. SPOTFACE DIA SHOWN SHALL BE FREE OF FINISH MATERIALS. TREAT PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI.

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007201	
NEXT ASSY	USED IN

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .010 .XXX ± .005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN 22 Sep 65
CHECKED 28 Sep 65
APPROVED
APPROVED 9/22/65
APPROVED MIT 28 Sep 65
NOT REQUIRED PER LETTER
APPROVED MSC PP7-65-612
DATE

COVER
PIPA ELECTRONICS

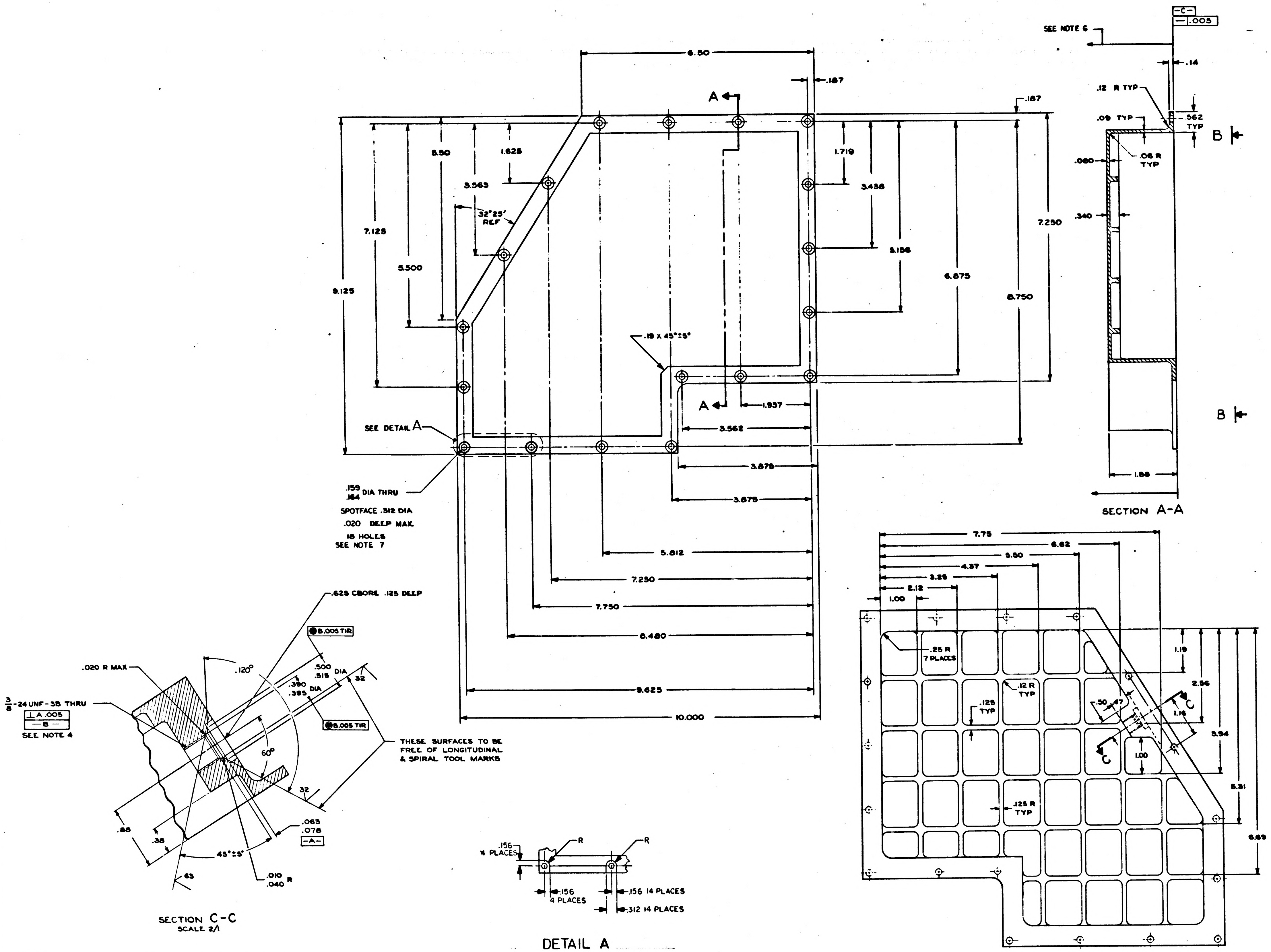
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2008376
SCALE 1/1
SHEET 1 OF 1

2008376 C

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22792

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


SEE NOTE 6
-C-
.005
.14
6.50
.187
.187
A
A
.12 R TYP
.09 TYP
.562 TYP
B
B
.080
.06 R TYP
.340
1.86
SECTION A-A
8.50
1.625
3.563
32°25' REF
7.125
5.500
9.125
1.719
3.438
5.156
6.875
7.250
8.750
.19 X 45°±5°
1.937
3.562
3.875
3.875
SEE DETAIL A
.159 .164 DIA THRU
SPOTFACE .312 DIA
.020 DEEP MAX.
18 HOLES
SEE NOTE 7
5.812
7.250
7.750
8.480
9.625
10.000
.625 CBORE .125 DEEP
B.005 TIR
.020 R MAX
.120°
.500 .515 DIA
.390 .395 DIA
32
3/8-24 UNF-3B THRU
⊥ A .005
— B —
SEE NOTE 4
B.005 TIR
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
60°
32
.063 .078
-A-
.88
.38
45°±5°
63
.010 .040 R
SECTION C-C
SCALE 2/1
.156 14 PLACES
R
R
.156 4 PLACES
.156 14 PLACES
.312 14 PLACES
DETAIL A
OPTIONAL
7.75
6.62
5.50
4.87
3.25
2.12
1.00
.25 R 7 PLACES
.12 R TYP
.125 TYP
.50
.47
C
C
1.19
2.56
1.16
3.94
1.00
5.31
6.69
.125 R TYP
VIEW B-B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY-AZ-31B-H24 PER QQ-M-44
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015
4. UNLESS OTHERWISE SPECIFIED 63✓ ALL OVER
5. ANODIZE PER MIL-M-45202 TYPE I CLASS C
6. PAINT EXTERIOR SURFACES ABOVE PLANE -C- PER ND UNLESS OTHERWISE SPECIFED, ALL HOLES SHALL BE FREE OF PAINT
7. SPOTFACE DIA SHOWN SHALL BE FREE OF FINISH MATERIALS. TREAT PER ND1002040 DO NOT EPOXY COAT.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007201	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .010 .XXX ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 1

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN L. Remy 22Sep65
CHECKED R. Kongelberg 28Sep65
APPROVED
APPROVED D. Ritter 9/32/65
APPROVED MIT W. Koffer 14 Aug
NOT REQUIRED PER LETTER NASA PP7-65-612
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
PIPA ELECTRONICS

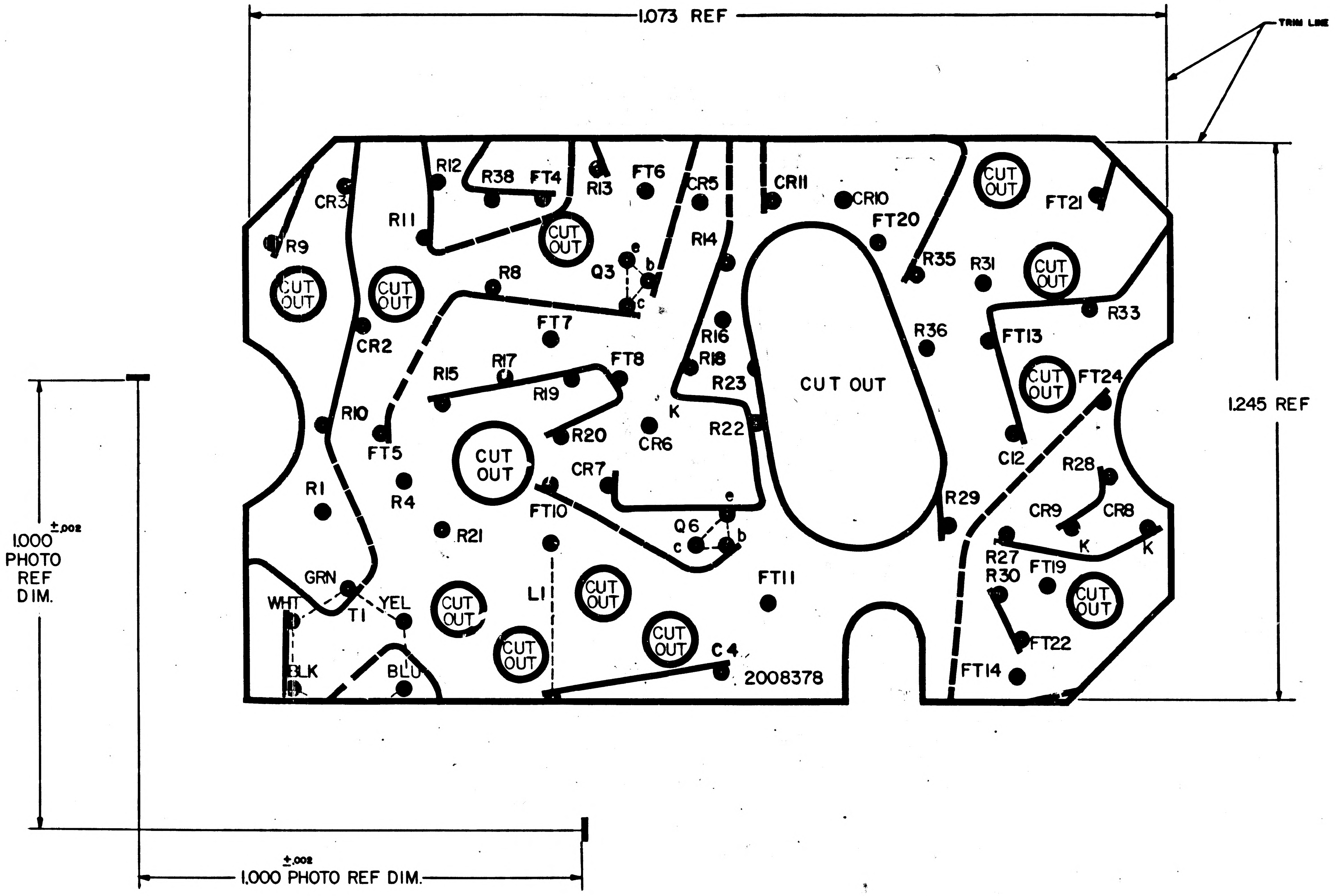
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008376
SCALE 1/1		SHEET 1 OF 1

2008376

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22553

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23046	A.A.			


1.073 REF
TRIM LINE
1.245 REF
1.000 ±.002 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.
R12
R38
FT4
R13
FT6
CR5
CR11
CR10
CUT OUT
FT21
CR3
R11
FT20
R9
Q3
e
b
c
R14
R35
R31
R8
R33
FT7
R36
CR2
R16
R18
FT13
R15
R17
FT8
R23
CUT OUT
FT24
R19
K
R10
R20
CR6
R22
FT5
C12
R28
CR7
R1
R4
FT10
Q6
e
b
c
R29
CR9
CR8
K
K
R21
R27
R30
FT19
GRN
WHT
T1
YEL
L1
FT11
FT22
BLK
BLU
C4
2008378
FT14

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE 1B, CLASS 2, STYLE 1A
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .045/.055 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007109	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT W Rufer
APPROVED MSC NOT REQUIRED PER LETTER NASA PI 7-65-612
DATE

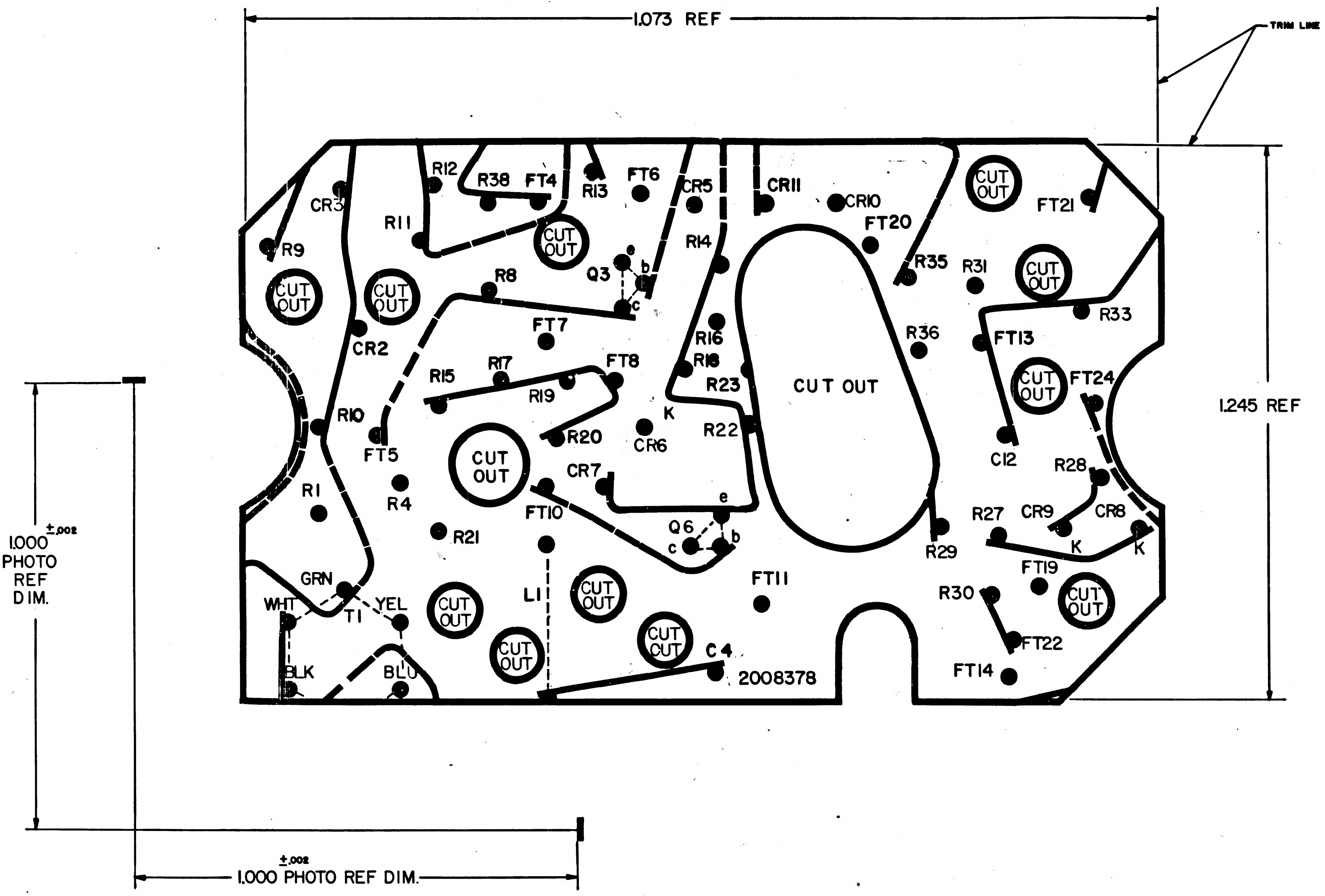
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP
PHOTOGRAPHIC MASTER
AAC FILTER AND MULTIVIBRATOR-3200 CPS

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008378
SCALE 10/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22253						
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED



1.073 REF
TRIM LINE
1.245 REF
1.000 ±.002 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.
R12
R38
FT4
R13
FT6
CR5
CR11
CR10
CR3
R11
R9
CUT OUT
FT21
FT20
R14
Q3
e
b
c
R8
R35
R31
R33
FT7
CR2
R16
R36
FT13
R15
R17
FT8
R18
R23
CUT OUT
FT24
R19
K
R10
R20
CR6
R22
FT5
C12
R28
CR7
R1
R4
FT10
e
CR9
CR8
R27
Q6
R21
c
b
K
K
R29
GRN
FT19
FT11
WHT
T1
YEL
L1
R30
FT22
C4
BLK
BLU
2008378
FT14

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THK SENSITIZED DIMENSIONALLY STABLE PER L-F-340, TYPE IB, CLASS 2, STYLE IA
3. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
5. CUT TO WITHIN .010 OF TRIM LINE
6. BROKEN LINE DENOTES SLEEVING
7. ● .045 / 055 DIA HOLE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007109	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED 27 Sep 65
APPROVED 29 Sep 65
APPROVED 30 Sep 65
APPROVED MIT WKupfer 30 Sep 65
APPROVED MSC NOT REQUIRED PER LETTER NASA PP7-65-612
DATE

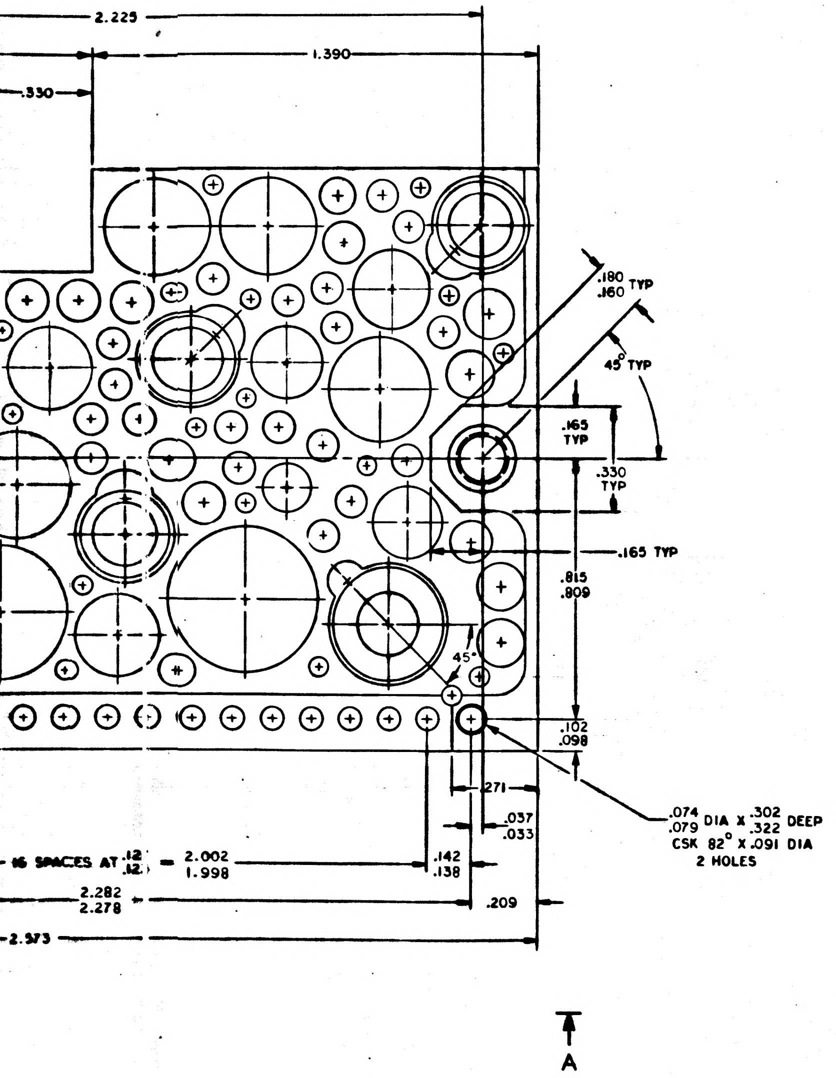
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TOP
PHOTOGRAPHIC MASTER
AAC FILTER AND MULTIVIBRATOR-3200 CPS

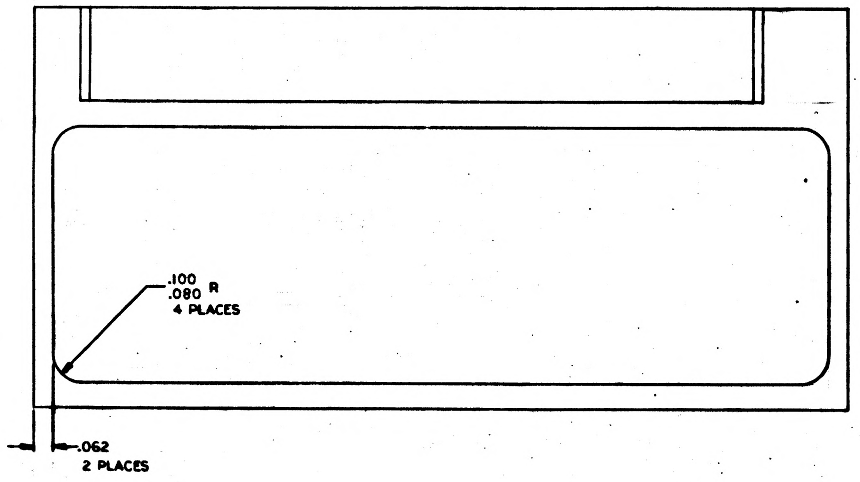
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008378

SCALE 10/1 SHEET 1 OF 1

REVISIONS 22853						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24393				



2.225
1.390
.330
.180
.160 TYP
45° TYP
.165
TYP
.330
TYP
.165 TYP
.815
.809
45°
.102
.098
.271
.037
.033
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
16 SPACES AT .12
.12 = 2.002
1.998
.142
.138
2.282
2.278
.209
2.373
A



.100
.080 R
4 PLACES
.062
2 PLACES

VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XX .02 .XXX .005 ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007109
NEXT ASSY USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
NOT REQUIRED PER LETTER
NASA-PP7-65-812
MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

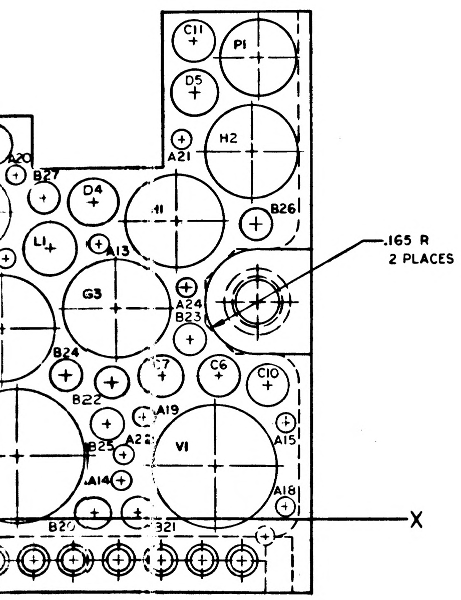
HEATSINK,
AAC, FILTER & MULTIVIBRATOR
3200 CPS

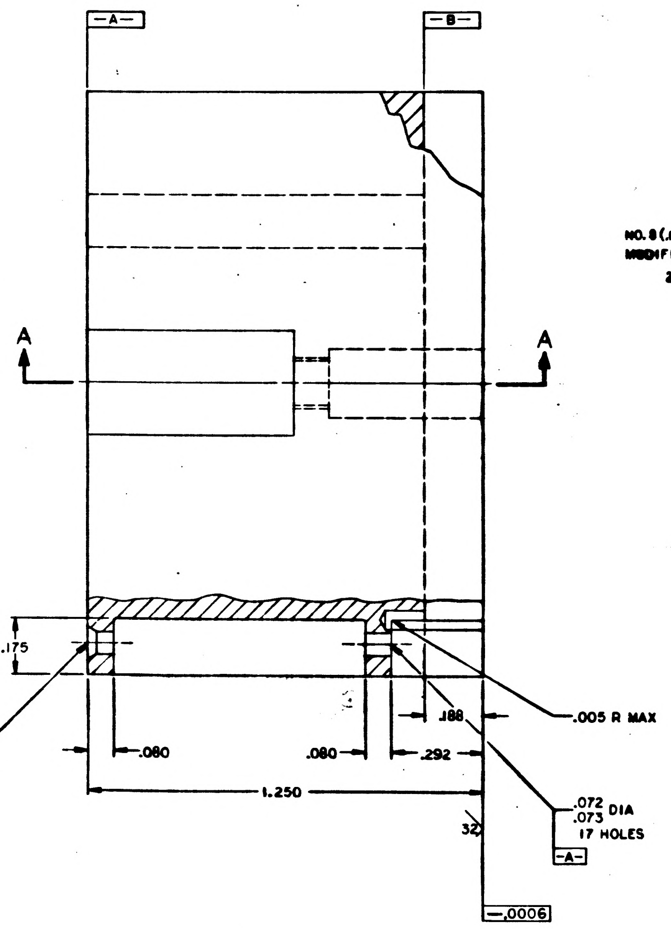
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008379
SCALE 5/1
SHEET 1 OF 1

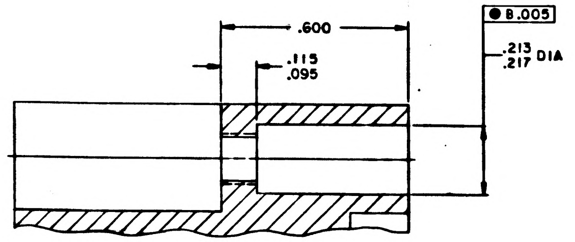
2008379 A

2008379 A

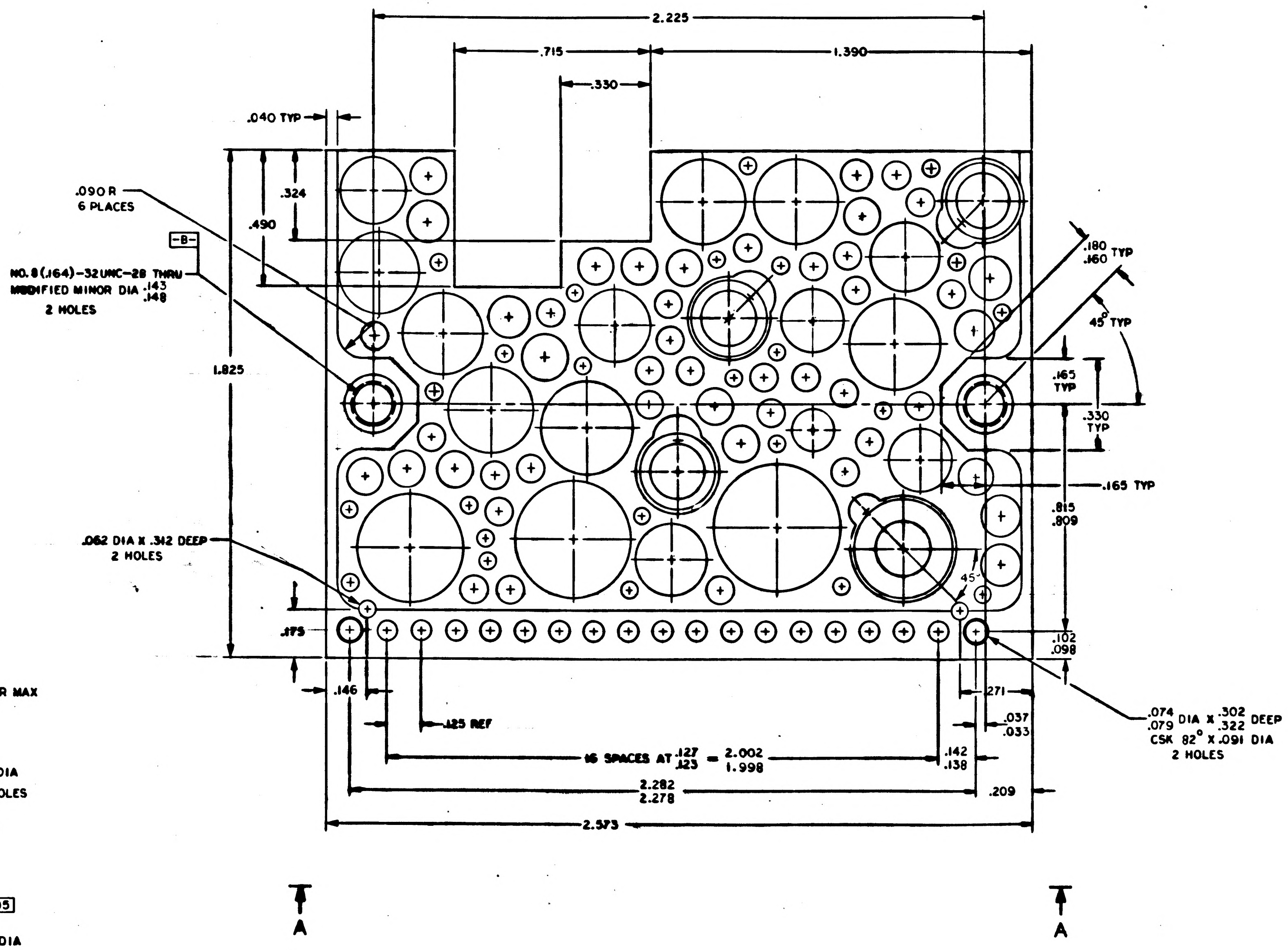
E-3

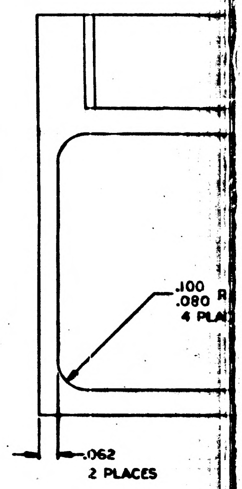

C11
P1
D5
H2
A21
A20
B27
D4
H1
B26
L1
A13
.165 R
2 PLACES
G3
A24
B23
B24
B22
C7
C6
C10
A19
A15
B25
A22
V1
A14
A18
B20
B21
X


-A-
-B-
A
A
.175
● A .005
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
17 HOLES
.080
.080
.188
.292
.005 R MAX
1.250
32
.072
.073 DIA
17 HOLES
-A-
—.0006


.600
.115
.095
● B .005
.213
.217 DIA

PARTIAL SECTION A-A

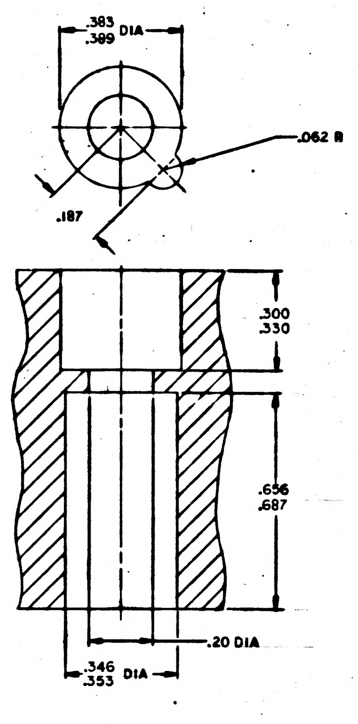

2.225
.715
1.390
.330
.040 TYP
.324
.490
.090 R
6 PLACES
-B-
NO. 8 (.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
1.825
.180
.160 TYP
45° TYP
.165
TYP
.330
TYP
.165 TYP
.815
.809
.062 DIA X .312 DEEP
2 HOLES
45°
.175
.102
.098
.146
.125 REF
.271
.037
.033
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
16 SPACES AT .127
.123 = 2.002
1.998
.142
.138
2.282
2.278
.209
2.573
A
A


.100
.080 R
4 PLA
.062
2 PLACES

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

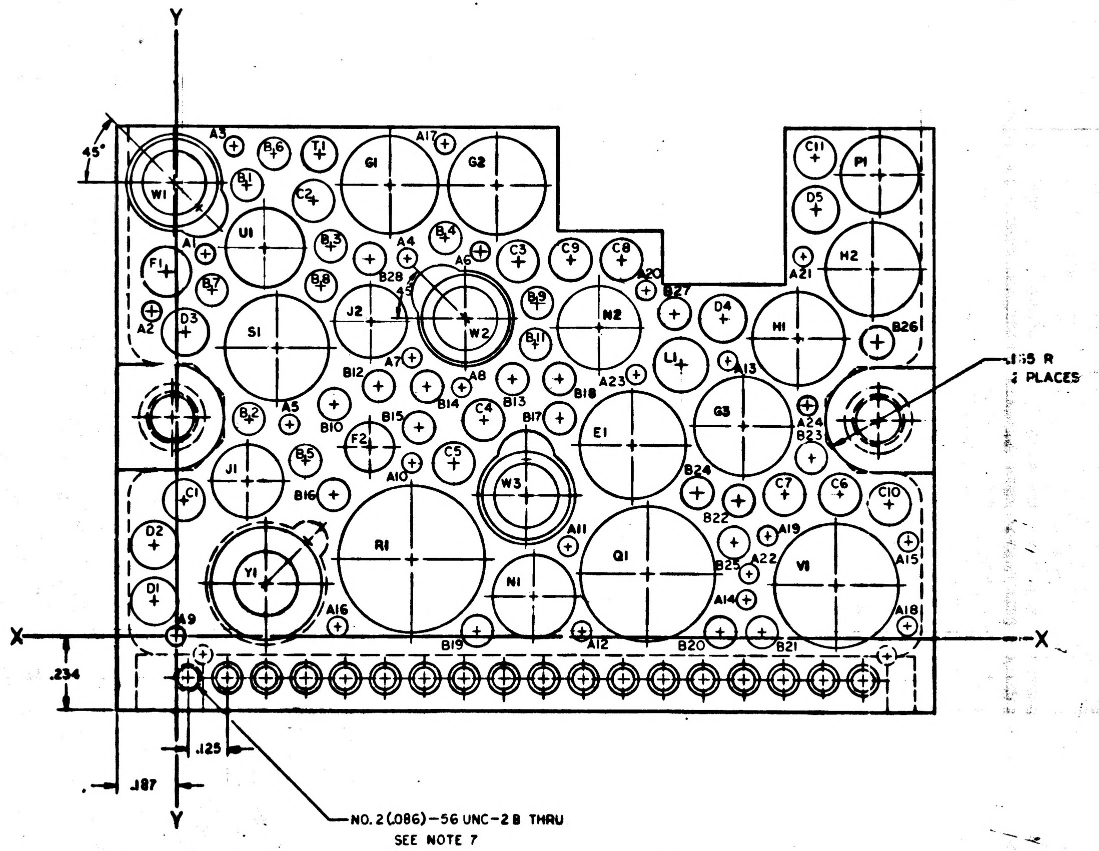
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A1	.092	1.193	.058/.062	24
A2	-.080	1.012		
A3	.185	1.528		
A4	.730	1.180		
A5	.360	.660		
A6	.960	1.200		
A7	.745	.870		
A8	.901	.779		
A9	.000	.000		
A10	.744	.542		
A11	1.233	.280		
A12	1.280	.017		
A13	1.735	.864		
A14	1.795	.116		
A15	2.302	.300		
A16	.508	.030		
A17	.846	1.540		
A18	2.300	.038		
A19	1.863	.317		
A20	1.482	1.082		
A21	1.977	1.190		
A22	1.805	.200		
A23	1.450	.820		
A24	1.990	.726		
B1	.225	1.410	.100/.104	28
B2	.230	.676		
B3	.490	1.218		
B4	.850	1.247		
B5	.410	.548		
B6	.310	1.508		
B7	.114	1.080		
B8	.460	1.095		
B9	1.142	1.040		
B10	.500	.725		
B11	1.132	.914		
B12	.640	.782		
B13	1.058	.804		
B14	.792	.780		
B15	.768	.652		
B16	.500	.442		
B17	1.208	.681		
B18	1.208	.805		
B19	.950	.018		
B20	1.715	.018		
B21	1.846	.018		
B22	1.772	.428		
B23	2.002	.562		
B24	1.640	.450		
B25	1.757	.297		
B26	2.210	.924		
B27	1.570	1.010		
B28	.614	1.180		
			.127/.131	11
C1	.025	.422		
C2	.435	1.360		
C3	1.080	1.170		
C4	.968	.675		
C5	.875	.542		
C6	2.090	.448		
C7	1.917	.447		
C8	1.405	1.178		
C9	1.245	1.175		
C10	2.245	.418		
C11	2.014	1.500		

HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
D1	-.070	.108	.146/.150	5
D2	-.070	.282		
D3	.028	.944		
D4	1.722	.994		
D5	2.021	1.335		
E1	1.437	.598	.330/.337	1
F1	-.032	1.135	.153/.157	2
F2	.614	.590		
G1	.677	1.408	.310/.317	3
G2	1.014	1.408		
G3	1.785	.658		
H1	1.960	.934	.288/.295	2
H2	2.193	1.152		
J1	.228	.485	.227/.231	2
J2	.615	.984		
L1	1.592	.850	.165/.169	1
N1	1.127	.126	.255/.262	2
N2	1.334	.968		
P1	2.216	1.445	.237/.241	1
Q1	1.487	.197	.419/.426	1
R1	.743	.242	.455/.462	1
S1	.319	.900	.326/.333	1
T1	.455	1.508	.112/.116	1
U1	.280	1.213	.245/.249	1
V1	2.080	.162	.384/.391	1
W1	-.007	1.413	SEE DETAIL A	3
W2	.915	.990		
W3	1.103	.442		
Y1	.289	.160	SEE DETAIL D	1

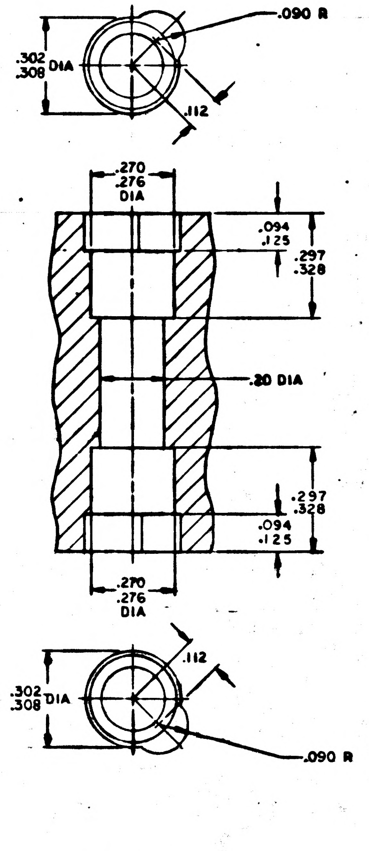


.383
.389 DIA
.062 R
.187
.300
.330
.656
.687
.20 DIA
.346
.353 DIA

DETAIL D



Y
X
45°
W1
A3
B1
B6
T1
G1
A17
G2
C11
P1
D5
H2
A21
U1
C2
F1
A1
B3
A4
B4
A6
C3
C9
C8
A20
B27
D4
H1
B26
B7
B8
B28
45
B9
N2
A2
D3
S1
J2
W2
B11
L1
A13
B12
A7
A8
A23
B13
B18
G3
E1
B2
A5
B10
B15
B14
C4
B17
A24
B23
F2
C5
J1
B5
B16
A10
W3
B24
C7
C6
C10
C1
B22
A19
D2
Y1
R1
A11
Q1
A22
B25
V1
A15
D1
N1
A14
A16
A18
A9
B19
A12
B20
B21
.155 R
2 PLACES
.234
.125
.187
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7



.090 R
.302
.308 DIA
.112
.270
.276
DIA
.094
.125
.297
.328
.20 DIA
.297
.328
.094
.125
.270
.276
DIA
.302
.308 DIA
.112
.090 R

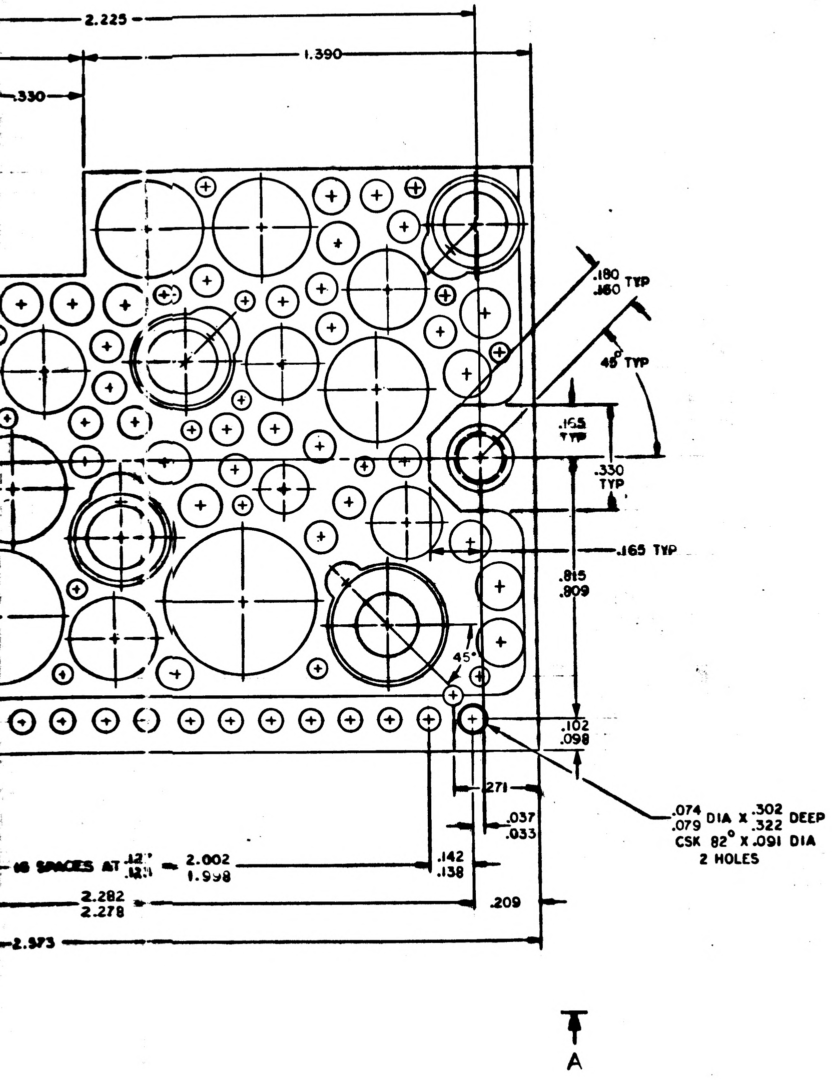
DETAIL A

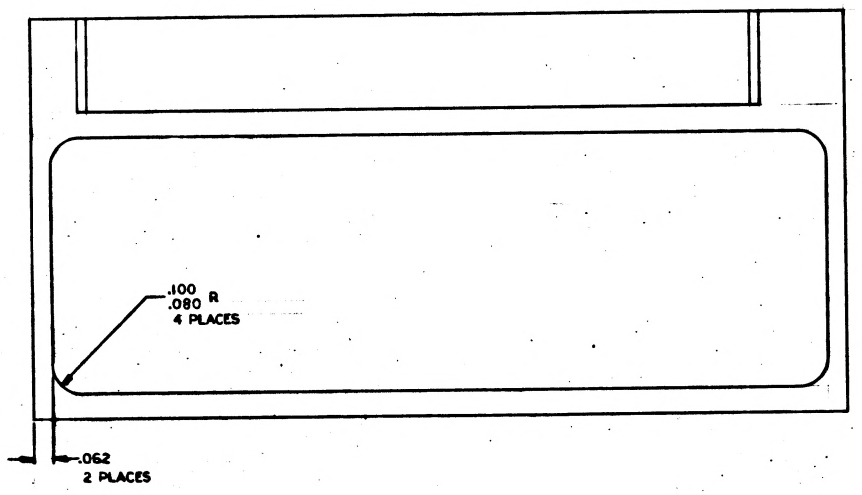
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH PART NO. PER ND1002019
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II TO SURFACES $\boxed{-A-}$ AND $\boxed{-B-}$

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.225
1.390
.330
.180
.160 TYP
45° TYP
.165 TYP
.330 TYP
.165 TYP
.815
.809
45°
.102
.098
.271
.037
.033
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
16 SPACES AT .125 = 2.002
1.998
.142
.138
2.282
2.278
.209
2.373
A


.100
.080 R
4 PLACES
.062
2 PLACES

VIEW A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007109	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
NOT REQUIRED PER LETTER NASA-PP7-65-813
MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

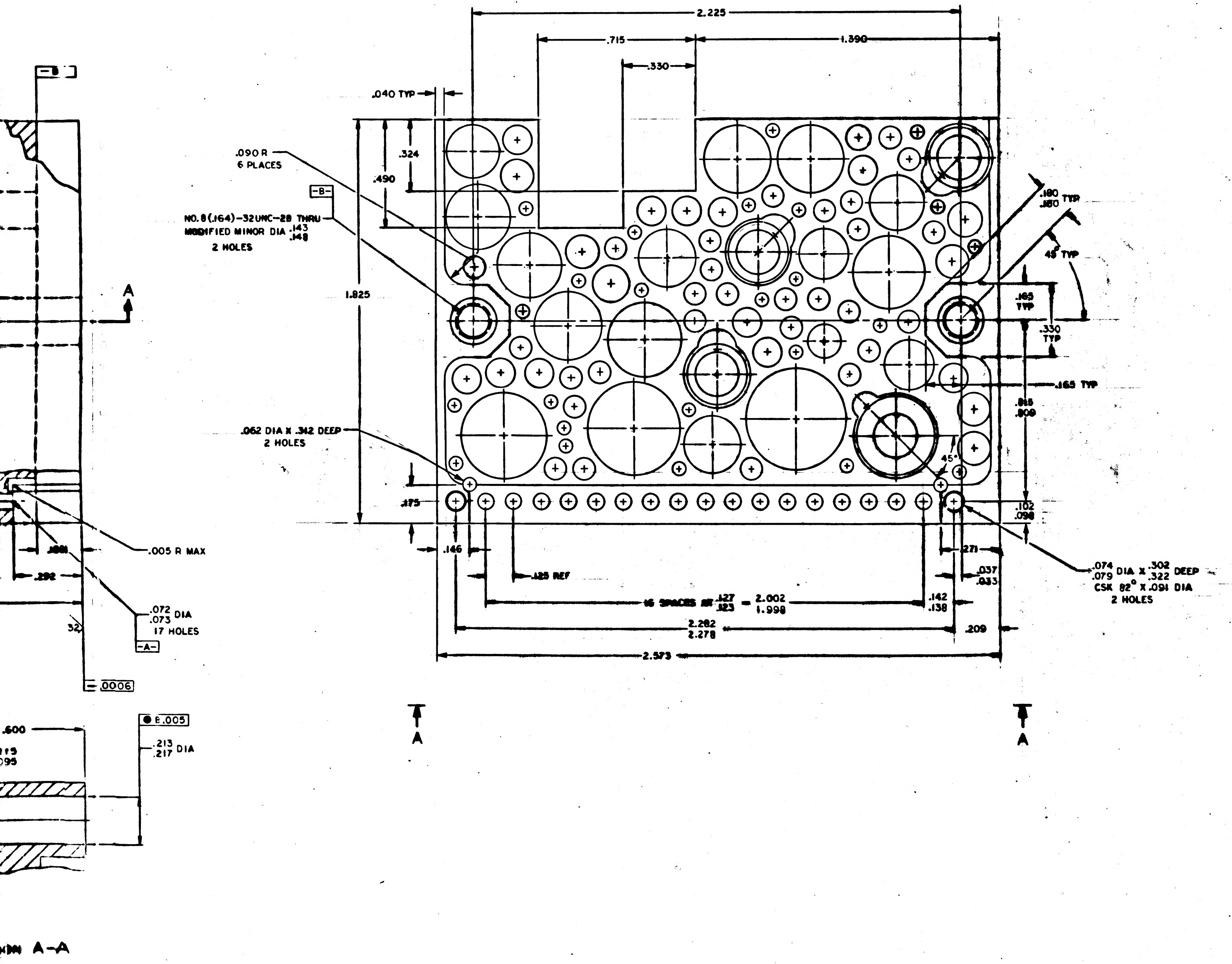
HEATSINK,
AAC, FILTER & MULTIVIBRATOR
3200 CPS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008379

SCALE 5/1 SHEET 1 OF 1

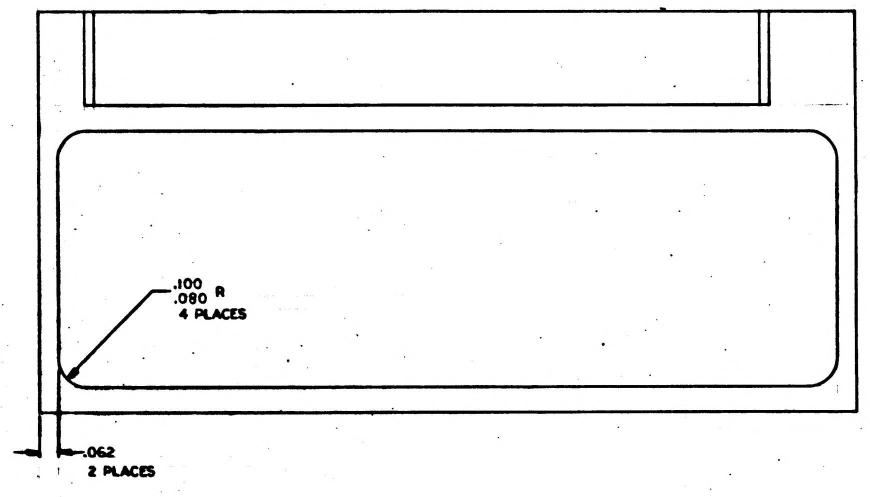
2008379

2008379



2.225
.715
1.390
.330
.040 TYP
.324
.490
1.825
.090 R
6 PLACES
-B-
NO. 8 (.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.062 DIA X .312 DEEP
2 HOLES
.175
.146
.125 REF
16 SPACES AT .127 .123 = 2.002 1.998
2.282 2.278
2.573
.180 .150 TYP
45° TYP
.165 TYP
.330 TYP
.165 TYP
.815 .809
45°
.102 .098
.271
.037 .033
.142 .138
.209
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
A
A
A
.005 R MAX
.088
.292
.072 .073 DIA
17 HOLES
-A-
32
.0006
.600
.215 .095
E .005
.213 .217 DIA

ION A-A



.100 .080 R
4 PLACES
.062
2 PLACES

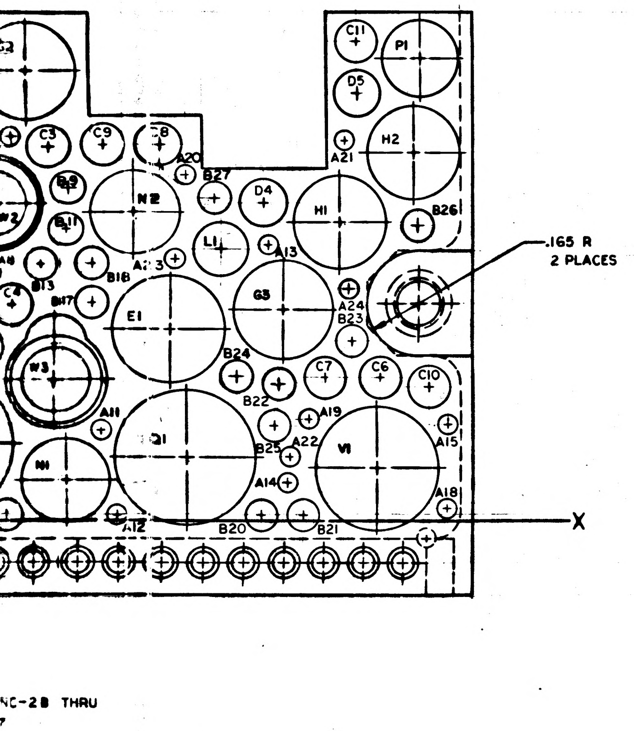
VIEW A-A

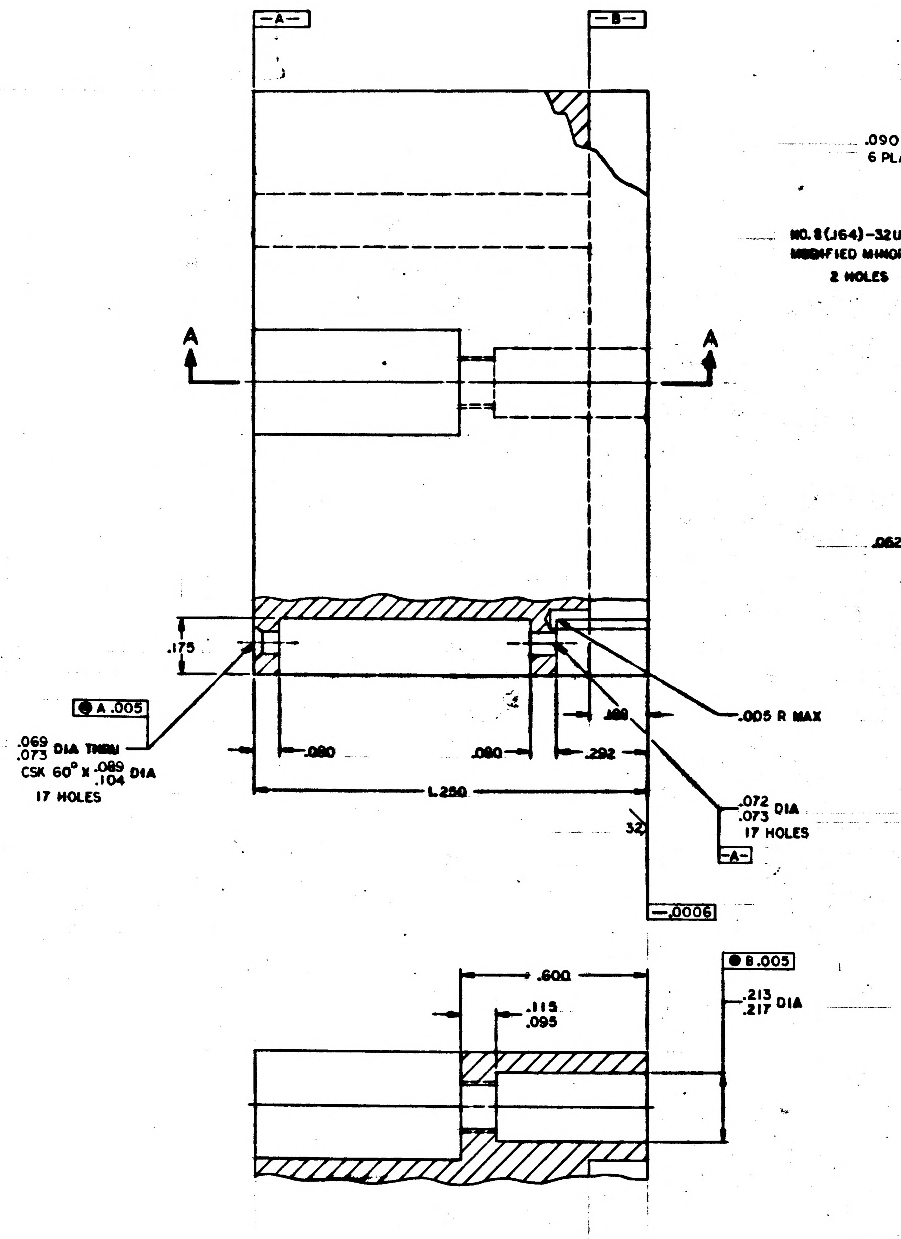
MASTER

NEXT ASSY

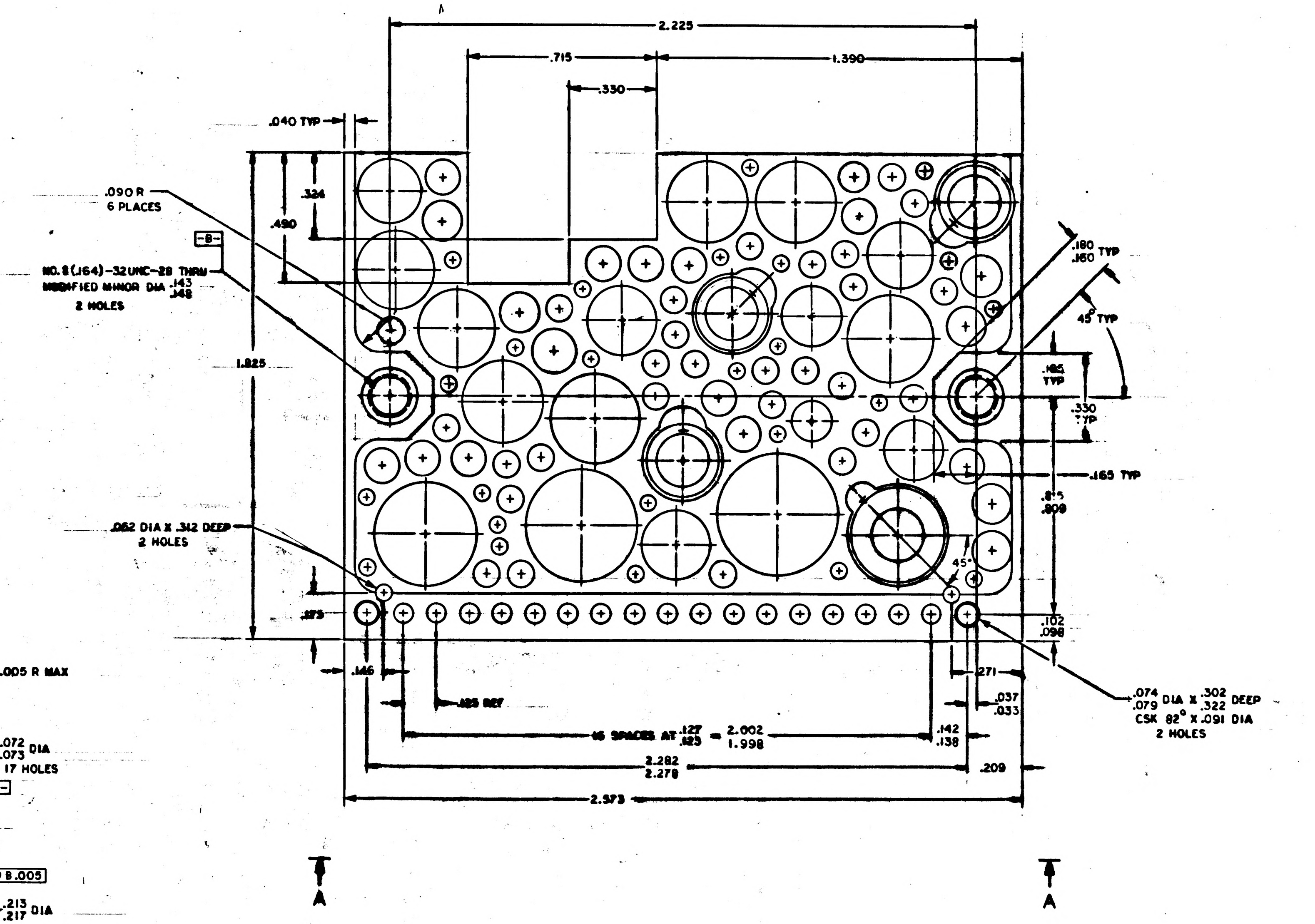
APPLICATION

2008379


C2
C3
C9
C8
A20
B27
B9
W2
N2
B11
A8
B18
A23
B13
C4
B17
W3
E1
L1
D4
H1
A13
G3
A24
B23
B24
B22
C7
C6
C10
A11
Q1
B25
A22
A19
V1
A15
A14
A18
N1
A12
B20
B21
C11
P1
D5
H2
A21
B26
.165 R
2 PLACES
X
NC-2B THRU
7


-A-
-B-
A
A
.175
A .005
.069 .073 DIA THRU
CSK 60° X .089 .104 DIA
17 HOLES
.080
.080
.188
.292
.005 R MAX
1.250
32
.072 .073 DIA
17 HOLES
-A-
—.0006
B .005
.600
.115 .095
.213 .217 DIA

PARTIAL SECTION A-A


2.225
.715
1.390
.330
.040 TYP
.324
.490
.090 R
6 PLACES
-B-
NO. 8(.164)-32UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.925
.062 DIA X .312 DEEP
2 HOLES
.173
.146
.125 REF
16 SPACES AT .127 .125 = 2.002 1.998
2.282 2.278
2.573
.180 .160 TYP
45° TYP
.165 TYP
.330 TYP
.165 TYP
.815 .809
45°
.102 .098
.271
.037 .033
.142 .138
.209
.074 .079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
A
A

.062
2 PLACES

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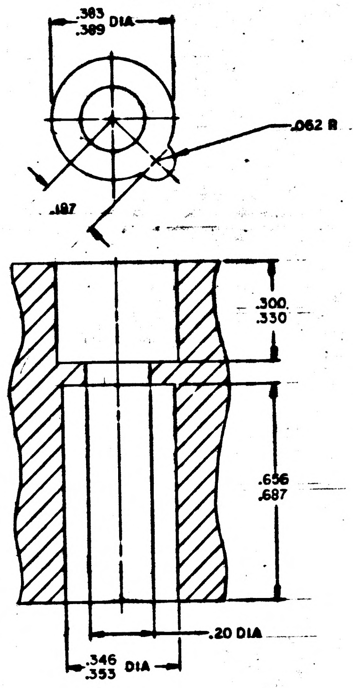
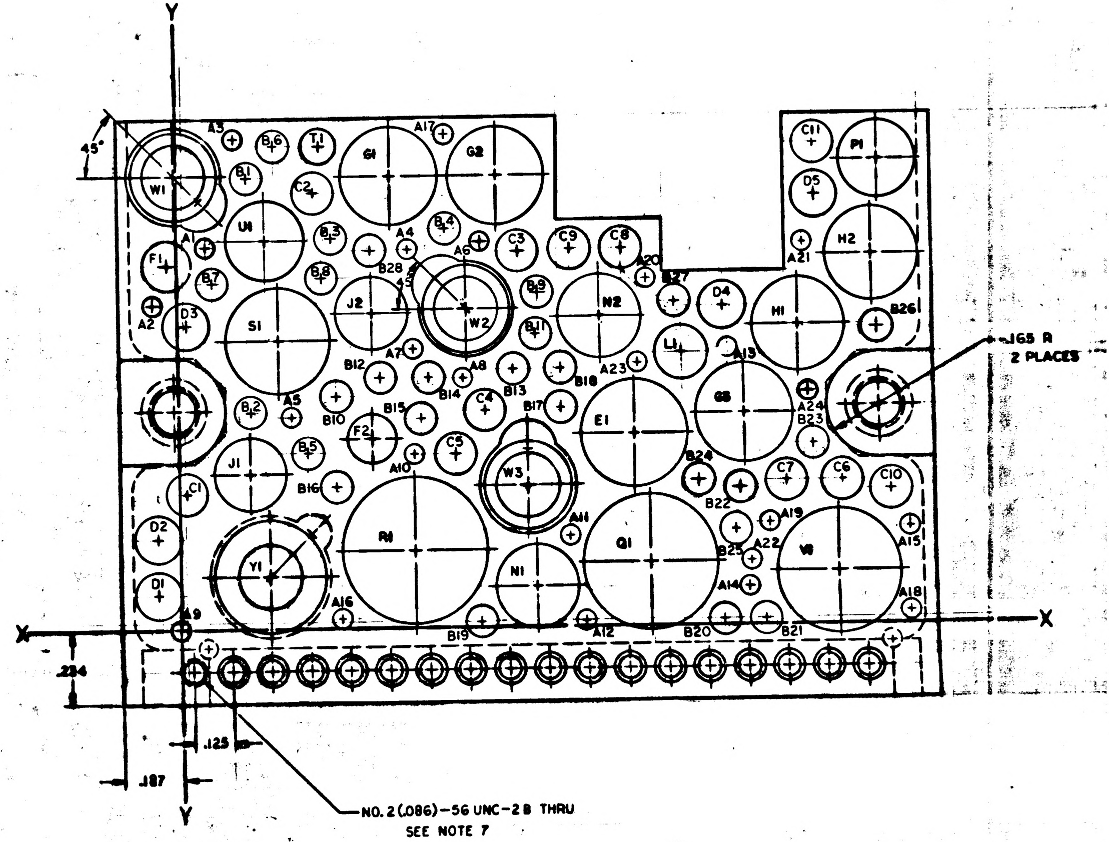
HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
A1	.092	1.190	.058/.062	24
A2	-.080	1.012		
A3	.185	1.528		
A4	.730	1.180		
A5	.360	.660		
A6	.960	1.200		
A7	.745	.870		
A8	.901	.779		
A9	.000	.000		
A10	.744	.542		
A11	1.233	.280		
A12	1.280	.017		
A13	1.735	.364		
A14	1.795	.116		
A15	2.302	.300		
A16	.508	.030		
A17	.846	1.540		
A18	2.300	.038		
A19	1.863	.317		
A20	1.482	1.082		
A21	1.977	1.190		
A22	1.805	.200		
A23	1.450	.820		
A24	1.990	.726		
B1	.225	1.410	.100/.104	28
B2	.230	.676		
B3	.490	1.218		
B4	.850	1.247		
B5	.410	.548		
B6	.310	1.508		
B7	.114	1.080		
B8	.460	1.095		
B9	1.142	1.040		
B10	.500	.725		
B11	1.132	.914		
B12	.640	.782		
B13	1.058	.804		
B14	.792	.780		
B15	.768	.652		
B16	.500	.442		
B17	1.208	.681		
B18	1.208	.805		
B19	.950	.018		
B20	1.715	.018		
B21	1.846	.018		
B22	1.772	.428		
B23	[illegible]	.362		
B24	[illegible]	.450		
B25	[illegible]	.297		
B26	2.210	.924		
B27	1.570	1.010		
B28	.614	1.180		
[illegible]	.025	.422	.127/.131	11
[illegible]	[illegible]	1.360		
[illegible]	1.080	1.170		
[illegible]	[illegible]	.875		
[illegible]	[illegible]	.542		
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	.447		
[illegible]	[illegible]	1.178		
[illegible]	1.245	1.175		
C10	2.245	.418		
C11	2.014	1.500		

HOLE IDENT	X-DIM	Y-DIM	HOLE DIA	QTY
D1	-.070	.108	.146/.150	5
D2	-.070	.282		
D3	.028	.944		
D4	1.722	[illegible]		
D5	[illegible]	[illegible]		
[illegible]	1.437	.598	.330/.337	1
F1	.032	1.135	.153/.157	2
F2	.614	.590		
G1	.677	1.408	.310/.317	3
G2	1.014	1.408		
G3	1.785	.658		
H1	1.960	.934	.288/.295	2
H2	2.195	1.152		
J1	.228	.485	.227/.231	2
J2	.615	.984		
L1	1.592	.150	.165/.169	1
N1	1.127	.126	.255/.262	2
N2	1.334	[illegible]		
P1	2.216	1.445	.237/.241	1
Q1	1.487	.197	.419/.426	1
R1	.743	.242	.455/.462	1
S1	.319	.900	.326/.333	1
T1	.455	1.508	.112/.116	1
U1	.280	1.213	.245/.249	1
V1	2.080	.162	.384/.391	1
W1	-.007	1.413	SEE DETAIL A	3
W2	.915	.990		
W3	1.103	.442		
Y1	.289	.160	SEE DETAIL D	1

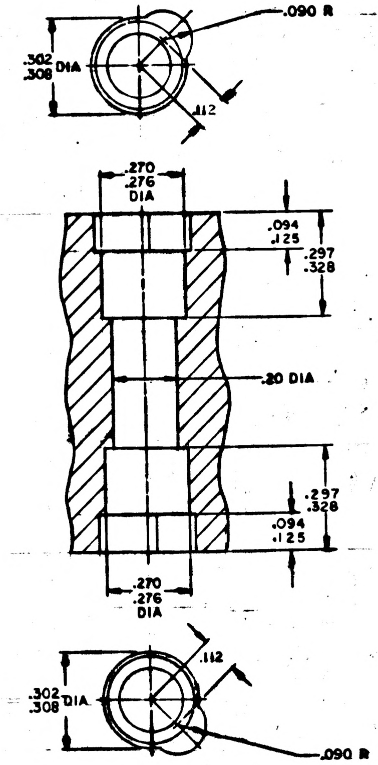


.383
.389 DIA
.062 R
.187
.300
.330
.656
.687
.20 DIA
.346
.353 DIA

DETAIL D



Y
X
45°
W1
W2
W3
Y1
G1
G2
H1
H2
J1
J2
S1
U1
E1
G3
Q1
R1
N1
N2
P1
V1
L1
F1
F2
T1
.165 R
2 PLACES
.234
.187
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7



.090 R
.302
.308 DIA
.112
.270
.276
DIA
.094
.125
.297
.328
.20 DIA
.297
.328
.094
.125
.270
.276
DIA
.112
.302
.308 DIA
.090 R

DETAIL A

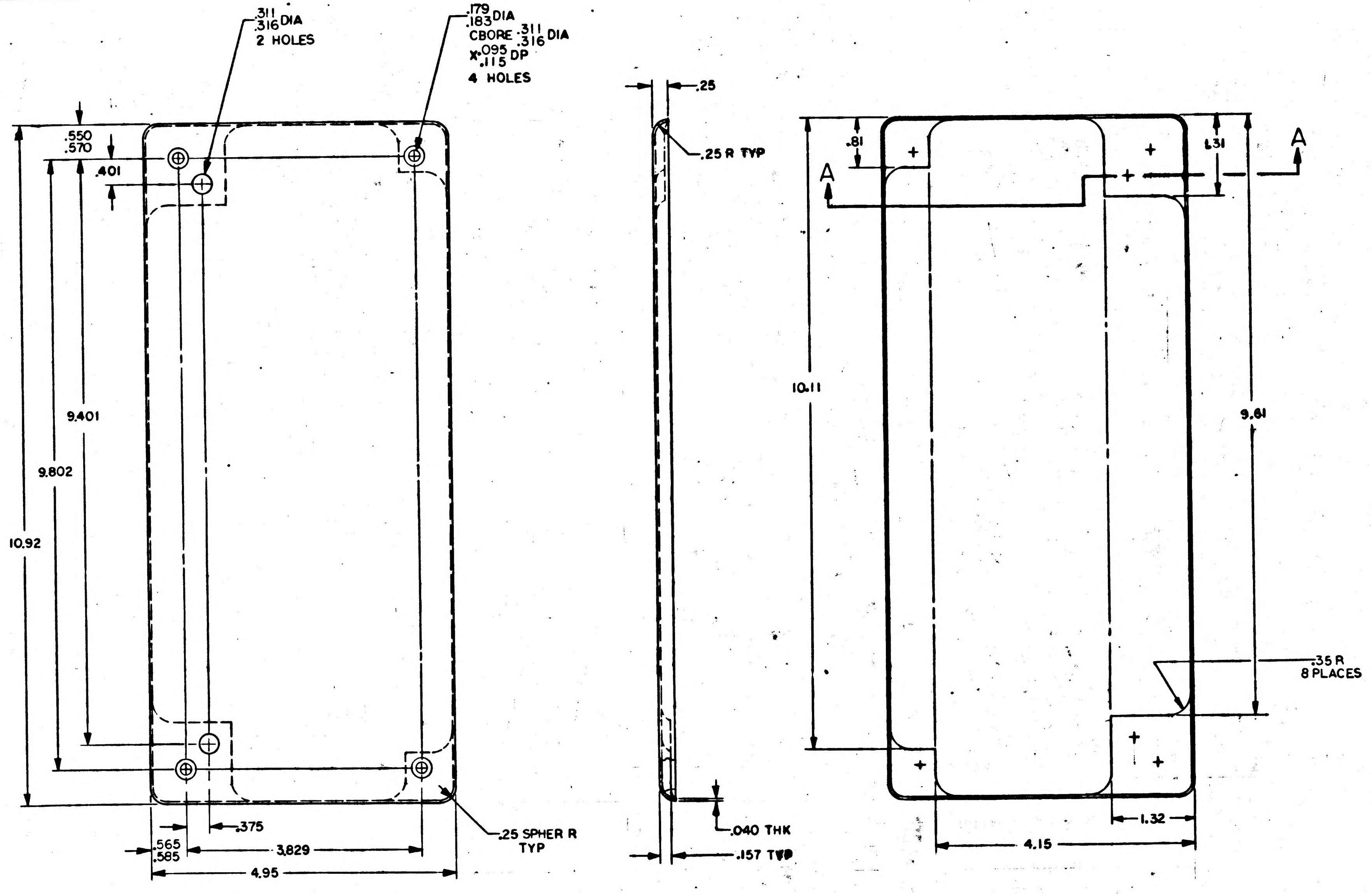
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125 UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040
8. IDENTIFY WITH PART NO. PER ND1002019
9. APPLY A .31 MIN WIDTH PERIMETER OF ADHESIVE PER ND 1002187 TYPE II TO SURFACES -A- AND -B-

2008379

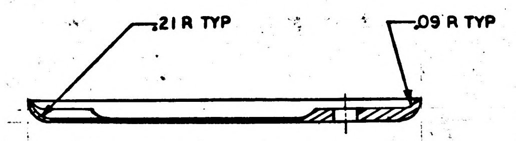
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23938			15 [illegible] 65	


.311
.316 DIA
2 HOLES
.179
.183 DIA
CBORE .311
.316 DIA
X .095
.115 DP
4 HOLES
.550
.570
.401
9.401
9.802
10.92
.375
.565
.585
3.829
4.95
.25 SPHER R
TYP
.25
.25 R TYP
.040 THK
.157 TYP
.81
A
A
.31
10.11
9.61
.35 R
8 PLACES
1.32
4.15

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. REMOVE BURRS AND SHARP EDGES .005/.015
4.
5. ANODIZE PER MIL-M-45202, TYPE I, CLASS C
6. PAINT ALL SURFACES PER ND1002279 USING PRIMER 1010942 AND PAINT 1008809-2
7. IDENTIFY WITH PART NO. PER ND1002019


.21 R TYP
.09 R TYP

SECTION A-A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007222	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 24Aug65
CHECKED 15Sep65
APPROVED
APPROVED 9/20/65
APPROVED MIT 21Sep65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

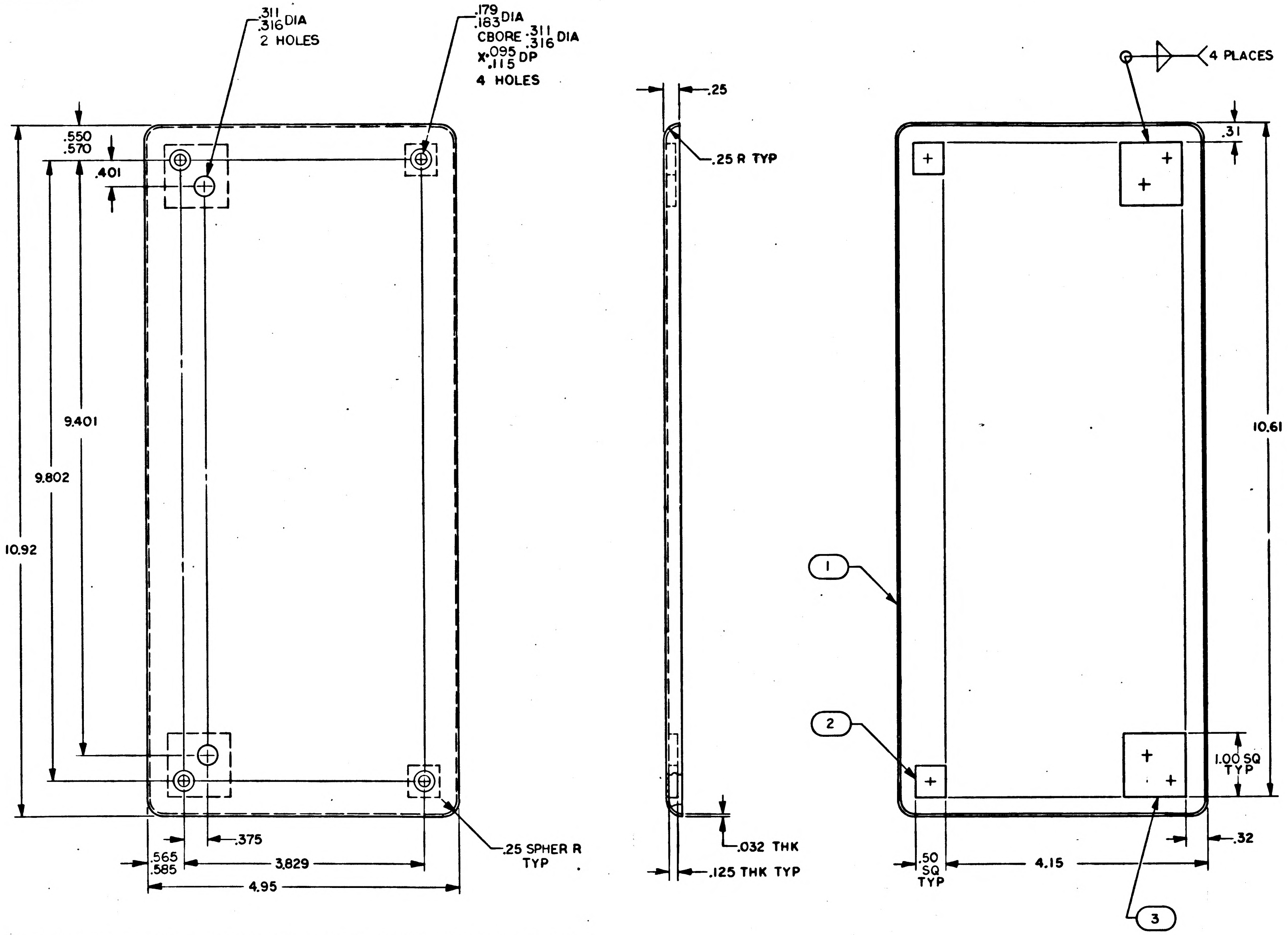
COVER
C/M CDU

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008381
SCALE FULL
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22610

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



.311 .316 DIA
2 HOLES
.179 .183 DIA
CBORE .311 .316 DIA
X .095 .115 DP
4 HOLES
.550 .570
.401
9.401
9.802
10.92
.375
.565 .585
3.829
4.95
.25 SPHER R TYP
.25
.25 R TYP
.032 THK
.125 THK TYP
4 PLACES
.31
10.61
1
2
1.00 SQ TYP
.32
.50 SQ TYP
4.15
3

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. WELD PER MIL-W-18326
5. ANODIZE PER MIL–M–45202, TYPE I, CLASS C
6. PAINT ALL SURFACES PER ND1002279 USING PRIMER 1010942 AND PAINT 1008809-2
7. IDENTIFY WITH PART NO. PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008381–003	BOSS	3
2	2008381–002	BOSS	2
1	2008381–001	COVER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007222	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 24Aug65
CHECKED 17Sep65
APPROVED
APPROVED 9/20/65
APPROVED MIT 21Sep65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

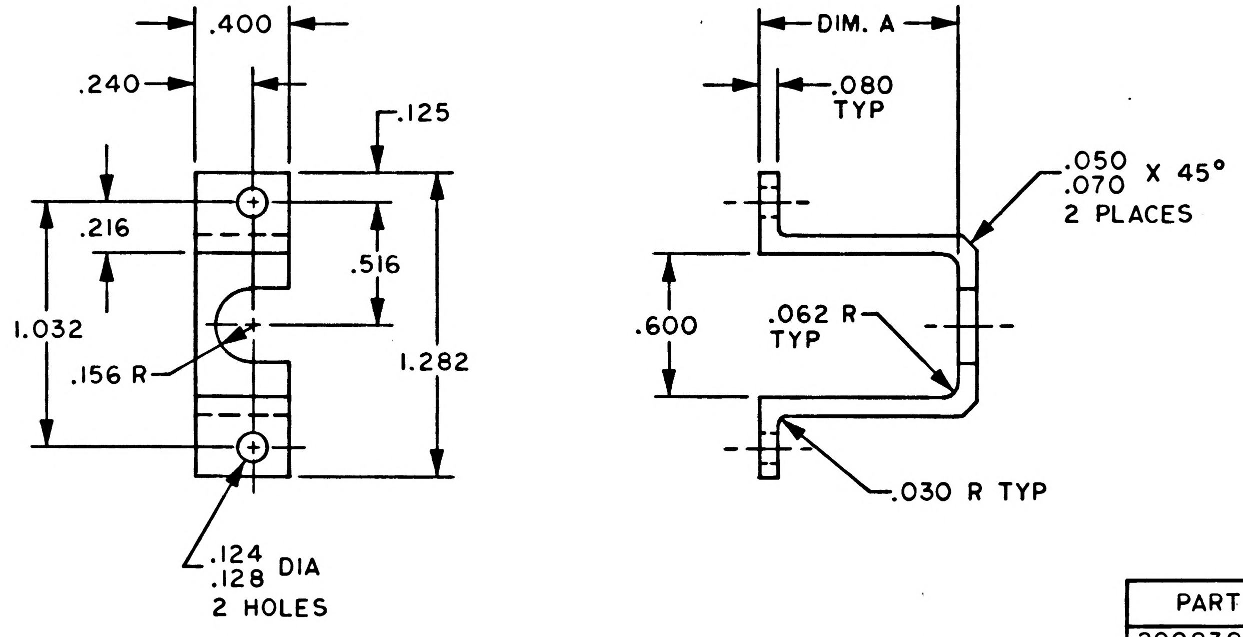
COVER (HF)
INSEPARABLE ASSEMBLY
C/M CDU

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008381
SCALE FULL
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22609

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28671	Jim P	CP	13 MAY 66	



PART NO.	DIM. A
2008386 - 001	.845
2008386 - 002	.960
2008386 - 003	.907

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. ALL SURFACES 125√
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
6. PAINT ALL OVER PER ND1002289
7. IDENTIFY WITH PART NO. PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 16 SEPT 65
CHECKED R.P. Kingsbury 17 Sep 65
APPROVED
APPROVED D.A. Test 9/20/65
APPROVED MIT W Kupfer 11/4/65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, SCREW RETAINER

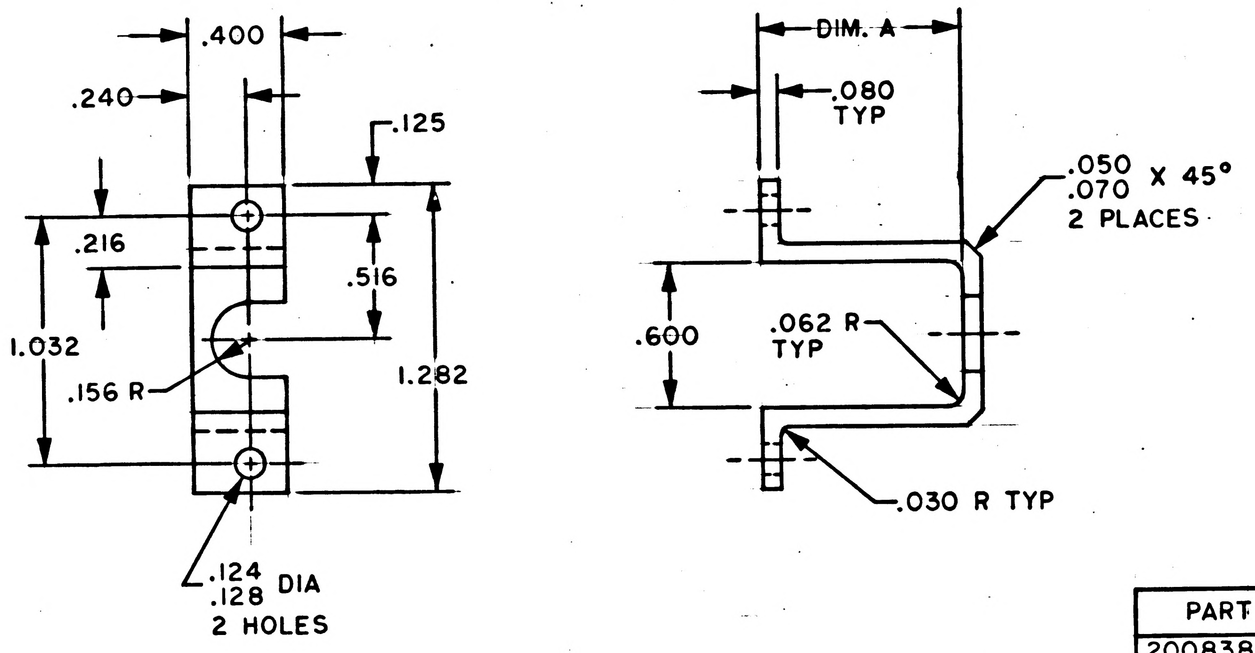
CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008386
SCALE 2/1
SHEET 1 OF 1

2008386 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22609

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



PART NO.	DIM. A
2008386-001	.845
2008386-002	.960
2008386-003	.907

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY ZK60A-T5 PER QQ-M-31 TEMP 5
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. ALL SURFACES 125√
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
6. PAINT ALL OVER PER ND
7. IDENTIFY WITH PART NO. PER ND1002019

MASTER

2007222	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Ken Healy	16 SEPT 65
CHECKED		17Sep65
APPROVED		
APPROVED		9/20/65
APPROVED M.I.T		
APPROVED MSC		DATE

BRACKET, SCREW RETAINER

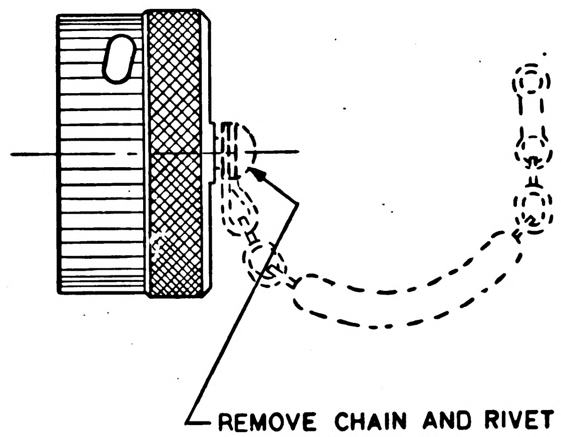
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008386

SCALE 2/1 SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 24260

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 31161	EC		29 SEP 66	



PART NUMBER	MATERIAL (MAKE FROM)	PAINT REQ'D
2008389-001	1008808-001	
-002	-002	
-003	-003	
-004	-004	
-005	-005	
-006	-006	
-007	-007	
-008	-008	
-012	-012	SEE NOTE 5
-014	-014	SEE NOTE 5
2008389-015	1008808-015	SEE NOTE 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SEAL HOLE PER ND1002187 TYPE I AFTER REMOVAL OF RIVET
3. TOUCHUP PER ND1002040 OF IRIDITE SURFACES PERMITTED
4. IDENTIFY WITH PART NUMBER PER ND1002019
5. PAINT ALL OUTER SURFACES PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1. OVERCOAT THE 1008809-1 PAINT WITH 1012543-003 PAINT ND1002291 TYPE II EXCEPT DO NOT USE PRIMER.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007201	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE CHART

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Addario Jr. 28 Sept 65
CHECKED 30 Sept 65
APPROVED
APPROVED LSB
APPROVED MIT 23 Nov 65
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAP, PROTECTIVE

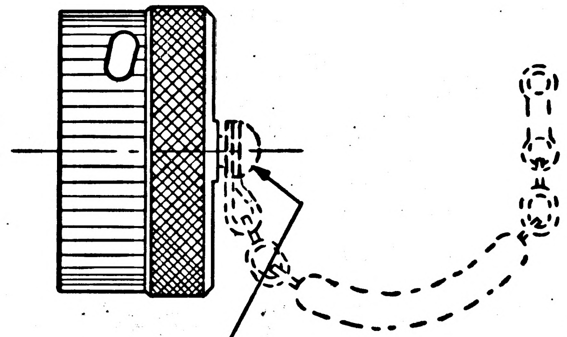
CODE IDENT NO.
SIZE C
DRAWING NO. 2008389
SCALE NONE
SHEET 1 OF 1

2008389 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 24260

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



PART NUMBER	MATERIAL (MAKE FROM)
2008389-001	1008808-001
-002	-002
-003	-003
-004	-004
-005	-005
-006	-006
-007	-007
2008389-008	1008808-008

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SEAL HOLE PER ND1002187 TYPE I AFTER REMOVAL OF RIVET
3. TOUCHUP PER ND1002040 OF IRIDITE SURFACES PERMITTED
4. IDENTIFY WITH PART NUMBER PER ND1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007201	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE CHART

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Addario Jr. 28 Sept 65
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

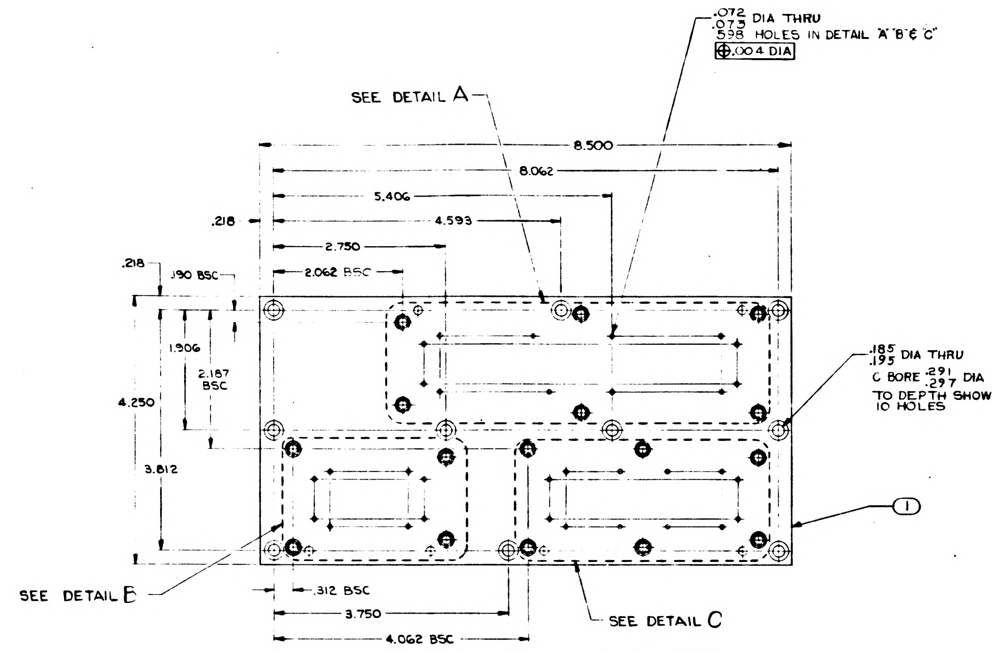
CAP, PROTECTIVE

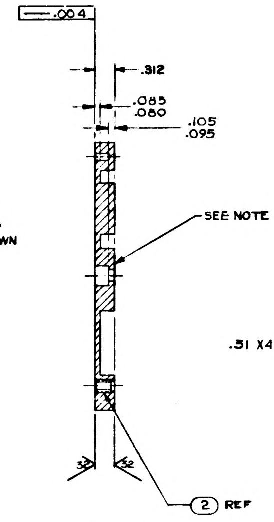
CODE IDENT NO.
SIZE C
DRAWING NO. 2008389
SCALE NONE
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

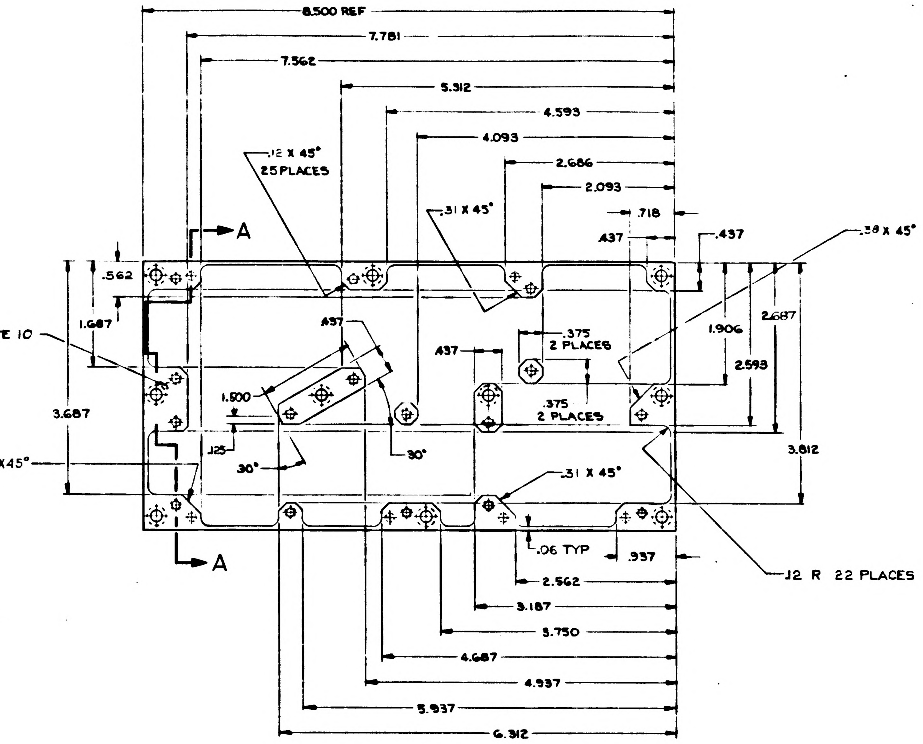
REVISIONS 23931

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 25556	BP	mcm	7 FEB 66	

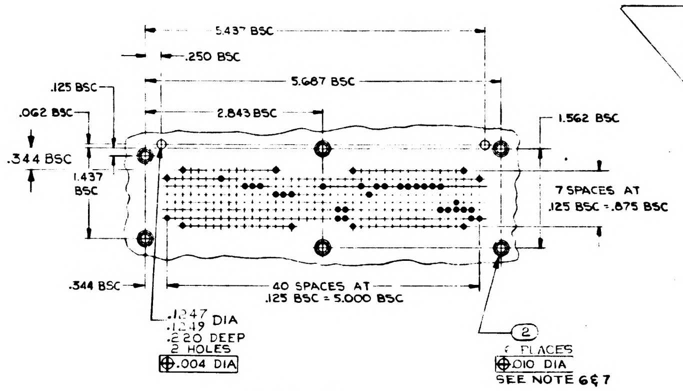

.072
.073 DIA THRU
598 HOLES IN DETAIL "A" "B" & "C"
⊕.004 DIA
SEE DETAIL A
8.500
8.062
5.406
4.593
.218
2.750
2.062 BSC
.218
.190 BSC
1.906
2.187 BSC
4.250
3.812
.185
.195 DIA THRU
C BORE .291
.297 DIA
TO DEPTH SHOWN
10 HOLES
①
SEE DETAIL B
.312 BSC
3.750
4.062 BSC
SEE DETAIL C


—.004
.312
.085
.080
.105
.095
SEE NOTE 10
32
32
② REF

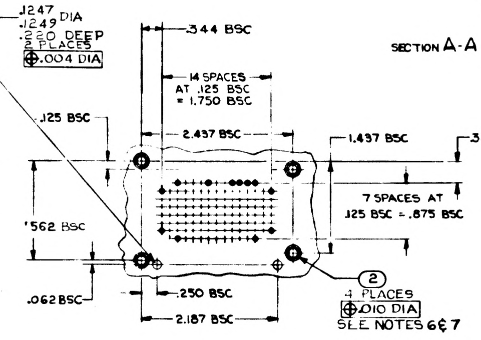
SECTION A-A


8.500 REF
7.781
7.562
5.312
4.593
4.093
2.686
2.093
.12 X 45°
25 PLACES
.31 X 45°
.718
.437
.437
.38 X 45°
A
A
.562
1.687
3.687
SEE NOTE 10
.437
1.500
.125
30°
30°
.437
.375
2 PLACES
.375
2 PLACES
1.906
2.687
2.593
3.812
.51 X45°
.31 X 45°
.06 TYP
.937
.12 R 22 PLACES
2.562
3.187
3.750
4.687
4.937
5.937
6.312

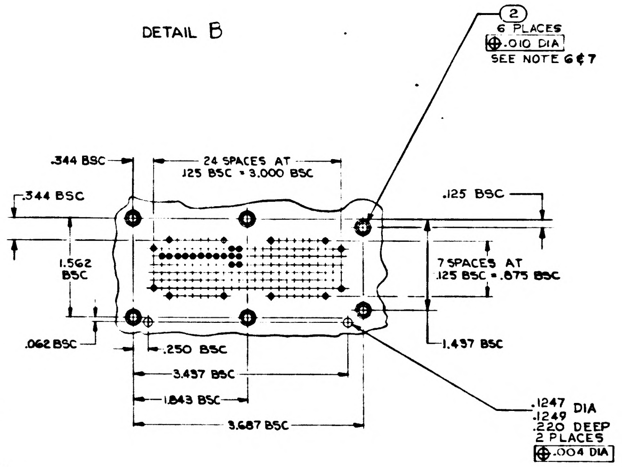
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED


5.437 BSC
.250 BSC
5.687 BSC
.125 BSC
.062 BSC
2.843 BSC
1.562 BSC
.344 BSC
1.437 BSC
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
40 SPACES AT
.125 BSC = 5.000 BSC
.1247
.1249 DIA
.220 DEEP
2 HOLES
⊕.004 DIA
②
6 PLACES
⊕.010 DIA
SEE NOTE 6 & 7

DETAIL A


.1247
.1249 DIA
.220 DEEP
2 PLACES
⊕.004 DIA
.344 BSC
14 SPACES
AT .125 BSC
= 1.750 BSC
.125 BSC
2.437 BSC
1.437 BSC
.344 BSC
.562 BSC
7 SPACES AT
.125 BSC = .875 BSC
.062 BSC
.250 BSC
2.187 BSC
②
4 PLACES
⊕.010 DIA
SEE NOTES 6 & 7

DETAIL B


②
6 PLACES
⊕.010 DIA
SEE NOTE 6 & 7
.344 BSC
24 SPACES AT
.125 BSC = 3.000 BSC
.344 BSC
.125 BSC
1.562 BSC
7 SPACES AT
.125 BSC = .875 BSC
.062 BSC
.250 BSC
1.437 BSC
3.437 BSC
1.843 BSC
3.687 BSC
.1247
.1249 DIA
.220 DEEP
2 PLACES
⊕.004 DIA

DETAIL C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
16	1010957-010		INSERT, SCREW THD, SELF-LOCKING	2
1	2008394-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007116	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.XX ±.01 ±.XXX ±.005 ANGLES ±1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	R.W. Cobot	11-4-65
CHECKED	HPQ	11/8/65
APPROVED	H. Diggle	11/8/65
APPROVED	D. Test	11/8/65
APPROVED MIT	W. Snyder A. C. METZGER	9 Nov 65
APPROVED MSC		
		DATE

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M LEFT PSA

CODE IDENT NO.	SIZE	DRAWING NO.
	E	2008394

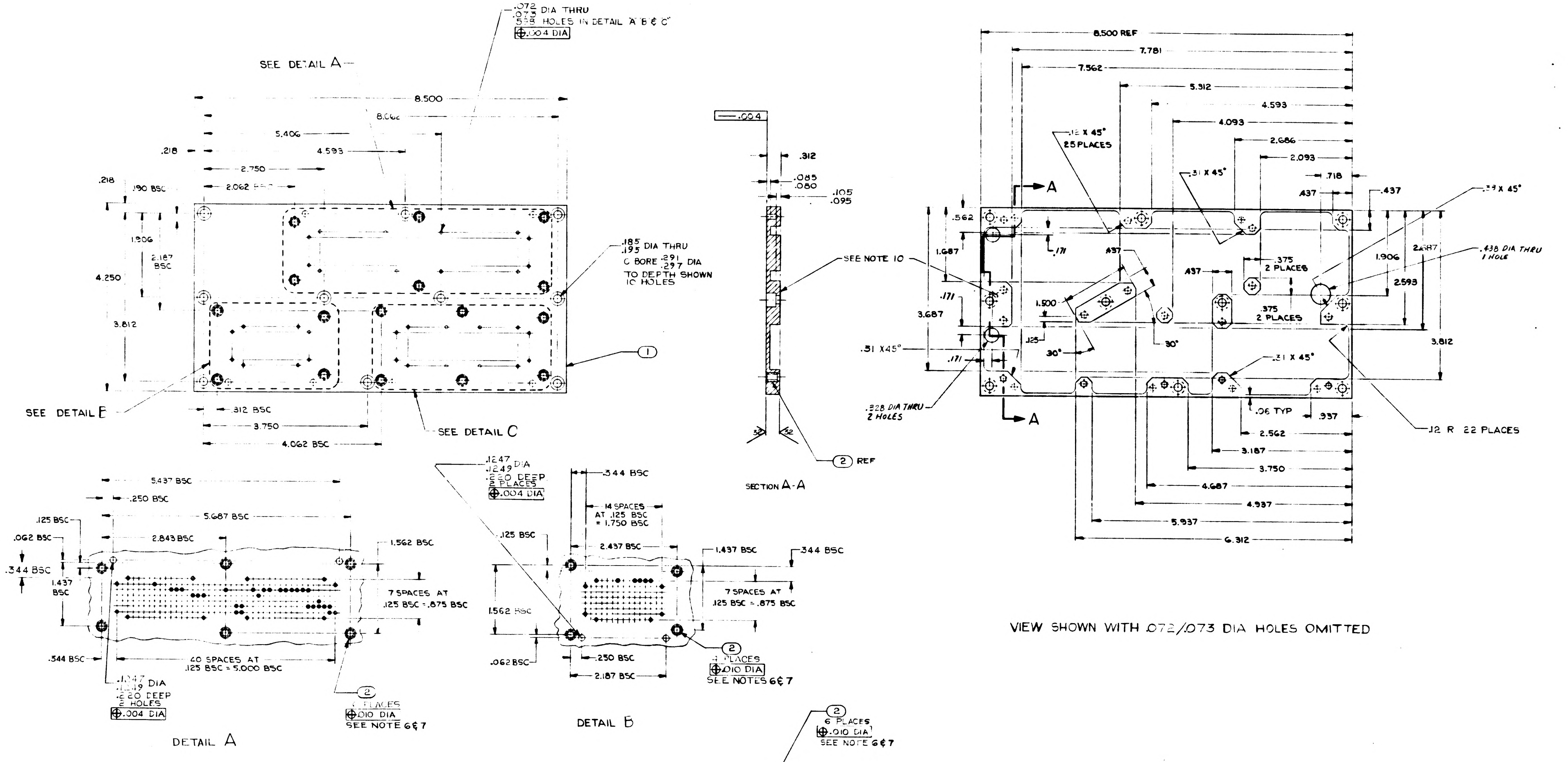
SCALE 1/1 SHEET 1 OF 1

2008394 A

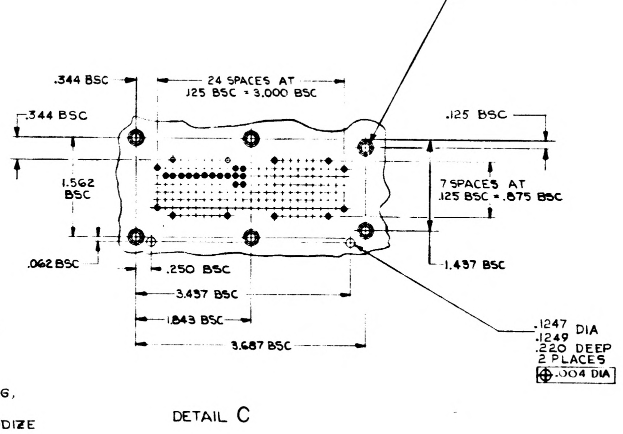
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 23971

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25556			7 FEB 66	
B		REVISED PER TDRR 28470			6 MAY 66	



SEE DETAIL A
.072 DIA THRU
.073
.538 HOLES IN DETAIL "A" "B" & "C"
⊕ .004 DIA
8.500
8.062
5.406
4.593
2.750
2.062 BSC
.218
.190 BSC
1.906
2.187 BSC
4.250
3.812
.185 DIA THRU
.195
C BORE .291 DIA
.297
TO DEPTH SHOWN
10 HOLES
1
SEE DETAIL B
.312 BSC
3.750
4.062 BSC
SEE DETAIL C
.004
.312
.085
.080
.105
.095
SEE NOTE 10
2 REF
SECTION A-A
8.500 REF
7.781
7.562
5.312
4.593
4.093
2.686
2.093
.718
.437
.437
.12 X 45° 25 PLACES
.31 X 45°
.19 X 45°
.438 DIA THRU 1 HOLE
.562
1.687
.171
.437
.375 2 PLACES
1.906
2.187
2.593
.375 2 PLACES
3.687
1.500
.125
30°
30°
.31 X 45°
3.812
.51 X 45°
.171
.128 DIA THRU 2 HOLES
.06 TYP
.937
.12 R 22 PLACES
2.562
3.187
3.750
4.687
4.937
5.937
6.312
A
A
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED
5.437 BSC
.250 BSC
.125 BSC
5.687 BSC
.062 BSC
2.843 BSC
1.562 BSC
.344 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
.344 BSC
40 SPACES AT .125 BSC = 5.000 BSC
.1247 DIA
.1249
.220 DEEP
2 HOLES
⊕ .004 DIA
2
4 PLACES
⊕ .010 DIA
SEE NOTE 6 & 7
DETAIL A
.1247 DIA
.1249
.220 DEEP
2 PLACES
⊕ .004 DIA
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
2.437 BSC
1.437 BSC
.344 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
2.187 BSC
2
4 PLACES
⊕ .010 DIA
SEE NOTES 6 & 7
DETAIL B
2
6 PLACES
⊕ .010 DIA
SEE NOTE 6 & 7



.344 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.344 BSC
.125 BSC
1.562 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
.250 BSC
1.437 BSC
3.437 BSC
1.843 BSC
3.687 BSC
.1247 DIA
.1249
.220 DEEP
2 PLACES
⊕ .004 DIA

DETAIL C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
16	1010957-010		INSERT, SCREW THD, SELF-LOCKING	2
1	2008394-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007116	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.XX ±.010 .XXX ±.005 ANGLES ±1° 0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R. W. Cotton 11/4/65
CHECKED 11/8/65
APPROVED 11/8/65
APPROVED 11/8/65
APPROVED MIT
APPROVED MSC
DATE

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M LEFT PSA

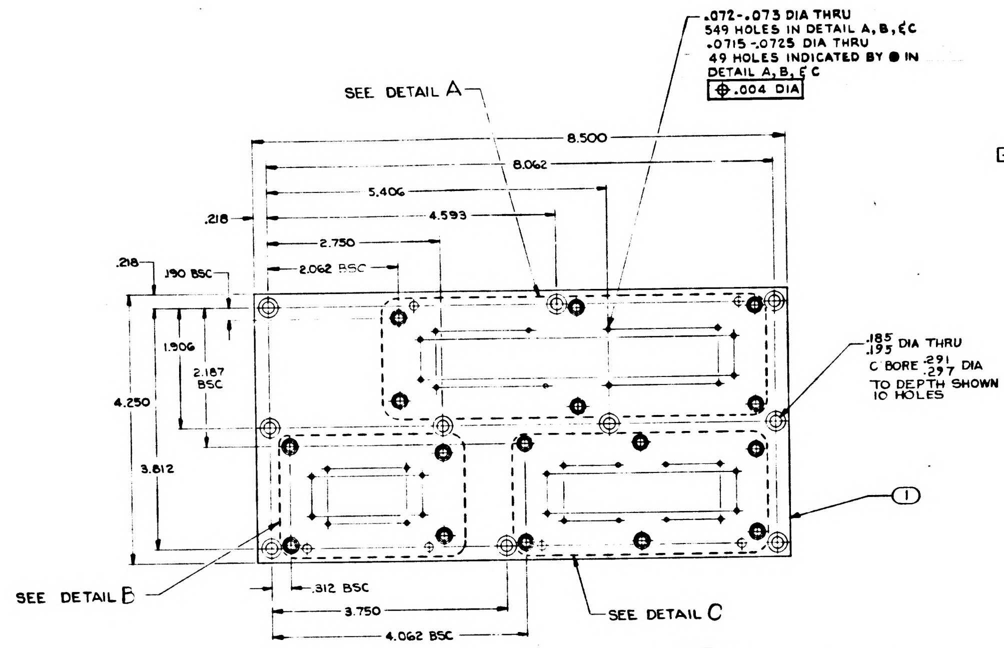
CODE IDENT NO
SIZE E
DRAWING NO. 2008394
SCALE 1/1
SHEET 1 OF 1

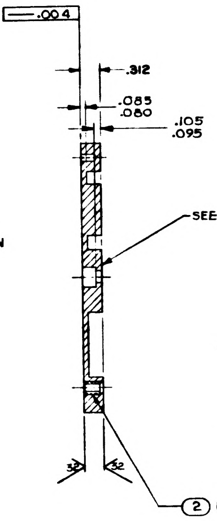
2008394 B

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

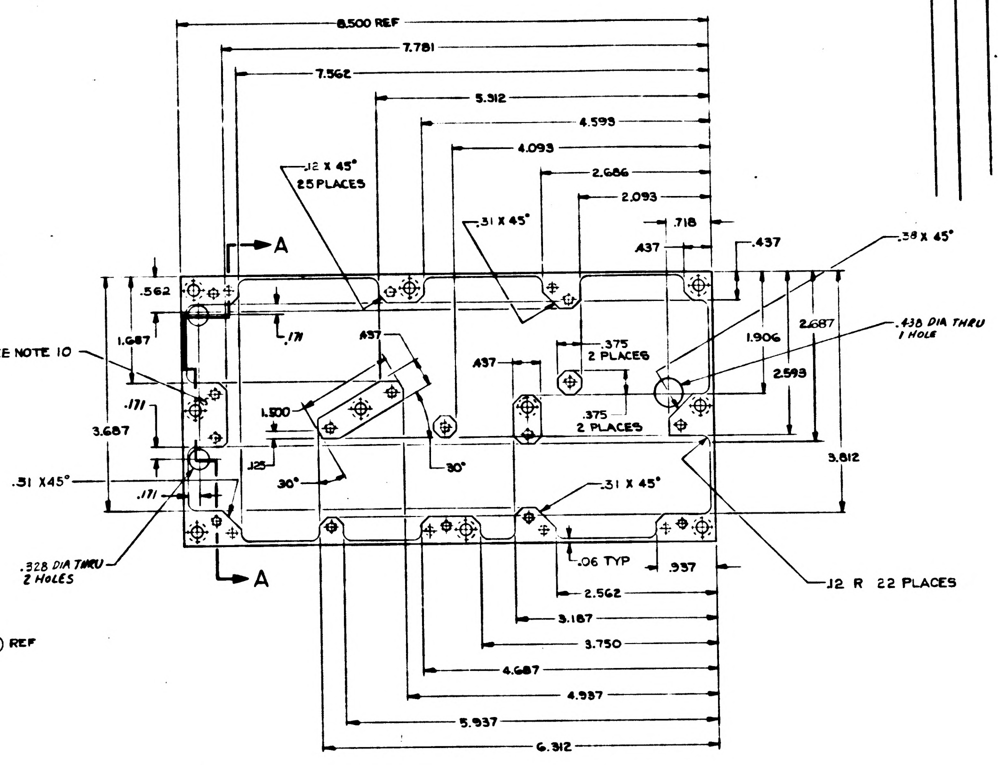
REVISIONS 23971

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25556			7 FEB 66	
B		REVISED PER TDRR 28470			6 MAY 66	
C		REVISED PER TDRR 29448	PHG		10 JUN 66	

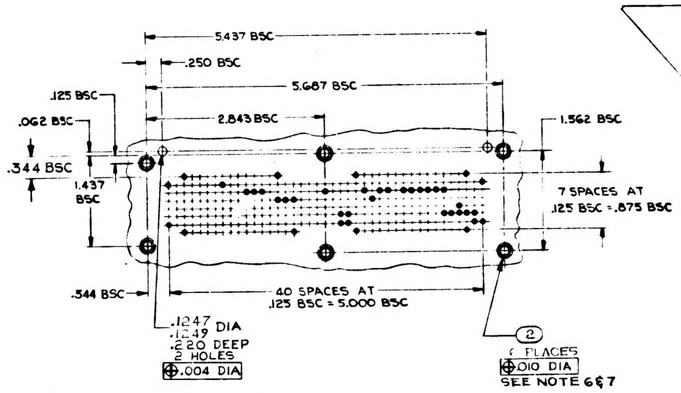

.072-.073 DIA THRU
549 HOLES IN DETAIL A, B, & C
.0715-.0725 DIA THRU
49 HOLES INDICATED BY ● IN DETAIL A, B, & C
⊕ .004 DIA
SEE DETAIL A
8.500
8.062
5.406
4.593
2.750
2.062 BSC
.218
.218
.190 BSC
1.906
2.187 BSC
4.250
3.812
.185/.195 DIA THRU
C BORE .291/.297 DIA
TO DEPTH SHOWN
10 HOLES
1
SEE DETAIL B
.312 BSC
3.750
4.062 BSC
SEE DETAIL C


.004
.312
.085
.080
.105
.095
SEE NOTE 10
2 REF

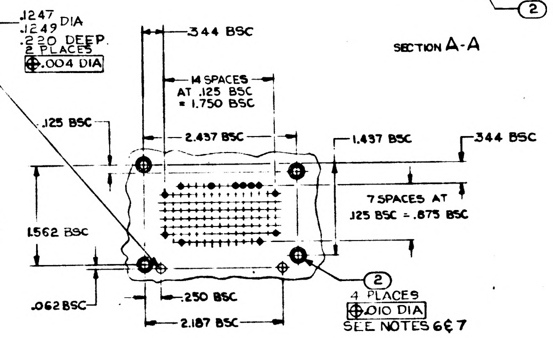
SECTION A-A


8.500 REF
7.781
7.562
5.312
4.593
4.093
2.686
2.093
.718
.437
.437
.12 X 45° 25 PLACES
.31 X 45°
.38 X 45°
A
A
.562
1.687
.171
.171
3.687
.457
.437
.375 2 PLACES
.375 2 PLACES
1.906
2.687
2.593
.438 DIA THRU 1 HOLE
1.500
.125
30°
30°
.51 X45°
.31 X 45°
3.812
.328 DIA THRU 2 HOLES
.06 TYP
.937
.12 R 22 PLACES
2.562
3.187
3.750
4.687
4.937
5.937
6.312

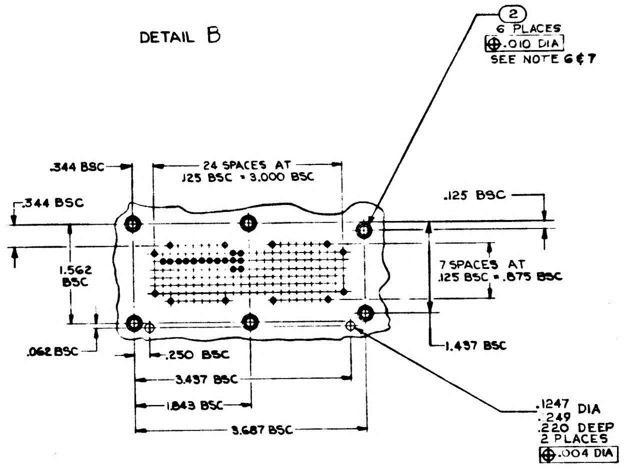
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED


5.437 BSC
.250 BSC
5.687 BSC
.125 BSC
.062 BSC
2.843 BSC
1.562 BSC
.344 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
.344 BSC
40 SPACES AT .125 BSC = 5.000 BSC
.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
2
4 PLACES
⊕ .010 DIA
SEE NOTE 6 & 7

DETAIL A


.1247/.1249 DIA
.220 DEEP
2 PLACES
⊕ .004 DIA
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
2.437 BSC
1.437 BSC
.344 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
2.187 BSC
2
4 PLACES
⊕ .010 DIA
SEE NOTES 6 & 7

DETAIL B


2
6 PLACES
⊕ .010 DIA
SEE NOTE 6 & 7
.344 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.344 BSC
.125 BSC
1.562 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.437 BSC
.250 BSC
3.437 BSC
1.843 BSC
3.687 BSC
.1247/.1249 DIA
.220 DEEP
2 PLACES
⊕ .004 DIA

DETAIL C

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .0715/.0725 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185-.195 DIA HOLES TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
16	1010957-010		INSERT, SCREW THD, SELF-LOCKING	2
1	2008394-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007116	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.XX ±.01 .XXX ±.005 ANGLES ± 1° 0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

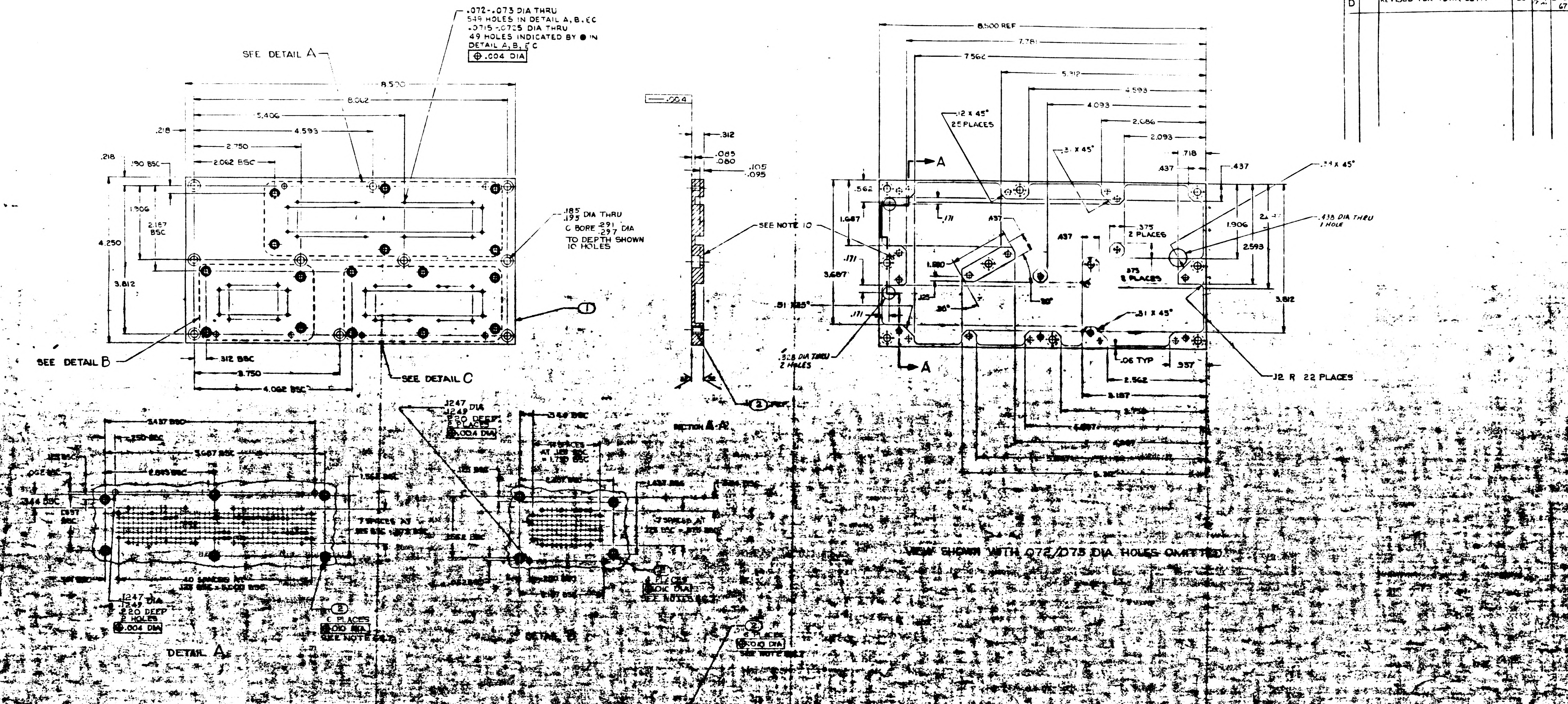
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

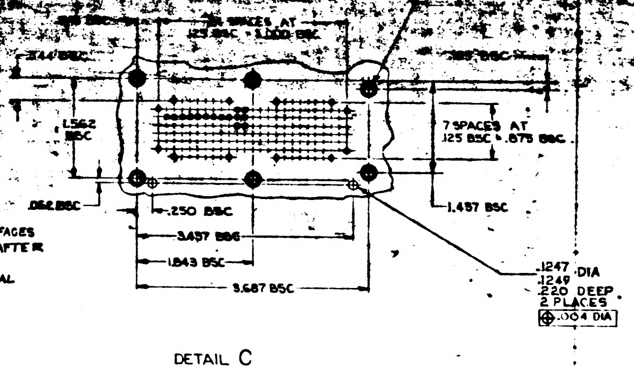
DRAWN R.W. Cotant 11-4-65
CHECKED 11/8/65
APPROVED 11/8/65
APPROVED 11/8/65
APPROVED MIT W Kupfer 6 MAY 65
A. C. METZGER
APPROVED MSC
DATE

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M LEFT PSA

CODE IDENT NO.
SIZE E
DRAWING NO. 2008394
SCALE 1/1
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25556			7 FEB 66	
B		REVISED PER TDRR 28470			6 MAY 66	
C		REVISED PER TDRR 29448	PHG		10 JUN 66	
D		REVISED PER TDRR 32771	LL		2 FEB 67	


SEE DETAIL A
.072-.073 DIA THRU
549 HOLES IN DETAIL A, B, & C
.0715-.0725 DIA THRU
49 HOLES INDICATED BY ● IN DETAIL A, B, & C
.004 DIA
8.570
8.062
5.406
4.593
2.750
2.062 BSC
.190 BSC
.218
1.306
2.157 BSC
4.250
3.812
.185 .195 DIA THRU
C BORE .291 .297 DIA
TO DEPTH SHOWN
10 HOLES
SEE DETAIL B
.312 BSC
2.750
4.062 BSC
SEE DETAIL C
.312
.085 .080
.105 .095
SEE NOTE 10
SECTION A-A
8.500 REF
7.781
7.562
5.312
4.593
4.093
2.086
2.093
.718
.437
.12 X 45° 22 PLACES
.31 X 45°
.437
.375 2 PLACES
1.906
2.593
.438 DIA THRU 1 HOLE
1.687
3.687
.171
1.880
.125
30°
.81 X 25°
.328 DIA THRU 2 HOLES
.06 TYP
.957
2.562
3.187
.12 R 22 PLACES
3.812
A
A
.1247 .1249 DIA
.220 DEEP
.004 DIA
3.437 BSC
1.250 BSC
3.687 BSC
7 SPACES AT .125 BSC = .875 BSC
40 SPACES AT .125 BSC = 5.000 BSC
2 HOLES
6 PLACES
.010 DIA
SEE NOTE 9
DETAIL A
DETAIL B
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED


18 SPACES AT .125 BSC = 2.000 BSC
1.562 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
.250 BSC
3.437 BSC
1.843 BSC
3.687 BSC
1.457 BSC
.1247 .1249 DIA
.220 DEEP
2 PLACES
.004 DIA

DETAIL C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24 - PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125 UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF HOLES FOR FIND NO. 2 WITH MIL-P-8585, COLOR Y, AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NO. 2 (SEE NOTE NO. 6) PER MS33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO., PER ND1002019
9. .0715/.0725 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185-.195 DIA HOLES TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
16	[illegible]-010		INSERT SCREW THD, SELF-LOCKING	2
1	2008394-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .XX ±.01 .XXX ±.005 ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007-[illegible]
NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

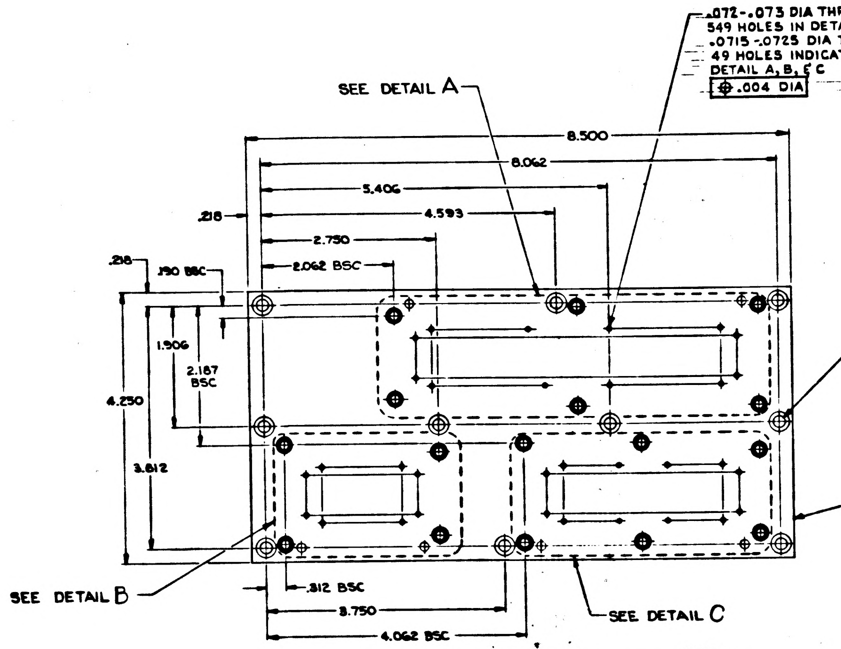
CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
CONN LEFT PSA

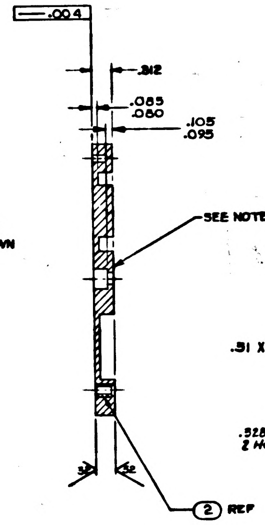
SIZE E
DRAWING NO. 2008394
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

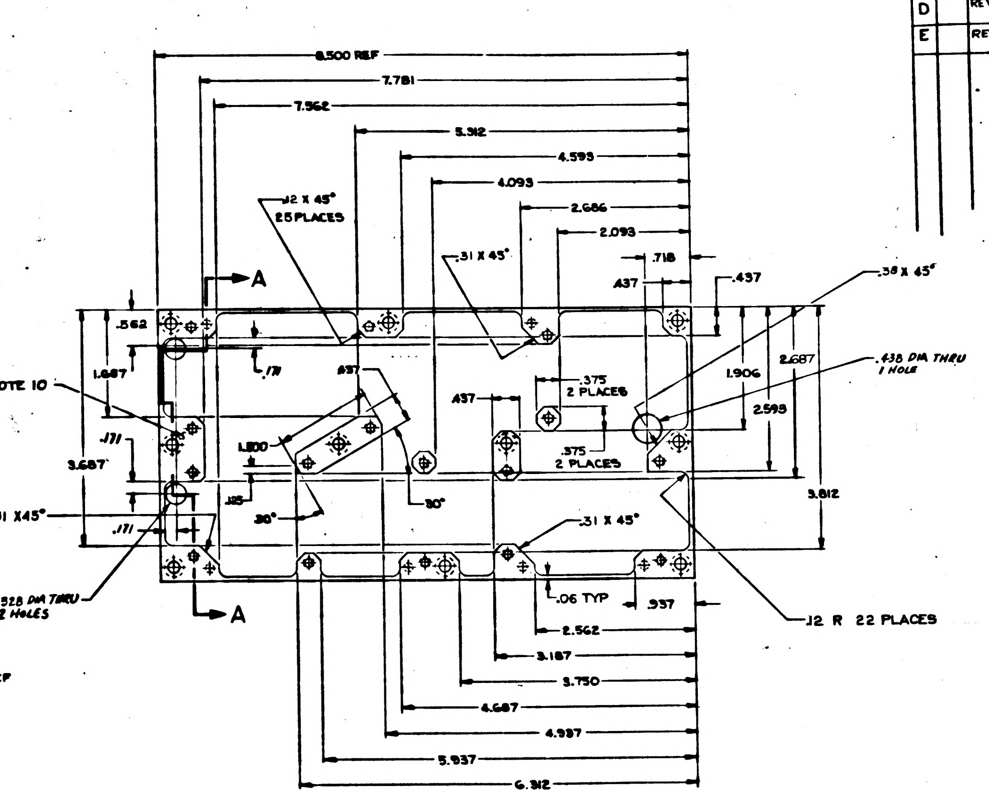
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 25556			7 FEB 66	
B		REVISED PER TDRR 28470			6 MAY 66	
C		REVISED PER TDRR 29448	PHG		16 JUN 66	
D		REVISED PER TDRR 32771	LL		2 FEB 67	
E		REVISED PER TDRR 32791	LL		3 FEB 67	

REVISIONS 23931

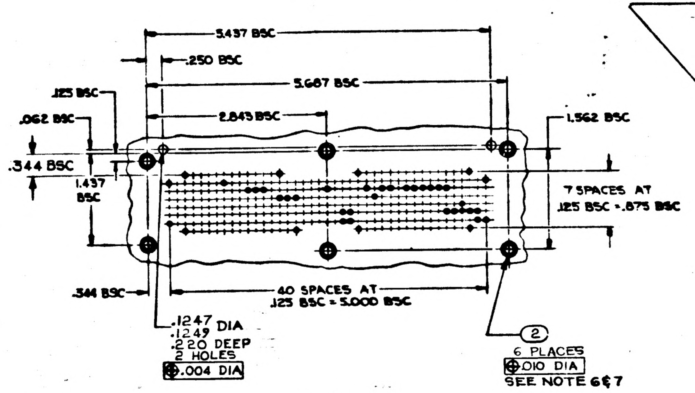

SEE DETAIL A
.072-.073 DIA THRU
549 HOLES IN DETAIL A, B, & C
.0715-.0725 DIA THRU
49 HOLES INDICATED BY ● IN DETAIL A, B, & C
.004 DIA
8.500
8.062
5.406
4.593
2.750
2.062 BSC
.218
.218
.190 BSC
1.906
2.187 BSC
4.250
3.812
.185 .195 DIA THRU
C'BORE .291 .297 DIA
TO DEPTH SHOWN
10 HOLES
1
SEE DETAIL B
.312 BSC
3.750
4.062 BSC
SEE DETAIL C


.004
.312
.085 .080
.105 .095
SEE NOTE 10
2 REF

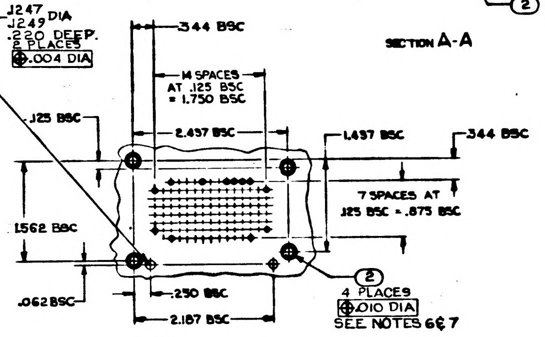
SECTION A-A


8.500 REF
7.781
7.562
5.312
4.593
4.093
2.686
2.093
.718
.437
.437
.12 X 45° 2.5 PLACES
.31 X 45°
.38 X 45°
.438 DIA THRU 1 HOLE
A
A
.562
1.687
.171
3.687
.171
.31 X 45°
.328 DIA THRU 2 HOLES
1.800
.125
.437
.375 2 PLACES
.375 2 PLACES
1.906
2.687
2.593
3.812
30°
30°
.31 X 45°
.06 TYP
.937
.12 R 22 PLACES
2.562
3.187
3.750
4.687
4.937
5.937
6.312

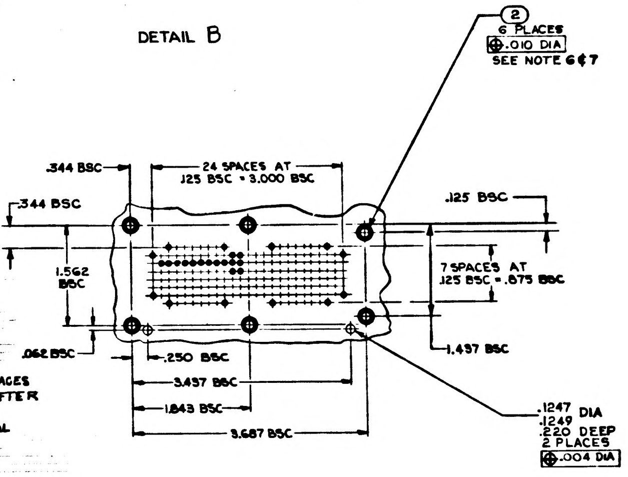
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED


5.437 BSC
.250 BSC
5.687 BSC
.125 BSC
.062 BSC
2.843 BSC
.344 BSC
1.437 BSC
1.562 BSC
7 SPACES AT .125 BSC = .875 BSC
.344 BSC
40 SPACES AT .125 BSC = 5.000 BSC
.1247 .1249 DIA
.220 DEEP
2 HOLES
.004 DIA
2
6 PLACES
.010 DIA
SEE NOTE 6 & 7

DETAIL A


.1247 .1249 DIA
.220 DEEP
2 PLACES
.004 DIA
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
2.437 BSC
1.437 BSC
.344 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
2.187 BSC
2
4 PLACES
.010 DIA
SEE NOTES 6 & 7

DETAIL B


2
6 PLACES
.010 DIA
SEE NOTE 6 & 7
.344 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.344 BSC
.125 BSC
1.562 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
.250 BSC
1.437 BSC
3.437 BSC
1.843 BSC
3.687 BSC
.1247 .1249 DIA
.220 DEEP
2 PLACES
.004 DIA

DETAIL C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24 - PER QQ-M-44 AND MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
6. COAT THREADS OF HOLES FOR FIND NO. 2 WITH MIL-P-8585, COLOR Y, AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NO. 2 (SEE NOTE NO. 6) PER MS33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO., PER ND1002019.
9. .0715/.0725 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185-.195 DIA HOLES TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
16	1010957-010		INSERT, SCREW THD, SELF-LOCKING	2
1	2008394-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007116	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±
DECIMALS .XX ±.01 .XXX ±.005
ANGLES ±1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.W. Cottrell 11-4-65
CHECKED 11/8/65
APPROVED 11/8/65
APPROVED 11/9/65
APPROVED MIT W Kupfer 9 Nov 65
A. C. METZGER
APPROVED MSC
DATE

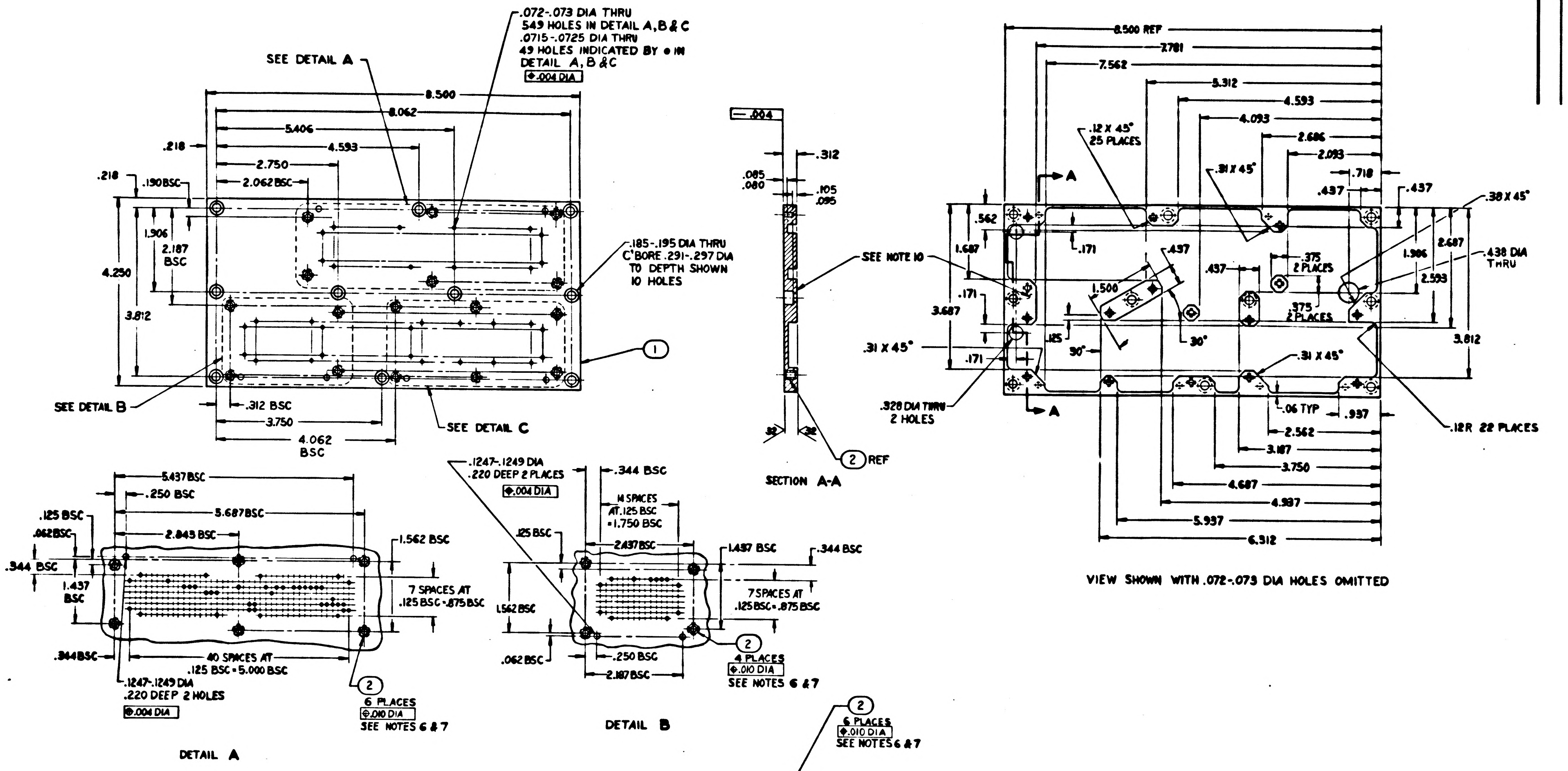
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M LEFT PSA

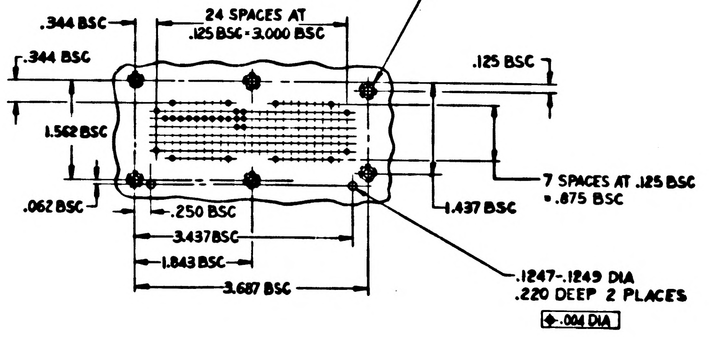
CODE IDENT NO.
SIZE E
DRAWING NO. 2008394
SCALE 1/1
SHEET 1 OF 1

2008394 E

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
	F	REDRAWN REV "E" WITHOUT CHANGE PER TDRR 32931		25 FEB 67	628



SEE DETAIL A
.072-.073 DIA THRU
549 HOLES IN DETAIL A, B & C
.0715-.0725 DIA THRU
49 HOLES INDICATED BY ● IN DETAIL A, B & C
⌖ .004 DIA
8.500
8.062
5.406
4.593
2.750
2.062 BSC
.218
.190 BSC
1.906
2.187 BSC
4.250
3.812
.185-.195 DIA THRU
C'BORE .291-.297 DIA
TO DEPTH SHOWN
10 HOLES
1
SEE DETAIL B
.312 BSC
3.750
4.062 BSC
SEE DETAIL C
.004
.312
.085
.080
.105
.095
SEE NOTE 10
2 REF
SECTION A-A
8.500 REF
7.781
7.562
5.312
4.593
4.093
2.686
2.093
.718
.437
.12 X 45° 25 PLACES
.31 X 45°
.38 X 45°
.562
1.687
.171
.437
.375 2 PLACES
1.906
2.687
.438 DIA THRU
1.500
2.593
.375 2 PLACES
3.687
.125
30°
3.812
.31 X 45°
.328 DIA THRU 2 HOLES
.06 TYP
.937
.12R 22 PLACES
2.562
3.187
3.750
4.687
4.937
5.937
6.312
A
VIEW SHOWN WITH .072-.073 DIA HOLES OMITTED
5.437 BSC
.250 BSC
.125 BSC
.062 BSC
5.687 BSC
2.843 BSC
1.562 BSC
.344 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
40 SPACES AT .125 BSC = 5.000 BSC
.1247-.1249 DIA
.220 DEEP 2 HOLES
⌖ .004 DIA
2
6 PLACES
⌖ .010 DIA
SEE NOTES 6 & 7
DETAIL A
.1247-.1249 DIA
.220 DEEP 2 PLACES
⌖ .004 DIA
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.437 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
2.187 BSC
2
4 PLACES
⌖ .010 DIA
SEE NOTES 6 & 7
DETAIL B
2
6 PLACES
⌖ .010 DIA
SEE NOTES 6 & 7



.344 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.125 BSC
1.562 BSC
.062 BSC
.250 BSC
3.437 BSC
1.843 BSC
3.687 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
.1247-.1249 DIA
.220 DEEP 2 PLACES
⌖ .004 DIA

DETAIL C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44 AND MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. REMOVE BURRS AND SHARP EDGES .005-.015 UNLESS OTHERWISE SPECIFIED.
4. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED.
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED TOUCH UP, EXCLUDING CORROSION, PER ND1002040.
6. COAT THREADS OF HOLES FOR FIND NO. 2 WITH MIL-P-8585, COLOR Y, AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NO. 2 (SEE NOTE NO. 6) PER MS-33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO., PER ND 1002019.
9. .0715-.0725 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185-.195 DIA HOLES TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

QTY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
16	2	1010957-010	INSERT, SCREW THD, SELF-LOCKING
1	1	2008394-001	CONNECTOR MTG PLATE

LIST OF PARTS AND MATERIALS

2007116	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES
+.01	+.005	+1° 0'
-.01	-.005	-1° 0'

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE, WIS.
DRAWN R.W. CONTANT DATE 4 NOV 65
CHECKED H.P.D. 8 NOV 65
APPROVAL H.P. DIGGLE 8 NOV 65
CONTRACT
NASA APPROVAL A.C. METZGER 9 NOV 65
MIT APPROVAL W. KUPFER 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASSEMBLY)
C/M LEFT PSA

SIZE E
CODE IDENT NO. 80230
2008394
SCALE 1/1
SHEET OF

F 2008394

2008394

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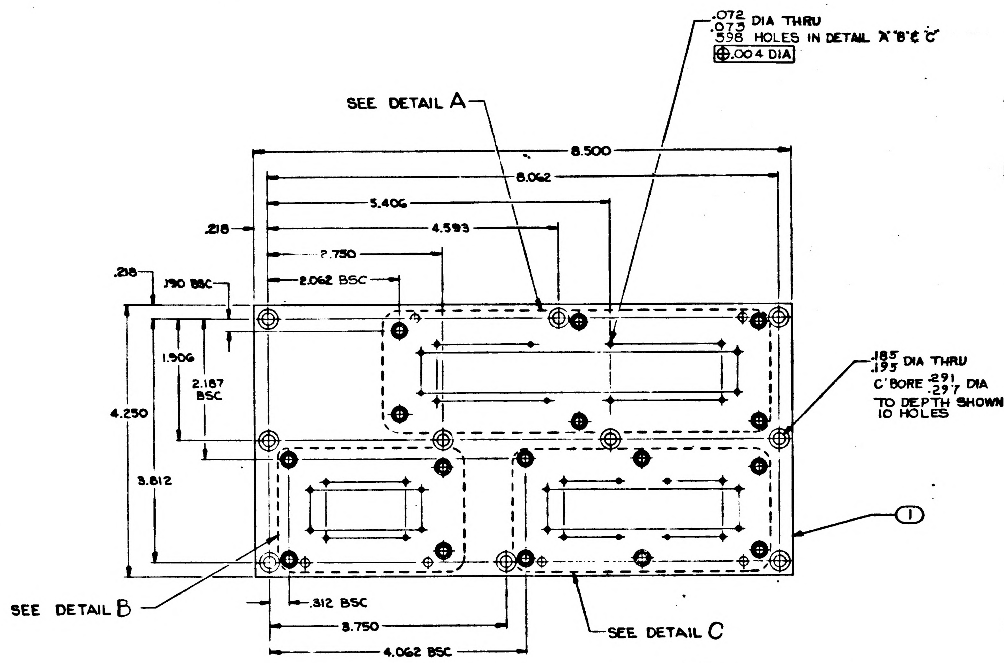
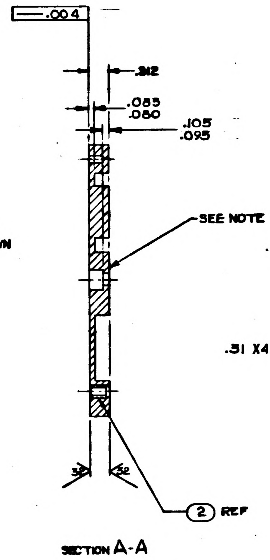
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

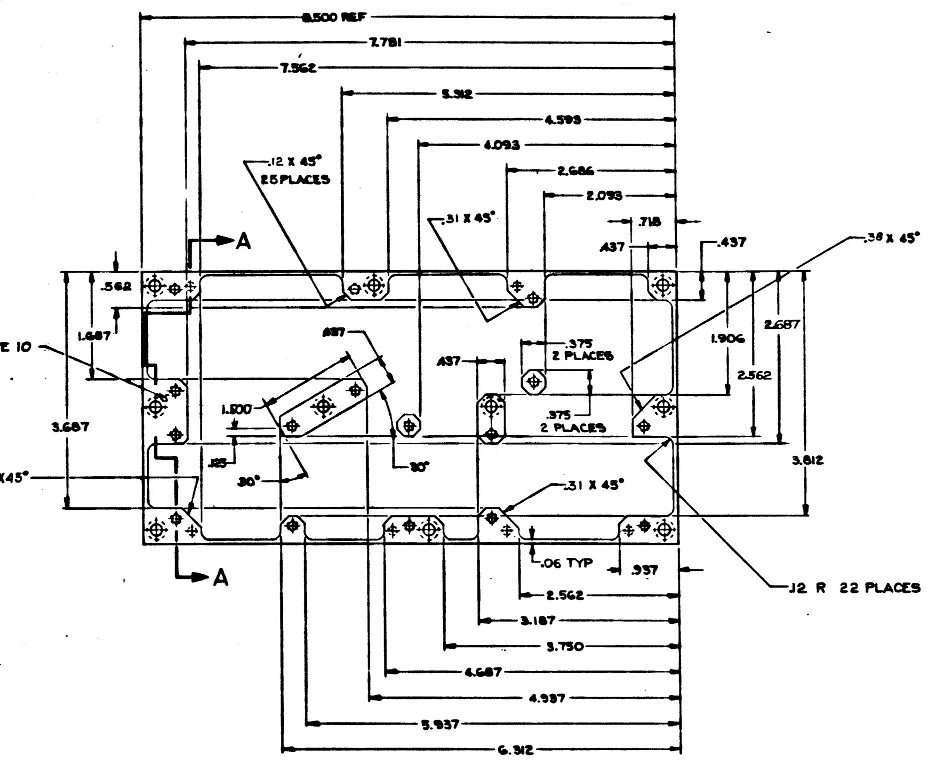


.072/.073 DIA THRU
598 HOLES IN DETAIL "A" "B" & "C"
⊕ .004 DIA
SEE DETAIL A
8.500
8.062
5.406
4.593
2.750
2.062 BSC
.218
.28
.190 BSC
1.906
2.187 BSC
4.250
3.812
.185/.195 DIA THRU
C'BORE .291/.297 DIA
TO DEPTH SHOWN
10 HOLES
1
SEE DETAIL B
.312 BSC
3.750
4.062 BSC
SEE DETAIL C



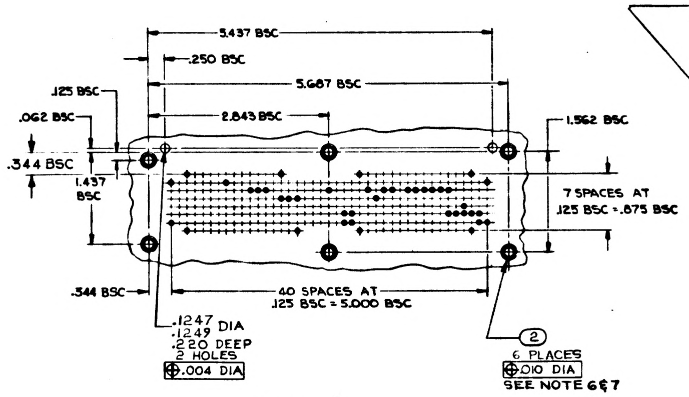
.004
.312
.085
.080
.105
.095
SEE NOTE 10
2 REF

SECTION A-A



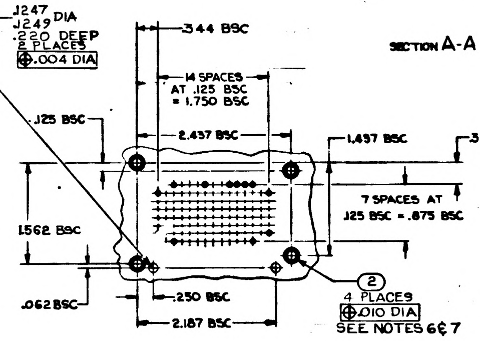
8.500 REF
7.781
7.562
5.312
4.593
4.093
2.686
2.093
.718
.437
.437
.38 X 45°
.12 X 45°
25 PLACES
.31 X 45°
A
.562
1.687
3.687
1.906
2.687
2.562
3.812
.687
1.900
.125
30°
30°
.437
.375
2 PLACES
.375
2 PLACES
.31 X 45°
.31 X45°
.06 TYP
.357
.12 R 22 PLACES
A
2.562
3.187
3.750
4.687
4.937
5.937
6.312

VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED



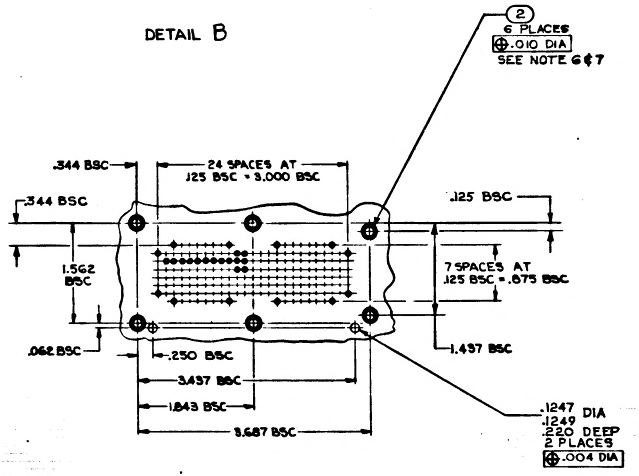
5.437 BSC
.250 BSC
.125 BSC
5.687 BSC
.062 BSC
2.843 BSC
1.562 BSC
.344 BSC
1.437 BSC
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
40 SPACES AT
.125 BSC = 5.000 BSC
.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
2
6 PLACES
⊕ .010 DIA
SEE NOTE 6&7

DETAIL A



.1247/.1249 DIA
.220 DEEP
2 PLACES
⊕ .004 DIA
.344 BSC
14 SPACES
AT .125 BSC
= 1.750 BSC
.125 BSC
2.437 BSC
1.437 BSC
.344 BSC
7 SPACES AT
.125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
2.187 BSC
2
4 PLACES
⊕ .010 DIA
SEE NOTES 6&7

DETAIL B



2
6 PLACES
⊕ .010 DIA
SEE NOTE 6&7
.344 BSC
24 SPACES AT
.125 BSC = 3.000 BSC
.344 BSC
.125 BSC
1.562 BSC
7 SPACES AT
.125 BSC = .875 BSC
.062 BSC
.250 BSC
1.437 BSC
3.437 BSC
1.843 BSC
3.687 BSC
.1247/.1249 DIA
.220 DEEP
2 PLACES
⊕ .004 DIA

DETAIL C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITF HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
16	1010957-010	—	INSERT, SCREW THD, SELF-LOCKING	2
1	2008394-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007116	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ±1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.W. Cot… 11-4-65
CHECKED … 11/8/65
APPROVED … 11/8/65
APPROVED … 11/9/65
APPROVED MIT W… A. C. METZGER 9 Mar 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

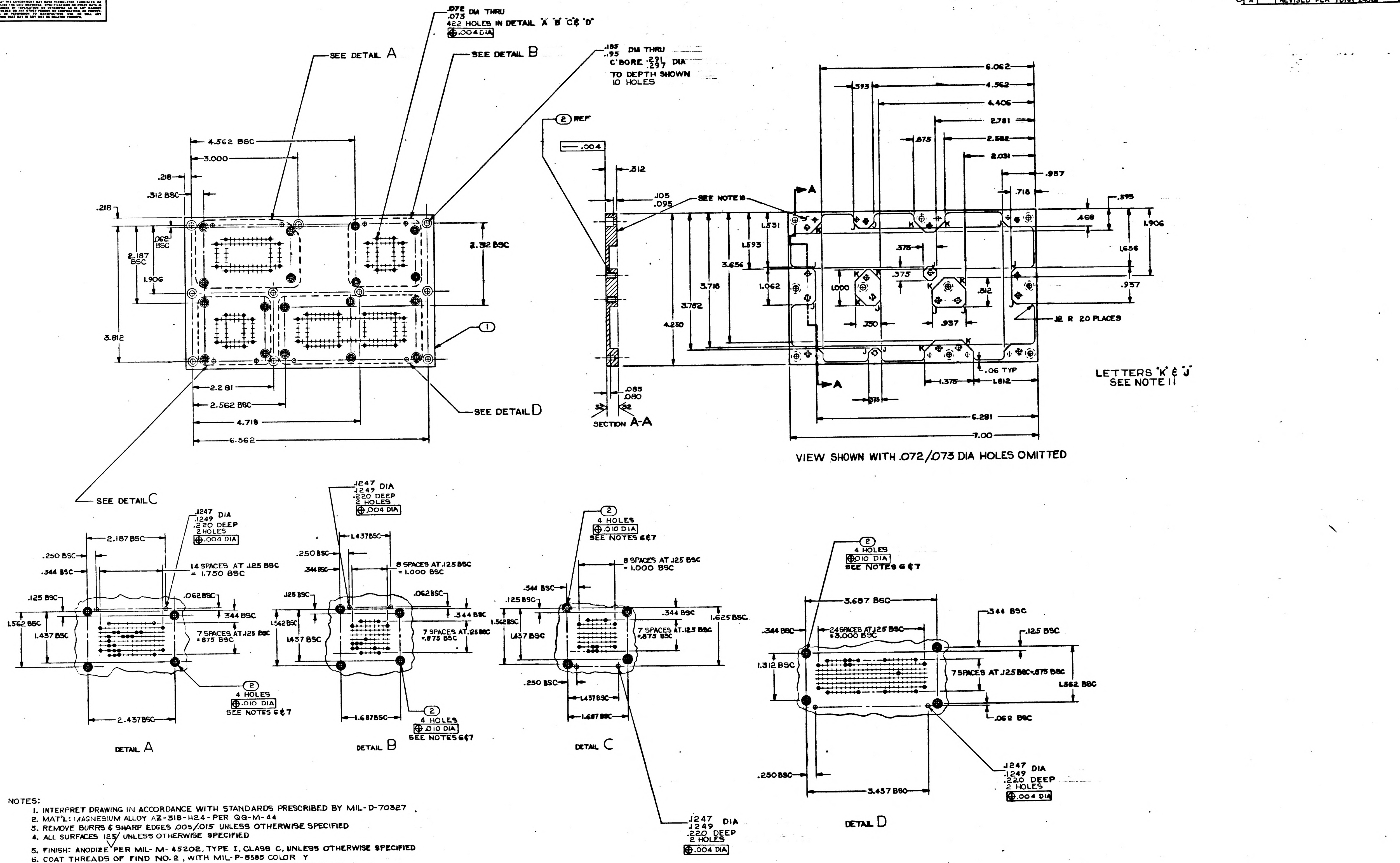
CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M LEFT PSA

CODE IDENT NO.
SIZE E
DRAWING NO. 2008394
SCALE 1/1
SHEET 1 OF 1

2008394

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 23931						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24561				WK



.072 DIA THRU
.073
422 HOLES IN DETAIL "A" "B" "C" & "D"
⊕ .004 DIA
SEE DETAIL A
SEE DETAIL B
.185 DIA THRU
.195
C'BORE .291 DIA
.297
TO DEPTH SHOWN
10 HOLES
② REF
.004
.312
4.562 BSC
3.000
.218
.312 BSC
.218
.062 BSC
2.187 BSC
1.906
3.812
2.312 BSC
①
2.281
2.562 BSC
4.718
6.562
SEE DETAIL D
SEE DETAIL C
.105
.095
SEE NOTE 10
.085
.080
32
32
SECTION A-A
A
A
6.062
4.562
4.406
2.781
2.562
2.031
.593
.875
.937
.718
.595
.468
1.906
1.656
.937
1.531
1.593
3.656
3.718
3.782
4.250
1.062
1.000
.375
.375
.812
.250
.937
.12 R 20 PLACES
K
J
.06 TYP
1.375
1.812
.375
6.281
7.00
LETTERS "K" & "J"
SEE NOTE 11
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED
.1247 DIA
.1249
.220 DEEP
2 HOLES
⊕ .004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC
= 1.750 BSC
.125 BSC
.062 BSC
1.562 BSC
1.437 BSC
.344 BSC
7 SPACES AT .125 BSC
=.875 BSC
②
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
2.437 BSC
DETAIL A
1.437 BSC
8 SPACES AT .125 BSC
= 1.000 BSC
1.687 BSC
DETAIL B
1.625 BSC
.250 BSC
1.687 BSC
DETAIL C
3.687 BSC
24 SPACES AT .125 BSC
=3.000 BSC
1.312 BSC
7 SPACES AT .125 BSC =.875 BSC
1.562 BSC
.062 BSC
3.437 BSC
DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040
11. CHAMFER:
    - .31 X 45° AREAS MARKED "K" (10 PLACES)
    - .12 X 45° AREAS MARKED "J" (16 PLACES)
    - .18 X 45° AREAS UNMARKED (2 PLACES)

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
18	1010957 - 010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	R. a. C	11-3-65
CHECKED		11/8/65
APPROVED		11/8/65
APPROVED		
APPROVED MIT	W Kupfer A. C. METZGER	
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

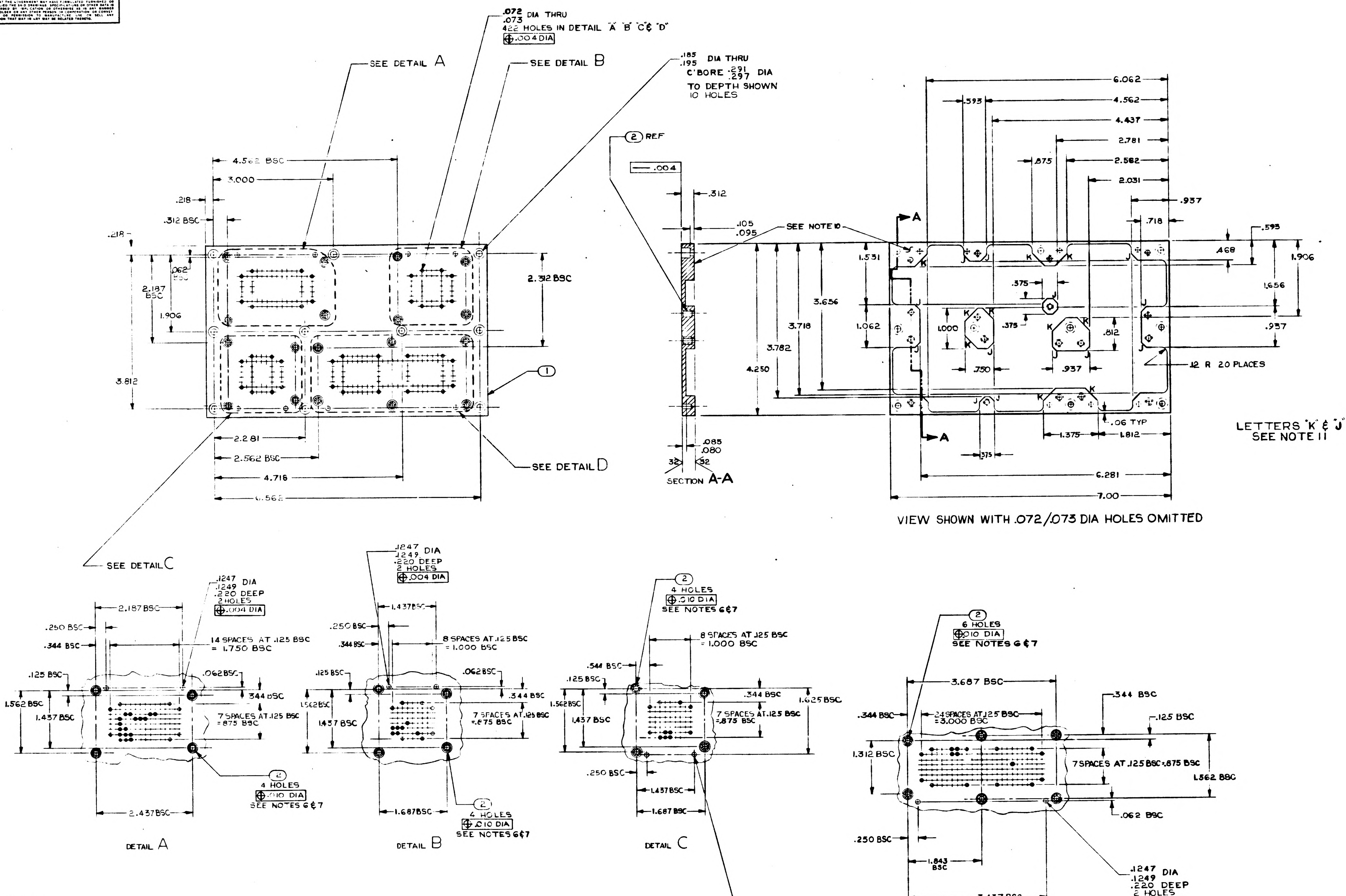
CODE IDENT NO	SIZE	DRAWING NO.
	E	2008395

SCALE
SHEET 1 OF 1

2008395 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27931						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24561			9 Dec 65	WR
B		REVISED PER TDRR 25557		CF		



.072/.073 DIA THRU
422 HOLES IN DETAIL "A" "B" "C" & "D"
⊕.004 DIA
SEE DETAIL A
SEE DETAIL B
.185/.195 DIA THRU
C'BORE .291/.297 DIA
TO DEPTH SHOWN
10 HOLES
② REF
.004
.312
.105/.095
SEE NOTE 10
A
4.562 BSC
3.000
.218
.312 BSC
2.187 BSC
.062 BSC
1.906
2.312 BSC
3.812
①
2.281
2.562 BSC
4.718
4.562
SEE DETAIL D
SEE DETAIL C
.085/.080
32
SECTION A-A
6.062
4.562
.593
4.437
2.781
.875
2.562
2.031
.937
.718
.593
.468
1.906
1.656
.937
.375
.375
1.531
3.656
1.062
3.718
3.782
4.250
1.000
.750
.812
.937
.12 R 20 PLACES
.06 TYP
1.375
1.812
.375
6.281
7.00
K
J
LETTERS "K" & "J" SEE NOTE 11
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED
.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕.004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
② 4 HOLES ⊕.010 DIA SEE NOTES 6 & 7
2.437 BSC
DETAIL A
1.437 BSC
8 SPACES AT .125 BSC = 1.000 BSC
1.687 BSC
DETAIL B
.544 BSC
.125 BSC
1.625 BSC
.250 BSC
DETAIL C
② 6 HOLES ⊕.010 DIA SEE NOTES 6 & 7
3.687 BSC
24 SPACES AT .125 BSC = 3.000 BSC
1.312 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
1.843 BSC
3.437 BSC

.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕.004 DIA

DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040
11. CHAMFER:
    - .31 X 45° AREAS MARKED "K" (10 PLACES)
    - .12 X 45° AREAS MARKED "J" (16 PLACES)
    - .18 X 45° AREAS UNMARKED (2 PLACES)

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
18	1010957 - 010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

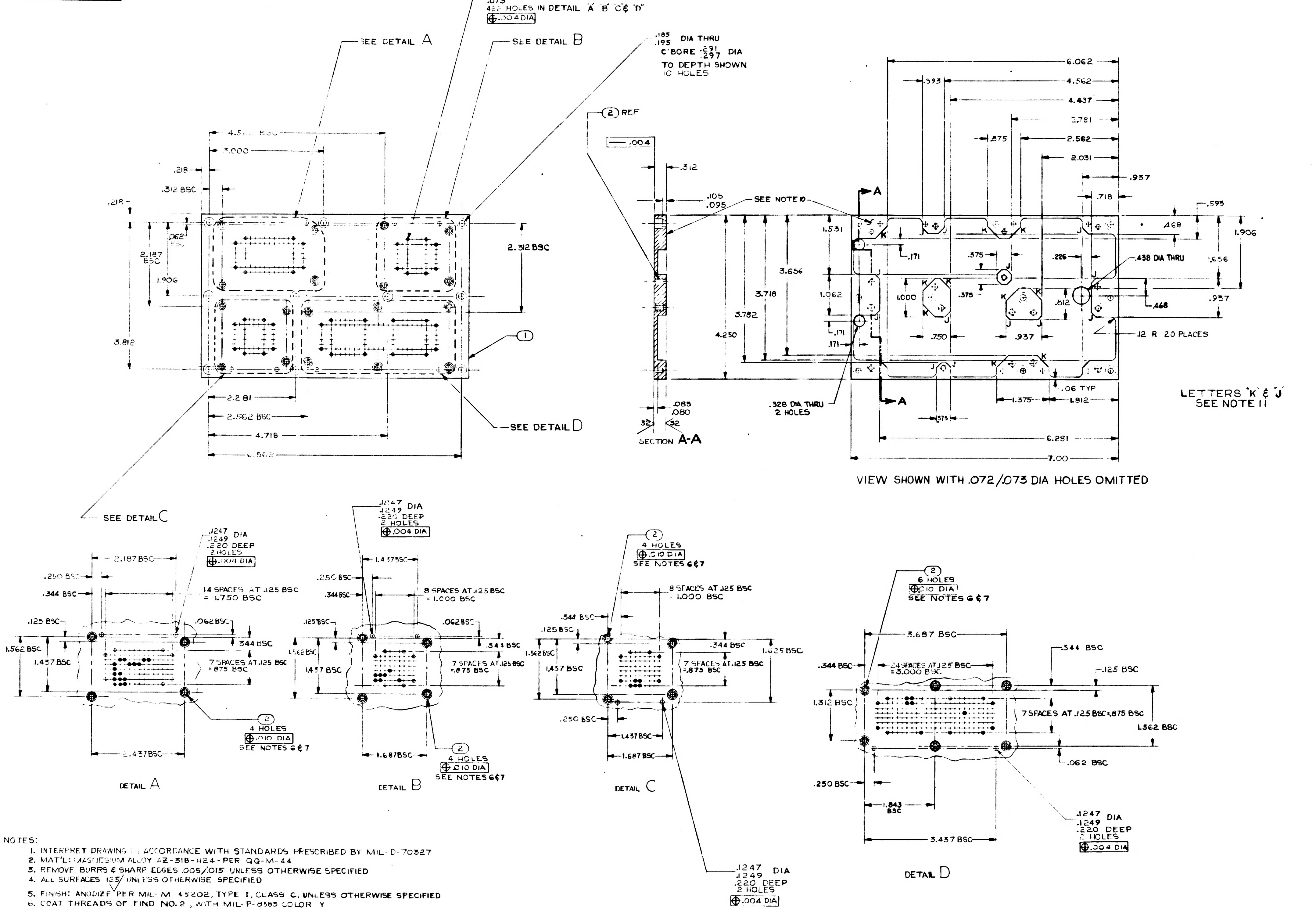
DRAWN	R. Ch	11-3-65
CHECKED		11/8/65
APPROVED		11/9/65
APPROVED		11/9/65
APPROVED MIT	W. Kupfer A. C. HALLER	9 Nov 65
APPROVED MSC		

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

CODE IDENT NO.
SIZE E
DRAWING NO. 2008395
SCALE
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 931						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24561				
B		REVISED PER TDRR 2555		GF		
C		REVISED PER TDRR 2846				



.072 / .073 DIA THRU
422 HOLES IN DETAIL "A" "B" "C" & "D"
.004 DIA
SEE DETAIL A
SEE DETAIL B
SEE DETAIL C
SEE DETAIL D
.185 / .195 DIA THRU
C'BORE .291 / .297 DIA
TO DEPTH SHOWN
10 HOLES
2 REF
.004
.312
.105 / .095
SEE NOTE 10
4.562 BSC
3.000
.218
.312 BSC
.062 BSC
2.187 BSC
1.906
3.812
2.312 BSC
1
2.281
2.562 BSC
4.718
6.562
3.656
3.718
3.782
4.250
.085 / .080
32
SECTION A-A
A
6.062
.593
4.562
4.437
2.781
.875
2.562
2.031
.937
.718
1.531
.171
.375
.226
.438 DIA THRU
.468
1.906
1.656
1.062
1.000
.812
.750
.937
.12 R 20 PLACES
.06 TYP
.328 DIA THRU
2 HOLES
1.375
1.812
6.281
7.00
K
J
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED
LETTERS "K" & "J" SEE NOTE 11
.1247 / .1249 DIA
.220 DEEP
2 HOLES
.004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
.062 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
4 HOLES
.010 DIA
SEE NOTES 6 & 7
2.437 BSC
DETAIL A
1.437 BSC
8 SPACES AT .125 BSC = 1.000 BSC
1.687 BSC
DETAIL B
6 HOLES
DETAIL C
3.687 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.125 BSC
1.312 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
1.843 BSC
3.437 BSC
DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24 - PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040
11. CHAMFER:
    - .31 X 45° AREAS MARKED "K" (10 PLACES)
    - .12 X 45° AREAS MARKED "J" (16 PLACES)
    - .12 X 45° AREAS UNMARKED (2 PLACES)

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
18	1010957-010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 11-3-65
CHECKED 11/8/65
APPROVED 11/8/65
APPROVED
APPROVED MIT A. C. ALNGER
APPROVED MSC
DATE

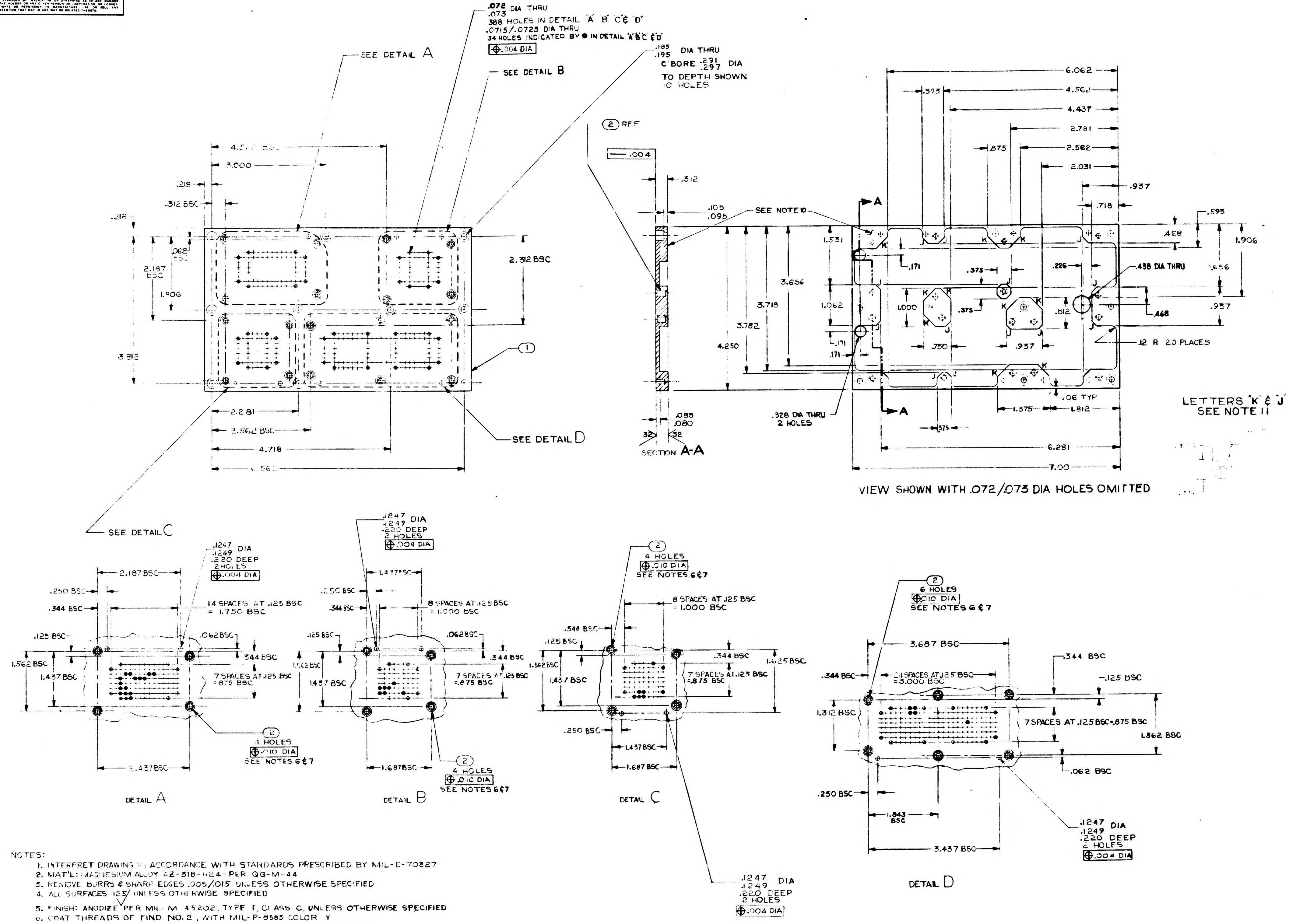
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

CODE IDENT NO
SIZE E
DRAWING NO. 2008395
SCALE
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 239						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24561			9 Dec 65	
B		REVISED PER TDRR 25557	JHF	CF		
C		REVISED PER TDRR 28469				
D		REVISED PER TDRR 29447	JHF	CP		


.072/.073 DIA THRU
388 HOLES IN DETAIL "A" "B" "C" & "D"
.0715/.0725 DIA THRU
34 HOLES INDICATED BY ● IN DETAIL "A" "B" "C" & "D"
⊕ .004 DIA
SEE DETAIL A
SEE DETAIL B
.185/.195 DIA THRU
C'BORE .291/.297 DIA
TO DEPTH SHOWN
10 HOLES
② REF
.004
.312
.105/.095
SEE NOTE 10
4.5 BSC
3.000
.218
.312 BSC
.062 BSC
2.187 BSC
1.906
3.812
2.312 BSC
①
2.281
2.562 BSC
4.718
6.562
SEE DETAIL D
SEE DETAIL C
3.656
3.718
3.782
4.250
.085/.080
32
SECTION A-A
A
6.062
4.562
4.437
2.781
2.562
2.031
.593
.875
.937
.718
.595
.468
1.906
1.656
.937
1.531
.171
.375
.226
.438 DIA THRU
1.062
1.000
.812
.750
.937
.12 R 20 PLACES
.328 DIA THRU
2 HOLES
.06 TYP
1.375
1.812
.375
6.281
7.00
K
J
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED
LETTERS "K" & "J" SEE NOTE 11
.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
②
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
2.437 BSC
DETAIL A
1.437 BSC
8 SPACES AT .125 BSC = 1.000 BSC
1.687 BSC
DETAIL B
.344 BSC
1.625 BSC
1.437 BSC
1.687 BSC
DETAIL C
6 HOLES
3.687 BSC
24 SPACES AT .125 BSC = 3.000 BSC
1.312 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
1.843 BSC
3.437 BSC
DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M 45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO. 2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
11. CHAMFER:
    .3 X 45° AREAS MARKED "K" (10 PLACES)
    .12 X 45° AREAS MARKED "J" (16 PLACES)
    .1 X 45° AREAS UNMARKED (2 PLACES)

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
18	1010957-010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MTG PLATE	1

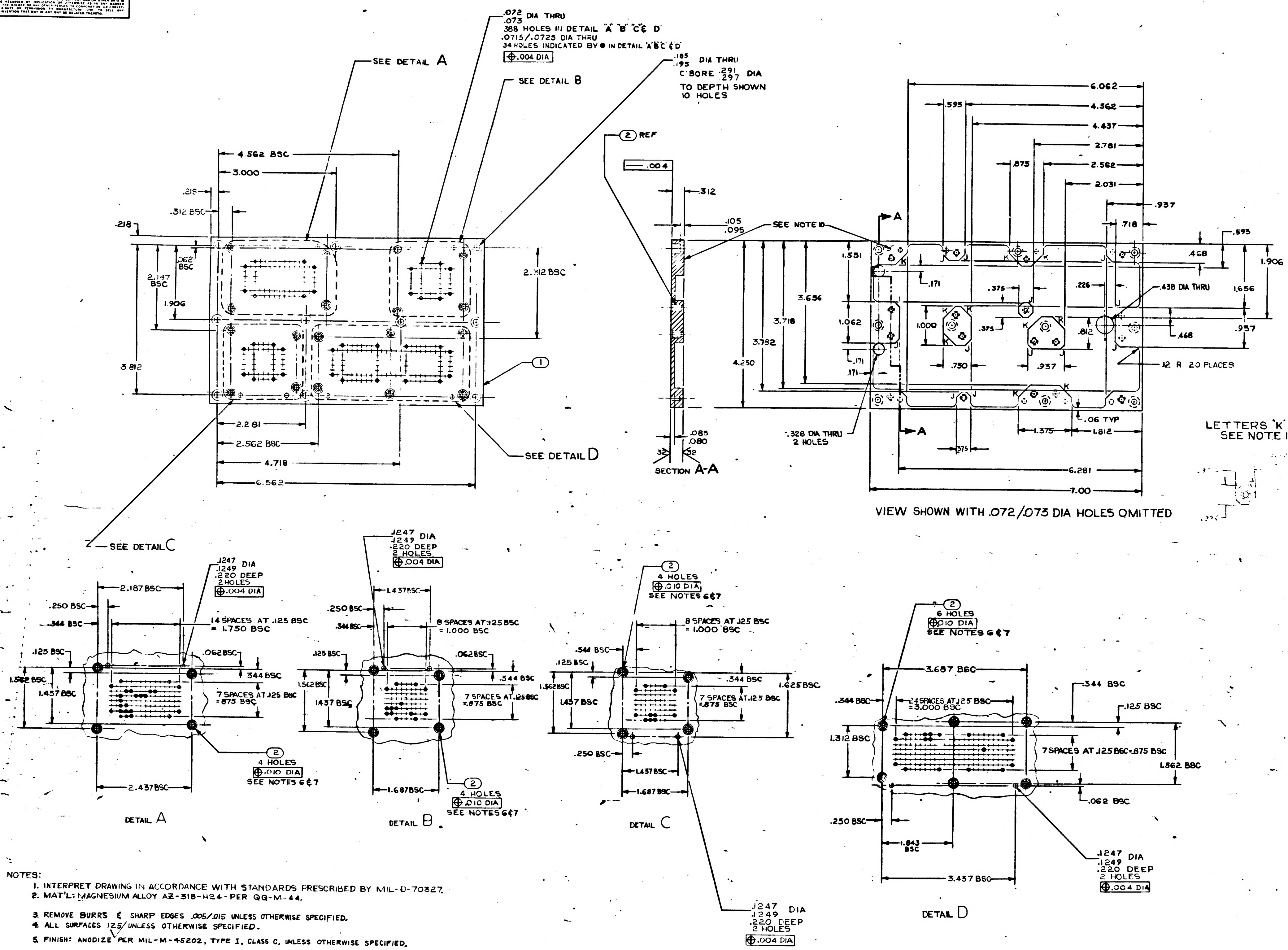
LIST OF MATERIALS

2007115		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 1°0' DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON TEXAS
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	DRAWN R.W. 11-3-65 CHECKED 11/8/65 APPROVED 11/8/65 APPROVED 11/8/65	CONNECTOR MOUNTING PLATE (INSEPARABLE ASS'Y) C/M RIGHT PSA
APPLICATION			APPROVED MIT A. C. METZGER APPROVED MSC DATE	CODE IDENT NO. SIZE E DRAWING NO. 2008395 SCALE SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 23931

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TCRR 24561			9DEC65	
B		REVISED PER TDRR 25557	JHP	EF		
C		REVISED PER TDRR 28469	TR		10MAY66	
D		REVISED PER TDRR 29447	JHP	CP	10JUN66	
E		REVISED PER TDRR 32772	LL		3FEB67	


.072 DIA THRU
.073
388 HOLES IN DETAIL A B C & D
.0715/.0725 DIA THRU
34 HOLES INDICATED BY ● IN DETAIL A B C & D
.004 DIA
SEE DETAIL A
SEE DETAIL B
.185 DIA THRU
.195
C'BORE .291 .297 DIA
TO DEPTH SHOWN
10 HOLES
2 REF
.004
.312
SEE NOTE 10
4.562 BSC
3.000
.218
.312 BSC
.218
.062 BSC
2.147 BSC
1.906
2.312 BSC
3.812
1
2.281
2.562 BSC
4.718
6.562
SEE DETAIL D
SEE DETAIL C
.105
.095
.085
.080
32
SECTION A-A
6.062
4.562
4.437
2.781
2.562
2.031
.595
.875
.937
.718
.595
1.906
1.656
.937
.468
.468
.438 DIA THRU
.226
.375
.375
.171
.171
1.531
1.062
1.000
3.656
3.718
3.782
4.250
.812
.750
.937
.12 R 20 PLACES
.06 TYP
.328 DIA THRU
2 HOLES
.375
1.375
1.812
6.281
7.00
A
A
K
J
LETTERS "K" & "J" SEE NOTE 11
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED
.1247 DIA
.1249
.220 DEEP
2 HOLES
.004 DIA
2.187 BSC
.250 BSC
.344 BSC
.125 BSC
.062 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
2
4 HOLES
.010 DIA
SEE NOTES 6 & 7
2.437 BSC
DETAIL A
1.437 BSC
8 SPACES AT .125 BSC = 1.000 BSC
1.687 BSC
DETAIL B
1.625 BSC
1.457 BSC
1.687 BSC
DETAIL C
.1247 DIA
.1249
.220 DEEP
2 HOLES
.004 DIA
6 HOLES
3.687 BSC
24 SPACES AT .125 BSC = 3.000 BSC
1.312 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
1.843 BSC
3.457 BSC
DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44.
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED.
4. ALL SURFACES 125/ UNLESS OTHERWISE SPECIFIED.
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.
6. COAT THREADS OF HOLES FOR FIND NO. 2 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NO. 2 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO., PER ND1002019.
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
11. CHAMFER:
    - .31 X 45° AREAS MARKED "K" (10 PLACES)
    - .12 X 45° AREAS MARKED "J" (16 PLACES)
    - .18 X 45° AREAS UNMARKED (2 PLACES)

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
18	1010957-010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2.

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

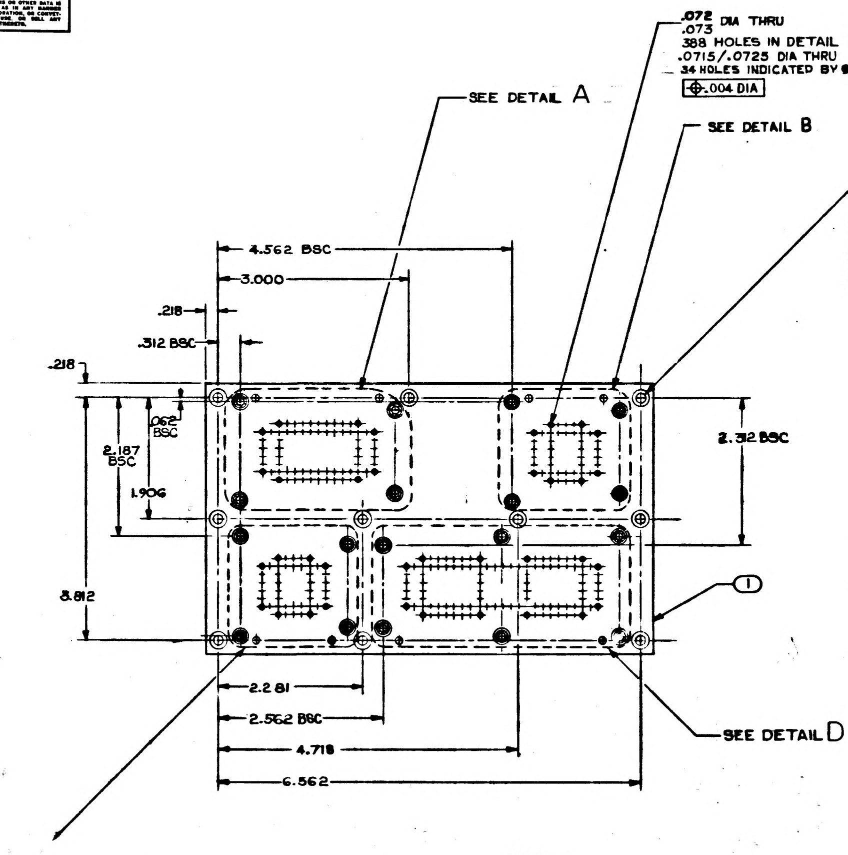
DRAWN 11-3-65
CHECKED 11/8/65
APPROVED 11/8/65
APPROVED 11/8/65
APPROVED MIT 9MAY66
APPROVED MSC
DATE

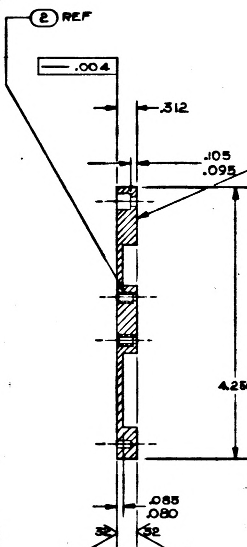
CONNECTOR MOUNTING PLATE -
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

CODE IDENT NO.
SIZE E
DRAWING NO. 2008395
SCALE
SHEET 1 OF

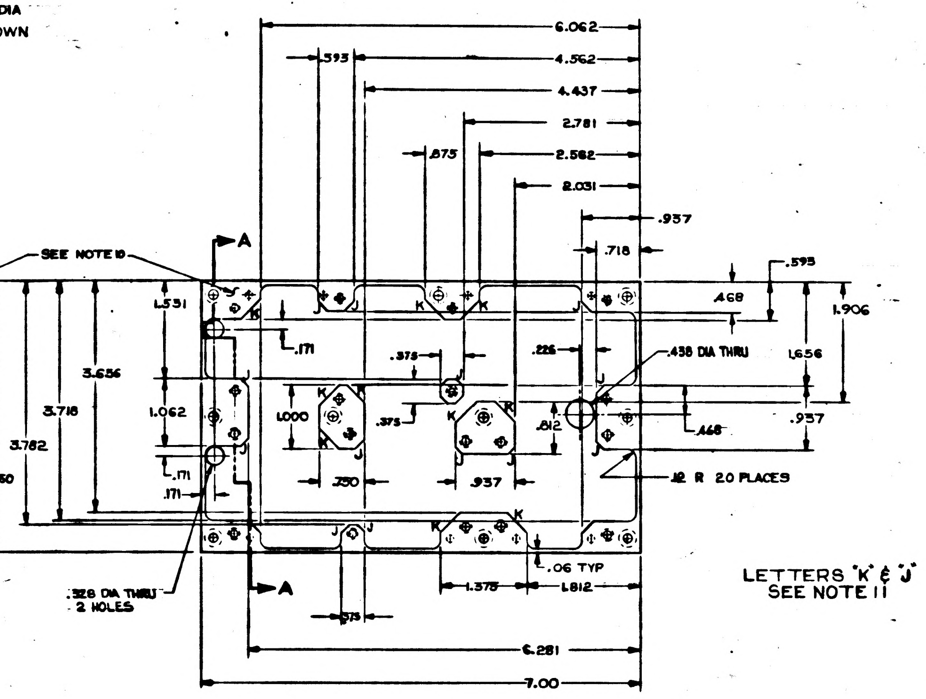
NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2-931						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24561				WK
B		REVISED PER TDRR 25557	J.H.P.	CF		
C		REVISED PER TDRR 28469				
D		REVISED PER TDRR 29447	JHP	CP	10JUN66	
E		REVISED PER TDRR 32772	LL		3FEB67	
F		REVISED PER TDRR 32797	LL		3FEB67	

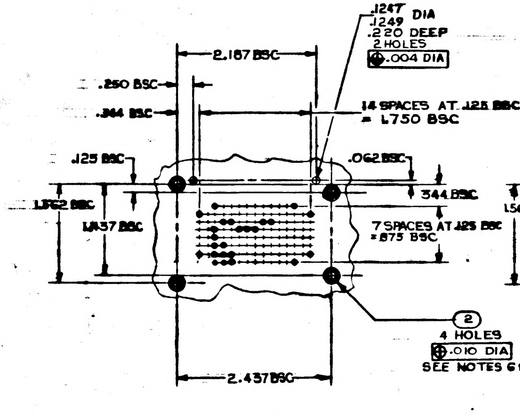

.072/.073 DIA THRU
388 HOLES IN DETAIL "A" "B" "C" & "D"
.0715/.0725 DIA THRU
34 HOLES INDICATED BY ● IN DETAIL "A" "B" "C" & "D"
⊕ .004 DIA
SEE DETAIL A
SEE DETAIL B
.185/.195 DIA THRU
C'BORE .291/.297 DIA
TO DEPTH SHOWN
10 HOLES
4.562 BSC
3.000
.218
.312 BSC
.218
.062 BSC
2.187 BSC
1.906
2.312 BSC
3.812
①
2.281
2.562 BSC
4.718
6.562
SEE DETAIL D
SEE DETAIL C


② REF
.004
.312
.105/.095
.085/.080
32
32

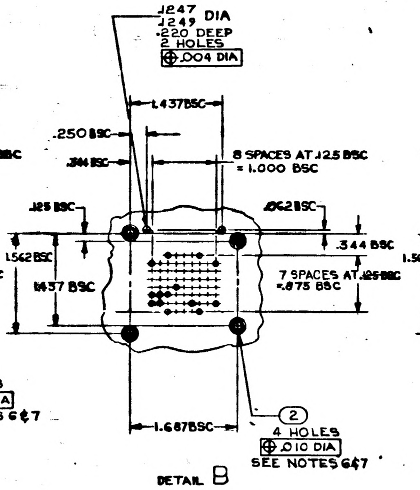
SECTION A-A


SEE NOTE 10
A
A
6.062
.593
4.562
4.437
2.781
.875
2.562
2.031
.937
.718
.593
.468
1.906
1.656
.438 DIA THRU
.226
.375
.375
1.000
.812
.468
.937
.12 R 20 PLACES
1.551
.171
3.656
3.718
3.782
4.250
1.062
.171
.171
.750
.937
.06 TYP
.328 DIA THRU
2 HOLES
.375
1.375
1.812
6.281
7.00
K
J
LETTERS "K" & "J"
SEE NOTE 11

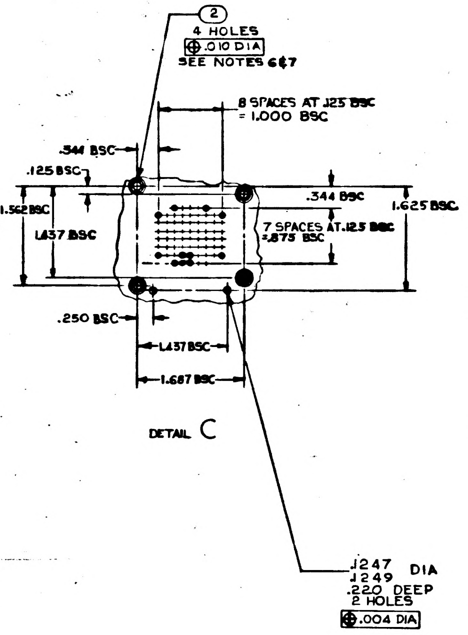
VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED


.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
②
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
2.437 BSC

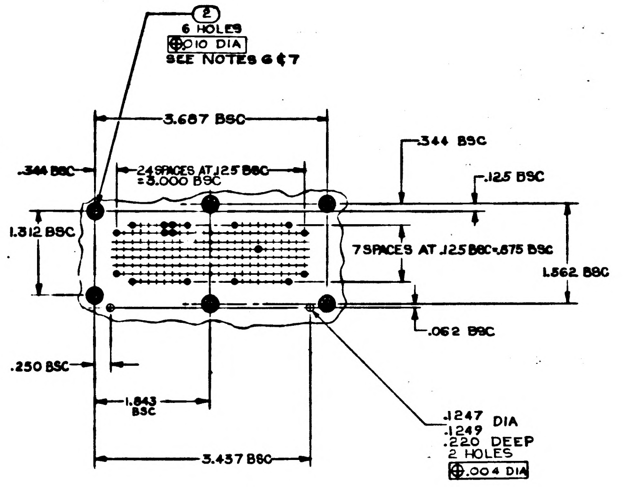
DETAIL A


.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
1.437 BSC
.250 BSC
.344 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
1.687 BSC
②
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7

DETAIL B


②
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
8 SPACES AT .125 BSC = 1.000 BSC
.344 BSC
.125 BSC
.344 BSC
1.625 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
.250 BSC
1.437 BSC
1.687 BSC
.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA

DETAIL C


②
6 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
3.687 BSC
.344 BSC
.344 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.125 BSC
1.312 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
1.843 BSC
3.457 BSC
.1247/.1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA

DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44 AND MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED.
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED.
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
6. COAT THREADS OF HOLES FOR FIND NO. 2 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NO. 2 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO., PER ND1002019.
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT BOSSES PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
11. CHAMFERS: .31 X 45° AREAS MARKED "K" (10 PLACES)
    .12 X 45° AREAS MARKED "J" (16 PLACES)
    .18 X 45° AREAS UNMARKED (2 PLACES)

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
18	1010957 - 010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MT6 PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS XX ±.01 XXX ±.005 ANGLES ± 1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 11-3-65
CHECKED 11/9/65
APPROVED
APPROVED
APPROVED MIT W Kupfer A. C. METZGER 9/16/65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

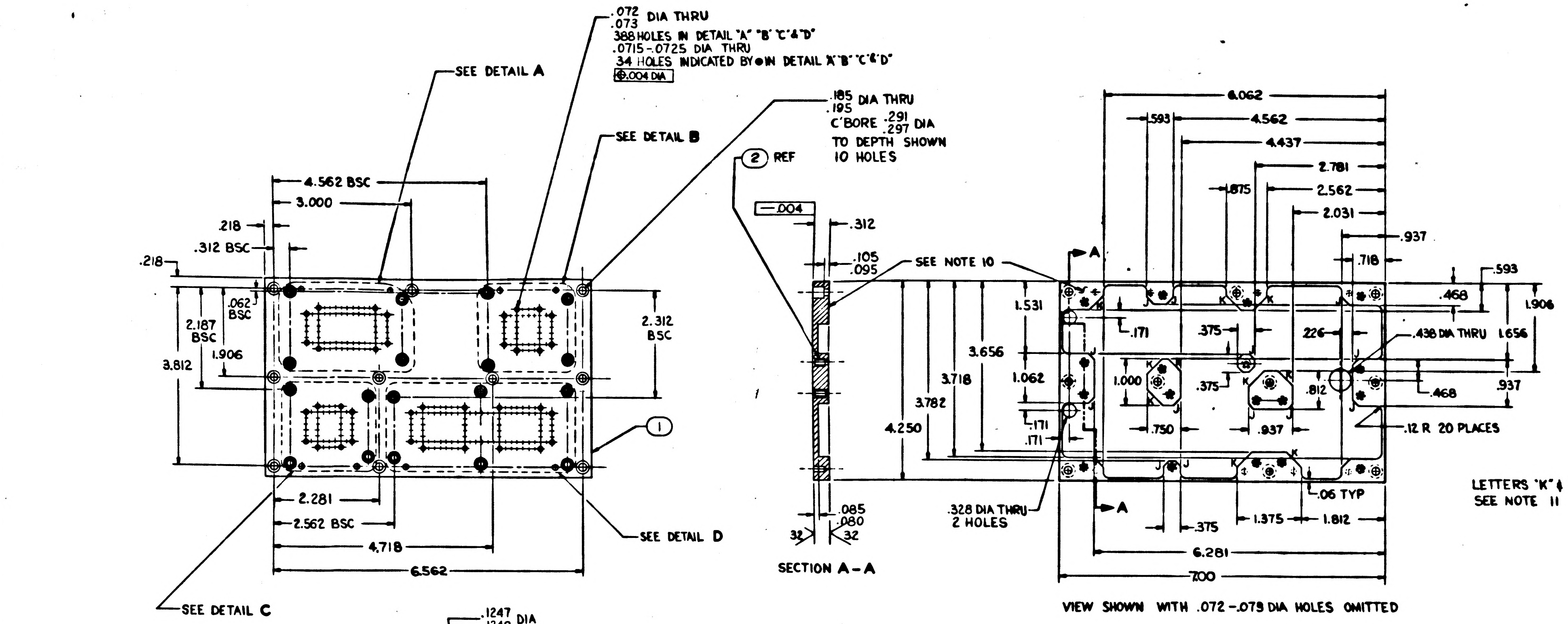
CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

CODE IDENT NO.
SIZE E
DRAWING NO. 2008395
SCALE
SHEET 1 OF 1

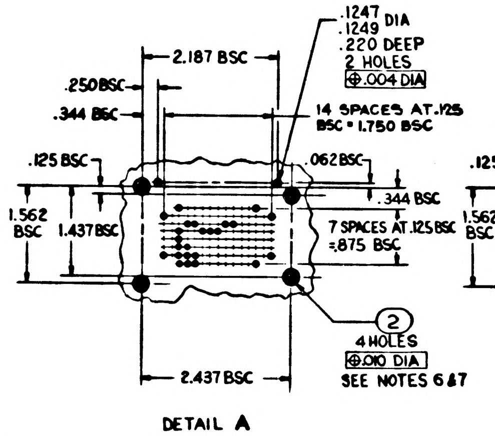
MASTER

2008395

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
REVISIONS					
	G	REDRAWN REV "F" WITHOUT CHANGE PER TDRR 32931		26 FEB 67	AF

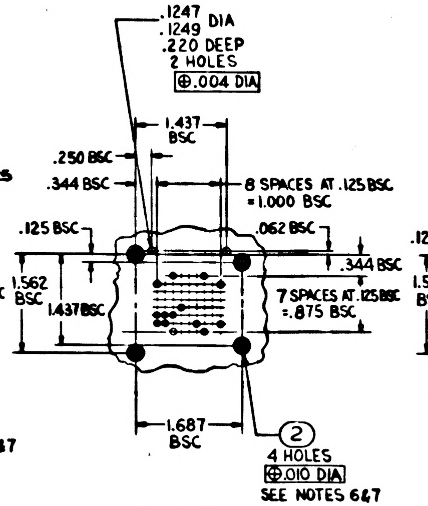


SEE DETAIL A
.072 .073 DIA THRU
388 HOLES IN DETAIL "A" "B" "C" & "D"
.0715-.0725 DIA THRU
34 HOLES INDICATED BY ● IN DETAIL "A" "B" "C" & "D"
⊕ .004 DIA
SEE DETAIL B
.185 .195 DIA THRU
C'BORE .291 .297 DIA
TO DEPTH SHOWN
10 HOLES
(2) REF
4.562 BSC
3.000
.218
.312 BSC
.218
.062 BSC
2.187 BSC
1.906
3.812
2.312 BSC
(1)
2.281
2.562 BSC
4.718
6.562
SEE DETAIL D
SEE DETAIL C
.004
.312
.105 .095
SEE NOTE 10
.085 .080
32
32
SECTION A-A
6.062
.593
4.562
4.437
2.781
.875
2.562
2.031
.937
A
.718
.593
1.531
.468
1.906
.171
.375
.226
.438 DIA THRU
1.656
3.656
1.062
1.000
.375
.812
.468
.937
3.718
3.782
4.250
.171
.171
.750
.937
.12 R 20 PLACES
K
J
.328 DIA THRU 2 HOLES
.06 TYP
.375
1.375
1.812
6.281
7.00
LETTERS "K" & "J" SEE NOTE 11
VIEW SHOWN WITH .072-.073 DIA HOLES OMITTED



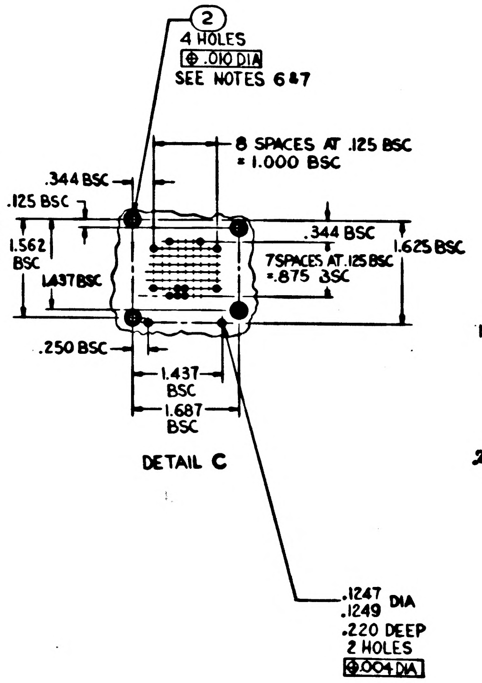
.1247 .1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
(2)
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
2.437 BSC

DETAIL A



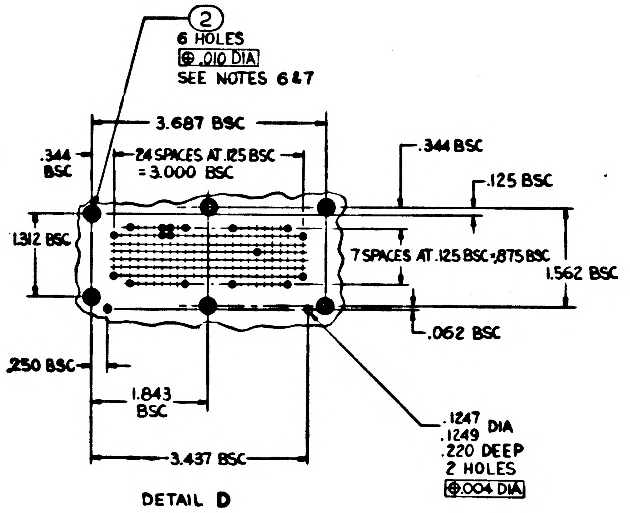
.1247 .1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
1.437 BSC
.250 BSC
.344 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
1.687 BSC
(2)
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7

DETAIL B



(2)
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
8 SPACES AT .125 BSC = 1.000 BSC
.344 BSC
.125 BSC
.344 BSC
1.625 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
.250 BSC
1.437 BSC
1.687 BSC
.1247 .1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA

DETAIL C



(2)
6 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
3.687 BSC
.344 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.344 BSC
.125 BSC
1.312 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
1.843 BSC
3.437 BSC
.1247 .1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA

DETAIL D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44 AND MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.

3. REMOVE BURRS & SHARP EDGES .005-.015 UNLESS OTHERWISE SPECIFIED.

4. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED.

5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.

6. COAT THREADS OF HOLES FOR FIND NO. 2 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.

7. INSTALL FIND NO. 2 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREADS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.

8. IDENTIFY WITH PART NO., PER ND 1002019.

9. .072-.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

10. TOP SURFACES OF 10 BOSSES CONTAINING .185-.195 DIA HOLES TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND 1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

11. CHAMFER:
.31 × 45° AREAS MARKED "K" (10 PLACES)
.12 × 45° AREAS MARKED "J" (16 PLACES)
.18 × 45° AREAS UNMARKED (2 PLACES)

QTY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
18	2	1010957-010	INSERT, SCREW THD, SELF-LOCKING
1	1	2008395-001	CONNECTOR MTG PLATE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

2 PLACE DECIMALS	3 PLACE DECIMALS	ANGLES
+.01 -.01	+.005 -.005	+1°0' -1°0'

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.W. CONTANT DATE 11-3-66
CHECKED HRD. 11-8-66
APPROVAL H.P. DIGBLE 11-8-66
CONTRACT

NASA APPROVAL A.C. METZGER 9 NOV 66
MIT APPROVAL W. KUPFER

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

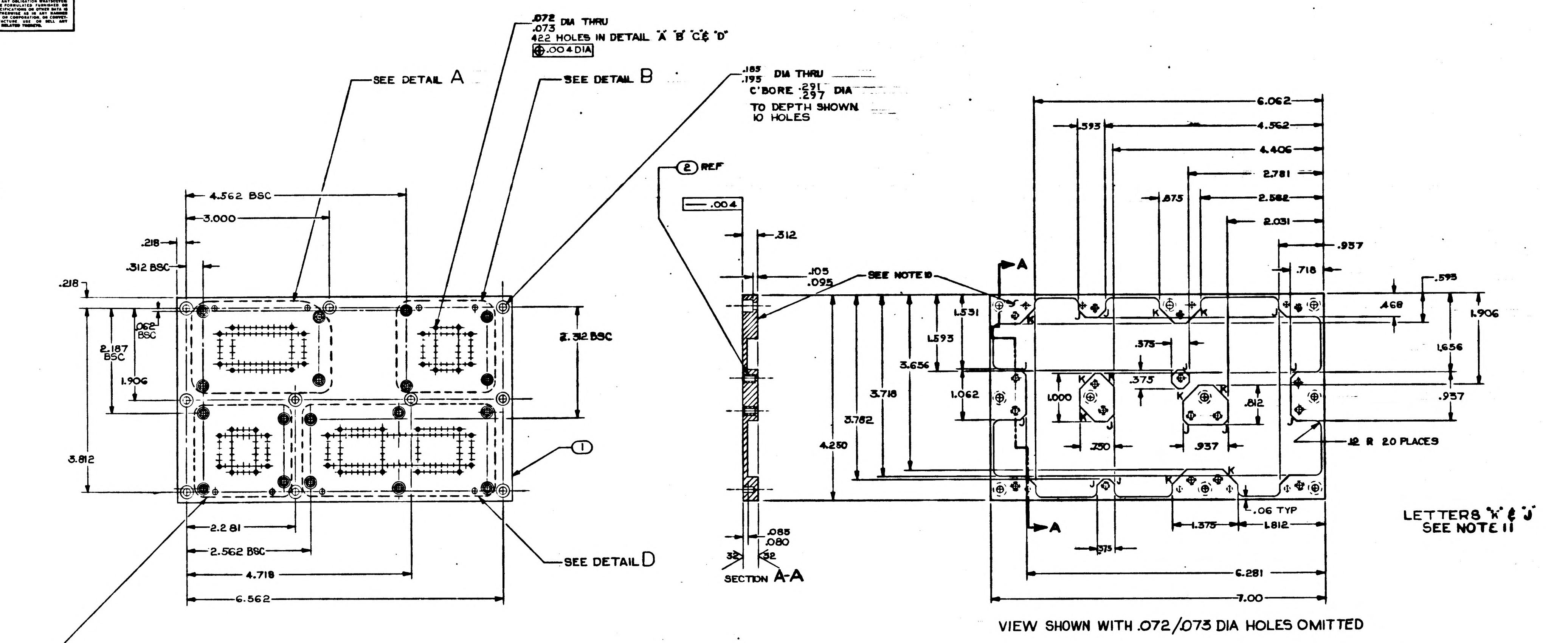
SIZE E
CODE IDENT NO. 80230
2008395

SCALE 1:1
SHEET 1 OF

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 23931

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.072 / .073 DIA THRU
422 HOLES IN DETAIL "A" "B" "C" & "D"
⊕ .004 DIA
SEE DETAIL A
SEE DETAIL B
.185 / .195 DIA THRU
C'BORE .291 / .297 DIA
TO DEPTH SHOWN
10 HOLES
4.562 BSC
3.000
.218
.312 BSC
.218
.062 BSC
2.187 BSC
1.906
3.812
2.312 BSC
1
2.281
2.562 BSC
4.718
6.562
SEE DETAIL D
SEE DETAIL C
2 REF
.004
.312
.105 / .095
SEE NOTE 10
.085 / .080
32
32
SECTION A-A
6.062
.593
4.562
4.406
2.781
.875
2.562
2.031
.937
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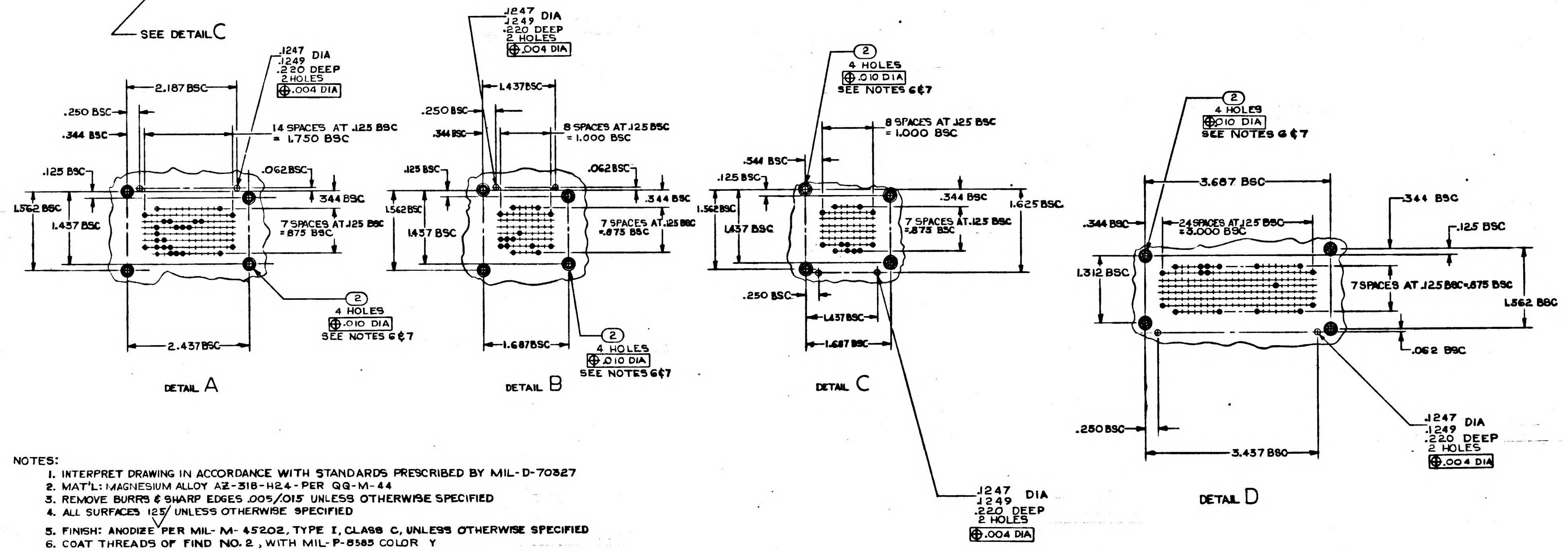
1.906
1.656
.937
1.531
1.593
3.656
3.718
3.782
4.250
1.062
.375
.375
1.000
.812
.750
.937
.12 R 20 PLACES
.06 TYP
1.375
1.812
.375
6.281
7.00
A
A
K
J
LETTERS "K" & "J" SEE NOTE 11

VIEW SHOWN WITH .072/.073 DIA HOLES OMITTED


.1247 / .1249 DIA
.220 DEEP
2 HOLES
⊕ .004 DIA
2.187 BSC
.250 BSC
.344 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.125 BSC
.062 BSC
.344 BSC
1.562 BSC
1.437 BSC
7 SPACES AT .125 BSC = .875 BSC
2
4 HOLES
⊕ .010 DIA
SEE NOTES 6 & 7
2.437 BSC
DETAIL A
1.437 BSC
8 SPACES AT .125 BSC = 1.000 BSC
1.687 BSC
DETAIL B
1.625 BSC
DETAIL C
3.687 BSC
24 SPACES AT .125 BSC = 3.000 BSC
1.312 BSC
.125 BSC
7 SPACES AT .125 BSC = .875 BSC
1.562 BSC
.062 BSC
.250 BSC
3.437 BSC
DETAIL D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MAT'L: MAGNESIUM ALLOY AZ-31B-H24-PER QQ-M-44
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED
6. COAT THREADS OF FIND NO. 2, WITH MIL-P-8585 COLOR Y
7. INSTALL FIND NO.2, WET PER MS33646, REMOVE DRIVING TANG
8. IDENTIFY WITH PART NO., PER ND1002019
9. .072/.073 DIA HOLES INDICATED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040
10. TOP SURFACES OF 10 BOSSES CONTAINING .185/.195 DIA HOLES TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE BOSS SURFACES PER ND1002040
11. CHAMFER:
    - .31 X 45° AREAS MARKED "K" (10 PLACES)
    - .12 X 45° AREAS MARKED "J" (16 PLACES)
    - .18 X 45° AREAS UNMARKED (2 PLACES)

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
18	1010957 - 010		INSERT, SCREW, THD, SELF-LOCKING	2
1	2008395-001		CONNECTOR MTG PLATE	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007115	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 1°0'
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.J. C[illegible] 11-3-65
CHECKED [illegible] 1/4/66
APPROVED [illegible] 1/4/66
APPROVED [illegible] 1/4/66
APPROVED MIT W. Kupfer 1/4/66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CONNECTOR MOUNTING PLATE
(INSEPARABLE ASS'Y)
C/M RIGHT PSA

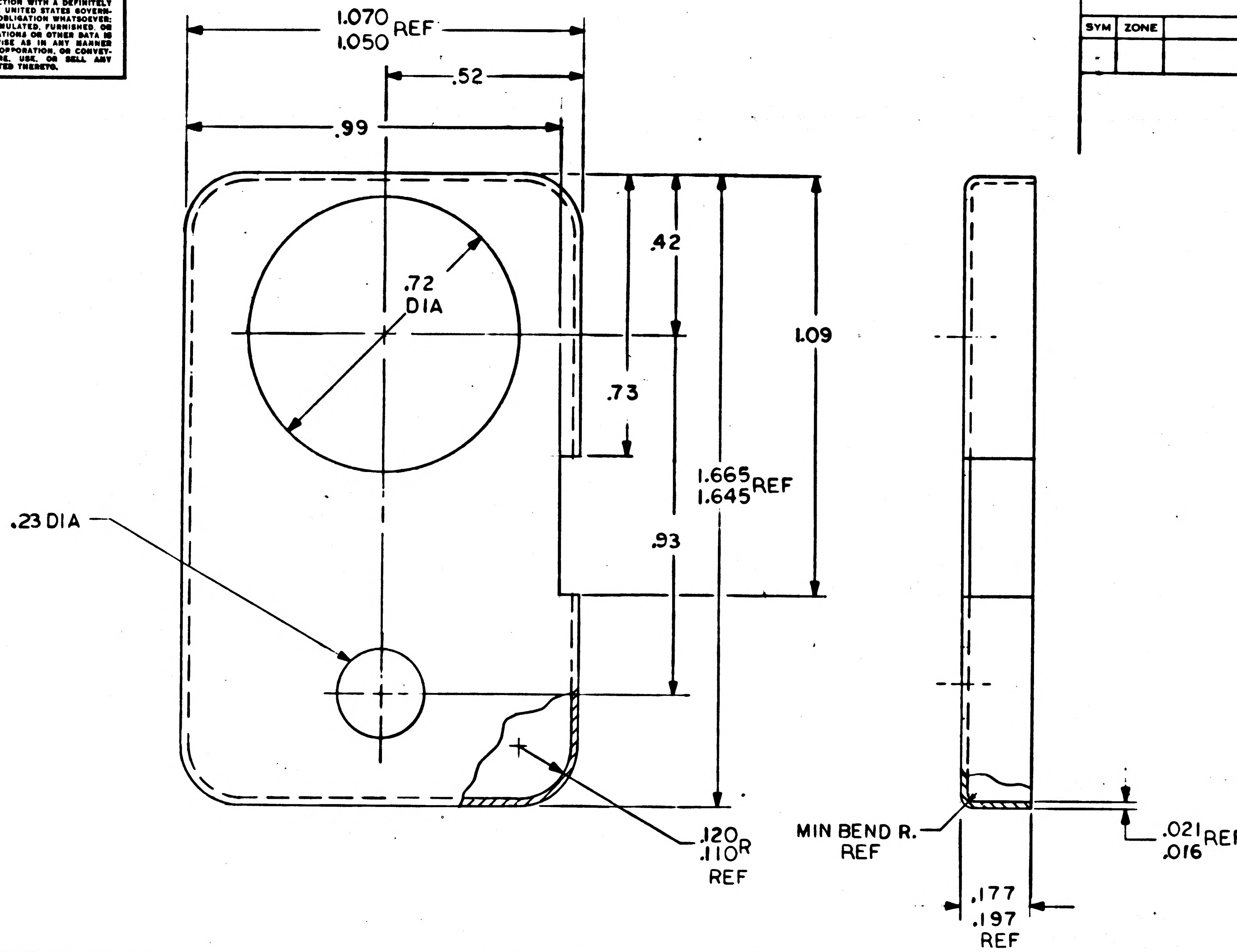
CODE IDENT NO.
SIZE E
DRAWING NO. 2008395
SCALE
SHEET 1 OF 1

2008395

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 24190

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAKE FROM 1010691-9
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .010 MAX
4. IDENTIFY WITH PART NO. ND1002019
5. WARNING: DO NOT SHOCK THIS ASSEMBLY BY ROUGH HANDLING, AS MAGNETIC SHIELDING PROPERTIES MAY BE IMPAIRED

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007179	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX±.01 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Don Bell 11/9/65
CHECKED 11/16/65
APPROVED 11/17/65
APPROVED 11/18/65
11/18/65
APPROVED MIT W Kupfer 19 Nov 65
APPROVED MSC A. C. METZGER
DATE

COVER
(PHOTOMETER)

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008398

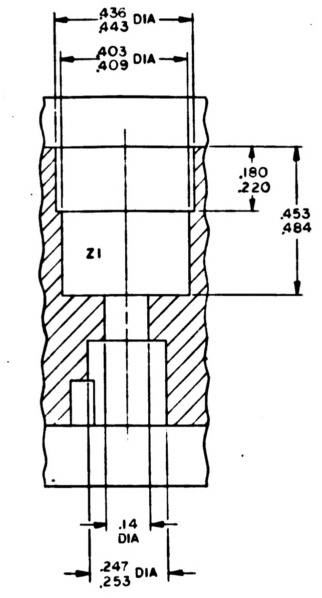
SCALE 4/1 SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

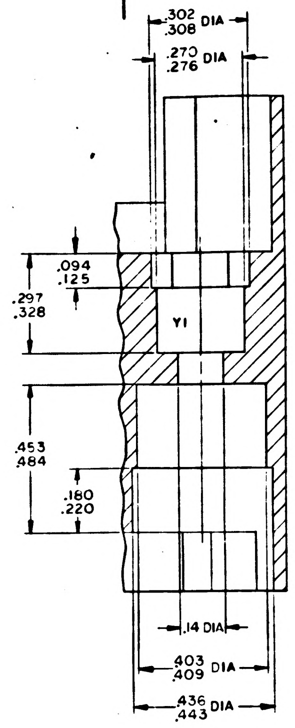
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
A1	.214	-.016	.045/.049	45
A2	.270	.050		
A3	.734	.220		
A4	.313	.315		
A5	.254	.524		
A6	.426	.734		
A7	.120	.940		
A8	.426	.994		
A9	-.014	1.310		
A10	.180	1.214		
A11	.490	1.190		
A12	.160	1.520		
A13	-.030	2.246		
A14	-.020	2.616		
A15	.636	2.760		
A16	.768	1.186		
A17	1.060	1.164		
A18	1.070	1.335		
A19	1.340	1.216		
A20	1.616	1.000		
A21	1.610	.820		
A22	1.630	.046		
A23	2.390	.010		
A24	2.364	.144		
A25	2.322	.420		
A26	3.362	.124		
A27	3.460	.000		
A28	3.560	-.020		
A29	3.430	.624		
A30	3.240	.886		
A31	3.160	.934		
A32	3.070	1.256		
A33	3.130	1.330		
A34	3.180	1.754		
A35	2.996	1.860		
A36	3.120	1.886		
A37	3.500	1.912		
A38	3.612	1.966		
A39	3.270	2.110		
A40	3.256	2.550		
A41	3.082	2.826		
A42	3.422	2.730		
A43	3.530	2.940		
A44	3.230	3.226		
A45	3.720	3.156		
B1	.000	.000	.100/.104	28
B2	-.010	.400		
B3	.312	.428		
B4	.560	1.090		
B5	.104	1.290		
B6	.614	1.420		
B7	.640	2.064		
B8	.604	2.190		
B9	.187	2.330		
B10	.747	.050		
B11	.766	.708		
B12	.834	.824		
B13	.850	.950		
B14	.970	.904		
B15	1.500	.912		
B16	1.326	1.326		
B17	1.456	1.326		
B18	2.212	.010		
B19	2.570	.010		
B20	3.474	.512		
B21	3.060	.970		
B22	3.724	.946		
B23	2.936	1.110		
B24	3.060	1.150		
B25	3.402	1.454		
B26	3.240	1.614		
B27	3.122	1.666		
B28	3.530	1.740		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B29	3.710	1.740	.100/.104	7
B30	3.424	1.624		
B31	3.600	1.652		
B32	3.324	2.344		
B33	3.434	2.432		
B34	3.270	2.656		
B35	3.530	2.796		
C1	1.576	1.296	.088/.092	17
C2	1.640	1.196		
C3	2.160	.360		
C4	2.320	.270		
C5	3.700	1.260		
C6	2.857	1.720		
C7	2.976	1.740		
C8	3.080	1.790		
C9	2.880	1.840		
C10	2.874	2.470		
C11	2.930	2.590		
C12	2.880	2.706		
C13	2.910	2.850		
C14	3.020	2.900		
C15	2.910	3.000		
C16	3.020	3.050		
C17	2.900	3.170		
D1	.284	.644	.093/.097	7
D2	1.350	.964		
D3	1.800	.476		
D4	3.560	.884		
D5	3.296	1.750		
D6	3.720	1.920		
D7	3.232	2.444		
E1	.180	.440	.106/.110	6
E2	.875	.010		
E3	3.610	1.004		
E4	3.720	2.070		
E5	3.045	2.160		
E6	3.670	2.840		
F1	-.060	1.588	.112/.116	3
F2	.630	1.732		
F3	2.896	.982		
G1	.240	1.086	.127/.131	13
G2	.400	1.110		
G3	.790	1.320		
G4	.950	1.310		
G5	1.264	1.070		
G6	2.870	1.230		
G7	3.710	1.110		
G8	3.220	1.440		
G9	3.284	1.890		
G10	3.710	2.220		
G11	3.080	2.450		
G12	3.670	3.000		
G13	3.310	.014		
H1	.736	1.056	.153/.157	5
H2	3.400	1.620		
H3	3.160	2.030		
H4	3.200	2.240		
H5	3.420	2.590		

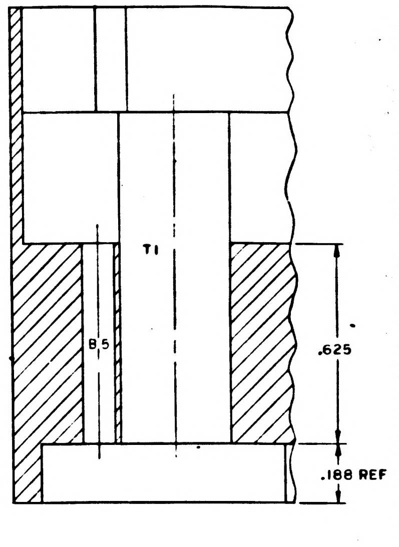
HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
H6	3.120	3.156	.153/.157	3
H7	3.340	3.156		
H8	3.560	3.156		
J1	.626	1.246	.181/.185	4
J2	.914	1.132		
J3	1.092	1.022		
J4	1.184	1.238		
K1	3.407	.800	.202/.206	4
K2	2.930	2.010		
K3	2.940	2.300		
K4	3.080	2.670		
L1	1.474	1.106	.227/.231	1
M1	.046	1.440	.165/.169	2
M2	.556	1.580		
N1	.020	1.100	.255/.262	2
N2	.280	.870		
P1	2.670	1.280	.220/.224	1
Q1	2.694	1.016	.241/.245	1
R1	.120	.204	.310/.317	2
R2	3.632	1.490		
S1	.494	.140	.373/.380	2
S2	.564	.540		
T1	.350	1.380	.346/.353	1
U1	1.244	.426	.936/.943	2
U2	2.930	.436		
V1	2.960	1.500	SEE SECTION A-A	3
V2	3.480	2.130		
V3	3.300	2.890		
W1	.580	.886	SEE SECTION F-F	1
Y1	3.634	.256	SEE SECTION E-E	1
Z1	3.356	1.164	SEE SECTION G-G	1
AA1	.450	2.480	SEE SECTION D-D	2
AA2	1.920	.176		
AB1	.236	1.910	SEE SECTION A-A	2
AB2	.306	3.054		
AC1	2.130	.914	SEE SECTION C-C	1



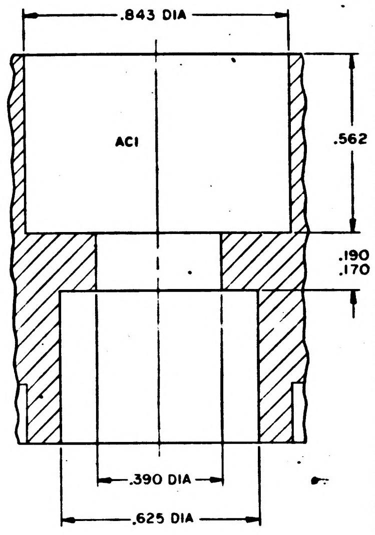
PARTIAL SECTION G-G



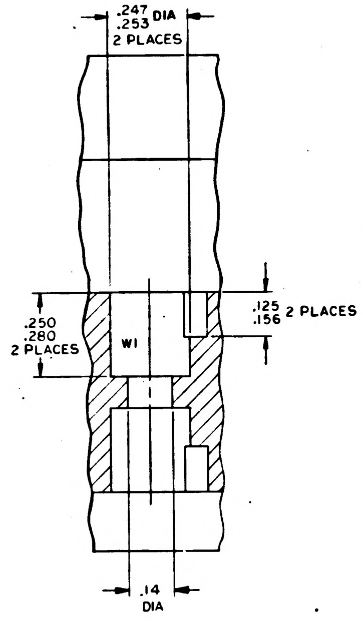
PARTIAL SECTION E-E



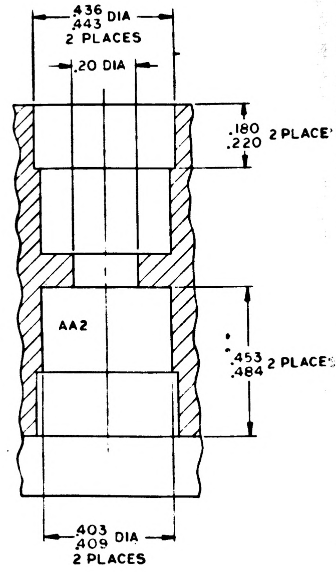
PARTIAL SECTION B-B



PARTIAL SECTION C-C



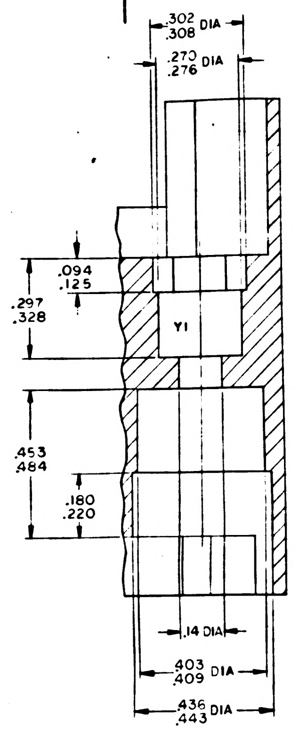
PARTIAL SECTION F-F



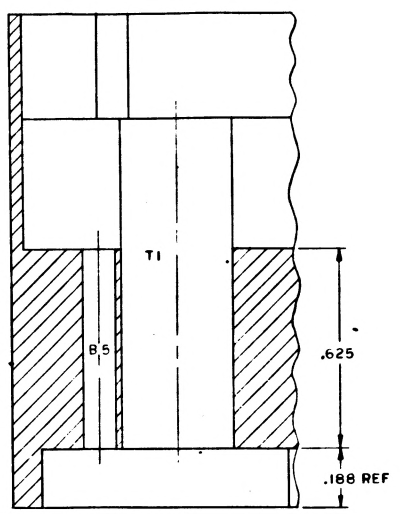
PARTIAL SECTION D-D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6-AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES $\sqrt{}^{.125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: APPLY CHEMICAL FILM PER MIL-C-5541 GRADE C, CLASS 2
7. HOLE TO BE FREE OF CHROMATE. TREAT PER ND1002040. DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019
9. COAT SURFACE $\boxed{-B-}$ PER ND1002167 TYPE II

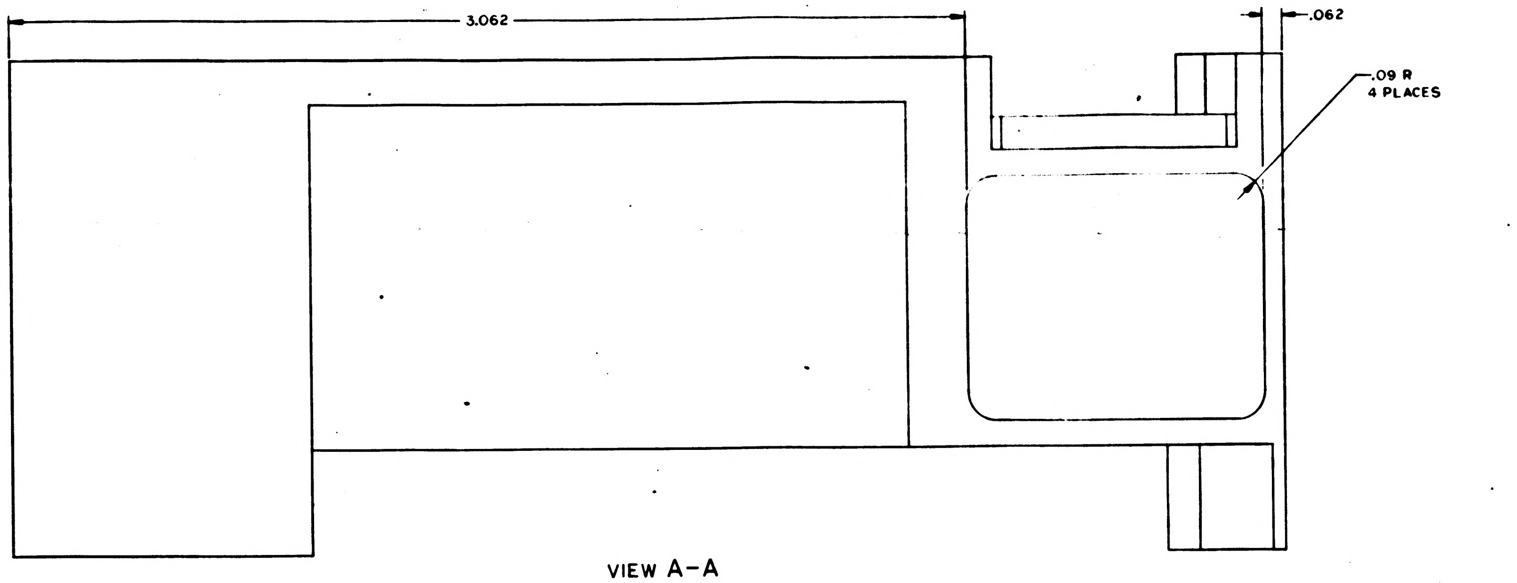
4H


.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
Y1
.453
.484
.180
.220
.14 DIA
.403
.409 DIA
.436
.443 DIA

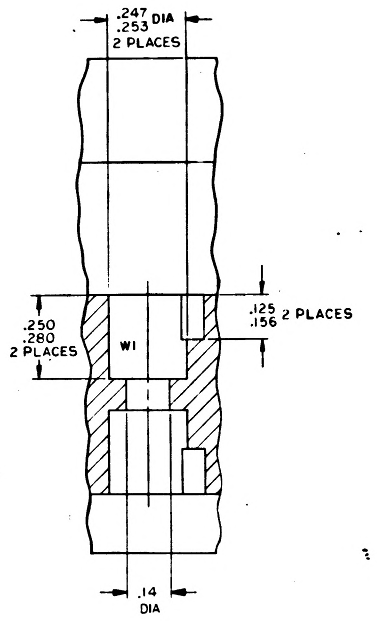
PARTIAL SECTION E-E


T1
B5
.625
.188 REF

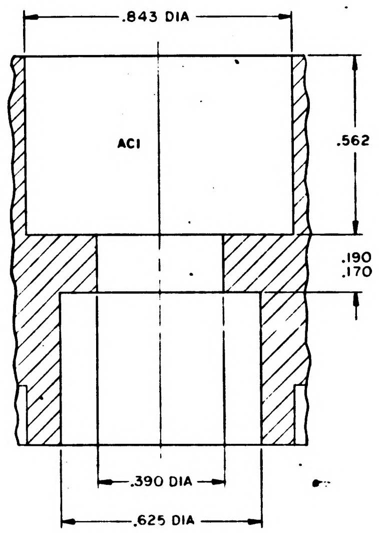
PARTIAL SECTION B-B


3.062
.062
.09 R
4 PLACES

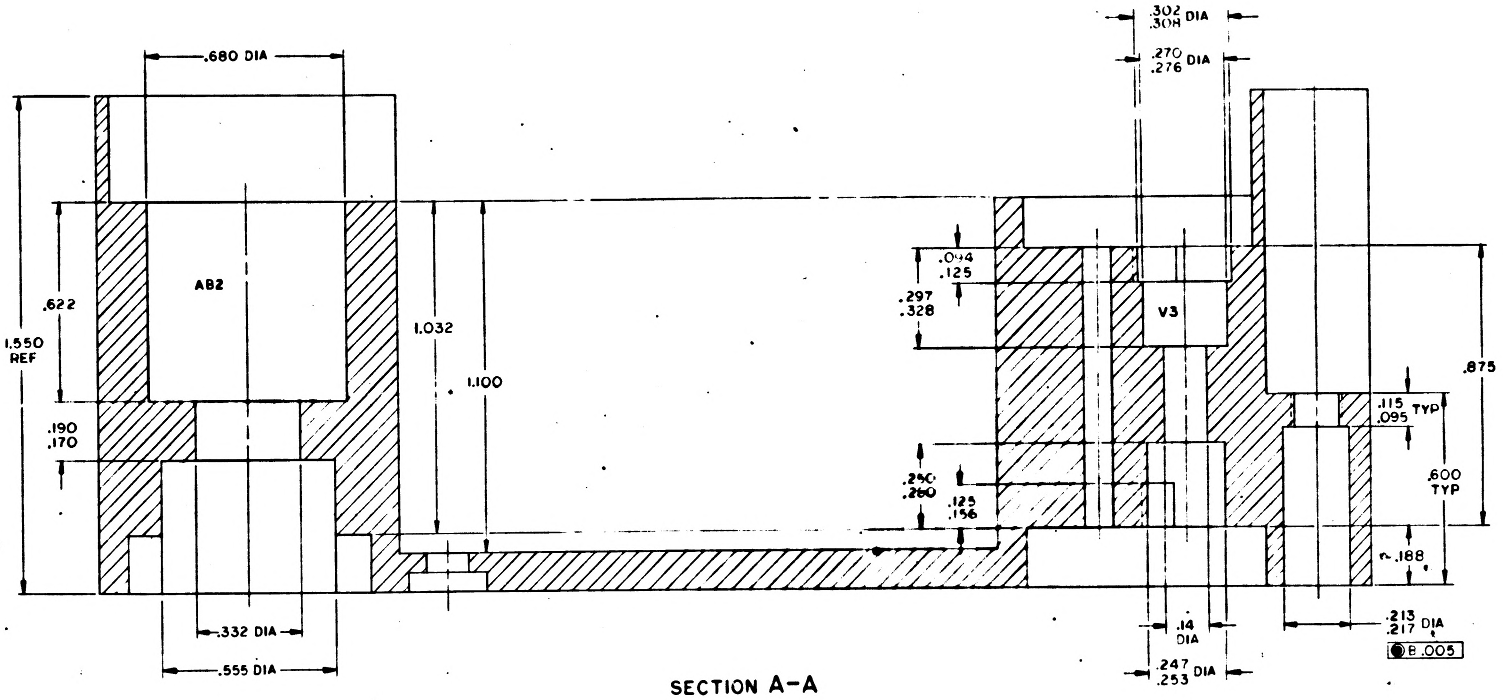
VIEW A-A


.247
.253 DIA
2 PLACES
.250
.280
2 PLACES
W1
.125
.156 2 PLACES
.14
DIA

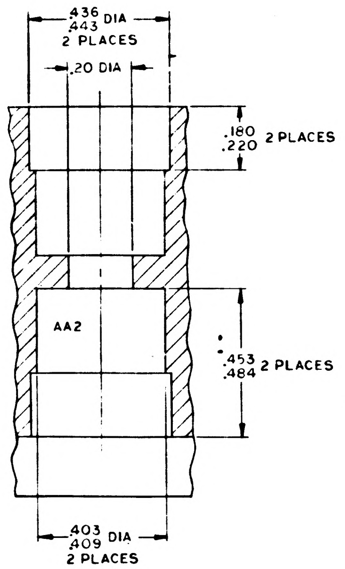
PARTIAL SECTION F-F


.843 DIA
AC1
.562
.190
.170
.390 DIA
.625 DIA

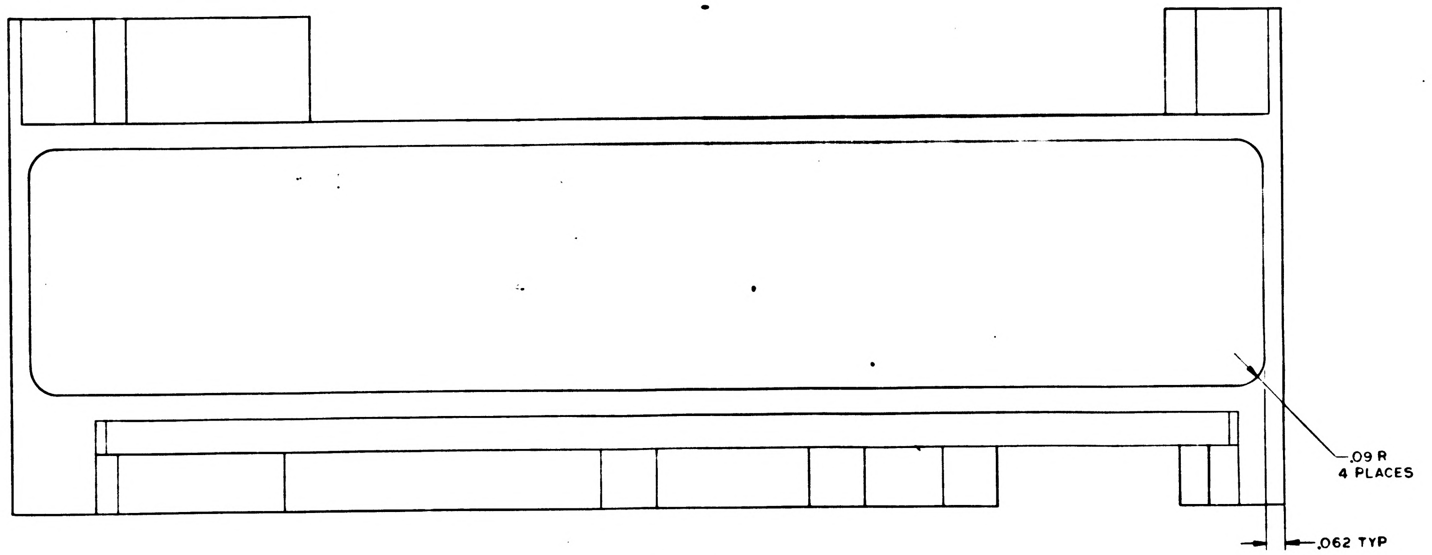
PARTIAL SECTION C-C


.680 DIA
.302
.308 DIA
.270
.276 DIA
1.550
REF
.622
AB2
1.032
1.100
.190
.170
.332 DIA
.555 DIA
.094
.125
.297
.328
V3
.875
.115
.095 TYP
.600
TYP
.240
.260
.125
.156
.188
.14
DIA
.247
.253 DIA
.213
.217 DIA
B .005

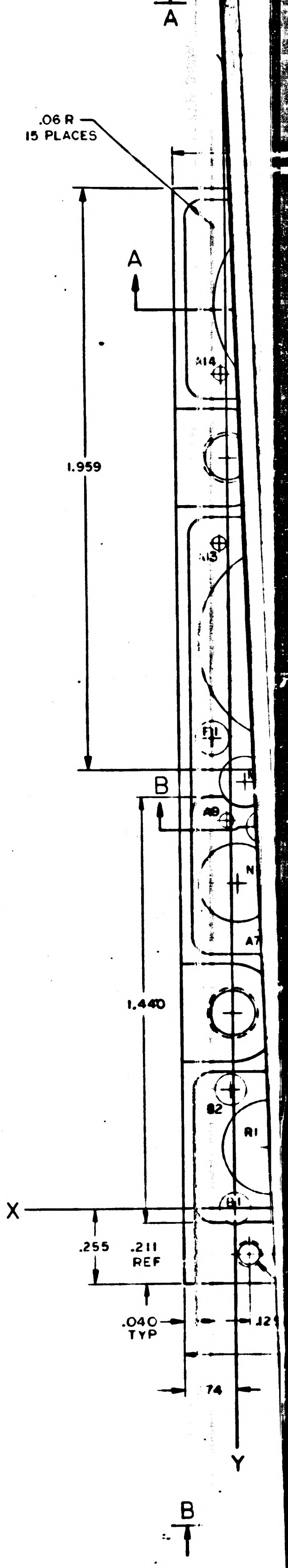
SECTION A-A

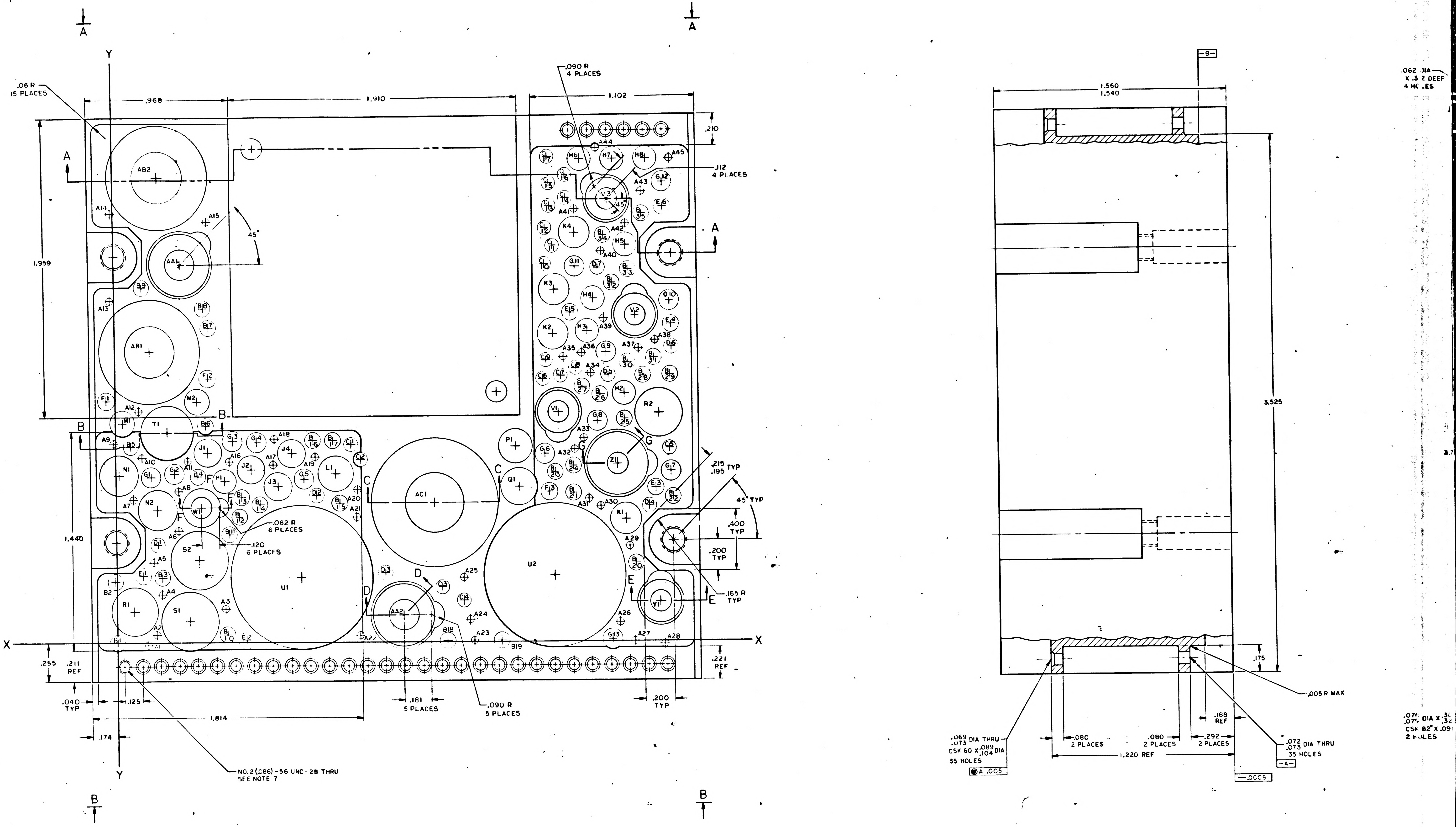

.436
.443 DIA
2 PLACES
.20 DIA
.180
.220 2 PLACES
AA2
.453
.484 2 PLACES
.403
.409 DIA
2 PLACES

PARTIAL SECTION D-D


.09 R
4 PLACES
.062 TYP

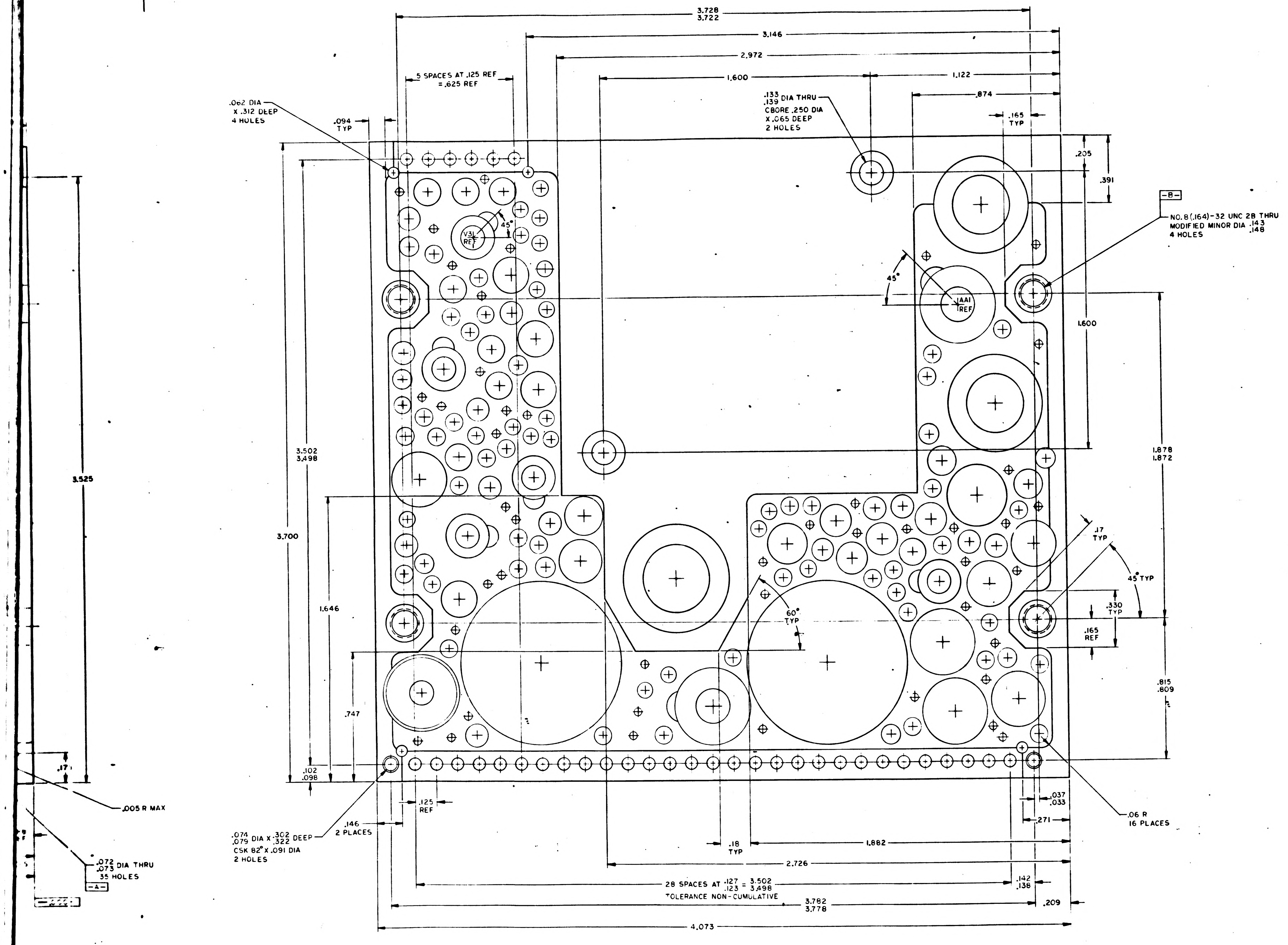
VIEW B-B


A
.06 R
15 PLACES
A
1.959
B
1.440
X
.255
.211
REF
.040
TYP
.74
Y
B


A
A
Y
.06 R
15 PLACES
.968
1.910
.090 R
4 PLACES
1.102
.210
.112
4 PLACES
AB2
A14
A15
45°
1.959
AA1
AB1
A13
M2
M1
T1
B
B
A9
N1
N2
W1
S2
R1
S1
U1
AC1
C
C
AA2
D
D
U2
V3
V2
V1
Z11
R2
K1
K2
K3
K4
P1
Q1
Y1
E
E
G
F
F
.062 R
6 PLACES
.120
6 PLACES
.215
.195 TYP
45° TYP
.400 TYP
.200 TYP
.165 R TYP
1.440
X
X
.255
.211 REF
.221 REF
.040 TYP
.125
1.814
.174
.181
5 PLACES
.090 R
5 PLACES
.200 TYP
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7
Y
B
B
-B-
1.560
1.540
3.525
.175
.005 R MAX
.188 REF
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.220 REF
.069
.073 DIA THRU
CSK 60 X .089
.104 DIA
35 HOLES
⌖ A .005
.072
.073 DIA THRU
35 HOLES
-A-
— .0005
.09 R
4 PLACES
.875
.600 TYP
.188
.213
.217 DIA
⌖ .005
.062 DIA
X .32 DEEP
4 HOLES
.074
.075 DIA X .3
CSK 82° X .09
2 HOLES
.09 R
4 PLACES
.062 TYP

REVISIONS 2/607

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28526		JI	10 AUG 66	


3.728
3.722
3.146
2.972
1.600
1.122
.874
5 SPACES AT .125 REF
=.625 REF
.062 DIA
X .312 DEEP
4 HOLES
.094
TYP
.133
.139 DIA THRU
CBORE .250 DIA
X .065 DEEP
2 HOLES
.165
TYP
.205
.391
-B-
NO. 8 (.164)-32 UNC 2B THRU
MODIFIED MINOR DIA .143 .148
4 HOLES
V31
REF
45°
1AA1
REF
1.600
1.878
1.872
3.525
3.502
3.498
3.700
1.646
.747
.17
TYP
45° TYP
60°
TYP
.330
TYP
.165
REF
.815
.809
.102
.098
.17
.005 R MAX
.072
.073 DIA THRU
35 HOLES
-A-
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146
2 PLACES
.125
REF
.037
.033
.271
.06 R
16 PLACES
.18
TYP
1.882
2.726
28 SPACES AT .127 .123 = 3.502 3.498
TOLERANCE NON-CUMULATIVE
.142
.138
3.782
3.778
.209
4.073

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.01 XXX ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.C. Taylor 17 FEB 66
CHECKED
APPROVED 2 Feb 66
APPROVED
APPROVED MIT W Gaylor 23 Feb 66
APPROVED NSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEATSINK
PULSE TORQUE POWER SUPPLY

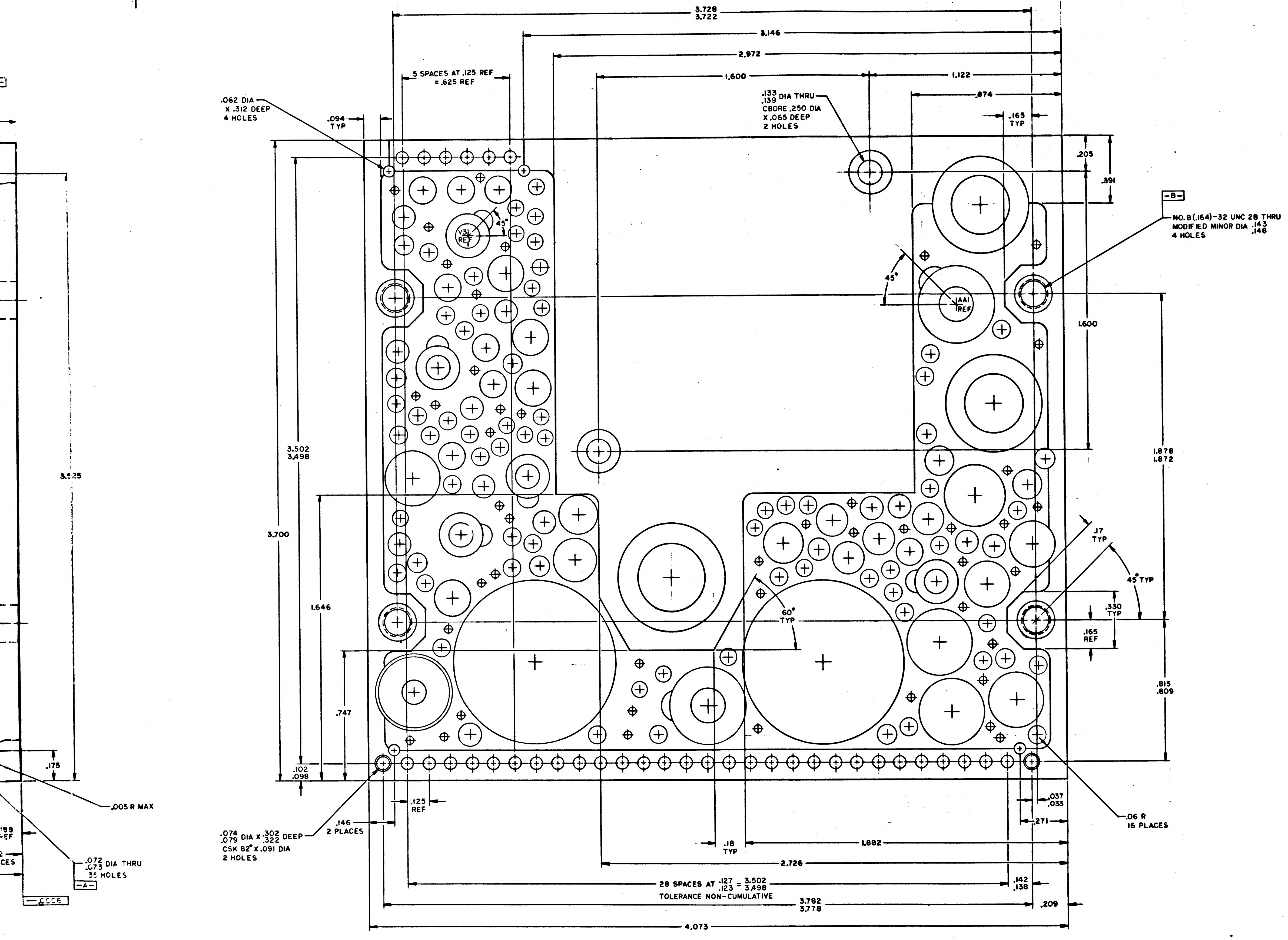
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008406
SCALE 5/1
SHEET 1 OF 1

2008406 A

2008406 A

4/2008406

REVISIONS 26607


3.728
3.722
3.146
2.972
1.600
1.122
.874
5 SPACES AT .125 REF
= .625 REF
.062 DIA
X .312 DEEP
4 HOLES
.094
TYP
.133
.139 DIA THRU
CBORE .250 DIA
X .065 DEEP
2 HOLES
.165
TYP
.205
.391
-B-
NO. 8 (.164)-32 UNC 2B THRU
MODIFIED MINOR DIA .143 .148
4 HOLES
V3L
REF
45°
45°
AA1
REF
1.600
1.878
1.872
3.502
3.498
3.525
3.700
1.646
.747
.17
TYP
45° TYP
60°
TYP
.330
TYP
.165
REF
.815
.809
.175
.102
.098
.005 R MAX
.125
REF
.074
.079 DIA X .302 .322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146
2 PLACES
.072
.073 DIA THRU
35 HOLES
-A-
.0005
.037
.033
.271
.06 R
16 PLACES
.18
TYP
1.882
2.726
28 SPACES AT .127 .123 = 3.502 3.498
TOLERANCE NON-CUMULATIVE
.142
.138
3.782
3.778
.209
4.073

F-4

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .01 XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

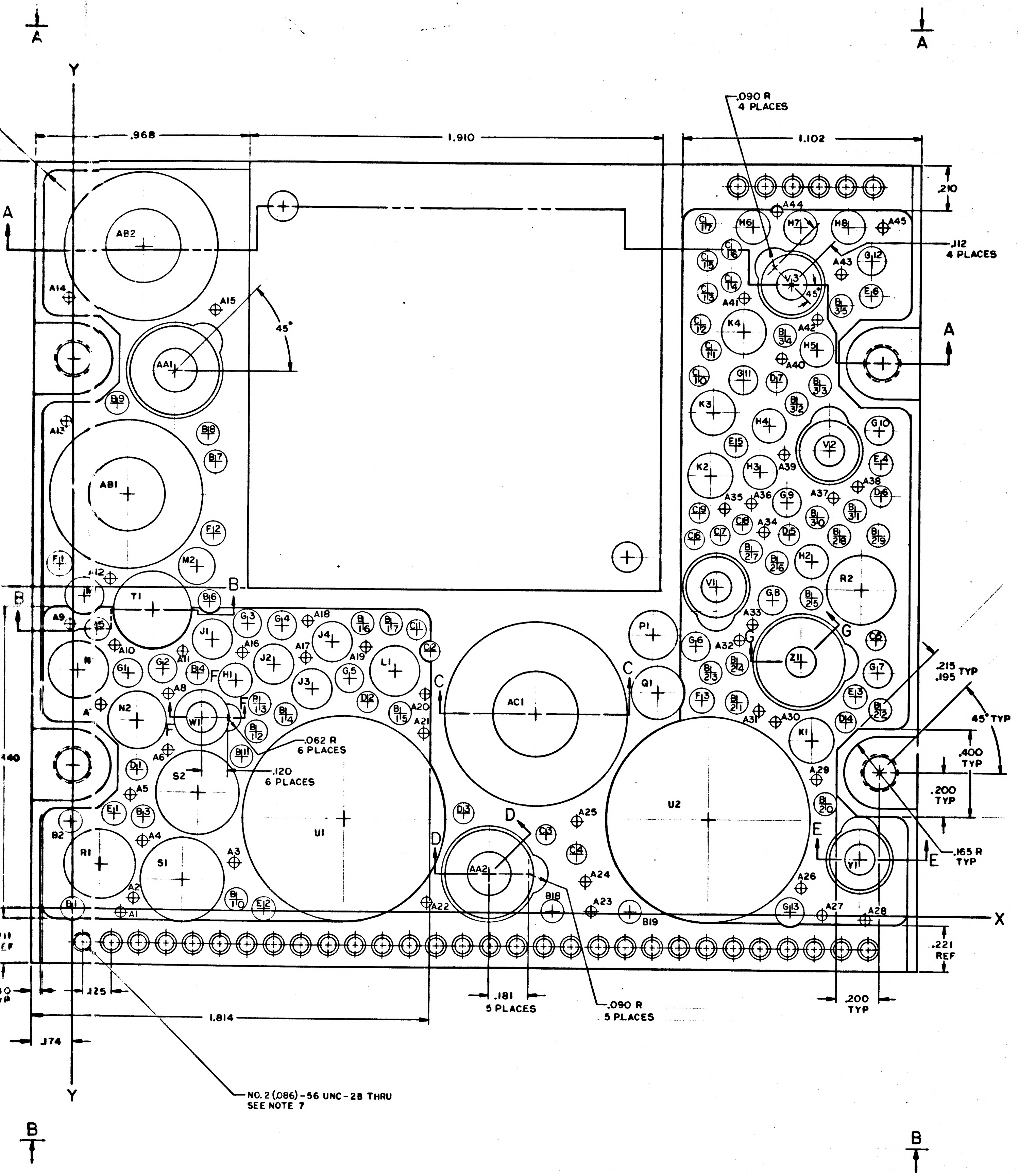
DRAWN R.C. Taylor
CHECKED
APPROVED
APPROVED
APPROVED MIT
A. C. METZGER
APPROVED MSC
DATE

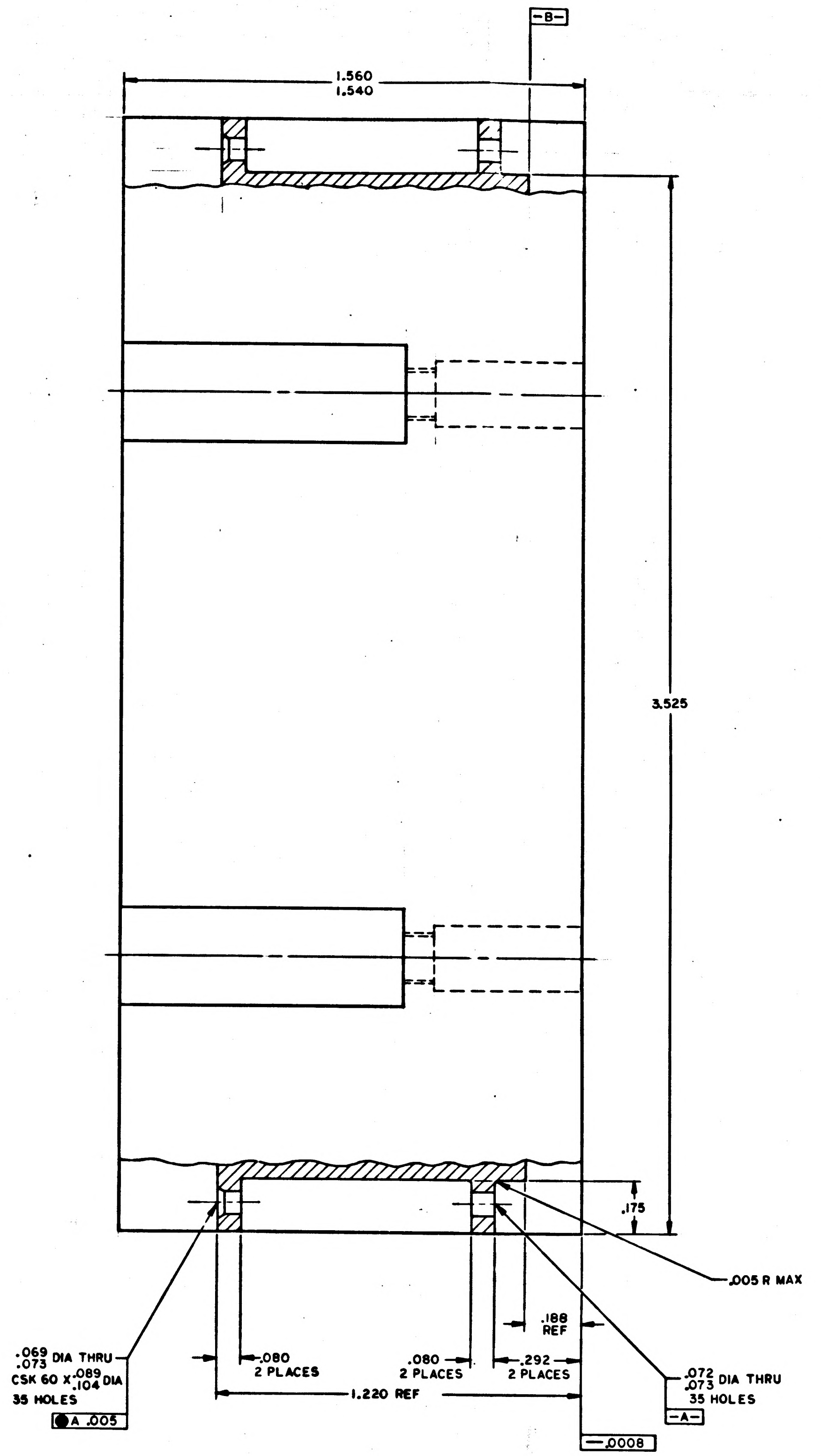
HEATSINK
PULSE TORQUE POWER SUPPLY

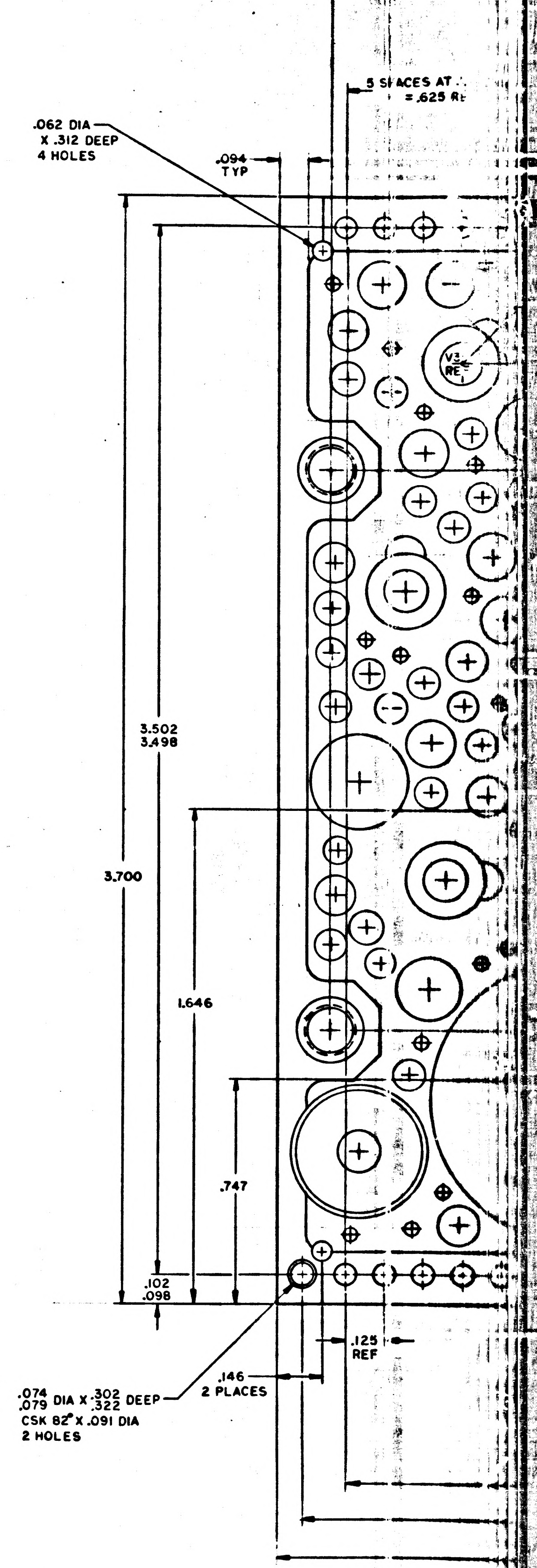
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008406
SCALE 5/1
SHEET 1 OF 1

2008406

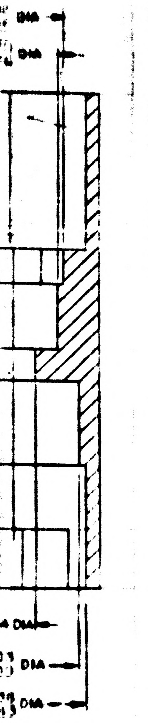
2008406


A
A
Y
.968
1.910
1.102
.090 R
4 PLACES
.210
.112
4 PLACES
AB2
AA1
AB1
A14
A15
45°
A12
A
A
B
B
T1
R
N2
W1
S2
U1
AC1
U2
V1
V2
V3
Z1
K1
K2
K3
K4
R1
R2
S1
P1
Q1
AA2
Y1
B19
B18
.062 R
6 PLACES
.120
6 PLACES
.215
.195 TYP
45° TYP
.400
TYP
.200
TYP
.165 R
TYP
C
C
D
D
E
E
F
F
G
G
X
.221
REF
.125
.181
5 PLACES
.090 R
5 PLACES
.200
TYP
1.814
.174
NO. 2 (.086) - 56 UNC - 2B THRU
SEE NOTE 7
Y
B
B

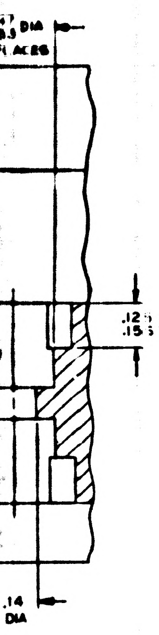

-B-
1.560
1.540
3.525
.175
.005 R MAX
.069
.073 DIA THRU
CSK 60 X .089
.104 DIA
35 HOLES
A .005
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.188
REF
1.220 REF
.072
.073 DIA THRU
35 HOLES
-A-
.0008


5 SPACES AT
= .625 REF
.062 DIA
X .312 DEEP
4 HOLES
.094
TYP
V3
3.502
3.498
3.700
1.646
.747
.102
.098
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.146
2 PLACES
.125
REF

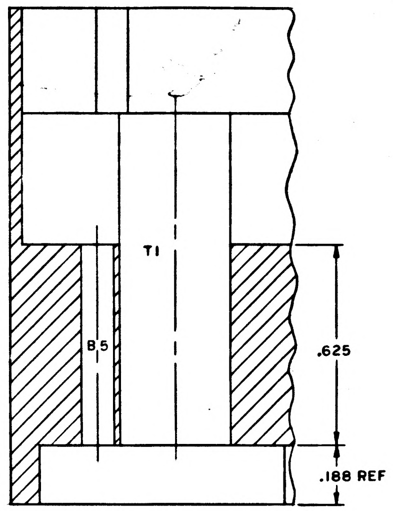
F3


DIA
DIA
DIA
DIA

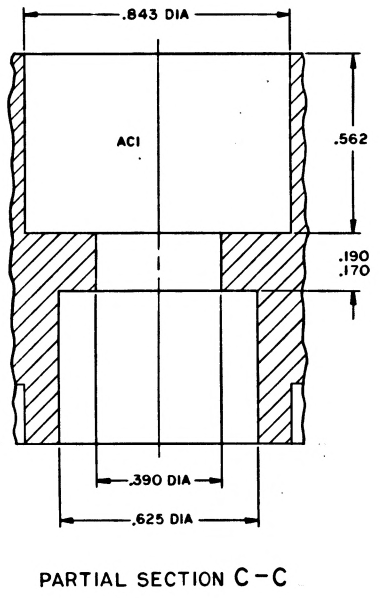
ECTION E – E


DIA
ACES
.12
.15 2 PLACES
.14
DIA

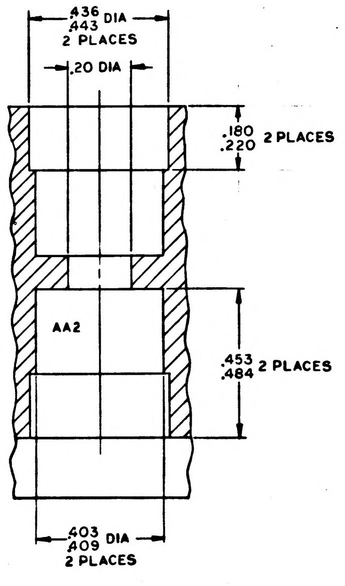
SECTION F – F


T1
B5
.625
.188 REF

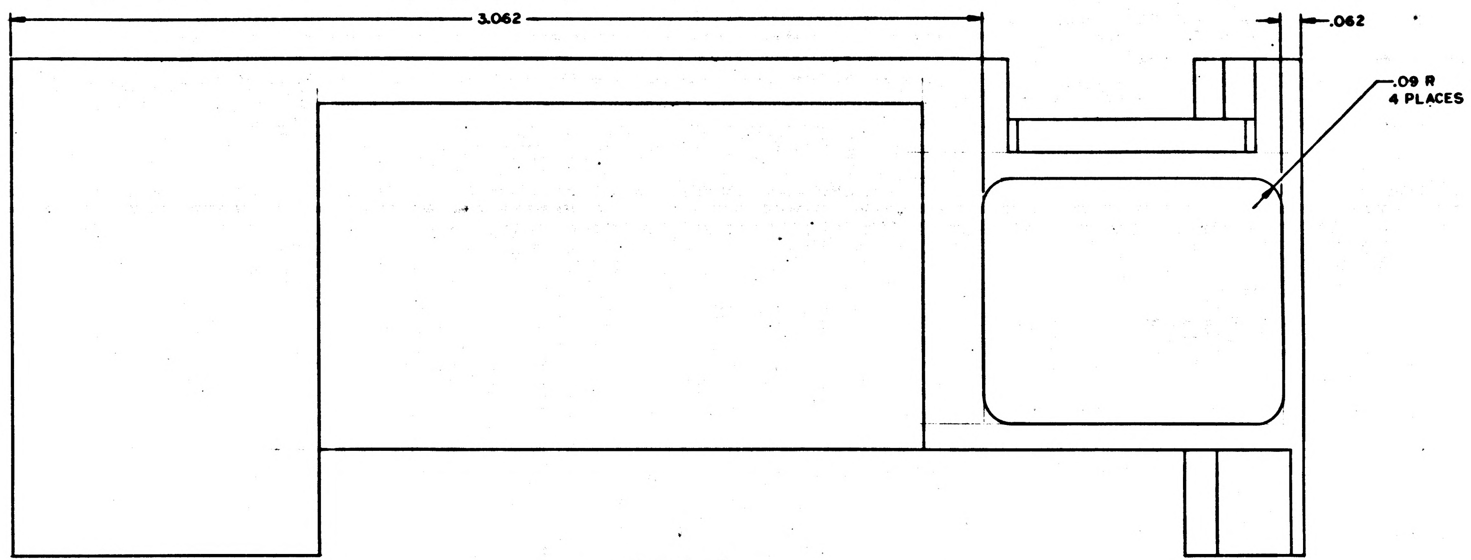
PARTIAL SECTION B – B


.843 DIA
AC1
.562
.190
.170
.390 DIA
.625 DIA

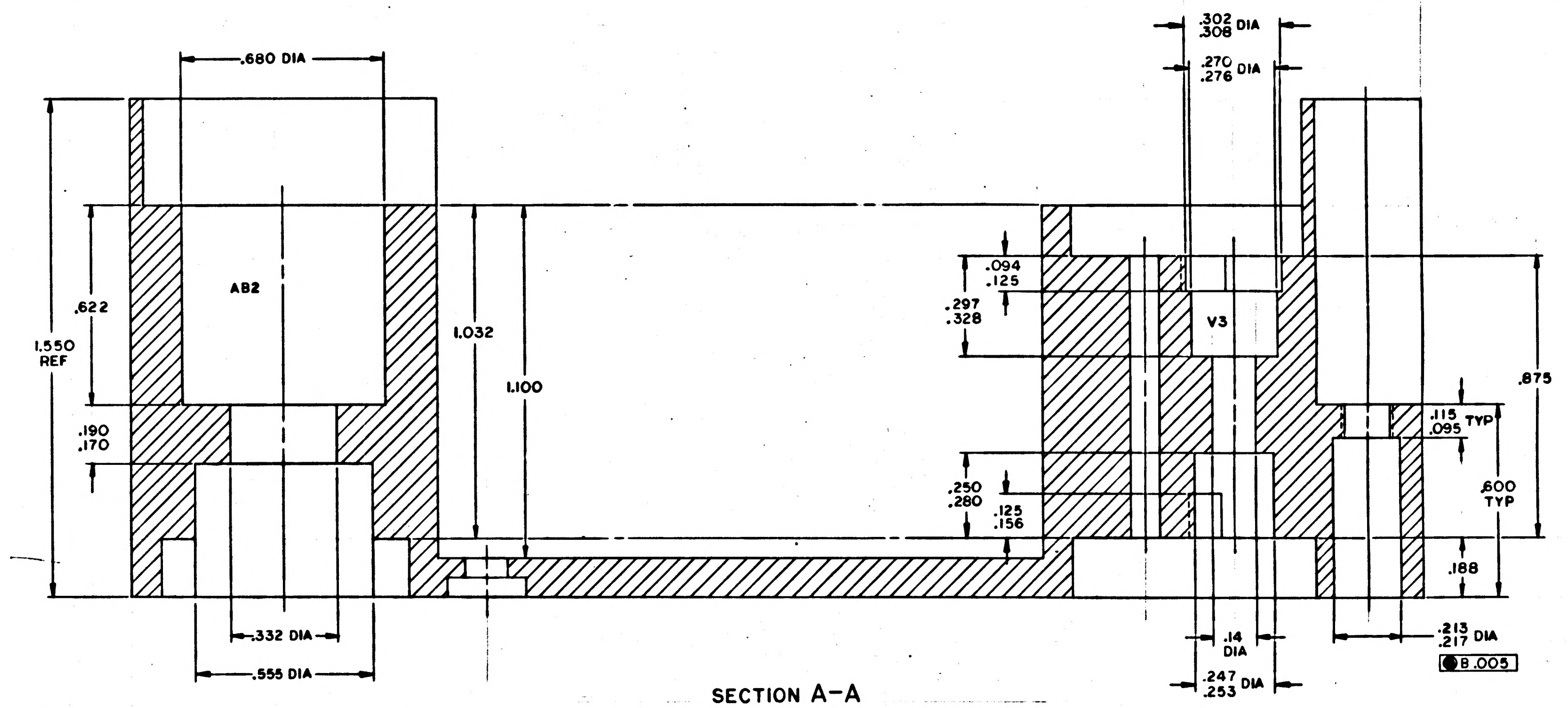
PARTIAL SECTION C – C


.436
.443 DIA
2 PLACES
.20 DIA
.180
.220 2 PLACES
AA2
.453
.484 2 PLACES
.403
.409 DIA
2 PLACES

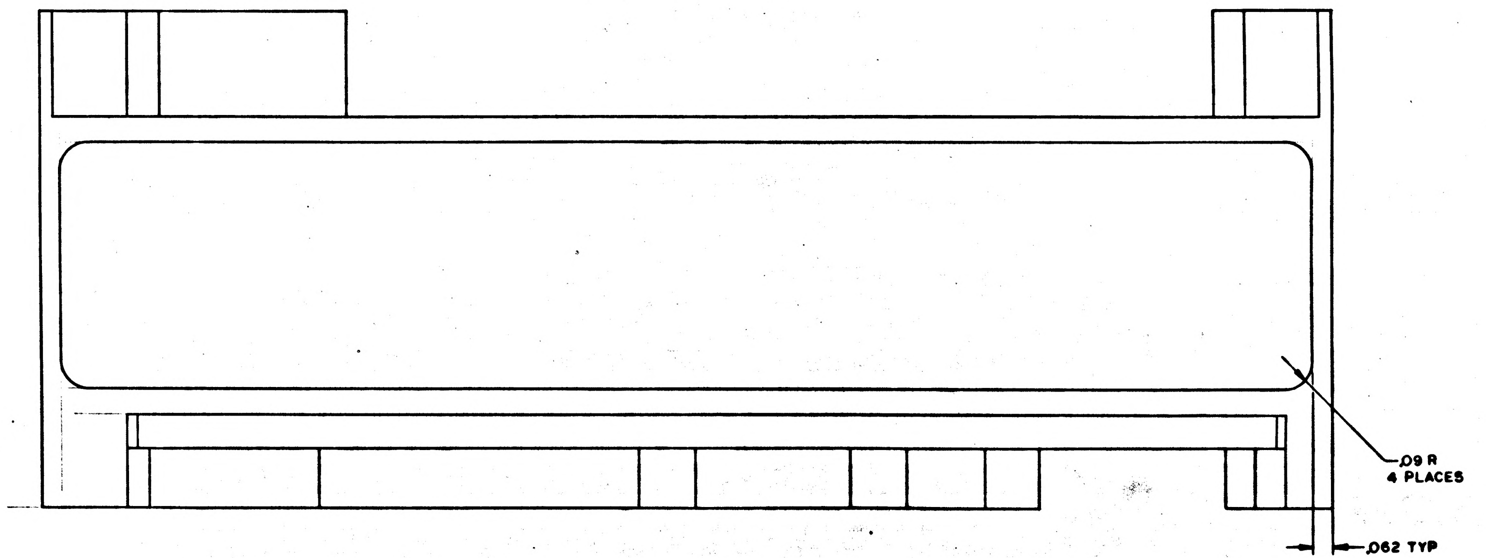
PARTIAL SECTION D – D


3.062
.062
.09 R
4 PLACES

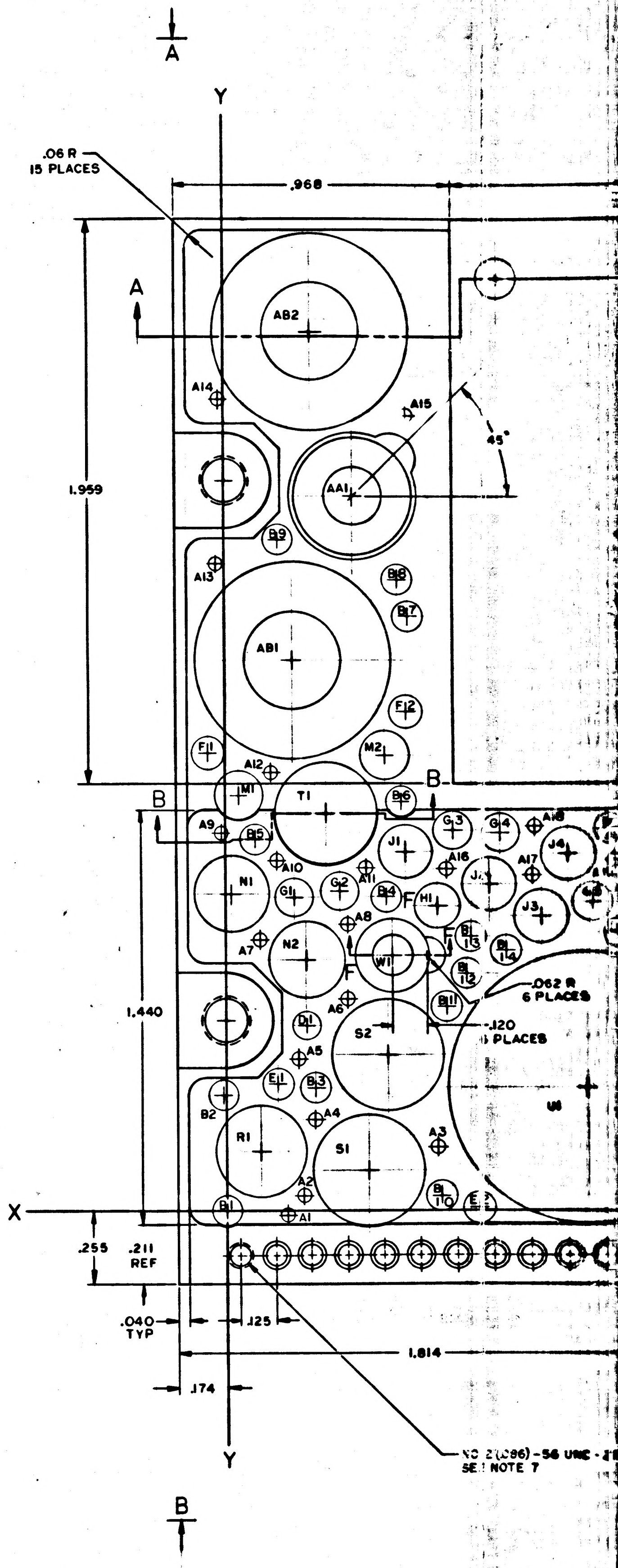
VIEW A – A


.680 DIA
1.550
REF
.622
AB2
.190
.170
.332 DIA
.555 DIA
1.032
1.100
.302
.308 DIA
.270
.276 DIA
.094
.125
.297
.328
V3
.250
.280
.125
.156
.14
DIA
.247
.253 DIA
.875
.115
.095 TYP
.600
TYP
.188
.213
.217 DIA
B .005

SECTION A – A


.09 R
4 PLACES
.062 TYP

VIEW B – B


A
Y
.06 R
15 PLACES
.968
1.959
A
AB2
A14
A15
45°
AA1
B9
A13
B8
AB1
B7
F12
F11
A12
M2
B
B
M1
T1
B6
A9
B5
A10
G3
G4
A16
J4
J1
N1
G1
G2
A11
B4
A17
H1
J3
A8
A7
N2
W1
F
B1
.062 R
6 PLACES
1.440
B11
D1
A6
S2
.120
PLACES
A5
B3
E1
A4
B2
R1
S1
A3
A2
B1
A1
X
.255
.211
REF
.040
TYP
.125
1.814
.174
Y
NO 2 (.086)-56 UNC
SEE NOTE 7
B

F-2

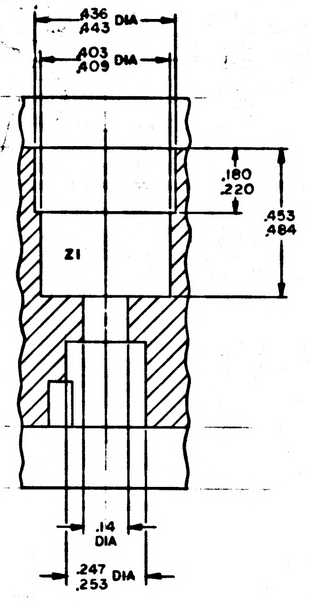
2008406

[illegible]

HOLE IDENT	X DIM.	Y D[illegible]	HOLE DIA	QTY
A1	.214	-.0[illegible]	.045/.049	45
A2	.270	.0[illegible]		
A3	.734	.2[illegible]		
A4	.313	.3[illegible]		
A5	.254	.5[illegible]4		
A6	.426	.7[illegible]4		
A7	.120	.9[illegible]0		
A8	.426	.9[illegible]4		
A9	-.014	1.3[illegible]		
A10	.180	1.2[illegible]		
A11	.490	1.1[illegible]		
A12	.160	1.5[illegible]0		
A13	-.030	2.2[illegible]6		
A14	-.020	2.[illegible]6		
A15	.636	2.[illegible]60		
A16	.768	1.[illegible]6		
A17	1.060	1.6[illegible]		
A18	1.070	1.3[illegible]5		
A19	1.340	1.2[illegible]5		
A20	1.616	1.[illegible]00		
A21	1.610	.[illegible]20		
A22	1.630	.[illegible]46		
A23	2.390	.010		
A24	2.364	.144		
A25	2.322	.420		
A26	3.362	.124		
A27	3.460	.000		
A28	3.660	-.020		
A29	3.430	.624		
A30	3.240	.836		
A31	3.160	.934		
A32	3.070	1.256		
A33	3.130	1.330		
A34	3.180	1.754		
A35	2.996	1.860		
A36	3.120	1.886		
A37	3.500	1.912		
A38	3.612	1.966		
A39	3.270	2.110		
A40	3.256	2.550		
A41	3.082	2.826		
A42	3.422	2.730		
A43	3.530	2.940		
A44	3.230	3.226		
A45	3.720	3.156		
B1	.000	.000	.100/.104	28
B2	-.010	.400		
B3	.312	.428		
B4	.560	1.090		
B5	.104	1.290		
B6	.614	1.420		
B7	.640	2.064		
B8	.604	2.190		
B9	.187	2.330		
B10	.747	.050		
B11	.766	.708		
B12	.834	.824		
B13	.850	.950		
B14	.970	.904		
B15	1.500	.912		
B16	1.326	1.326		
B17	1.456	1.326		
B18	2.212	.010		
B19	2.570	.010		
B20	3.474	.512		
B21	3.060	.970		
B22	3.724	.946		
B23	2.936	1.110		
B24	3.06[illegible]	1.150		
B25	3.402	1.454		
B26	3.240	1.614		
B27	3.122	1.666		
B28	3.530	1.740		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
B29	3.710	1.740	.100/.104	7
B30	3.424	1.824		
B31	3.600	1.852		
B32	3.324	2.344		
B33	3.434	2.432		
B34	3.270	2.656		
B35	3.530	2.796		
C1	1.576	1.296	.088/.092	17
C2	1.640	1.196		
C3	2.180	.360		
C4	2.320	.270		
C5	3.700	1.260		
C6	2.857	1.720		
C7	2.976	1.740		
C8	3.080	1.790		
C9	2.880	1.840		
C10	2.874	2.470		
C11	2.930	2.590		
C12	2.880	2.706		
C13	2.910	2.850		
C14	3.020	2.900		
C15	2.910	3.000		
C16	3.020	3.050		
C17	2.900	3.170		
D1	.284	.644	.093/.097	7
D2	1.350	.964		
D3	1.800	.476		
D4	3.560	.884		
D5	3.296	1.944		
D6	3.720	1.920		
D7	3.232	2.444		
E1	.180	.440	.106/.110	6
E2	.875	.010		
E3	3.610	1.004		
E4	3.720	2.070		
E5	3.045	2.350		
E6	3.670	2.840		
F1	-.060	1.588	.112/.116	3
F2	.630	1.732		
F3	2.896	.982		
G1	.240	1.086	.127/.131	13
G2	.400	1.110		
G3	.790	1.320		
G4	.950	1.310		
G5	1.264	1.070		
G6	2.870	1.230		
G7	3.710	1.110		
G8	3.220	1.440		
G9	3.284	1.890		
G10	3.710	2.220		
G11	3.080	2.450		
G12	3.670	3.000		
G13	3.310	.014		
H1	.736	1.056	.153/.157	5
H2	3.400	1.620		
H3	3.160	2.030		
H4	3.200	2.240		
H5	3.420	2.590		

HOLE IDENT	X DIM.	Y DIM.	HOLE DIA	QTY
H6	3.120	3.156	.153/.157	3
H7	3.340	3.156		
H8	3.560	3.156		
J1	.626	1.246	.181/.185	4
J2	.914	1.132		
J3	1.092	1.022		
J4	1.184	1.238		
K1	3.407	.800	.202/.206	4
K2	2.930	2.010		
K3	2.940	2.300		
K4	3.080	2.670		
L1	1.474	1.106	.227/.231	1
M1	.046	1.440	.165/.169	2
M2	.556	1.580		
N1	.020	1.100	.255/.262	2
N2	.280	.870		
P1	2.670	1.280	.220/.224	1
Q1	2.694	1.016	.241/.245	1
R1	.120	.204	.310/.317	2
R2	3.632	1.490		
S1	.494	.140	.373/.380	2
S2	.564	.540		
T1	.350	1.380	.346/.353	1
U1	1.244	.426	.936/.943	2
U2	2.930	.436		
V1	2.960	1.500	SEE SECTION A-A	3
V2	3.480	2.130		
V3	3.300	2.890		
W1	.580	.886	SEE SECTION F-F	1
Y1	3.634	.256	SEE SECTION E-E	1
Z1	3.356	1.164	SEE SECTION G-G	1
AA1	.450	2.480	SEE SECTION D-D	2
AA2	1.920	.176		
AB1	.236	1.910	SEE SECTION A-A	2
AB2	.306	3.054		
AC1	2.130	.914	SEE SECTION C-C	1



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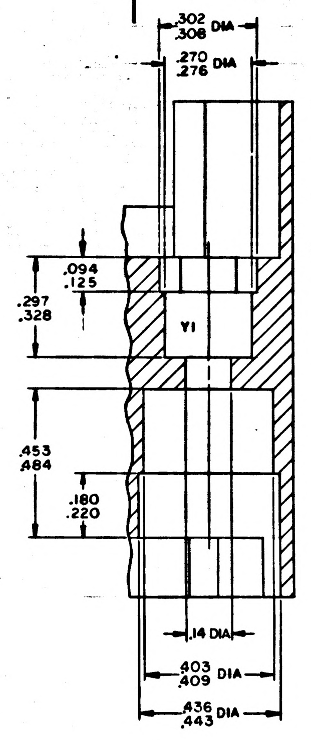

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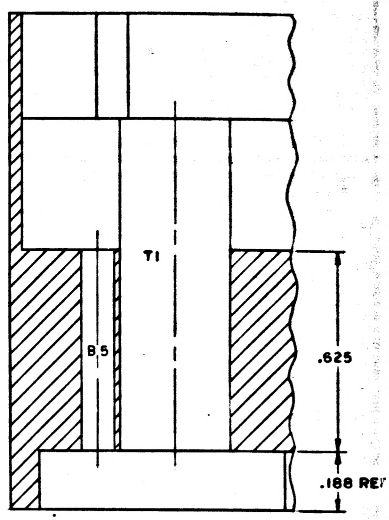

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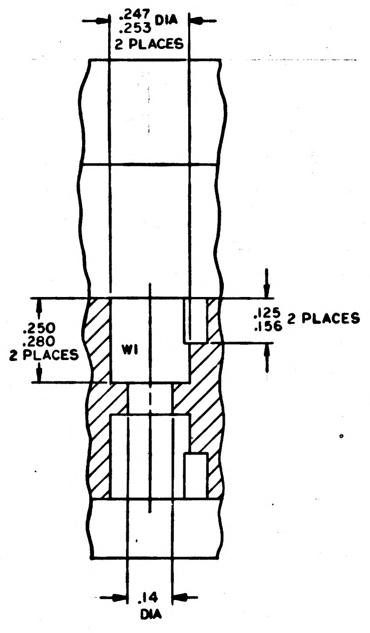
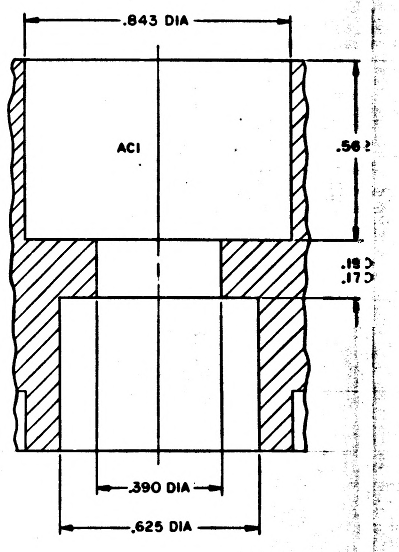
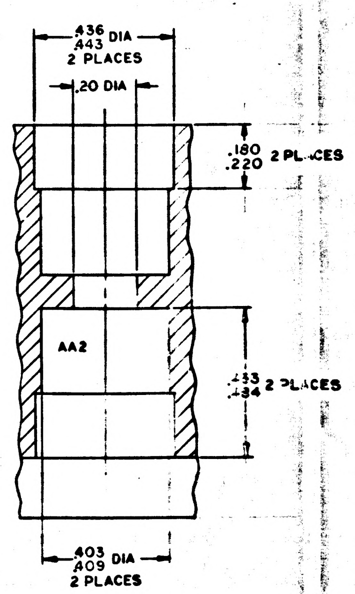


PARTIAL SECTION F-F



PARTIAL SECTION C-C

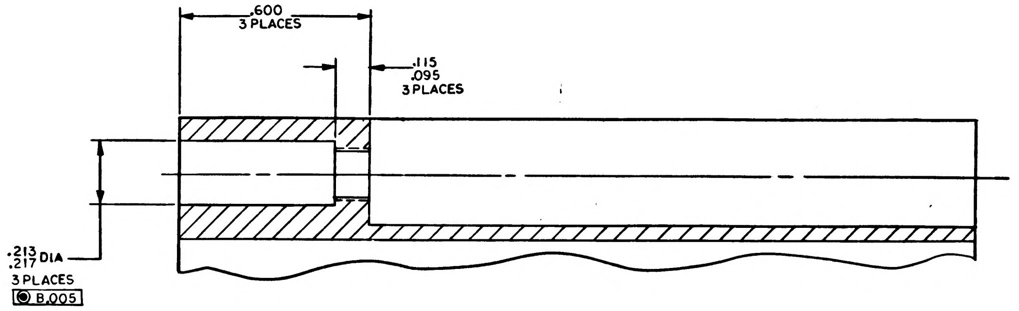


PARTIAL SECTION D-D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6-AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES .125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: APPLY CHEMICAL FILM PER MIL-C-5541 GRADE C, CLASS 2
7. HOLE TO BE FREE OF CHROMATE. TREAT PER ND1002040. DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019
9. COAT SURFACE -B- PER ND1002187 TYPE II

F-1

D


.600
3 PLACES
.115
.095
3 PLACES
.213
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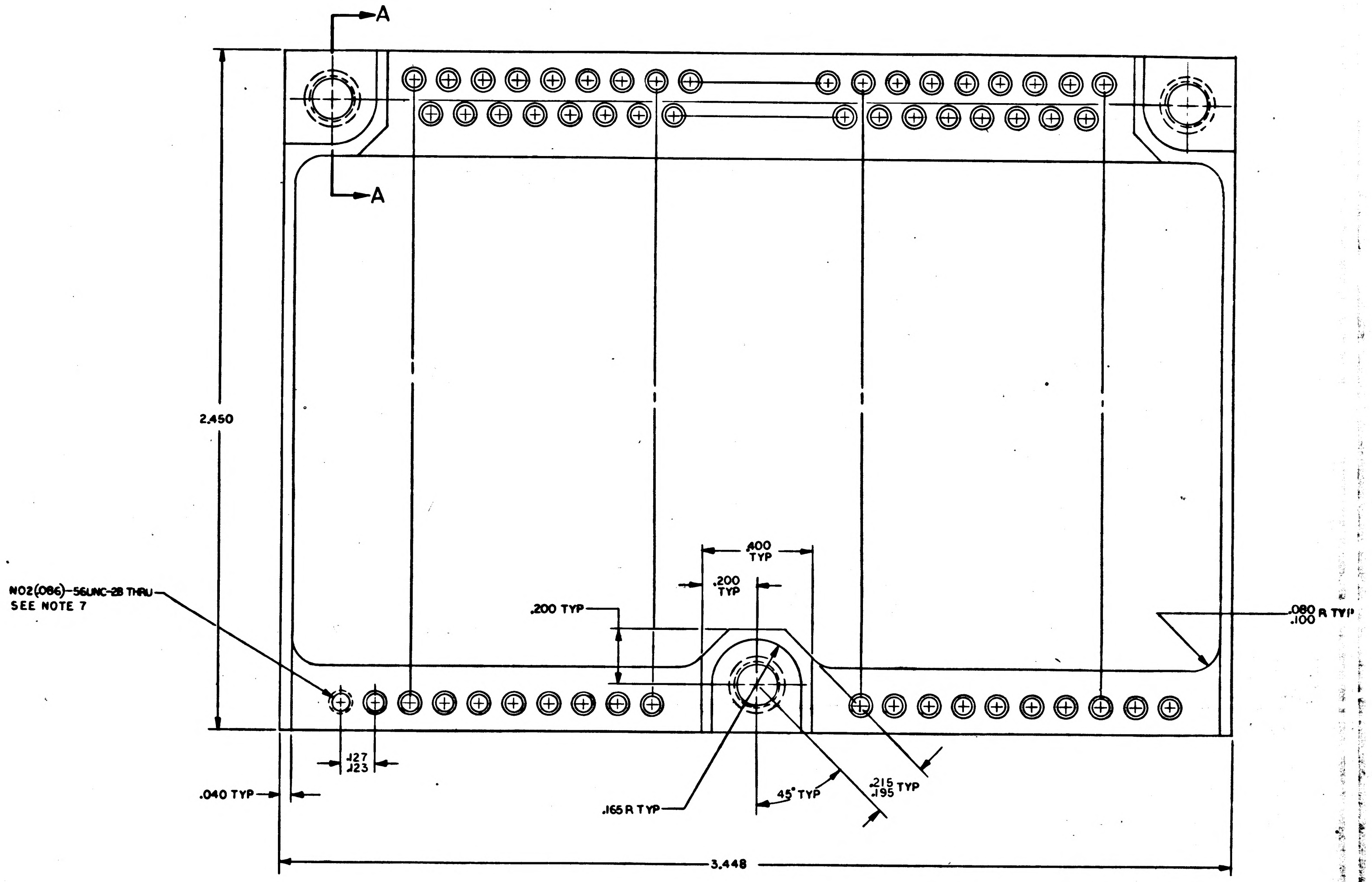
3 PLACES
◉ B .005

SECTION A-A


A
A
2.450
.400
TYP
.200
TYP
.200 TYP
N02(086)-56UNC-2B THRU
SEE NOTE 7
.080
.100 R TYP
.127
.123
.040 TYP
.165 R TYP
45° TYP
.215
.195 TYP
3.448

C

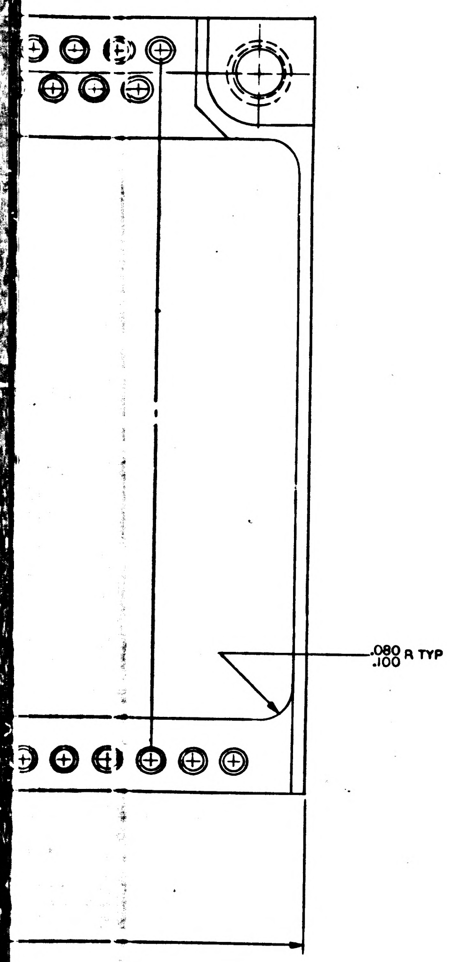
B

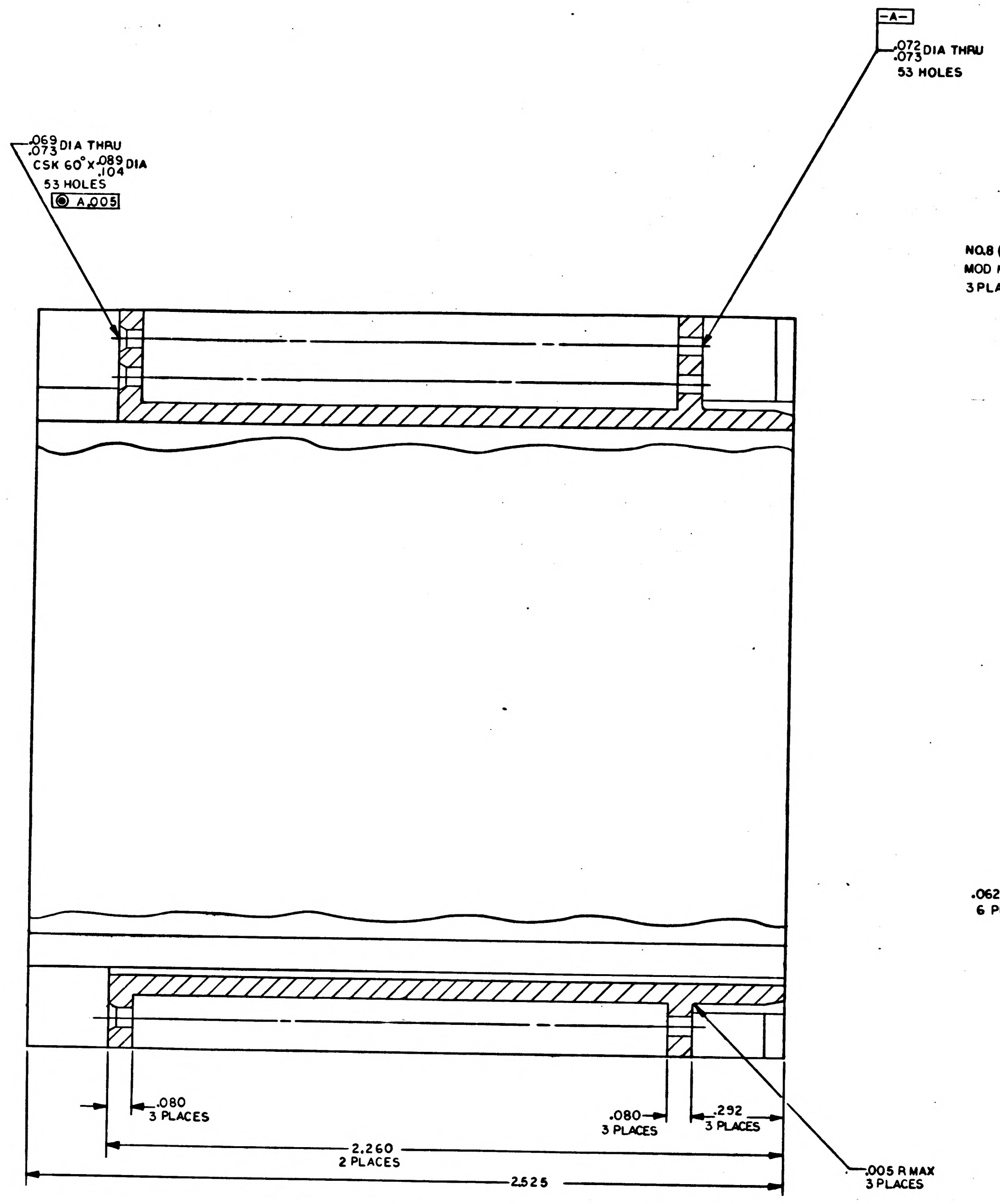
3 H

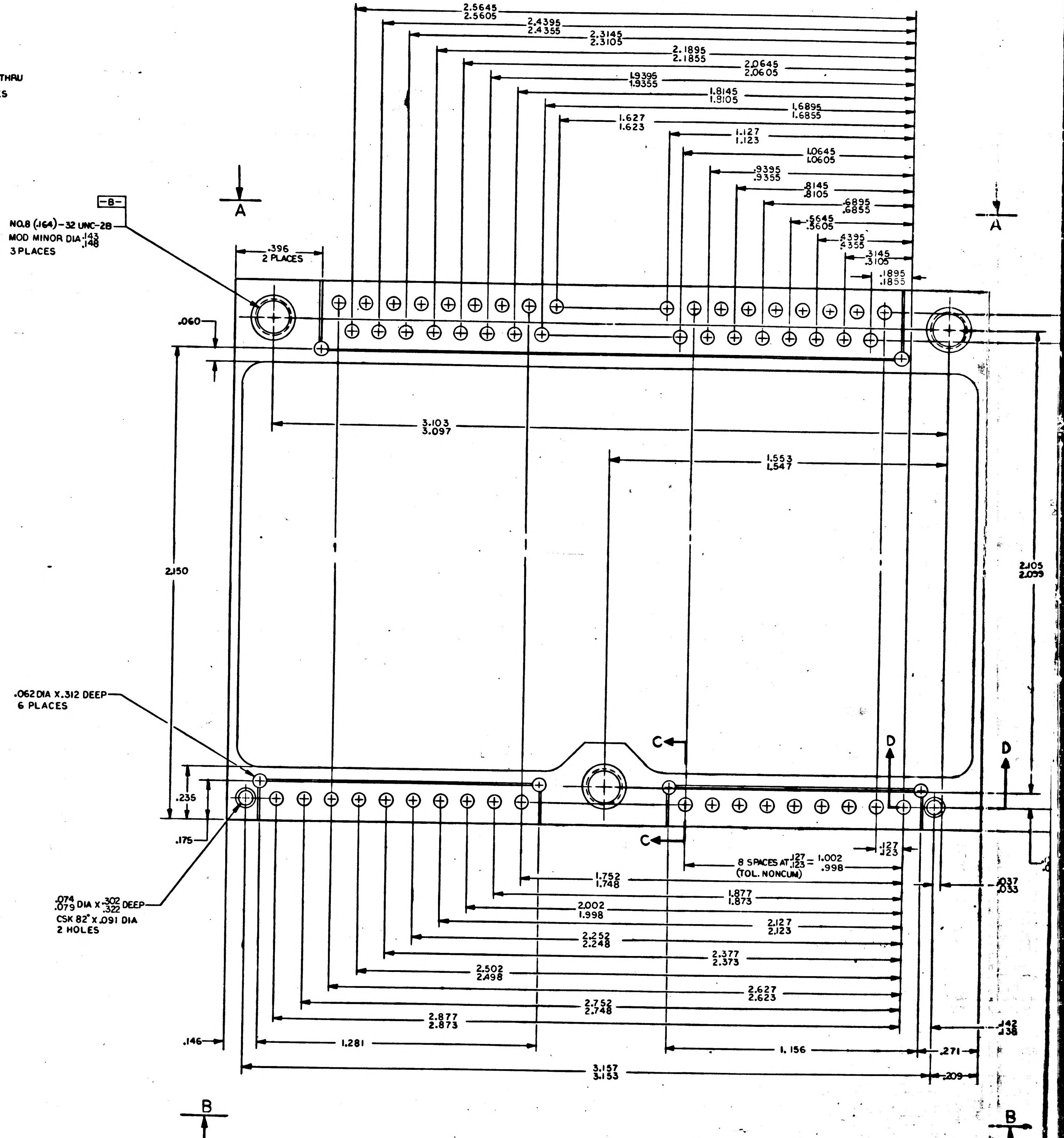
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE, COAT PER ND 1002040 DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND 1002019

A

2008408	A


.080
.100 R TYP


-A-
.072
.073 DIA THRU
53 HOLES
.069
.073 DIA THRU
CSK 60° X .089
.104 DIA
53 HOLES
◎ A .005
.080
3 PLACES
.080
3 PLACES
.292
3 PLACES
2.260
2 PLACES
2.525
.005 R MAX
3 PLACES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2.0605
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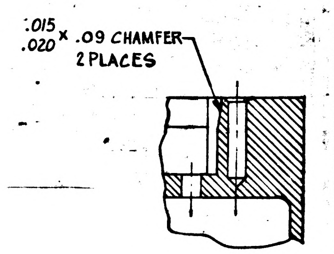
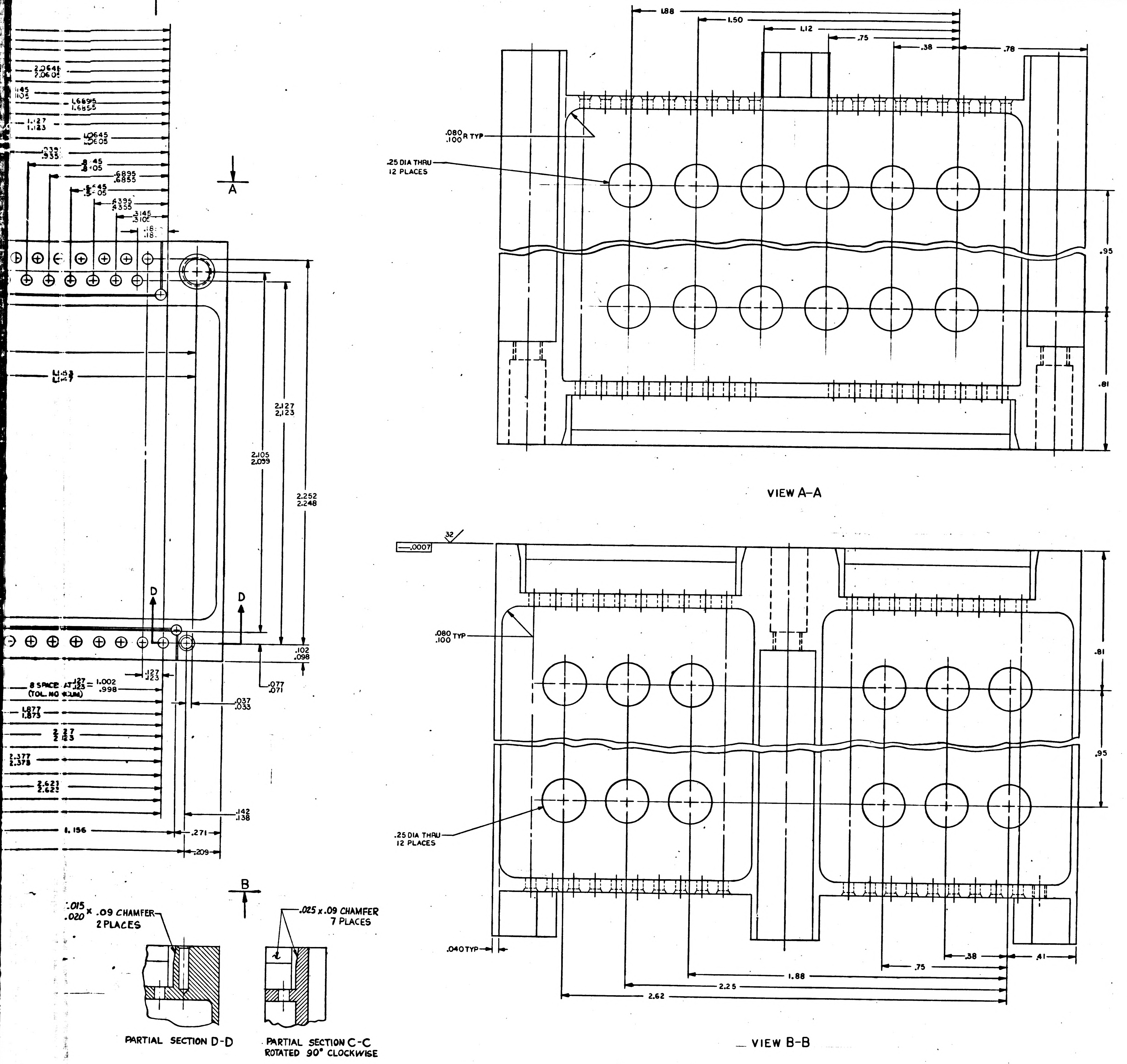
1.9355
1.8145
1.8105
1.6895
1.6855
1.627
1.623
1.127
1.123
1.0645
1.0605
.9395
.9355
.8145
.8105
.6895
.6855
.5645
.5605
.4395
.4355
.3145
.3105
.1895
.1855
A
A
-B-
NO.8 (.164)-32 UNC-2B
MOD MINOR DIA .143
.148
3 PLACES
.396
2 PLACES
.060
3.103
3.097
1.553
1.547
2.150
2.105
2.099
.062 DIA X .312 DEEP
6 PLACES
C
C
D
D
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° X .091 DIA
2 HOLES
.127
.123
8 SPACES AT .127
.123 = 1.002
.998
(TOL. NONCUM)
.037
.033
1.752
1.748
1.877
1.873
2.002
1.998
2.127
2.123
2.252
2.248
2.377
2.373
2.502
2.498
2.627
2.623
2.752
2.748
2.877
2.873
.146
1.281
1.156
.271
.142
.138
3.157
3.153
.209
B
B


.015
.020 X .09 CHAMFER
2 PLACES

PARTIAL SECTION D-D

REVISIONS 29255						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 32432	AF	DPW	9-1-67	



4
3
2
1
D
C
B
A
1.88
1.50
1.12
.75
.38
.78
.080
.100 R TYP
.25 DIA THRU
12 PLACES
.95
.81
VIEW A-A
32
.0007
.080
.100 TYP
.25 DIA THRU
12 PLACES
.040 TYP
.41
2.25
2.62
VIEW B-B
A
D
B
2.127
2.123
2.105
2.099
2.252
2.248
.102
.098
.127
.123
8 SPACE AT .125 = 1.002
.998
(TOL. NO ACUM)
.077
.071
.037
.033
1.877
1.873
2.377
2.373
2.621
2.625
.142
.138
1.156
.271
.209
.015
.020 x .09 CHAMFER
2 PLACES
.025 x .09 CHAMFER
7 PLACES
PARTIAL SECTION D-D
PARTIAL SECTION C-C
ROTATED 90° CLOCKWISE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007239	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN L. Graham 4 May 66
CHECKED Bonarrigo 12 May 66
APPROVED R. Moser 13 May 66
APPROVED DW Jones May 66
APPROVED MIT W 6 Marley 6-1-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

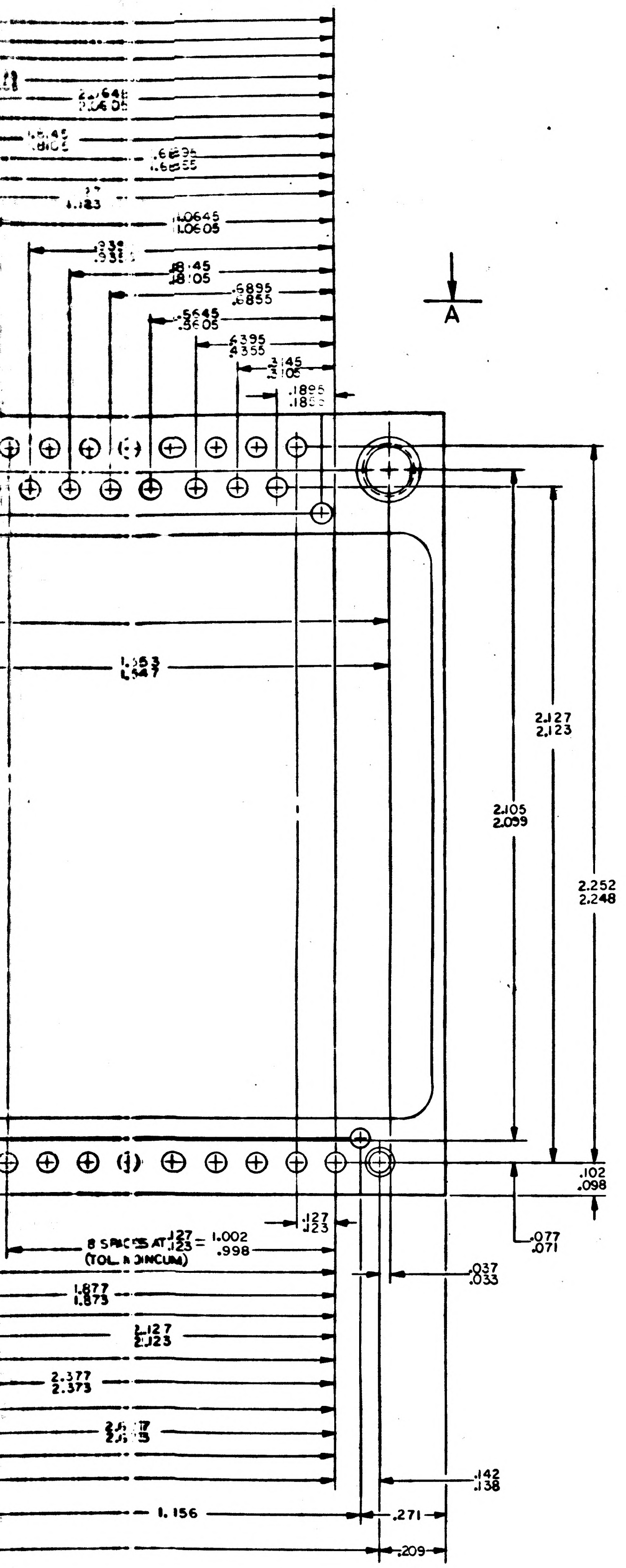
FRAME
TORQUE MOTOR & 1 X SINE
GIMBAL RESOLVER
SIGNAL CONDITIONER

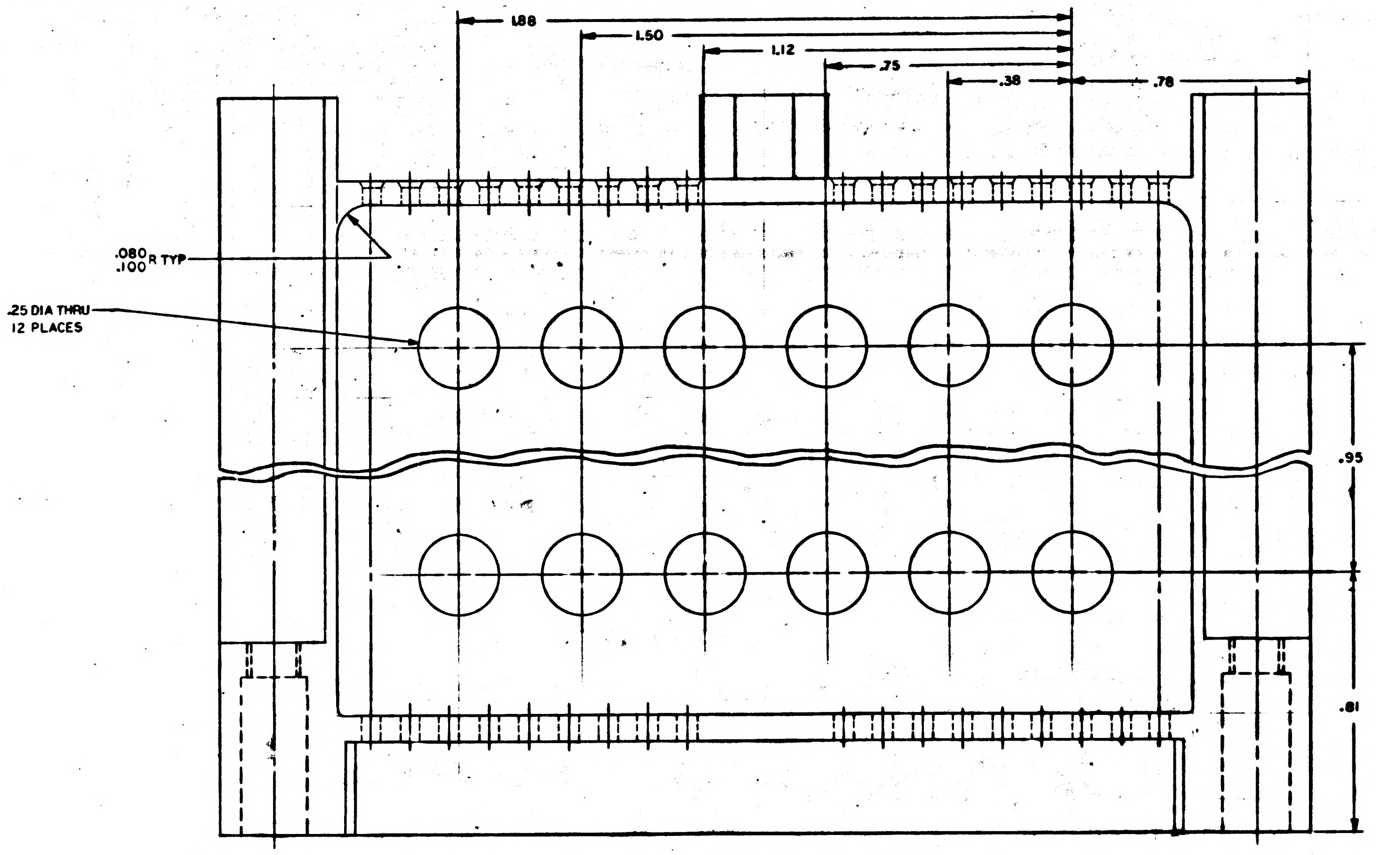
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008408
SCALE 5/1		SHEET 1 OF 1

2008408 A

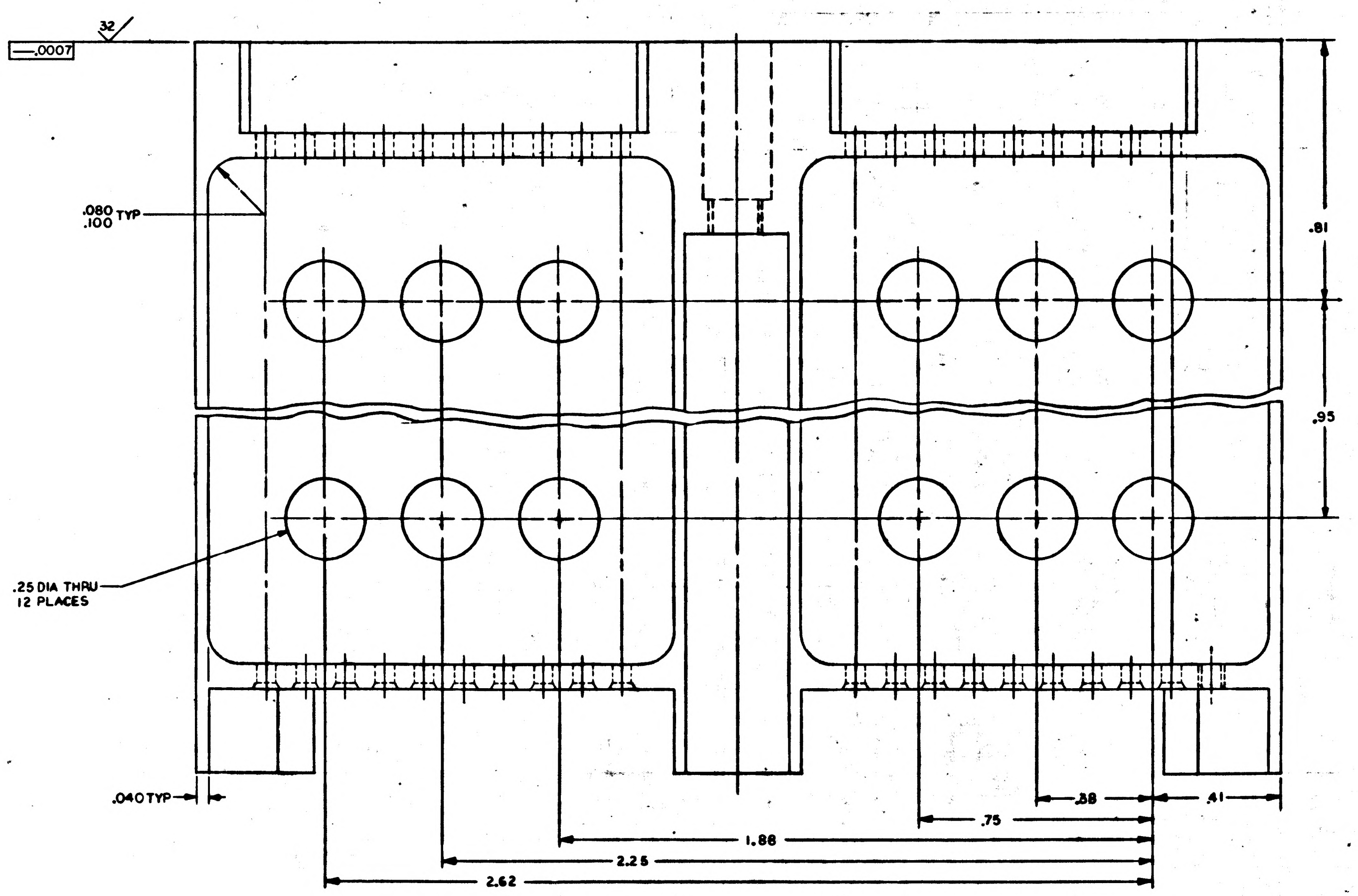
3/2008408

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISIONS 29255				


A
2.0645
2.0605
1.8145
1.8105
1.6895
1.6855
1.183
1.0645
1.0605
.9395
.9355
.8145
.8105
.6895
.6855
.5645
.5605
.4395
.4355
.3145
.3105
.1895
.1855
1.153
1.147
2.127
2.123
2.105
2.099
2.252
2.248
.102
.098
.077
.071
8 SPACES AT .127/.123 = 1.002/.998
(TOL NONCUM)
.127
.123
.037
.033
1.877
1.873
2.127
2.123
2.377
2.373
.142
.138
1.156
.271
.209
B


1.88
1.50
1.12
.75
.38
.78
.080
.100 R TYP
.25 DIA THRU
12 PLACES
.95
.81

VIEW A-A


32
.0007
.080
.100 TYP
.81
.95
.25 DIA THRU
12 PLACES
.040 TYP
.75
.38
.41
1.88
2.25
2.62

VIEW B-B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XXX ± .005 .XX ± .02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007239	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN L. Gotham
CHECKED Benarrigo 12 May 66
APPROVED 18 May 66
APPROVED May 66
APPROVED MIT 6-1-66
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

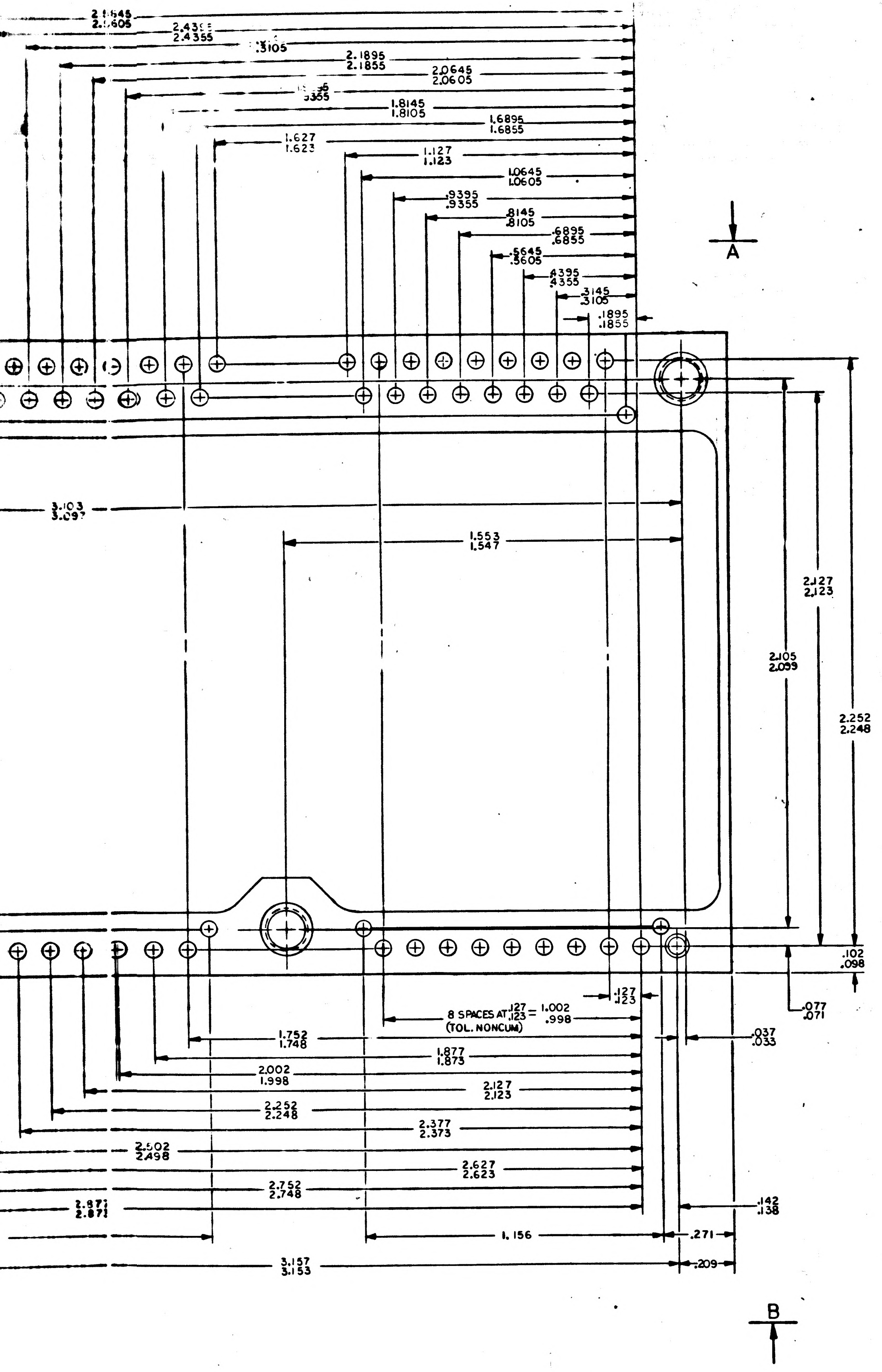
FRAME
TORQUE MOTOR & 1 X SINE GIMBAL RESOLVER SIGNAL CONDITIONER

CODE IDENT NO	SIZE	DRAWING NO.
80230	J	2008408

SCALE 5/1
SHEET 1 OF 1

MASTER

2008408



2.1645
2.1605
2.4395
2.4355
.3105
2.1895
2.1855
2.0645
2.0605
.9355
1.8145
1.8105
1.6895
1.6855
1.627
1.623
1.127
1.123
1.0645
1.0605
.9395
.9355
.8145
.8105
.6895
.6855
.5645
.5605
.4395
.4355
.3145
.3105
.1895
.1855
A
3.103
3.097
1.553
1.547
2.127
2.123
2.105
2.099
2.252
2.248
.102
.098
.077
.071
8 SPACES AT .127/.123 = 1.002/.998
(TOL. NONCUM)
.127
.123
.037
.033
1.752
1.748
1.877
1.873
2.002
1.998
2.127
2.123
2.252
2.248
2.377
2.373
2.502
2.498
2.627
2.623
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.142
.138
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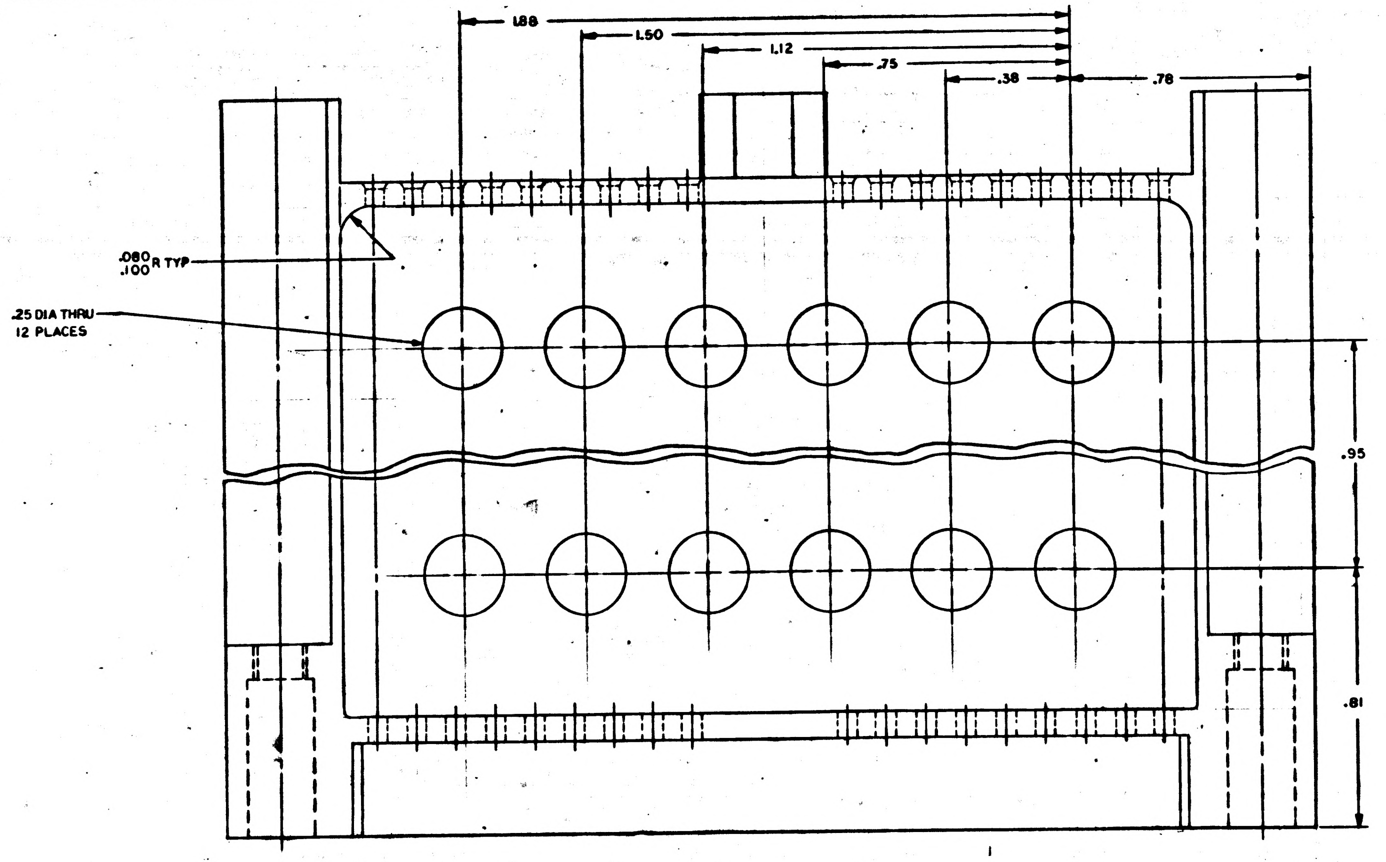
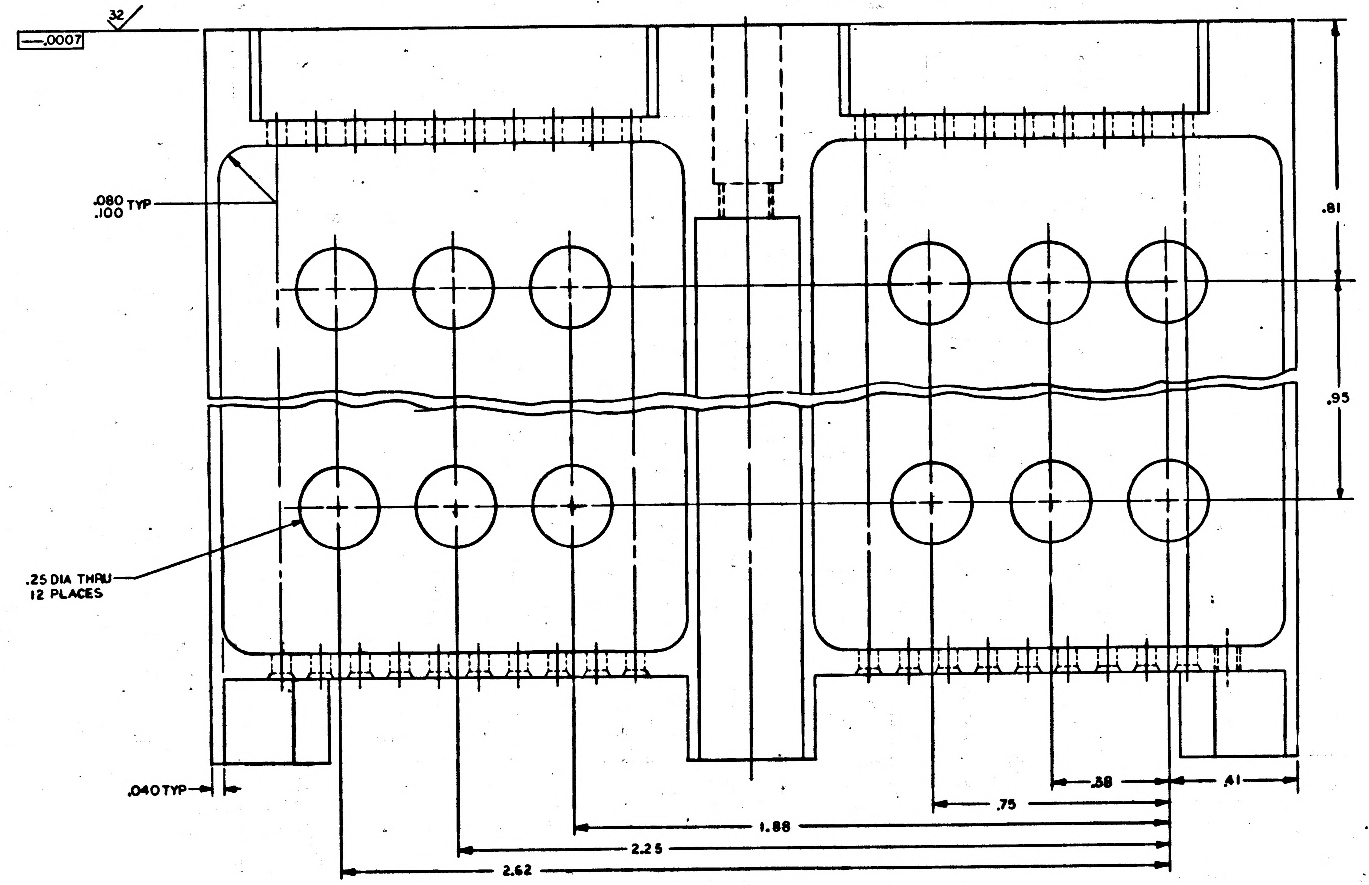
.271
3.157
3.153
.209
B



1.88
1.50
1.12
.75
.38
.78
.080
.100 R TYP
.25 DIA THRU
12 PLACES
.95
.81

VIEW A–A



32
.0007
.080
.100 TYP
.81
.95
.25 DIA THRU
12 PLACES
.040 TYP
.38
.41
.75
1.88
2.25
2.62

VIEW B–B

QTY REQD	PART OR IDENTIFYING NO.	NOMEN DESC

OF MATERIALS

2007239	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XXX ± .005 ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACEC

DRAWN 12 May 66
CHECKED 12 May 66
APPROVED 18 May 66
APPROVED May 66
APPROVED MIT 6-1-66
APPROVED MSC
DATE

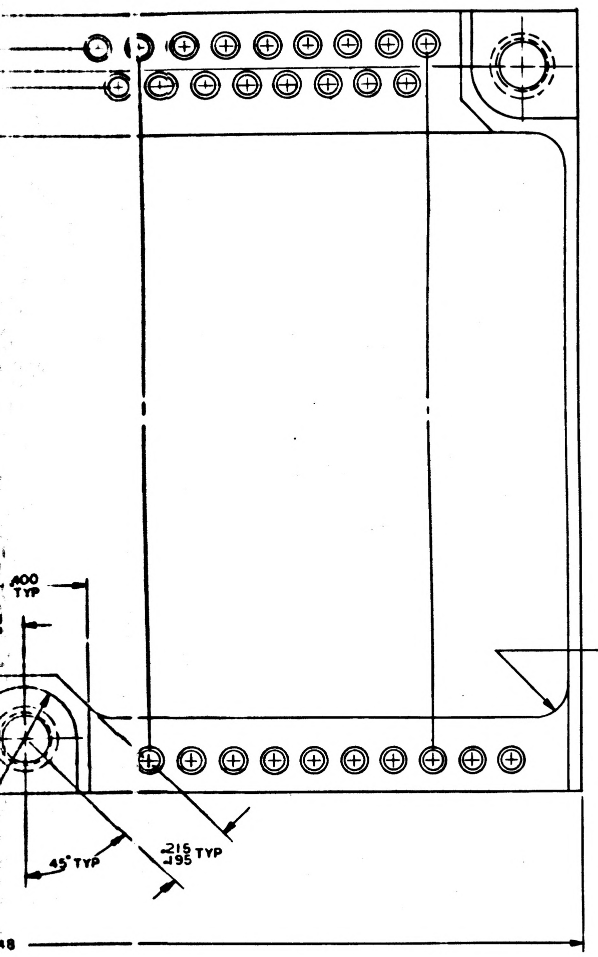
TOR
gi

CODE IDENT NO 80230
SIZE
SCALE 4/1

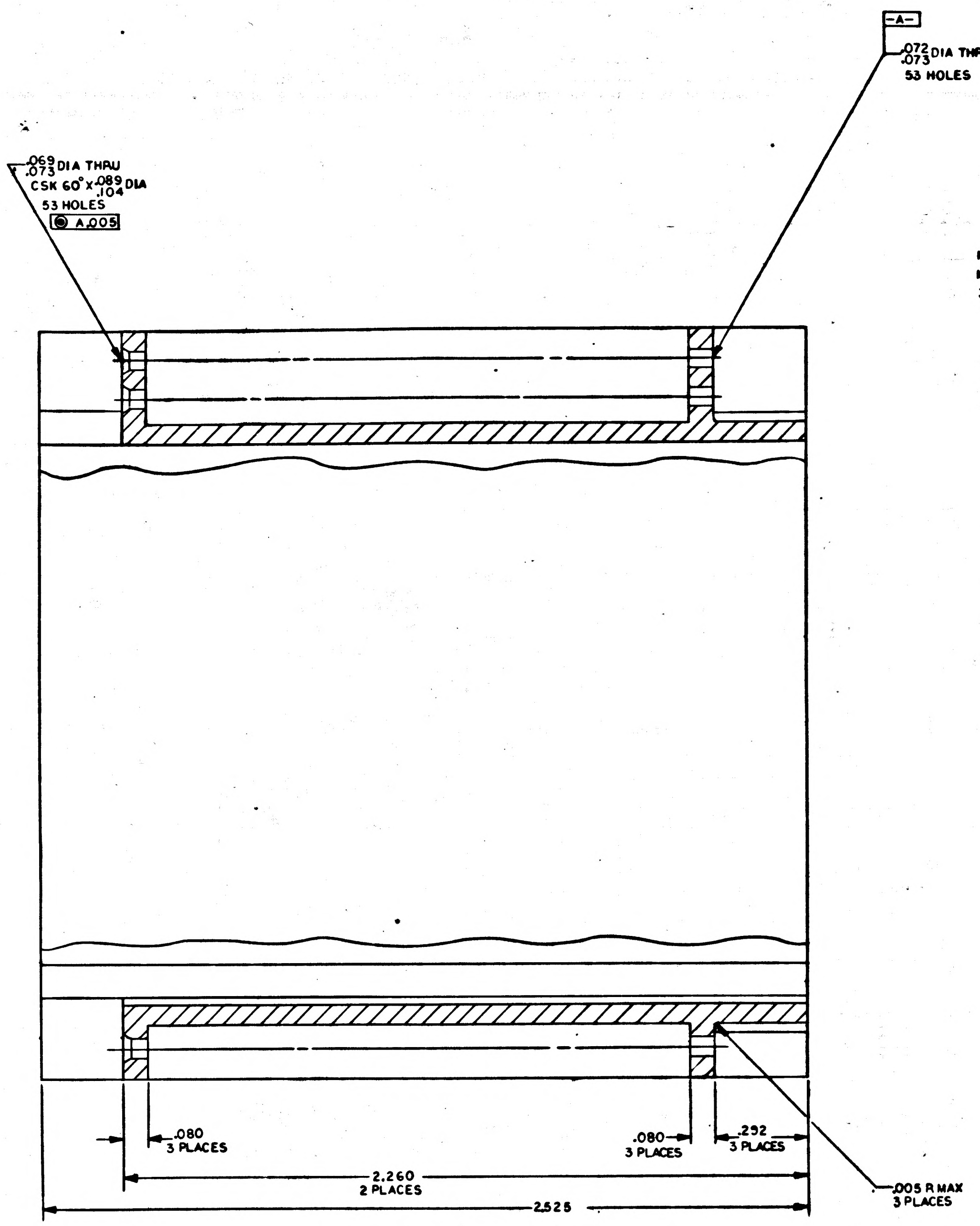
MASTER

2008408

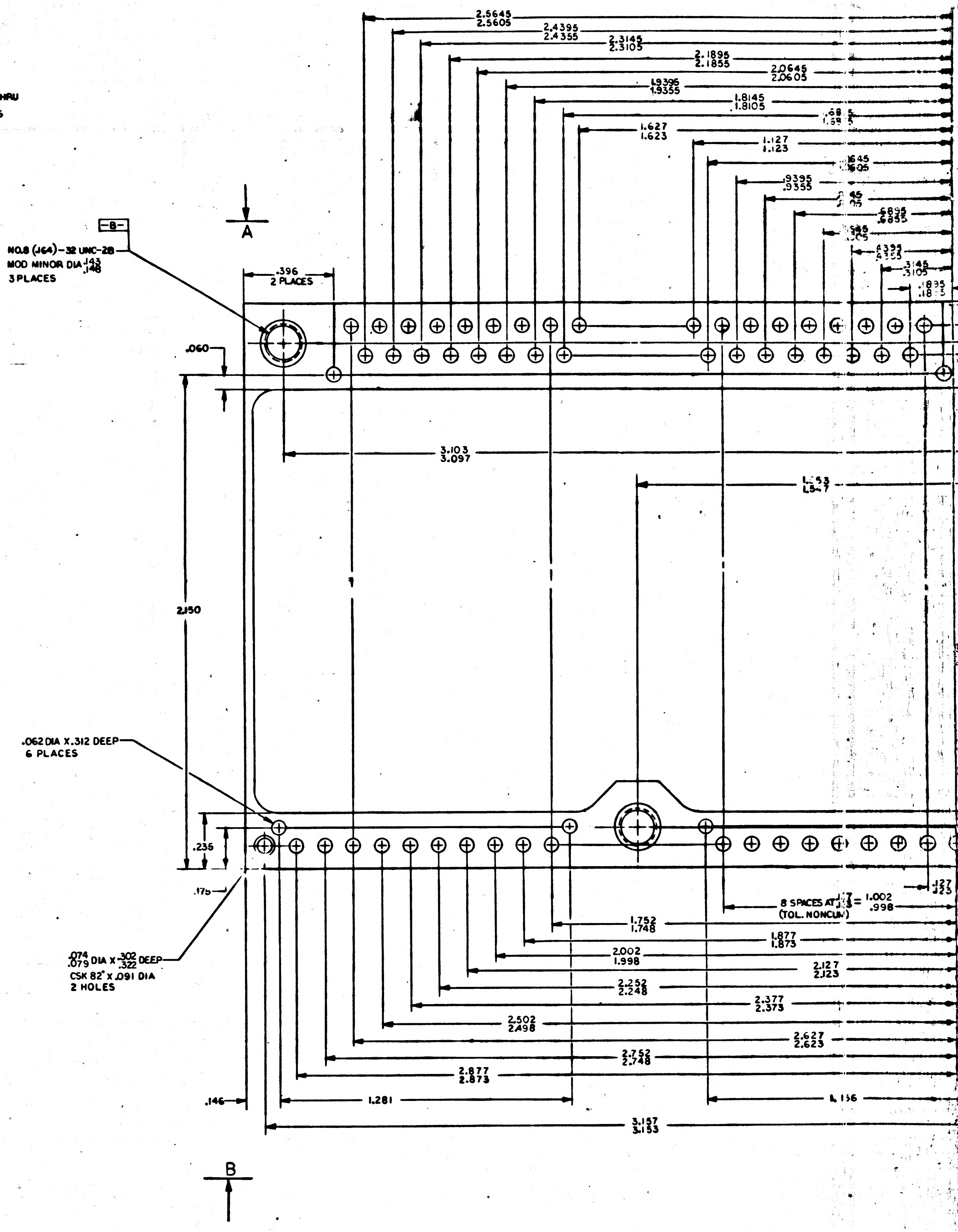
F-3



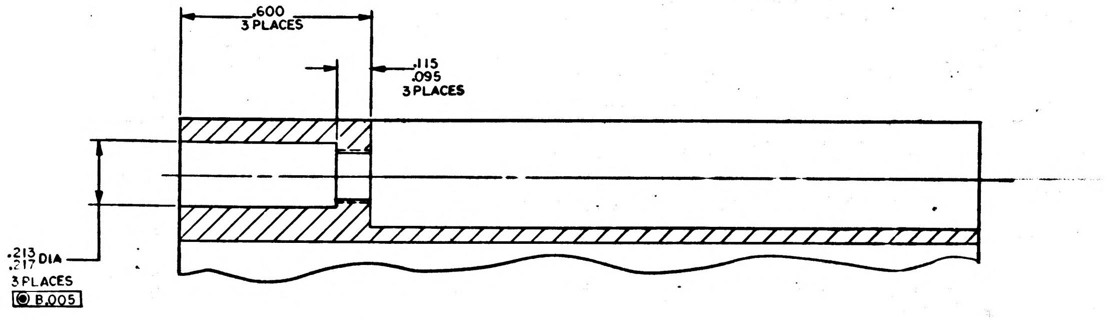
.400 TYP
.080 .100 R TYP
45° TYP
.215 .195 TYP



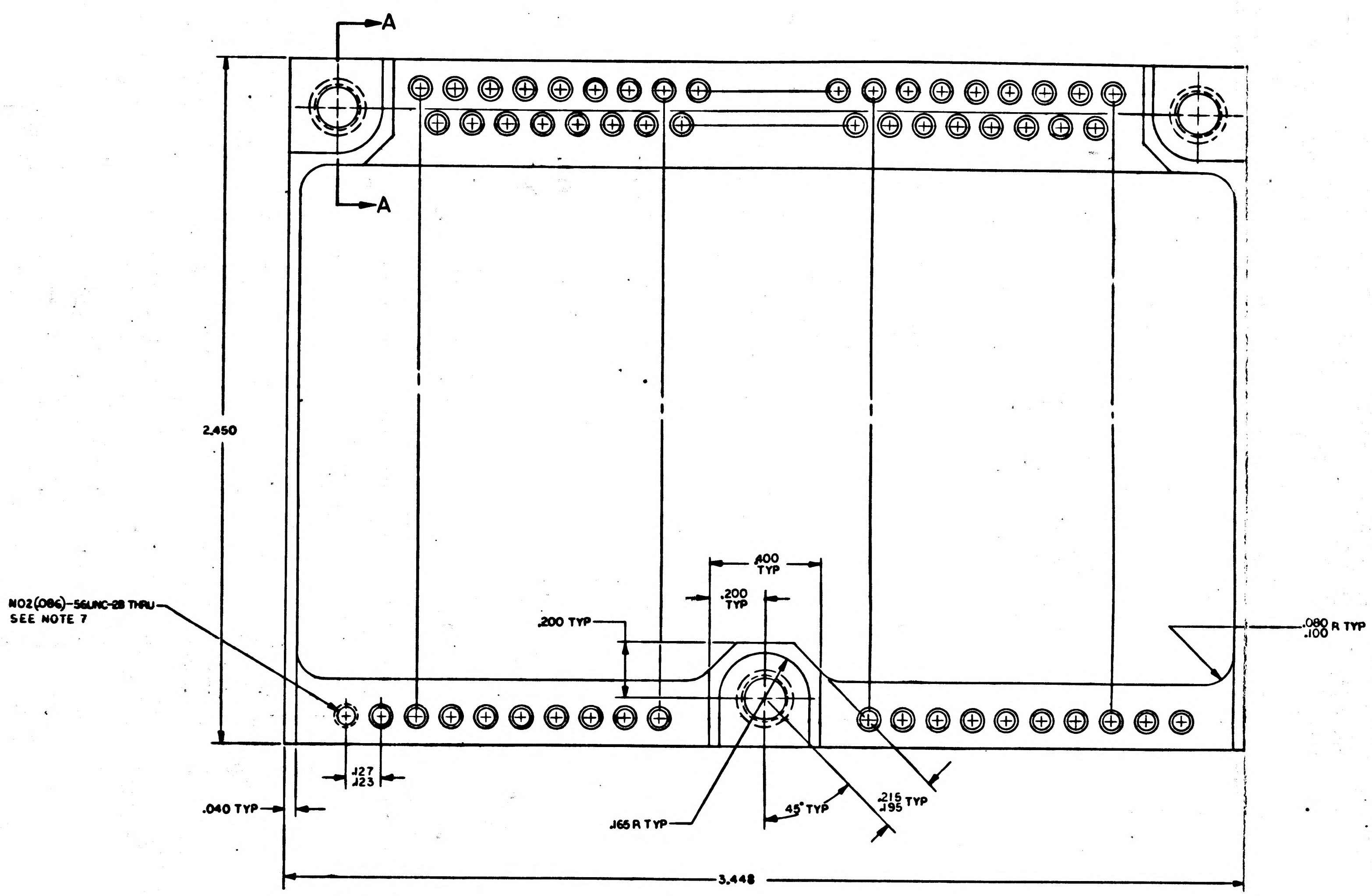
-A-
.072 .073 DIA THRU 53 HOLES
.069 .073 DIA THRU CSK 60° X .089 .104 DIA 53 HOLES
⊚ A .005
.080 3 PLACES
.080 3 PLACES
.292 3 PLACES
2.260 2 PLACES
2.525
.005 R MAX 3 PLACES



A
-B-
NO.8 (.164)-32 UNC-2B MOD MINOR DIA .143 .148 3 PLACES
.396 2 PLACES
.060
3.103 3.097
2.150
1.553 1.547
.062 DIA X .312 DEEP 6 PLACES
.236
.175
.074 .079 DIA X .302 .322 DEEP CSK 82° X .091 DIA 2 HOLES
.146
1.281
3.157 3.153
1.156
2.5645 2.5605
2.4395 2.4355
2.3145 2.3105
2.1895 2.1855
2.0645 2.0605
1.9395 1.9355
1.8145 1.8105
1.627 1.623
1.127 1.123
.9395 .9355
8 SPACES AT .127 .123 = 1.002 .998 (TOL. NONCUM)
1.752 1.748
1.877 1.873
2.002 1.998
2.127 2.123
2.252 2.248
2.377 2.373
2.502 2.498
2.627 2.623
2.752 2.748
2.877 2.873
B


.600
3 PLACES
.115
.095
3 PLACES
.213
.217 DIA
3 PLACES
◎ B.005

SECTION A-A


A
A
2.450
NO2(.086)-56UNC-2B THRU
SEE NOTE 7
.400
TYP
.200
TYP
.200 TYP
.080
.100 R TYP
.127
.123
.040 TYP
.165 R TYP
45° TYP
.215
.195 TYP
3.448

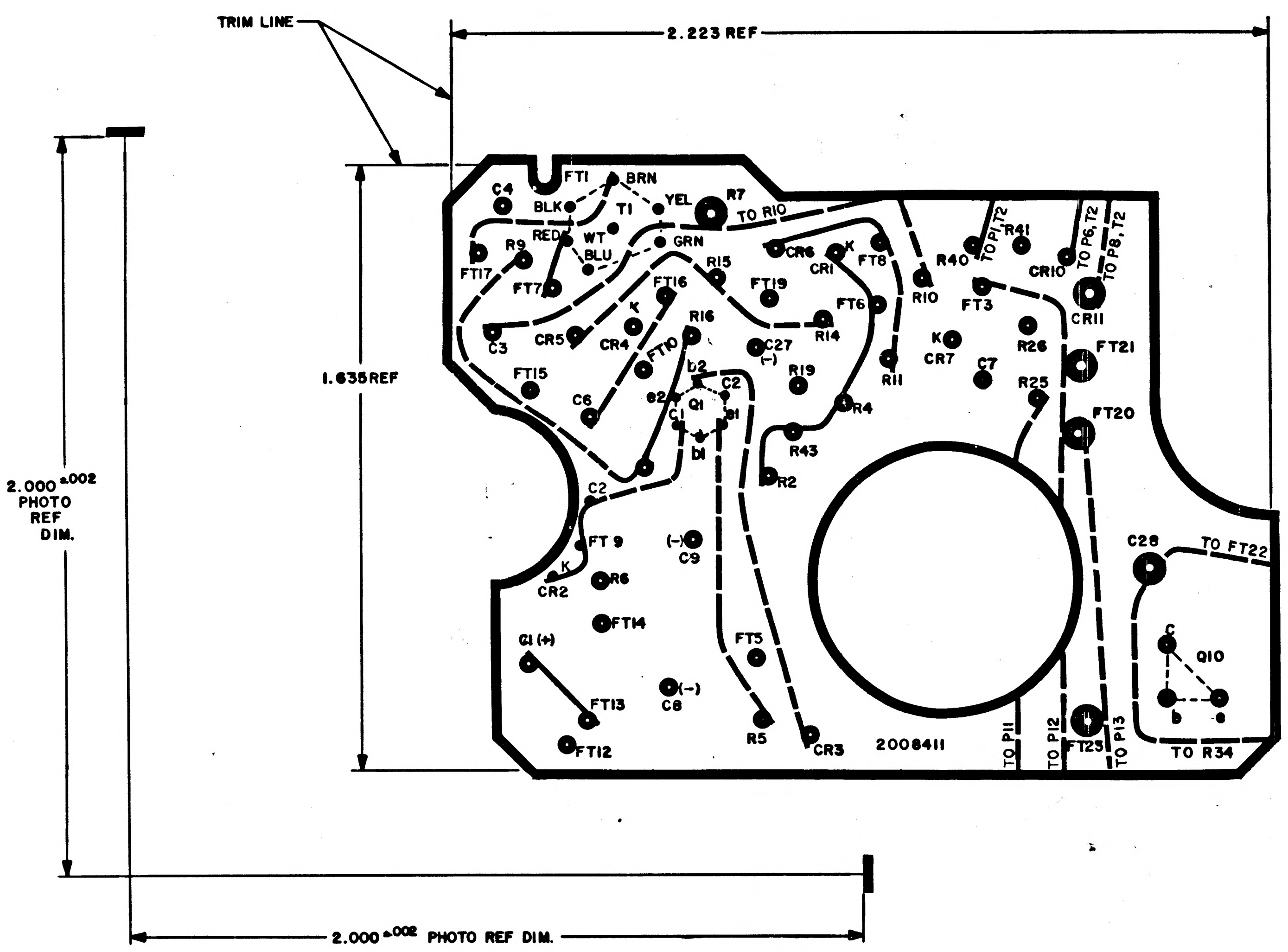
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. REMOVE BURRS AND SHARP EDGES .005/.015
4. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE, COAT PER ND 1002040 DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27187

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TRIM LINE
2.223 REF
1.635REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
C4
FT1
BRN
BLK
T1
YEL
R7
TO R10
R9
RED
WT
BLU
GRN
FT17
FT7
R15
CR6
K
CR1
FT8
R40
TO P1,T2
R41
CR10
TO P6,T2
TO P8,T2
FT16
FT19
FT6
R10
FT3
CR11
K
R16
R14
K
CR7
R26
FT21
C3
CR5
CR4
FT10
C27
(-)
R19
R11
C7
b2
C2
FT15
C6
e2
Q1
C1
e1
R4
R25
FT20
b1
R43
C2
R2
C28
TO FT22
FT 9
(-)
C9
K
CR2
R6
FT14
C1(+)
FT5
Q10
c
b
e
FT13
(-)
C8
R5
CR3
2008411
TO P11
TO P12
FT23
TO P13
TO R34
FT12

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN.
4. CUT TO WITHIN .010 OF TRIM LINE.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±— ANGLES ±—
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W.HORGAN A.A. 24 Feb 66
CHECKED R.L. Kingsbury 9 Mar 66
APPROVED 14 Mar 66
APPROVED
APPROVED MIT W. Crofer 15 Mar 66
A.E. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
PULSE TORQUE POWER SUPPLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008410

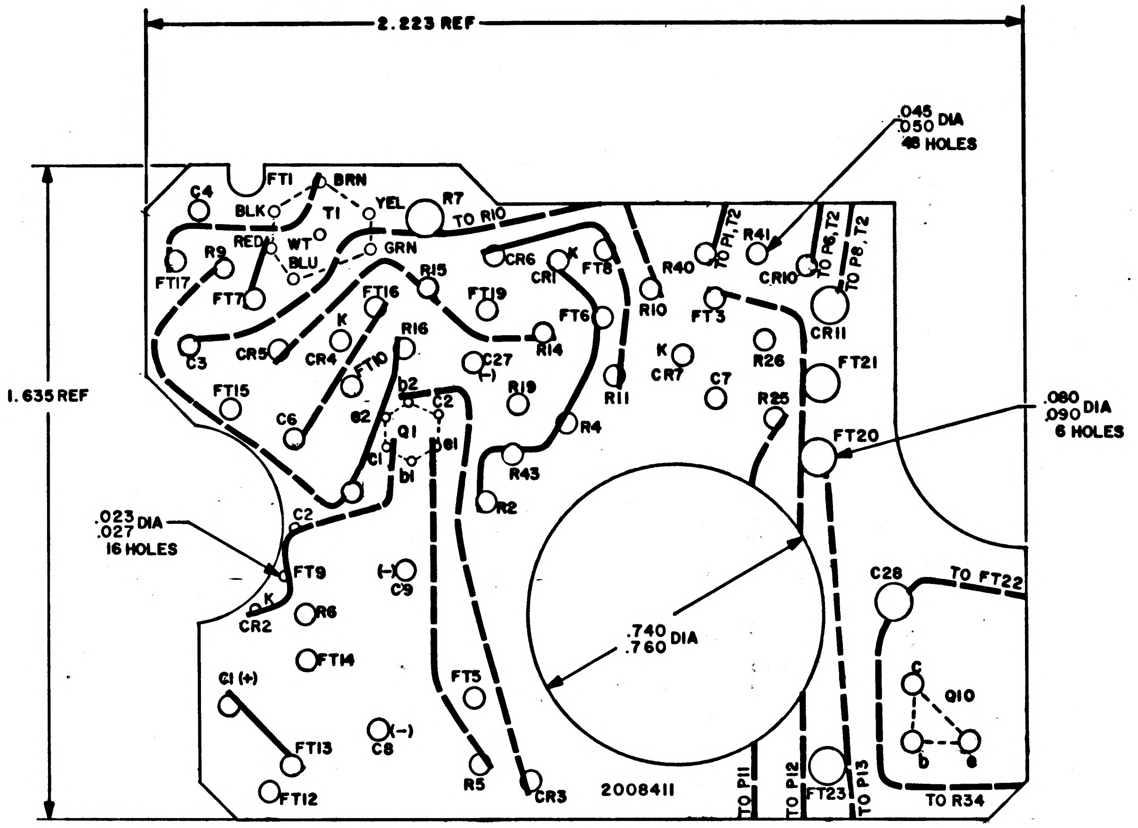
SCALE 5/1
SHEET 1 OF 1

2008410

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 271F7

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2.223 REF
1.635 REF
.045 .050 DIA 48 HOLES
.080 .090 DIA 6 HOLES
.023 .027 DIA 16 HOLES
.740 .760 DIA
FT1
BRN
C4
BLK
T1
YEL
R7
TO R10
RED
WT
GRN
BLU
R9
FT17
FT7
CR6
K
CR1
FT8
R40
TO P1, T2
R41
CR10
TO P6, T2
TO P8, T2
R15
FT16
FT19
FT6
R10
FT3
CR11
K
R16
CR5
CR4
C3
C27
(-)
R14
R11
K
CR7
R26
FT21
FT10
FT15
b2
C2
e2
Q1
e1
c1
b1
C6
R19
R4
C7
R25
FT20
R43
R2
C2
FT9
K
CR2
R6
(-)
C9
C28
TO FT22
FT14
C1 (+)
FT5
C
Q10
b
e
FT13
(-)
C8
R5
CR3
2008411
TO P11
TO P12
FT23
TO P13
TO R34
FT12

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

REF:
DRAWING NO. 2008410 FOR
PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007166	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. HORGAN A.A. 23 Feb 66
CHECKED R.P. Kingsbury 9 Mar 66
APPROVED 14 Mar 66
APPROVED
APPROVED MIT 15 Mar 66
APPROVED MSC A.C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

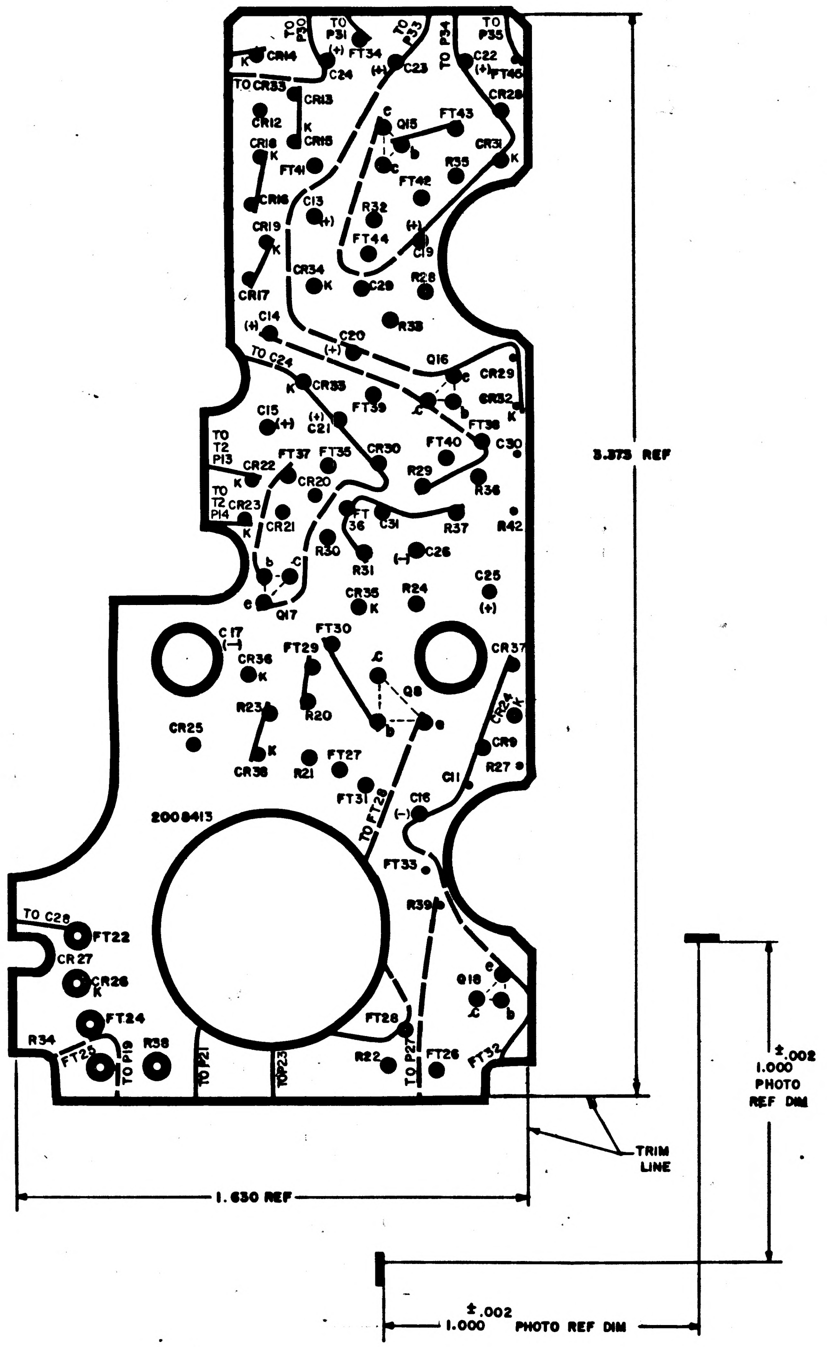
WIRING BOARD A
PULSE TORQUE POWER SUPPLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008411
SCALE 5/1		SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27187

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TO P30
TO P31
TO P33
TO P34
TO P35
CR14
K
(+)
FT34
C24
(+)
C23
C22
(+)
FT46
TO CR33
CR13
CR12
K
CR15
CR28
C
Q15
FT43
b
c
CR31
K
CR18
K
FT41
R35
FT42
CR16
C13
(+)
R32
(+)
CR19
K
FT44
C19
CR34
K
C29
R28
CR17
R33
C14
(+)
C20
(+)
TO C24
Q16
c
CR29
K
CR33
CR32
FT39
c
b
K
C15
(+)
(+)
C21
FT38
TO T2 P13
C30
FT37
FT35
CR30
FT40
CR22
K
CR20
R29
R36
TO T2 P14
CR23
K
CR21
FT 36
C31
R37
R42
R30
R31
(–)
C26
b
c
e
Q17
C25
(+)
CR35
K
R24
C17
(–)
FT30
CR36
K
FT29
c
Q8
CR37
R23
R20
b
e
CR24
K
CR25
K
CR38
R21
FT27
CR9
R27
C11
FT31
TO FT28
C16
(–)
2008413
FT33
R39
TO C28
FT22
CR27
CR26
K
Q18
e
c
b
FT24
FT28
R34
FT25
TO P19
R38
TO P21
TO P23
R22
TO P27
FT26
FT32
3.373 REF
±.002
1.000
PHOTO REF DIM
TRIM LINE
1.630 REF
±.002
1.000 PHOTO REF DIM

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 TRIMLINE

2008412

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007166	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED 14 Mar 66
APPROVED
APPROVED MIT A. E. METZGER
APPROVED MSC
DATE

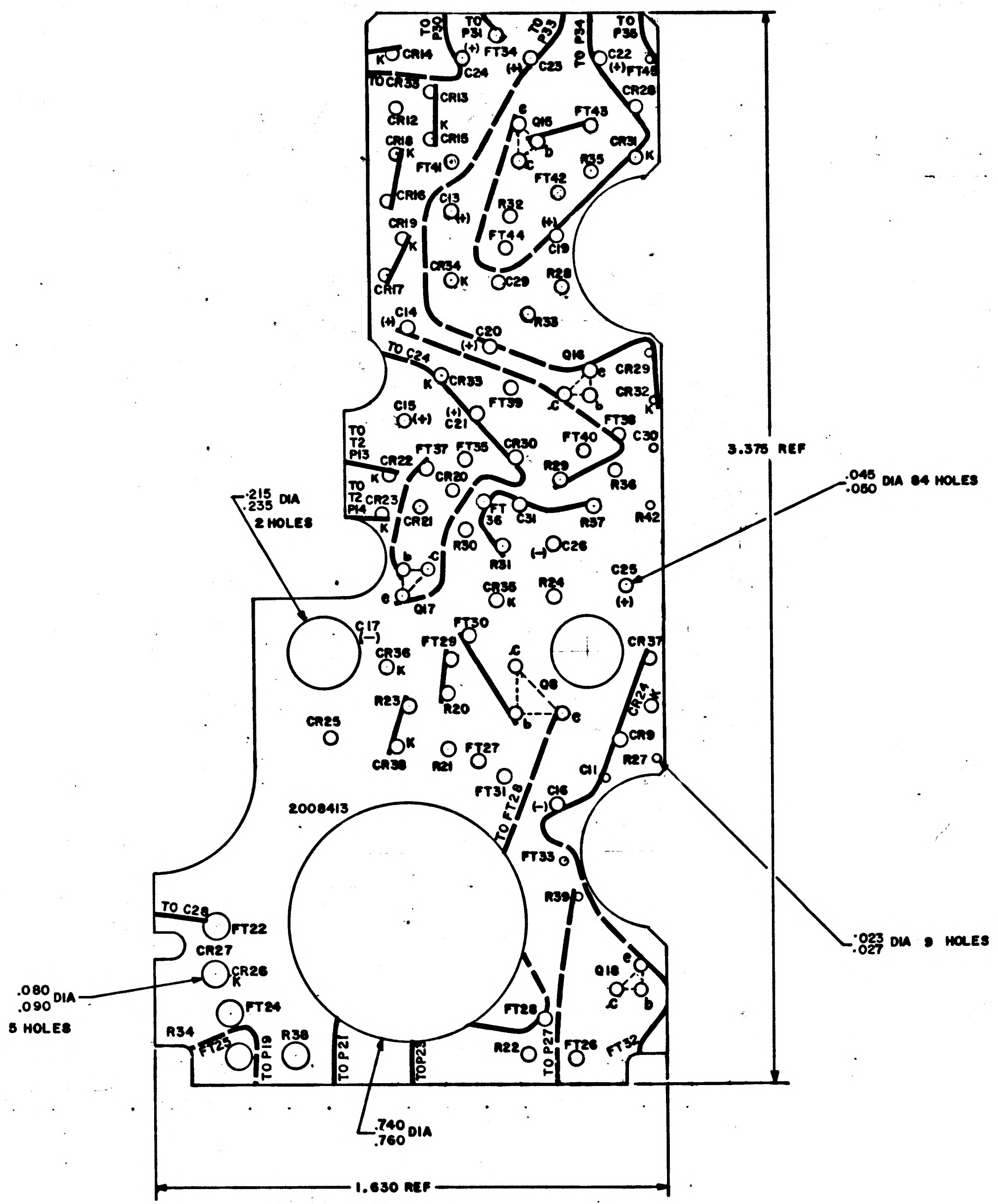
PHOTOGRAPHIC MASTER WIRING BOARD B
PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008412
SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29189

SYM	ZONE	DESCRIPTION	BR	CHK	DATE	APPROVED



TO P30
TO P31
TO P33
TO P34
TO P35
CR14
K
(+)
FT34
C24
(+)
C23
C22
(+)
FT45
TO CR35
CR13
CR28
CR12
K
CR15
e
Q15
FT43
CR18
K
b
CR31
K
FT41
c
R35
FT42
CR16
C13
(+)
R32
(+)
CR19
K
FT44
C19
CR34
K
C29
R28
CR17
R33
C14
(+)
C20
(+)
TO C24
Q16
e
CR29
K
CR33
c
b
CR32
K
FT39
C15
(+)
(+)
C21
FT38
TO T2 P13
FT40
C30
CR30
CR22
FT37
FT35
R29
K
CR20
R36
TO T2 P14
CR23
FT 36
C31
R37
R42
K
CR21
R30
b
c
R31
(–)
C26
C25
e
CR35
K
R24
(+)
Q17
C17
(–)
FT30
CR37
CR36
K
FT29
c
Q8
CR24
K
R23
R20
b
e
CR25
CR9
K
FT27
R27
CR38
R21
C11
FT31
C16
(–)
TO FT28
2008413
FT33
R39
TO C28
FT22
CR27
e
CR26
K
Q18
c
b
FT24
FT28
R34
FT25
TO P19
R38
TO P21
TO P23
R22
TO P27
FT26
FT32
3.375 REF
.045
.050 DIA 64 HOLES
.215
.235 DIA
2 HOLES
.023
.027 DIA 9 HOLES
.080
.090 DIA
5 HOLES
.740
.760 DIA
1.630 REF

REF DWG:
2008412 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133.
4. MARK BLACK CHARACTERS PER ND 1002133.
5. BROKEN LINE DENOTES SLEEVING.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007166	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
PULSE TORQUE POWER SUPPLY

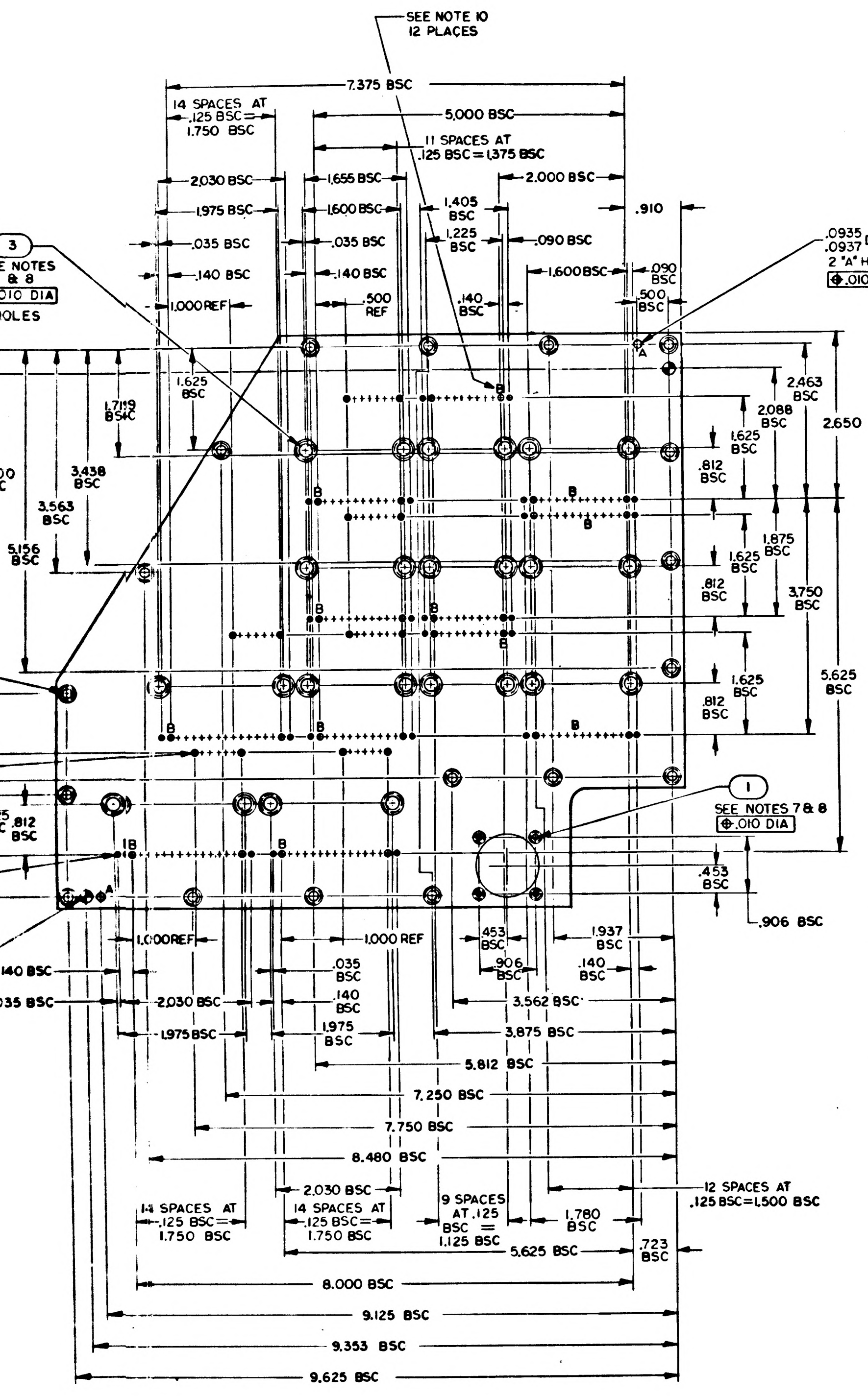
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008413

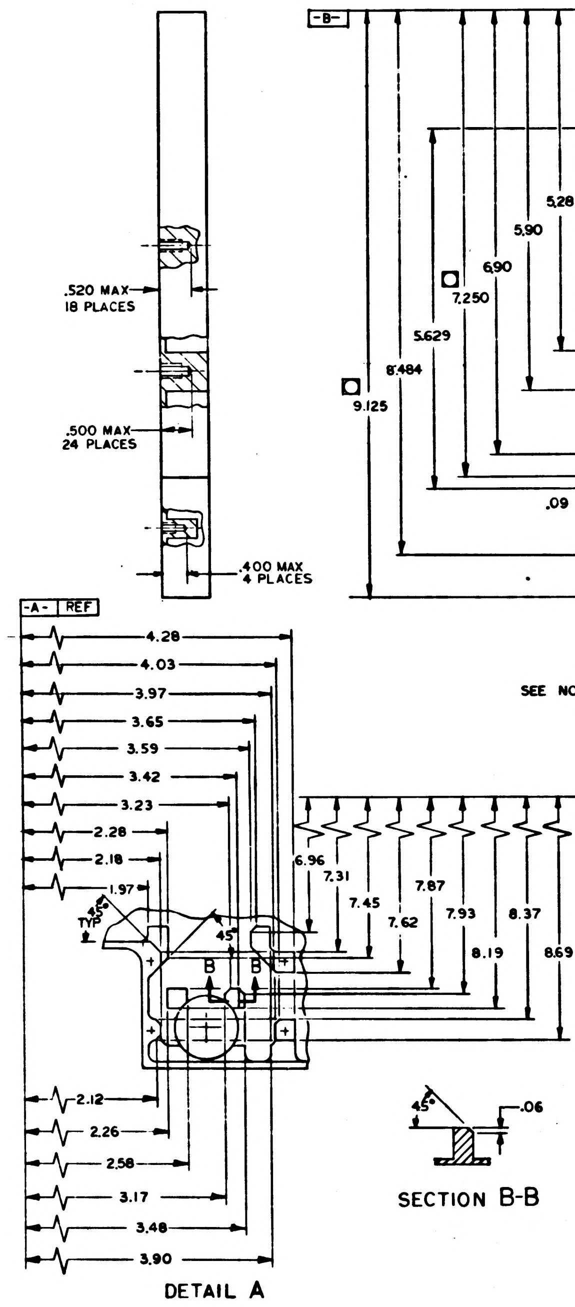
SCALE 5/1 SHEET 1 OF 1

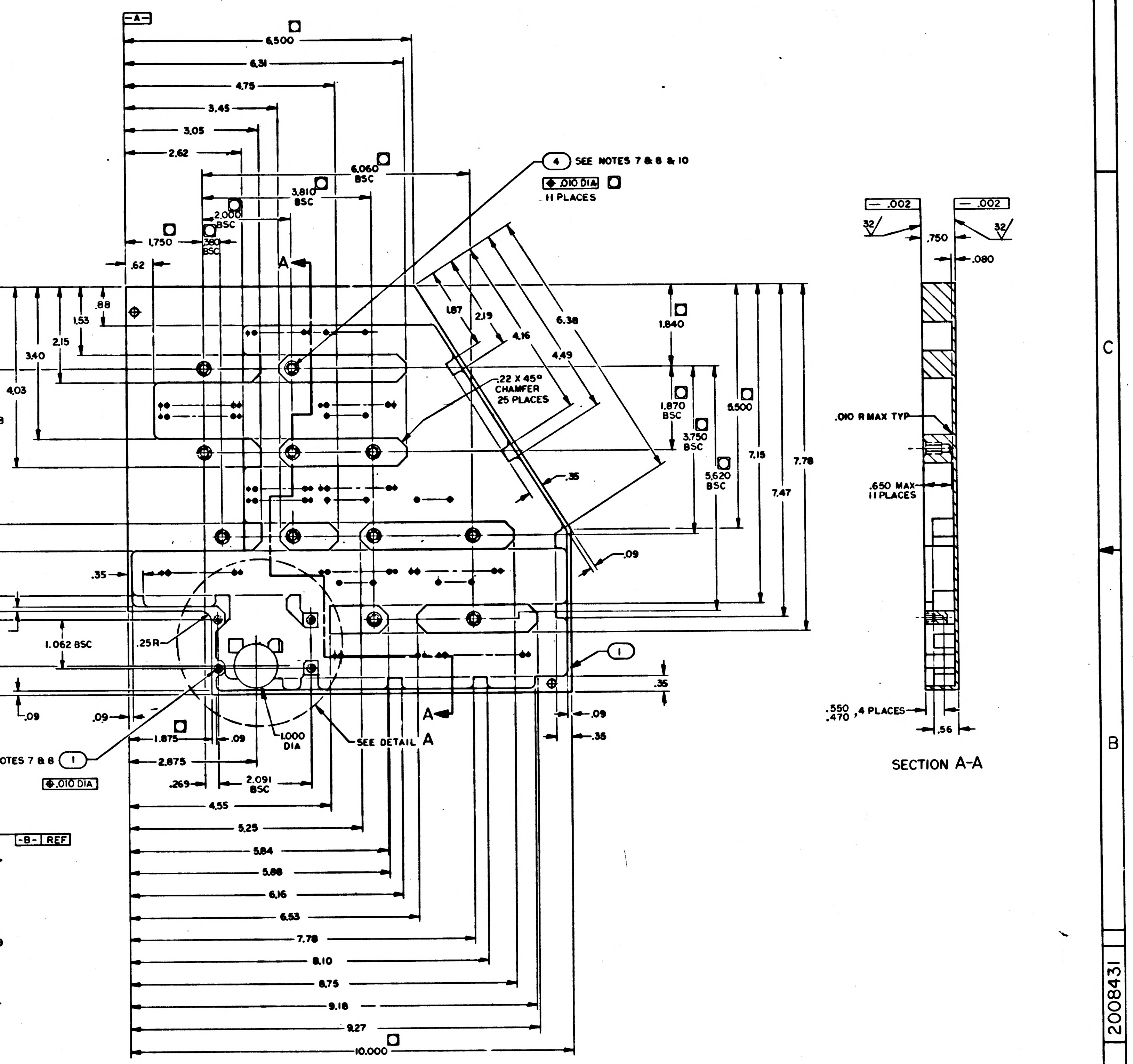
MASTER

A. C. METZGER

SYM	ZONE	REVISIONS 2475 DESCRIPTION	DR	CHK	DATE	APPROVED


SEE NOTE 10
12 PLACES
7.375 BSC
14 SPACES AT .125 BSC = 1.750 BSC
5.000 BSC
11 SPACES AT .125 BSC = 1.375 BSC
2.000 BSC
.0935 .0937 DIA X .235 .265 DP
2 "A" HOLES
.010 DIA
SEE NOTES 7 & 8
.010 DIA
SEE NOTES 7& 8
1.000 REF
9.625 BSC
9.353 BSC
9.125 BSC
8.000 BSC
5.625 BSC


.520 MAX 18 PLACES
.500 MAX 24 PLACES
.400 MAX 4 PLACES
-A- REF
-B- REF
DETAIL A
SECTION B-B
45°
.06


-A-
-B-
6.500
10.000
4 SEE NOTES 7 & 8 & 10
.010 DIA
11 PLACES
.22 X 45° CHAMFER 25 PLACES
SEE NOTES 7 & 8 1
.010 DIA
SEE DETAIL A
1.000 DIA
.25R
A
SECTION A-A
.002
32
.750
.080
.010 R MAX TYP
.650 MAX 11 PLACES
.550 .470 4 PLACES
.56

S IN ACCORDANCE WITH STANDARDS
MIL-D-70327
AL PER QQ-A-250/11, TEMP T6
SHARP EDGES .0 5/.040
MAX UNLESS OTHERWISE SPECIFIED
UNLESS OTHERWISE SPECIFIED
A-8625, TYPE I, CLEAR
FIND NO. 1,2,3 & 4 WITH MIL-P-8585, COLOR Y
,3 & 4 PER MS33646. REMOVE DRIVING TANG.
NO 4 MATING WITH SCREW SHALL BE FREE OF PRIMER
AFTER POST INSTALLATION CLEANING OF FIND NO.4,
ENGAGED AND DISENGAGED THE FULL LENGTH OF
CLEANING OF FIND NO.4 THREADS.
PER ND002013
B SHALL BE FREE FROM ANODIZE. CHROMATE TREATMENT OF
CLASS 3 (IRIDITE) TO BE DONE

11. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
1	2008431-001	HEADER	5
11	1010957-013	INSERT, SCREW THREAD, LOCKING	4
24	1010957-010	INSERT, SCREW THREAD, LOCKING	3
18	1010957-016	INSERT, SCREW THREAD, LOCKING	2
8	1010957-008	INSERT, SCREW THREAD, LOCKING	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007094	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ~~.XX~~ .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 21 Dec 65
CHECKED 22 Dec 65
APPROVED 28 Dec 65
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

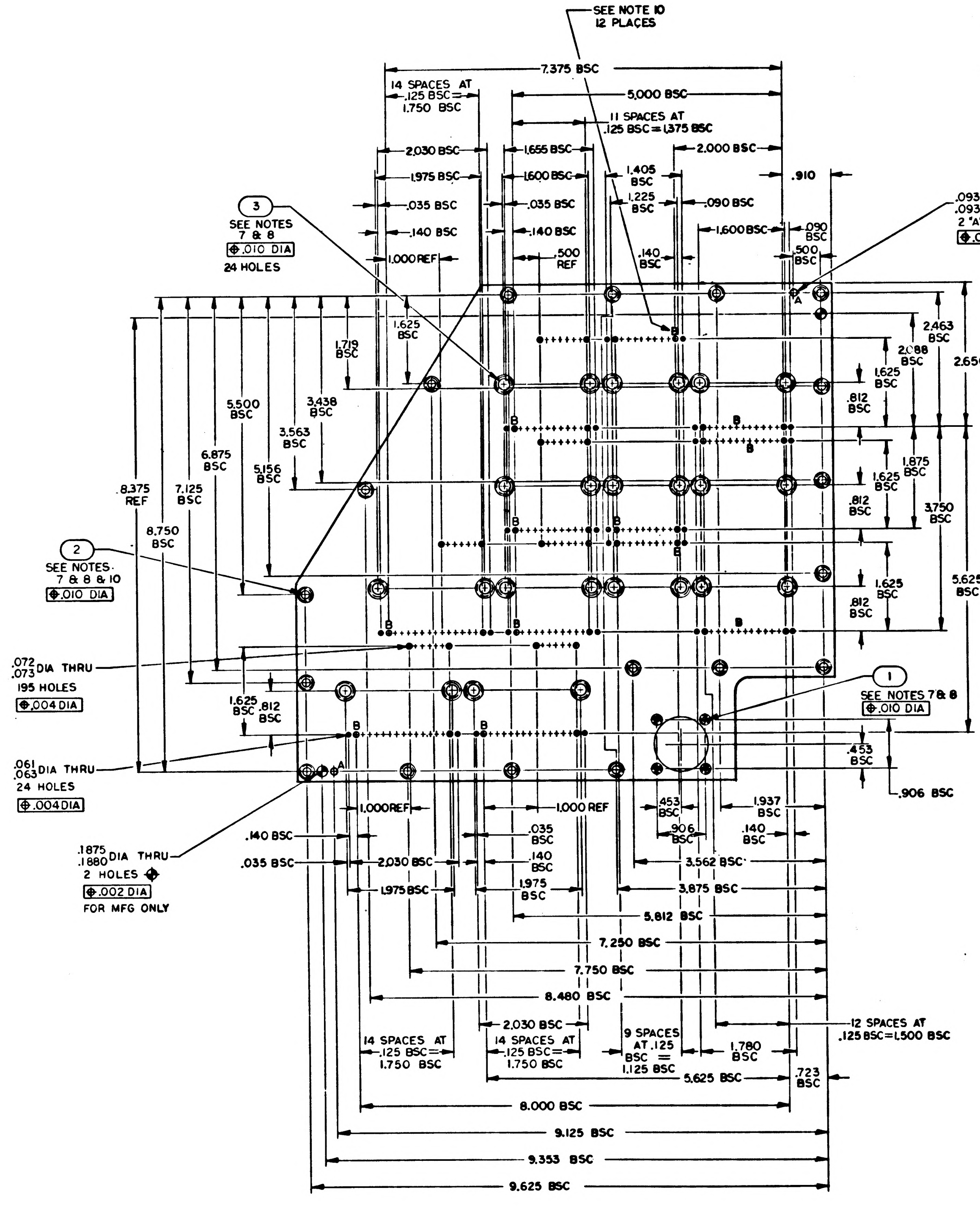
HEADER
INSEPARABLE ASSEMBLY
PIPA ELECTRONICS

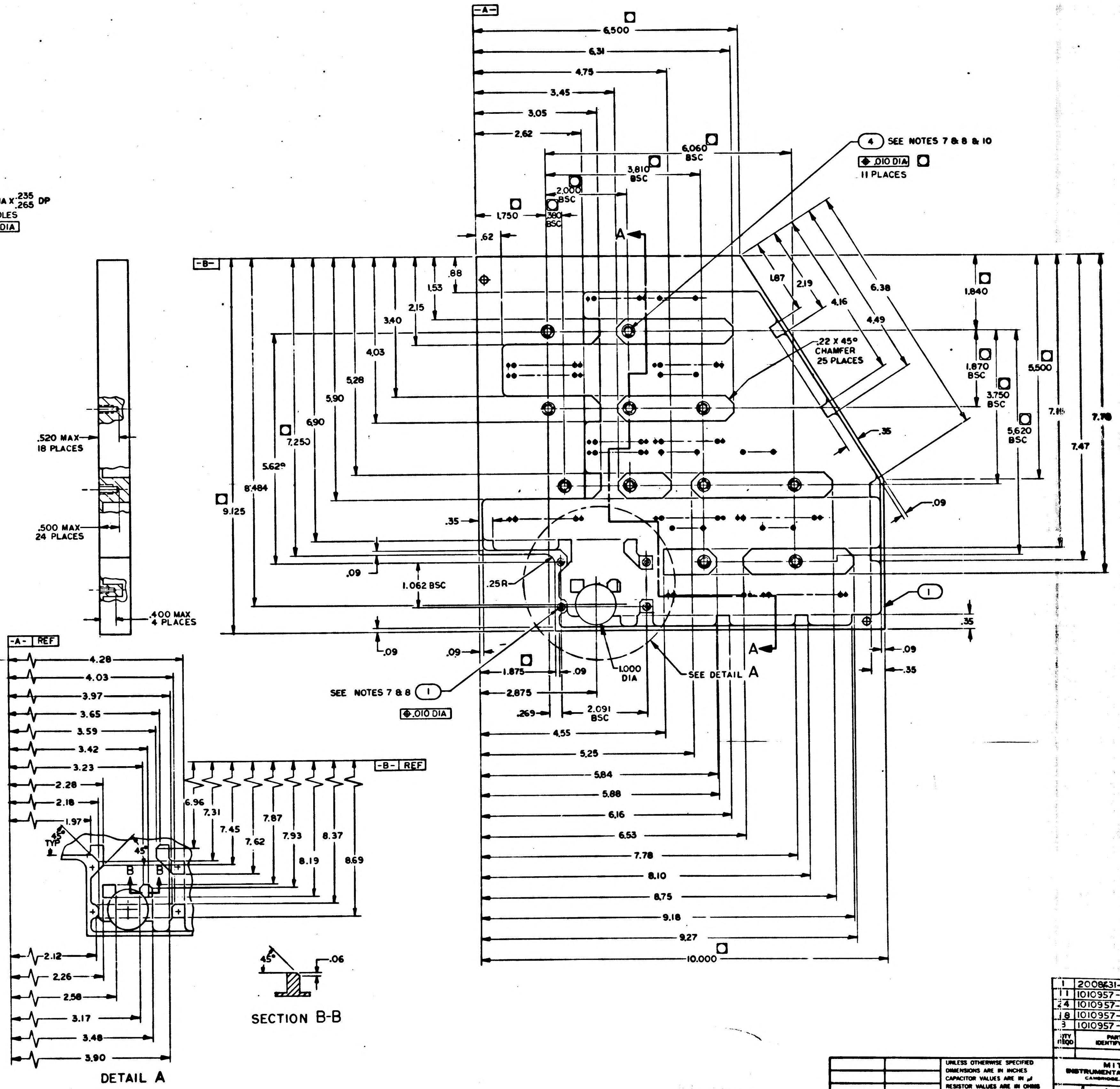
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008431

SCALE FULL
SHEET 1 OF 1

2008431

MASTER


SEE NOTE 10
12 PLACES
7.375 BSC
5.000 BSC
14 SPACES AT .125 BSC = 1.750 BSC
11 SPACES AT .125 BSC = 1.375 BSC
2.030 BSC
1.975 BSC
.035 BSC
.140 BSC
1.000 REF
1.655 BSC
1.600 BSC
1.405 BSC
1.225 BSC
2.000 BSC
.910
.090 BSC
1.600 BSC
.500 REF
.500 BSC
.0935 .0937 DIA X .235 .265 DP
2 "A" HOLES
⌖ .010 DIA
3
SEE NOTES 7 & 8
⌖ .010 DIA
24 HOLES
2.463 BSC
2.088 BSC
2.650
1.625 BSC
.812 BSC
1.875 BSC
3.750 BSC
5.625 BSC
1.719 BSC
5.500 BSC
3.438 BSC
3.563 BSC
6.875 BSC
5.156 BSC
7.125 BSC
8.375 REF
8.750 BSC
2
SEE NOTES 7 & 8 & 10
⌖ .010 DIA
.072 .073 DIA THRU
195 HOLES
⌖ .004 DIA
.061 .063 DIA THRU
24 HOLES
⌖ .004 DIA
.1875 .1880 DIA THRU
2 HOLES
⌖ .002 DIA
FOR MFG ONLY
1
SEE NOTES 7 & 8
⌖ .010 DIA
.453 BSC
.906 BSC
1.937 BSC
.140 BSC
1.000 REF
.035 BSC
.140 BSC
1.975 BSC
3.562 BSC
3.875 BSC
5.812 BSC
7.250 BSC
7.750 BSC
8.480 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC
9 SPACES AT .125 BSC = 1.125 BSC
1.780 BSC
12 SPACES AT .125 BSC = 1.500 BSC
5.625 BSC
.723 BSC
8.000 BSC
9.125 BSC
9.353 BSC
9.625 BSC
A
B


-A-
6.500
6.31
4.75
3.45
3.05
2.62
6.060 BSC
3.810 BSC
2.000 BSC
1.750
.380 BSC
.62
4
SEE NOTES 7 & 8 & 10
⌖ .010 DIA
11 PLACES
-B-
.88
1.53
2.15
3.40
4.03
5.28
5.90
6.90
7.250
5.62°
8.484
9.125
1.87
2.19
4.16
6.38
4.49
.22 X 45° CHAMFER
25 PLACES
.35
.09
1.840
1.870 BSC
3.750 BSC
5.500
5.620 BSC
7.15
7.47
7.78
1.062 BSC
.25R
1.000 DIA
SEE DETAIL A
A
1
SEE NOTES 7 & 8
⌖ .010 DIA
1.875
2.875
.269
2.091 BSC
4.55
5.25
5.84
5.88
6.16
6.53
7.78
8.10
8.75
9.18
9.27
10.000
.520 MAX
18 PLACES
.500 MAX
24 PLACES
.400 MAX
4 PLACES
-A- REF
4.28
4.03
3.97
3.65
3.59
3.42
3.23
2.28
2.18
1.97
45° TYP
45°
B
-B- REF
6.96
7.31
7.45
7.62
7.87
7.93
8.19
8.37
8.69
2.12
2.26
2.58
3.17
3.48
3.90
DETAIL A
45°
.06
SECTION B-B

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 6061-T6 AL PER QQ-A-250/11, TEMP T6
3. REMOVE BURRS AND SHARP EDGES .015/.040
4. ALL FILLETS .140 R MAX UNLESS OTHERWISE SPECIFIED
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. ANODIZE PER MIL-A-8625, TYPE I, CLEAR
7. COAT THREADS OF FIND NO. 1,2,3 & 4 WITH MIL-P-8585, COLOR Y
☐8. INSTALL FIND NO. 1,2,3 & 4 PER MS33646. REMOVE DRIVING TANG. THE SURFACES OF FIND NO.4 MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO.4, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF FIND NO.4 AS FINAL STEP IN CLEANING OF FIND NO.4 THREADS.
9. IDENTIFY WITH PART NO. PER ND1002019
10. INDICATED HOLES AND HOLES MARKED B SHALL BE FREE FROM ANODIZE. CHROMATE TREATMENT OF HOLES PER MIL-C-5541, TYPE II, GRADE C, CLASS 3 (IRIDITE) TO BE DONE AFTER ANODIZE
11. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01304-116

QTY REQD	PART OR IDENTIFYING NO.
1	2008431-001
11	1010957-013
24	1010957-010
18	1010957-016
3	1010957-008

NEXT ASSY	USED ON
2007094	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ~~.XX~~ .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

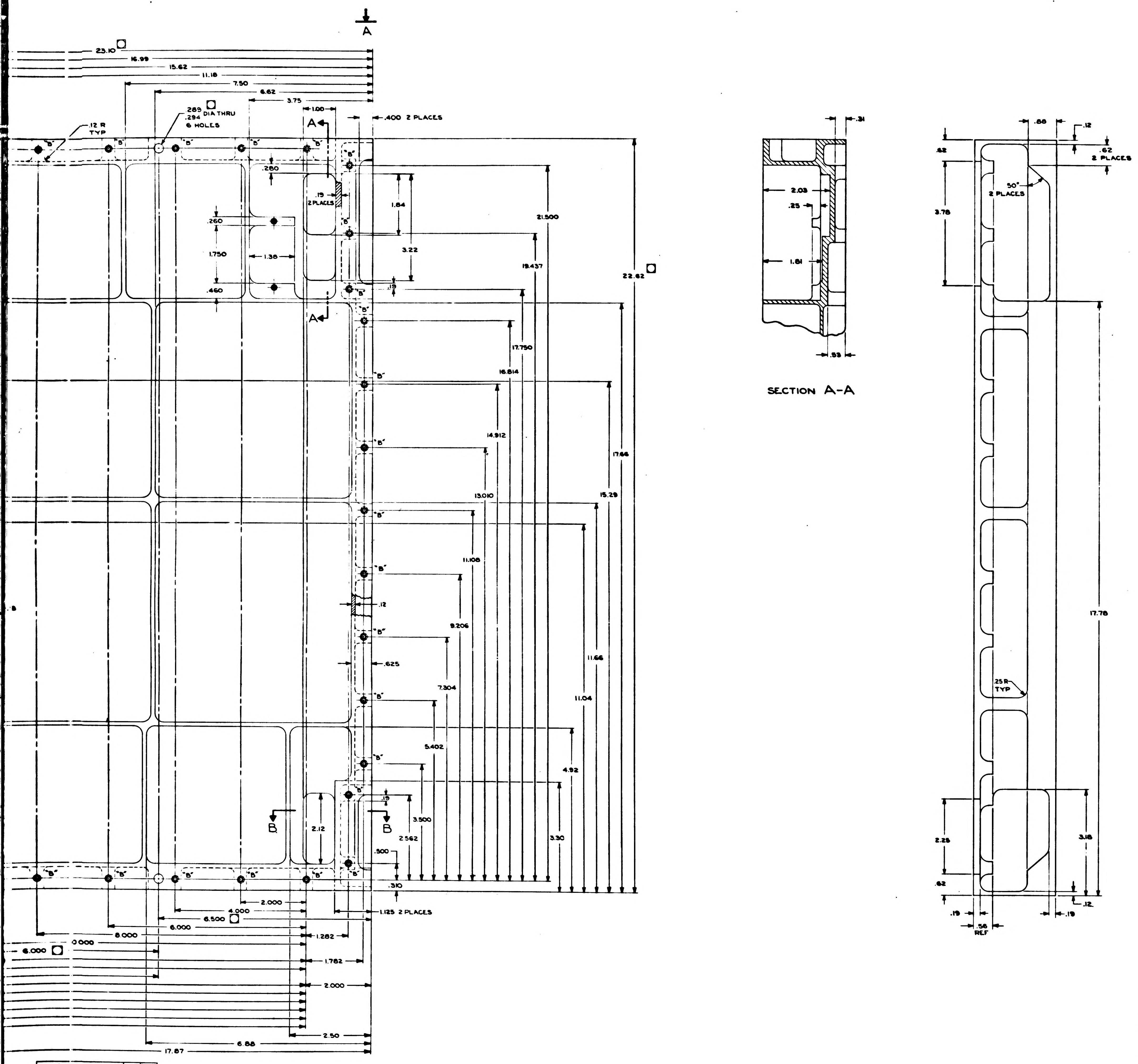
MATERIAL

MIT
INSTRUMENTATION
CAMBRIDGE, MASS

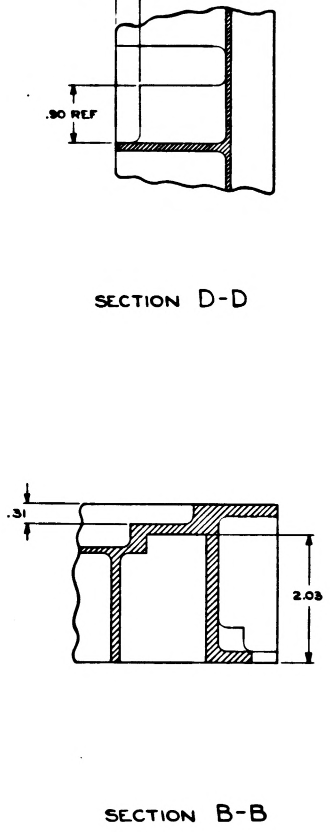
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASC

2008431

REVISIONS 25555					
SYM	ZONE	DESCRIPTION	DR	CHK	DATE
A		REVISED PER TDRR 28487	JMP		MAY 66



A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.289 .294 DIA THRU 6 HOLES
.12 R TYP
"B"
.280
.19 2 PLACES
.260
1.750
1.38
.460
3.22
1.84
.19
21.500
19.437
22.62
17.750
16.814
14.912
13.010
17.66
15.29
11.108
9.206
7.304
5.402
3.500
2.562
11.66
11.04
4.92
3.30
.12
.625
2.12
.500
.310
1.125 2 PLACES
B
2.000
4.000
6.500
6.000
8.000
1.282
1.782
2.000
6.000
2.50
6.88
17.87
.31
2.03
.25
1.81
.53
SECTION A-A
.88
.12
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25 R TYP
2.25
3.18
.19
.56 REF



.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B

4H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007015	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonarrigo 23 May 66
CHECKED CRKaiser 25 May 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY C/M PSA

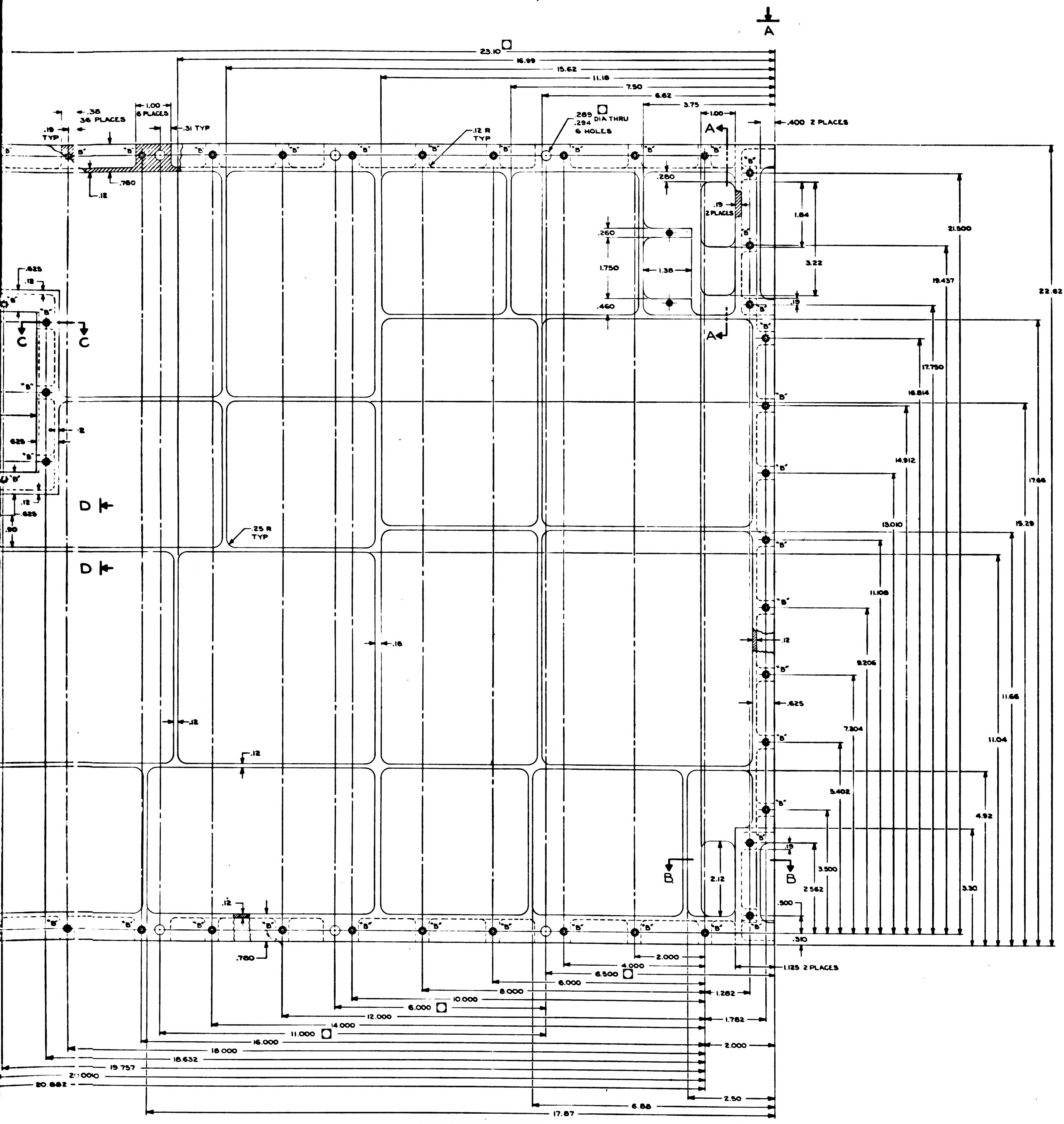
CODE IDENT NO	SIZE	DRAWING NO
80230	J	2008432

SCALE 1/1
SHEET 1 OF 2

2008432

2008432 REV A SHT 1

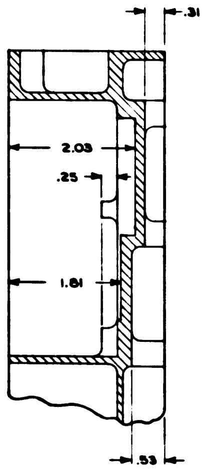
4720008432



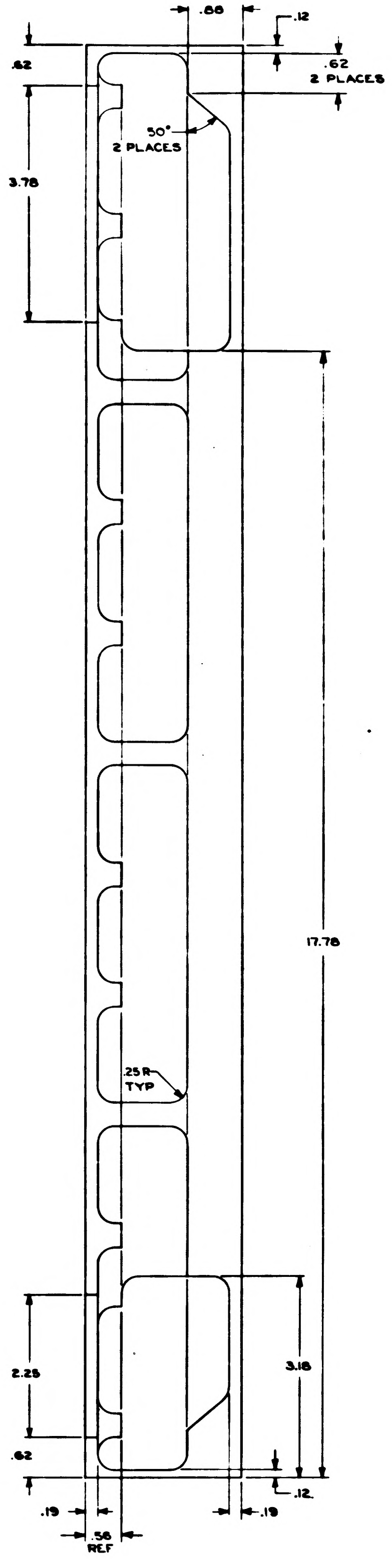
A
C
D
B
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.38 36 PLACES
1.00 6 PLACES
.31 TYP
.19 TYP
.289 .294 DIA THRU 6 HOLES
.12 R TYP
"B"
.780
.12
.280
.19 2 PLACES
.260
1.750
1.38
.460
1.84
3.22
21.500
19.437
22.62
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
17.66
15.29
11.66
11.04
4.92
3.30
3.500
2.562
.500
.310
.625
.25 R TYP
.18
.12
2.12
1.125 2 PLACES
2.000
4.000
6.500
6.000
8.000
10.000
12.000
14.000
16.000
18.000
18.632
19.757
21.000
20.882
11.000
1.282
1.782
2.50
6.88
17.87

2008432 REV. A SHT. 1

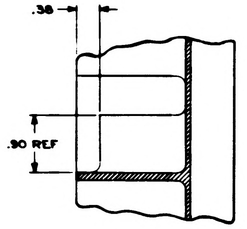
SECTION A-A



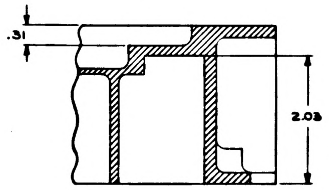
.31
2.03
.25
1.61
.53



.88
.12
.62
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25R TYP
2.25
3.18
.62
.19
.56 REF
.19
.12



SECTION D-D



SECTION B-B

2	010S
6	4521
113	010S
42	010S
50	010S
1	200
QTY REQD	

2007015	
NEXT ASSY	USED ON
APPLICATION	

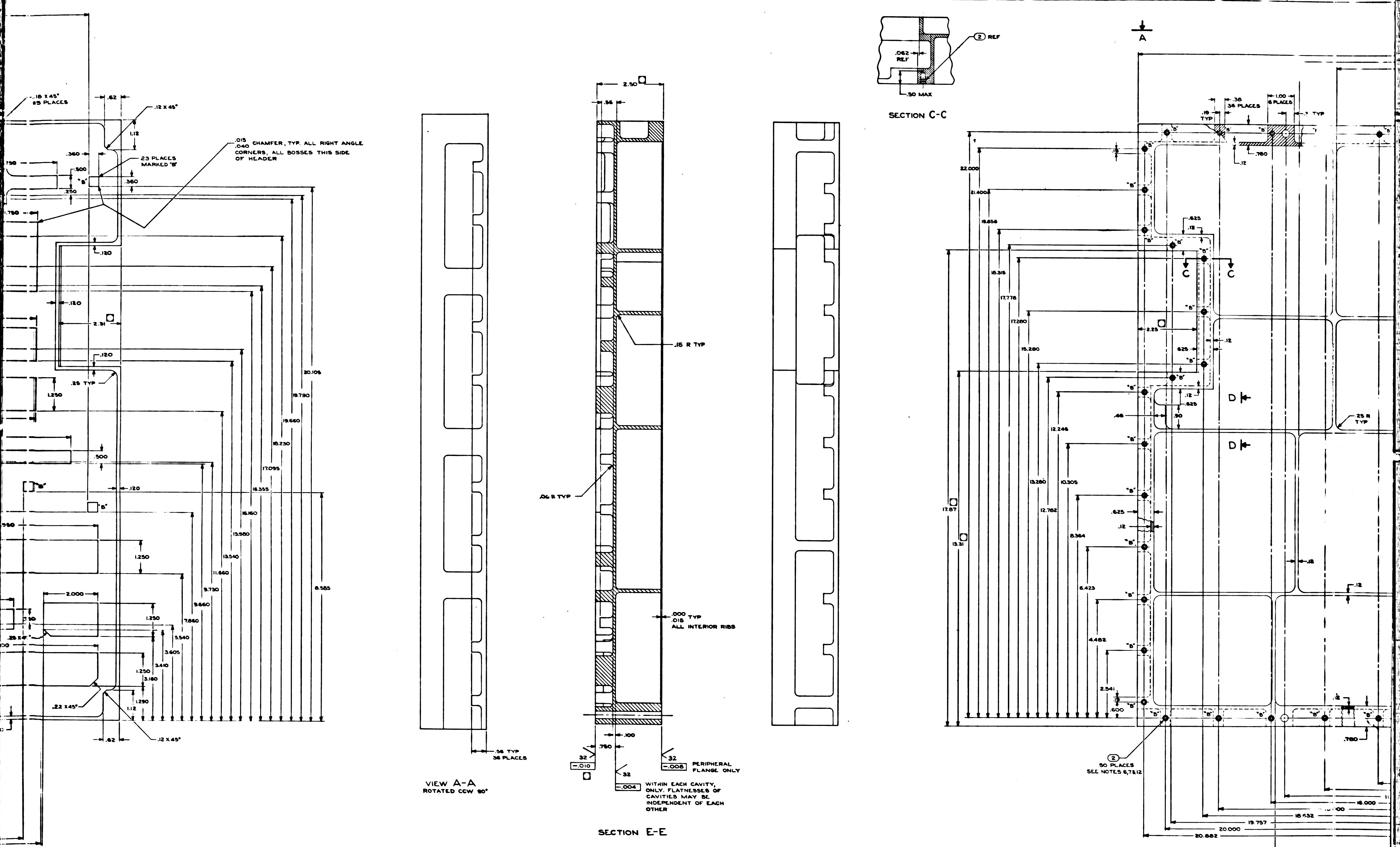
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

INSTRUM
CAMB

DRAWN
CHECK
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

3/2008432

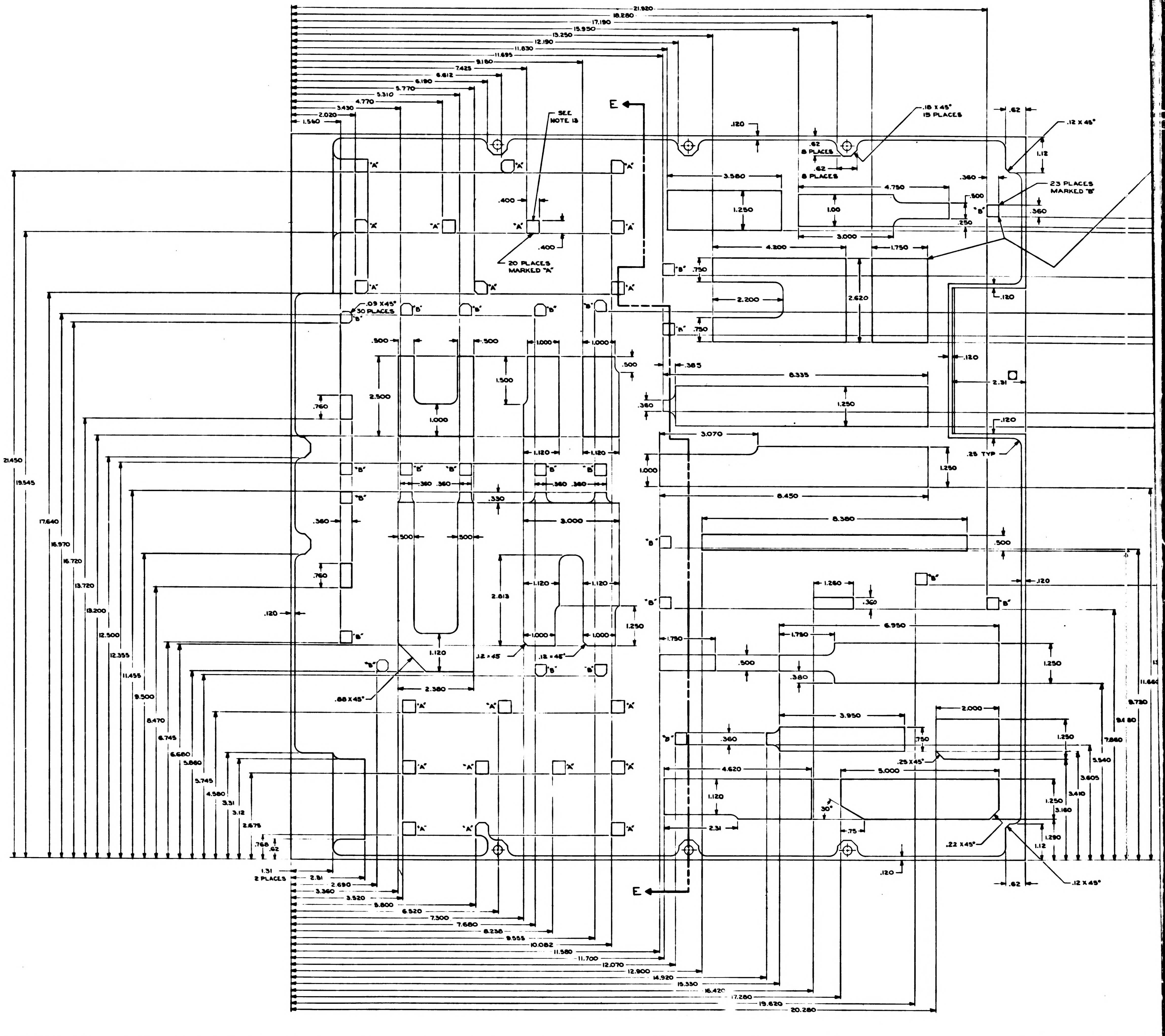


19
18
17
16
15
14
13
12
11
10
.18 X 45° 85 PLACES
.62
.12 X 45°
1.12
.360
.500
"B"
.250
.360
23 PLACES MARKED "B"
.015 .040 CHAMFER, TYP. ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
1.750
.120
.120
2.31
.120
.25 TYP
1.250
.500
.120
"B"
1.250
2.000
1.250
.25 X 45°
1.250
3.160
1.290
.22 X 45°
1.12
.62
.12 X 45°
20.105
19.790
19.660
18.230
17.095
16.355
16.160
13.980
13.540
11.660
9.730
9.660
7.860
5.540
3.605
3.410
8.585
.56 TYP 36 PLACES
VIEW A-A ROTATED CCW 90°
2.50
.56
.15 R TYP
.06 R TYP
.000 .015 TYP ALL INTERIOR RIBS
.100
.750
32
.010
32
.004
32
.008
PERIPHERAL FLANGE ONLY
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
SECTION E-E
.062 REF
2 REF
.50 MAX
SECTION C-C
A
.19 TYP
.38 36 PLACES
1.00 6 PLACES
.12 TYP
.780
.12
22.000
21.400
19.858
18.315
17.778
17.280
15.280
13.280
12.782
12.246
10.305
8.364
6.423
4.482
2.541
.600
.625
.12
C
C
2.25
.12
.625
.46
.90
.12
.625
D
D
.25 R TYP
17.87
13.31
.625
.12
.12
.12
.780
2
50 PLACES SEE NOTES 6,7&12
16.000
18.632
19.757
20.000
20.882

2008432 REV A SHT 1

272008432

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


E
E
SEE NOTE 13
20 PLACES MARKED "A"
23 PLACES MARKED "B"
.18 X 45° 15 PLACES
.09 X 45° 30 PLACES
.62 8 PLACES
.62 8 PLACES
.12 X 45°
.25 TYP
.88 X 45°
.12 × 45°
.12 × 45°
.25 X 45°
.22 X 45°
30°
1.31 2 PLACES
"A"
"B"
21.920
18.280
17.190
15.950
13.250
12.190
11.830
11.695
9.180
7.425
6.812
6.190
5.770
5.310
4.770
3.430
2.020
1.560
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.860
5.745
4.580
3.31
3.12
2.675
.768
.62
3.580
1.250
1.00
4.750
3.000
4.200
1.750
2.200
2.620
8.335
3.070
8.450
8.380
6.950
3.950
4.620
5.000
2.000
1.260
2.31
2.380
1.120
2.813
2.500
1.500
1.000
.500
.360
.330
.385
.400
.750
.760
.120
2.81
2.690
3.360
3.520
5.800
6.520
7.300
7.680
8.238
9.555
10.082
11.580
11.700
12.070
12.900
14.920
15.350
16.420
17.280
19.620
20.280
11.664
9.730
9.480
7.860
5.540
3.605
3.410
3.160
1.290
1.12
.75

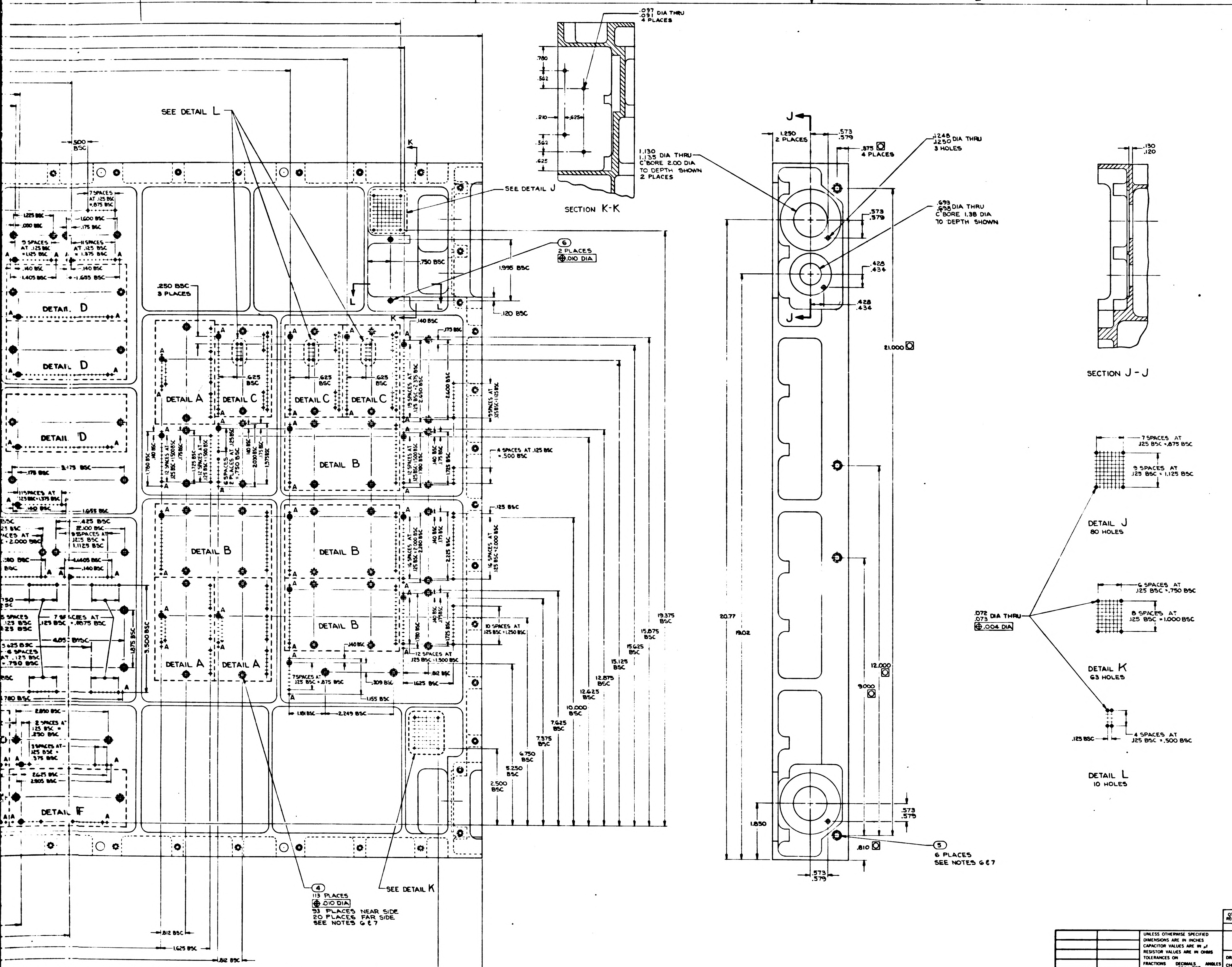
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.
6. COAT THREADS OF FIND 2,3,4,5 & 6 WITH MIL-P-8585, COLOR Y
7. ☐ INSTALL FIND NO. 2,3,4,5 & 6 WET PER MS33646. REMOVE DRIVING TANG. FOR FIND NO. 2 THE HELICOIL INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF HELICOIL INSERT, A STANDARD SCREW SHALL BE ENGAGED & DISENGAGED FULL LENGTH OF HELICOIL INSERT AS FINAL STEP IN CLEANING OF HELICOIL INSERT THREADS
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ◉ TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE IV. DO NOT EPOXY COAT.
10. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

	REV	SHT
2008432	A	1

1/2008432

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28487	JMP		9 MAY 66	


SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
SECTION K-K
SECTION J-J
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
1.248 1.250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.875 4 PLACES
1.250 2 PLACES
⑥ 2 PLACES ⊕ .010 DIA
④ 113 PLACES ⊕ .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
⑤ 6 PLACES SEE NOTES 6 & 7
.072 .073 DIA THRU ⊕ .004 DIA
DETAIL J 80 HOLES
DETAIL K 63 HOLES
DETAIL L 10 HOLES
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
21.000
20.77
19.02
12.000
9.000
1.850
.810
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
6.750 BSC
5.250 BSC
2.500 BSC
1.995 BSC
3.500 BSC
J
K
L

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS		MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
			DRAWN Bonarrigo	25 Jan 66	HEADER INSEPARABLE ASS'Y. C/M PSA		
			CHECKED				
			APPROVED				
		MATERIAL	APPROVED				
2007095		SEE NOTE 2	APPROVED MIT		CODE IDENT NO 80230	SIZE J	DRAWING NO. 2008432
NEXT ASSY	USED ON		APPROVED MSC A. C. METZGER	DATE	SCALE		SHEET 2 OF 2
APPLICATION							

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

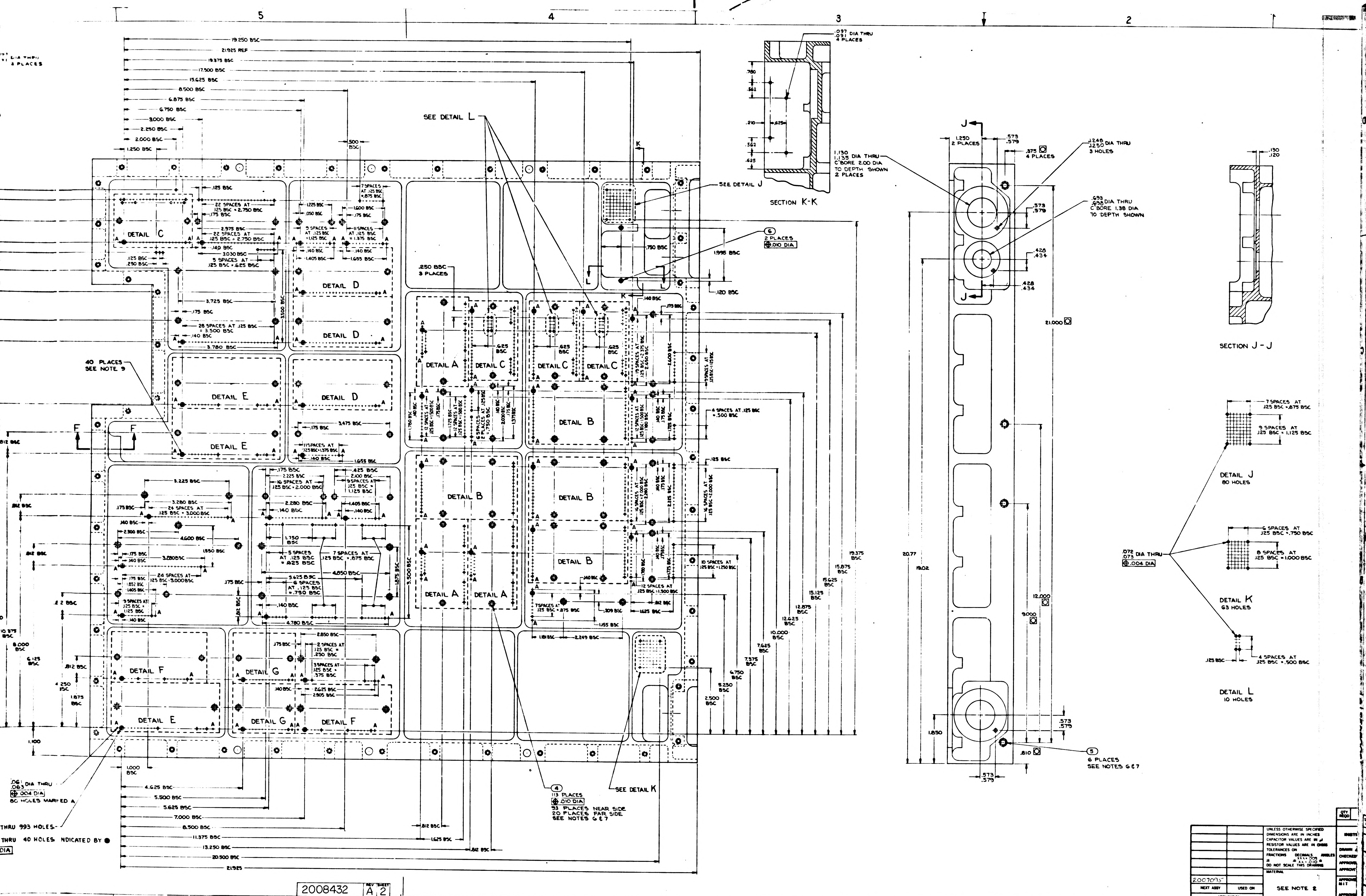
LIST OF MATERIALS

2008432 A 2

2008432 A

4H

4/2008432

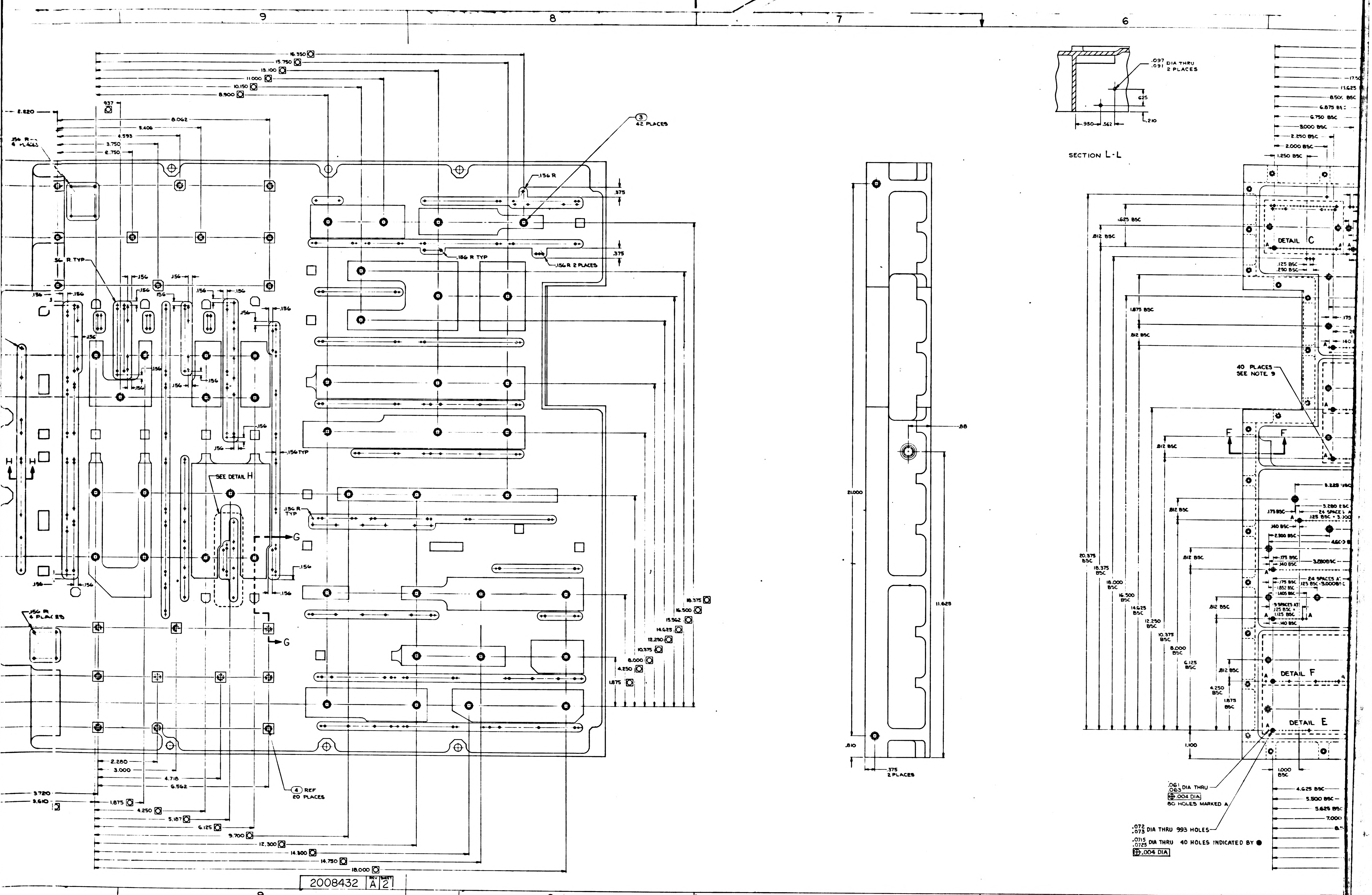


SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
SECTION K-K
SECTION J-J
DETAIL C
DETAIL D
DETAIL E
DETAIL A
DETAIL B
DETAIL F
DETAIL G
DETAIL J
80 HOLES
DETAIL K
63 HOLES
DETAIL L
10 HOLES
40 PLACES
SEE NOTE 9
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.097
.091 DIA THRU
4 PLACES
1.130
1.135 DIA THRU
C'BORE 2.00 DIA
TO DEPTH SHOWN
2 PLACES
1.248
1.250 DIA THRU
3 HOLES
.693
.698 DIA THRU
C'BORE 1.38 DIA
TO DEPTH SHOWN
.375 ☐
4 PLACES
21.000 ☐
12.000 ☐
9.000 ☐
.810 ☐
⑤
6 PLACES
SEE NOTES 6 & 7
⑥
2 PLACES
⊕ .010 DIA
④
113 PLACES
⊕ .010 DIA
93 PLACES NEAR SIDE
20 PLACES FAR SIDE
SEE NOTES 6 & 7
.072
.073 DIA THRU
⊕ .004 DIA
7 SPACES AT
.125 BSC = .875 BSC
9 SPACES AT
.125 BSC = 1.125 BSC
6 SPACES AT
.125 BSC = .750 BSC
8 SPACES AT
.125 BSC = 1.000 BSC
4 SPACES AT
.125 BSC = .500 BSC
.125 BSC
.061
.063 DIA THRU
⊕ .004 DIA
80 HOLES MARKED A
THRU 993 HOLES
THRU 40 HOLES INDICATED BY ●
DIA
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.500 BSC
21.925
.250 BSC
3 PLACES
.120 BSC
1.995 BSC
.750 BSC
20.77
19.02
1.850
.573
.579
.428
.434
.130
.120
5
4
3
2

2008432 REV A SHEET 2

3/2008432

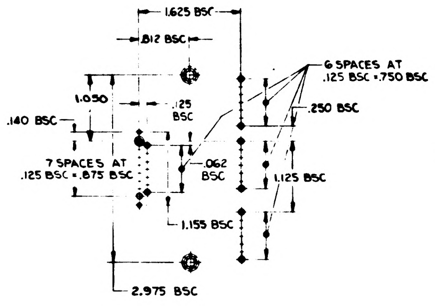
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ± DO NOT SCALE THIS DRAWING	QTY REQD
			INSTI
			DRAWN
			CHECKED
			APPROVE
		MATERIAL	APPROVE
2007095		SEE NOTE 2	APPROVE MIT
NEXT ASSY	USED ON		APPROVE MSC
APPLICATION			



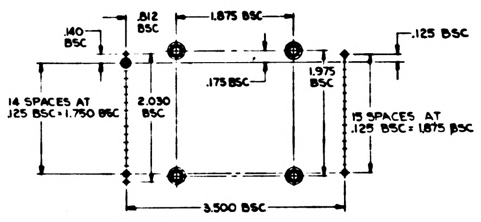
9
8
7
6
16.350
15.750
13.100
11.000
10.150
8.900
.937
8.062
5.406
4.593
3.750
2.750
2.820
.156 R
3
42 PLACES
.156 R
.375
.186 R TYP
.156 R 2 PLACES
.156
.156 R TYP
SEE DETAIL H
.156 TYP
.156 R TYP
G
G
H
H
.156 R 4 PLACES
4 REF 20 PLACES
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
.097 .091 DIA THRU 2 PLACES
.625
.950
.562
.210
SECTION L-L
21.000
.88
11.625
.810
.375 2 PLACES
.625 BSC
.812 BSC
1.875 BSC
40 PLACES SEE NOTE 9
DETAIL C
DETAIL F
DETAIL E
F
F
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000
.061 .063 DIA THRU
.004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU 993 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
.004 DIA

2008432 REV A SHEET 2

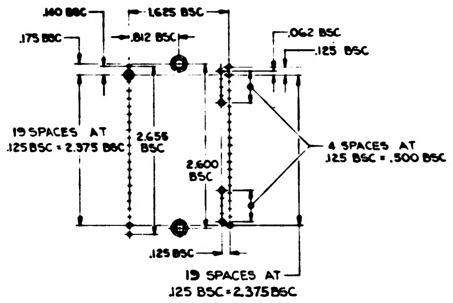
2720008432


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

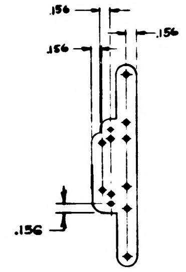
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
.175 BSC
1.975 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

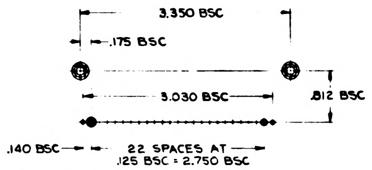
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.655 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

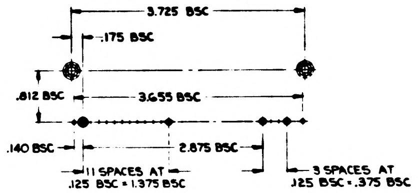
DETAIL C


.156
.156
.156
.156

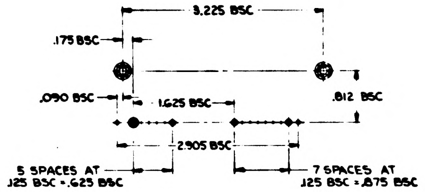
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

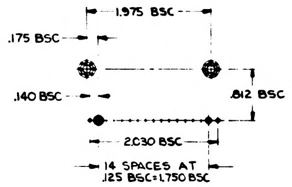
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

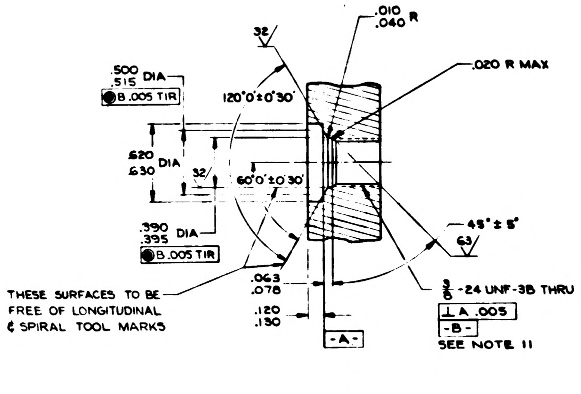
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

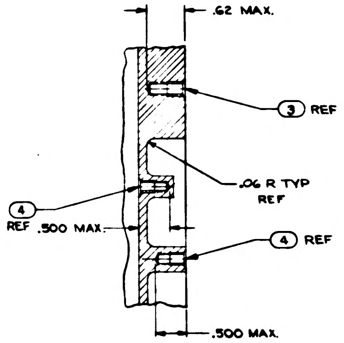
DETAIL F


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

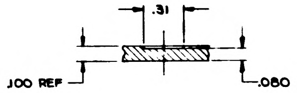
DETAIL G


.010
.040 R
32
.020 R MAX
.500
.515 DIA
B .005 TIR
120°0'±0°30'
.620
.630 DIA
32
60°0'±0°30'
.390
.395 DIA
B .005 TIR
45° ± 5°
63
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063
.078
.120
.130
-A-
3/8 -24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

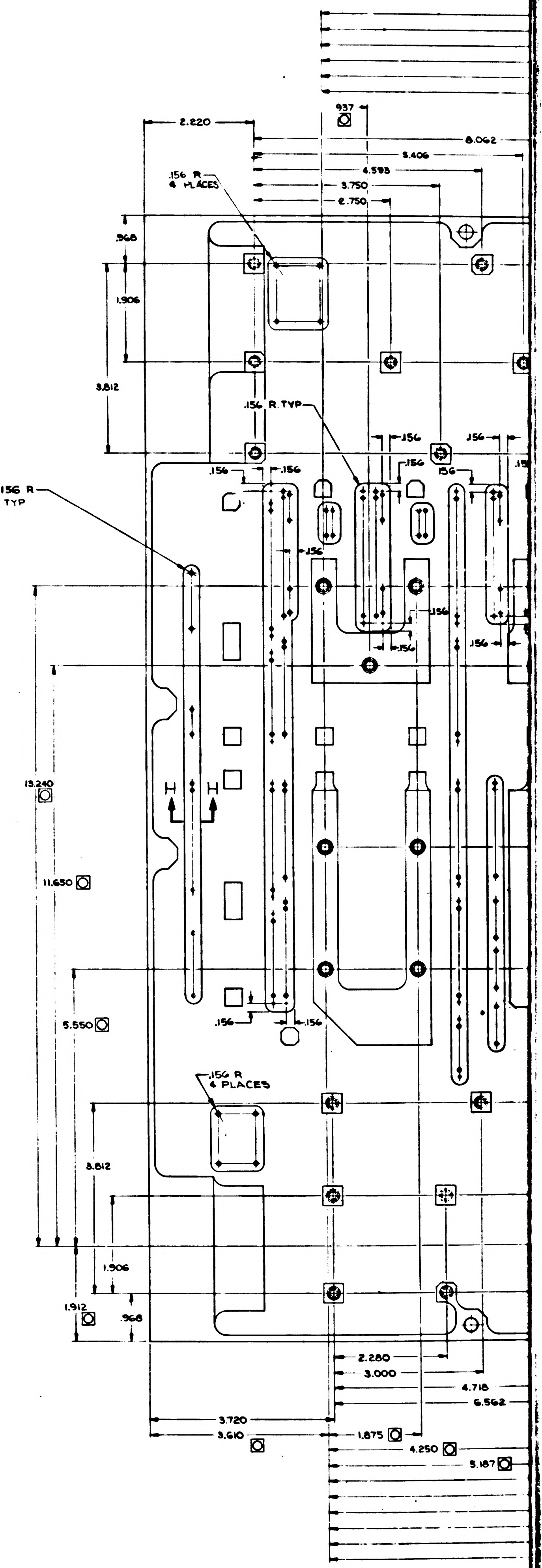
SECTION F-F
SCALE 2/1


.62 MAX.
3 REF
.06 R TYP REF
4 REF
.500 MAX.
4 REF
.500 MAX.

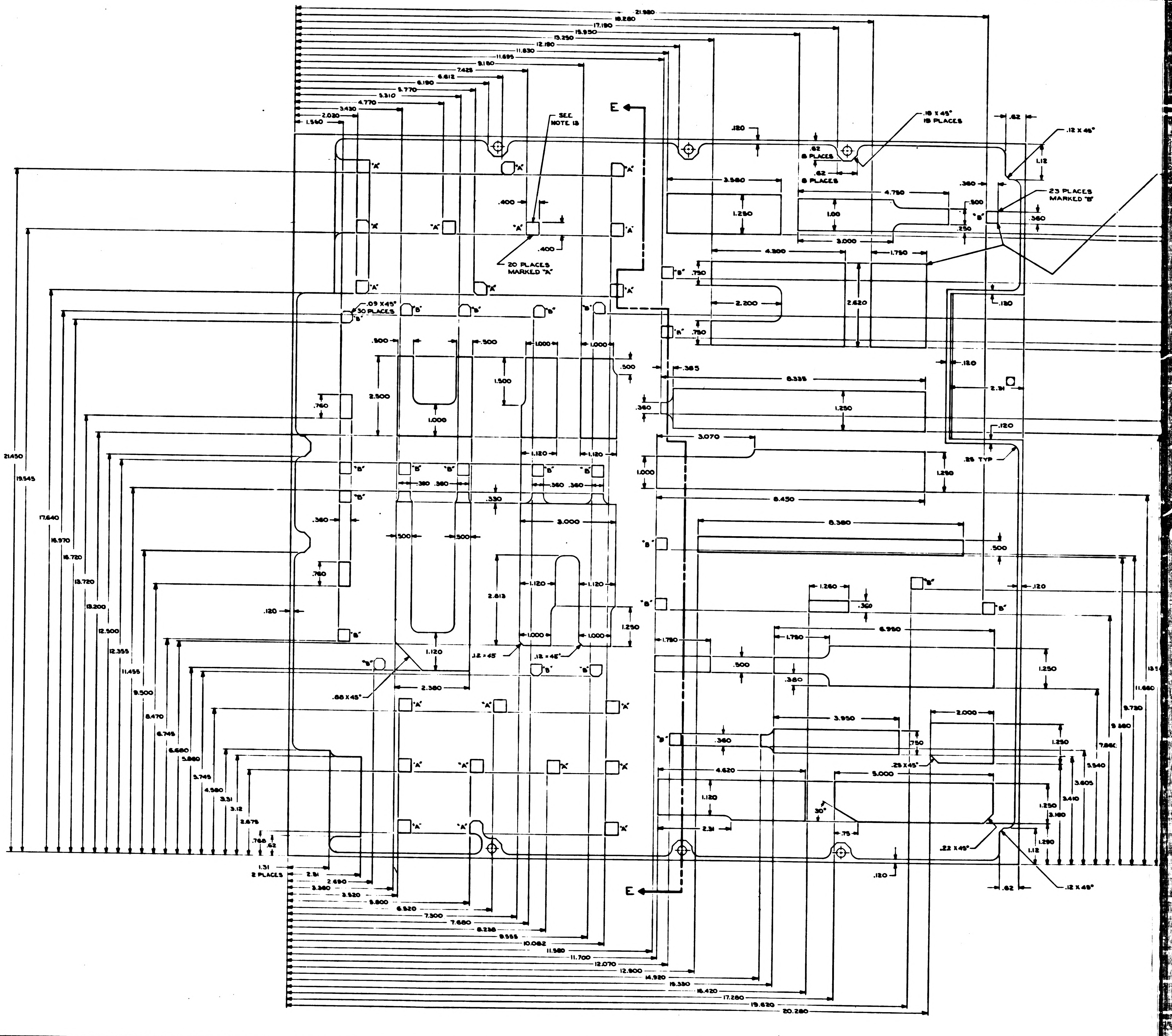
SECTION G-G


.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


.937
2.220
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R TYP
.156
.156
.156
.156
.156
.156
.156
.156
.156
.156 R TYP
H
H
13.240
11.650
5.550
.156
.156
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187

1/2008432


E
E
SEE NOTE 13
20 PLACES MARKED "A"
23 PLACES MARKED "B"
.18 X 45° 18 PLACES
.12 X 45°
.09 X 45° 30 PLACES
.88 X 45°
.22 X 45°
.25 X 45°
.25 TYP
.62 8 PLACES
1.31 2 PLACES
21.980
19.280
17.190
15.930
13.250
12.190
11.830
11.695
9.180
7.425
6.612
6.180
5.770
5.310
4.770
3.430
2.030
1.560
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.880
5.745
4.580
3.31
3.12
2.875
.768
.62
2.81
2.690
3.360
3.520
5.800
6.520
7.300
7.680
8.238
9.555
10.082
11.580
11.700
12.070
12.800
14.920
15.330
16.420
17.280
19.620
20.280
8.335
6.450
6.380
6.950
5.000
3.950
4.620
4.300
3.580
3.070
3.000
2.380
2.200
2.000

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.

6. COAT THREADS OF FIND 2,3,4,5 & 6 WITH MIL-P-8585, COLOR Y
☐ 7. INSTALL FIND NO. 2,3,4,5 & 6 WET PER MS33648. REMOVE DRIVING TANG. FOR FIND NO. 2 THE HELICOIL INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF HELICOIL INSERT, A STANDARD SCREW SHALL BE ENGAGED & DISENGAGED FULL LENGTH OF HELICOIL INSERT AS FINAL STEP IN CLEANING OF HELICOIL INSERT THREADS
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

2008432	REV. B	SHT. 1

ANDARDS PRESCRIBED BY MIL-D-70327
ION H24 PER MIL-M-26075 AND
ENTS OF THE ALUMINUM ASSOCIATION'S
ONS AND FORGINGS
NLESS OTHERWISE SPECIFIED

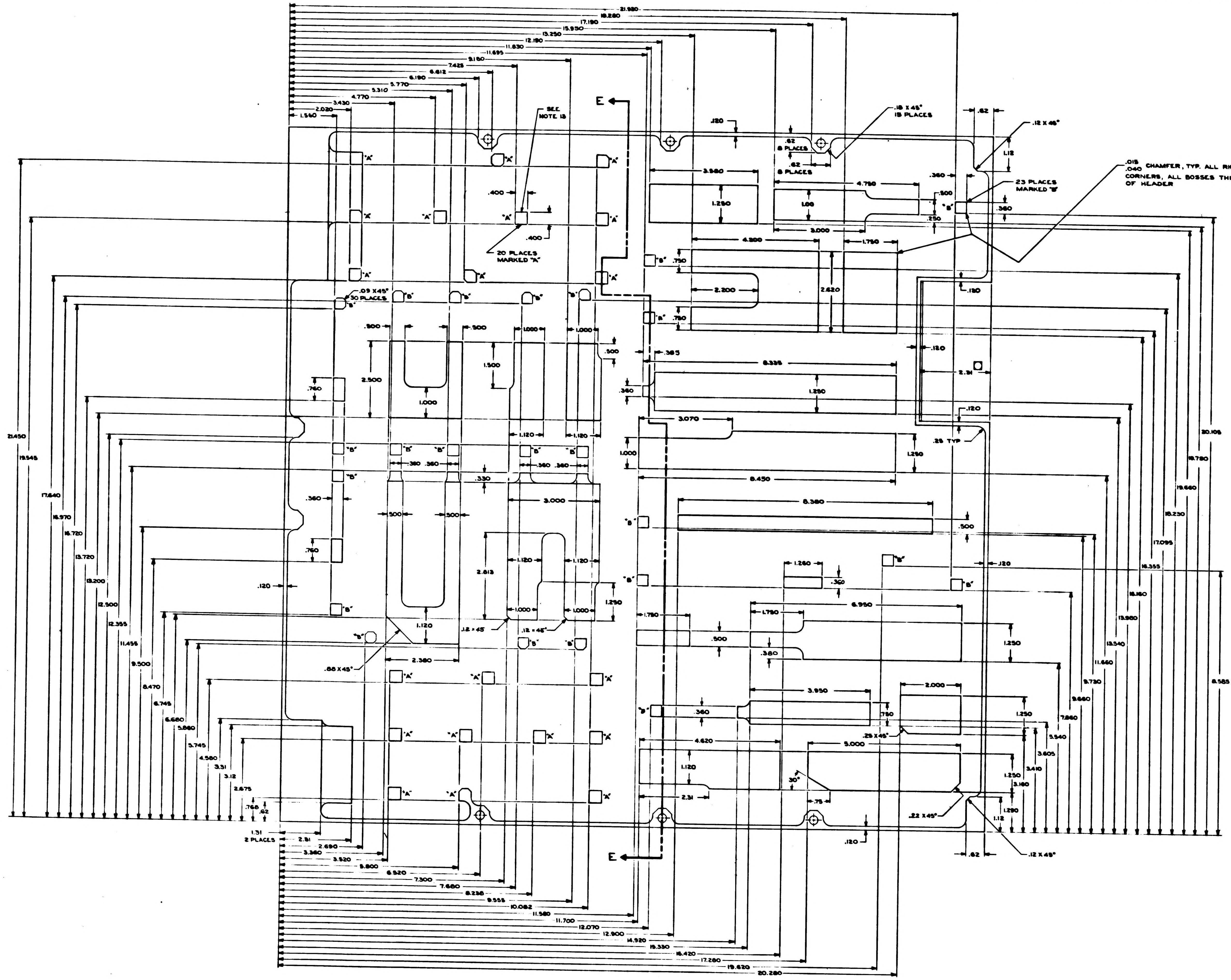
PECIFIED

PE I, CLASS C. UNLESS

MIL-P-8585, COLOR Y
REMOVE DRIVING TANG.
ALLS MATING WITH SCREW
CONTAMINANTS. AFTER POST
NSERT, A STANDARD SCREW
LENGTH OF HELICOIL INSERT
OIL INSERT THREADS
010
BE FREE OF ANODIZE, AFTER
NG MATERIAL PER MIL-M-3171, TYPE I.

MS21303-1B.

18. AFTER ANODIZING, COAT HOLES
TYPE II. DO NOT EPOXY COAT.
E FREE OF ANODIZE; AFTER
NG MATERIAL PER MIL-M-3171,


25
24
23
22
21
20
19
18
17
16
21.980
19.280
17.190
15.950
13.250
12.190
11.830
11.695
9.180
7.425
6.812
6.190
5.770
5.310
4.770
3.430
2.020
1.560
E
SEE NOTE 13
20 PLACES MARKED "A"
.18 X 45° 18 PLACES
.62 8 PLACES
.12 X 45°
.015 .040 CHAMFER, TYP. ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
23 PLACES MARKED "B"
.09 X 45° 30 PLACES
.25 TYP
.88 X 45°
.12 X 45
.29 X 45°
.22 X 45°
30°
1.31 2 PLACES
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.860
5.745
4.580
3.31
3.12
2.675
.768
.62
2.31
2.690
3.360
3.920
5.800
6.520
7.300
7.680
8.236
9.555
10.082
11.580
11.700
12.070
12.900
14.920
15.330
16.420
17.280
19.620
20.280
20.105
19.780
19.660
18.230
17.095
16.355
16.160
13.980
13.540
11.660
9.730
9.660
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3.605
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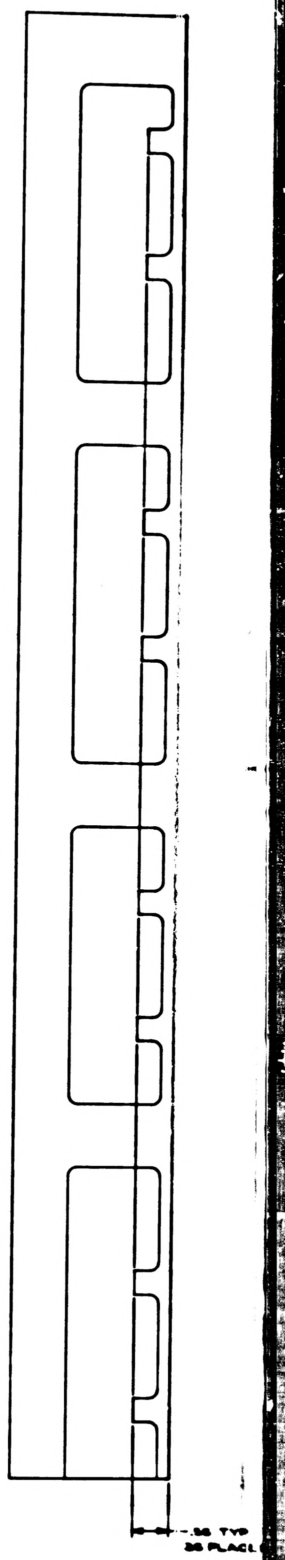
3.160
1.290
1.12
8.585

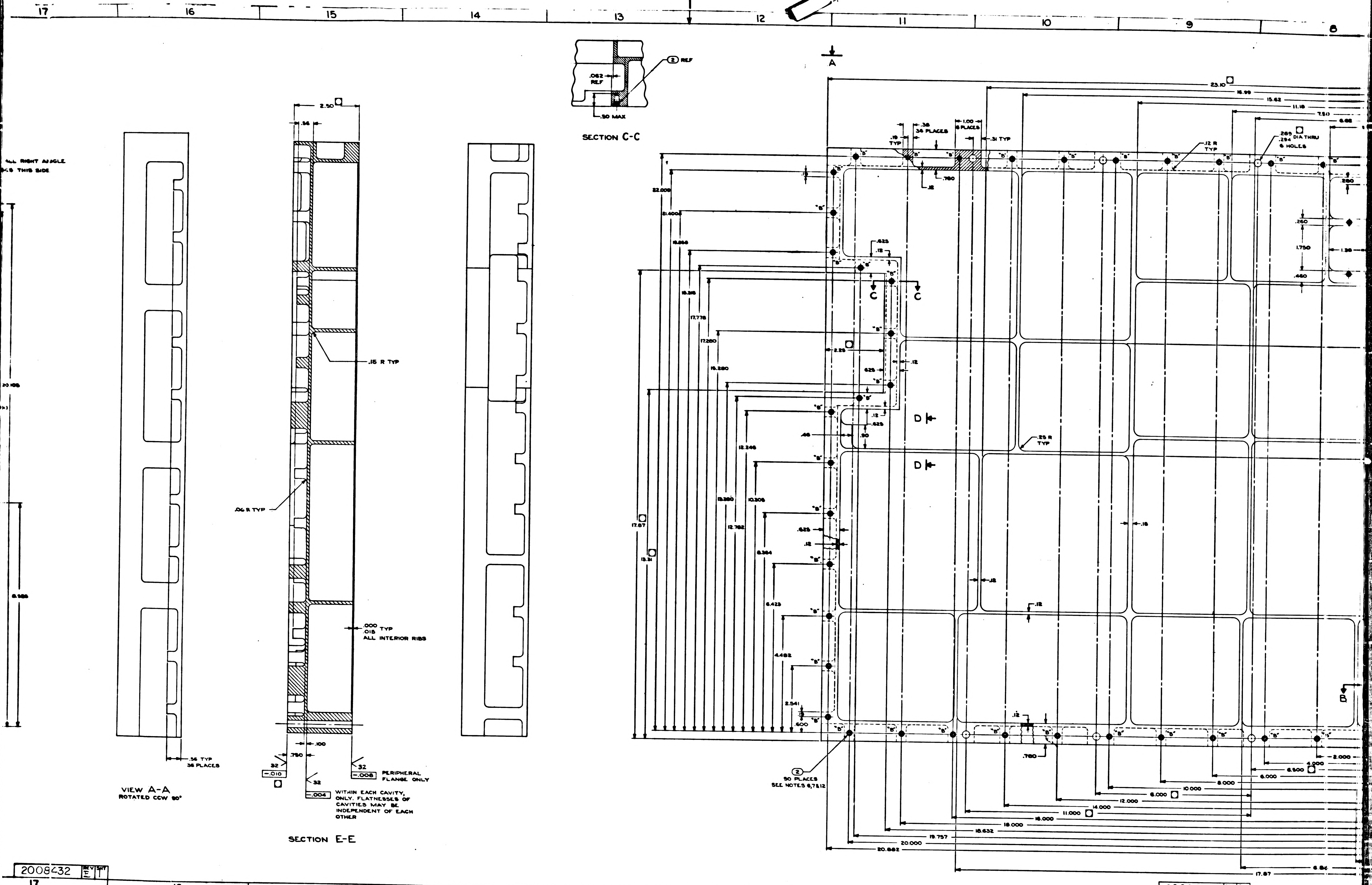

.56 TYP 38 PLACES

VIEW A-A
ROTATED CCW 90°

	REV	SHT
2008432	3	1

	REV	SHT
2008432	3	1

2/2008432


17
16
15
14
13
12
11
10
9
8
ALL RIGHT ANGLE
LS THIS SIDE
20.106
8.988
.56 TYP
36 PLACES
VIEW A-A
ROTATED CCW 90°
2.50
.56
.15 R TYP
.06 R TYP
.000
.015 TYP
ALL INTERIOR RIBS
.100
.750
32
.010
32
.004
32
.008
PERIPHERAL
FLANGE ONLY
WITHIN EACH CAVITY,
ONLY. FLATNESSES OF
CAVITIES MAY BE
INDEPENDENT OF EACH
OTHER
SECTION E-E
.062
REF
.50 MAX
② REF
SECTION C-C
A
23.10
16.99
15.62
11.18
7.510
6.62
.38
36 PLACES
1.00
6 PLACES
.31 TYP
.19
TYP
.12 R
TYP
.289
.294 DIA THRU
6 HOLES
.780
.12
"B"
22.000
21.400
19.856
18.316
17.778
17.280
15.280
12.246
13.280
12.782
10.306
8.364
6.423
4.482
2.541
.600
17.87
13.31
.625
.12
C
C
2.29
.12
.46
.90
D
D
.25 R
TYP
.18
.12
.260
1.750
.460
1.38
.280
B
②
50 PLACES
SEE NOTES 6,7 & 12
.780
2.000
4.000
5.500
6.000
8.000
10.000
9.000
12.000
14.000
11.000
16.000
18.000
18.632
19.757
20.000
20.882
6.86
17.87

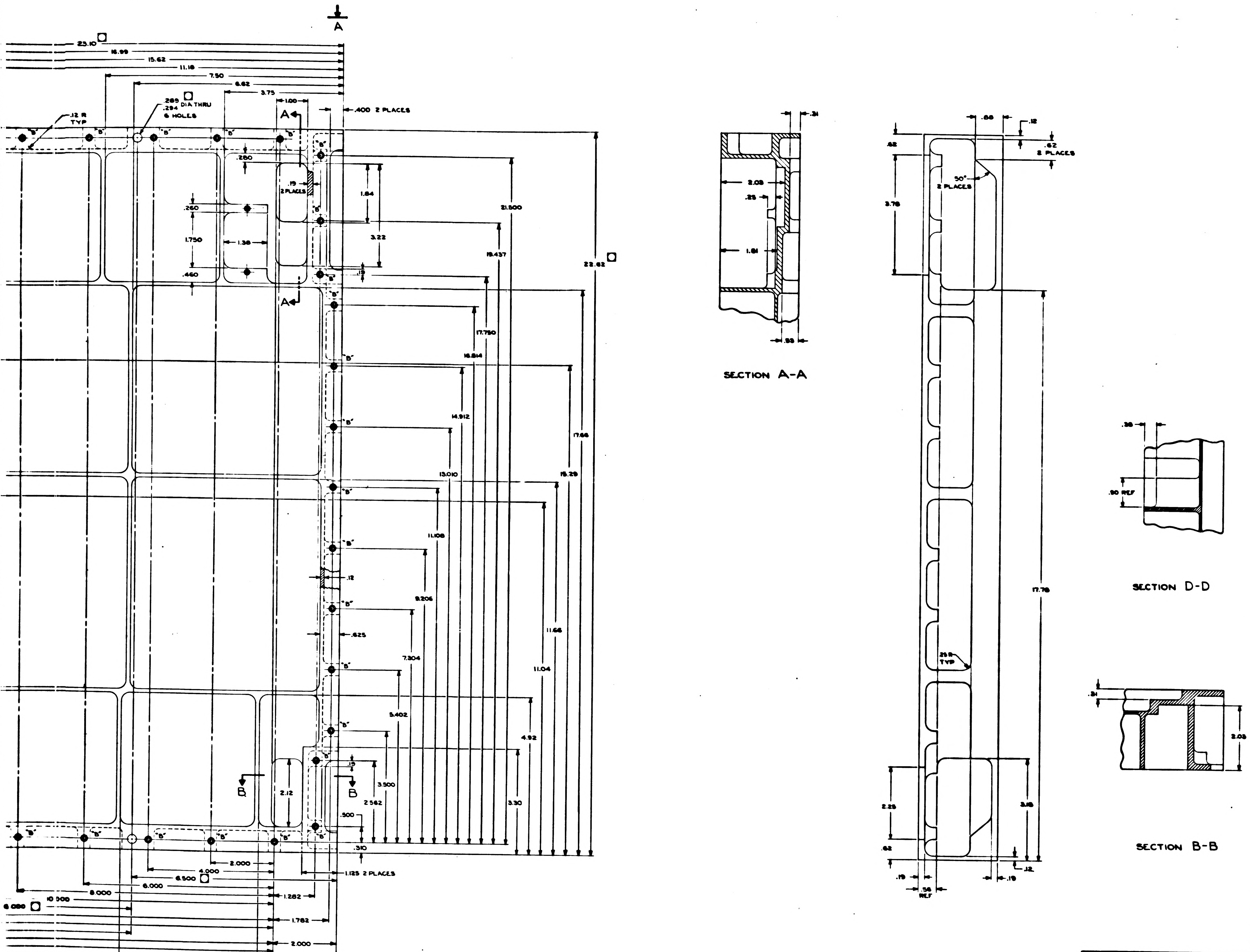
2008432 REV E SHT 1

2008432 REV B SHT 1

3/2008432

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	A
A		REVISED PER TDRR 28487	WAP		MAY 66	
B		REVISED PER TDRR 30531		JI	9 AUG 66	

REVISIONS 25555



A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.12 R TYP
.289 .294 DIA THRU 6 HOLES
A
"B"
.280
.19 2 PLACES
1.84
.260
1.750
1.38
3.22
.460
21.500
19.437
22.62
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
17.66
15.29
11.66
11.04
4.92
3.30
.12
.625
.19
.500
.310
2.12
B
B
2.000
4.000
6.000
6.500
8.000
10.000
6.080
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87
.31
2.03
.25
1.81
.53
SECTION A-A
.88
.12
.42
.62 2 PLACES
50° 2 PLACES
3.78
17.76
.25 R TYP
2.25
.62
3.18
.19
.56 REF
.19
.12
.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B

4H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

2007015	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

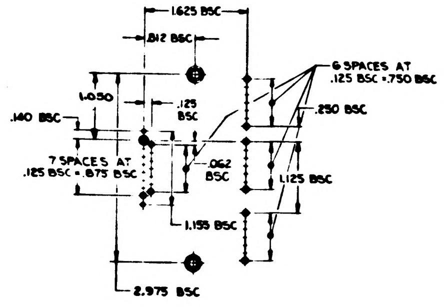
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonarrigo 23 Jun 66
CHECKED 25 Jun 66
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC A. C. METZGER
DATE

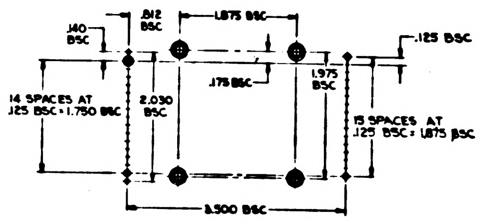
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY C/M PSA

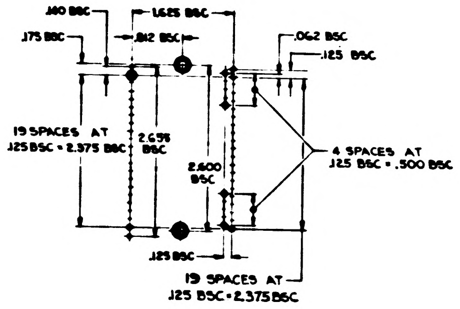
CODE IDENT NO 80230
SIZE J
DRAWING NO 2008432
SCALE 1/1
SHEET 1 OF 2


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

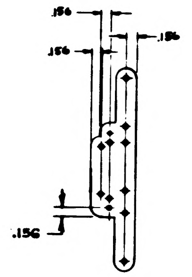
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

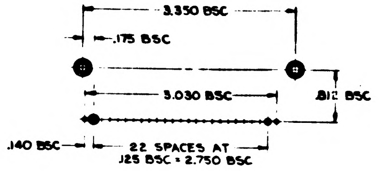
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.695 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

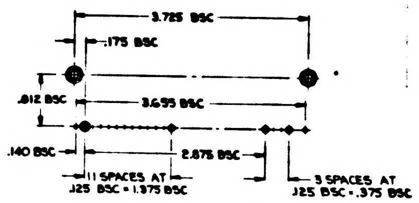
DETAIL C


.156
.156
.156
.156

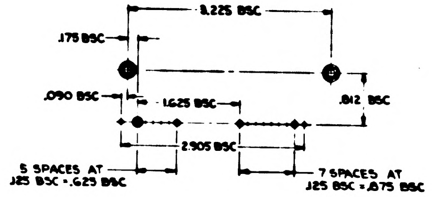
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

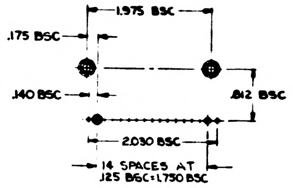
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.695 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

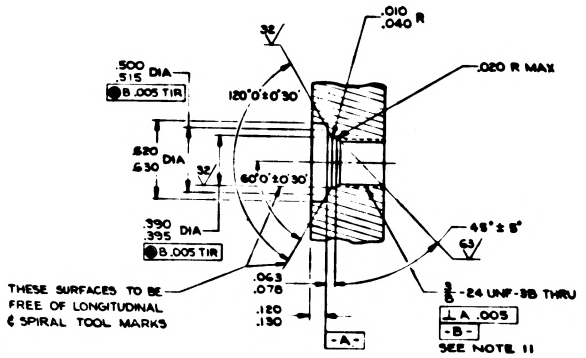
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

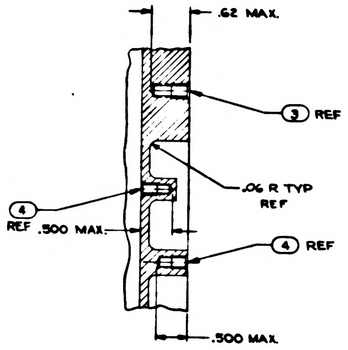
DETAIL F


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

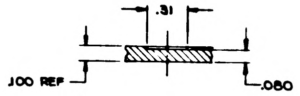
DETAIL G


.010 R
.040
32
.500 DIA
.515
B .005 TIR
120°0'±0°30'
.020 R MAX
.620 DIA
.630
32
60°0'±0°30'
.390 DIA
.395
B .005 TIR
45° ± 5°
63
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063
.078
.120
.130
-A-
3/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

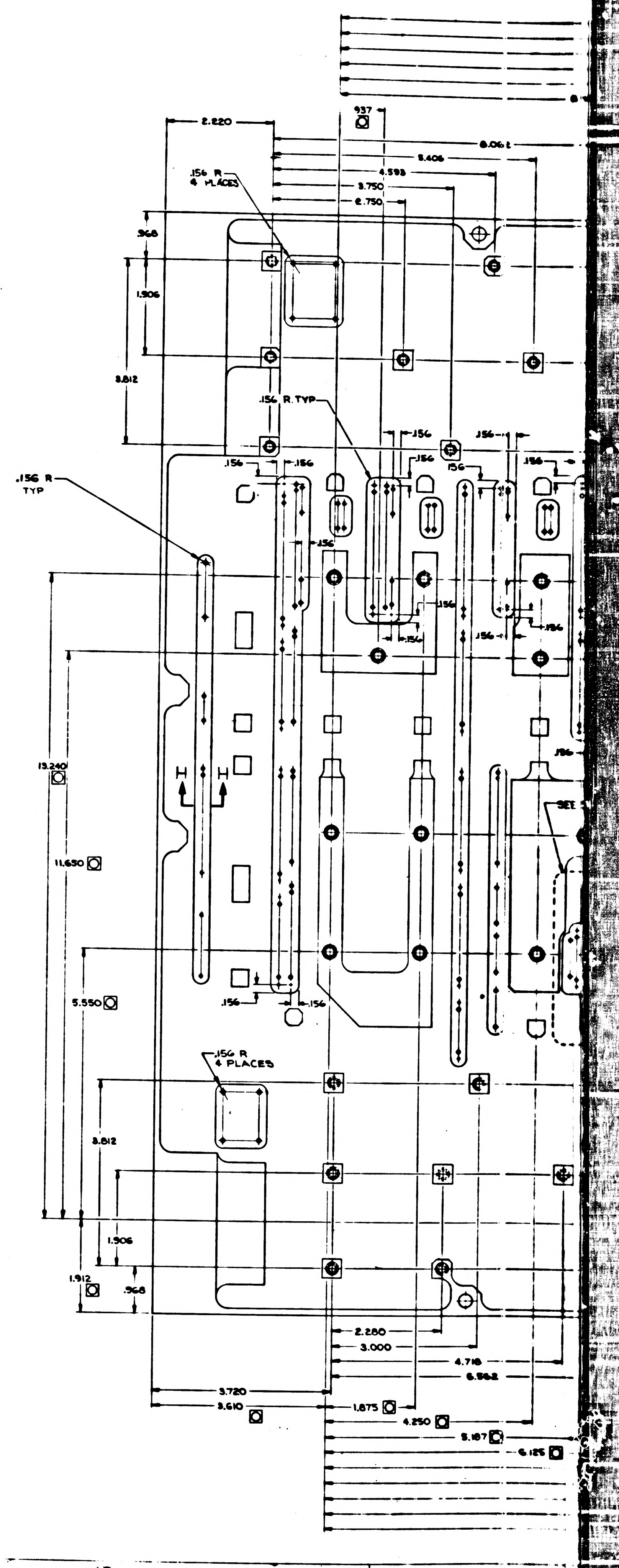
SECTION F-F
SCALE 2/1

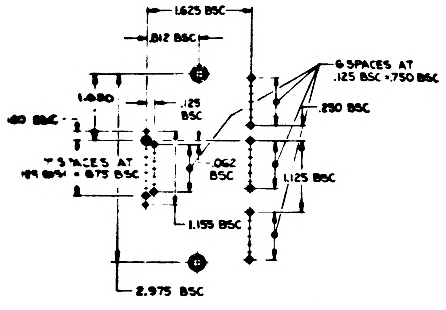

.62 MAX.
3 REF
.06 R TYP REF
4 REF .500 MAX.
4 REF
.500 MAX.

SECTION G-G

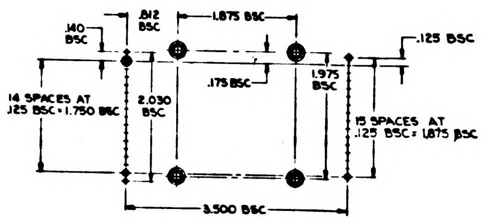

.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL

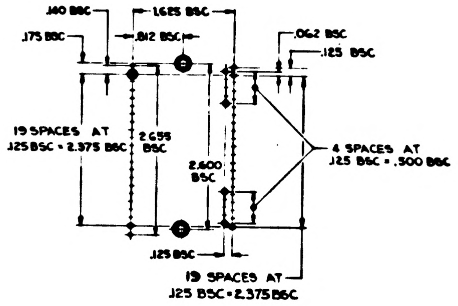

2.820
.937
8.062
5.406
.156 R 4 PLACES
4.593
3.750
2.750
.968
1.906
3.812
.156 R TYP
.156
.156 R TYP
13.240
11.650
5.550
H H
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
5.562
3.720
3.610
1.875
4.250
5.187
6.125


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
1.080
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

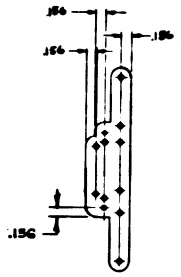
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
.175 BSC
1.975 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

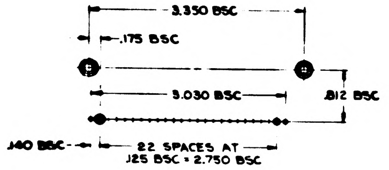
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.655 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

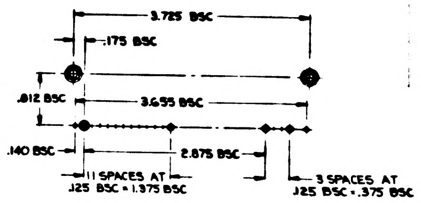
DETAIL C


.156
.156
.186
.156

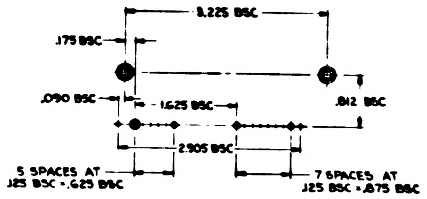
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

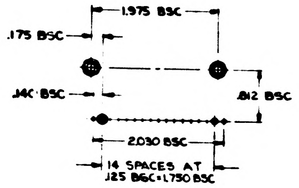
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

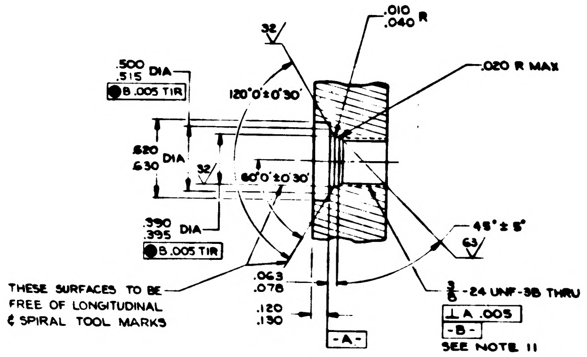
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

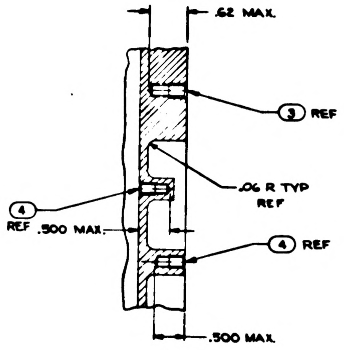
DETAIL F


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

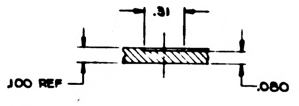
DETAIL G


32
.010 .040 R
.500 .515 DIA
B .005 TIR
120°0'±0°30'
.020 R MAX
.620 .630 DIA
32
60°0'±0°30'
.390 .395 DIA
B .005 TIR
45° ± 5°
63
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063 .078
.120 .130
-A-
3/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

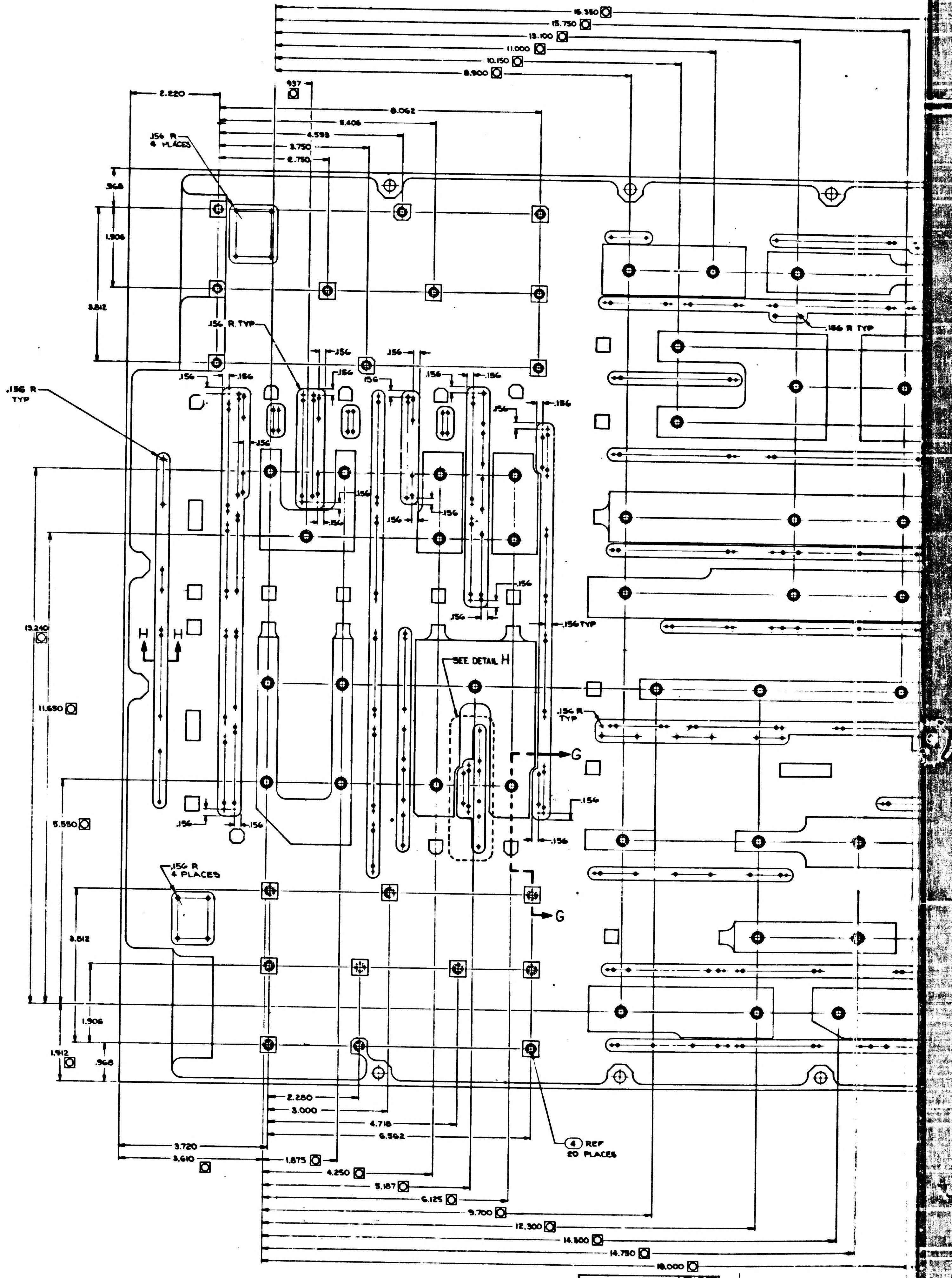
SECTION F-F
SCALE 2/1

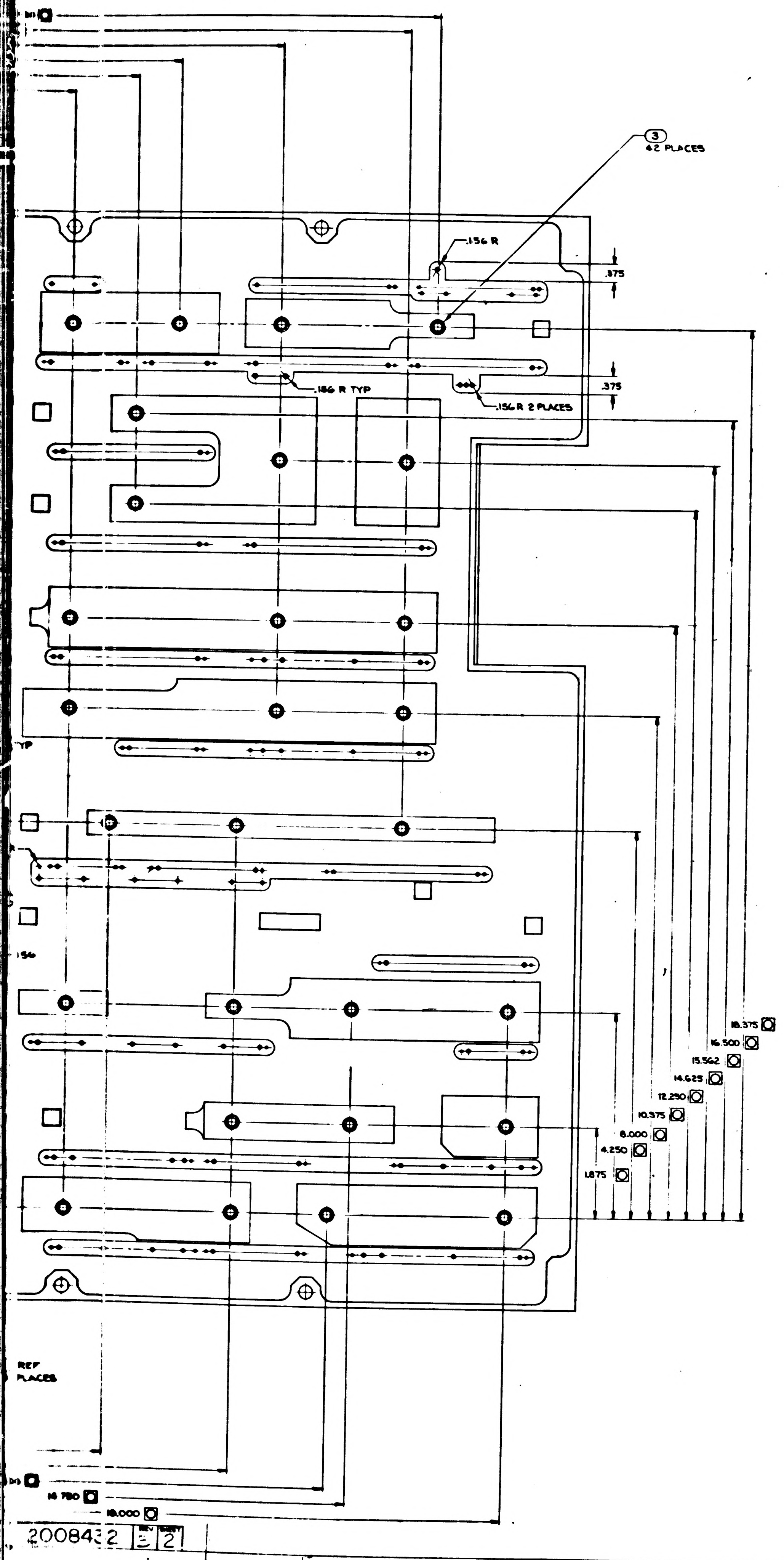

.62 MAX
3 REF
.06 R TYP REF
4 REF .500 MAX
4 REF
.500 MAX

SECTION G-G

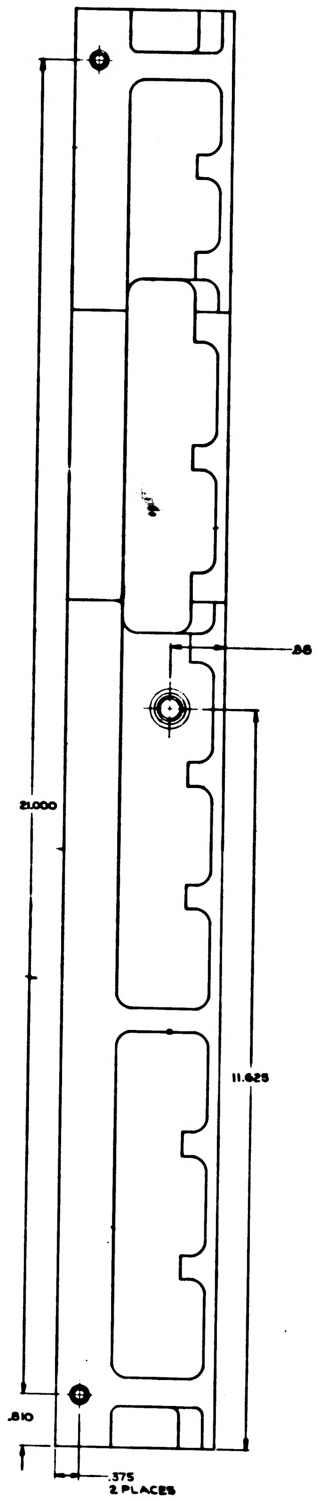

.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


16.350
15.750
13.100
11.000
10.150
8.900
2.220
.937
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R TYP
.186 R TYP
.156
.186
.156 R TYP
13.240
H H
11.650
SEE DETAIL H
.156 TYP
.156 R TYP
G
G
5.550
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.800
14.750
18.000
4 REF 20 PLACES



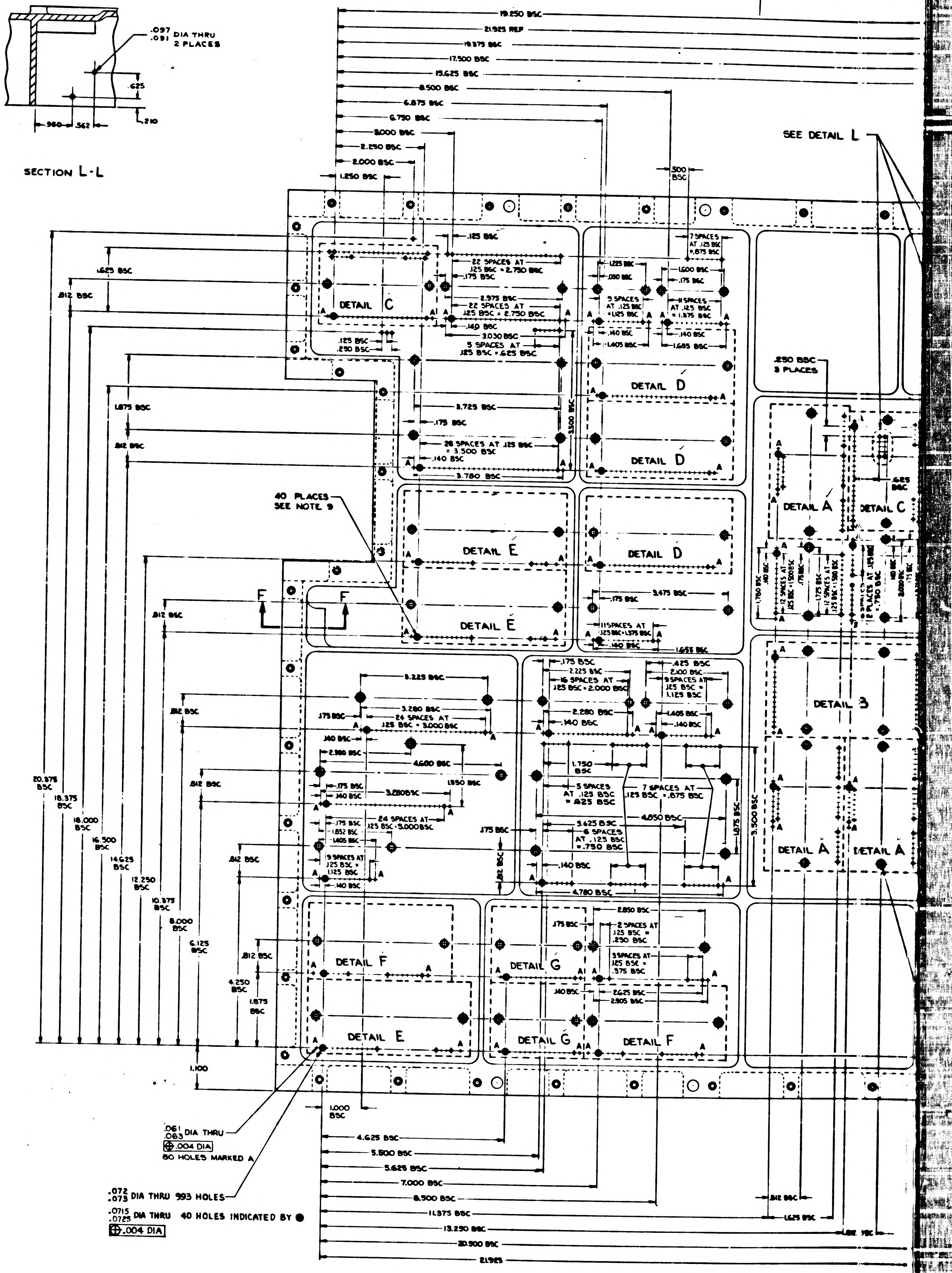
③ 42 PLACES
.156 R
.186 R TYP
.156 R 2 PLACES
.375
.375
18.375
16.500
15.562
14.625
12.290
10.375
8.000
4.250
1.875
16.750
18.000
REF
PLACES



21.000
11.625
.88
.810
.375 2 PLACES

SECTION L-L

.097 .091 DIA THRU 2 PLACES
.625
.960
.562
.210

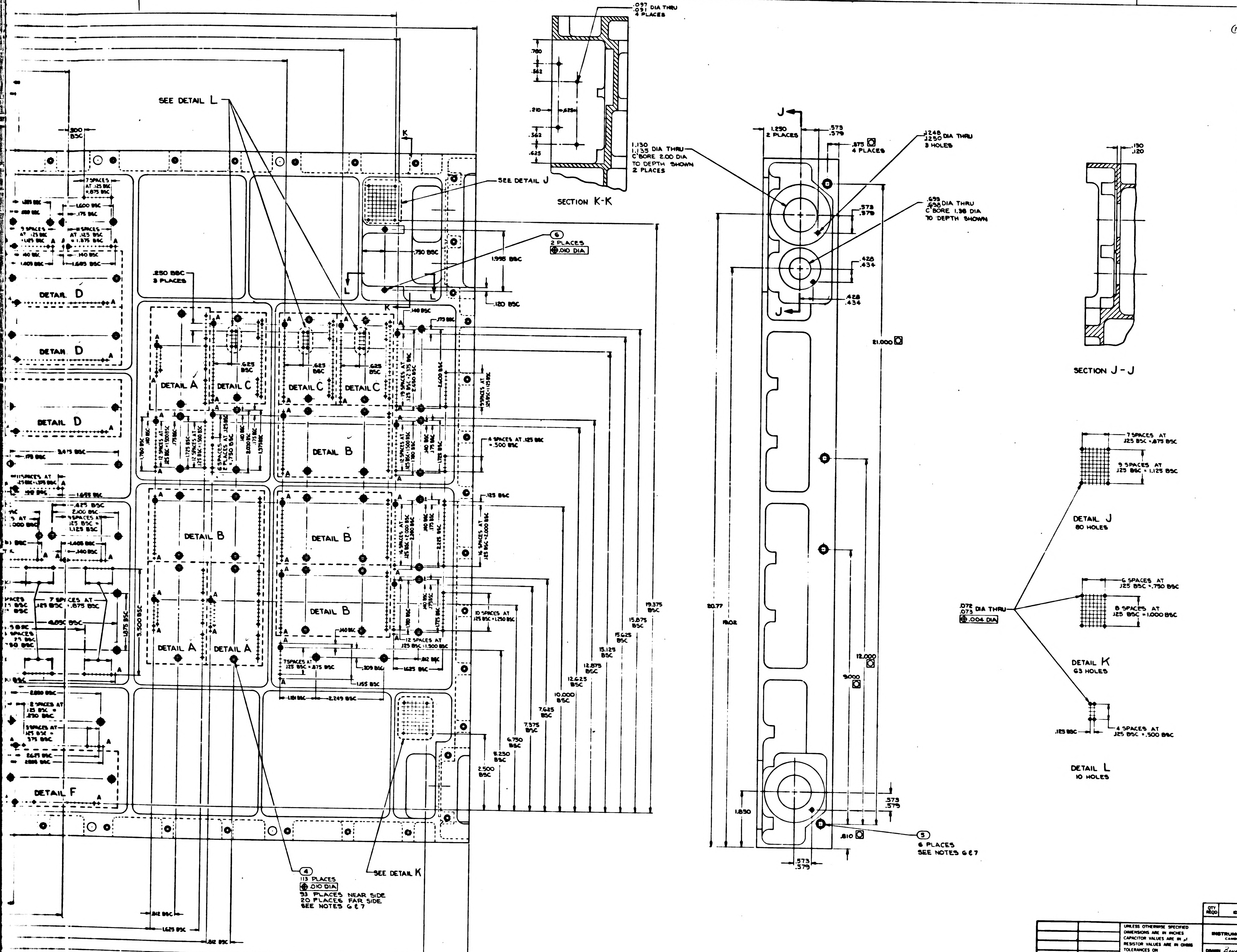


19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.500 BSC
SEE DETAIL L
DETAIL C
DETAIL D
DETAIL D
DETAIL D
DETAIL E
DETAIL E
DETAIL A
DETAIL C
DETAIL B
DETAIL A
DETAIL A
DETAIL F
DETAIL G
DETAIL E
DETAIL G
DETAIL F
.250 BSC 3 PLACES
40 PLACES SEE NOTE 9
F F
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.900 BSC
21.925
.061 .063 DIA THRU ⊕ .004 DIA 80 HOLES MARKED A
.072 .073 DIA THRU 993 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
⊕ .004 DIA

2008432 B 2

3/2008432

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28487	JIM P		9 MAY 66	
B		REVISION STATUS CHANGED	EHF	JI	9 AUG 66	



SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
.097 .091 DIA THRU 4 PLACES
.780
.562
.210
.625
SECTION K-K
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
J
1.250 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
6 2 PLACES .010 DIA
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
.130 .120
SECTION J-J
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
K
L
1.995 BSC
.750 BSC
.120 BSC
.250 BSC 3 PLACES
.625 BSC
.300 BSC
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
6.750 BSC
5.250 BSC
2.500 BSC
.812 BSC
1.625 BSC
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.072 .073 DIA THRU .004 DIA
DETAIL K 63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± .XXX = .005 .XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007095	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bonacco 25 Jan 66
CHECKED R.P. Kuncio 25 Jan 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE
SHEET 2 OF 2

2008432 B

2008432 REV B SHEET 2

4H

4/2008432

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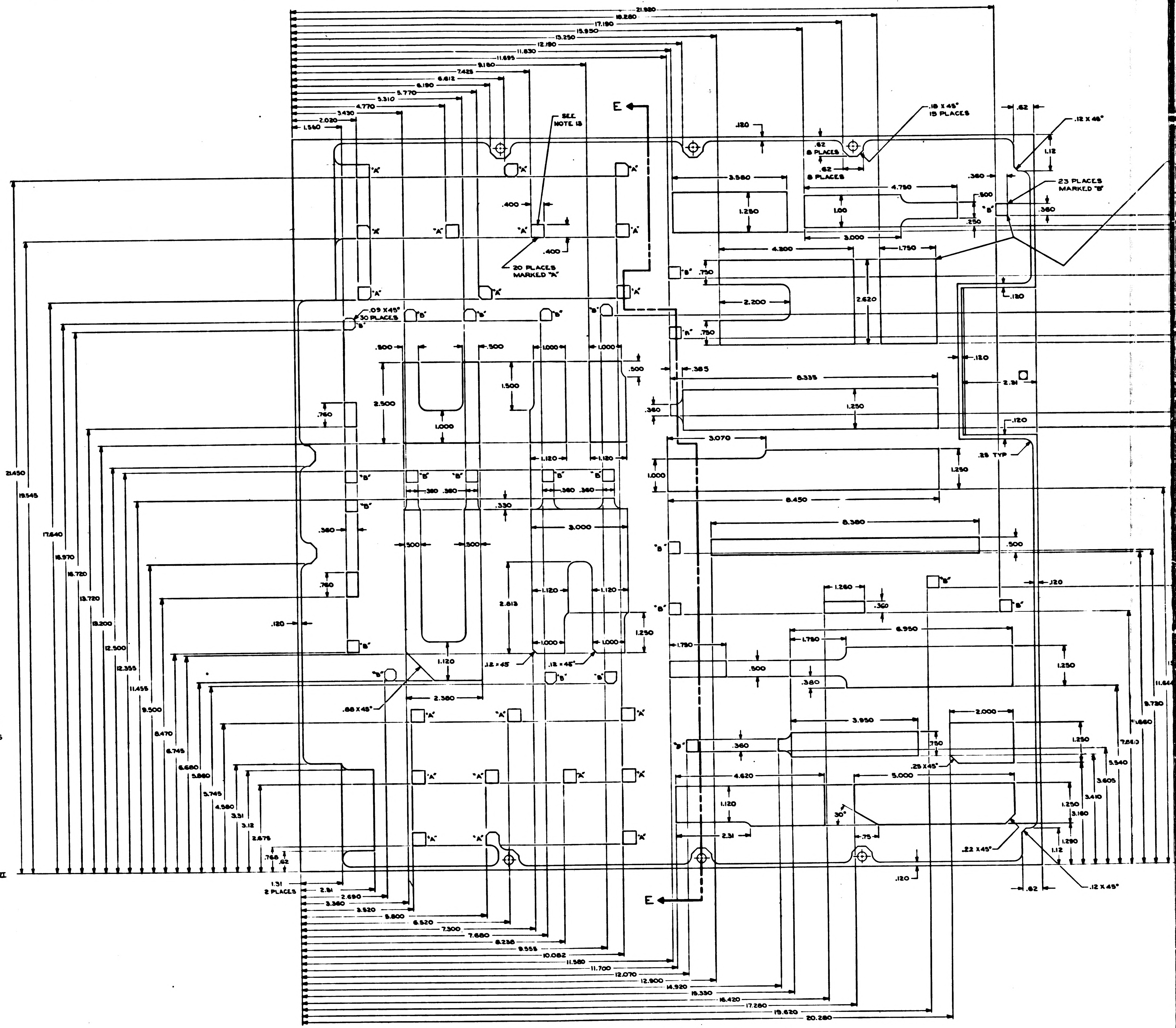
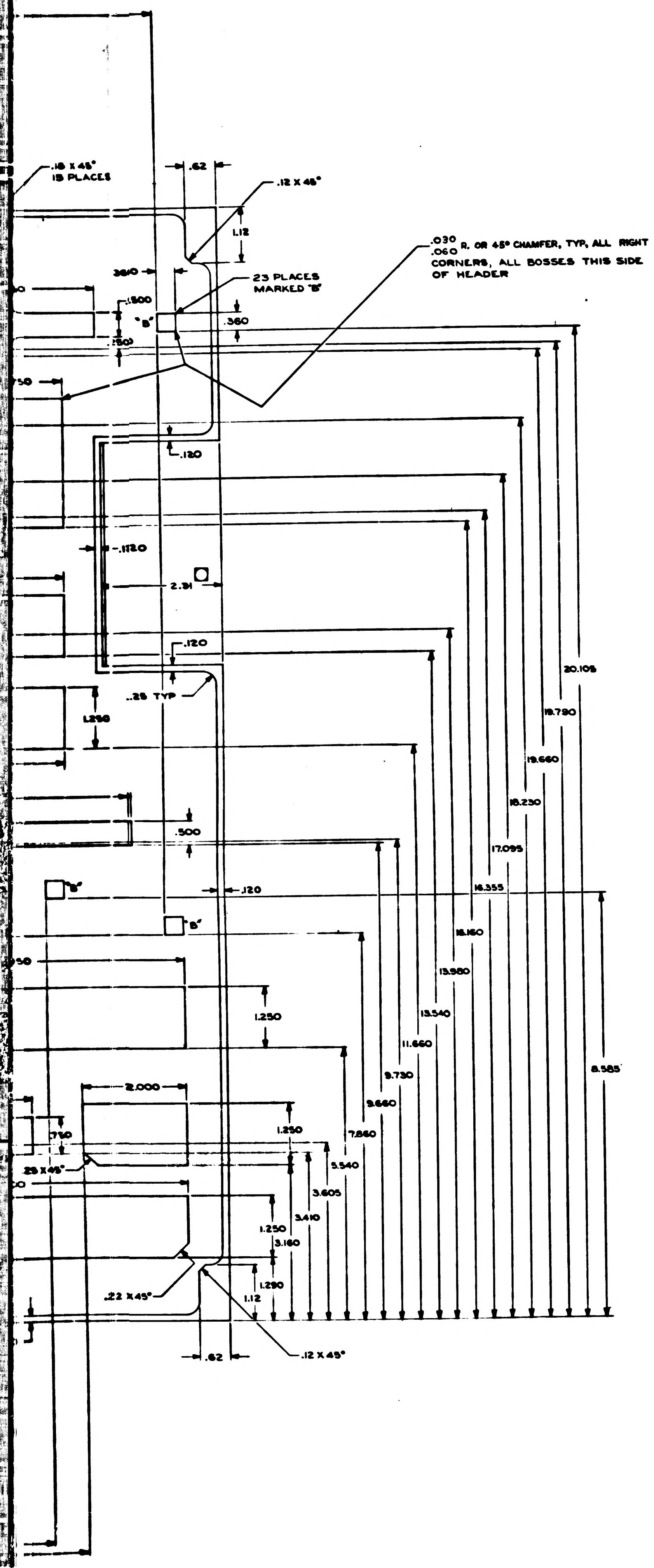


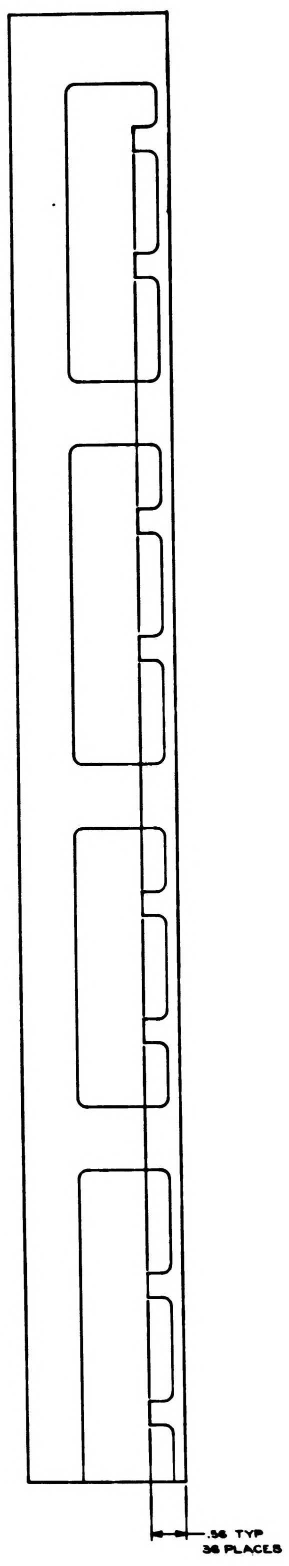
SEE NOTE 13
E
E
20 PLACES MARKED "A"
23 PLACES MARKED "B"
.19 X 45° 15 PLACES
.12 X 45°
.09 X 45° 30 PLACES
.88 X 45°
.12 X 45
.12 X 45°
.25 X 45°
.22 X 45°
.25 TYP
30°
.62 8 PLACES
.62 8 PLACES
1.31 2 PLACES
"A"
"B"
21.980
18.280
17.190
15.950
13.250
12.190
11.830
11.695
9.180
7.425
6.612
6.190
5.770
5.310
4.770
3.430
2.020
1.540
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.880
5.745
4.580
3.31
3.12
2.675
.768
.62
2.81
2.690
3.360
3.520
5.800
6.520
7.300
7.680
8.236
9.555
10.082
11.580
11.700
12.070
12.900
14.920
15.330
16.420
17.280
19.620
20.280
3.580
1.250
4.750
3.000
1.00
4.300
1.750
2.200
2.620
8.335
3.070
8.450
8.380
1.260
6.950
1.750
3.950
2.000
4.620
5.000
2.31
2.31
1.120
.75
2.500
1.500
1.000
2.380
3.000
2.813
1.120
.360
.380
.500
.385
.750
.120
.62
1.12
11.660
9.730
7.840
5.540
3.605
3.410
3.160
1.290
1.12

NOTES:

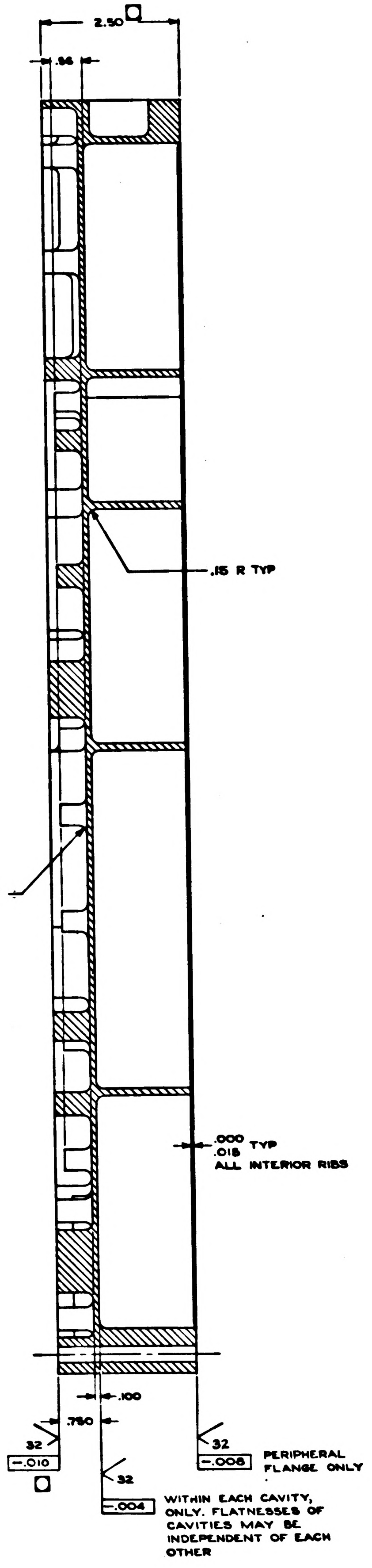
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.
6. COAT THREADS OF FIND 2,3,4,5 & 6 WITH MIL-P-8585, COLOR Y
7. ☐ INSTALL FIND NO. 2,3,4,5 & 6 WET PER MS33646. REMOVE DRIVING TANG. FOR FIND NO. 2 THE HELICOIL INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF HELICOIL INSERT, A STANDARD SCREW SHALL BE ENGAGED & DISENGAGED FULL LENGTH OF HELICOIL INSERT AS FINAL STEP IN CLEANING OF HELICOIL INSERT THREADS
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.

	REV.	SHT.
2008432	C	1

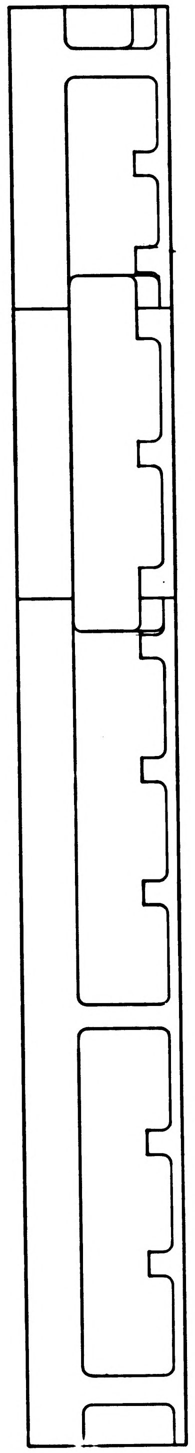

.18 X 45°
18 PLACES
.62
.12 X 45°
1.12
.030
.060 R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
23 PLACES MARKED "B"
"B"
.1500
.360
.120
.1120
2.31
.120
.25 TYP
1.258
.500
"B"
.120
1.250
2.000
1.250
.25 X 45°
1.250
3.160
1.290
.22 X 45°
1.12
.62
.12 X 45°
20.105
19.780
19.660
18.250
17.095
16.355
16.160
13.980
13.540
11.660
9.730
9.660
8.585
7.860
5.540
3.605
3.410

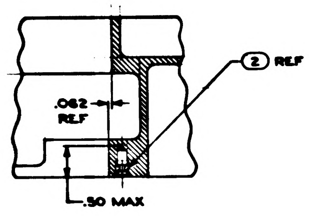

.56 TYP
36 PLACES

VIEW A-A
ROTATED CCW 90°

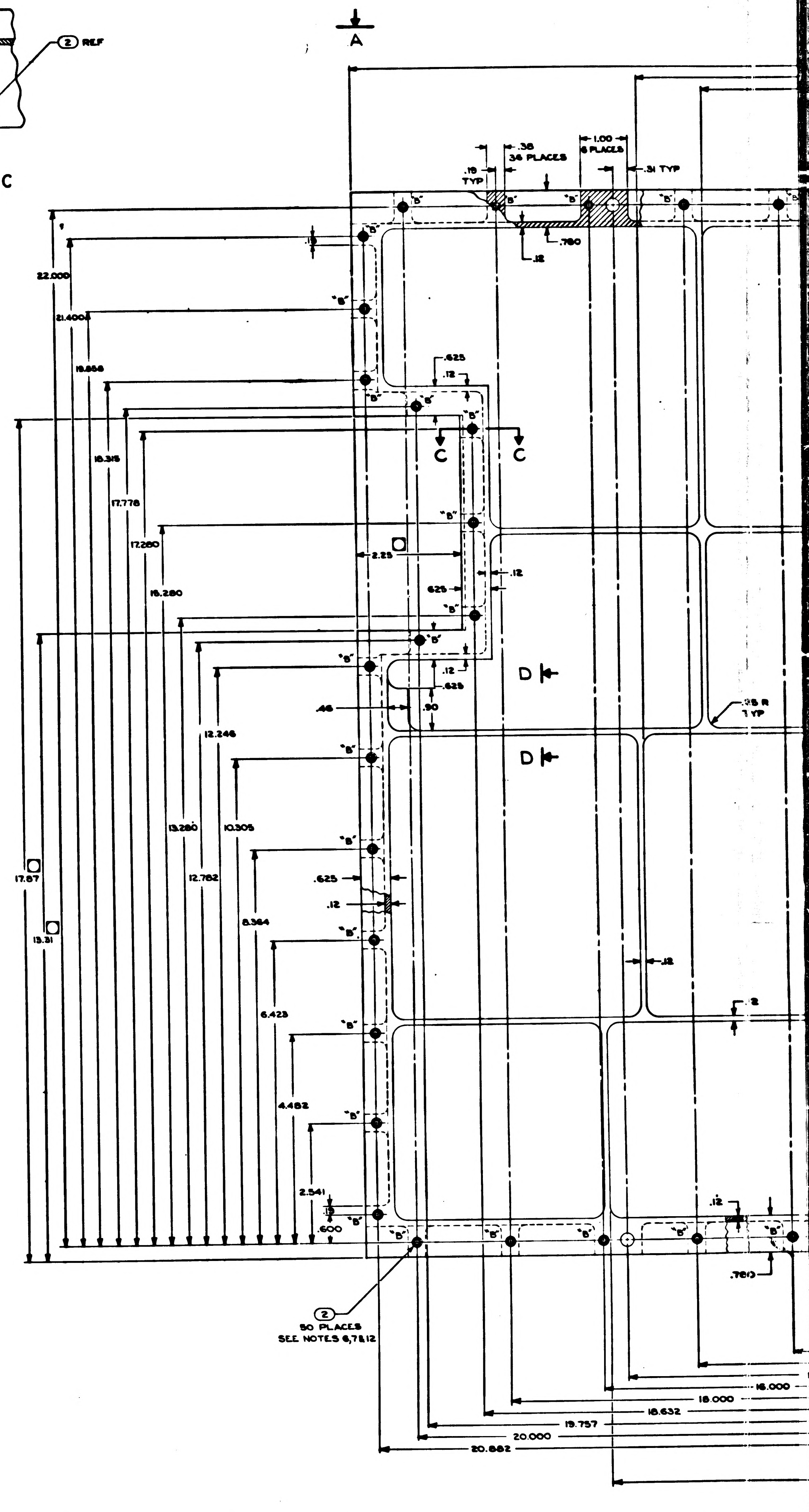

2.50
.56
.15 R TYP
.06 R TYP
.000
.015 TYP
ALL INTERIOR RIBS
.100
.750
32
.010
32
.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
32
.008
PERIPHERAL FLANGE ONLY

SECTION E-E



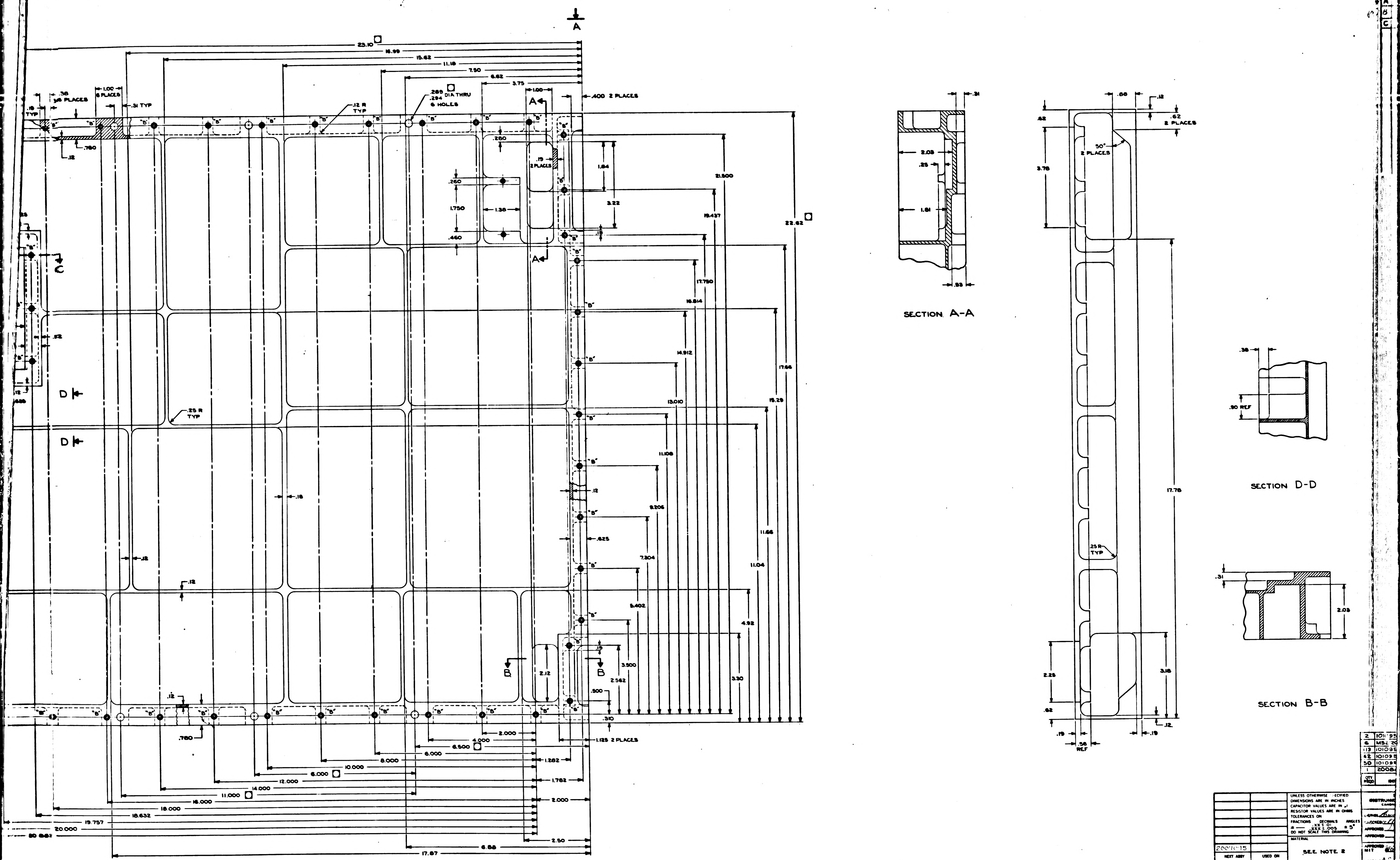

② REF
.062
REF
.50 MAX

SECTION C-C


A
.19
TYP
.38
36 PLACES
1.00
6 PLACES
.31 TYP
.780
.12
"B"
22.000
21.4004
19.868
18.315
17.776
17.280
15.280
13.280
12.782
12.246
10.305
8.364
6.423
4.482
2.541
.600
17.87
13.31
.625
.12
C
C
2.25
.625
.12
.12
.625
.90
.46
D
D
.25 R
TYP
.625
.12
.12
.12
.12
.7813
②
50 PLACES
SEE NOTES 6,7 & 12
16.000
18.000
18.632
19.757
20.000
20.882

2008432 REV C SHT 1

2/2008432


A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.38 3/8 PLACES
1.00 6 PLACES
.31 TYP
.12 R TYP
.289 .294 DIA THRU 6 HOLES
.19 TYP
.780
.12
"B"
A
.280
.19 2 PLACES
1.84
3.22
.260
1.750
1.38
.460
21.900
19.437
22.62
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
17.66
15.29
11.66
11.04
4.92
3.30
3.500
2.562
2.12
.500
.310
.19
.12
.625
.16
.25 R TYP
C
D
D
B
B
.780
2.000
4.000
6.500
6.000
8.000
10.000
6.000
12.000
14.000
11.000
16.000
18.000
18.632
19.757
20.000
20.881
1.282
1.782
2.000
2.50
6.88
17.87
1.125 2 PLACES
.31
2.03
.25
1.81
.53
SECTION A-A
.88
.12
.62
.62 2 PLACES
50° 2 PLACES
3.76
17.78
.25R TYP
2.25
3.18
.62
.19
.56 REF
.19
.12
SECTION B-B
.38
.90 REF
SECTION D-D
.31
2.03

2	101C95
6	MS2 20
113	101095
42	101095
50	101095
1	20084
QTY REQD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XX ± .01 .XXX ± .005 ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007015	

APPLICATION

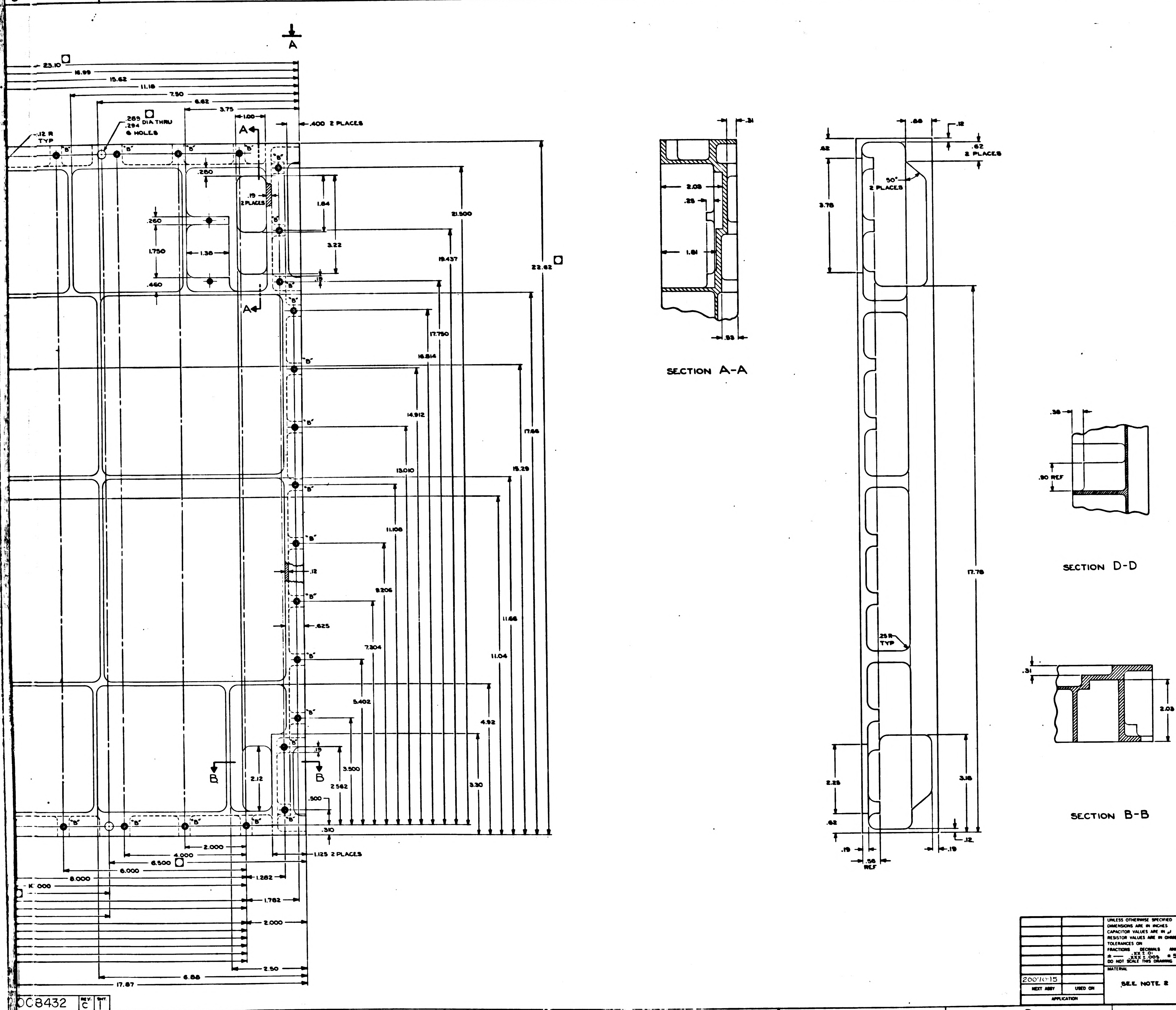
INSTRUM
CAMB

CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASA MSC

2008432 REV. C SHT. 1

3/2008432

REVISIONS 25555					
SYM	ZONE	DESCRIPTION	DR	CHK	DATE
A		REVISED PER TDRR 28487	JIMP		9 MAY 66
B		REVISED PER TDRR 30531	EMJ	JI	9 AUG 66
C		REVISED PER TDRR 31560	TD		20 OCT 66



SECTION A-A
SECTION D-D
SECTION B-B
.289 .294 DIA THRU 6 HOLES
.12 R TYP
.400 2 PLACES
1.125 2 PLACES
50° 2 PLACES
.62 2 PLACES
.25 R TYP
.90 REF
.56 REF
22.62
21.500
19.437
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
23.10
16.99
15.62
11.18
7.50
6.62
3.75
17.87
6.88
2.50
17.78
3.16
2.25
2.03
"B"
A
B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007015	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.01 .XXX ±.005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonarrigo 23 Jun 66
CHECKED 25 Jun 66
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY
C/M PSA

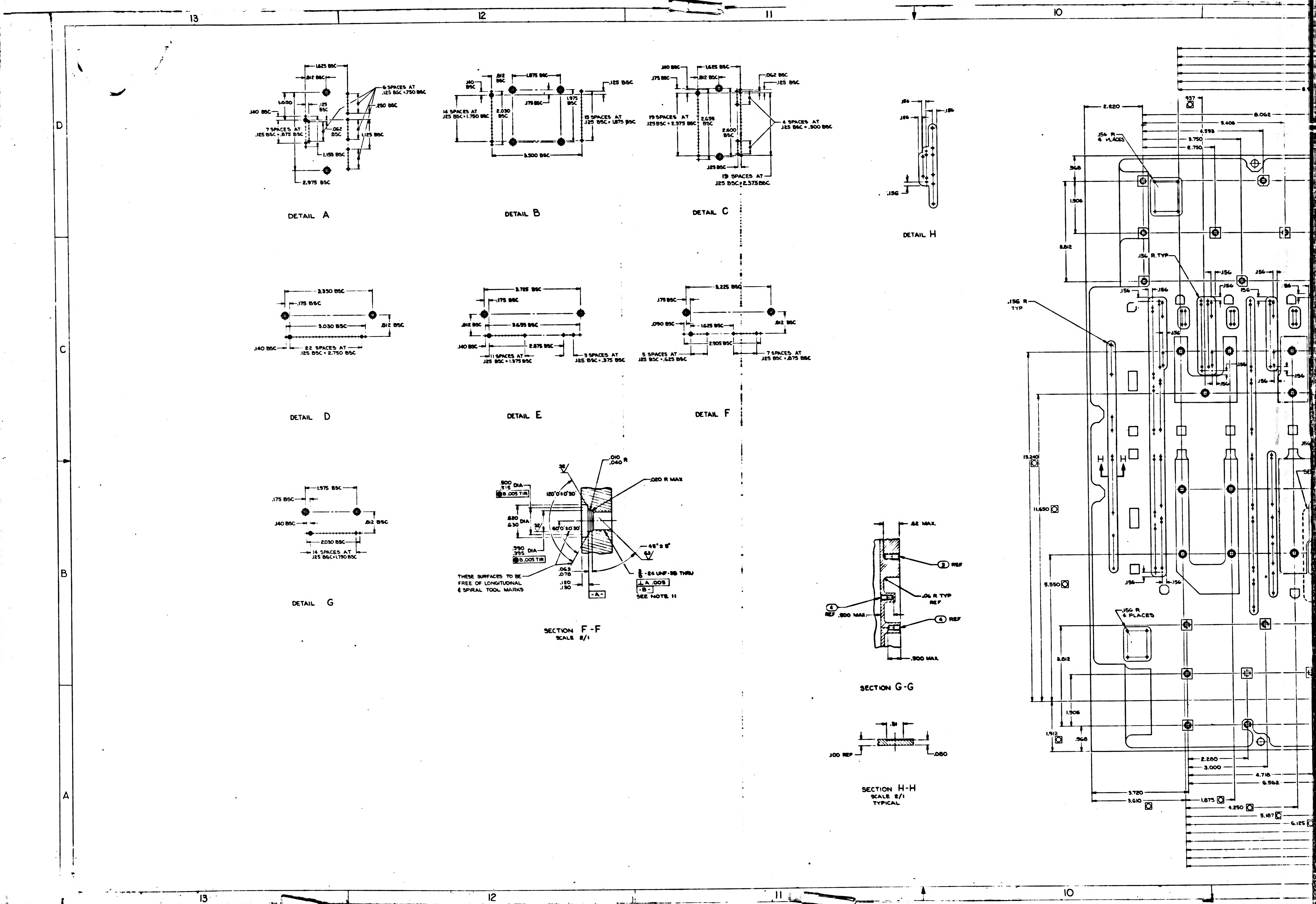
CODE IDENT NO. 80230
SIZE J
DRAWING NO 2008432
SCALE 1/1
SHEET 1 OF 2

2008432 C

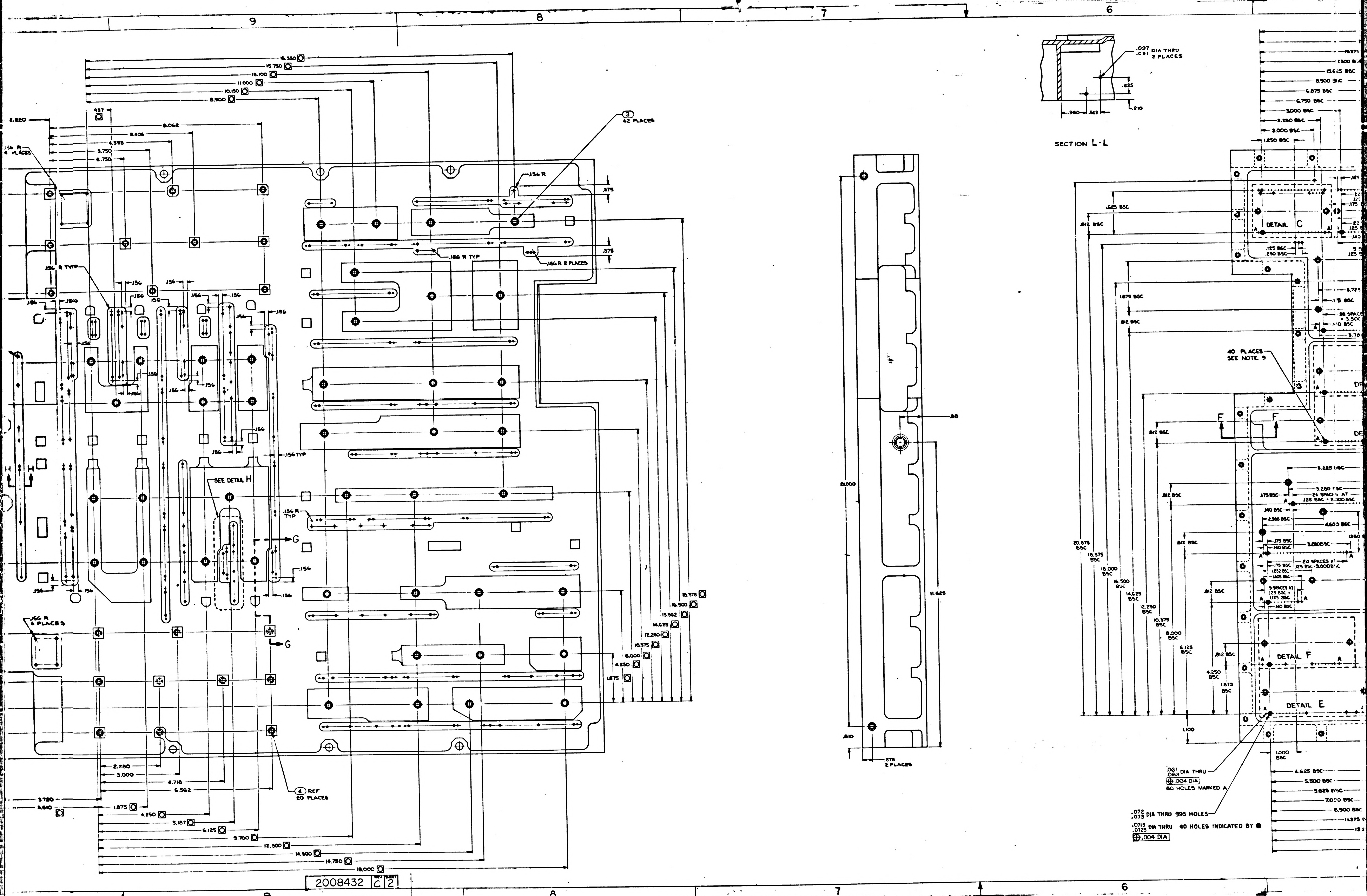
0C8432 REV. C SHT. 1

4H

4/2008432

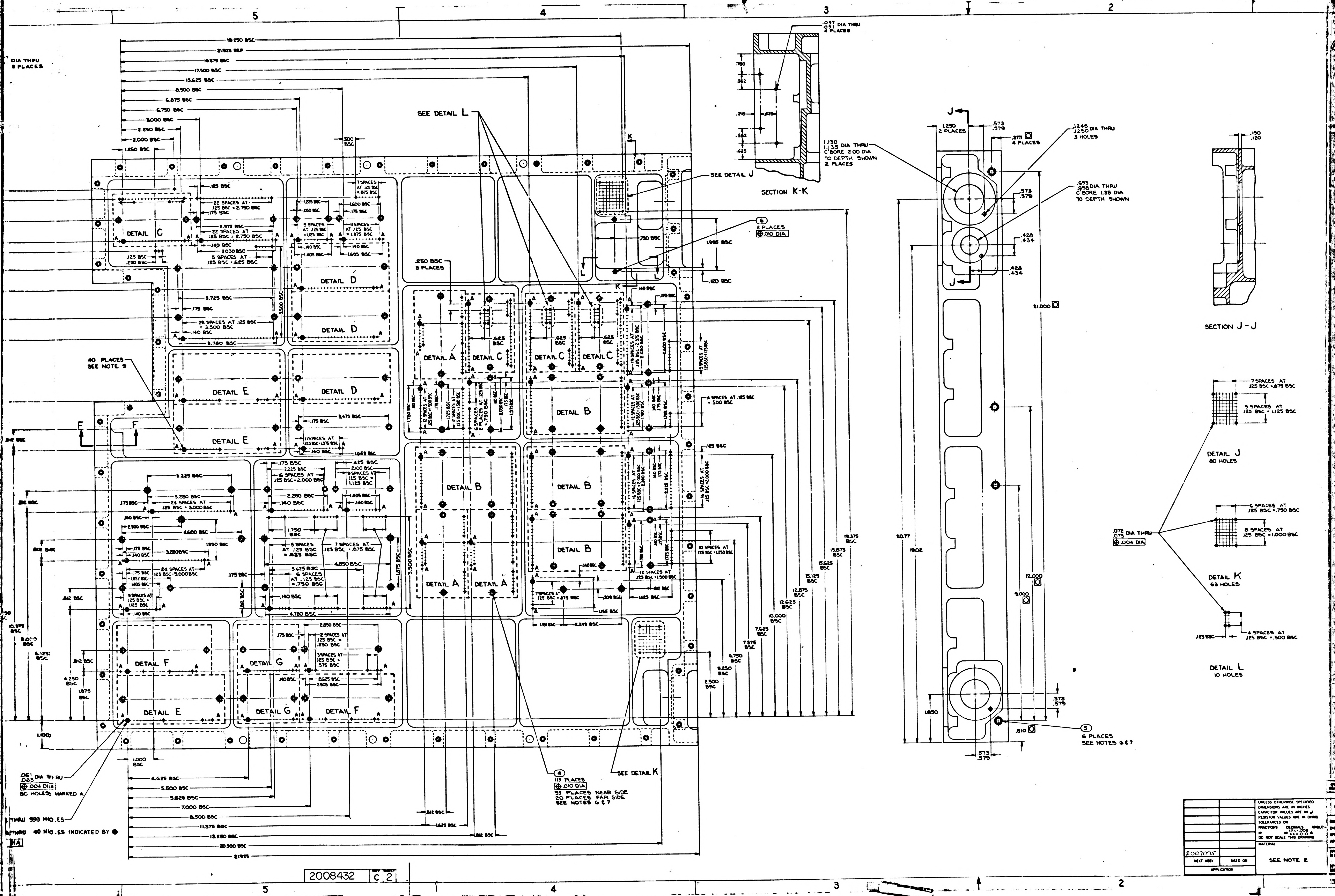


13
12
11
10
D
C
B
A
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL E
DETAIL F
DETAIL G
DETAIL H
1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
.250 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC = 1.750 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC
19 SPACES AT .125 BSC = 2.375 BSC
4 SPACES AT .125 BSC = .500 BSC
3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC
3.725 BSC
3.695 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC
3.225 BSC
.090 BSC
1.625 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC
1.975 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC
.156
.010 .040 R
.020 R MAX
.500 .515 DIA
B .005 TIR
120°0'±0°30'
.620 .630 DIA
60°0'±0°30'
.390 .395 DIA
B .005 TIR
45° ± 5°
63
32
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063 .078
.120 .130
-A-
3/8 -24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11
SECTION F-F
SCALE 2/1
.62 MAX
3 REF
.06 R TYP REF
4 REF
.500 MAX
.500 MAX
SECTION G-G
.31
.100 REF
.080
SECTION H-H
SCALE 2/1
TYPICAL
2.220
8.062
.156 R 4 PLACES
5.406
4.593
3.750
2.750
.968
1.906
3.812
.156 R TYP
.156 R TYP
13.240
11.650
5.550
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
1/2008432


9
8
7
6
SECTION L-L
.097 .091 DIA THRU 2 PLACES
.625
.210
.950
.562
③ 42 PLACES
.156 R
.375
.186 R TYP
.156 R 2 PLACES
.156 R 4 PLACES
.156 R TYP
.156 R 6 PLACES
.156 TYP
SEE DETAIL H
H
G
④ REF 20 PLACES
16.350
15.750
13.100
11.000
10.150
8.900
8.820
8.062
5.406
4.593
3.750
2.750
.937
21.000
11.625
.88
.810
.375 2 PLACES
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
2.280
3.000
4.718
6.562
3.780
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
DETAIL C
DETAIL F
DETAIL E
40 PLACES SEE NOTE 9
F
A
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
1.625 BSC
.812 BSC
1.875 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
.061 .063 DIA THRU
⊕ .004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU 993 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
⊕ .004 DIA
24 SPACES AT .125 BSC = 3.000 BSC
19 SPACES AT .125 BSC

2008432 C 2

2/2008432



5
4
3
2
19.250 BSC
21.925 REF
19.875 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.500 BSC
DIA THRU 2 PLACES
SEE DETAIL L
SEE DETAIL J
DETAIL C
DETAIL D
DETAIL E
DETAIL A
DETAIL B
DETAIL F
DETAIL G
22 SPACES AT .125 BSC = 2.750 BSC
28 SPACES AT .125 BSC = 3.500 BSC
24 SPACES AT .125 BSC = 3.000 BSC
7 SPACES AT .125 BSC = .875 BSC
40 PLACES SEE NOTE 9
.250 BSC 3 PLACES
6 2 PLACES .010 DIA
F
F
K
K
L
L
.061 .063 DIA THRU .004 DIA 80 HOLES MARKED A
THRU 993 HOLES
THRU 40 HOLES INDICATED BY ●
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
SEE DETAIL K
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.900 BSC
21.925
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
SECTION K-K
J
J
1.250 2 PLACES
.573 .579
.875 4 PLACES
1.248 1.250 DIA THRU 3 HOLES
.653 .658 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
.120 BSC
21.000
20.77
19.02
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
.130 .120
SECTION J - J
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
.072 .073 DIA THRU .004 DIA
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K 63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES
A
B
C

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS XXX = .005 ± XX = .010 ANGLES ± DO NOT SCALE THIS DRAWING
2007095		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

QTY REQD

INSTRUME

DRAWN

CHECKED

APPROVED

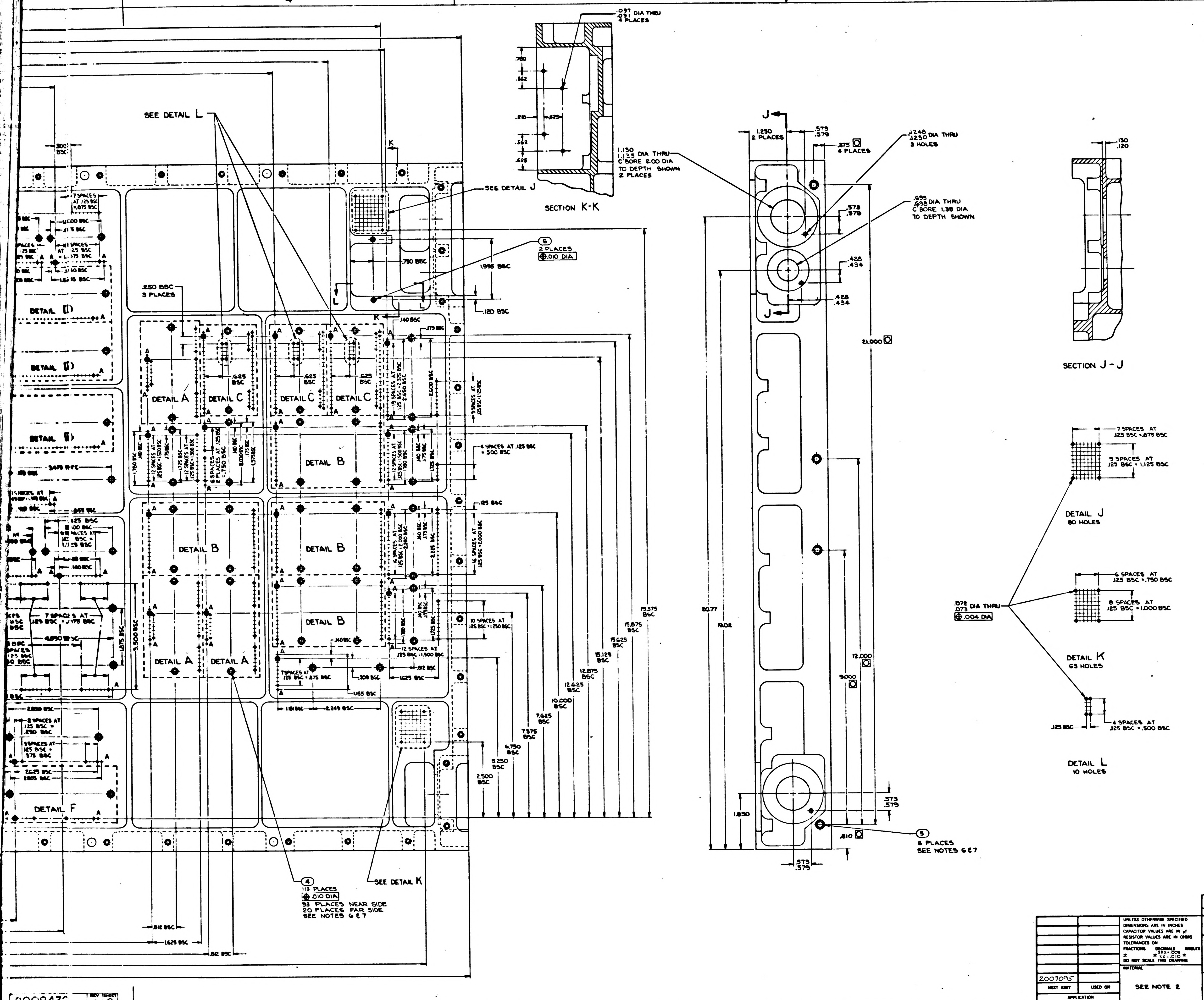
APPROVED

APPROVED MIT

APPROVED NSC A C

2008432 REV C SHEET 2

3/2008432


SEE DETAIL L
SEE DETAIL J
SECTION K-K
.097 DIA THRU .091 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
6 2 PLACES .010 DIA
.250 BSC 3 PLACES
DETAIL A
DETAIL C
DETAIL B
DETAIL F
DETAIL E
DETAIL D
1.995 BSC
.750 BSC
.120 BSC
.140 BSC
J
K
L
1.250 2 PLACES
.573 .579
.875 4 PLACES
1.248 1.250 DIA THRU 3 HOLES
.655 .658 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
12.000
9.000
20.77
19.02
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
SECTION J-J
.130 .120
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K 63 HOLES
.072 .073 DIA THRU .004 DIA
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
SEE DETAIL K
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
4.750 BSC
5.250 BSC
2.500 BSC
.812 BSC
1.625 BSC
4
3
2
1
D
C
B
A
4H

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 28487	JMP		9 MAY 66	
Ⓜ B		REVISION STATUS CHANGED	E M F	JI	9 AUG 66	
C		REVISION STATUS CHANGED	TD		20 OCT '66	

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007095	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bevacco 25 Jan 66
CHECKED R P Kossar 25 Jan 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008432

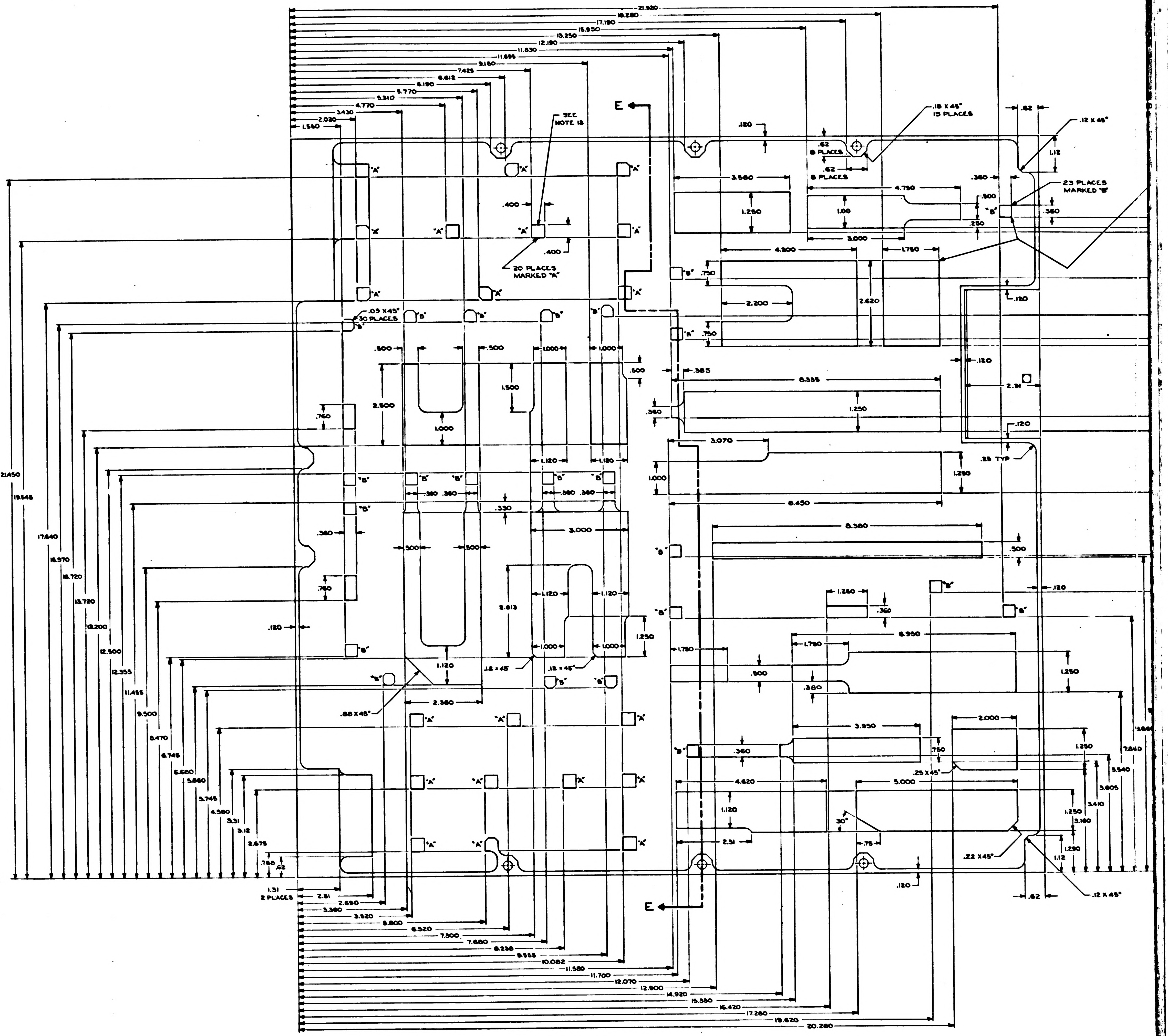
SCALE
SHEET 2 OF 2

2008432 C

2008432 C 2

4/2008432

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



E
E
SEE NOTE 13
20 PLACES MARKED "A"
"A"
"B"
.09 X 45° 30 PLACES
.18 X 45° 15 PLACES
.12 X 45°
.12 X 45
.88 X 45°
.22 X 45°
.25 X 45°
.25 TYP
30°
23 PLACES MARKED "B"
.62 8 PLACES
.62 8 PLACES
1.31 2 PLACES
21.920
18.280
17.190
15.950
13.250
12.190
11.830
11.695
9.150
7.425
6.612
6.190
5.770
5.310
4.770
3.430
2.020
1.560
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.860
5.745
4.580
3.31
3.12
2.675
.768
.62
2.81
2.690
3.360
3.520
5.800
6.520
7.300
7.680
8.236
9.555
10.082
11.580
11.700
12.070
12.900
14.920
15.330
16.420
17.280
19.620
20.280
3.580
1.250
4.750
1.00
3.000
4.200
1.750
2.200
2.620
8.335
3.070
8.450
8.380
1.260
6.950
1.790
3.950
2.000
4.620
5.000
2.31
.75
1.120
.500
1.000
1.500
2.500
2.813
2.380
3.000
.360
.380
.330
.400
.760
.750
.385
.120
.12
1.12
1.250
1.280
3.160
3.410
3.605
3.540
7.840
3.664

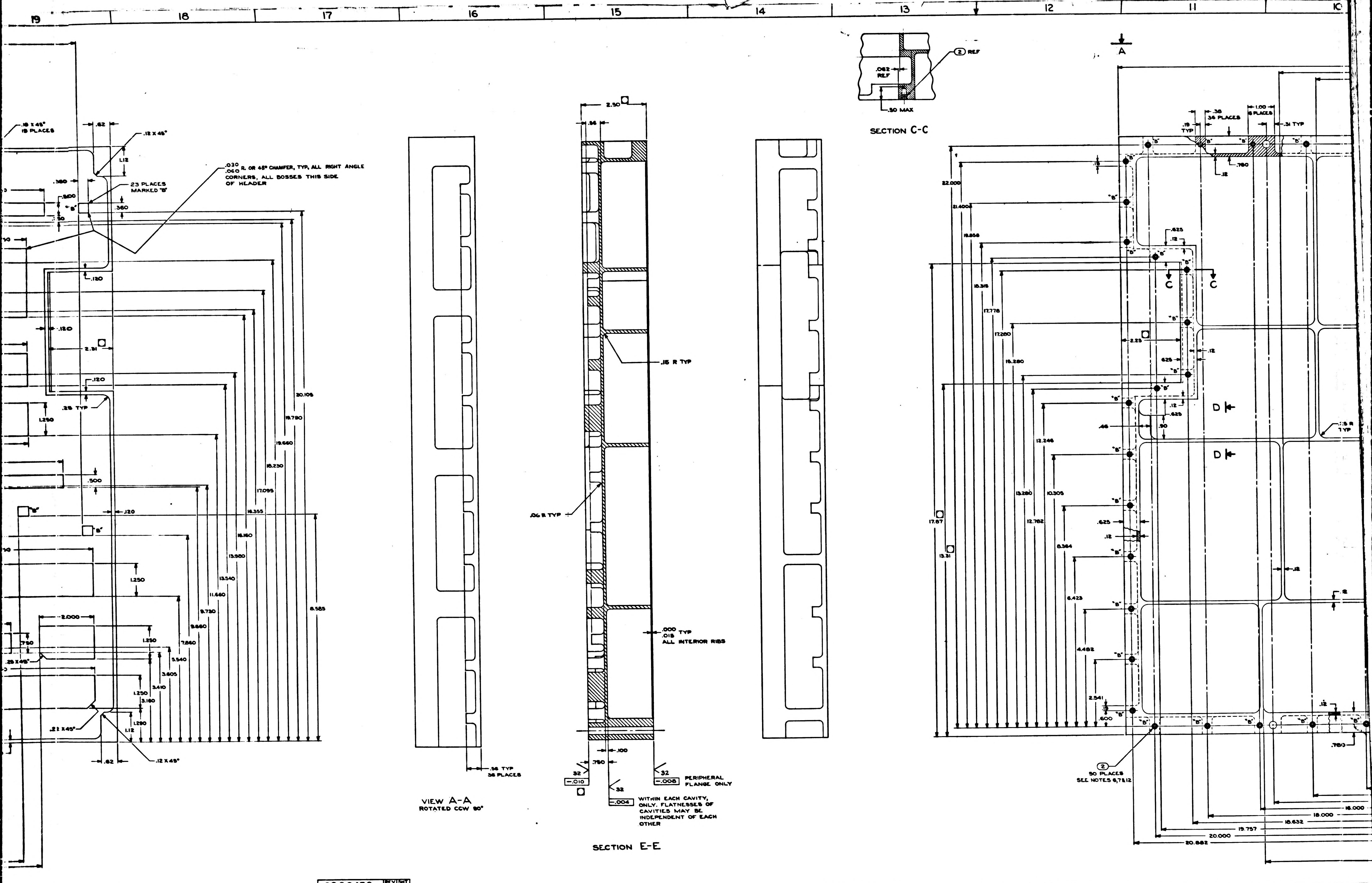
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.

6. COAT THREADS OF FIND 2,3,4,5 & 6 WITH MIL-P-8585, COLOR Y

□ 7. INSTALL FIND NO. 2,3,4,5 & 6 WET PER MS33646. REMOVE DRIVING TANG. FOR FIND NO. 2 THE HELICOIL INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF HELICOIL INSERT, A STANDARD SCREW SHALL BE ENGAGED & DISENGAGED FULL LENGTH OF HELICOIL INSERT AS FINAL STEP IN CLEANING OF HELICOIL INSERT THREADS
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. □ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT. IN EACH GROUP OF 10 BOSSES THE TOP SURFACES OF ALL THE BOSSES MUST BE FLAT WITHIN .004 WITH RESPECT TO EACH OTHER.

	REV.	SHT.
2008432	D	1

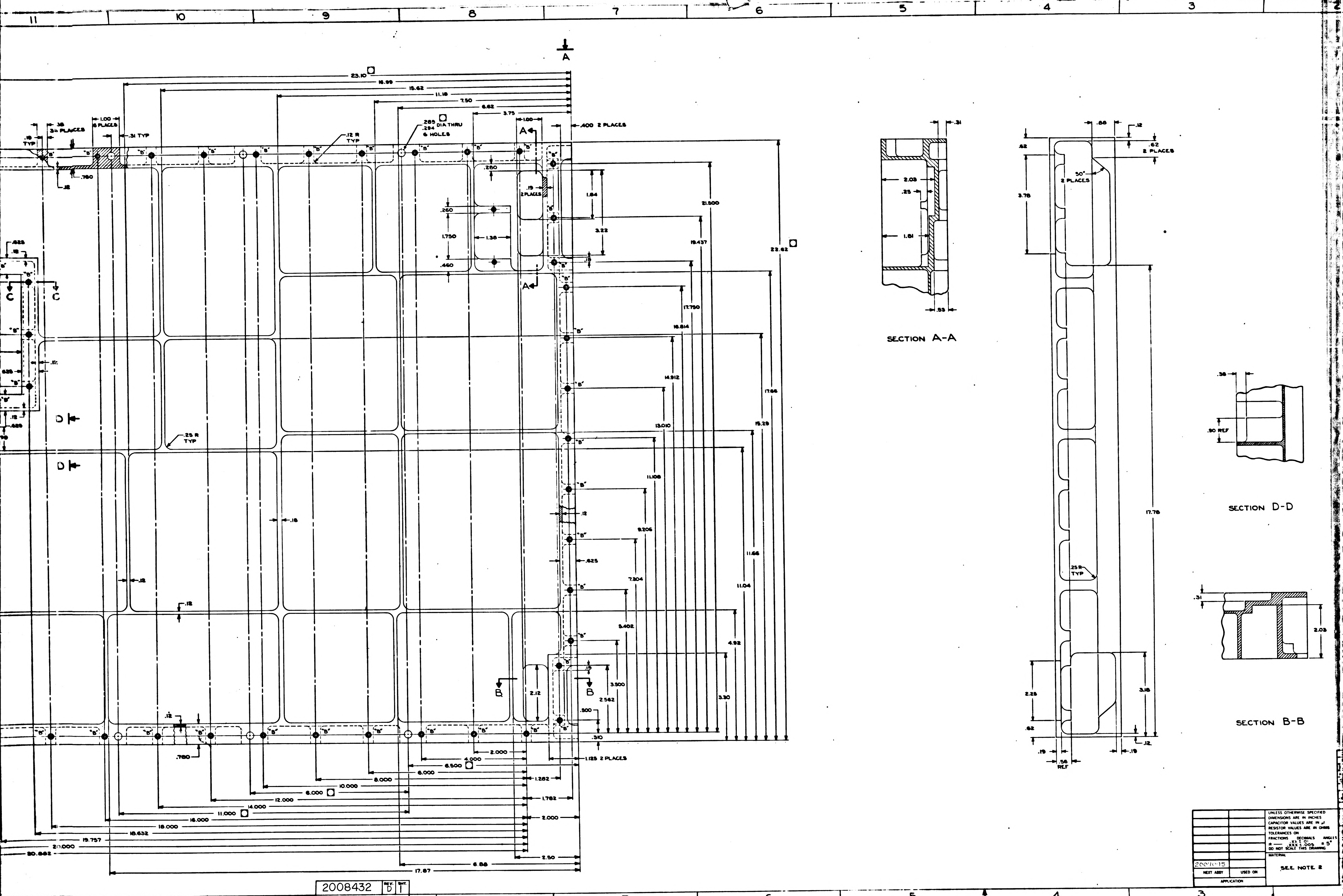

19
18
17
16
15
14
13
12
11
10
.18 X 45°
18 PLACES
.62
.12 X 45°
1.12
.030
.060 R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE
CORNERS, ALL BOSSES THIS SIDE
OF HEADER
.360
23 PLACES
MARKED "B"
.500
"B"
.360
.50
.120
.120
2.31
.120
.25 TYP
1.250
.500
.120
"B"
"B"
1.250
2.000
.750
1.250
.25 X 45°
1.250
3.160
3.410
3.605
3.540
1.290
1.12
.21 X 45°
.62
.12 X 45°
7.860
9.660
9.730
11.660
13.540
13.980
16.160
16.355
17.095
18.230
19.660
19.790
20.105
8.585
.56 TYP
36 PLACES
2.50
.56
.15 R TYP
.06 R TYP
.000
.015 TYP
ALL INTERIOR RIBS
.100
.750
32
-.010
32
-.004
32
-.008
PERIPHERAL
FLANGE ONLY
WITHIN EACH CAVITY,
ONLY. FLATNESSES OF
CAVITIES MAY BE
INDEPENDENT OF EACH
OTHER
.062
REF
② REF
.50 MAX
A
.19
TYP
.38
36 PLACES
1.00
6 PLACES
.31 TYP
.760
.12
22.000
21.400
19.856
18.315
17.778
17.280
16.280
13.280
12.782
12.246
10.305
8.364
6.423
4.482
2.541
.600
17.87
13.31
.625
.12
C
C
2.25
.625
.12
.12
.625
.90
.46
D
D
.625
.12
.15 R
TYP
.12
.12
.12
"B"
.780
②
50 PLACES
SEE NOTES 6,7&12
16.000
18.000
18.632
19.757
20.000
20.882

VIEW A-A
ROTATED CCW 90°

SECTION E-E

SECTION C-C

2008432 REV D SHT 1



11
10
9
8
7
6
5
4
3
A
A
A
B
B
C
C
D
D
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.285
.294 DIA THRU
6 HOLES
.12 R
TYP
.31 TYP
1.00
6 PLACES
.38
34 PLACES
.18
TYP
.780
.12
.260
.19
2 PLACES
1.64
3.22
.260
1.750
1.38
.460
.19
21.500
19.437
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
17.66
15.29
11.66
11.04
4.92
3.30
22.62
.25 R
TYP
.18
.12
.12
.12
.625
.500
.310
2.12
"B"
2.000
4.000
6.500
6.000
8.000
10.000
6.000
12.000
14.000
11.000
16.000
18.000
18.632
19.757
20.000
20.882
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87
.31
2.03
.25
1.61
.53
SECTION A-A
.88
.12
.62
.62
2 PLACES
50°
2 PLACES
3.78
17.78
.25 R
TYP
2.25
.62
3.16
.19
.56
REF
.12
.19
.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B

2008432 | REV. D | SHT. 1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

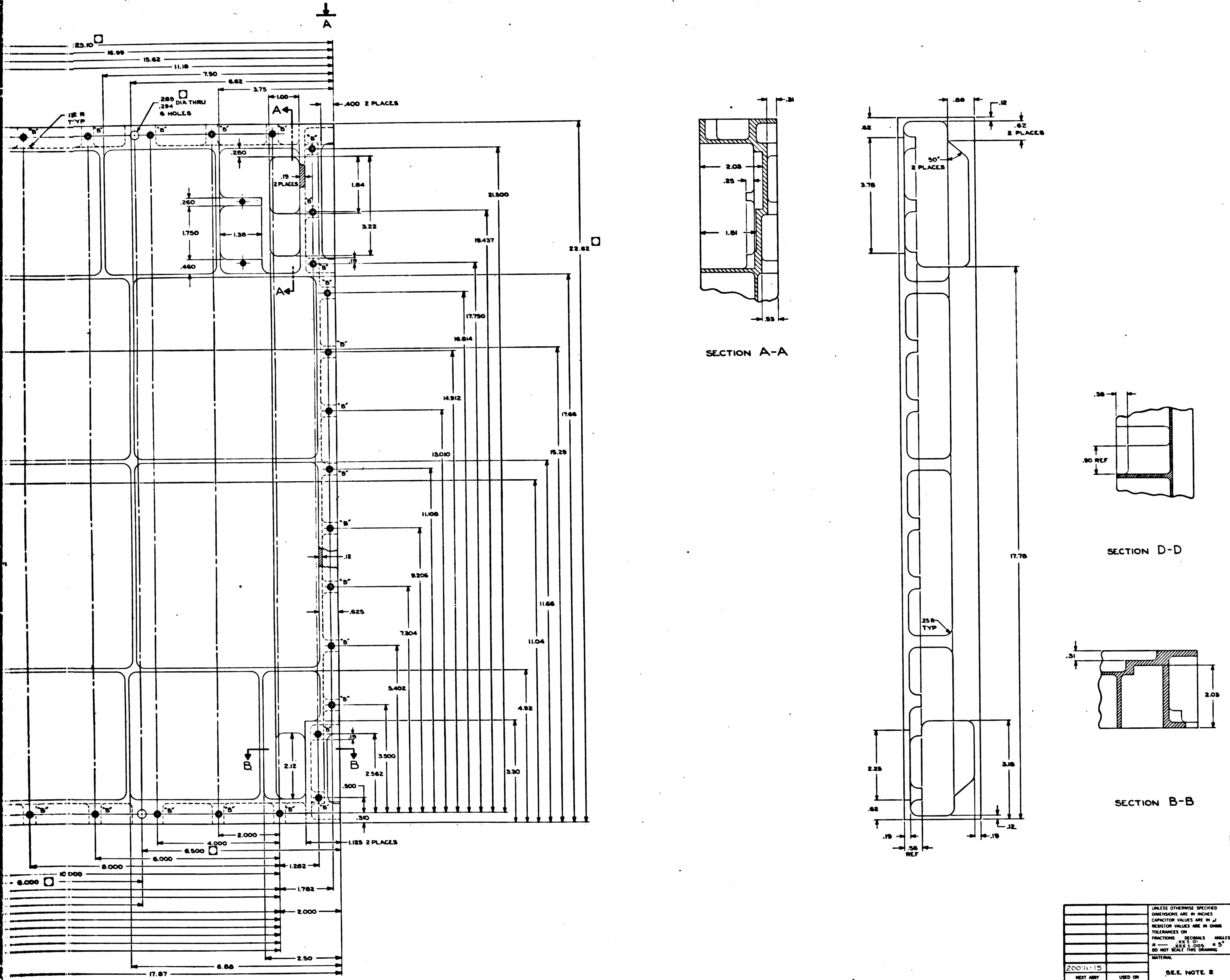
MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007015	
APPLICATION	

		1C1O3
		MS212
	3	101095
	2	101095
	D	101095
		2008
QTY REQD		IDE

37 2008432

SYM	ZONE	DESCRIPTION REVISIONS 25555	DR	CHK	DATE	A
A		REVISED PER TDRR 28487	JIMP		MAY 66	
B		REVISED PER TDRR 30531	Emt	JI	9 AUG 66	
C		REVISED PER TDRR 31560	TD		20 OCT 66	
D		REVISED PER TDRR 31657	WA	Elw	2 NOV 66	



SECTION A-A
SECTION D-D
SECTION B-B
.289/.294 DIA THRU 6 HOLES
.12 R TYP
.400 2 PLACES
1.125 2 PLACES
.19 2 PLACES
50° 2 PLACES
.62 2 PLACES
.25 R TYP
.90 REF
.56 REF
23.10
22.62
21.500
19.437
17.750
17.78
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
17.87
6.88
2.50
2.000
1.782
1.282
10.000
8.000
6.000
6.500
4.000
A
B
"B"

2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1
QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007015	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonarrigo 23 Jun 66
CHECKED C.C. Kuo 25 Jun 66
APPROVED
APPROVED
APPROVED MIT A. C. Metzger 1-25-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY
C/M PSA

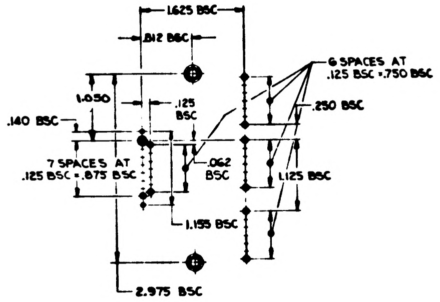
CODE IDENT NO 80230
SIZE J
DRAWING NO 2008432
SCALE 1/1
SHEET 1 OF 2

2008432 REV D SHT 1

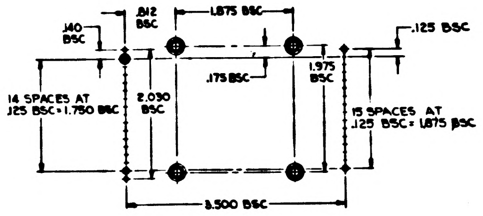
4H

4/2008432

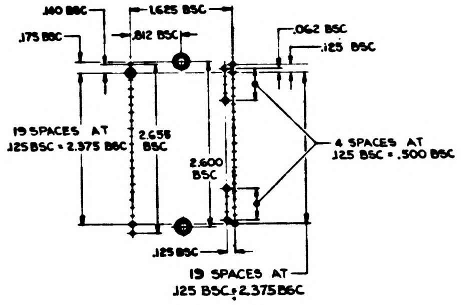
D


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC =.750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

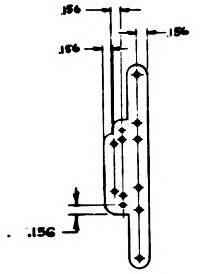
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
.175 BSC
1.975 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

DETAIL B

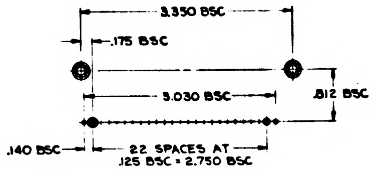

.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.658 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

DETAIL C

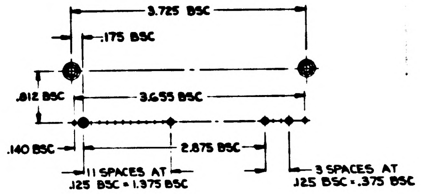

.156
.156
.156
.156

DETAIL H

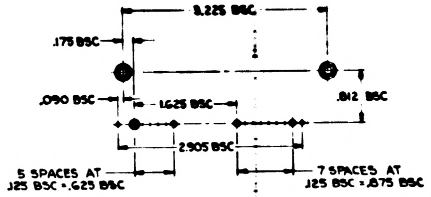
C


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

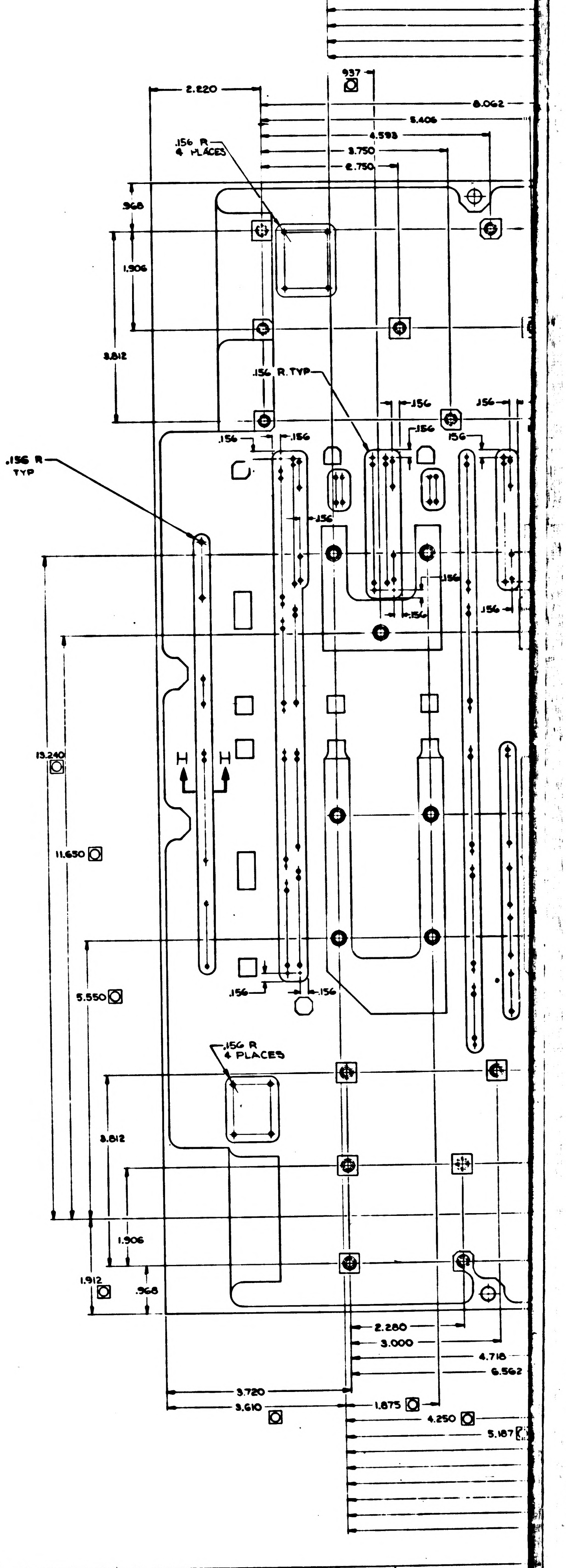
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

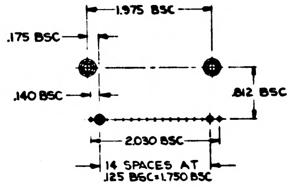
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

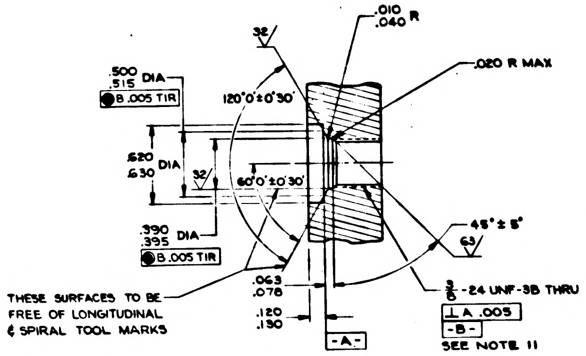
DETAIL F


.937
2.220
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R. TYP
.156
.156 R TYP
H
H
13.240
11.650
5.550
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187

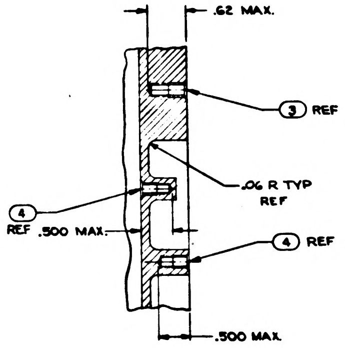
B


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

DETAIL G

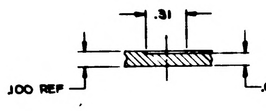

32
.010 .040 R
.020 R MAX
.500 .515 DIA
B .005 TIR
120°0'±0°30'
.620 .630 DIA
32
60°0'±0°30'
45°±5°
63
.390 .395 DIA
B .005 TIR
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063 .078
.120 .130
-A-
3/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

SECTION F-F
SCALE 2/1

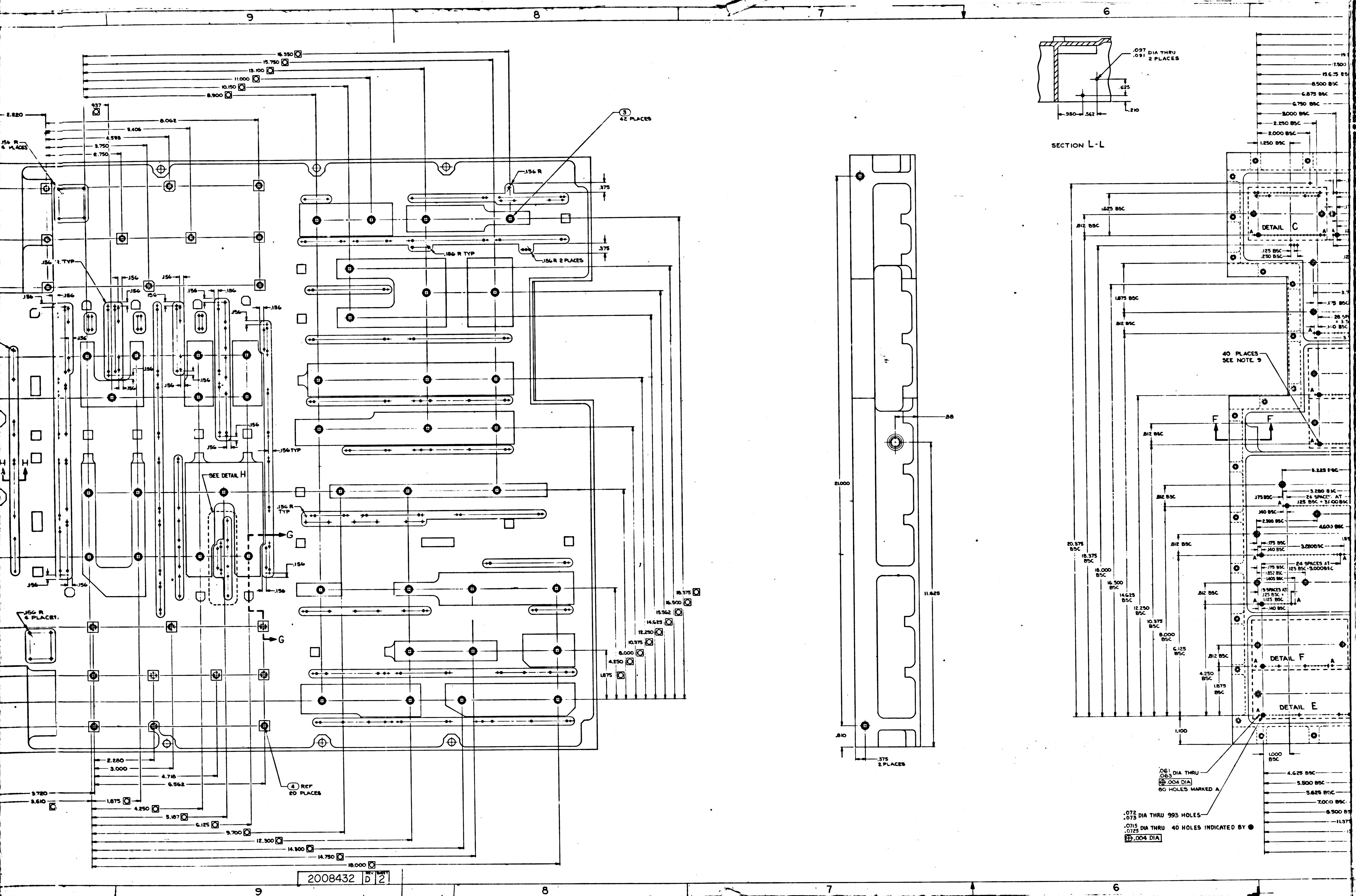

.62 MAX.
3 REF
.06 R TYP REF
4 REF
.500 MAX.
4 REF
.500 MAX.

SECTION G-G

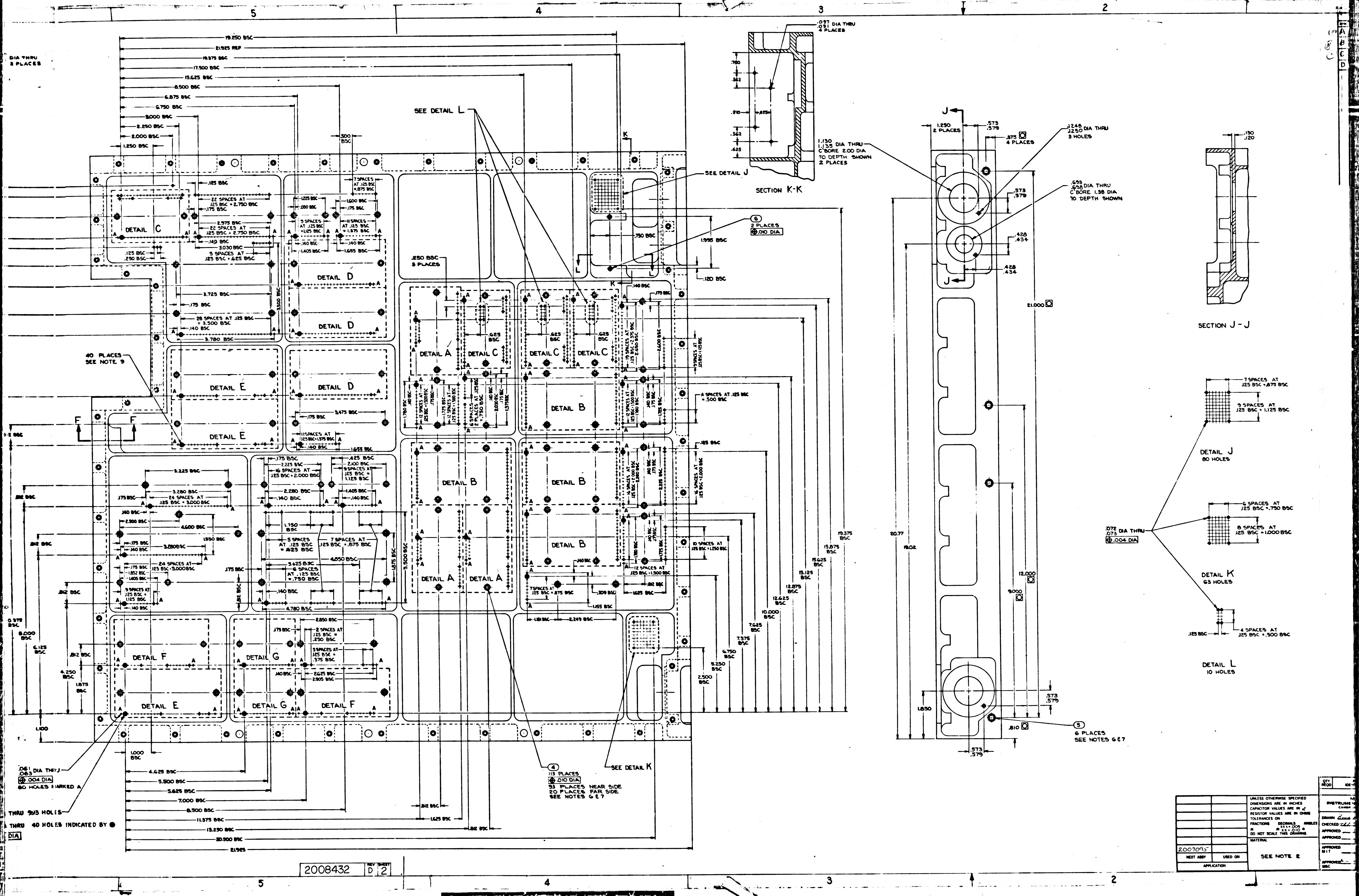
A

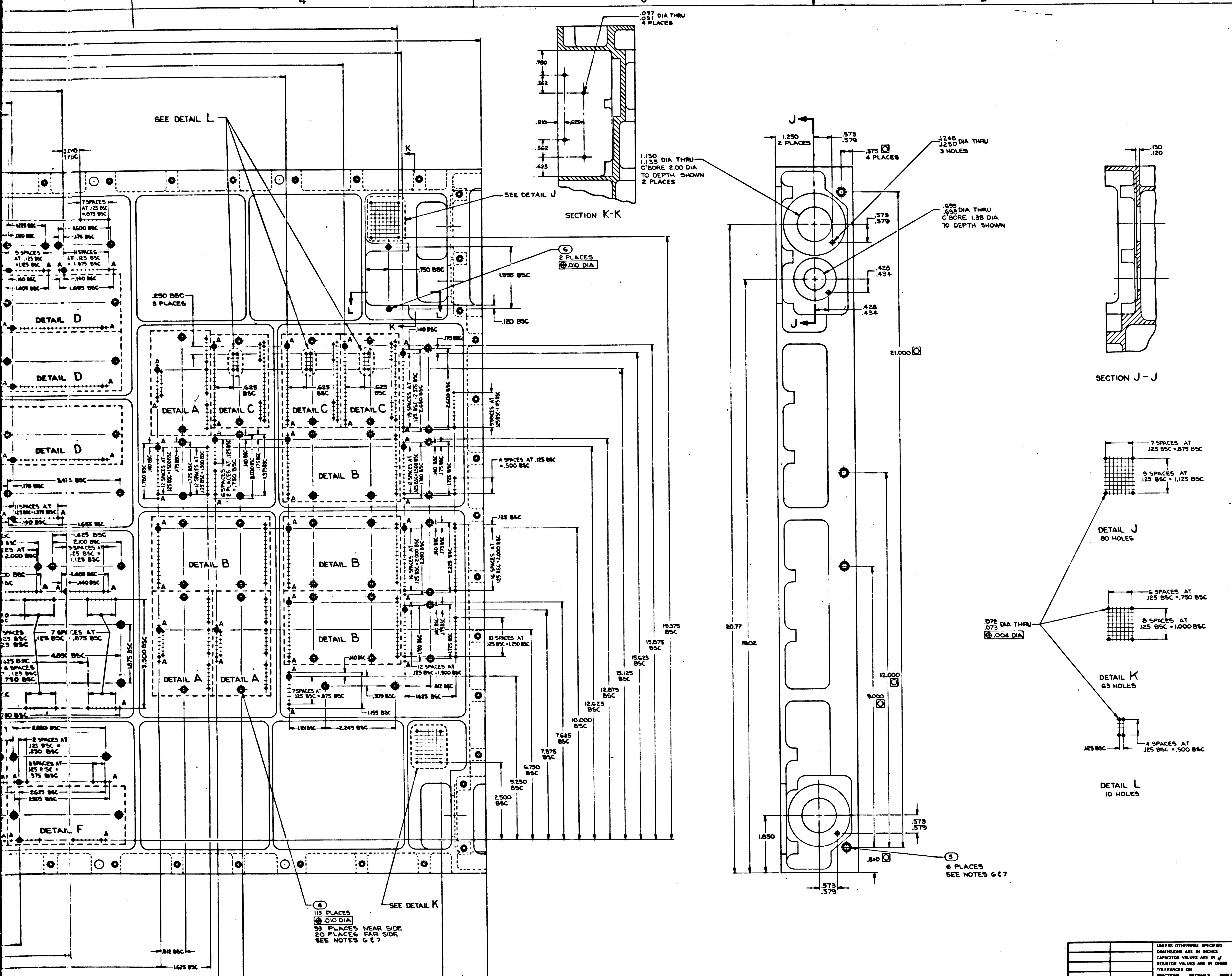

.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


9
8
7
6
SECTION L-L
.097 .091 DIA THRU 2 PLACES
.625
.210
.950
.562
③ 42 PLACES
.156 R
.375
.156 R TYP
.156 R 2 PLACES
.156 R 4 PLACES
.156 TYP
SEE DETAIL H
.156 R TYP
.156 R 4 PLACES
G
④ REF 20 PLACES
16.350
15.750
13.100
11.000
10.150
8.900
8.062
5.406
4.593
3.750
2.750
2.220
.937
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
21.000
11.625
.810
.88
.375 2 PLACES
40 PLACES SEE NOTE 9
DETAIL C
DETAIL F
DETAIL E
F
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.625 BSC
.812 BSC
1.100
1.000 BSC
.125 BSC
.250 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.061 .063 DIA THRU
.004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU 993 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
.004 DIA
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
2008432
REV D
SHEET 2

2/2008432


5
4
3
2
A
B
C
D
SEE DETAIL L
SEE DETAIL J
SECTION K-K
.097 .093 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
6 2 PLACES .010 DIA
DETAIL C
DETAIL D
DETAIL D
DETAIL E
DETAIL D
DETAIL E
DETAIL A
DETAIL C
DETAIL C
DETAIL C
DETAIL B
DETAIL B
DETAIL B
DETAIL B
DETAIL A
DETAIL A
DETAIL F
DETAIL G
DETAIL E
DETAIL G
DETAIL F
40 PLACES SEE NOTE 9
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
1.100
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.900 BSC
21.925
21.000
20.77
19.02
12.000
9.000
1.850
.810
J
J
1.250 2 PLACES
.573 .579
.375 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
5 6 PLACES SEE NOTES 6 & 7
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
SEE DETAIL K
SECTION J-J
.130 .120
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
.072 .073 DIA THRU .004 DIA
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K 63 HOLES
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
DETAIL L 10 HOLES
F
F
K
K
L
L
.061 .063 DIA THRU .004 DIA 80 HOLES MARKED A
THRU 993 HOLES
THRU 40 HOLES INDICATED BY ●
DIA
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ± DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
2007095
NEXT ASSY
USED ON
APPLICATION
QTY REQD
INSTRUME
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
2008432 D 2
REV
SHEET


SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
SECTION K-K
1.250 2 PLACES
.573 .579
.875 4 PLACES
1.248 1.250 DIA THRU 3 HOLES
.695 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
SECTION J-J
.130 .120
6 2 PLACES .010 DIA
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
DETAIL J 80 HOLES
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL K 63 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.072 .073 DIA THRU .004 DIA
DETAIL L 10 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
6.750 BSC
5.250 BSC
2.500 BSC
1.995 BSC
.120 BSC
.750 BSC
.250 BSC 3 PLACES
.812 BSC
1.625 BSC
J
K
L
4
3
2
1
D
C
B
A

4H

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 28487	JMP		9 MAY 66	
Ⓜ B		REVISION STATUS CHANGED	E74	JI	9 AUG 66	
Ⓜ C		REVISION STATUS CHANGED	TD		20 OCT '66	
D		REVISION STATUS CHANGED	WA		2 NOV 66	

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007095	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bussaco 25 Jan 66
CHECKED R.P. Kumar 25 Jan 66
APPROVED
APPROVED
APPROVED MIT
APPROVED A. C. METZGER
MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASS'Y.
C/M PSA

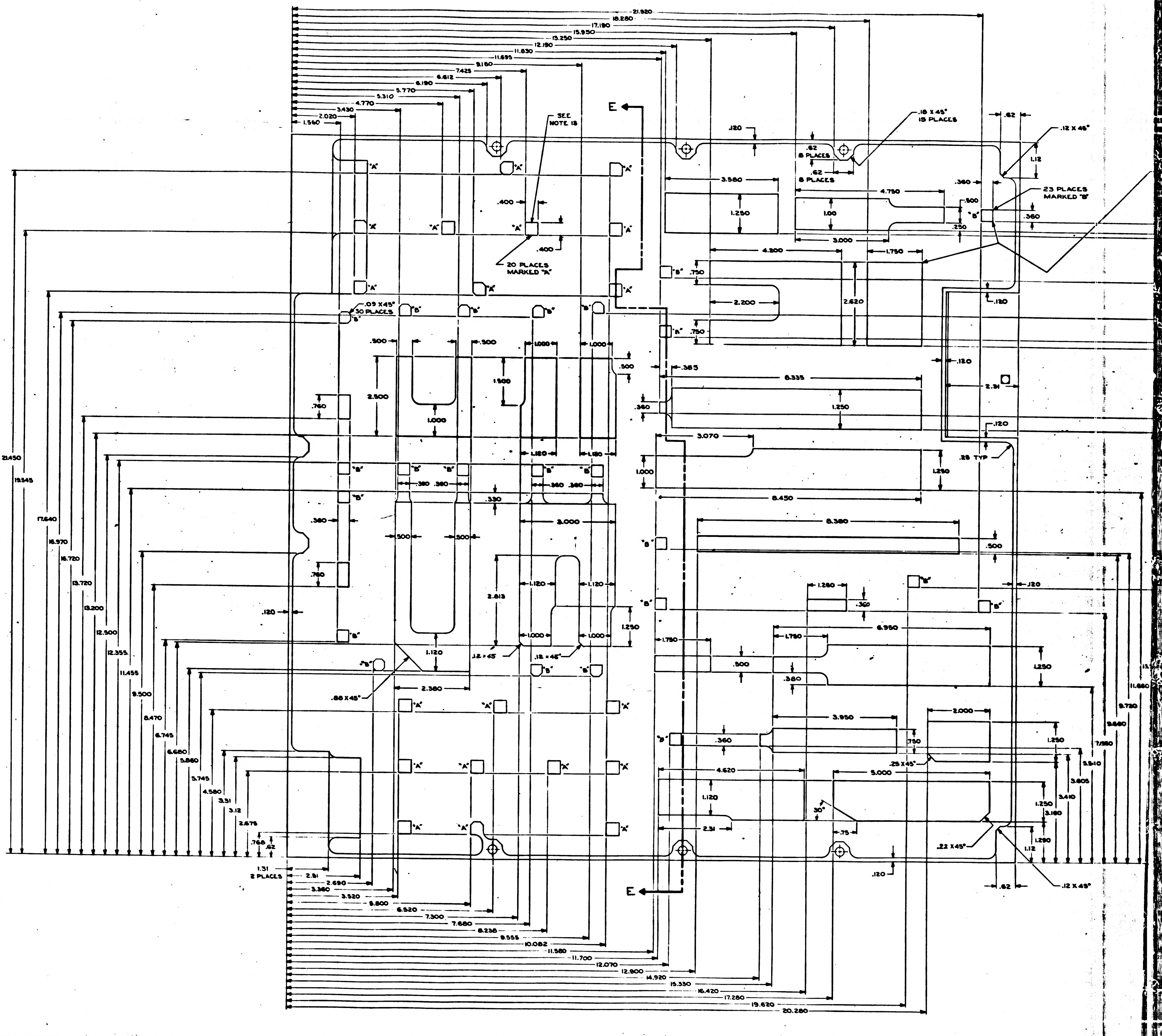
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE
SHEET 2 OF 2

2008432 D

2008432 REV D SHEET 2

4728008432

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

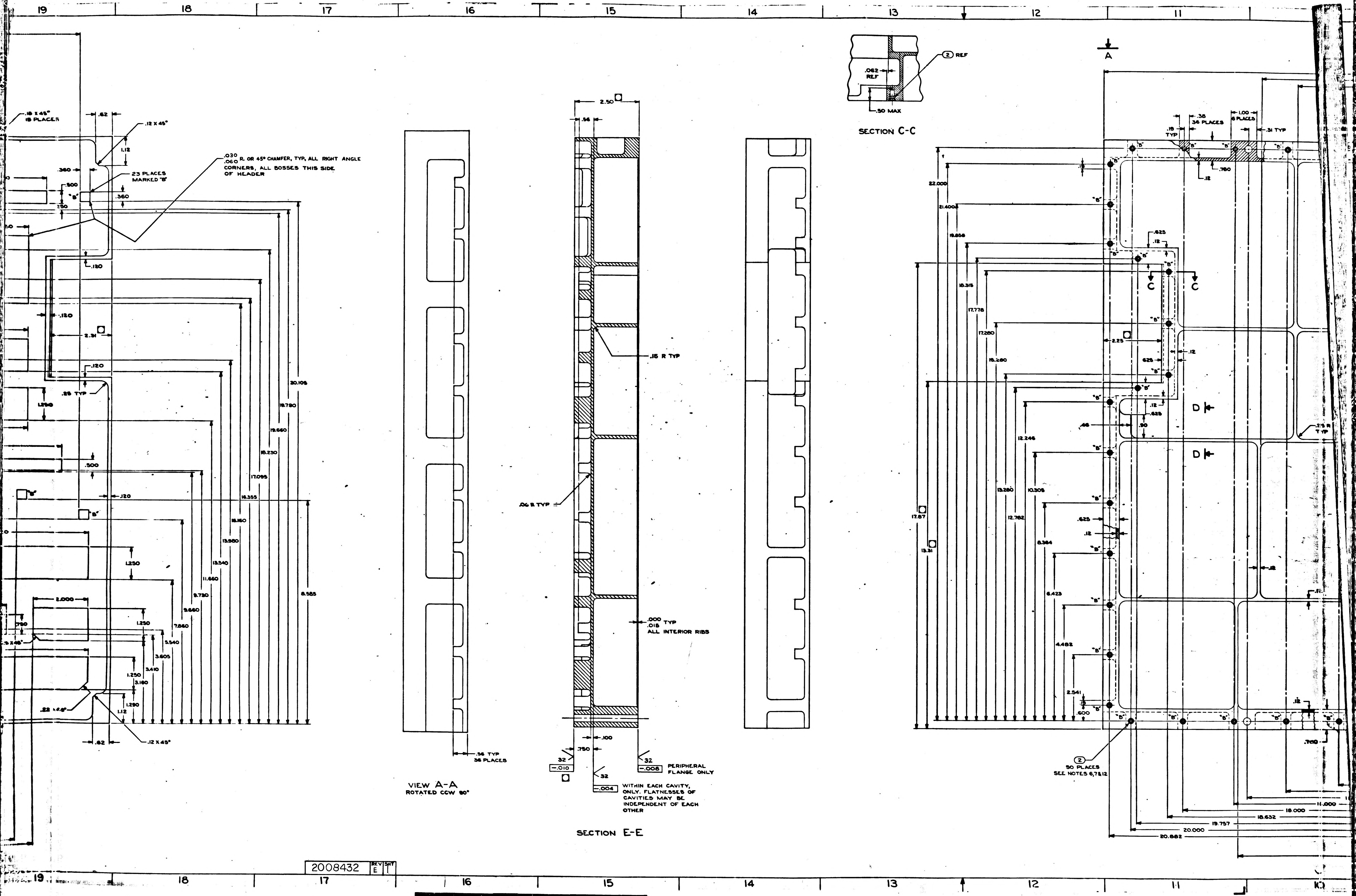


21.920
18.280
17.190
15.950
13.250
12.190
11.830
11.695
9.180
7.425
6.812
6.190
5.770
5.310
4.770
3.430
2.020
1.560
E
SEE NOTE 13
.18 X 45°
15 PLACES
.62
8 PLACES
.12 X 45°
1.12
23 PLACES MARKED "B"
"A"
"B"
20 PLACES MARKED "A"
.400
3.580
1.250
1.00
4.750
3.000
.360
.500
.250
4.200
1.750
.750
2.200
2.620
.120
.09 X 45°
30 PLACES
.500
1.000
1.500
2.500
.385
8.335
.360
2.31
3.070
1.120
1.180
.25 TYP
.760
.380
.330
8.450
3.000
8.380
2.813
1.280
6.950
1.750
.88 X 45°
2.380
.12 X 45°
3.950
2.000
4.620
5.000
.25 X 45°
30°
.75
.22 X 45°
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.860
5.745
4.580
3.31
3.12
2.875
.768
.62
1.31
2 PLACES
2.81
2.690
3.360
3.520
5.800
6.520
7.300
7.680
8.238
9.555
10.082
11.580
11.700
12.070
12.800
14.920
15.330
16.420
17.280
19.620
20.280
11.660
9.730
9.680
7.980
5.540
3.605
3.410
3.160
1.290

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.
6. COAT THREADS OF HOLES FOR FIND NOS. 2,3,4,5 AND 6 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. ☐ INSTALL FIND NOS. 2,3,4,5 AND 6 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREAD SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ◉ TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT. IN EACH GROUP OF 10 BOSSES THE TOP SURFACES OF ALL THE BOSSES MUST BE FLAT WITHIN .004 WITH RESPECT TO EACH OTHER.

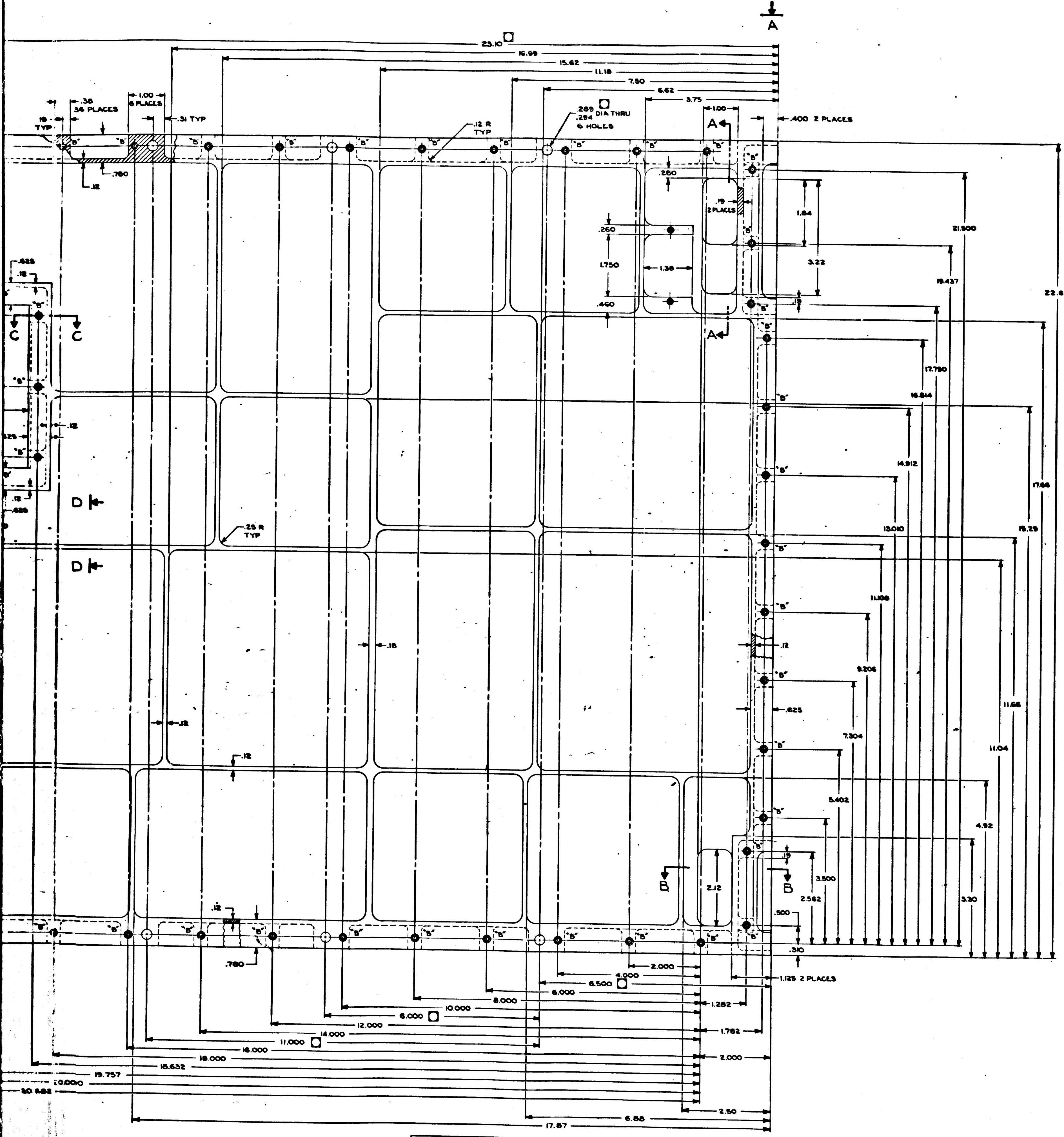
2008432	REV.	SHT.
	E	1


19
18
17
16
15
14
13
12
11
A
.18 X 45°
18 PLACES
.62
.12 X 45°
1.12
.360
23 PLACES
MARKED "B"
.500
"B"
.360
.250
.030
.060 R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
.120
.120
2.31
.120
.25 TYP
1.290
.500
.120
"B"
1.250
2.000
.790
1.250
1.250
3.160
1.290
1.12
.22 X 45°
.62
.12 X 45°
20.105
19.790
19.660
18.230
17.095
16.355
16.160
13.980
13.540
11.660
9.730
9.660
7.860
5.540
3.605
3.410
8.585
.56 TYP
36 PLACES
2.50
.56
.15 R TYP
.06 R TYP
.000
.015 TYP
ALL INTERIOR RIBS
.100
.750
32
-.010
32
-.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
32
-.008
PERIPHERAL FLANGE ONLY
.062
REF
② REF
.50 MAX
.15
TYP
.38
36 PLACES
1.00
8 PLACES
.31 TYP
.760
.12
22.000
21.4004
19.856
18.315
17.778
17.280
17.87
15.280
13.31
.625
.12
C
C
2.25
.625
.12
.12
.625
.90
.46
D
D
12.246
13.280
10.305
12.762
8.364
.625
.12
6.423
4.482
2.541
.15
.600
.75 R
TYP
.12
.12
.12
.760
②
50 PLACES
SEE NOTES 6,7&12
11.000
18.000
18.632
19.757
20.000
20.882

SECTION C-C

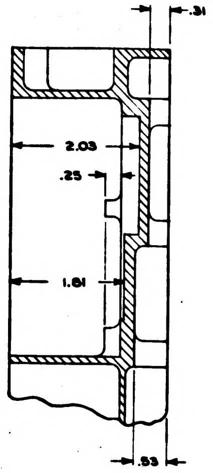
VIEW A-A
ROTATED CCW 90°

SECTION E-E



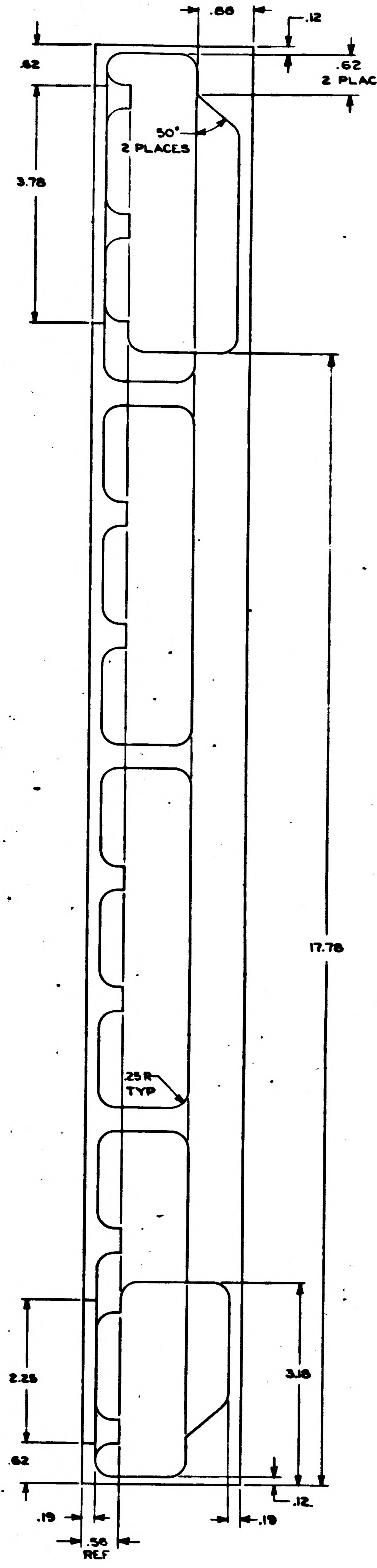
A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.38 36 PLACES
1.00 6 PLACES
.31 TYP
.19 TYP
.12 R TYP
.289 .294 DIA THRU 6 HOLES
"B"
.780
.12
.280
.19 2 PLACES
1.84
3.22
21.500
19.437
22.62
.260
1.750
1.38
.460
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
17.66
15.29
11.66
11.04
4.92
3.30
.625
.12
C
D
.25 R TYP
.18
.12
.625
2.12
.19
.500
.310
B
2.000
4.000
6.500
6.000
8.000
10.000
6.000
12.000
14.000
11.000
16.000
18.000
18.632
19.757
10.000
20.882
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87

2008432 REV. E SHT. 1

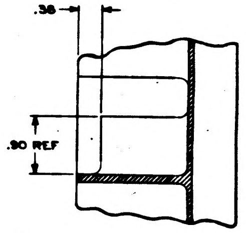


.31
2.03
.25
1.61
.53

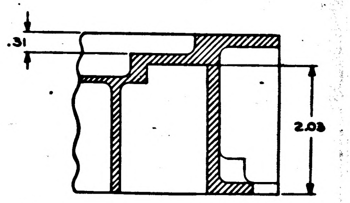
SECTION A-A



.88
.12
.62
.62 2 PLACES
50° 2 PLACES
3.76
17.76
.25 R TYP
2.25
.62
3.18
.12
.19
.56 REF
.19



SECTION D-D



SECTION B-B

2	101095
6	2120
13	1095
12	1095
50	101095
1	20084
QTY REQD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL

SEE NOTE 2

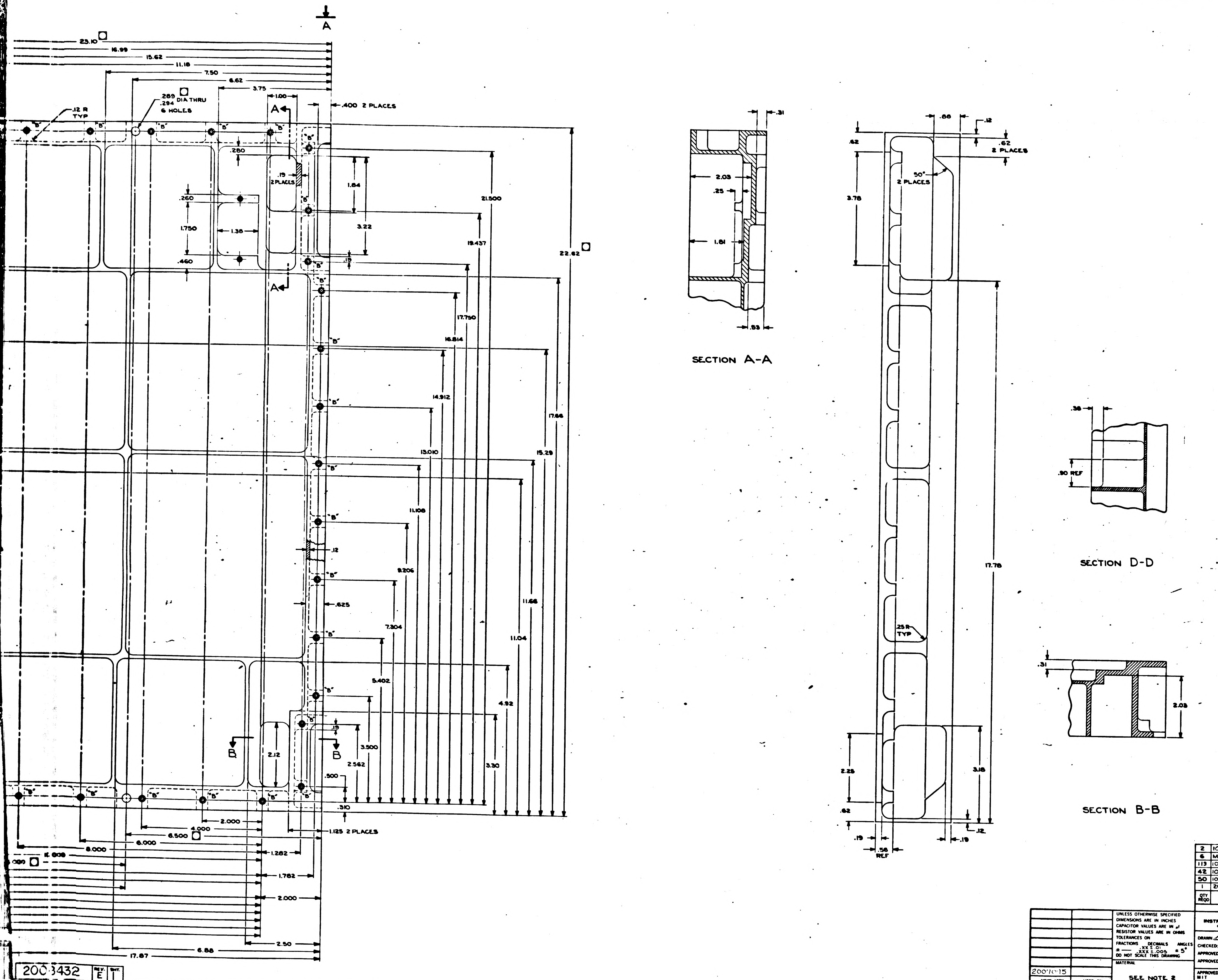
NEXT ASSY	USED ON
2001015	

APPLICATION

INSTRUMENT

DRAWN
CHECKED
APPROVED
APPROVED

3/2008432



A
25.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.12 R TYP
.289 .294 DIA THRU 6 HOLES
"B"
A
.280
.19 2 PLACES
1.84
.260
1.750
1.38
.460
3.22
.19
21.500
19.437
22.62
17.750
16.814
14.912
13.010
17.66
15.29
11.108
.12
9.206
.625
7.304
11.66
11.04
5.402
4.92
3.500
2.562
3.30
.19
.500
.310
2.12
B
B
2.000
4.000
6.500
6.000
8.000
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87
.31
2.03
.25
1.81
.53
SECTION A-A
.88
.12
.62
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25R TYP
2.25
.62
3.18
.12
.19
.56 REF
.19
.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B

		REVISIONS 25555				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	A
A		REVISED PER TDRR 28487	JMP		9 MAY 66	
B		REVISED PER TDRR 30531	EMJ	JI	9 AUG 66	
C		REVISED PER TDRR 31560	TD		20 OCT 66	
D		REVISED PER TDRR 31657	WA	elw	2 NOV 66	
E		REVISED PER TDRR 32773	JC		3 FEB 67	

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

2007015	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bonarrigo 23 Jun 66
CHECKED P Kaiser 25 Jun 66
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC
DATE

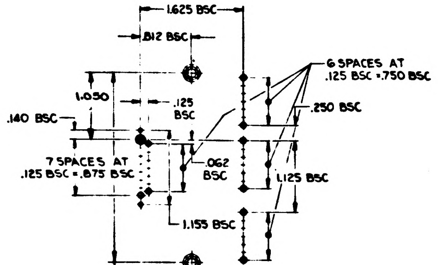
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY
C/M PSA

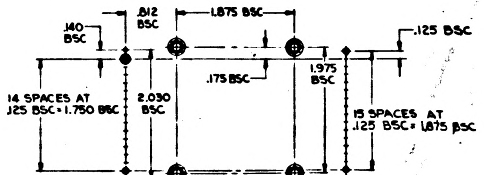
CODE IDENT NO. 80230
SIZE J
DRAWING NO 2008432
SCALE 1/1
SHEET 1 OF 2

2008432 REV. E SHT. 1

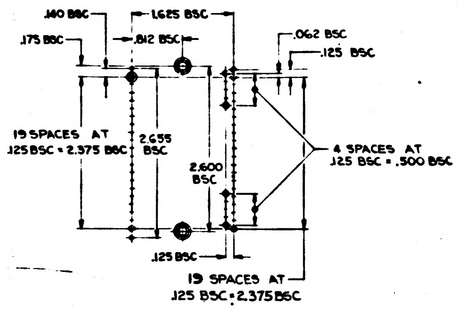
4/2008432


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC =.750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC =.875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

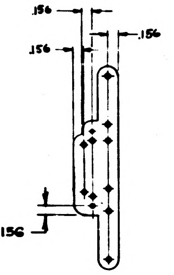
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

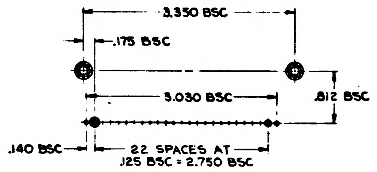
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.655 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

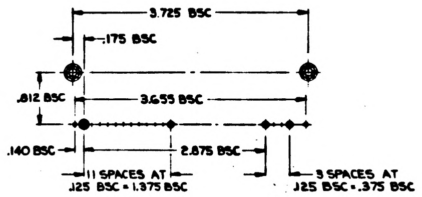
DETAIL C


.156
.156
.156
.156

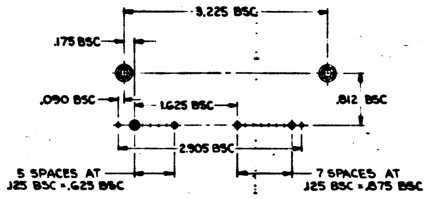
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

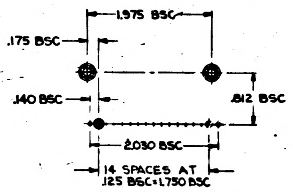
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

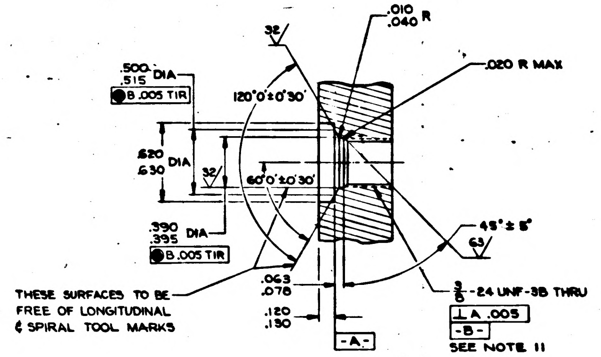
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

DETAIL F

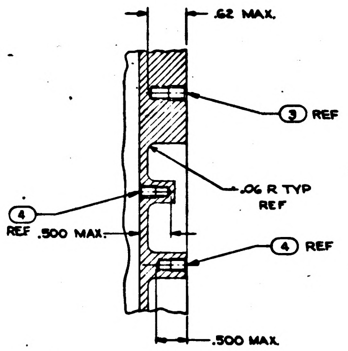

.175 BSC
1.975 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

DETAIL G

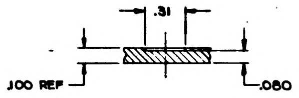

32
.010
.040 R
.020 R MAX
.500
.515 DIA
B .005 TIR
120°0'±0°30'
.620
.630 DIA
32
60°0'±0°30'
.390
.395 DIA
B .005 TIR
45°± 5°
63
.063
.078
.120
.130
-A-
3/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS

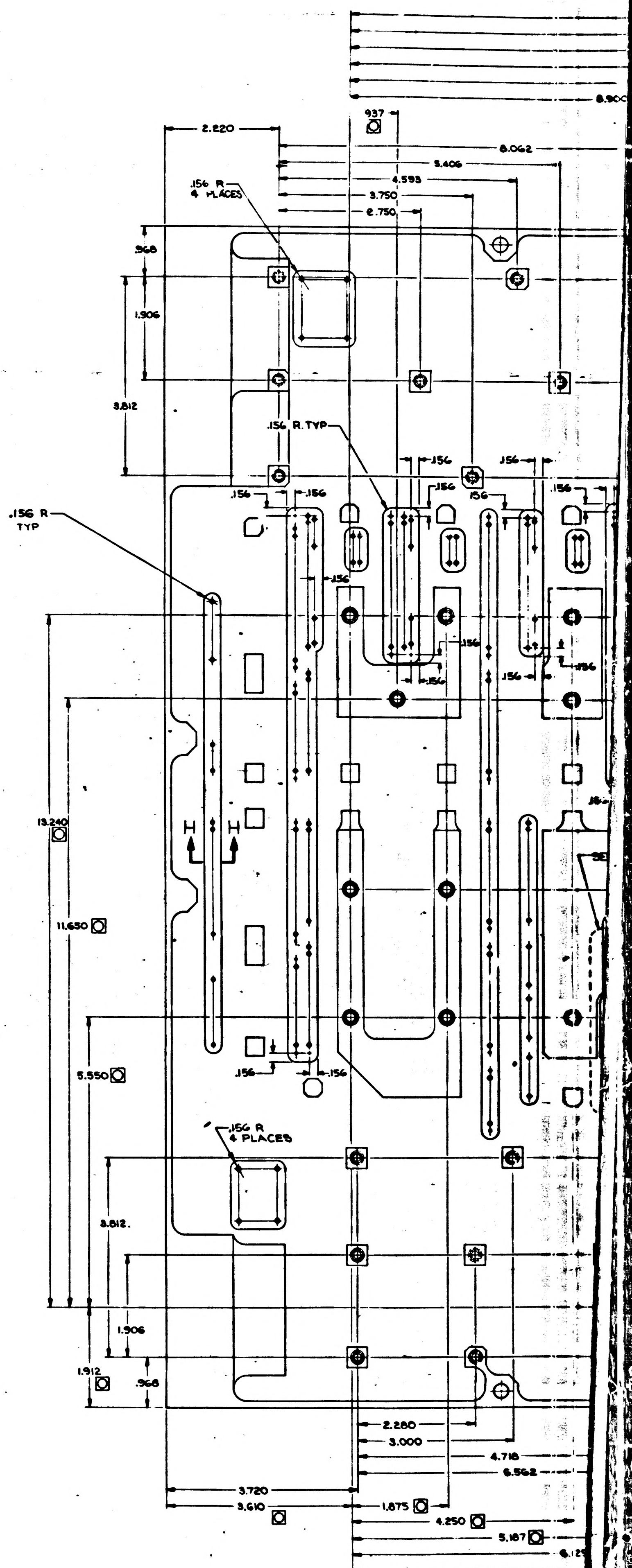
SECTION F-F
SCALE 2/1

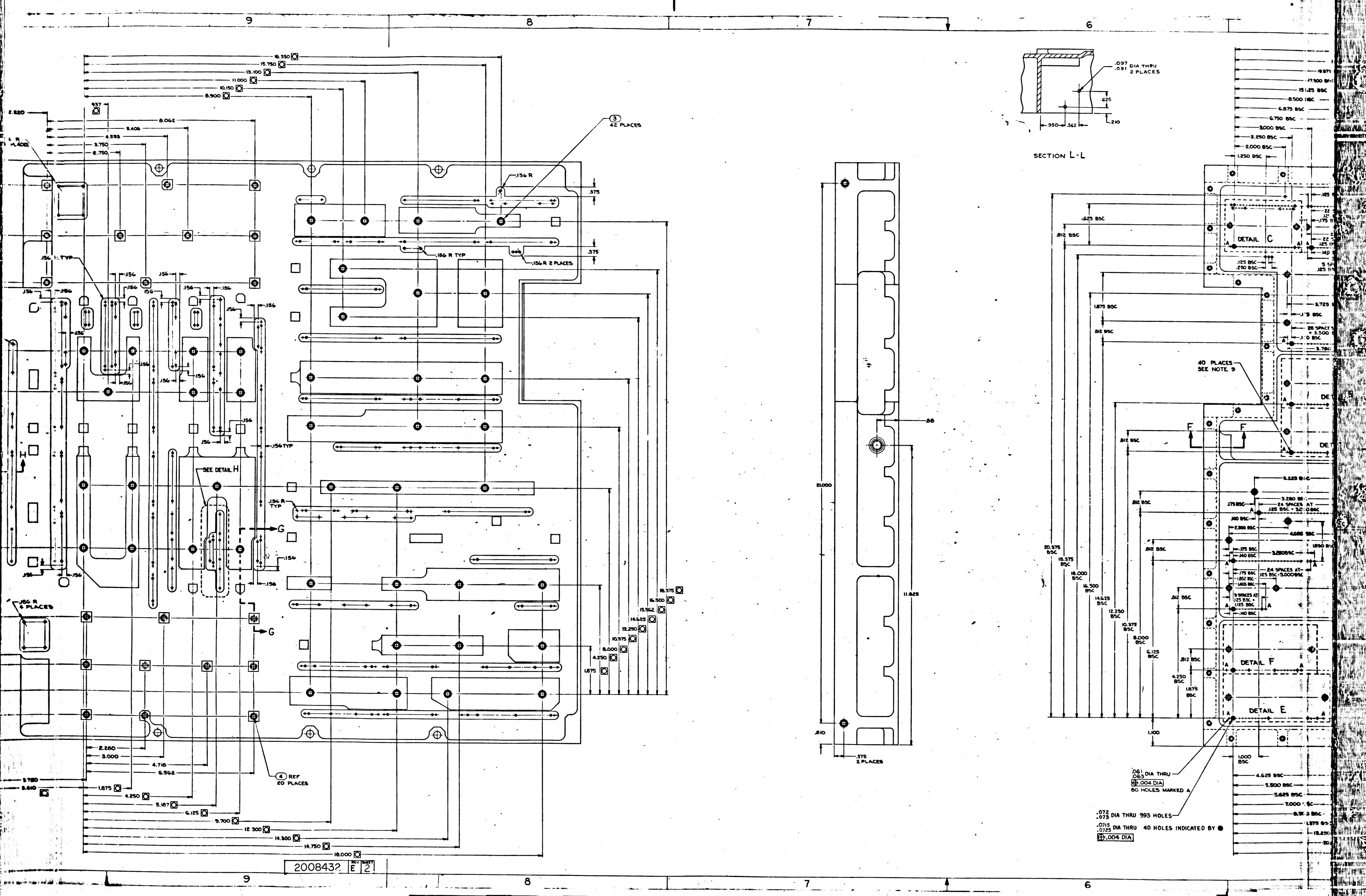

.62 MAX.
3 REF
.06 R TYP REF
4 REF
.500 MAX.
4 REF
.500 MAX.

SECTION G-G

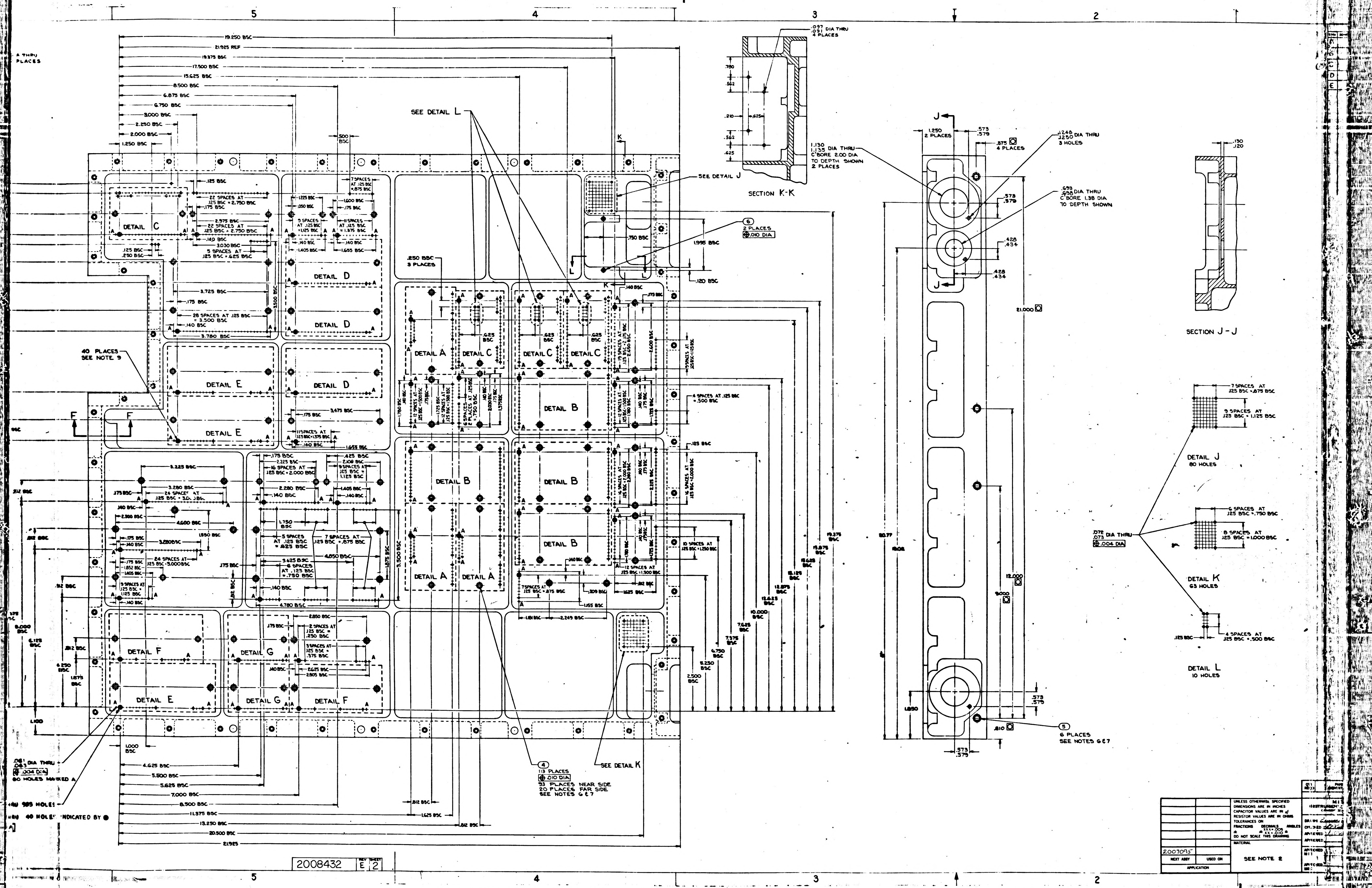

.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


8.900
937
2.220
8.062
5.406
4.593
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R. TYP
.156
.156
.156
.156
.156
.156
.156
.156
.156 R TYP
.156
.156
.156
.156
.156
.156
.156
13.240
H H
11.650
5.550
.156
.156
.156 R 4 PLACES
3.812.
1.906
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125


9
8
7
6
16.350
15.750
15.100
11.000
10.150
8.900
③ 42 PLACES
.156 R
.375
.186 R TYP
.156 R 2 PLACES
.156 TYP
SEE DETAIL H
H
G
.156 R TYP
.156 R 4 PLACES
④ REF 20 PLACES
2.280
3.000
4.718
6.562
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
.097 .091 DIA THRU 2 PLACES
.625
.210
.950
.562
SECTION L-L
21.000
11.625
.88
.810
.375 2 PLACES
1.625 BSC
.812 BSC
1.875 BSC
40 PLACES SEE NOTE 9
DETAIL C
DETAIL F
DETAIL E
F
20.375 BSC
18.375 BSC
16.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
24 SPACES AT .125 BSC = 3.000 BSC
.061 .063 DIA THRU ⊕ .004 DIA 80 HOLES MARKED A
.072 .073 DIA THRU 993 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
⊕ .004 DIA
2008432 REV E SHEET 2

2720084 32



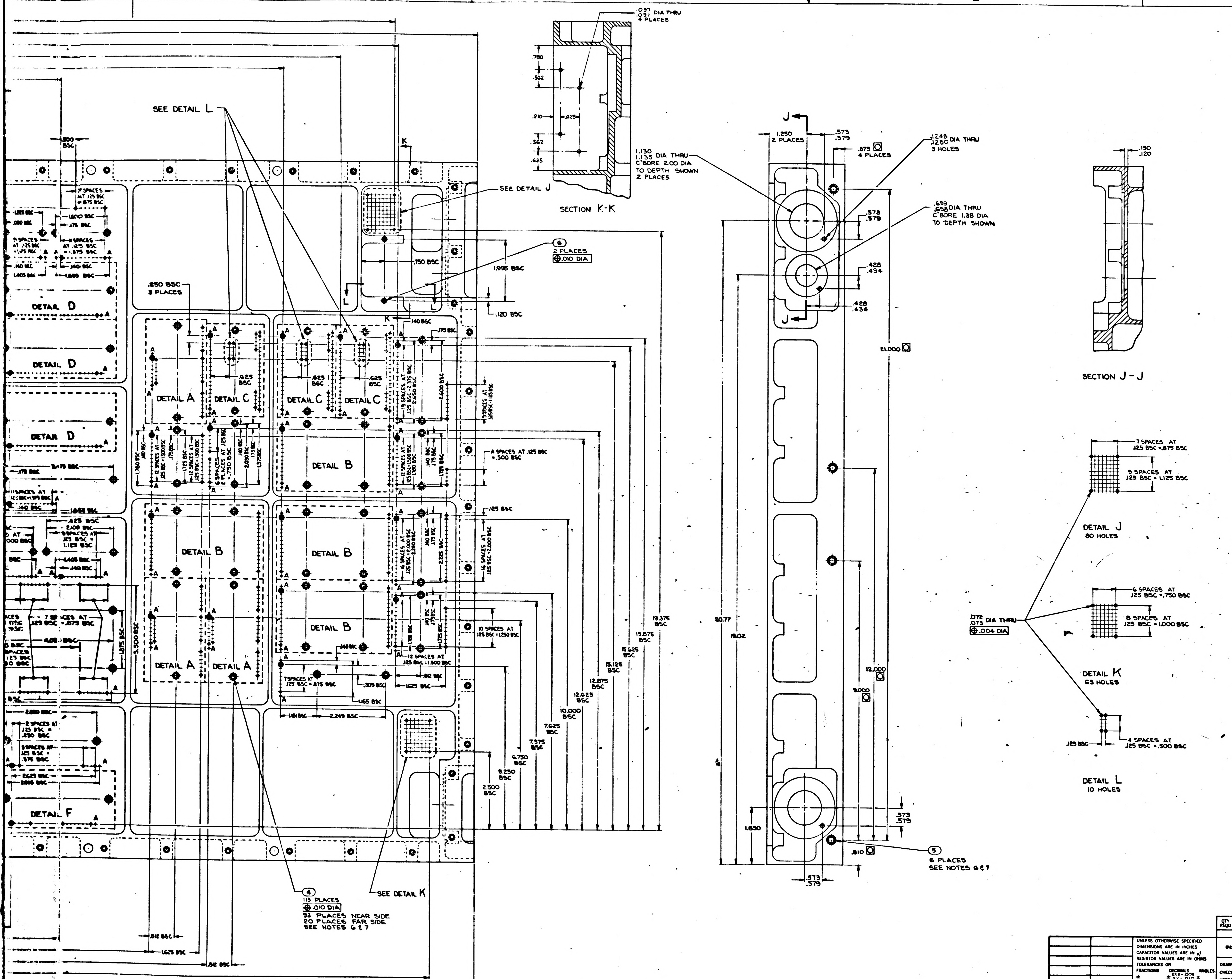
5
4
3
2
A THRU
PLACES
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.500 BSC
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
DETAIL C
DETAIL D
DETAIL E
DETAIL A
DETAIL B
DETAIL F
DETAIL G
22 SPACES AT .125 BSC = 2.750 BSC
26 SPACES AT .125 BSC = 3.500 BSC
24 SPACES AT .125 BSC = 3.000 BSC
16 SPACES AT .125 BSC = 2.000 BSC
7 SPACES AT .125 BSC = .875 BSC
40 PLACES SEE NOTE 9
F
K
L
J
SECTION K-K
SECTION J-J
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .695 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.875 4 PLACES
21.000
12.000
9.000
.810
⑤ 6 PLACES SEE NOTES 6 & 7
⑥ 2 PLACES ⊕ .010 DIA
④ 113 PLACES ⊕ .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
.072 .073 DIA THRU ⊕ .004 DIA
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K 63 HOLES
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES
.061 .063 DIA THRU ⊕ .004 DIA 60 HOLES MARKED A
989 HOLES
40 HOLES INDICATED BY ●
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.500 BSC
21.925

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ± DO NOT SCALE THIS DRAWING
2007095		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

2008432 REV E SHEET 2

3/2008432

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28487	JMP		9 MAY 66	
B		REVISION STATUS CHANGED	CMF	JI	9 AUG 66	
C		REVISION STATUS CHANGED	TD	BW	20 OCT '66	
D		REVISION STATUS CHANGED	WA	RW	2 NOV 66	
E		REVISION STATUS CHANGED	JC	BW	3 FEB 67	


SEE DETAIL L
SEE DETAIL J
SECTION K-K
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
6 2 PLACES ⊕ .010 DIA
1.995 BSC
.750 BSC
.120 BSC
.250 BSC 3 PLACES
DETAIL D
DETAIL A
DETAIL C
DETAIL B
DETAIL F
J
1.250 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.653 .658 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
6.750 BSC
5.250 BSC
2.500 BSC
3.500 BSC
.812 BSC
1.625 BSC
.812 BSC
4 113 PLACES ⊕ .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
SEE DETAIL K
.130 .120
SECTION J-J
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.072 .073 DIA THRU ⊕ .004 DIA
DETAIL K 63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES
4
3
2
1
D
C
B
A

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007095	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Zuccarello 25 Jan 66
CHECKED R.P. Kaiser 25 Jan 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE
SHEET 2 OF 2

2008432 E

2008432 REV E SHEET 2

4/2008432

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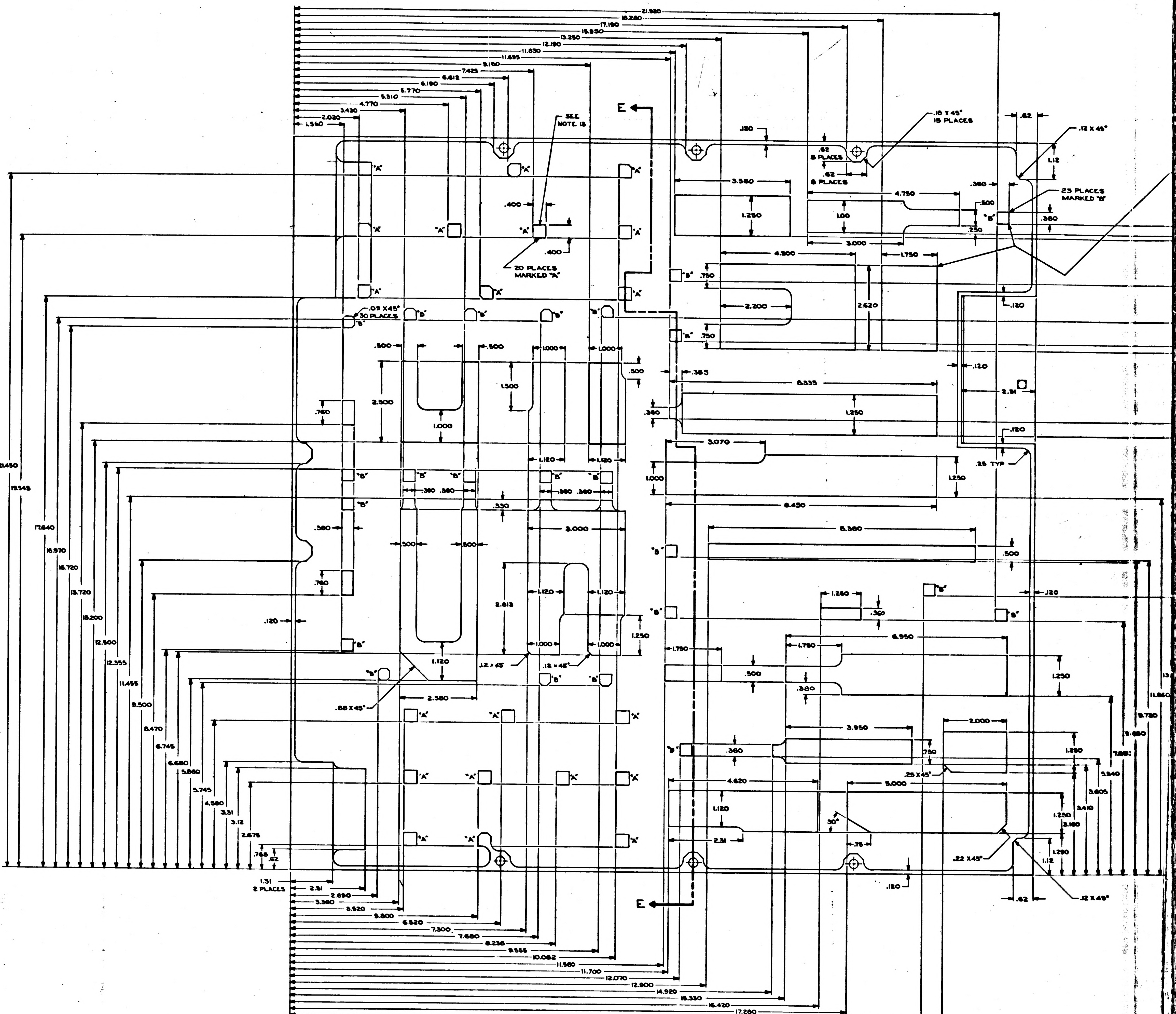
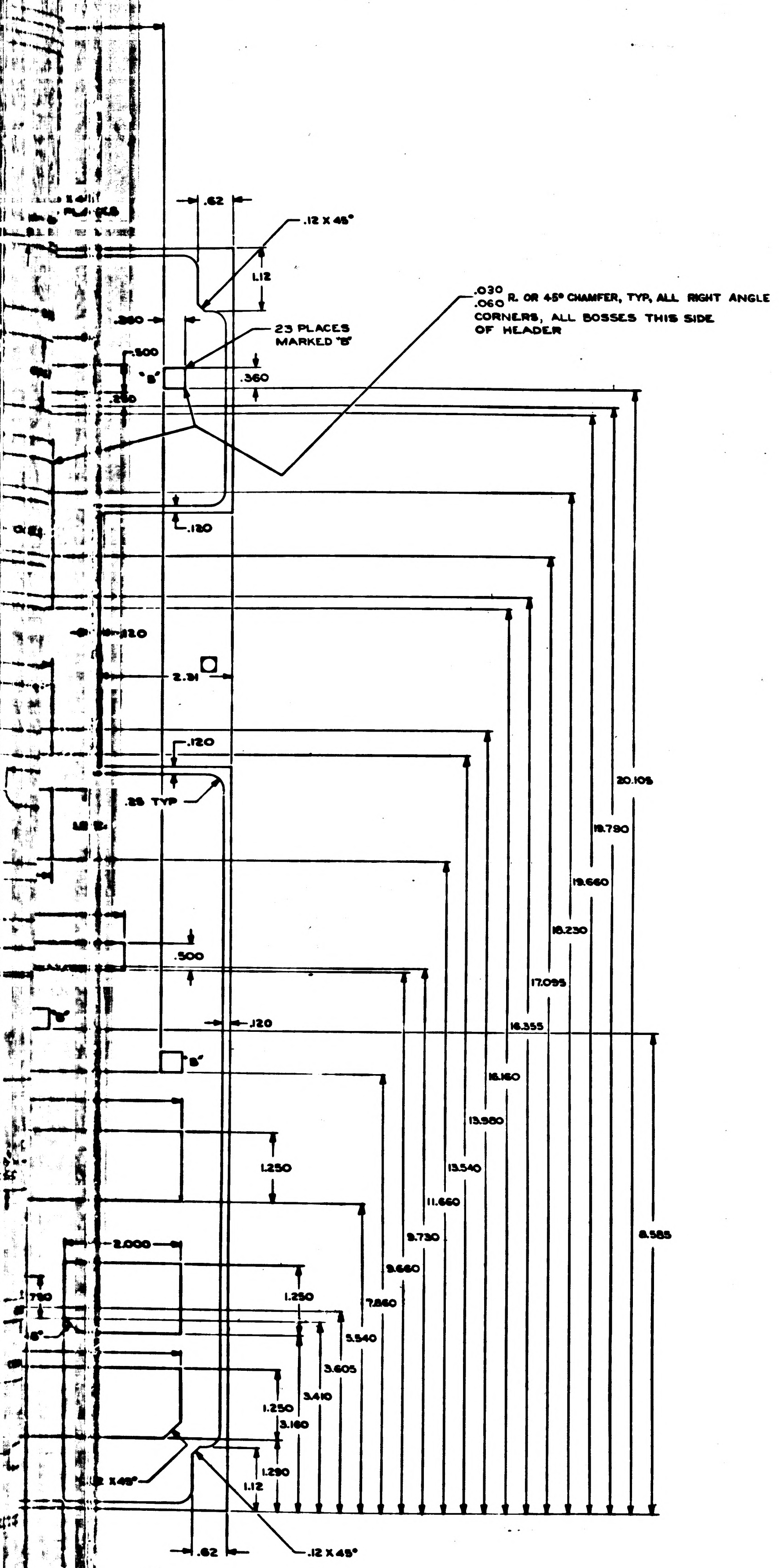
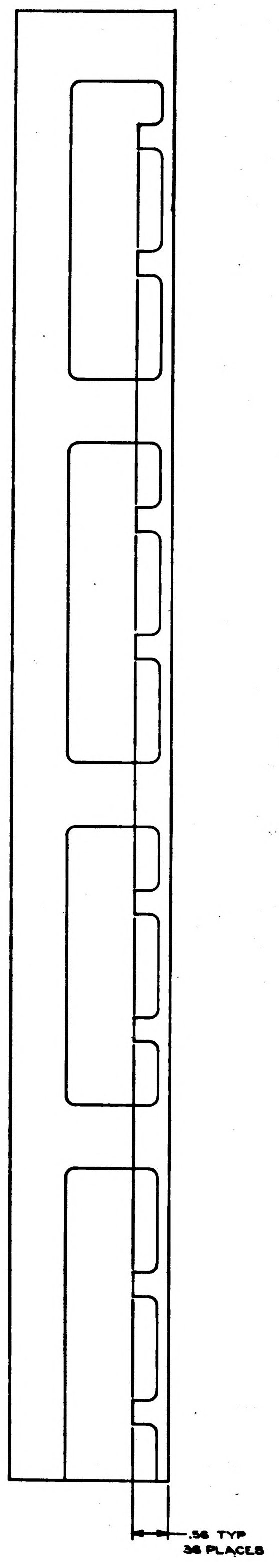

21.980
18.280
17.190
15.850
13.250
12.190
11.630
11.695
9.180
7.425
6.612
6.190
5.770
5.310
4.770
3.430
2.020
1.560
SEE NOTE 13
E
.120
.18 X 45°
15 PLACES
.62
.12 X 45°
.62
8 PLACES
.62
8 PLACES
3.580
1.250
4.750
1.00
3.000
.500
.250
"B"
.360
1.12
.360
23 PLACES
MARKED "B"
.400
.400
20 PLACES
MARKED "A"
"A"
4.200
1.750
.750
2.200
2.620
.750
.120
.09 X 45°
30 PLACES
"B"
.500
.500
1.000
1.000
2.500
1.500
1.000
.500
.385
8.335
.120
2.31
.360
1.250
.760
3.070
.120
.25 TYP
1.120
1.120
1.000
1.250
.360
.360
.360
.360
.330
8.450
.360
.500
.500
3.000
8.380
.500
.760
2.613
1.120
1.120
.120
1.260
.300
.120
1.000
1.000
1.250
1.750
6.950
1.750
.12 X 45
.12 X 45°
1.120
.500
.380
1.250
.88 X 45°
2.380
3.950
2.000
.360
.750
1.250
.25 X 45°
4.620
5.000
1.120
30°
.75
2.31
1.250
.22 X 45°
1.12
1.290
.120
.62
.12 X 45°
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.860
5.745
4.580
3.31
3.12
2.675
.768
.62
11.640
9.730
9.680
7.88
5.540
3.805
3.410
3.160
1.31
2 PLACES
2.31
2.690
3.360
3.520
5.800
6.520
7.300
7.680
8.236
9.555
10.082
11.580
11.700
12.070
12.900
14.920
15.330
16.420
17.280
19.620
20.280

NOTES:

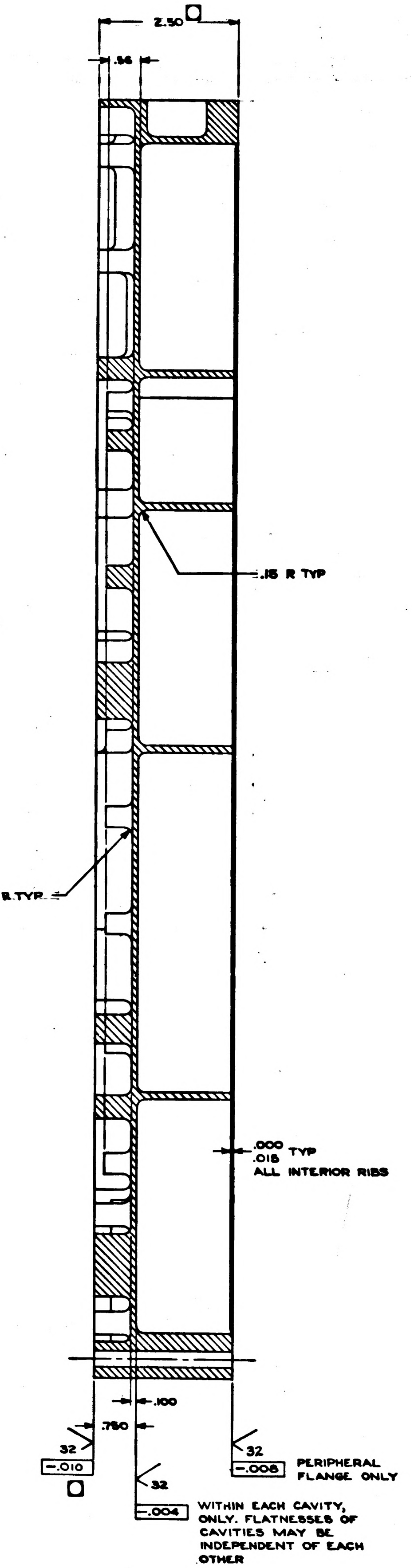
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
6. COAT THREADS OF HOLES FOR FIND NOS. 2, 3, 4, 5 AND 6 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. ▢ INSTALL FIND NOS. 2,3,4,5 AND 6 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREAD SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ▢ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT. IN EACH GROUP OF 10 BOSSES THE TOP SURFACES OF ALL THE BOSSES MUST BE FLAT WITHIN .004 WITH RESPECT TO EACH OTHER.
14. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.

2008432	REV. F	SHT. 1

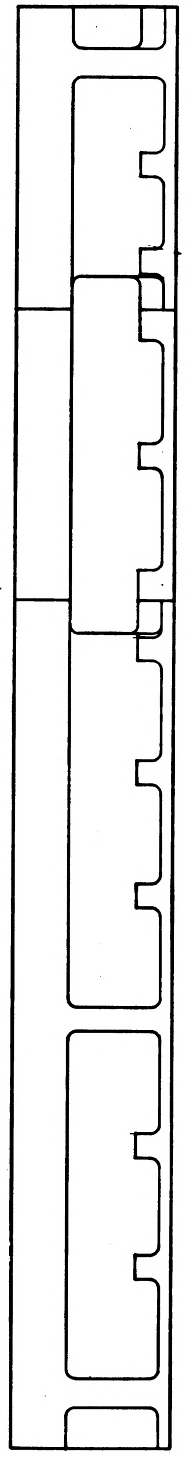

.12 X 45°
.62
1.12
.030 .060 R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
23 PLACES MARKED "B"
.360
.500
"B"
.120
2.31
.25 TYP
.500
1.250
2.000
.120
"B"
1.12
.12 X 45°
.62
20.105
19.790
19.660
18.230
17.095
16.355
16.160
13.980
13.540
11.660
9.730
9.660
8.585
7.860
5.540
3.605
3.410
3.160
1.290

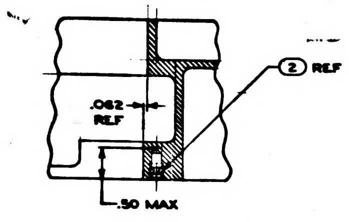

.56 TYP
36 PLACES

VIEW A-A
ROTATED CCW 90°

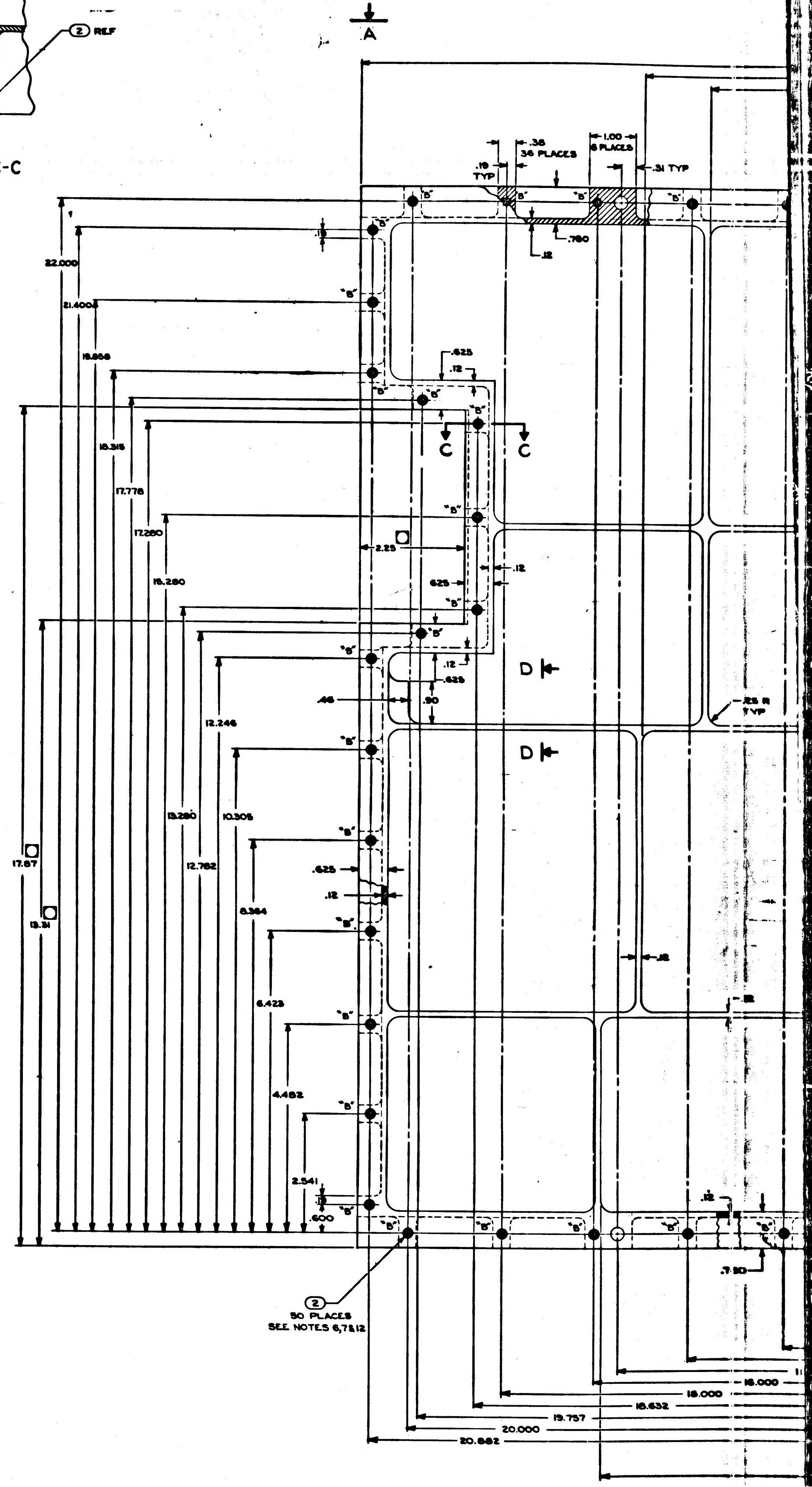

2.50
.56
.15 R TYP
.06 R TYP
.000 TYP
.015
ALL INTERIOR RIBS
.100
.750
32
-.010
32
-.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
32
-.008
PERIPHERAL FLANGE ONLY

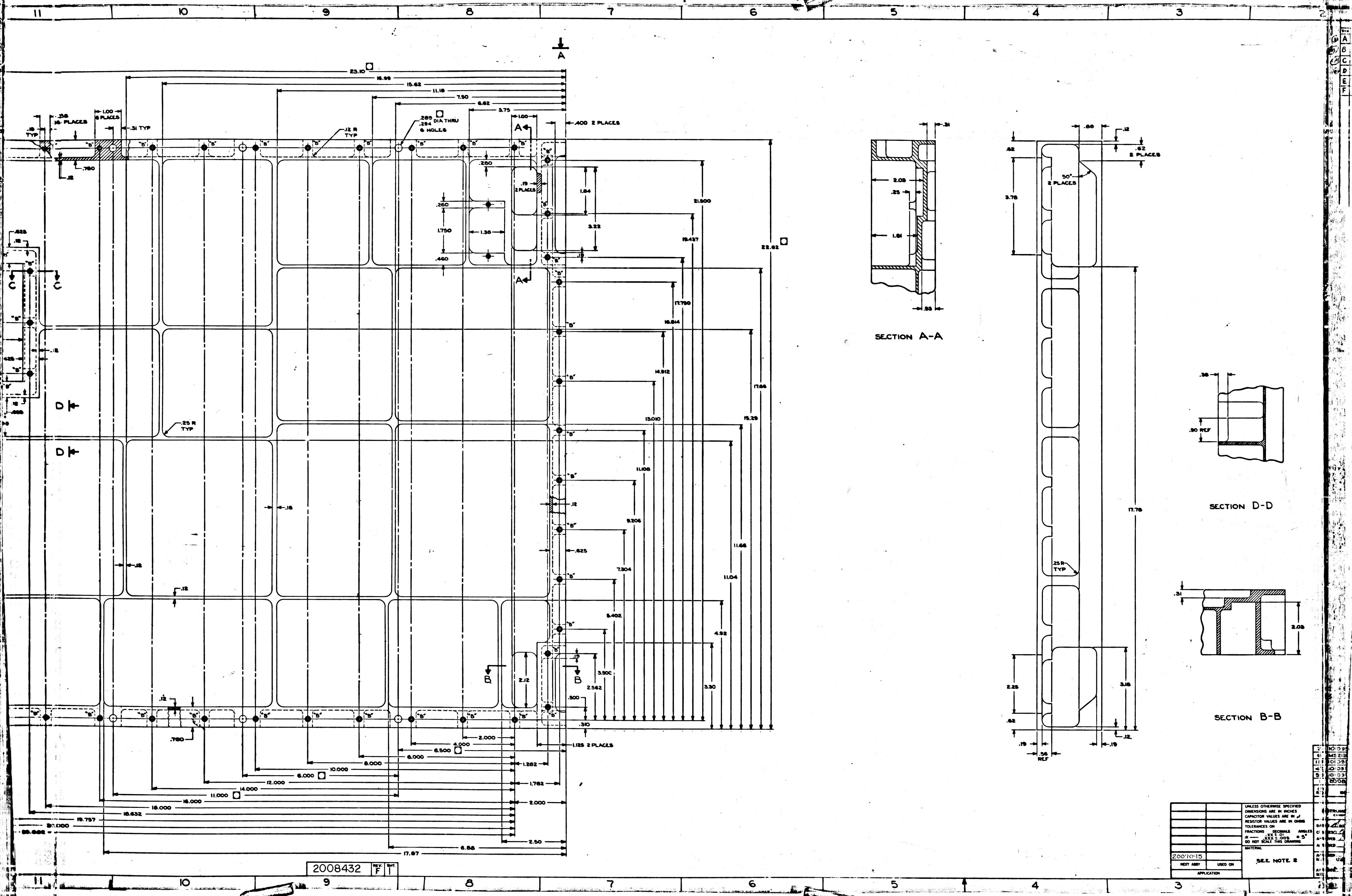
SECTION E-E




② REF
.062
REF
.50 MAX

SECTION C-C


A
.19 TYP
.36
36 PLACES
1.00
6 PLACES
.31 TYP
.760
.12
22.000
21.400
19.858
18.315
17.778
17.280
15.280
13.280
12.762
12.246
10.305
8.364
6.423
4.482
2.541
.600
17.87
13.31
.625
.12
C
C
2.25
D
D
.46
.90
.25 R TYP
"B"
② 50 PLACES
SEE NOTES 6,7 & 12
.720
16.000
18.000
18.632
19.757
20.000
20.882



11
10
9
8
7
6
5
4
3
A
B
C
D
E
F
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.136 16 PLACES
1.00 6 PLACES
.31 TYP
.16 TYP
.760
.12
.289 .294 DIA THRU 6 HOLES
.12 R TYP
"B"
.280
.19 2 PLACES
.260
1.750
1.38
.460
1.84
3.22
21.500
19.437
22.62
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
17.66
15.29
11.66
11.04
4.92
3.30
.625
.25 R TYP
.18
.12
2.12
.500
.310
1.125 2 PLACES
2.000
4.000
6.500
6.000
8.000
10.000
12.000
14.000
16.000
18.000
18.632
19.757
21.000
22.882
11.000
1.282
1.782
2.50
6.88
17.87
SECTION A-A
2.03
.25
1.81
.31
.33
.88
.12
.62 2 PLACES
50° 2 PLACES
3.76
17.76
.25 R TYP
2.25
3.16
.19
.56 REF
SECTION D-D
.36
.90 REF
SECTION B-B
2.03

2007045	
NEXT ASSY	USED ON
APPLICATION	

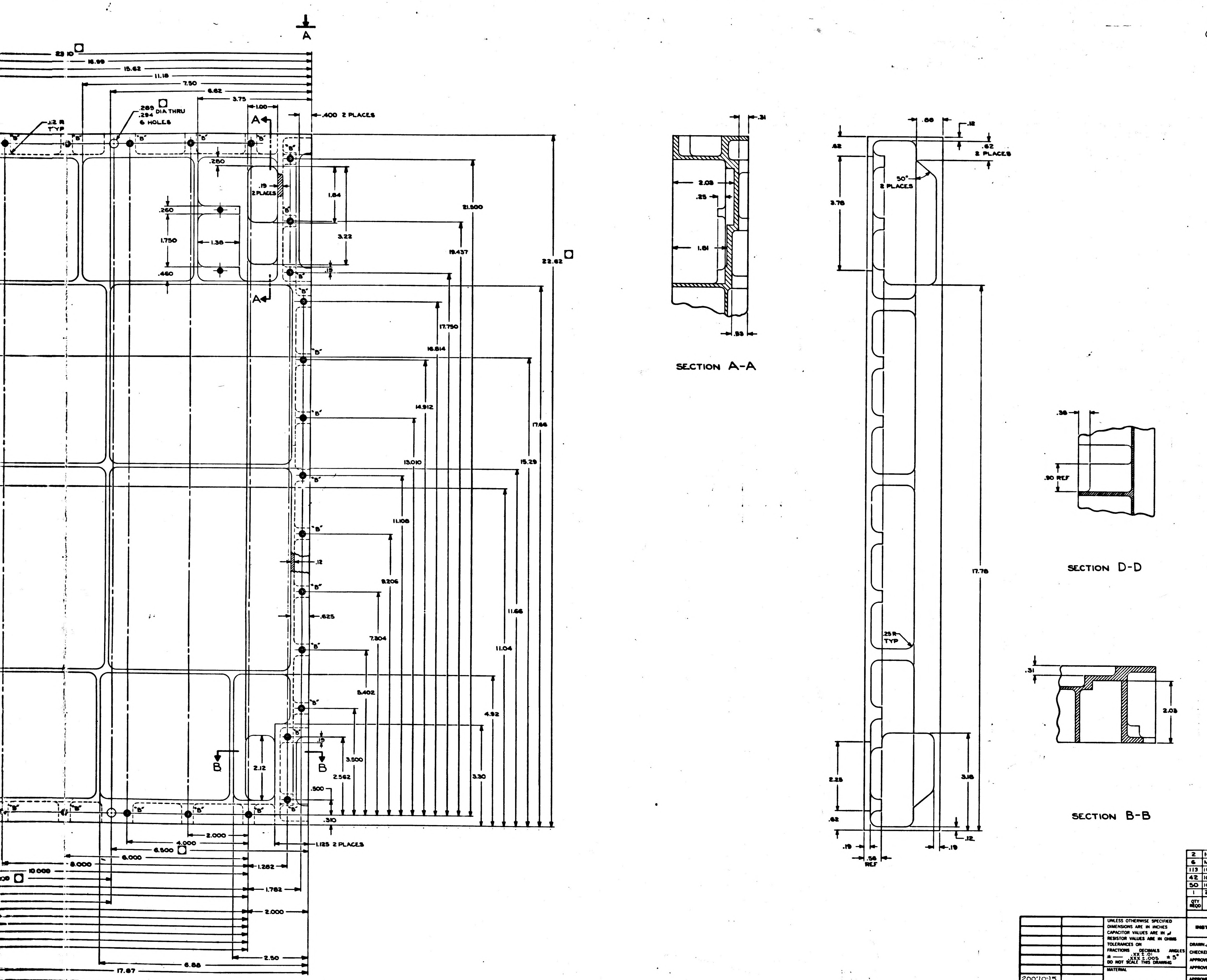
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2008432 REV. F SHT. 1

3/2008432

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	A
A		REVISED PER TDRR 28487			MAY 66	
B		REVISED PER TDRR 30531		JI	9 AUG 66	
C		REVISED PER TDRR 31560	TD		20 OCT 66	
D		REVISED PER TDRR 31657	WA		2 NOV 66	
E		REVISED PER TDRR 32772	JC		3 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	



A
A
B
B
SECTION A-A
SECTION D-D
SECTION B-B
.289 .294 DIA THRU 6 HOLES
.12 R TYP
.400 2 PLACES
1.125 2 PLACES
.19 2 PLACES
.62 2 PLACES
50° 2 PLACES
.25 R TYP
.90 REF
.56 REF
"B"
23.10
18.99
15.62
11.18
7.50
6.62
3.75
1.00
22.62
21.500
19.437
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
17.66
15.29
11.66
11.04
4.92
3.30
17.78
2.03
1.81
2.12
1.84
3.22
1.750
1.38
.260
.460
.280
.625
.500
.310
.12
.31
.33
.36
.88
.42
3.78
3.18
2.28
2.000
4.000
6.000
6.500
8.000
10.000
1.282
1.782
2.50
6.88
17.87

4H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007095	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bonarrigo 23 Jan 66
CHECKED CC P.P. Kwasney 25 Jan 66
APPROVED 25 Jan 66
APPROVED
APPROVED MIT W G Murley 1-25-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

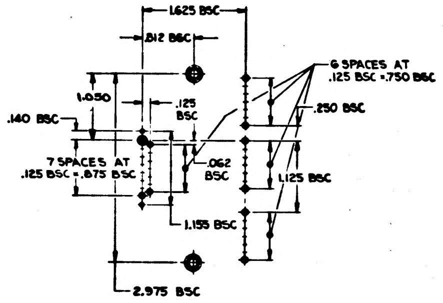
HEADER INSEPARABLE ASSY
C/M PSA

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2008432
SCALE 1/1 | SHEET 1 OF 2

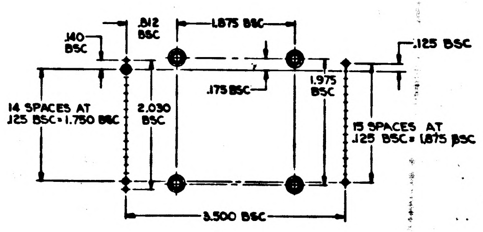
2008432

2008432 REV. F SHT. 1

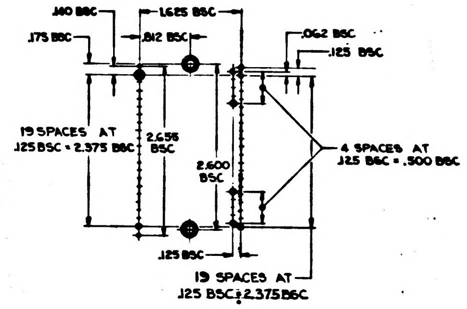
472008432


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

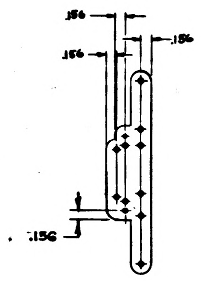
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

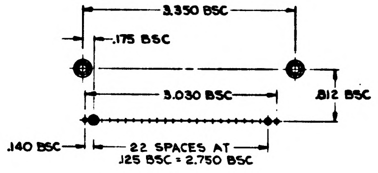
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.656 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

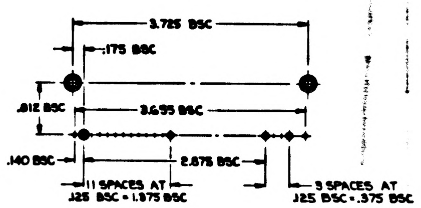
DETAIL C


.156
.156
.156
.156

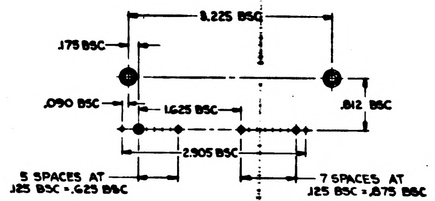
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

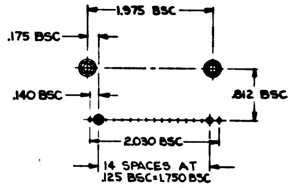
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.695 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

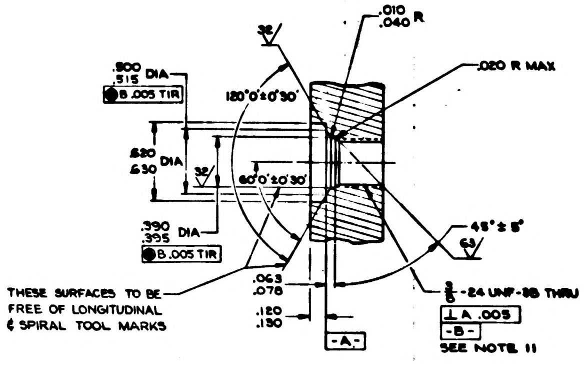
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

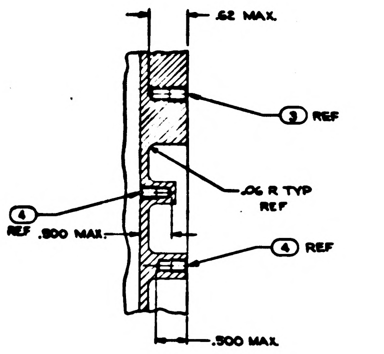
DETAIL F


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

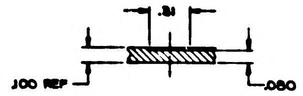
DETAIL G


.010
.040 R
.020 R MAX
.500
.515 DIA
B .005 TIR
120°0'±0°30'
.620
.630 DIA
60°0'±0°30'
.390
.395 DIA
B .005 TIR
45°±5°
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063
.078
.120
.130
-A-
5/8-24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

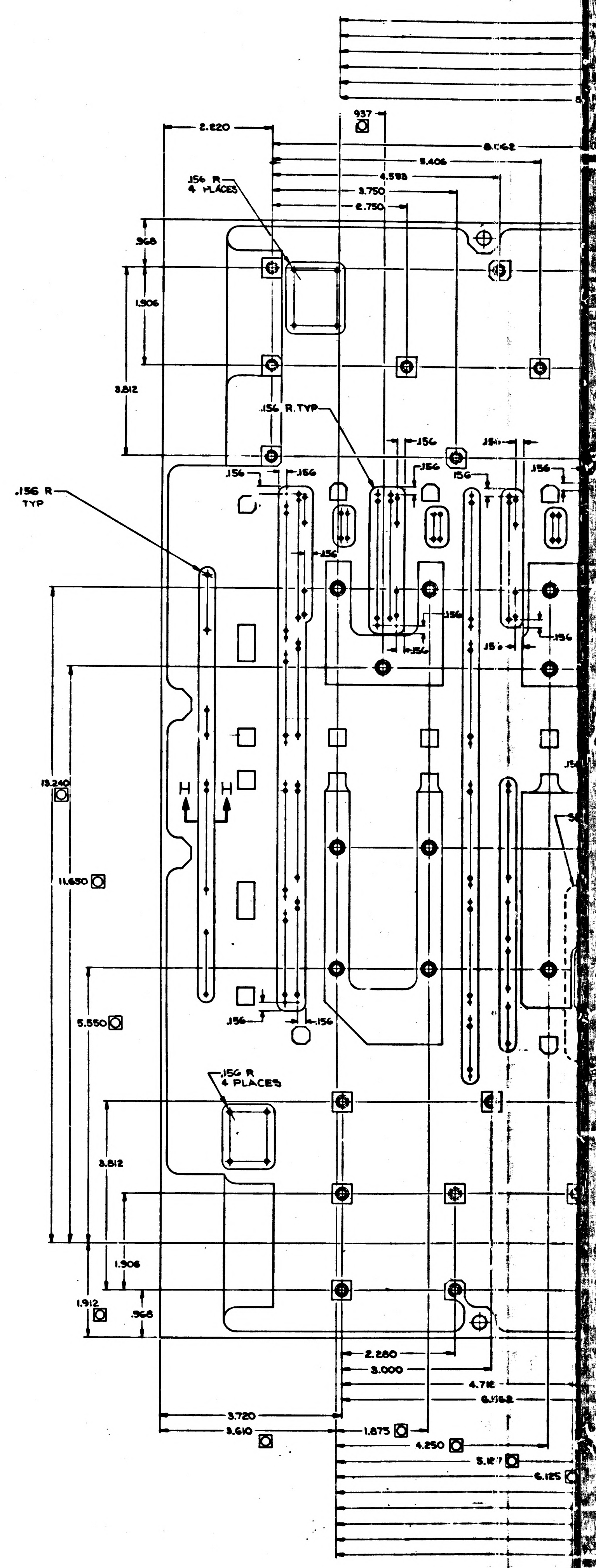
SECTION F-F
SCALE 2/1


.62 MAX.
3 REF
.06 R TYP REF
4 REF
.500 MAX.
4 REF
.500 MAX.

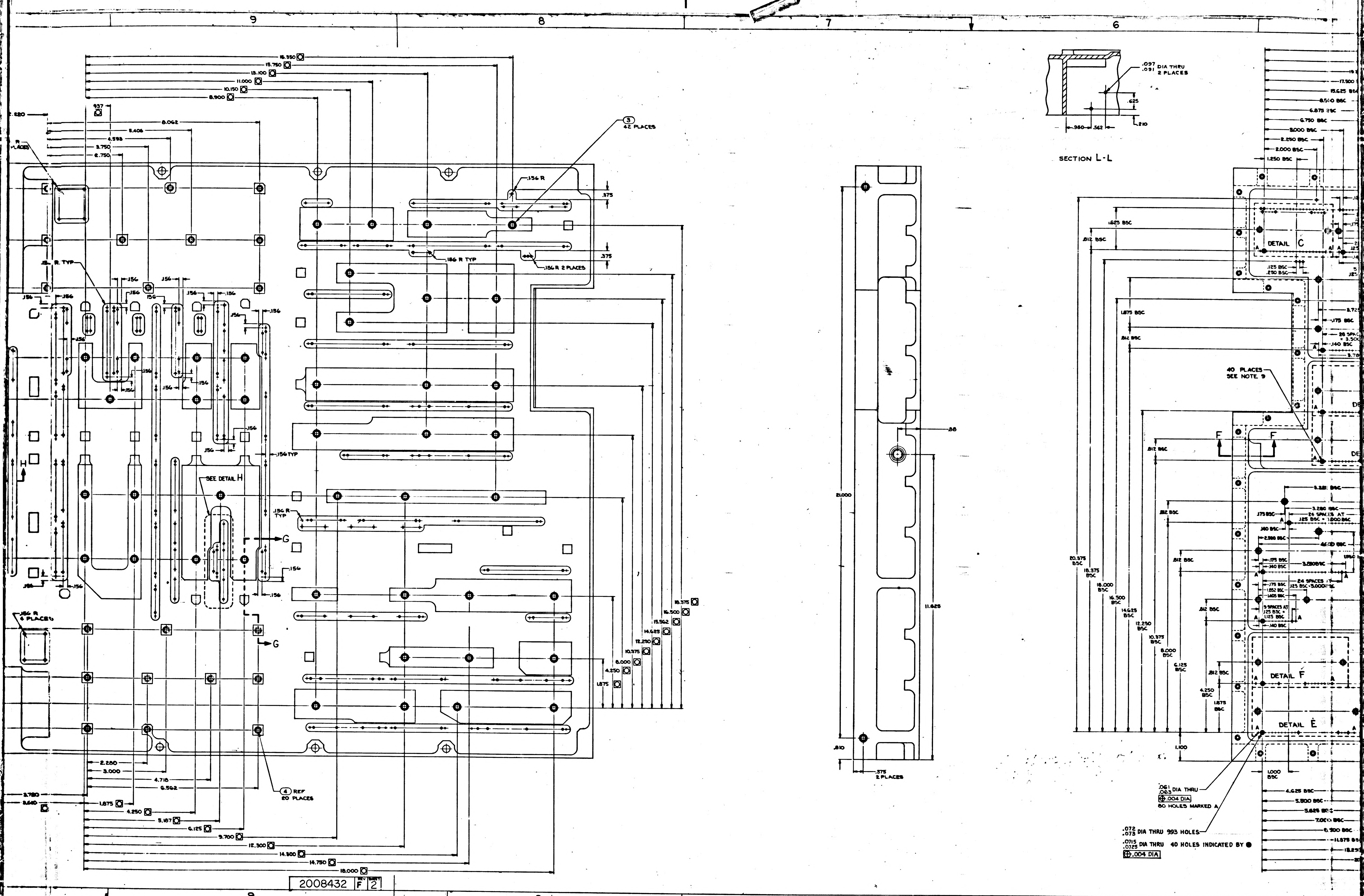
SECTION G-G


.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


2.220
.937
8.062
5.406
4.598
3.750
2.750
.156 R 4 PLACES
.968
1.906
3.812
.156 R TYP
.156 R TYP
13.240
11.650
5.550
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.716
6.168
3.720
3.610
1.875
4.250
5.167
6.125
H
H

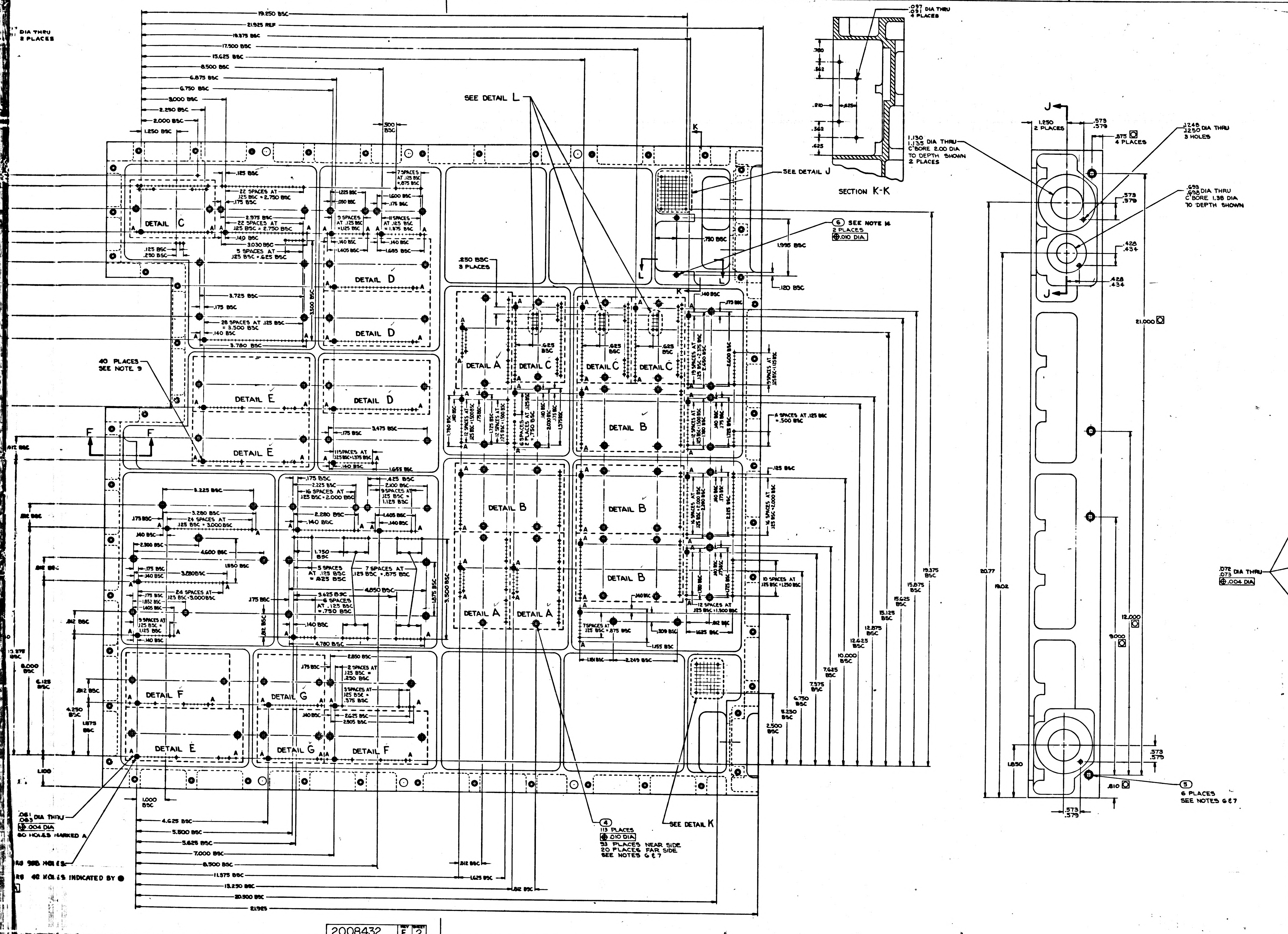
1/2008432



SECTION L-L
.097 / .091 DIA THRU 2 PLACES
.625
.210
.980
.562
③ 42 PLACES
④ REF 20 PLACES
.156 R
.156 R TYP
.156 R 2 PLACES
.186 R TYP
.156 R 4 PLACES
.375
SEE DETAIL H
H
G
F
DETAIL C
DETAIL F
DETAIL E
40 PLACES SEE NOTE 9
21.000
11.625
.810
.375 2 PLACES
.88
16.350
15.750
13.100
11.000
10.150
8.900
8.062
5.406
4.593
3.750
2.750
2.280
3.000
4.718
6.562
1.875
4.250
5.187
6.125
9.700
12.300
14.800
14.750
18.000
18.375
16.500
15.562
14.625
12.250
10.375
8.000
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
1.625 BSC
.812 BSC
4.625 BSC
5.800 BSC
.061 / .063 DIA THRU
.004 DIA
80 HOLES MARKED A
.072 / .073 DIA THRU 993 HOLES
.0715 / .0725 DIA THRU 40 HOLES INDICATED BY ●
.004 DIA
24 SPACES AT .125 BSC = 3.000 BSC
9 SPACES AT .125 BSC = 1.125 BSC
9
8
7
6

2008432 F 2

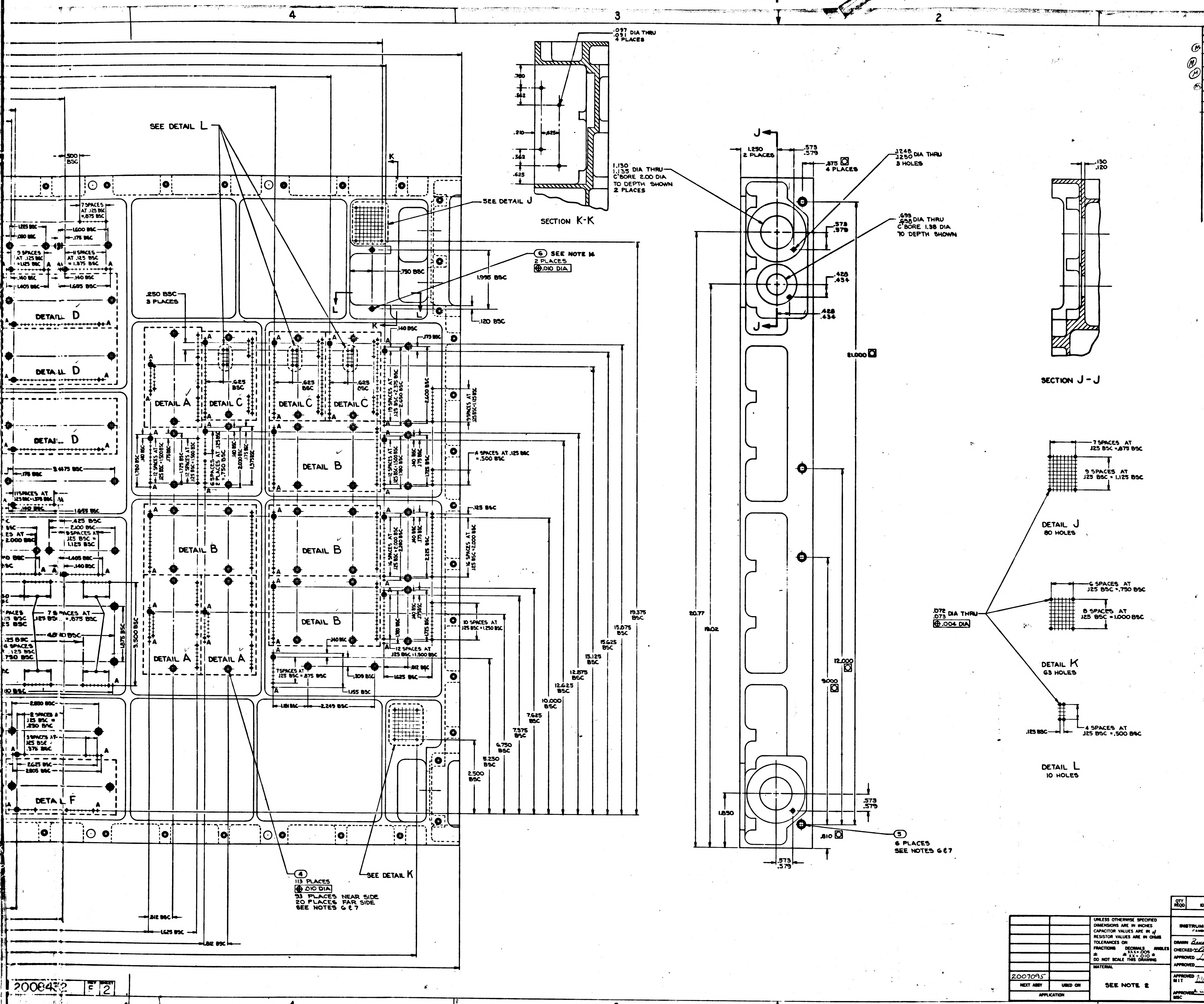
2/2008432


SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
SECTION K-K
SECTION J-J
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL E
DETAIL F
DETAIL G
DETAIL J
80 HOLES
DETAIL K
63 HOLES
DETAIL L
10 HOLES
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
6 SEE NOTE 14 2 PLACES .010 DIA
.750 BSC
1.995 BSC
.120 BSC
.250 BSC 3 PLACES
40 PLACES SEE NOTE 9
21.000
20.77
19.02
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
4 115 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
.061 .063 DIA THRU .004 DIA 80 HOLES MARKED A
98 HOLES
40 HOLES INDICATED BY ●
.072 .073 DIA THRU .004 DIA
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
4 SPACES AT .125 BSC = .500 BSC
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.500 BSC
21.925
F
J
K
L
5
4
3
2
A
B
C
D
E

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ± DO NOT SCALE THIS DRAWING
2007095		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

2008432 REV F SHEET 2

3420084 32



SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
SECTION K-K
SECTION J-J
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
1.250 2 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.875 4 PLACES
6 SEE NOTE 14 2 PLACES .010 DIA
.250 BSC 3 PLACES
.750 BSC
1.995 BSC
.120 BSC
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
21.000
20.77
19.02
19.375 BSC
12.000
9.000
1.850
.810
5 6 PLACES SEE NOTES 6 & 7
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
.072 .073 DIA THRU .004 DIA
DETAIL J 80 HOLES
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL K 63 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL L 10 HOLES
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
4H

		REVISIONS 25555				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 28487	JMP		9 MAY 66	
Ⓜ B		REVISION STATUS CHANGED	EHF	JI	9 AUG 66	
Ⓜ C		REVISION STATUS CHANGED	TD		20 OCT '66	
Ⓜ D		REVISION STATUS CHANGED	WA		2 NOV 66	
E		REVISION STATUS CHANGED	JC		9 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007095	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Buscarello 25 Jan 66
CHECKED R.P. Kunsel 25 Jan 66
APPROVED 25 Jan 66
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

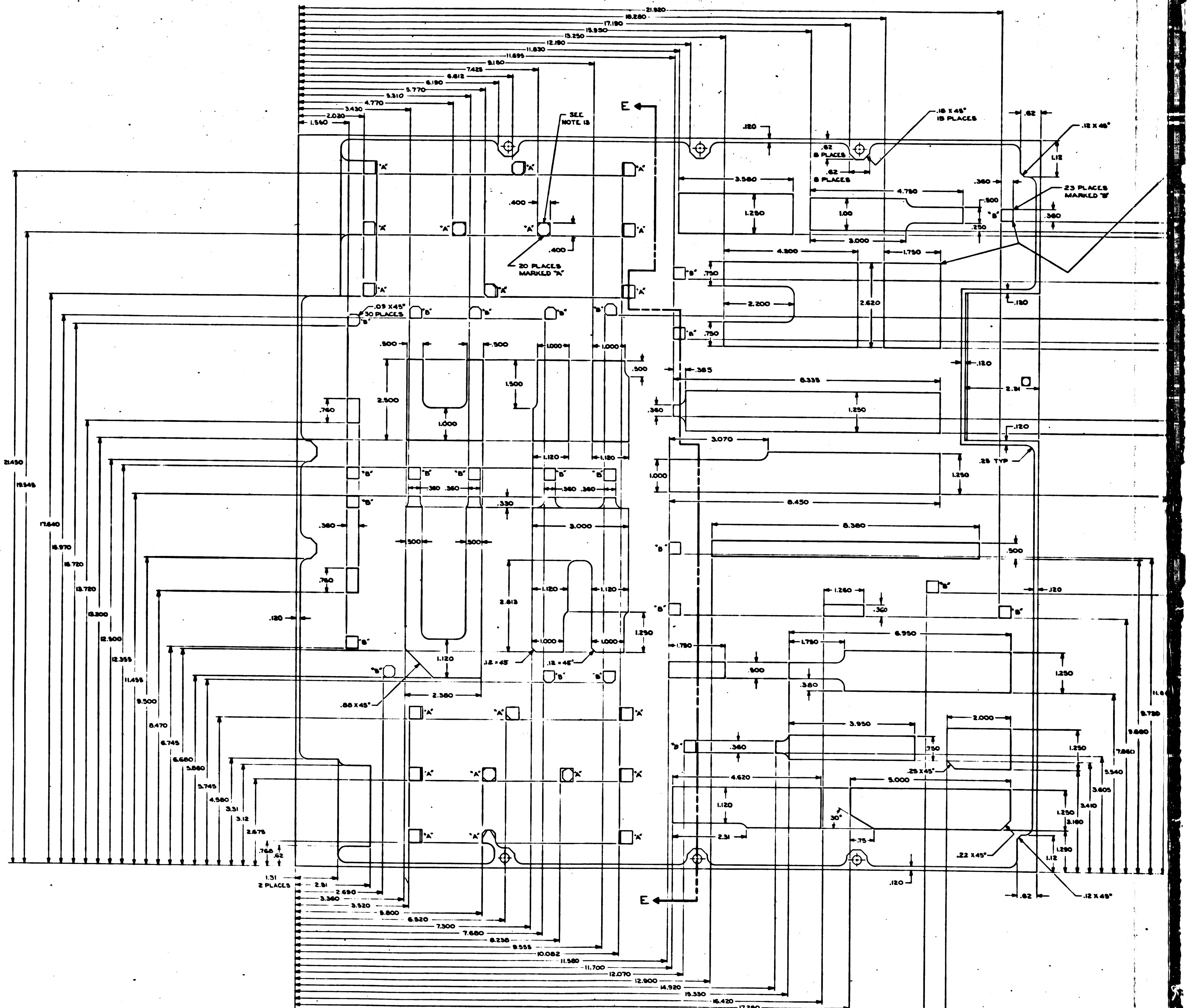
HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE
SHEET 2 OF 2

2008432 F

2008432 F 2

4/2008432

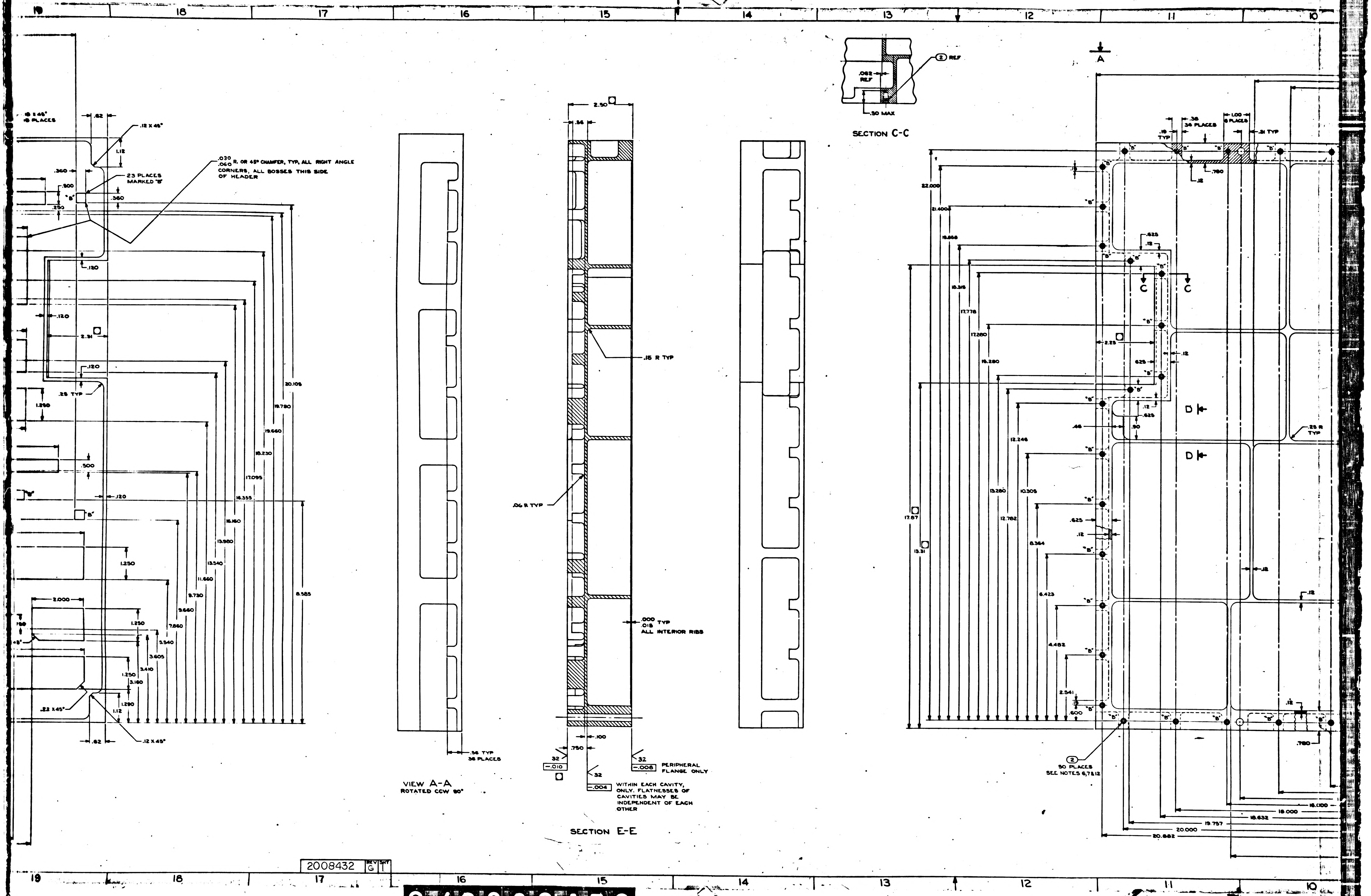


NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
6. COAT THREADS OF HOLES FOR FIND NOS. 2, 3, 4, 5 AND 6 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NOS. 2, 3, 4, 5 AND 6 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREAD SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT. IN EACH GROUP OF 10 BOSSES THE TOP SURFACES OF ALL THE BOSSES MUST BE FLAT WITHIN .004 WITH RESPECT TO EACH OTHER.
14. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.

2008432	REV. G	SHT. 1

1/2008432



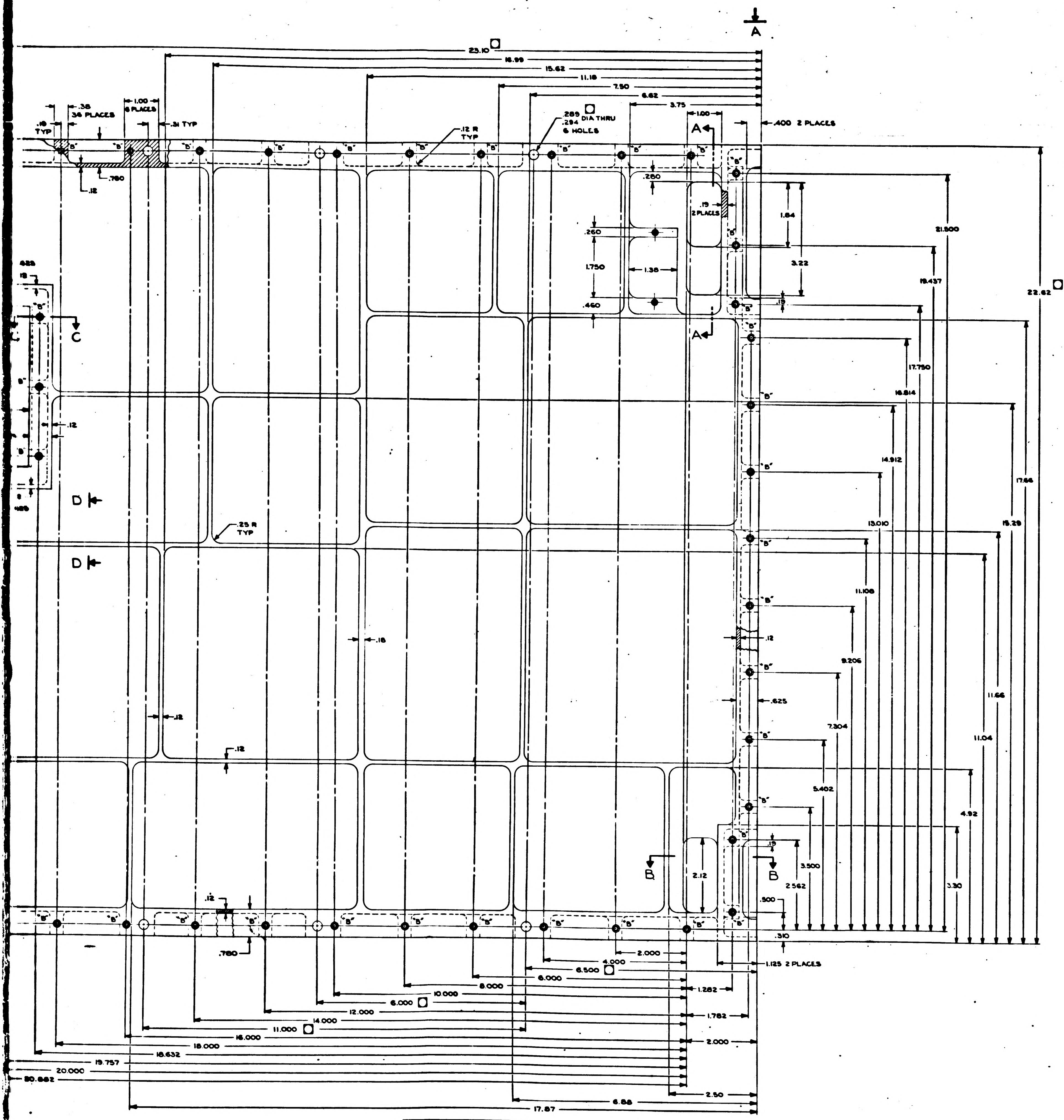
19
18
17
16
15
14
13
12
11
10
.10 X 45°
10 PLACES
.62
.12 X 45°
1.12
.360
23 PLACES
MARKED "B"
.500
"B"
.360
.250
.030
.060 R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
.120
.120
2.31
.120
.25 TYP
1.250
.500
.120
"B"
1.250
2.000
1.250
1.250
1.290
1.12
.22 X 45°
.62
.12 X 45°
20.105
19.790
19.660
18.230
17.095
16.555
16.160
13.980
13.540
11.660
9.730
9.660
7.860
5.540
3.605
3.410
3.160
8.585
.56 TYP
36 PLACES
2.50
.56
.15 R TYP
.06 R TYP
.000
.018 TYP
ALL INTERIOR RIBS
.100
.750
32
-.010
32
-.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
32
-.008
PERIPHERAL FLANGE ONLY
.062
REF
.50 MAX
② REF
A
.10
TYP
.36
36 PLACES
1.00
6 PLACES
.31 TYP
.12
.780
22.000
21.400
19.868
18.316
17.778
17.280
16.280
13.280
12.782
12.246
10.305
8.364
6.423
4.482
2.541
.600
17.87
13.31
.625
.12
C
C
2.25
.625
.12
.12
.625
.46
.90
D
D
.25 R
TYP
.625
.12
.12
.12
.12
.780
②
50 PLACES
SEE NOTES 6,7 & 12
16.000
18.000
18.632
19.757
20.000
20.882

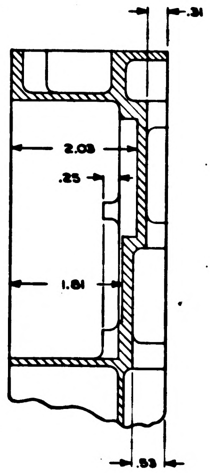
VIEW A-A
ROTATED CCW 90°

SECTION E-E

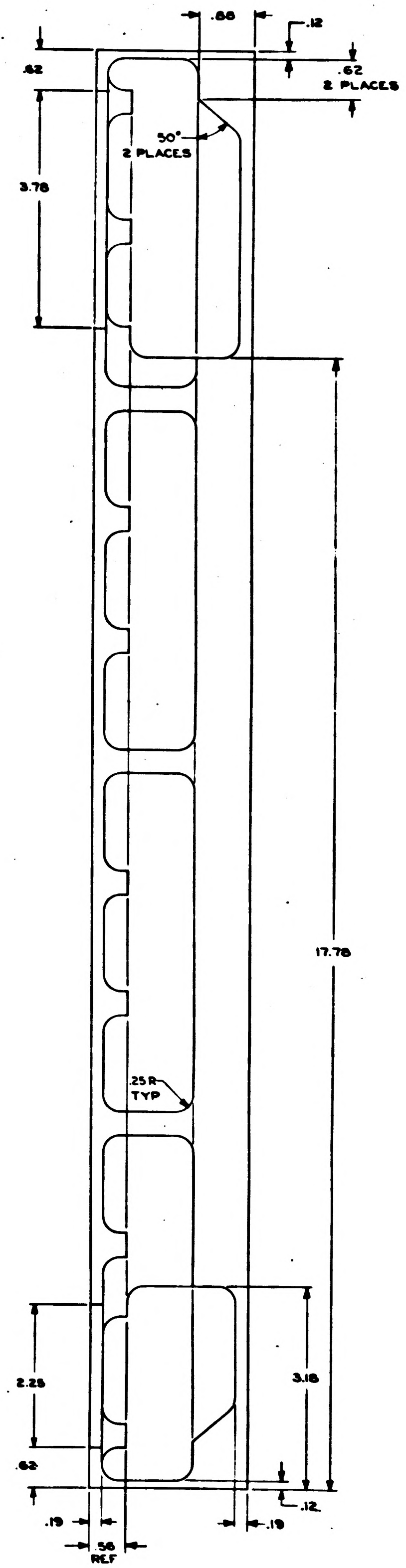
SECTION C-C

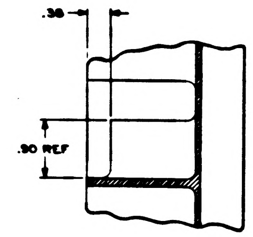
2008432	REV G	SHT 1


A
23.10 ☐
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.38
36 PLACES
1.00
6 PLACES
.31 TYP
.18 TYP
.12 R TYP
.289 ☐ DIA THRU
.294
6 HOLES
.400 2 PLACES
.780
.12
"B"
A
.260
.19 2 PLACES
.260
1.750
1.38
.460
1.84
3.22
21.500
19.437
22.62 ☐
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
17.66
15.29
11.66
11.04
4.92
3.30
3.500
2.562
.500
.310
1.125 2 PLACES
C
D
D
.25 R TYP
.18
.12
.12
.12
.625
.12
2.12
B
B
.780
2.000
4.000
6.500 ☐
8.000
6.000
10.000
1.282
6.000 ☐
12.000
1.782
14.000
11.000 ☐
16.000
2.000
18.000
18.632
19.757
20.000
20.882
2.50
6.88
17.87

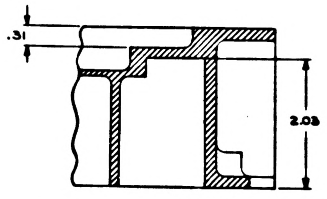

.31
2.03
.25
1.61
.53

SECTION A-A


.88
.12
.62
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25 R TYP
2.25
3.18
.62
.12
.19
.56 REF
.19



SECTION D-D



SECTION B-B

2	
6	
113	
42	
50	
1	
QTY REQD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007015	

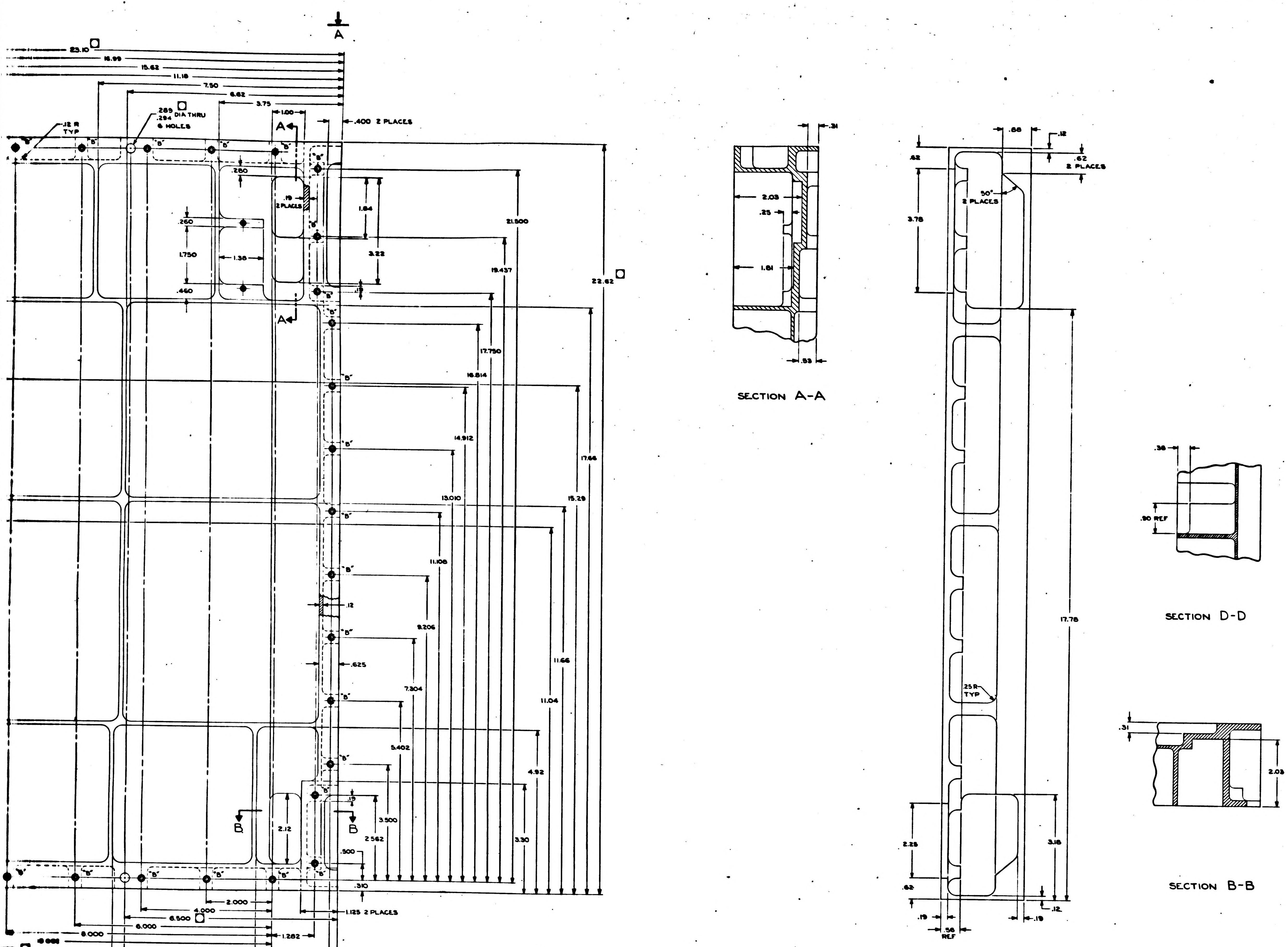
APPLICATION

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED
APPROVED

2008432 REV. G SHT. 1

3/2008432

		REVISIONS 25556				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	A
A		REVISED PER TDRR 28487			MAY 66	
B		REVISED PER TDRR 30531		JI	9 AUG 66	
C		REVISED PER TDRR 31560	TD		20 OCT 66	
D		REVISED PER TDRR 31657	WA		2 NOV 66	
E		REVISED PER TDRR 32772	JC		3 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	
G		REVISED PER TDRR 33688			2 AUG 67	



8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.12 R TYP
.289 .294 DIA THRU 6 HOLES
"B"
.260
.19 2 PLACES
1.84
3.22
1.750
1.38
.460
21.500
19.437
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
22.62
17.66
15.28
11.66
11.04
4.92
3.30
.12
.625
2.12
.500
.310
2.000
4.000
6.500
6.000
8.000
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87
A
B
.31
2.03
.25
1.61
.53
SECTION A-A
.88
.12
.42
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25R TYP
2.25
3.18
.62
.19
.56 REF
.12
.19
.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B

2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1
QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007015	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonarrigo 23 Aug 66
CHECKED C. Kasser 25 Aug 66
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY
C/M PSA

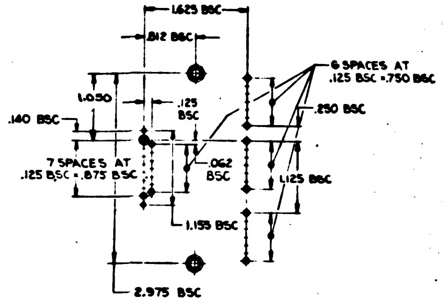
CODE IDENT NO 80230
SIZE J
DRAWING NO 2008432
SCALE 1/1
SHEET 1 OF 2

2008432

2008432 REV. G SHT. 1

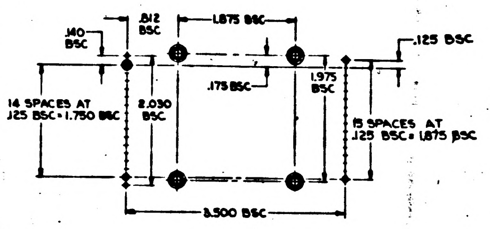
4H

4/2008432



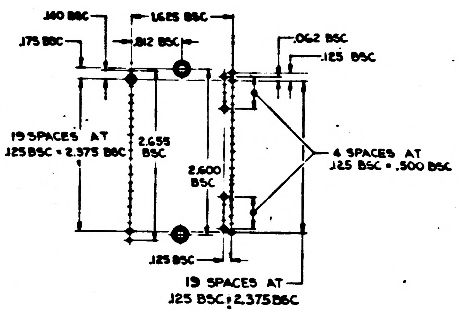
1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
1.050
.125 BSC
.250 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

DETAIL A



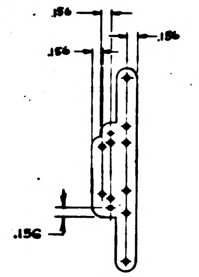
.140 BSC
.812 BSC
1.875 BSC
.125 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

DETAIL B



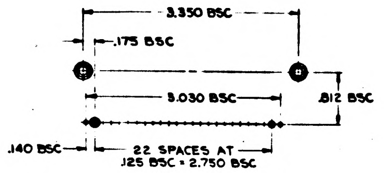
.140 BSC
1.625 BSC
.062 BSC
.175 BSC
.812 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.655 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

DETAIL C



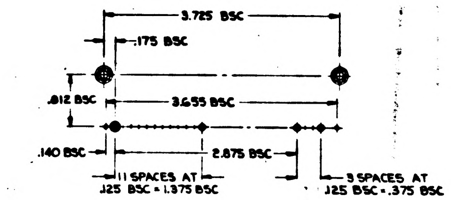
.156
.156
.156
.156

DETAIL H



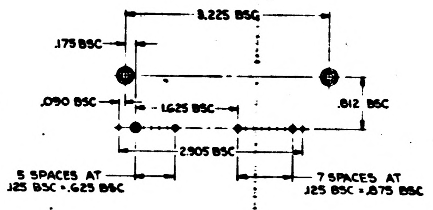
3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

DETAIL D



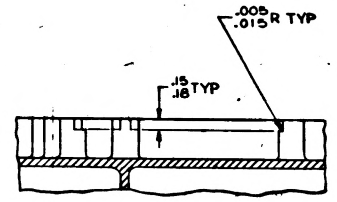
3.725 BSC
.175 BSC
.812 BSC
3.655 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

DETAIL E



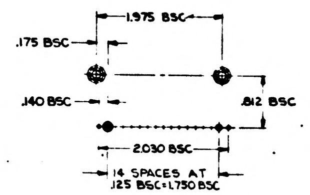
3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

DETAIL F



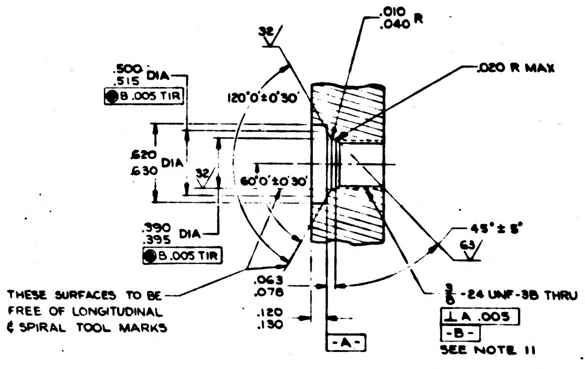
.005 .015 R TYP
.15 .18 TYP

PARTIAL SECTION M-M



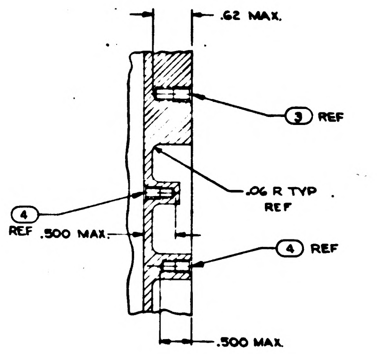
.175 BSC
1.975 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

DETAIL G



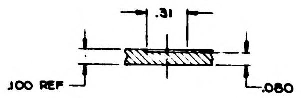
32
.010 .040 R
.020 R MAX
.500 .515 DIA
B .005 TIR
120°0'±0°30'
.620 .630 DIA
32
60°0'±0°30'
.390 .395 DIA
B .005 TIR
45° ± 5°
63
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063 .078
.120 .130
-A-
3/8 -24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

SECTION F-F
SCALE 2/1



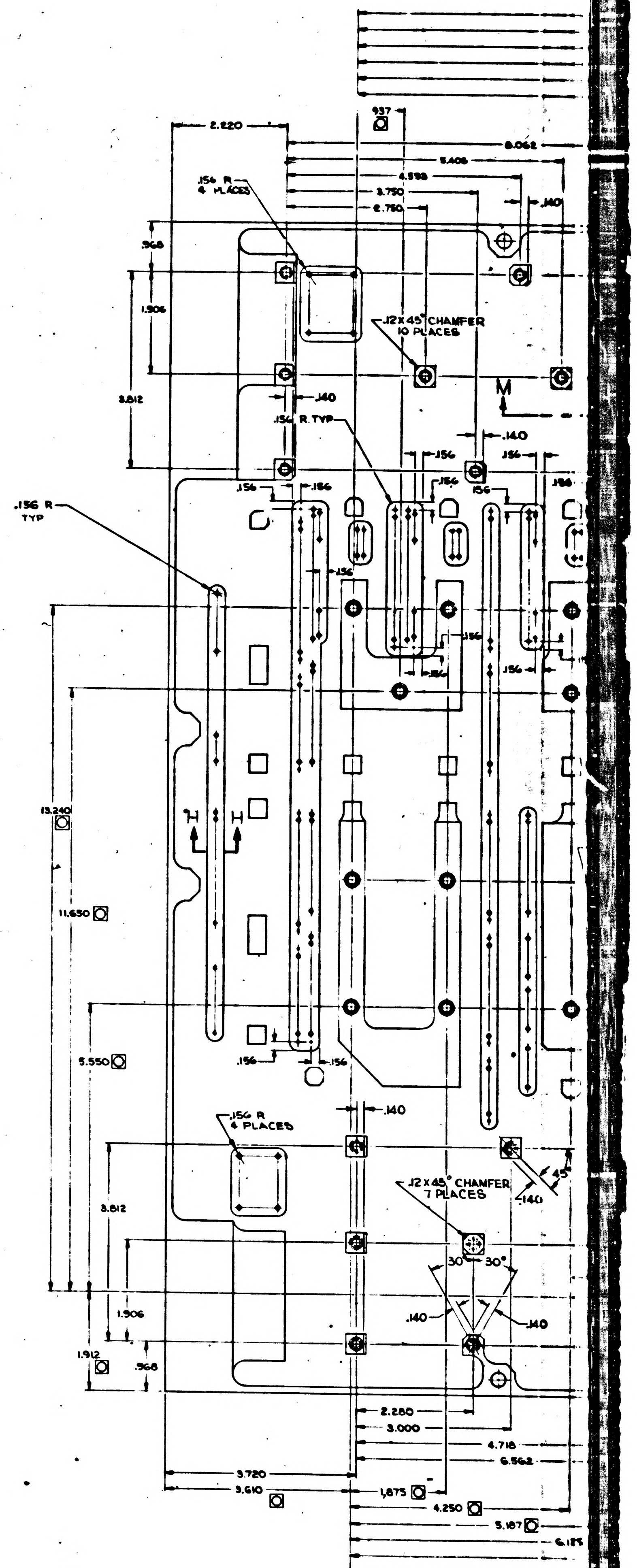
.62 MAX.
3 REF
.06 R TYP REF
4 REF
.500 MAX.
4 REF
.500 MAX.

SECTION G-G

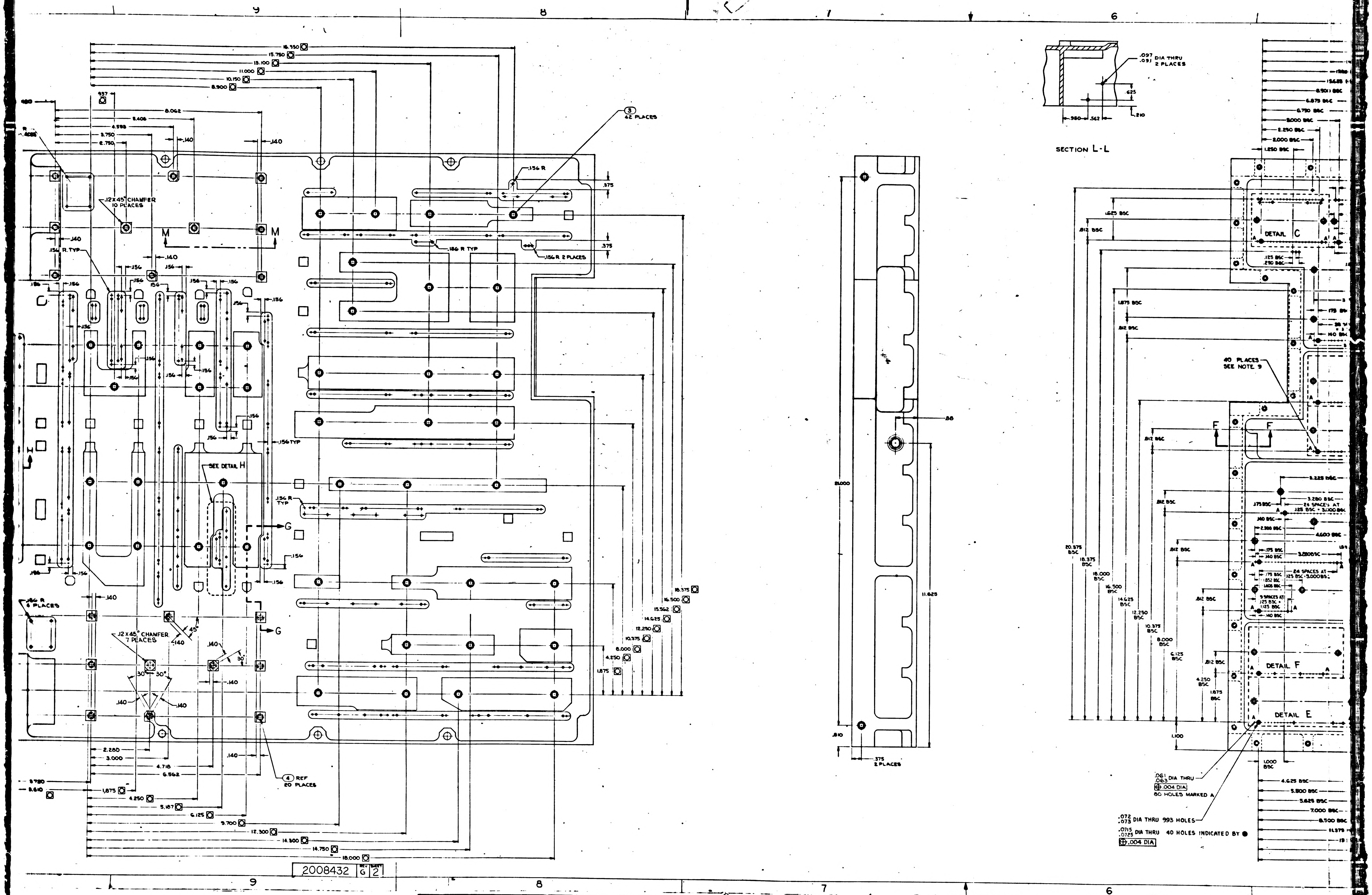


.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL

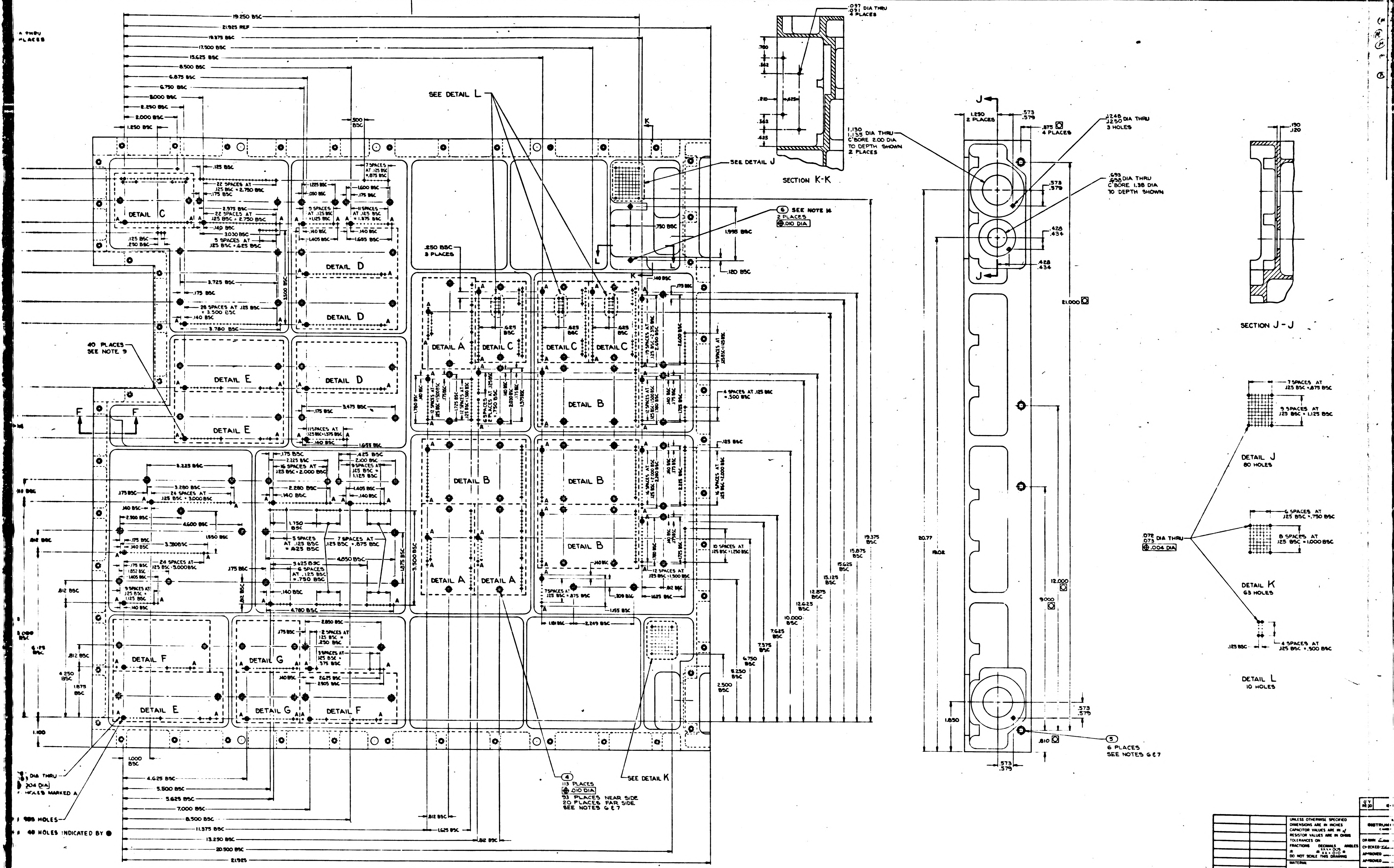


2.220
.937
8.062
5.406
.154 R 4 PLACES
4.598
3.750
2.750
.140
.968
1.906
.12 X 45° CHAMFER 10 PLACES
3.812
M
.140
.154 R TYP
.140
.156
.156 R TYP
13.240
H
H
11.650
5.550
.156 R 4 PLACES
.140
.12 X 45° CHAMFER 7 PLACES
45°
.140
3.812
30°
30°
1.906
.140
.140
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125



9
8
7
6
SECTION L-L
.097 .091 DIA THRU 2 PLACES
③ 42 PLACES
.12 X 45° CHAMFER 10 PLACES
.12 X 45° CHAMFER 7 PLACES
.156 R TYP
.186 R TYP
.156 R 2 PLACES
SEE DETAIL H
.156 R TYP
.186 R 6 PLACES
④ REF 20 PLACES
M
G
H
DETAIL C
DETAIL F
DETAIL E
40 PLACES SEE NOTE 9
.061 .063 DIA THRU
⌖ .004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU 993 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
⌖ .004 DIA
.375 2 PLACES
21.000
11.625
24 SPACES AT .125 BSC = 3.000 BSC
9 SPACES AT .125 BSC = 1.125 BSC
16.350
15.750
13.100
11.000
10.150
8.900
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875
2.280
3.000
4.718
6.562
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
4.625 BSC
5.800 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375

2008432 REV G SHEET 2


5
4
3
2
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.500 BSC
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
DETAIL C
DETAIL D
DETAIL A
DETAIL B
DETAIL E
DETAIL F
DETAIL G
22 SPACES AT .125 BSC = 2.750 BSC
28 SPACES AT .125 BSC = 3.500 BSC
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
11 SPACES AT .125 BSC = 1.375 BSC
5 SPACES AT .125 BSC = .625 BSC
16 SPACES AT .125 BSC = 2.000 BSC
24 SPACES AT .125 BSC = 3.000 BSC
6 SPACES AT .125 BSC = .750 BSC
10 SPACES AT .125 BSC = 1.250 BSC
12 SPACES AT .125 BSC = 1.500 BSC
.250 BSC 3 PLACES
40 PLACES SEE NOTE 9
F
K
L
⑥ SEE NOTE 14
2 PLACES
⌖ .010 DIA
④ 113 PLACES
⌖ .010 DIA
93 PLACES NEAR SIDE
20 PLACES FAR SIDE
SEE NOTES 6 & 7
DIA THRU
.204 DIA
HOLES MARKED A
HOLES
40 HOLES INDICATED BY ●
1.000 BSC
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.500 BSC
21.925
.097 .091 DIA THRU 4 PLACES
SECTION K-K
1.130 1.135 DIA THRU
C'BORE 2.00 DIA
TO DEPTH SHOWN
2 PLACES
J
1.250 2 PLACES
.573 .579
.875 4 PLACES
1.248 1.250 DIA THRU 3 HOLES
.693 .698 DIA THRU
C'BORE 1.38 DIA
TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
⑤ 6 PLACES
SEE NOTES 6 & 7
SECTION J-J
.130 .120
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J
80 HOLES
.072 .073 DIA THRU
⌖ .004 DIA
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
DETAIL K
63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L
10 HOLES

2007095	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± .XXX = .005 .XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

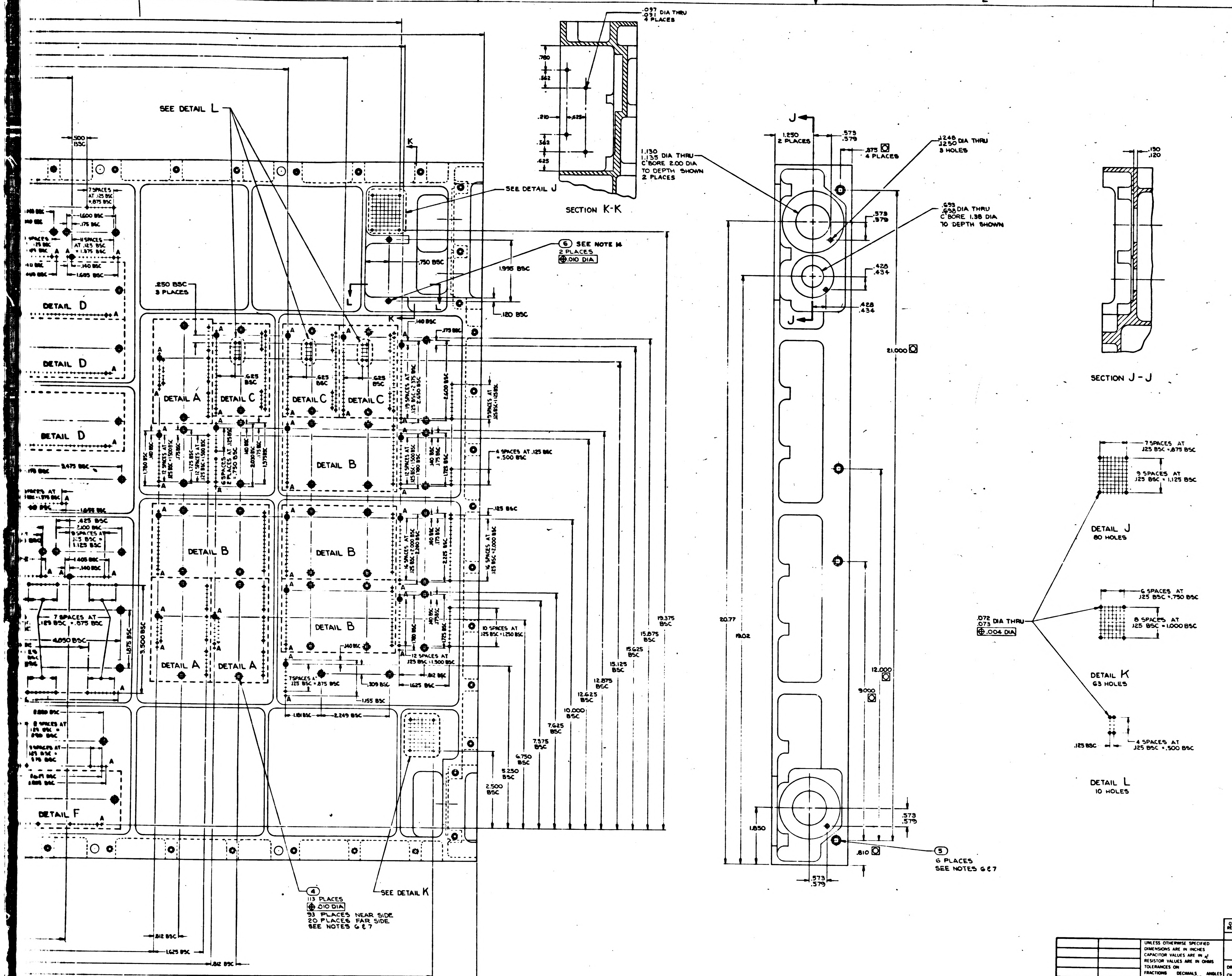
MATERIAL

SEE NOTE 2

QTY REQD

INSTRUM

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED M T
APPROVED MSC



SECTION K-K
.097 .091 DIA THRU 4 PLACES
SECTION J-J
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
⑥ SEE NOTE 14 2 PLACES ⊕ .010 DIA
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
④ 113 PLACES ⊕ .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
.1248 .1250 DIA THRU 3 HOLES
.658 .656 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
⑤ 6 PLACES SEE NOTES 6 & 7
21.000
20.77
19.02
12.000
9.000
1.850
.810
.072 .073 DIA THRU ⊕ .004 DIA
DETAIL J 80 HOLES
DETAIL K 63 HOLES
DETAIL L 10 HOLES
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
4 SPACES AT .125 BSC = .500 BSC

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28487			9 MAY 66	
B		REVISION STATUS CHANGED		JI	9 AUG 66	
C		REVISION STATUS CHANGED	TD		20 OCT '66	
D		REVISION STATUS CHANGED	WA		2 NOV 66	
E		REVISION STATUS CHANGED	JC		3 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	
G		REVISED PER TDRR 33688			2 AUG 67	

REVISIONS 25555

4H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007095	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

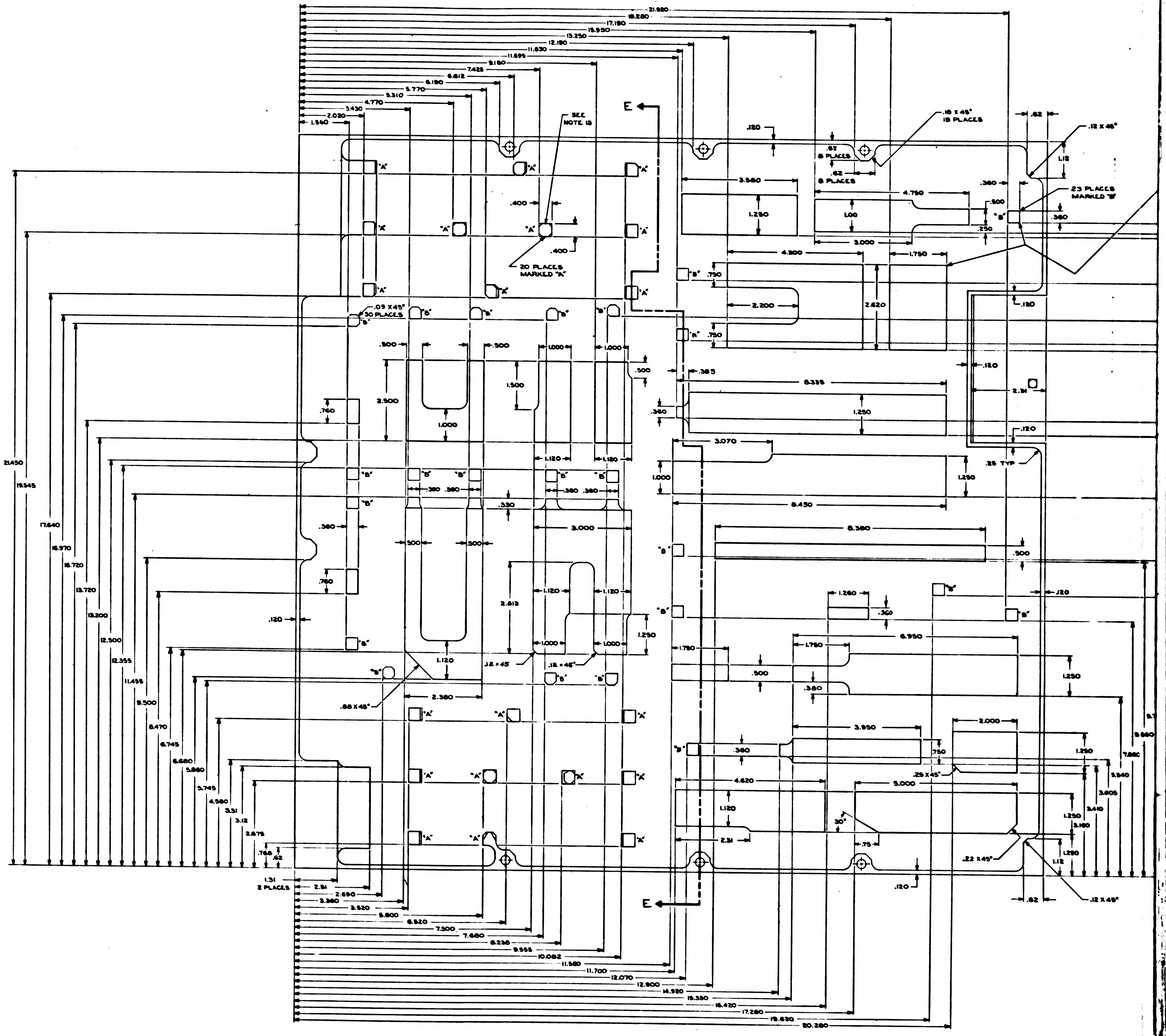
HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO 80230
SIZE J
DRAWING NO 2008432
SCALE
SHEET 2 OF 2

2008432 G

008432 REV G SHEET 2

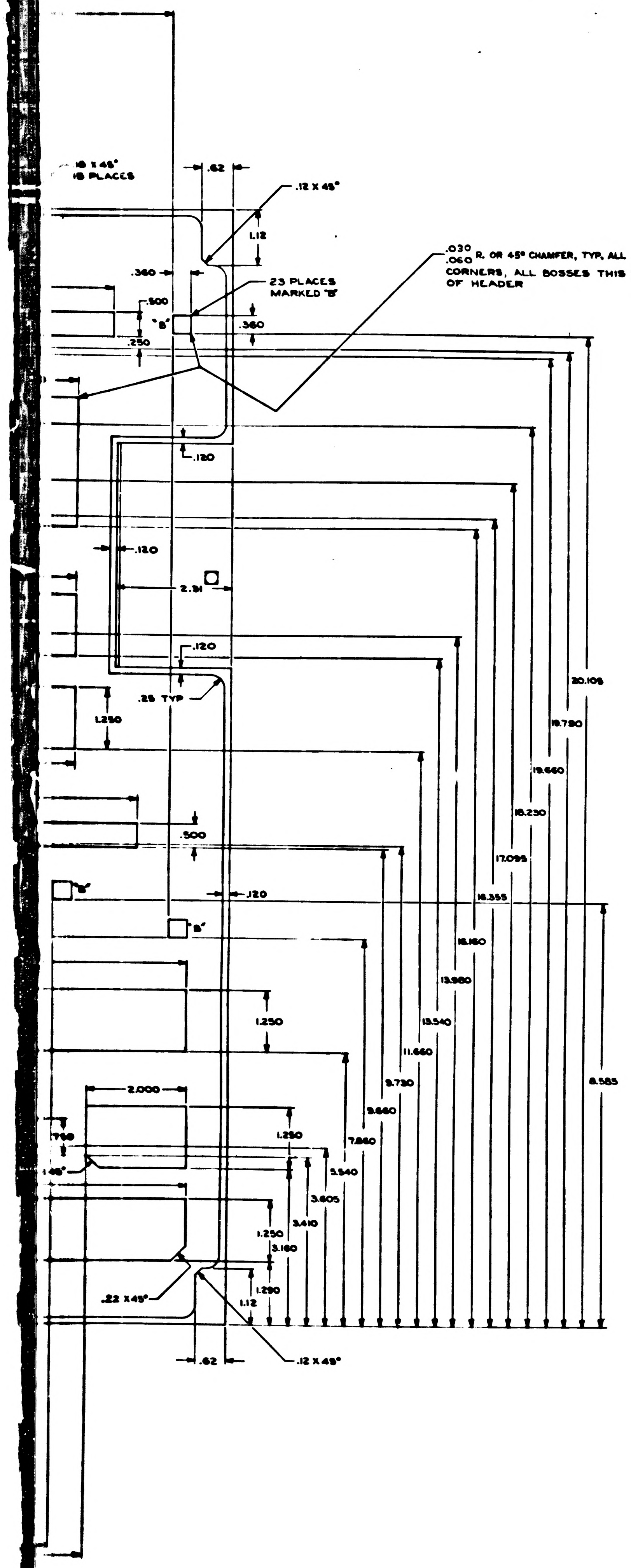
4/2008432

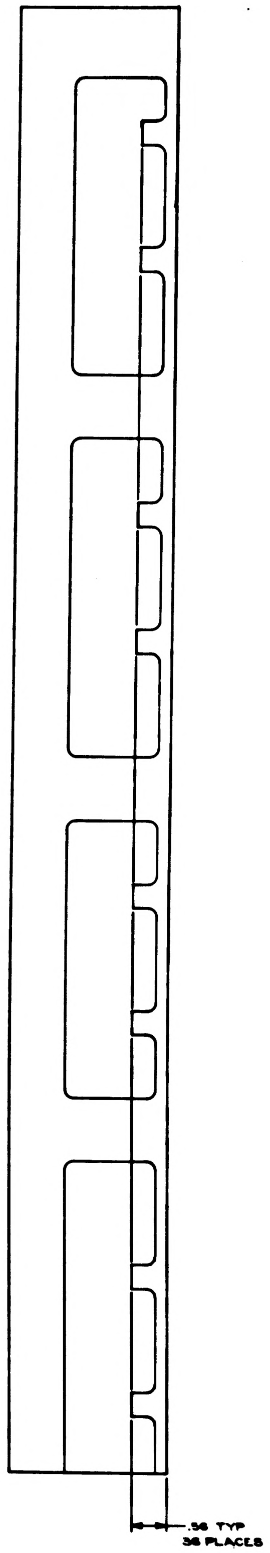

21.920
19.280
17.190
15.950
13.250
12.190
11.830
11.695
9.180
7.425
6.612
6.190
5.770
5.310
4.770
3.430
2.020
1.560
SEE NOTE 13
E
.18 X 45°
18 PLACES
.62
.12 X 45°
.120
.62 8 PLACES
.62 8 PLACES
1.12
3.580
1.250
4.750
1.00
3.000
.500
.250
.360
23 PLACES MARKED "B"
.400
.400
20 PLACES MARKED "A"
4.300
1.750
.750
2.200
2.620
.09 X45° 30 PLACES
.500
1.000
.385
.120
8.335
2.31
1.250
2.500
1.500
.760
.360
3.070
.120
1.000
.25 TYP
1.120
.330
8.450
3.000
8.380
.500
2.813
1.250
1.260
.120
6.950
1.780
1.750
.12 X 45
.12 X 45°
.88 X 45°
2.380
.120
3.950
2.000
.750
.25 X 45°
4.620
5.000
1.120
30°
.75
.22 X 45°
21.450
19.545
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.880
5.745
4.980
3.31
3.12
2.675
.768
.62
1.31 2 PLACES
2.81
2.690
3.380
3.520
5.800
6.520
7.300
7.680
8.238
9.555
10.082
11.580
11.700
12.070
12.900
14.920
15.330
16.420
17.280
19.620
20.280
"A"
"B"

NOTES:

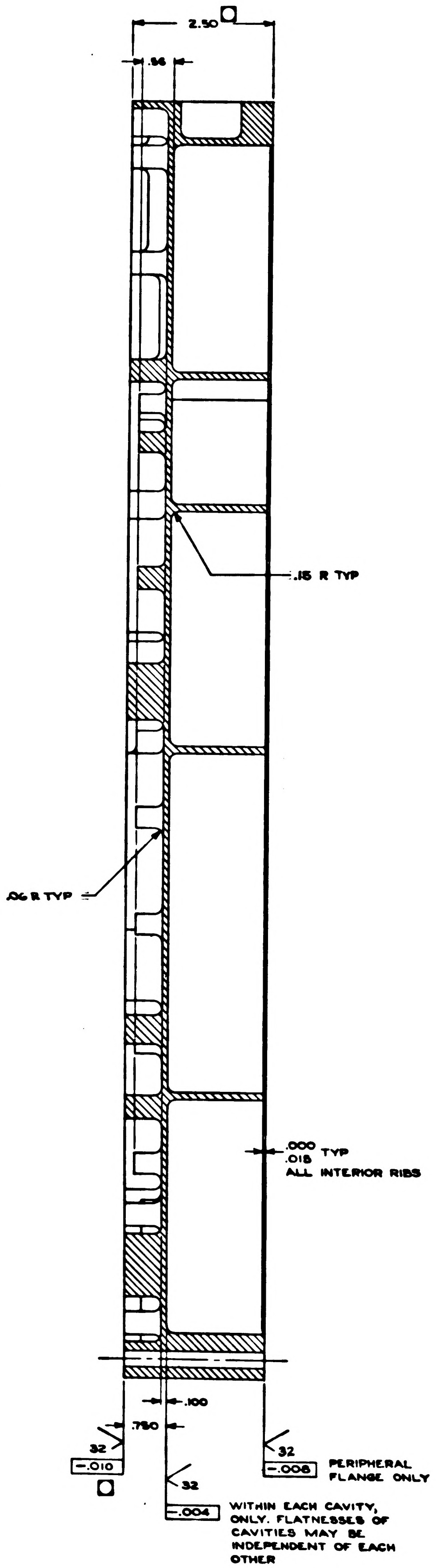
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
6. COAT THREADS OF HOLES FOR FIND NOS. 2, 3, 4, 5 AND 6 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NOS. 2,3,4,5 AND 6 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREAD SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ☐ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT. IN EACH GROUP OF 10 BOSSES THE TOP SURFACES OF ALL THE BOSSES MUST BE FLAT WITHIN .004 WITH RESPECT TO EACH OTHER.
14. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.

	REV.	SHT.
2008432	H	1

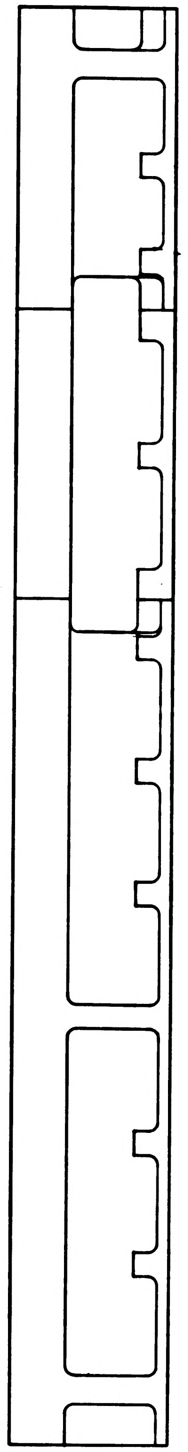

.10 X 45°
18 PLACES
.62
.12 X 45°
1.12
.360
23 PLACES
MARKED "B"
.030
.060 R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
.500
"B"
.360
.250
.120
.120
2.31
.120
.25 TYP
1.250
20.105
19.790
19.660
18.230
.500
17.095
"B"
.120
16.355
"B"
16.160
13.980
1.250
13.540
11.660
9.730
9.660
2.000
7.860
.760
1.250
5.540
3.605
3.410
1.250
3.160
.22 X 45°
1.290
1.12
.62
.12 X 45°
8.585

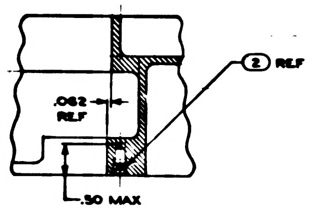

.56 TYP
36 PLACES

VIEW A-A
ROTATED CCW 90°

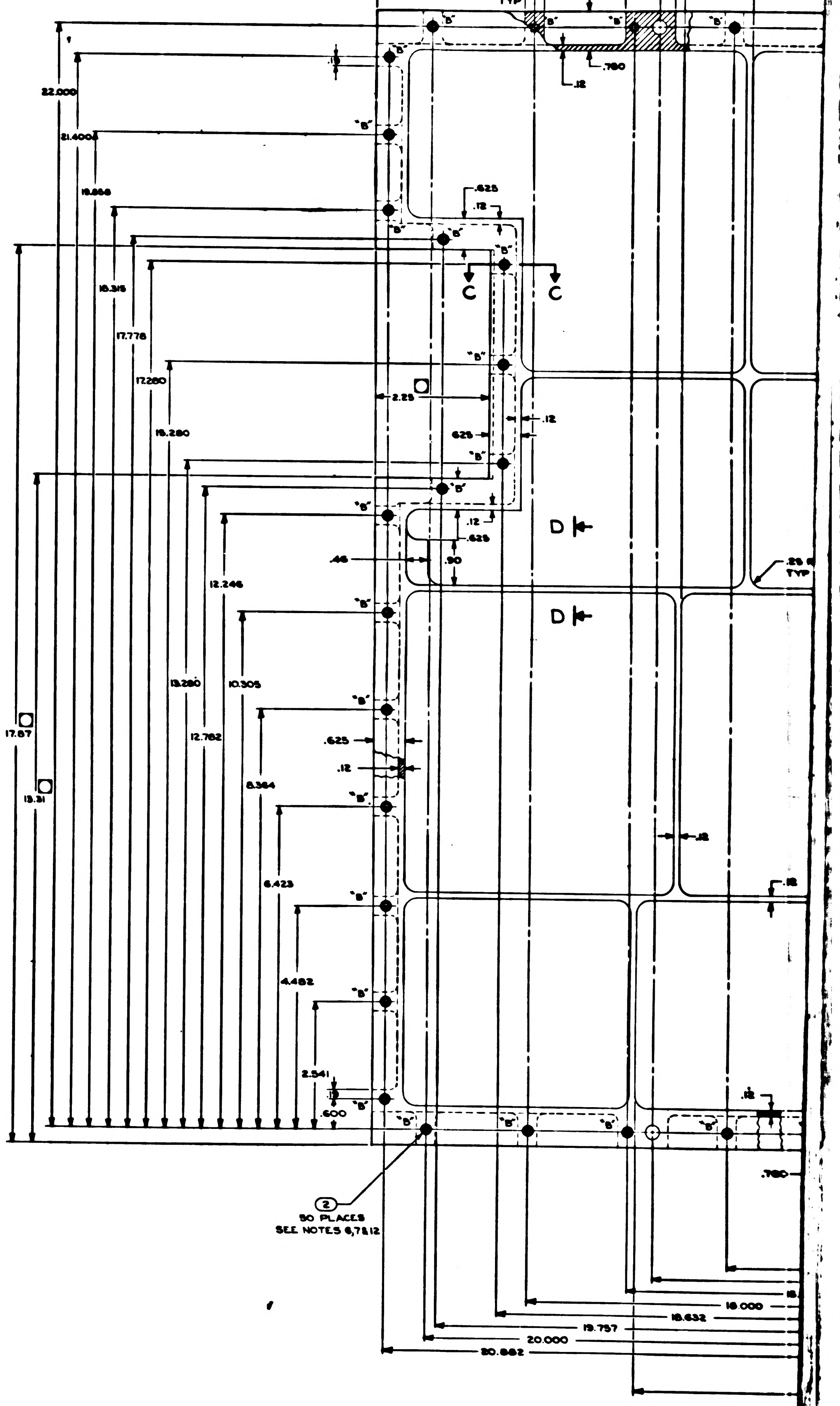

2.50
.56
.15 R TYP
.06 R TYP
.000
.018 TYP
ALL INTERIOR RIBS
.100
.750
32
-.010
32
-.008
PERIPHERAL FLANGE ONLY
32
-.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER

SECTION E-E

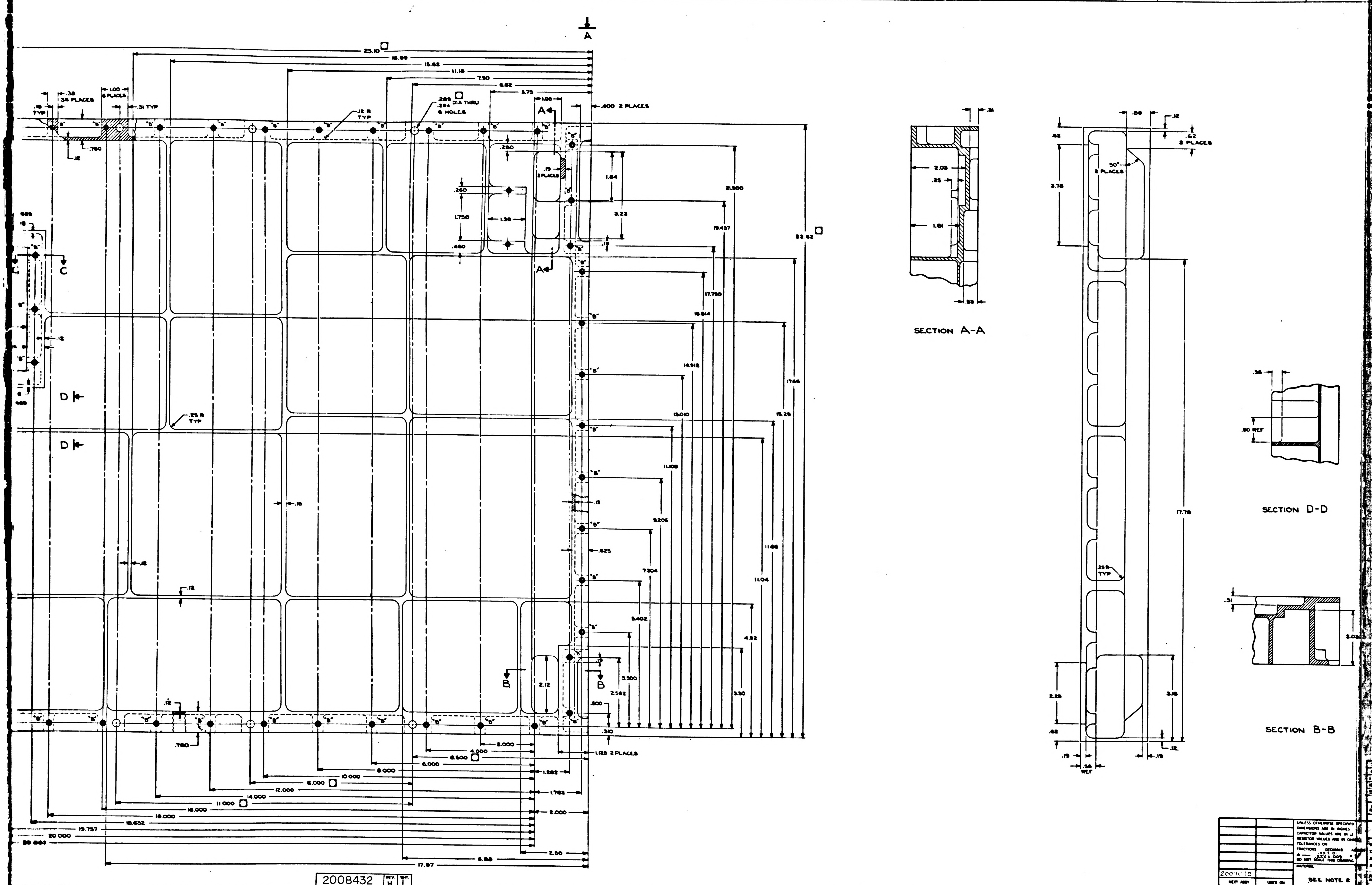



2 REF
.062
REF
.50 MAX

SECTION C-C


A
.36
36 PLACES
1.00
6 PLACES
.19
TYP
.31 TYP
"B"
.12
.760
.12
22.000
21.400
19.868
18.316
17.778
17.280
15.280
13.280
12.246
12.782
10.305
8.364
6.423
4.482
2.541
.600
17.87
13.31
.625
.12
C
C
2.25
.12
.625
.12
.625
.46
.90
D
D
.25 R
TYP
.625
.12
.12
.12
.12
.760
2
50 PLACES
SEE NOTES 6,7&12
18.000
18.632
19.757
20.000
20.882

2-/ 2008432



A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.38
36 PLACES
1.00
6 PLACES
.18
TYP
.31 TYP
.12 R
TYP
.289
.294 DIA THRU
6 HOLES
"B"
.760
.12
.280
.19
2 PLACES
.260
1.750
1.38
.460
1.84
3.22
.19
21.800
19.437
22.62
17.750
16.814
17.66
14.912
15.29
13.010
11.108
9.206
11.66
7.304
11.04
5.402
4.92
3.500
2.562
3.30
2.12
.500
.310
1.125 2 PLACES
.25 R
TYP
.625
.18
.12
C
D
B
2.000
4.000
6.500
6.000
8.000
1.282
10.000
6.000
12.000
1.782
14.000
11.000
16.000
2.000
18.000
18.632
19.757
20.000
20.883
2.50
6.88
17.87
.31
2.03
.25
1.81
.93
SECTION A-A
.88
.12
.62
2 PLACES
.62
50°
2 PLACES
3.78
17.78
.25 R
TYP
2.25
.62
.19
.56
REF
.19
3.18
.12
.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B
11
10
9
8
7
6
5
4
3

2	1010
6	1458
11	1010
4	1010
8	1010
1	200

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS
± —— .XX ± .01
.XXX ± .005
DO NOT SCALE THIS DRAWING

MATERIAL

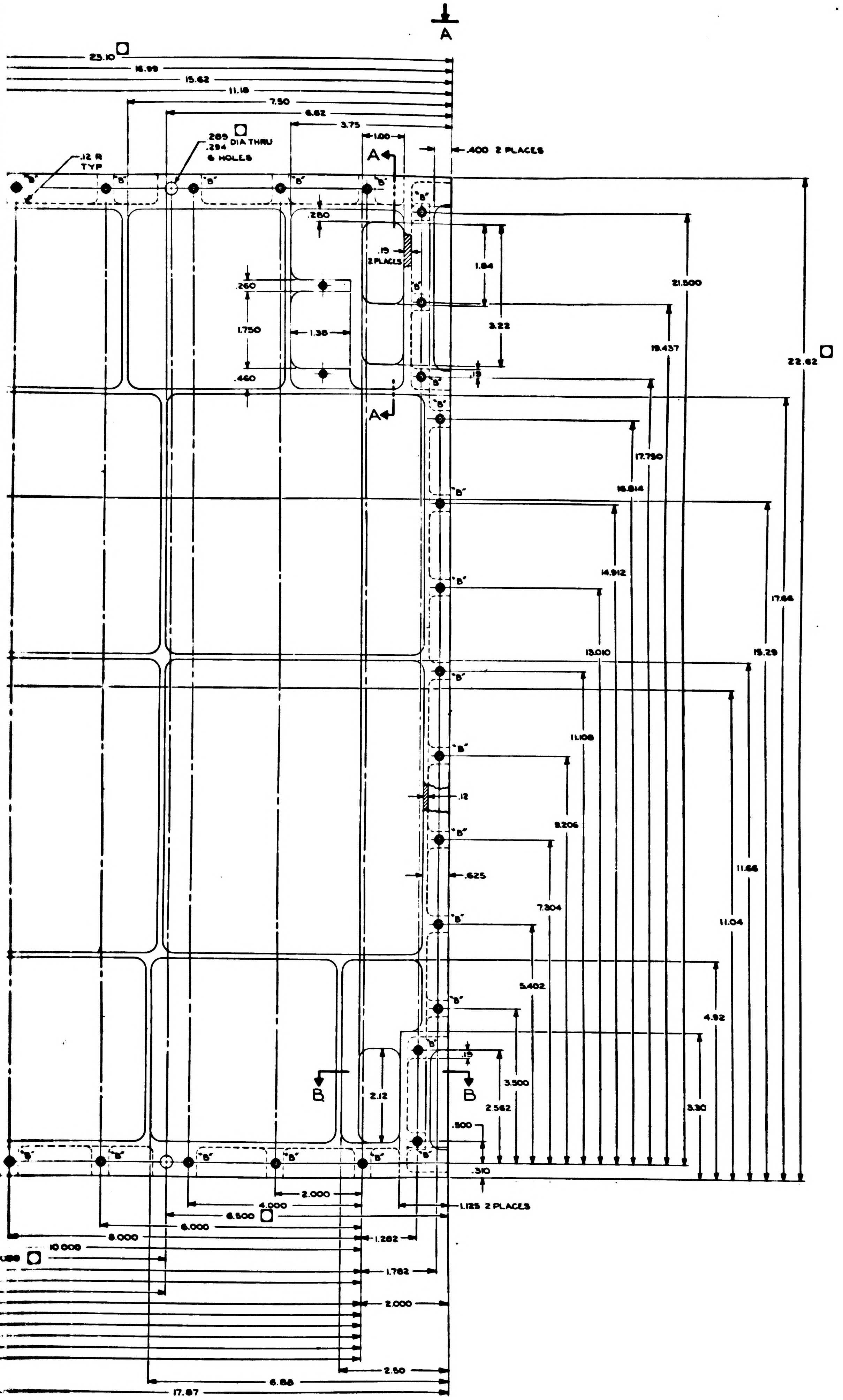
SEE NOTE 2

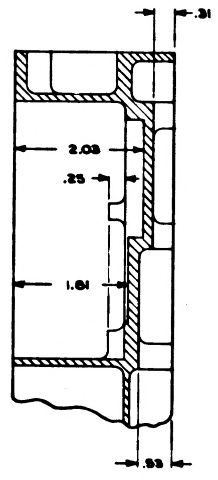
2007015	
NEXT ASSY	USED ON
APPLICATION	

2008432 REV. H SHT. 1

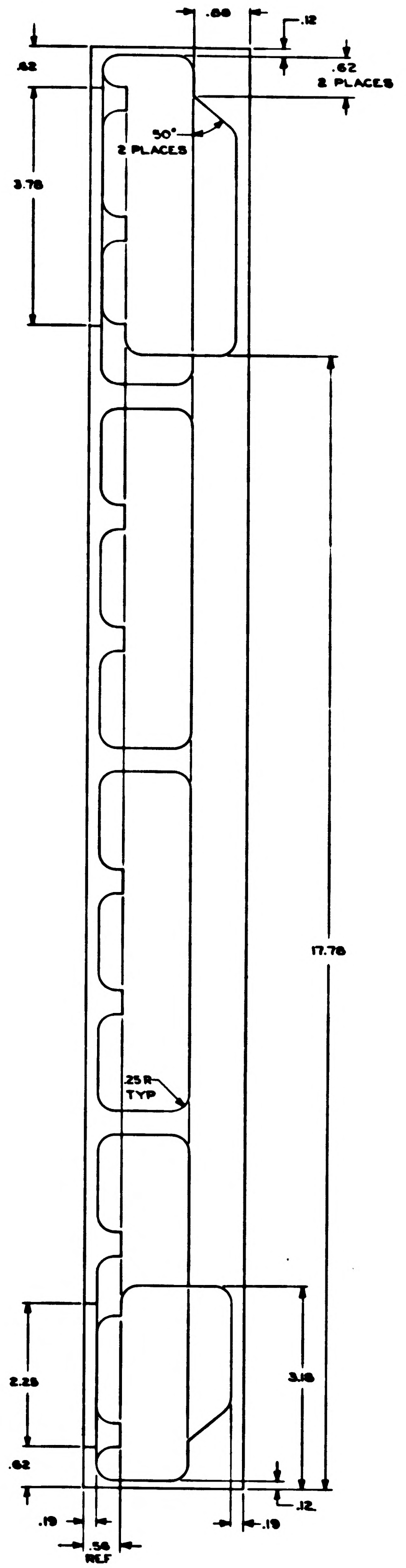
3/2008432

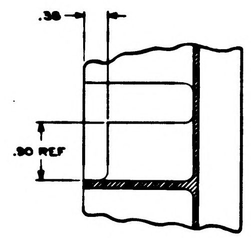
SYM	ZONE	REVISIONS 25555 DESCRIPTION	DR	CHK	DATE	A
A		REVISED PER TDRR 28487			MAY 66	
B		REVISED PER TDRR 30531		JI	9 AUG 66	
C		REVISED PER TDRR 31560	TD		20 OCT 66	
D		REVISED PER TDRR 31657	WA		2 NOV 66	
E		REVISED PER TDRR 32772	JC		3 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	
G		REVISED PER TDRR 33688			2 AUG 67	
H		REVISION STATUS CHANGED			9 AUG 67	


A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.12 R TYP
.289 .294 DIA THRU 6 HOLES
A
A
"B"
.280
.19 2 PLACES
.260
1.750
1.38
.460
1.84
3.22
21.500
19.437
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
22.62
17.66
15.29
11.66
11.04
4.92
3.30
.12
.625
.19
B
B
2.12
.500
.310
2.000
4.000
6.500
6.000
8.000
10.000
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87

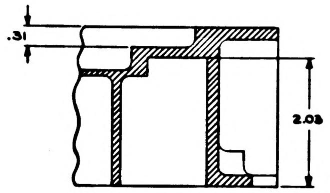

.31
2.03
.25
1.81
.93

SECTION A-A


.88
.12
.62
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25 R TYP
2.25
.62
3.18
.12
.19
.19
.56 REF



SECTION D-D



SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007015	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bonarrigo 23 66
CHECKED 25 66
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY
C/M PSA

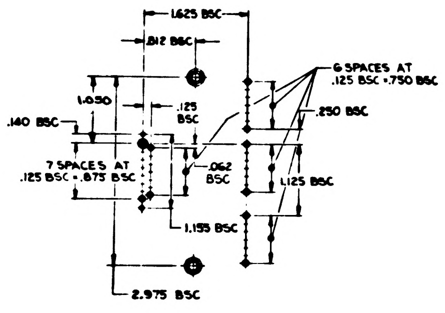
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE 1/1
SHEET 1 OF 2

2008432 REV H SHT 1

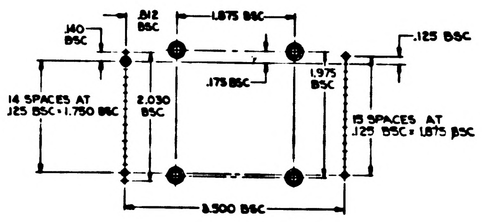
2008432

4H

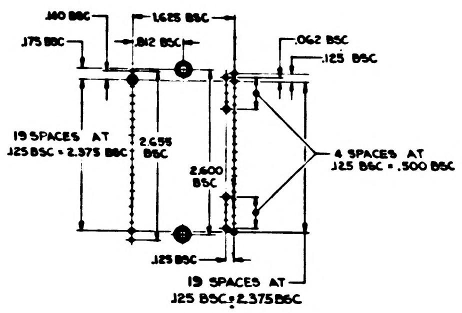
4/2008432


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC = .750 BSC
.250 BSC
1.125 BSC
7 SPACES AT .125 BSC = .875 BSC
1.155 BSC
2.975 BSC

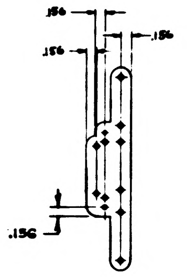
DETAIL A


1.875 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
15 SPACES AT .125 BSC = 1.875 BSC
3.500 BSC

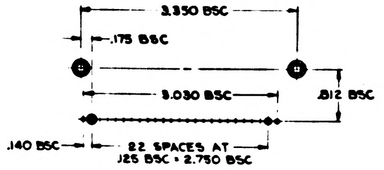
DETAIL B


1.625 BSC
.812 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
19 SPACES AT .125 BSC = 2.375 BSC

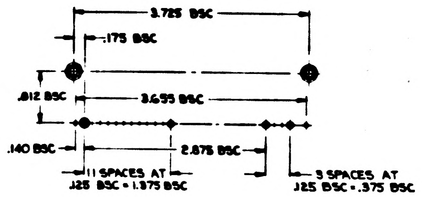
DETAIL C



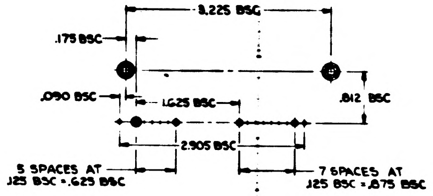
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
82 SPACES AT .125 BSC = 2.750 BSC

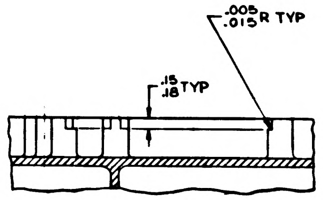
DETAIL D


3.725 BSC
.175 BSC
3.695 BSC
.812 BSC
2.875 BSC
.140 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

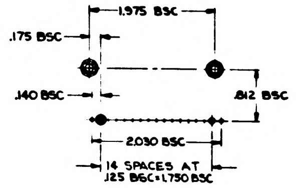
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
2.905 BSC
.812 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

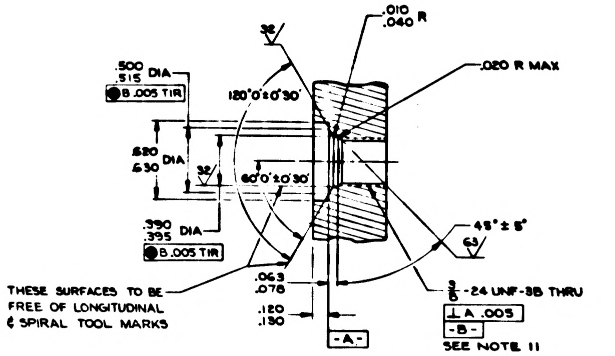
DETAIL F


.005 .015 R TYP
.15 .18 TYP

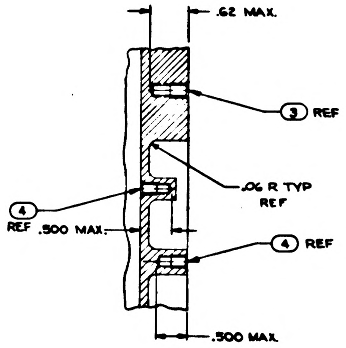
PARTIAL SECTION M-M


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

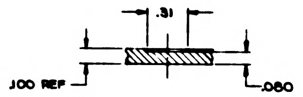
DETAIL G


.010 .040 R
.020 R MAX
.500 .515 DIA
B .005 TIR
180°0'±0°30'
.620 .630 DIA
60°0'±0°30'
.390 .395 DIA
B .005 TIR
45° ± 5°
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063 .078
.120 .130
3/8 -24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11
-A-

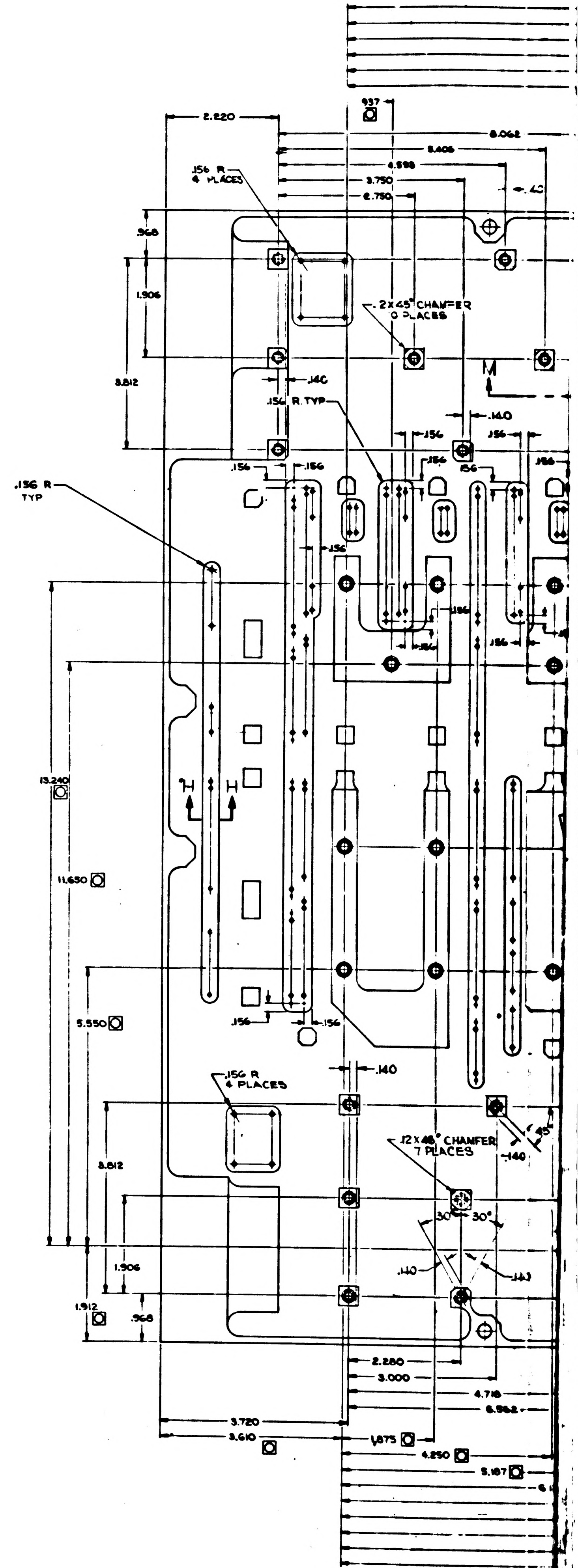
SECTION F-F
SCALE 2/1


.62 MAX.
③ REF
.06 R TYP REF
④ REF .500 MAX.
④ REF
.500 MAX.

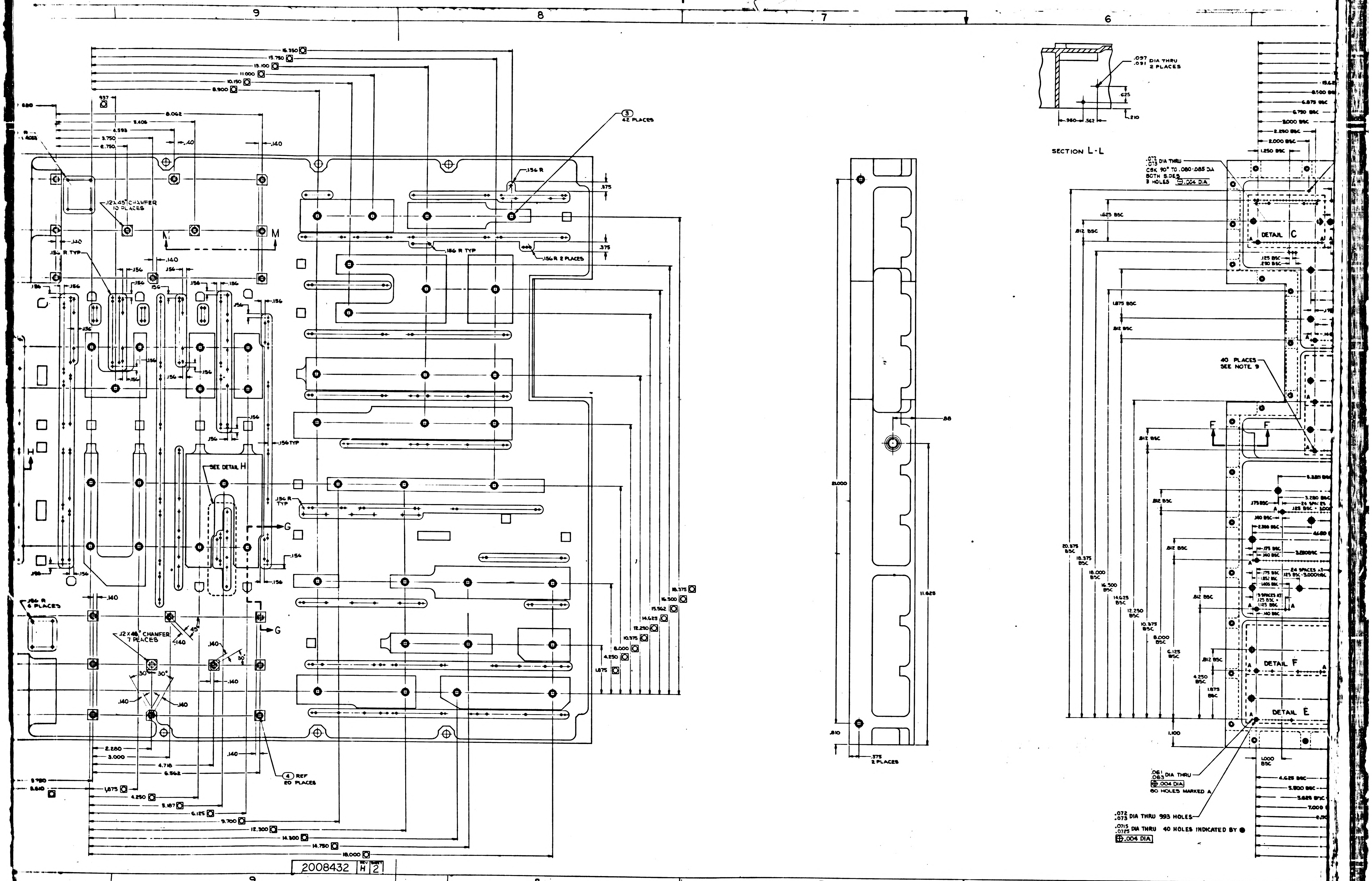
SECTION G-G

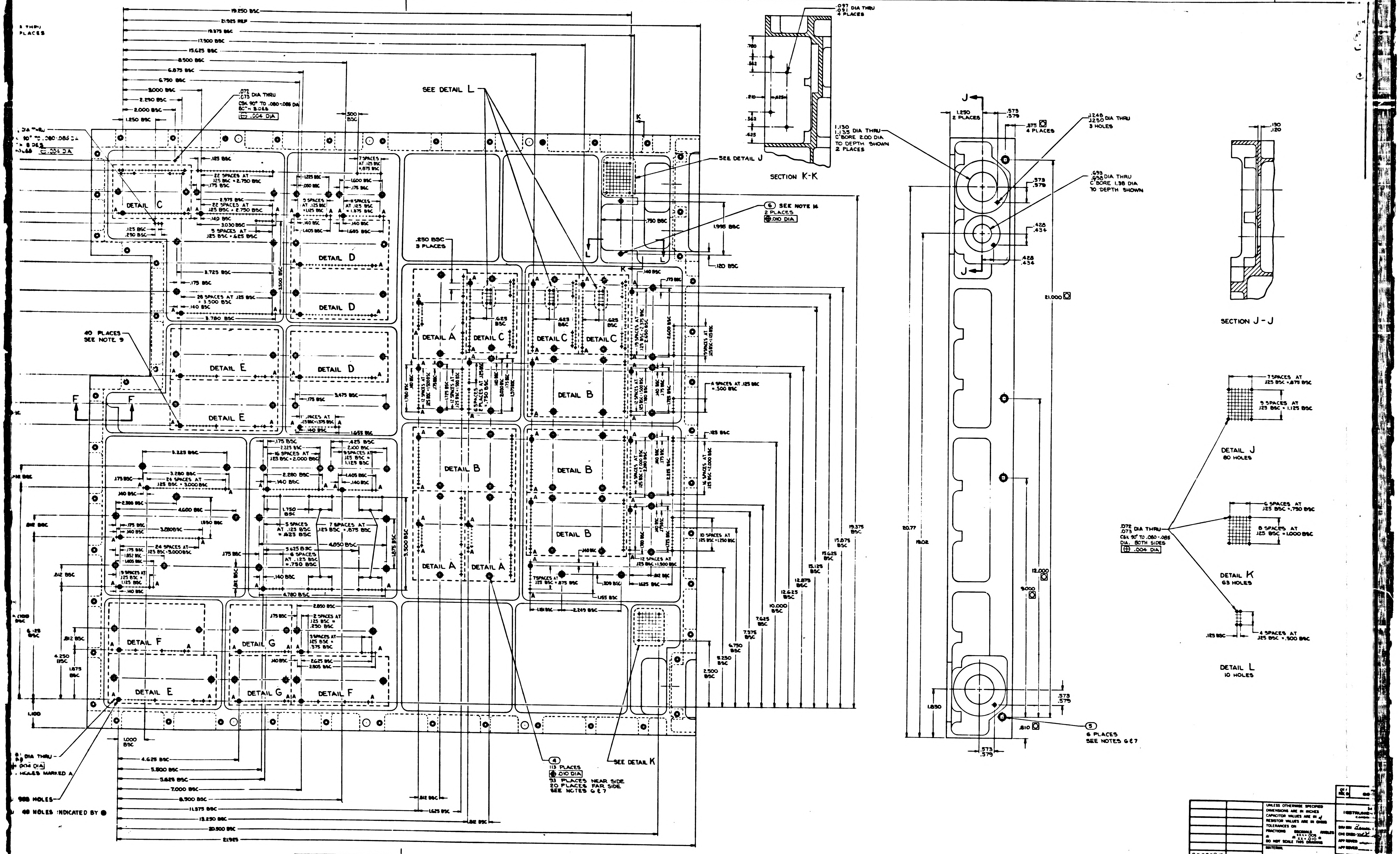

.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


2.220
.937
8.062
5.406
4.598
3.750
2.750
.156 R 4 PLACES
.2 X 45° CHAMFER 9 PLACES
.968
1.906
3.812
.140
.156 R TYP
.156
.156 R TYP
13.240
11.650
5.550
.156 R 4 PLACES
.12 X 45° CHAMFER 7 PLACES
30°
3.812
1.906
1.912
.968
2.280
3.000
4.718
5.562
3.720
3.610
1.875
4.250
5.187
H
M

1/2008432


9
8
7
6
15.350
15.750
13.100
11.000
10.150
8.900
.937
.688
8.062
5.406
4.593
3.750
2.750
.40
.140
R
1.4088
③
42 PLACES
.156 R
.375
.12 X 45° CHAMFER
10 PLACES
M
.186 R TYP
.156 R 2 PLACES
.154 R TYP
.156
.186
SEE DETAIL H
.156 TYP
.156 R
TYP
G
.154
.188
.186 R
4 PLACES
.12 X 45° CHAMFER
7 PLACES
45°
30°
80°
.140
2.280
3.000
4.718
6.562
.780
.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
④ REF
20 PLACES
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
21.000
11.625
.810
.375
2 PLACES
.88
.097
.091
DIA THRU
2 PLACES
.625
.210
.980
.562
SECTION L-L
.072
.073
DIA THRU
CSK 90° TO .080-.085 DIA
BOTH SIDES
3 HOLES ⊕ .004 DIA
1.625 BSC
.812 BSC
DETAIL C
1.875 BSC
40 PLACES
SEE NOTE 9
F
DETAIL F
DETAIL E
20.875 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
4.625 BSC
5.800 BSC
5.625 BSC
7.000
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.125 BSC
.250 BSC
24 SPACES AT
.125 BSC = 3.000 BSC
19 SPACES AT
.125 BSC
.061
.063
DIA THRU
⊕ .004 DIA
80 HOLES MARKED A
.072
.073
DIA THRU 993 HOLES
.0715
.0725
DIA THRU 40 HOLES INDICATED BY ●
⊕ .004 DIA
2008432
REV H
SHEET 2


5
4
3
2
19.250 BSC
21.925 REF
19.875 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.072 .075 DIA THRU CSK 90° TO .080-.085 DIA BOTH SIDES
.004 DIA
SEE DETAIL L
DETAIL C
DETAIL D
DETAIL E
DETAIL A
DETAIL B
DETAIL F
DETAIL G
40 PLACES SEE NOTE 9
SEE DETAIL J
SEE NOTE 14 2 PLACES .010 DIA
SECTION K-K
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
1.250 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
6 PLACES SEE NOTES 6 & 7
SECTION J-J
.130 .120
DETAIL J 80 HOLES
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL K 63 HOLES
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.072 .073 DIA THRU CSK 90° TO .080-.085 DIA. BOTH SIDES .004 DIA
DETAIL L 10 HOLES
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
SEE DETAIL K
HOLES MARKED A
988 HOLES
48 HOLES INDICATED BY ●
4.625 BSC
5.800 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.900 BSC
21.925
1.000 BSC
1.100

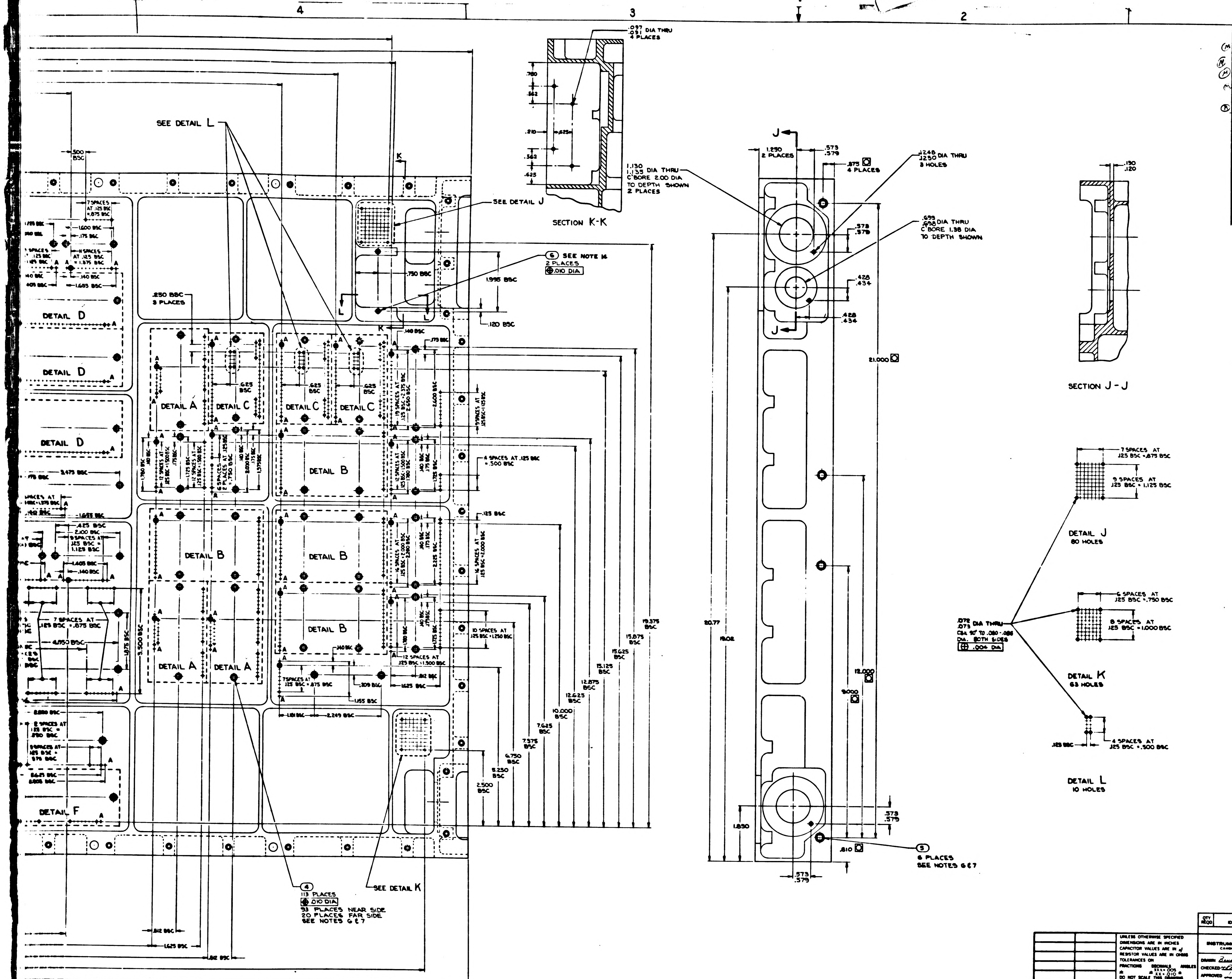
2008432 REV H SHEET 2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON FRACTIONS DECIMALS ANGLES
± .XXX ± .005
.XX ± .010
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2

2007095
NEXT ASSY | USED ON
APPLICATION

3/2008432

REVISIONS 25555						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 28487	JMP		9 MAY 66	
B		REVISION STATUS CHANGED	EMF	JI	9 AUG 66	
C		REVISION STATUS CHANGED	TD		20 OCT '66	
D		REVISION STATUS CHANGED	WA		2 NOV 66	
E		REVISION STATUS CHANGED	JC		3 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	
G		REVISED PER TDRR 33688			2 AUG 67	
H		REVISED PER TDRR 33997			9 AUG 67	


SECTION K-K
.097 .091 DIA THRU 4 PLACES
.780 .562 .210 .625 .562 .625
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
(6) SEE NOTE 14 2 PLACES ⊕ .010 DIA
1.995 BSC
.120 BSC
.250 BSC 3 PLACES
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
(4) 113 PLACES ⊕ .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
4.750 BSC
5.250 BSC
2.500 BSC
J J
1.250 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.573 .579
.428 .434
21.000
20.77
19.02
12.000
9.000
1.850
.810
(5) 6 PLACES SEE NOTES 6 & 7
SECTION J-J
.130 .120
7 SPACES AT .125 BSC =.875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
DETAIL J 80 HOLES
6 SPACES AT .125 BSC =.750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
.072 .073 DIA THRU CSK 90° TO .080-.086 DIA. BOTH SIDES ⊕ .004 DIA
DETAIL K 63 HOLES
.125 BSC
4 SPACES AT .125 BSC = .500 BSC
DETAIL L 10 HOLES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± .XXX = .005 .XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007095	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bouzarco 25 Jan 66
CHECKED R.R. Kunz 25 Jan 66
APPROVED
APPROVED
APPROVED MIT
APPROVED A. C. METZGER
MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

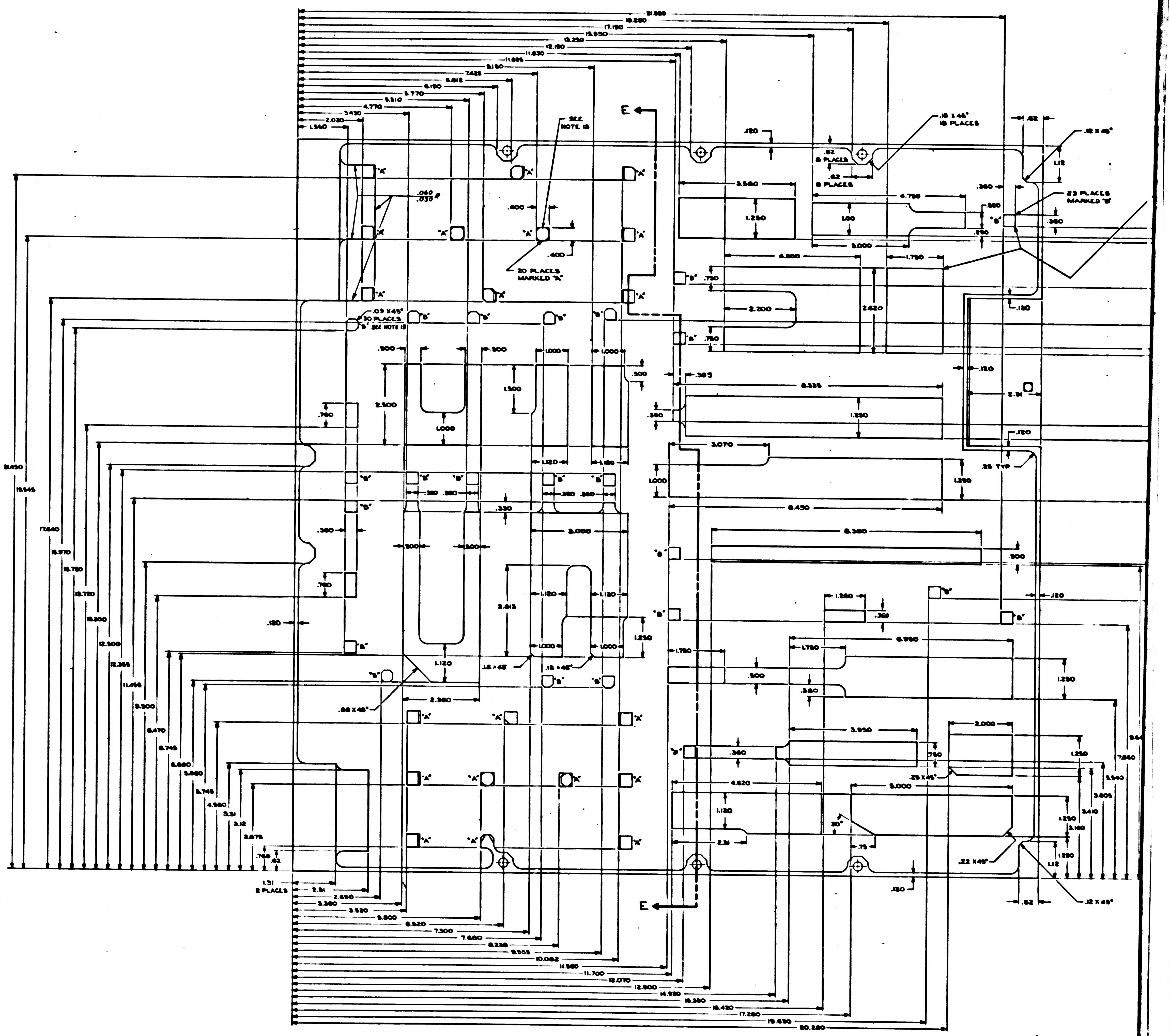
HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008432
SCALE
SHEET 2 OF 2

2008432 H

4H

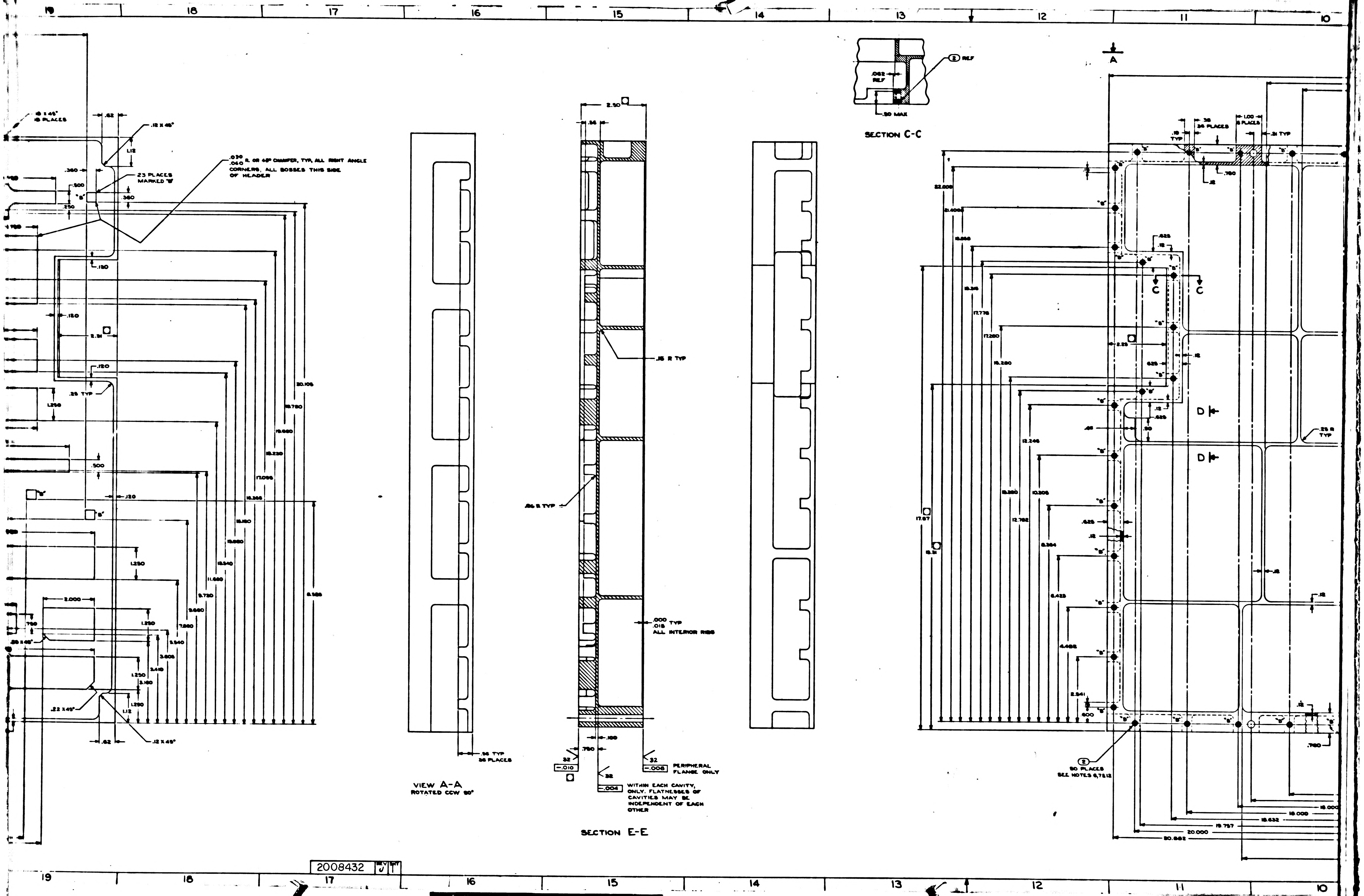
4/2008432

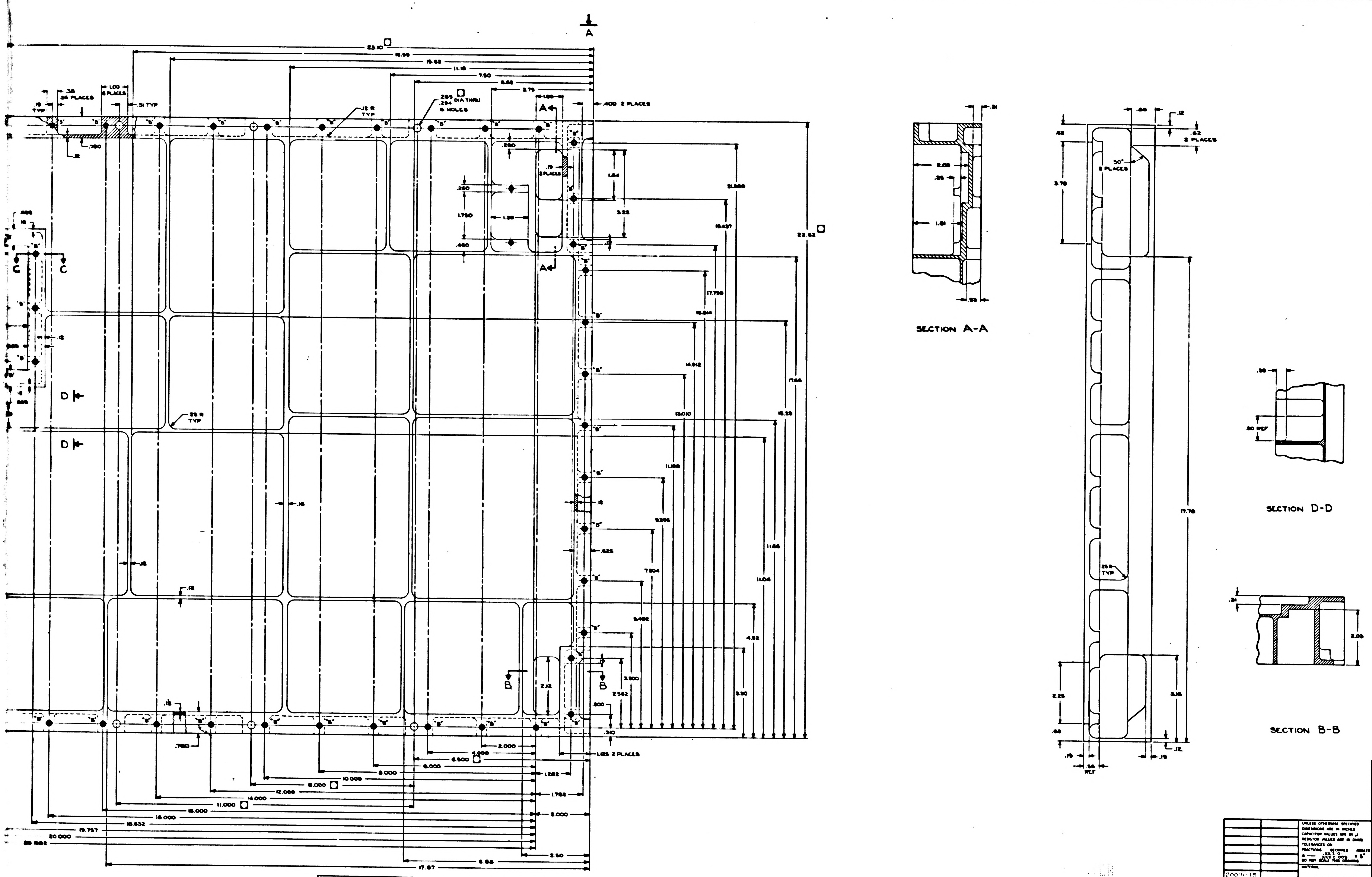


NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .008/.018 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.
6. COAT THREADS OF HOLES FOR FIND NOS. 2, 3, 4, 5 AND 6 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 7 WHILE PRIMER IS WET.
7. INSTALL FIND NOS. 2, 3, 4, 5 AND 6 (SEE NOTE NO. 6) PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW THREAD SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
8. IDENTIFY WITH PART NO. PER ND1002019
9. .0715/.0725 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI DO NOT EPOXY COAT.
10. ▢ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116.
11. THREADS MUST CONFORM TO MIL-S-7742.
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT HOLES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT.
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE; AFTER ANODIZING, COAT BOSSES PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI. DO NOT EPOXY COAT. IN EACH GROUP OF 10 BOSSES THE TOP SURFACES OF ALL THE BOSSES MUST BE FLAT WITHIN .004 WITH RESPECT TO EACH OTHER.
14. BLIND HOLES ARE PERMITTED TO BE FINISHED PER ND 1002040.
15. *EDGES OF CHAMFER TO BE ROUNDED TO .03 TO .06 INCH RADIUS.*

	REV.	SHT.
2008432	J	1

19
18
17
16
15
14
13
12
11
10
.16 X 45°
16 PLACES
.62
.12 X 45°
1.12
.030
.060
R. OR 45° CHAMFER, TYP, ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
.360
23 PLACES
MARKED "B"
.500
"B"
.360
.250
.130
.130
2.31
.120
.25 TYP
1.250
.500
.120
"B"
"B"
1.250
2.000
.750
.25 X 45°
1.250
1.250
3.160
1.250
.22 X 45°
1.12
.62
.12 X 45°
20.105
19.790
19.660
19.230
17.095
16.365
15.150
13.880
13.540
11.660
9.730
9.660
7.860
5.540
3.605
3.410
8.585
.56 TYP
36 PLACES
VIEW A-A
ROTATED CCW 90°
2.50
.56
.15 R TYP
.06 R TYP
.000
.015 TYP
ALL INTERIOR RIBS
.100
.750
32
−.010
32
−.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
32
−.008
PERIPHERAL FLANGE ONLY
SECTION E-E
.062
REF
② REF
.30 MAX
SECTION C-C
A
.18
TYP
.38
36 PLACES
1.00
5 PLACES
.31 TYP
.12
.780
22.000
21.400
19.660
18.315
17.775
17.280
16.280
.625
.12
C
C
2.25
.625
.12
.12
.625
.46
.90
D
D
.25 R
TYP
12.246
13.280
10.305
12.762
17.87
15.31
.625
.12
8.384
6.423
4.462
2.541
.600
.12
.12
.12
.780
②
30 PLACES
SEE NOTES 6,7&12
16.000
18.000
18.632
19.757
20.000
20.882


A
23.10
16.99
15.62
11.16
7.50
5.62
3.75
.38 34 PLACES
1.00 6 PLACES
.31 TYP
.12 R TYP
.289 .294 DIA THRU 6 HOLES
.400 2 PLACES
.780
.12
"B"
C
C
D
D
A
A
B
B
.29 R TYP
.19 2 PLACES
1.84
3.22
1.750
1.38
.250
.460
.12
21.500
19.437
22.62
17.750
16.814
14.912
17.66
13.010
15.29
11.198
9.306
.625
7.804
11.66
11.04
5.492
4.92
3.500
2.562
3.30
2.12
.500
.310
2.000
4.000
6.500
6.000
8.000
10.000
1.282
12.000
6.000
14.000
1.782
11.000
16.000
18.000
2.000
18.632
19.757
20.000
2.50
6.88
17.87
1.125 2 PLACES
SECTION A-A
2.05
.25
1.81
.31
.50
.88
.12
.62 2 PLACES
50° 2 PLACES
3.76
17.76
.25 R TYP
2.25
3.16
.62
.19
.56 REF
.19
.12
SECTION D-D
.38
.90 REF
SECTION B-B
.31
2.05

2	1010C9
6	MS212C
113	101095
42	101095
50	101095
	2008
QTY REQD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — .XX ± .01 .XXX ± .005 ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007615

NEXT ASSY | USED ON
APPLICATION

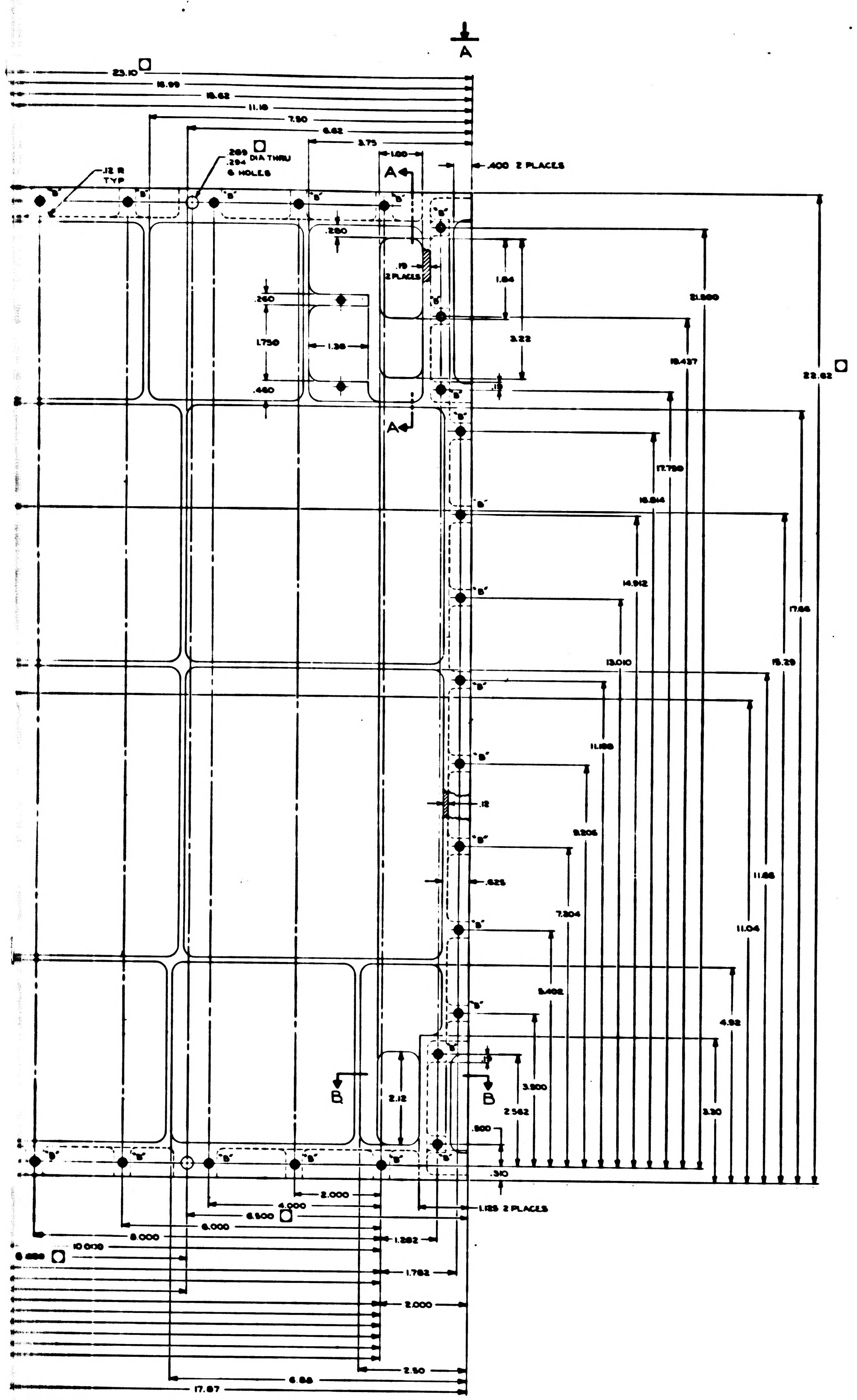
INSTRUMEN
CAMBRI

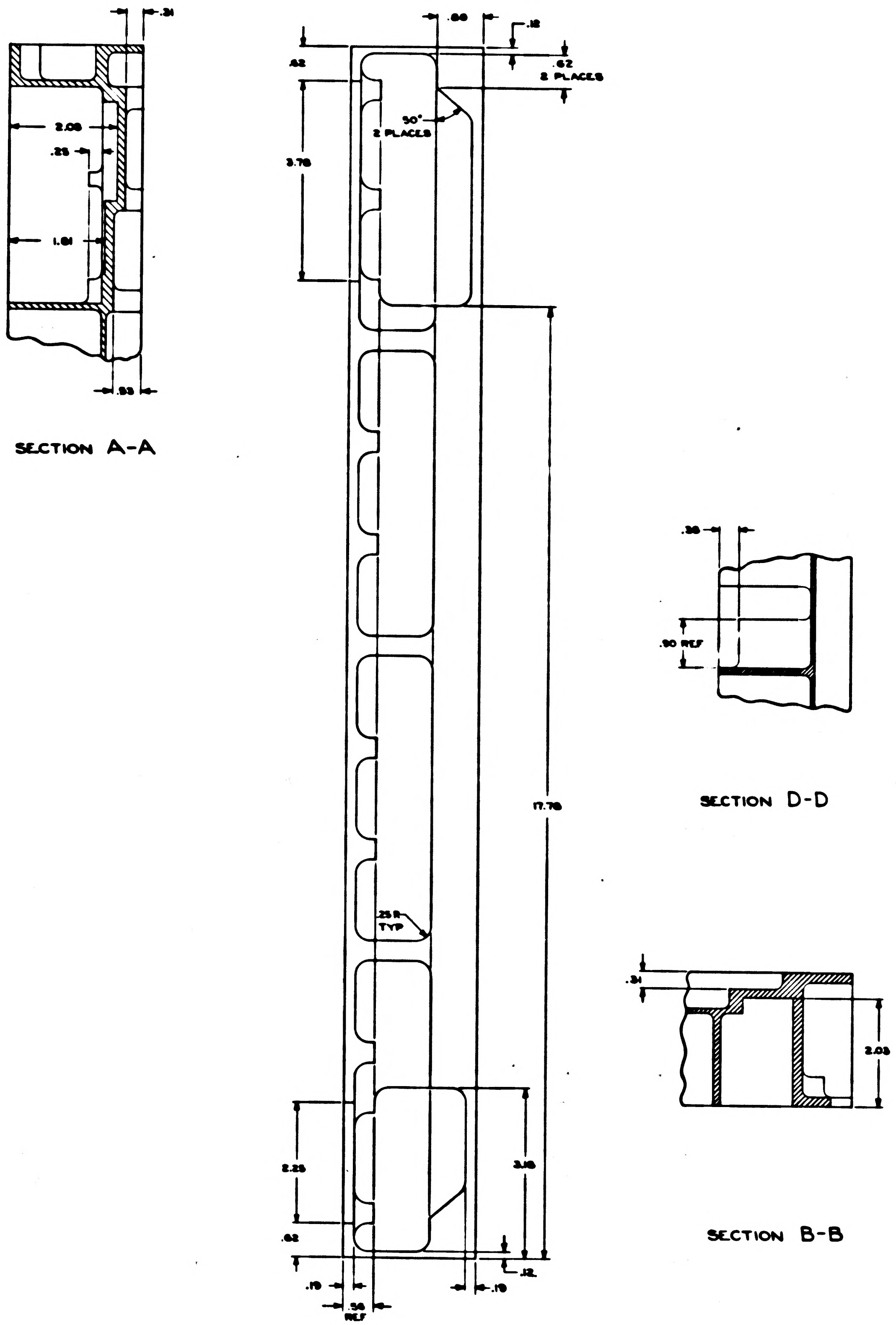
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED DIT
APPROVED MSC

2008432 J 1

3/2008432

SYM	ZONE	REVISIONS 25555 DESCRIPTION	DR	CHK	DATE
A		REVISED PER TDRR 28487			MAY 66
B		REVISED PER TDRR 30531		JT	9 AUG 66
C		REVISED PER TDRR 31560	TD		20 OCT 66
D		REVISED PER TDRR 31657	WA		2 NOV 66
E		REVISED PER TDRR 32772	JC		3 FEB 67
F		REVISED PER TDRR 32799	JC		3 FEB 67
G		REVISED PER TDRR 33688			2 AUG 67
H		REVISION STATUS CHANGED	TK		9 AUG 67
J		REVISED PER TDRR 34929			NOV 65


A
23.10
18.99
18.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.12 R TYP
.289 .294 DIA THRU 6 HOLES
A
.280
.19 2 PLACES
.260
1.750
1.38
.460
1.84
3.22
21.980
19.437
22.62
A
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
17.66
15.29
11.86
11.04
4.92
3.30
.12
.625
"B"
B
B
2.12
3.800
2.562
.800
.310
2.000
4.000
6.500
8.000
6.000
10.000
8.480
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87


.31
2.03
.25
1.81
.93
SECTION A-A
.60
.12
.42
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25 R TYP
2.25
3.18
.62
.12
.19
.56 REF
.19
.38
.90 REF
SECTION D-D
.31
2.03
SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007015	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Benarrigo 23 66
CHECKED
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED NASA A. C. METZGER

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

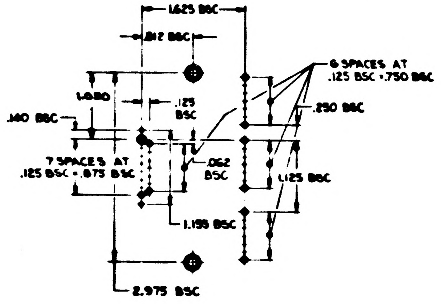
HEADER INSEPARABLE ASSY
C/M PSA

CODE IDENT NO 80230
SIZE J4
DRAWING NO 2008432
SCALE 1/1
SHEET 1 OF 2

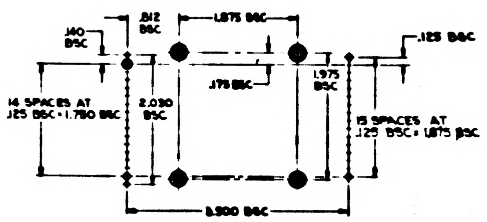
2008432 REV. J SHT 1

4H

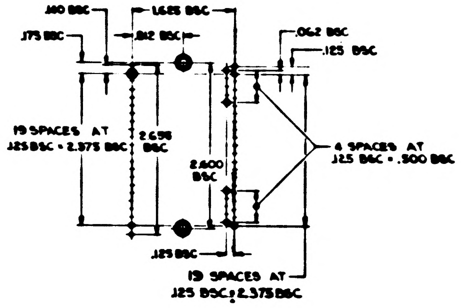
4/2008432


1.625 BSC
.812 BSC
1.680
.125 BSC
.140 BSC
7 SPACES AT .125 BSC = .875 BSC
.062
6 SPACES AT .125 BSC = .750 BSC
.250 BSC
1.125 BSC
1.155 BSC
2.975 BSC

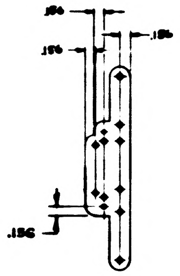
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
14 SPACES AT .125 BSC = 1.750 BSC
2.030 BSC
.175 BSC
1.975 BSC
15 SPACES AT .125 BSC = 1.875 BSC
.125 BSC
3.500 BSC

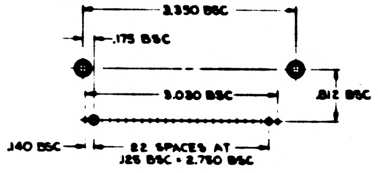
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC
2.698 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC = 2.375 BSC

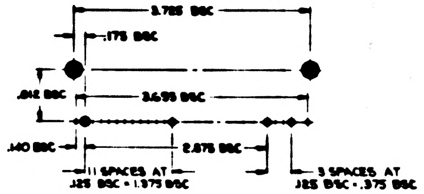
DETAIL C


.156
.156
.156
.156

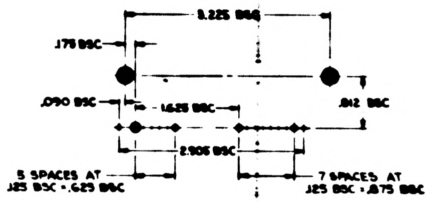
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

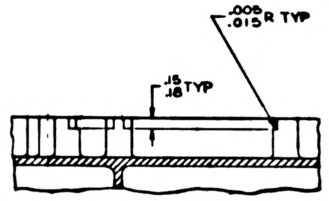
DETAIL D


3.785 BSC
.175 BSC
.812 BSC
3.698 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC = 1.375 BSC
3 SPACES AT .125 BSC = .375 BSC

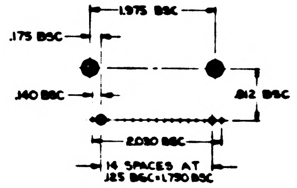
DETAIL E


3.225 BSC
.175 BSC
.090 BSC
1.625 BSC
.812 BSC
2.905 BSC
5 SPACES AT .125 BSC = .625 BSC
7 SPACES AT .125 BSC = .875 BSC

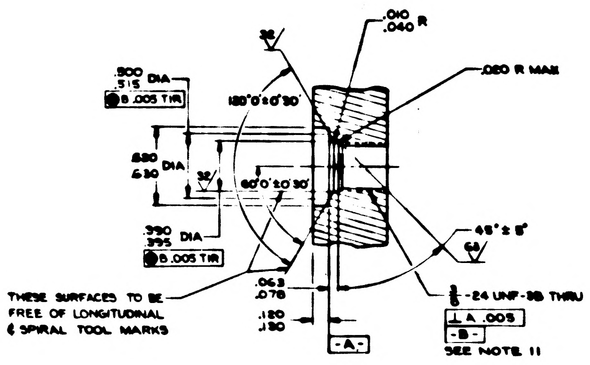
DETAIL F


.005 .015 R TYP
.15 .18 TYP

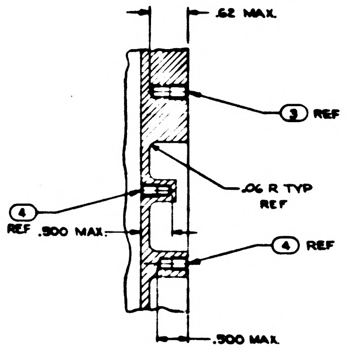
PARTIAL SECTION M-M


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC = 1.750 BSC

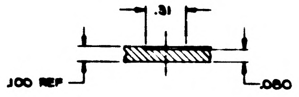
DETAIL G


.010 .040 R
.020 R MAX
.500 .515 DIA
.005 TIR
.590 .630 DIA
.390 .395 DIA
.005 TIR
45° ± 8°
-24 UNF-2B THRU
⊥ A .005
-B-
SEE NOTE 11
-A-
.063 .078
.120 .130
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS

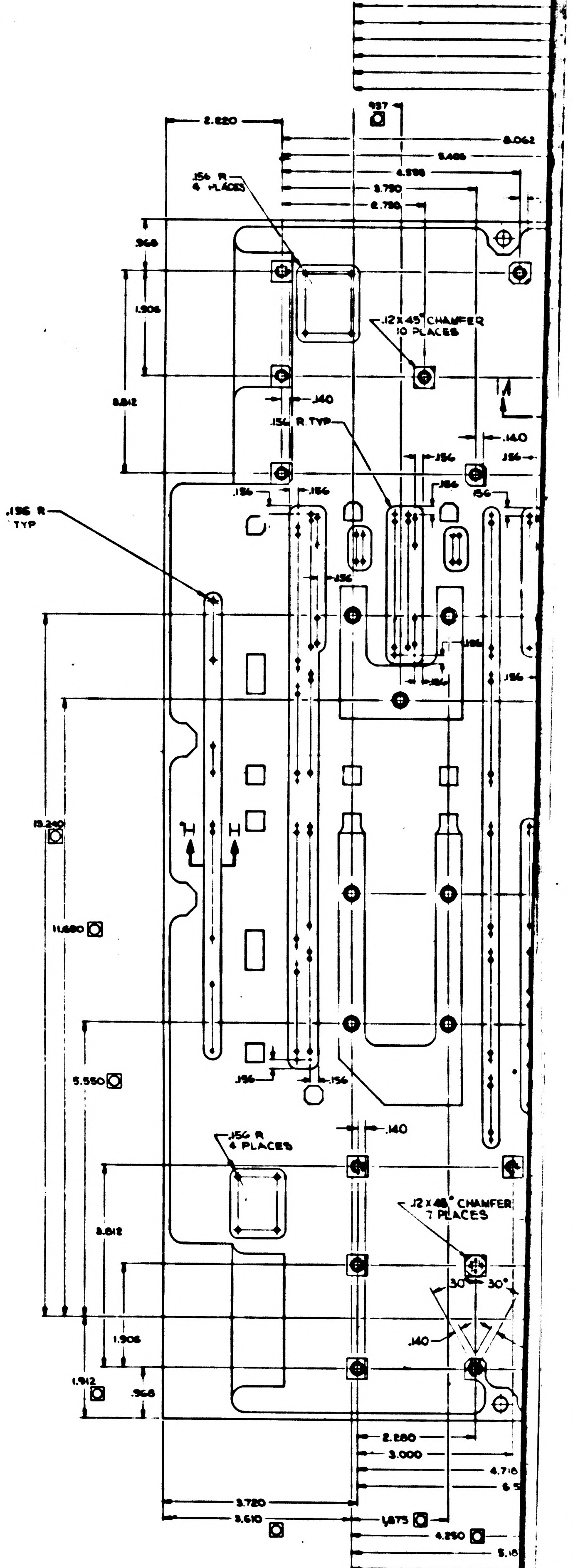
SECTION F-F
SCALE 2/1

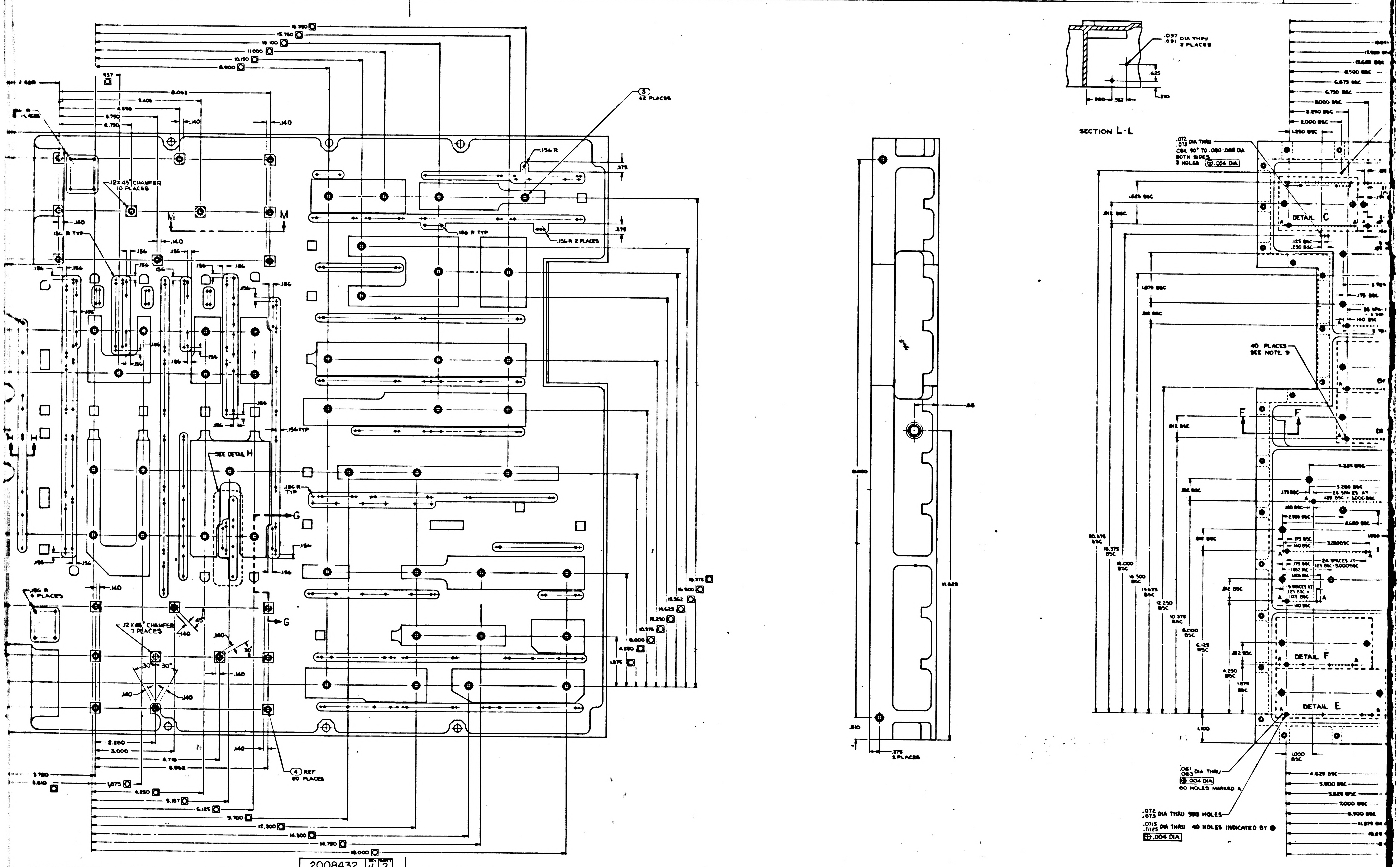

.62 MAX
③ REF
.06 R TYP REF
④ REF .500 MAX
④ REF
.500 MAX

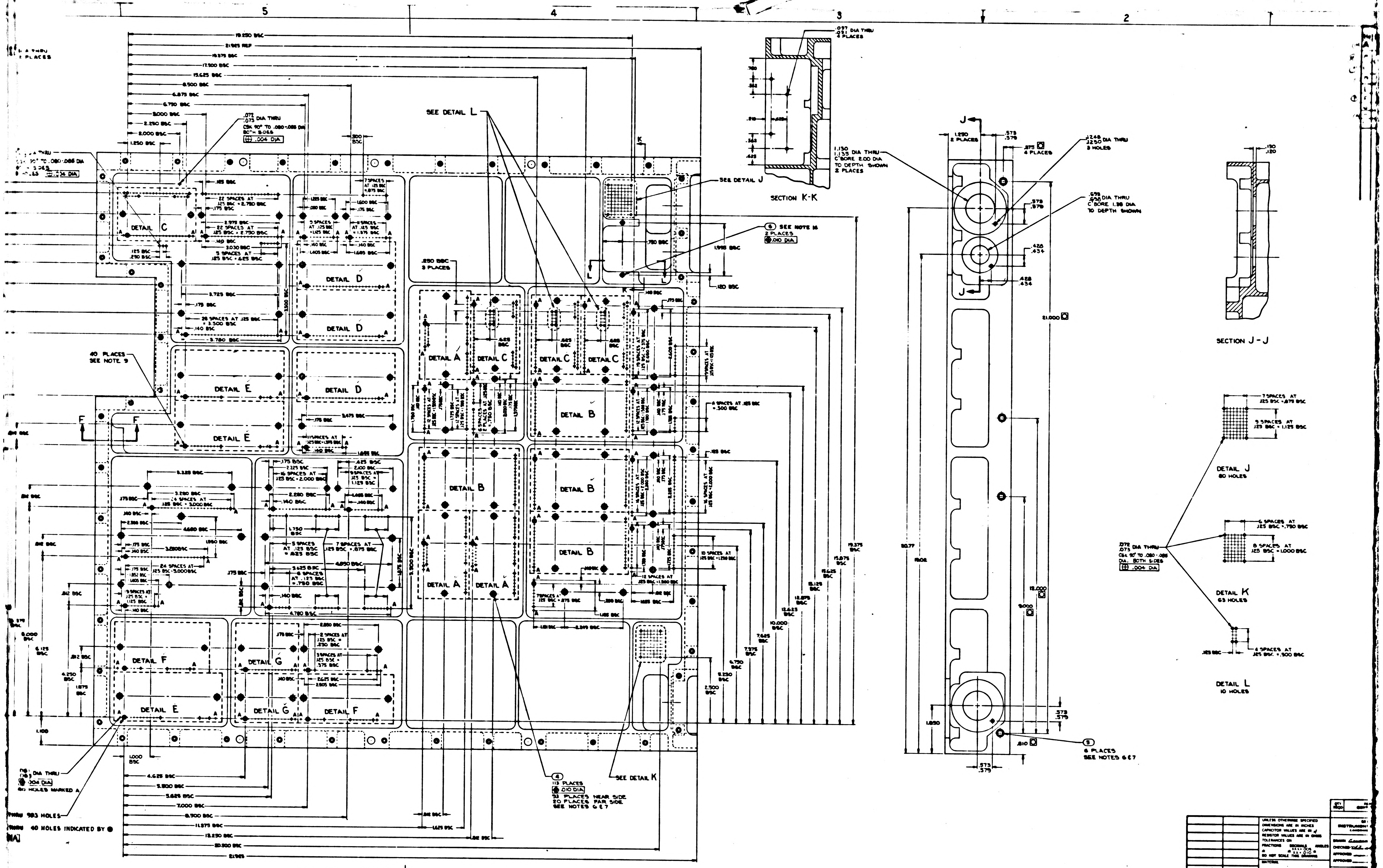
SECTION G-G


.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


2.820
.937
8.062
.156 R 4 PLACES
.12 X 45° CHAMFER 10 PLACES
.968
1.906
8.812
.140
.156 R TYP
.156 R TYP
13.240
11.680
5.550
.156 R 4 PLACES
.12 X 45° CHAMFER 7 PLACES
30° 30°
.140
1.906
1.912
.968
2.280
3.000
3.720
3.610
1.875
4.250


9
8
7
6
③ 42 PLACES
.12 X 45° CHAMFER 10 PLACES
.156 R TYP
.156 R
.186 R TYP
.156 R 2 PLACES
SEE DETAIL H
.186 R TYP
.186 R 6 PLACES
.12 X 45° CHAMFER 7 PLACES
④ REF 20 PLACES
M
G
SECTION L-L
.097 .091 DIA THRU 2 PLACES
.072 .073 DIA THRU CSK 90° TO .080-.085 DIA BOTH SIDES 3 HOLES
40 PLACES SEE NOTE 9
DETAIL C
DETAIL F
DETAIL E
F
.061 .063 DIA THRU .004 DIA 80 HOLES MARKED A
.072 .073 DIA THRU 595 HOLES
.0715 .0725 DIA THRU 40 HOLES INDICATED BY ●
.004 DIA
15.950
15.750
13.100
11.000
10.150
8.900
18.000
14.750
14.300
12.300
9.700
6.125
5.187
4.250
1.875
21.000
11.625
.810
.375 2 PLACES
20.375 BSC
18.375 BSC
16.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC


SECTION K-K
SECTION J-J
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL E
DETAIL F
DETAIL G
DETAIL J
80 HOLES
DETAIL K
63 HOLES
DETAIL L
10 HOLES
.097 DIA THRU .091 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
.1248 .1250 DIA THRU 3 HOLES
.698 .696 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.072 .075 DIA THRU CSK 90° TO .080-.086 DIA BOTH SIDES .004 DIA
6 SEE NOTE 16 2 PLACES .010 DIA
40 PLACES SEE NOTE 9
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
5 6 PLACES SEE NOTES 6 & 7
THRU 983 HOLES
THRU 40 HOLES INDICATED BY ●
60 HOLES MARKED A
19.250 BSC
21.965 REF
21.965
21.000
20.77
19.02
12.000
9.000

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± .XXX = .005 ± .XX = .010 ± DO NOT SCALE THIS DRAWING
2007095		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

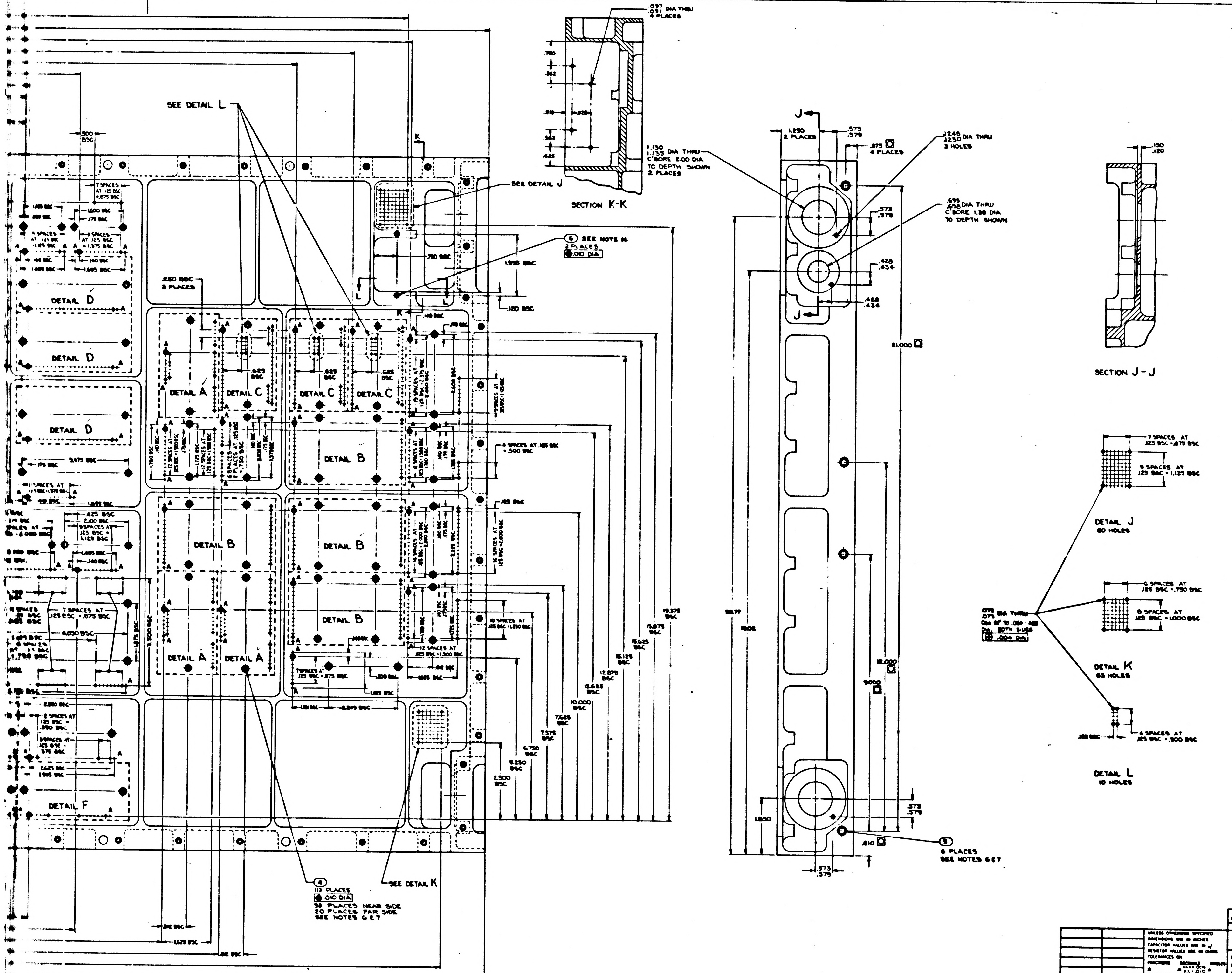
QTY REQD

INSTRUMENT

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASA

2008432 J 2

3/2008432



SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
SECTION K-K
SECTION J-J
.097 DIA THRU .091 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
1.290 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.693 .698 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
18.000
9.000
1.890
.810
6 PLACES SEE NOTES 6 & 7
6 SEE NOTE 14 2 PLACES .010 DIA
4 113 PLACES .010 DIA 93 PLACES NEAR SIDE 20 PLACES FAR SIDE SEE NOTES 6 & 7
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
DETAIL J 80 HOLES
DETAIL K 63 HOLES
DETAIL L 10 HOLES
7 SPACES AT .125 BSC = .875 BSC
9 SPACES AT .125 BSC = 1.125 BSC
6 SPACES AT .125 BSC = .750 BSC
8 SPACES AT .125 BSC = 1.000 BSC
4 SPACES AT .125 BSC = .500 BSC
12 SPACES AT .125 BSC = 1.500 BSC
10 SPACES AT .125 BSC = 1.250 BSC
16 SPACES AT .125 BSC = 2.000 BSC
.250 BSC 3 PLACES
.500 BSC
.750 BSC
1.995 BSC
.120 BSC
.130 .120
2.500 BSC
3.500 BSC
4.850 BSC
3.675 BSC
5.250 BSC
6.750 BSC
7.375 BSC
7.625 BSC
10.000 BSC
12.625 BSC
12.875 BSC
15.125 BSC
15.625 BSC
15.875 BSC
19.375 BSC
20.77
19.02
.812 BSC
1.625 BSC
.074 .073 DIA THRU CSK 90° TO .080 .085 DIA BOTH SIDES .004 DIA

REVISIONS 25555

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
A		REVISED PER TDRR 28487			9 MAY 66	
B		REVISION STATUS CHANGED			9 AUG 66	
C		REVISION STATUS CHANGED	TD		20 OCT '66	
D		REVISION STATUS CHANGED	WA		2 NOV 66	
E		REVISION STATUS CHANGED	JC		3 FEB 67	
F		REVISED PER TDRR 32799	JC		3 FEB 67	
G		REVISED PER TDRR 33688			2 AUG 67	
H		REVISED PER TCRR 33997			9 AUG 67	
J		REVISION STATUS CHANGED			8 NOV 67	

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007095	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XXX ± .005 .XX ± .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bonacco
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED A. C. METZGER
NASA

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO	SIZE	DRAWING NO
80230	J_3	2008432

SCALE
SHEET 2 OF 2

2008432 J

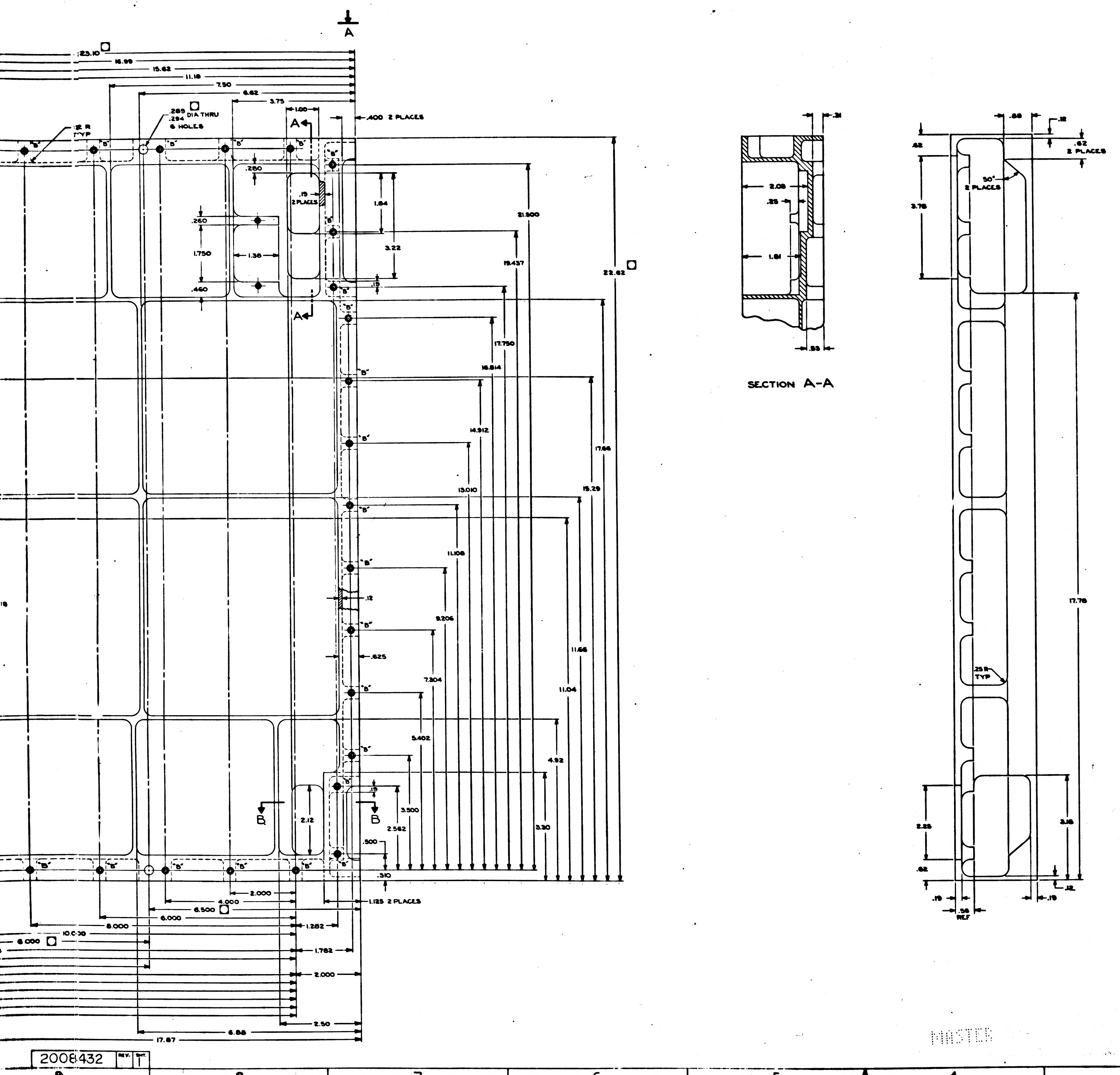
4H

2008432 J 2

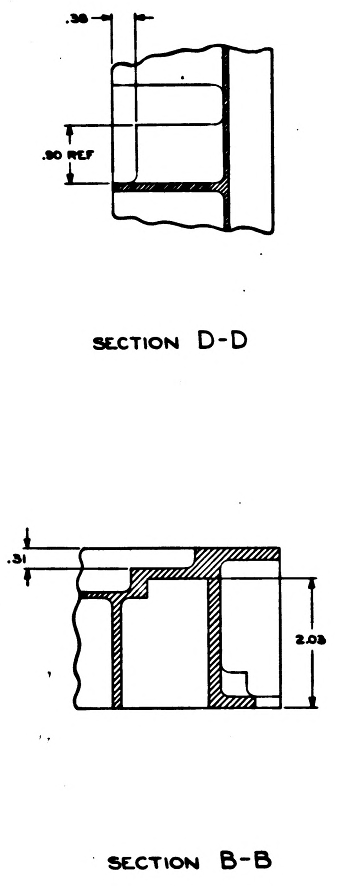
4/2008432

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	A

REVISIONS 25555


A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.12 R TYP
.283 .294 DIA THRU 6 HOLES
"B"
A
.280
.19 2 PLACES
1.84
.260
1.750
1.38
3.22
.460
.19
21.500
19.437
22.62
A
17.750
16.814
14.912
13.010
11.108
17.66
15.29
.12
9.206
.625
7.304
11.66
11.04
5.402
4.92
3.500
2.562
3.30
B
2.12
B
.500
.310
2.000
4.000
6.500
6.000
8.000
10.000
6.000
1.125 2 PLACES
1.282
1.782
2.000
2.50
6.88
17.87
.31
2.08
.25
1.81
.53
.88
.12
.42
.62 2 PLACES
50° 2 PLACES
3.78
17.78
.25 R TYP
2.25
3.18
.62
.19
.56 REF
.19
.12

SECTION A-A


.38
.90 REF
.31
2.03

SECTION D-D

SECTION B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	1010957-008		INSERT, SCREW THD, LOCKING	6
6	MS21208-F4-10		INSERT, SCREW THD	5
113	1010957-010		INSERT, SCREW THD, LOCKING	4
42	1010957-013		INSERT, SCREW THD, LOCKING	3
50	1010957-016		INSERT, SCREW THD, LOCKING	2
1	2008432-001		HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007015	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Bonarrigo 25 Jan 66
CHECKED C. L. P. Kyeraeny 25 Jan 66
APPROVED L. Wong 25 Jan 66
APPROVED

APPROVED MIT M G Hemley 1-25-66
APPROVED MSC A. C METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEPARABLE ASSY
C/M PSA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE 1/1
SHEET 1 OF 2

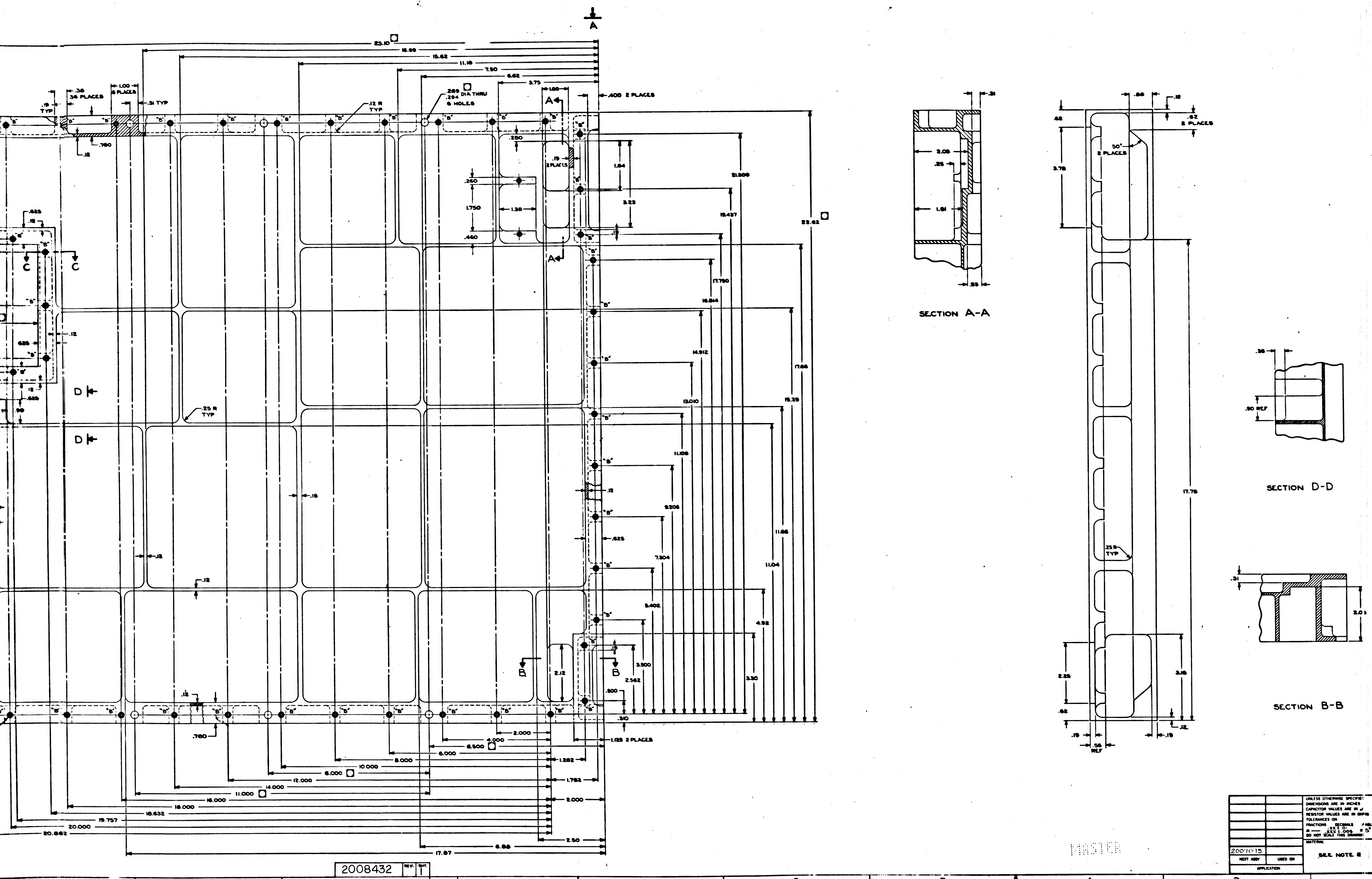
2008432

2008432 REV. SHT. 1

MASTER

4

F-4


A
23.10
16.99
15.62
11.18
7.50
6.62
3.75
1.00
.400 2 PLACES
.38
36 PLACES
1.00
6 PLACES
.31 TYP
.19 TYP
.12 R TYP
.289
.294 DIA THRU
6 HOLES
.760
.12
"B"
.260
1.84
3.22
21.509
22.62
19.437
1.750
1.38
.460
.19 2 PLACES
C
D
.625
.25 R TYP
17.750
16.814
14.912
13.010
11.108
9.206
7.304
5.402
3.500
2.562
.500
.310
17.66
15.29
11.66
11.04
4.92
3.30
2.12
.18
.12
.625
B
2.000
4.000
6.500
6.000
8.000
10.000
1.282
12.000
6.000
14.000
1.782
11.000
16.000
2.000
18.000
18.632
19.757
20.000
20.862
2.50
6.88
17.87
1.125 2 PLACES
.31
2.08
.25
1.81
.93
SECTION A-A
.88
.12
.42
.62 2 PLACES
3.78
50° 2 PLACES
17.78
.25 R TYP
2.25
3.18
.62
.19
.56 REF
.12
.38
.90 REF
SECTION D-D
.31
2.0
SECTION B-B

2	1010957-C
6	MS21208-F
113	1010957-C
42	1010957-C
50	1010957-C
1	2008432-
QTY REQD	PART OR IDENTIFYING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007015	

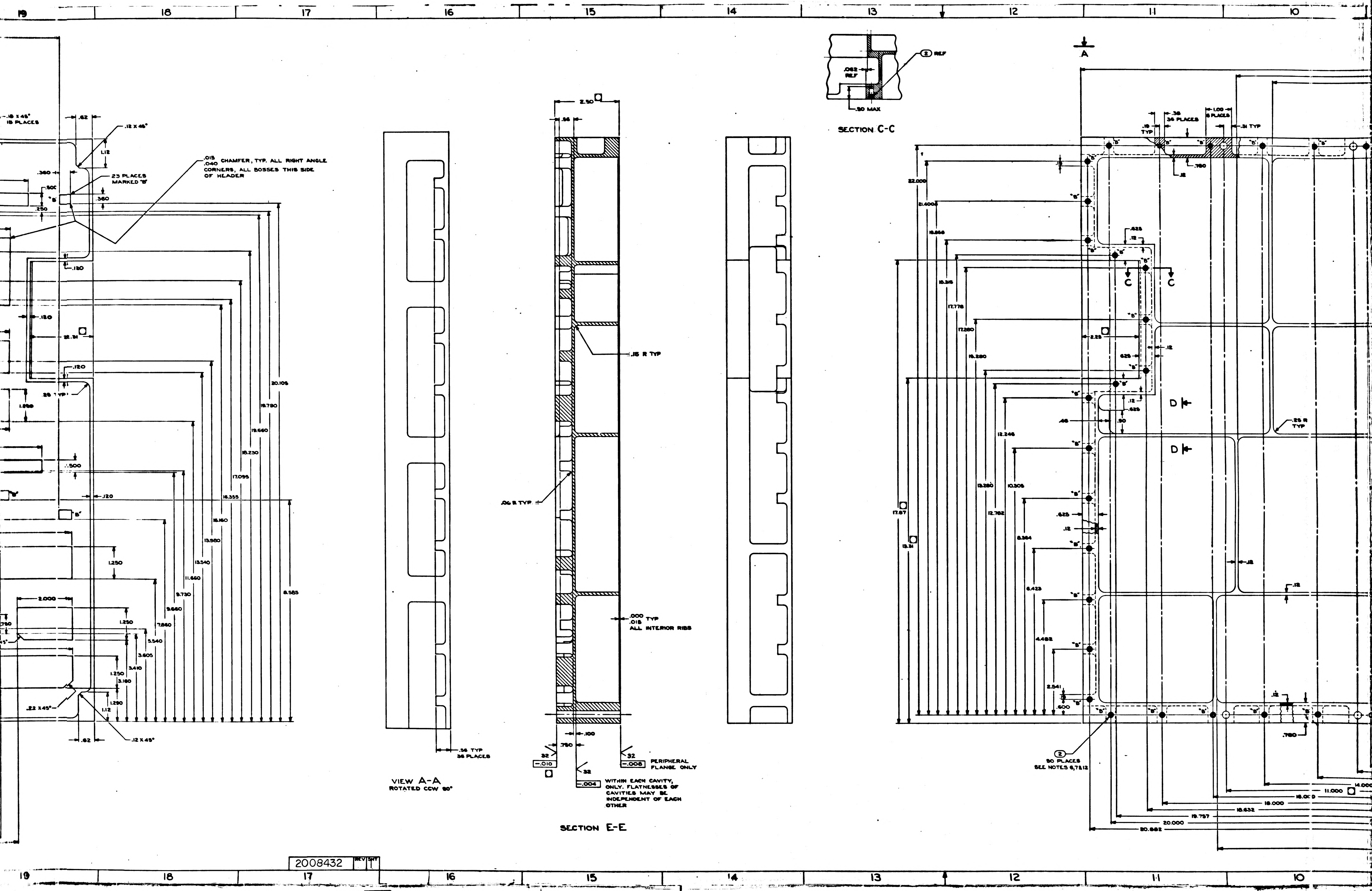
APPLICATION

MIT
INSTRUMENTATI
CAMBRIDGE

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASC

MASTER

2008432 REV. SHT. 1


19
18
17
16
15
14
13
12
11
10
.18 X 45°
18 PLACES
.62
.12 X 45°
1.12
.015
.040 CHAMFER, TYP. ALL RIGHT ANGLE CORNERS, ALL BOSSES THIS SIDE OF HEADER
23 PLACES MARKED "B"
.360
.500
.360
.250
.120
.120
22.31
.120
.25 TYP
1.868
.500
.120
"B"
1.250
2.000
1.250
1.250
3.160
1.290
1.12
.22 X 45°
.62
.12 X 45°
20.105
19.790
19.660
18.230
17.095
16.355
16.160
13.980
13.540
11.660
9.730
9.660
7.860
5.540
3.605
3.410
8.585
2.50
.56
.15 R TYP
.06 R TYP
.000
.015 TYP ALL INTERIOR RIBS
.100
.750
32
.010
32
.004
WITHIN EACH CAVITY, ONLY. FLATNESSES OF CAVITIES MAY BE INDEPENDENT OF EACH OTHER
32
.008
PERIPHERAL FLANGE ONLY
.56 TYP
36 PLACES
.062 REF
2 REF
.30 MAX
A
.19 TYP
.38
36 PLACES
1.00
6 PLACES
.31 TYP
.780
.12
22.000
21.400
19.866
18.315
17.776
17.280
15.280
13.280
12.246
10.305
12.782
8.364
6.423
4.482
2.541
.600
17.67
13.31
.625
.12
2.25
.625
.12
.12
.625
.46
.90
C
C
D
D
.25 R TYP
.625
.12
.12
.12
.12
.780
2
90 PLACES
SEE NOTES 6,7 & 12
14.000
11.000
16.000
18.000
18.632
19.797
20.000
20.882

VIEW A-A
ROTATED CCW 90°

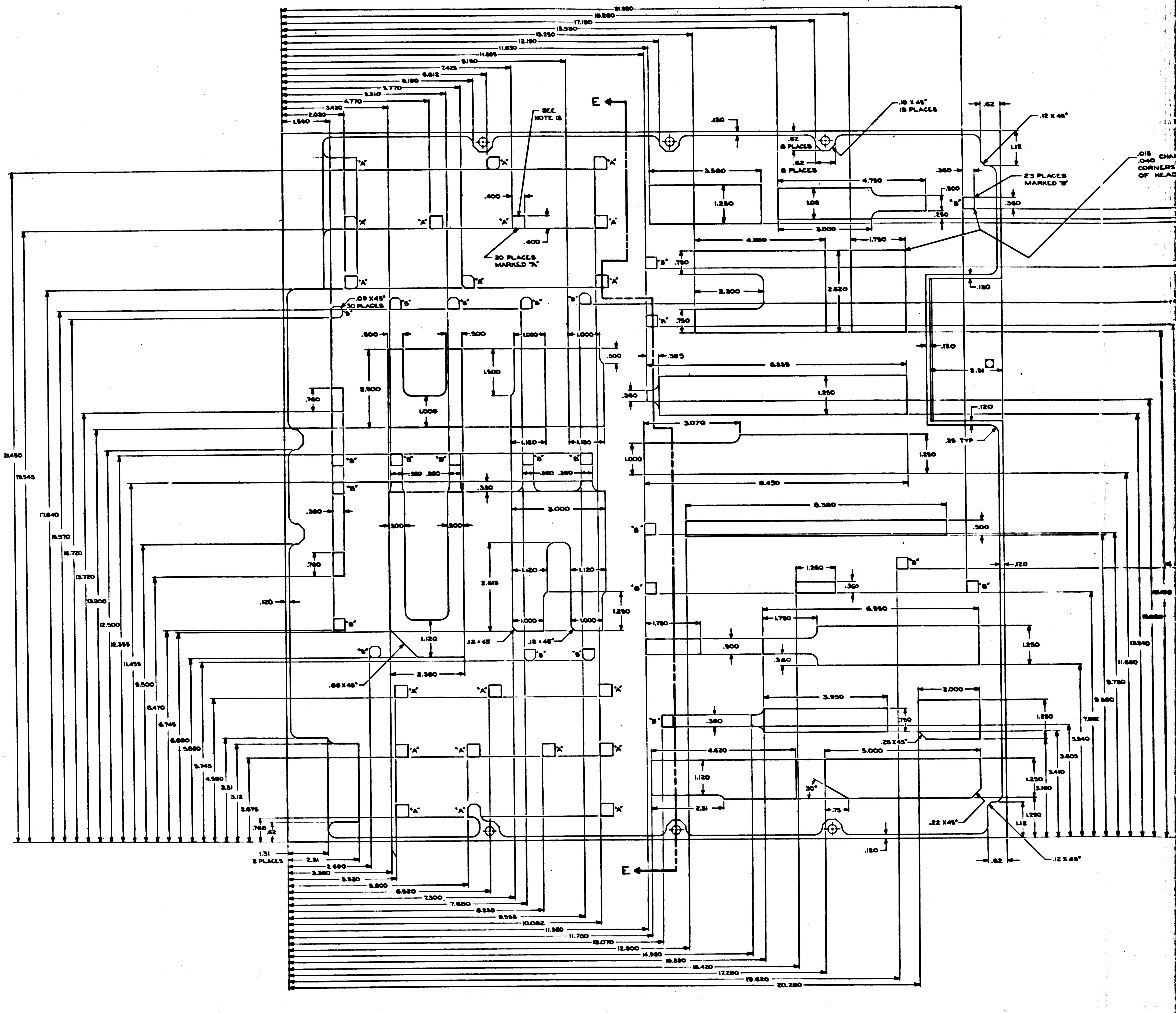
SECTION E-E

SECTION C-C

2008432 REV SHT

F-2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



26
25
24
23
22
21
20
19
18
H
G
F
E
D
C
B
A
21.880
19.280
17.190
15.930
13.250
12.190
11.630
11.665
9.180
7.425
6.612
6.190
5.770
5.310
4.770
3.430
2.030
1.540
SEE NOTE 13
E
.18 X 45°
18 PLACES
.62
.12 X 45°
.015 CHA
.040
CORNERS
OF HEAD
.180
.62
8 PLACES
.62
8 PLACES
1.12
23 PLACES MARKED "B"
"A"
"B"
.400
.400
20 PLACES MARKED "A"
3.580
1.250
4.750
.500
1.00
3.000
.360
.250
.360
4.200
1.750
2.200
2.620
.750
.120
.09 X 45°
30 PLACES
.500
1.000
1.500
2.500
1.009
.365
8.335
1.250
.360
.120
2.31
.760
1.120
3.070
.25 TYP
1.000
1.250
.380
.330
8.450
3.000
8.380
.500
.300
2.613
1.260
.360
1.290
6.950
1.750
1.120
.12 X 45°
2.380
.88 X 45°
.500
.360
1.250
3.950
2.000
.750
.25 X 45°
4.620
5.000
1.120
30°
2.31
.75
.22 X 45°
.12 X 45°
.62
21.450
19.345
17.640
16.970
16.720
13.720
13.200
12.500
12.355
11.455
9.500
8.470
6.745
6.680
5.860
3.745
4.580
3.31
3.12
2.675
.766
.62
1.31
2 PLACES
2.31
2.690
3.380
3.520
5.800
6.820
7.300
7.680
8.230
8.565
10.062
11.360
11.700
12.070
12.900
14.920
16.330
16.420
17.280
19.620
20.280
19.680
18.540
11.680
9.730
9.160
7.865
5.540
3.605
3.410
3.160
1.250
1.12

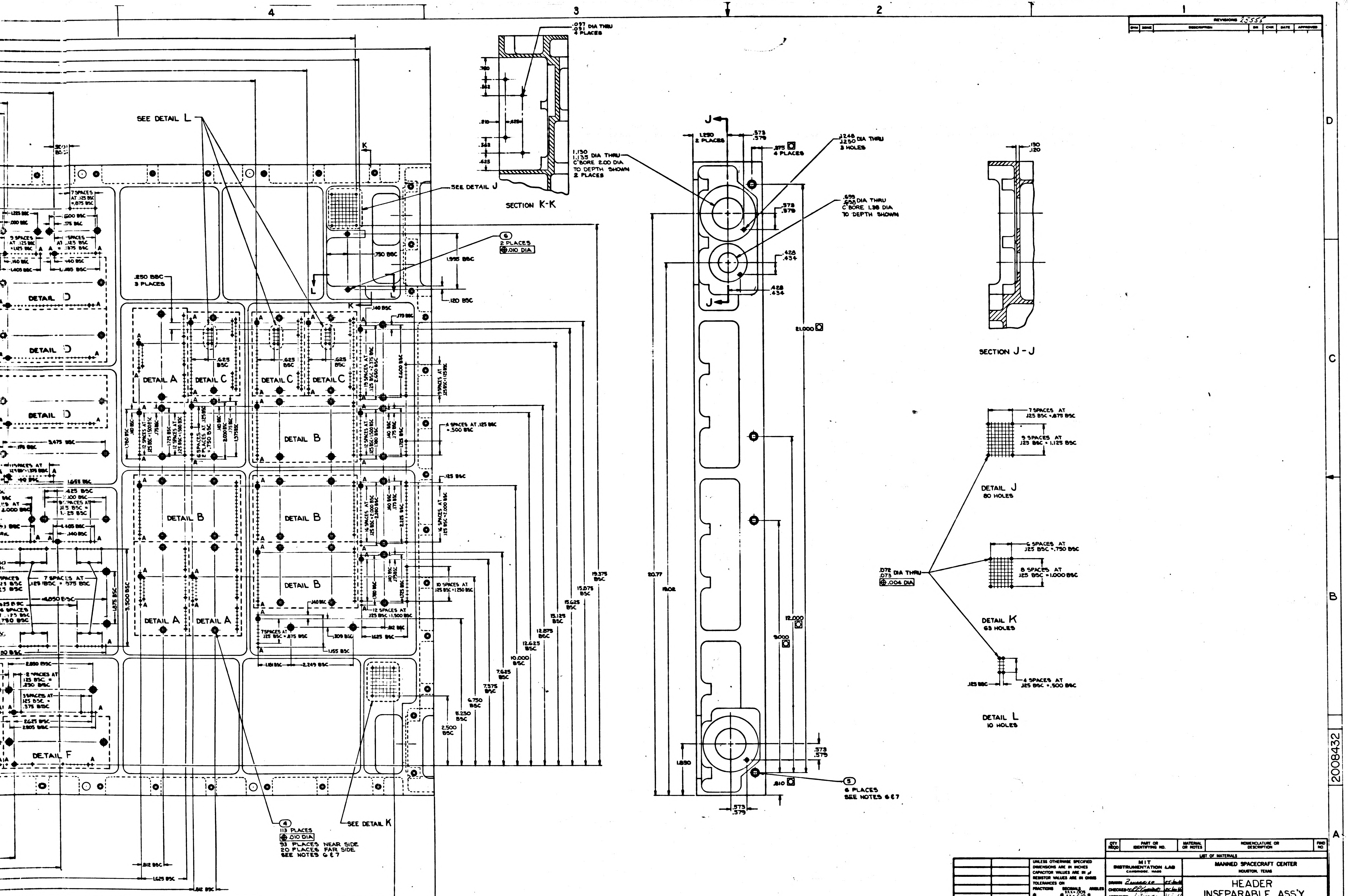
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ALLOY HK31A, CONDITION H24 PER MIL-M-26075 AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS
3. REMOVE BURRS & SHARP EDGES .005/.015 UNLESS OTHERWISE SPECIFIED
4. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
5. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C, UNLESS OTHERWISE SPECIFIED.

6. COAT THREADS OF FIND 2,3,4,5 & 6 WITH MIL-P-8585, COLOR Y

☐ 7. INSTALL FIND NO. 2,3,4,5 & 6 WET PER MS33646. REMOVE DRIVING TANG. FOR FIND NO. 2 THE HELICOIL INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF HELICOIL INSERT, A STANDARD SCREW SHALL BE ENGAGED & DISENGAGED FULL LENGTH OF HELICOIL INSERT AS FINAL STEP IN CLEANING OF HELICOIL INSERT THREADS
8. IDENTIFY WITH PART NO. PER ND1002019
9. .072/.073 HOLES IDENTIFIED BY ● TO BE FREE OF ANODIZE, AFTER ANODIZING IRIDITE HOLES PER ND1002040. DO NOT EPOXY COAT
10. ◯ THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-118
11. THREADS MUST CONFORM TO MIL-S-7742
12. 50 HOLES MARKED "B" TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE HOLES PER ND1002040. DO NOT EPOXY COAT
13. TOP SURFACE OF 20 BOSSES MARKED "A" TO BE FREE OF ANODIZE, AFTER ANODIZING, IRIDITE SURFACE PER ND1002040. DO NOT EPOXY COAT

2008432	REV.	SHT.
		1


SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
.097
.091 DIA THRU
4 PLACES
1.130
1.135 DIA THRU
C'BORE 2.00 DIA
TO DEPTH SHOWN
2 PLACES
SECTION K-K
1.250
2 PLACES
.573
.579
.875 4 PLACES
.1248
.1250 DIA THRU
3 HOLES
.699
.698 DIA THRU
C'BORE 1.38 DIA
TO DEPTH SHOWN
.428
.434
21.000
20.77
19.02
12.000
9.000
1.850
.810
5
6 PLACES
SEE NOTES 6 & 7
SECTION J - J
6
2 PLACES
.010 DIA
1.995 BSC
.750 BSC
.120 BSC
.250 BSC
3 PLACES
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL F
4
113 PLACES
.010 DIA
93 PLACES NEAR SIDE
20 PLACES FAR SIDE
SEE NOTES 6 & 7
19.375 BSC
15.875 BSC
15.625 BSC
15.125 BSC
12.875 BSC
12.625 BSC
10.000 BSC
7.625 BSC
7.375 BSC
6.750 BSC
5.250 BSC
2.500 BSC
.812 BSC
1.625 BSC
7 SPACES AT
.125 BSC = .875 BSC
9 SPACES AT
.125 BSC = 1.125 BSC
DETAIL J
80 HOLES
.072
.073 DIA THRU
.004 DIA
6 SPACES AT
.125 BSC = .750 BSC
8 SPACES AT
.125 BSC = 1.000 BSC
DETAIL K
63 HOLES
.125 BSC
4 SPACES AT
.125 BSC = .500 BSC
DETAIL L
10 HOLES
REVISIONS
SYM
ZONE
DESCRIPTION
BY
CHK
DATE
APPROVED
MASTER
4

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± XXX = .005 XX = .010 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007095	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Zuccaro 25 Jan 66
CHECKED 25 Jan 66
APPROVED 25 Jan 66
APPROVED
APPROVED MIT 1-25-66
APPROVED A. C. METZGER
MSC
DATE

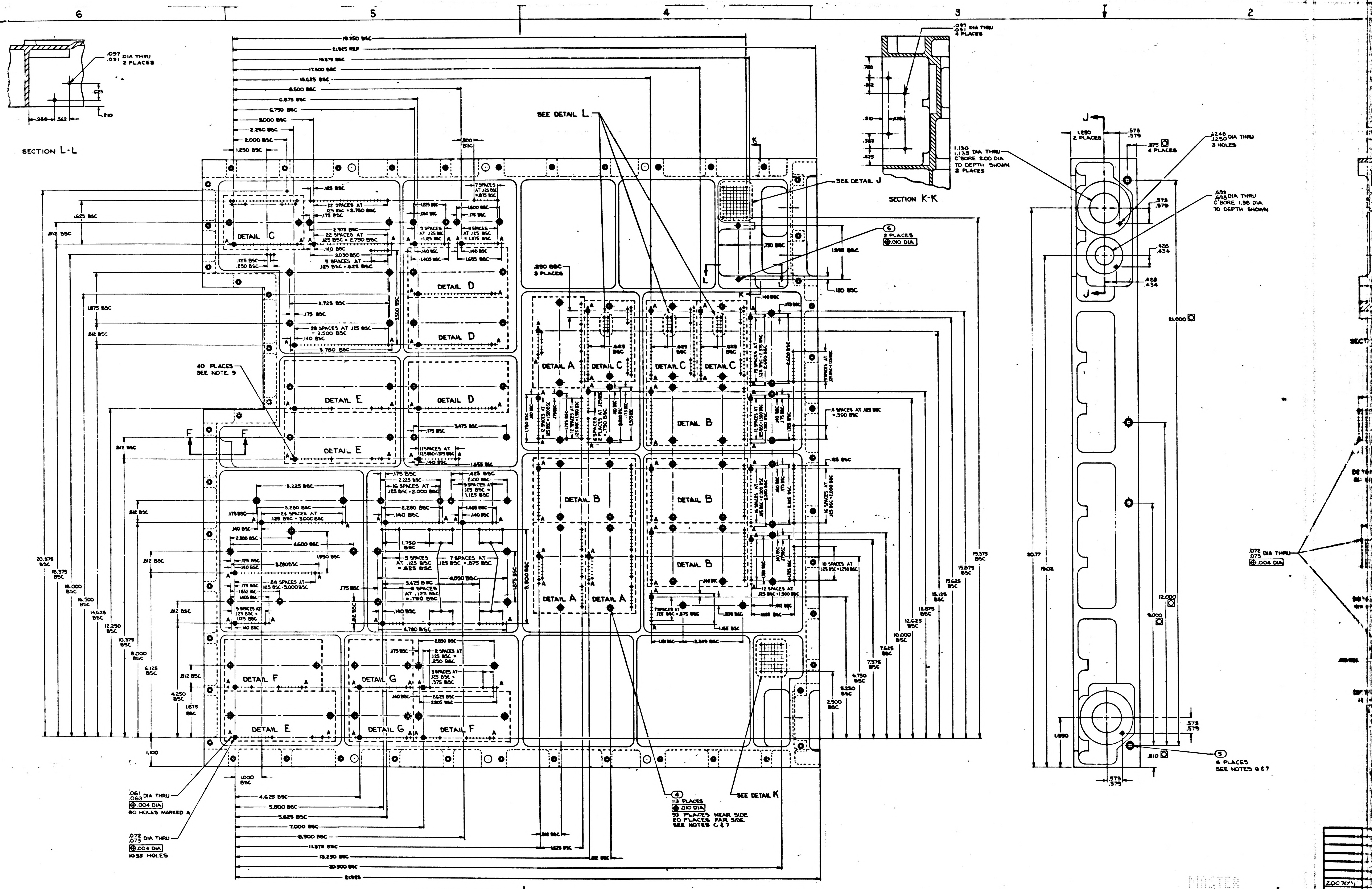
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
INSEPARABLE ASS'Y.
C/M PSA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008432
SCALE
SHEET 2 OF 2

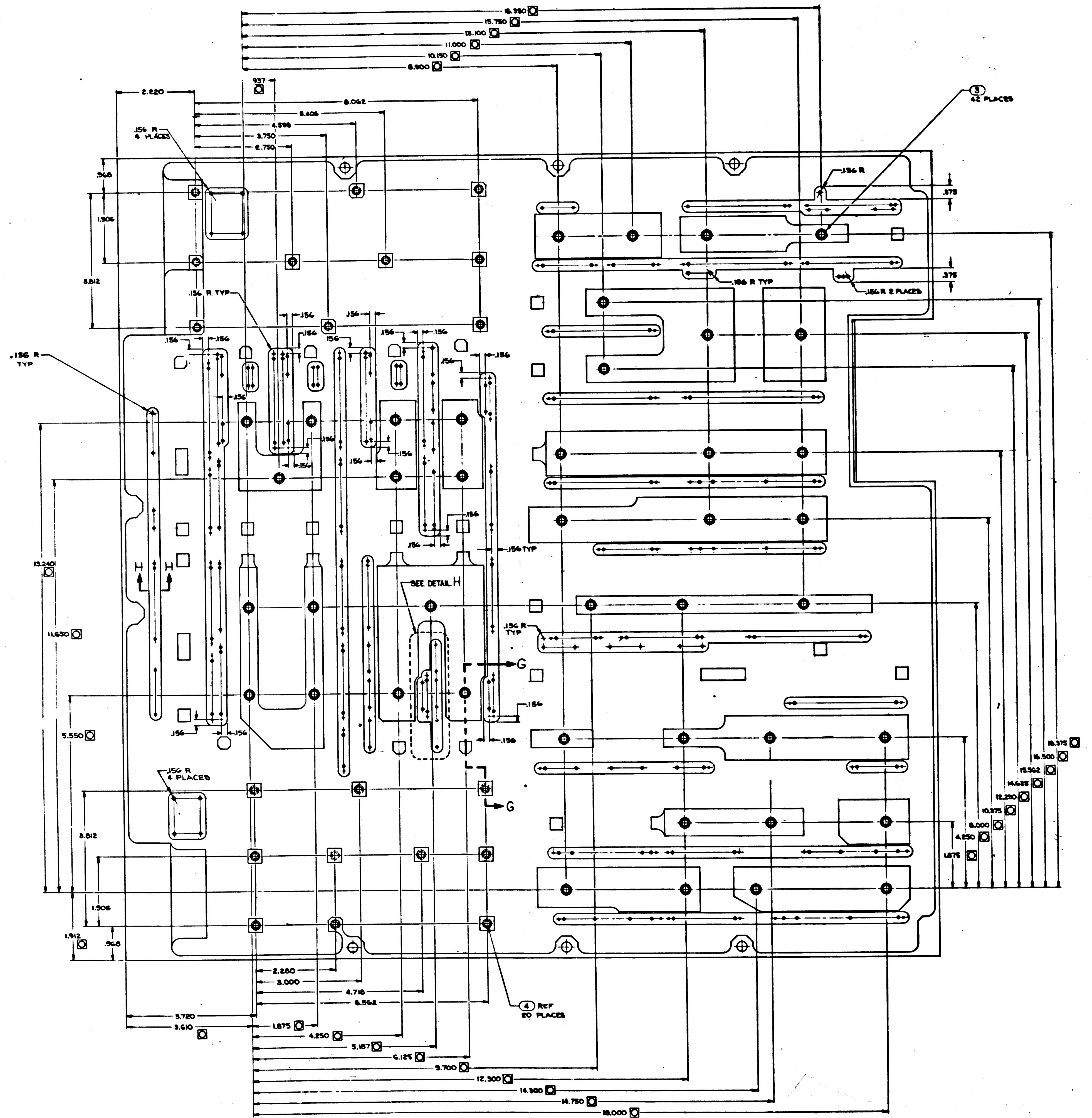
2008432

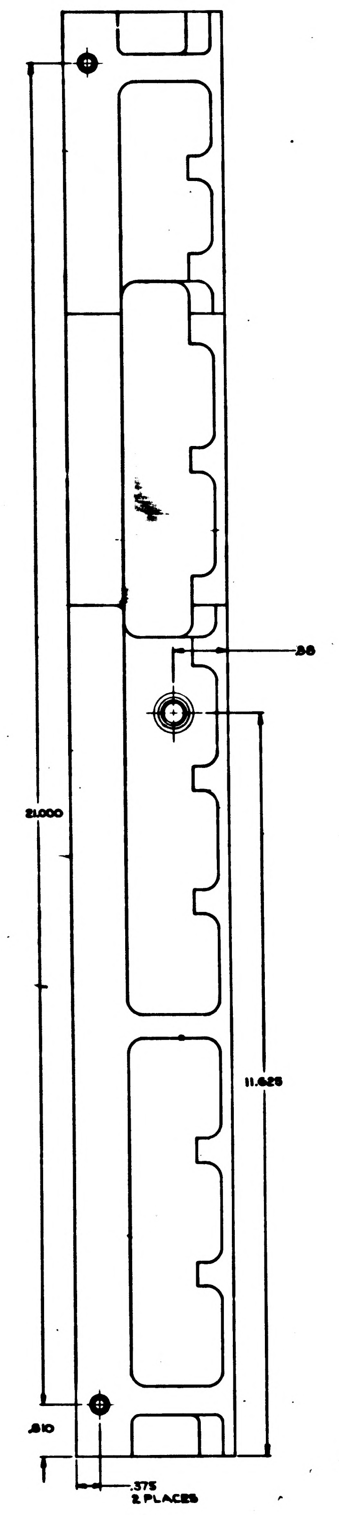
2008432	REV	SHEET 2

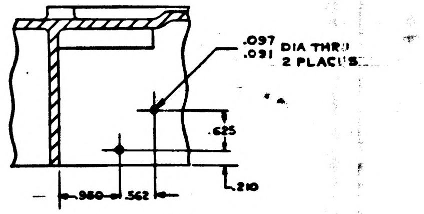

SECTION L-L
.097 .091 DIA THRU 2 PLACES
.625
.210
.950
.562
SECTION K-K
.097 .091 DIA THRU 4 PLACES
1.130 1.135 DIA THRU C'BORE 2.00 DIA TO DEPTH SHOWN 2 PLACES
SEE DETAIL L
SEE DETAIL J
SEE DETAIL K
19.250 BSC
21.925 REF
19.375 BSC
17.500 BSC
15.625 BSC
8.500 BSC
6.875 BSC
6.750 BSC
3.000 BSC
2.250 BSC
2.000 BSC
1.250 BSC
.500 BSC
DETAIL A
DETAIL B
DETAIL C
DETAIL D
DETAIL E
DETAIL F
DETAIL G
40 PLACES SEE NOTE 9
.250 BSC 3 PLACES
6 2 PLACES .010 DIA
1.995 BSC
.120 BSC
.061 .063 DIA THRU
.004 DIA
80 HOLES MARKED A
.072 .073 DIA THRU
.004 DIA
1033 HOLES
6 113 PLACES .010 DIA
93 PLACES NEAR SIDE
20 PLACES FAR SIDE
SEE NOTES 6 & 7
4.625 BSC
5.500 BSC
5.625 BSC
7.000 BSC
8.500 BSC
11.375 BSC
13.250 BSC
20.500 BSC
21.925
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.000 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
1.000 BSC
J
K
L
F
1.250 2 PLACES
.573 .579
.875 4 PLACES
.1248 .1250 DIA THRU 3 HOLES
.625 .630 DIA THRU C'BORE 1.38 DIA TO DEPTH SHOWN
.428 .434
21.000
20.77
19.02
12.000
9.000
1.990
.810
.072 .073 DIA THRU
.004 DIA
5 6 PLACES SEE NOTES 6 & 7
MASTER

2008432 2

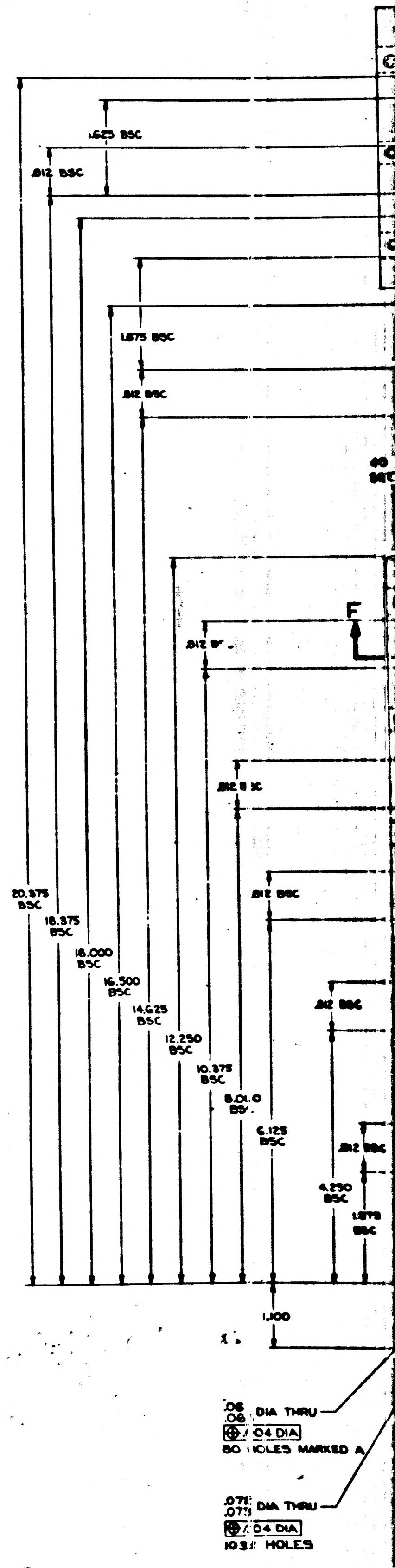
F3


15.350
15.750
13.100
11.000
10.150
8.900
.937
2.220
8.062
5.406
4.598
3.750
2.750
.156 R
4 PLACES
.968
1.906
3.812
③
42 PLACES
.156 R
.375
.186 R TYP
.186 R 2 PLACES
.156 R. TYP
.156
.156 R
TYP
H
SEE DETAIL H
.154 TYP
.156 R
TYP
G
13.240
11.650
5.550
.156 R
4 PLACES
1.912
.968
2.280
3.000
4.718
6.562
3.720
3.610
1.875
4.250
5.187
6.125
9.700
12.300
14.300
14.750
18.000
④ REF
20 PLACES
18.375
16.500
15.562
14.625
12.250
10.375
8.000
4.250
1.875

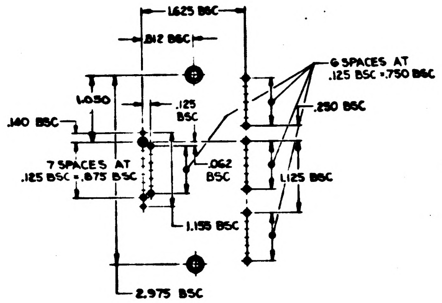

21.000
.38
11.625
.810
.375
2 PLACES


.097
.091
DIA THRU
2 PLACES
.625
.210
.950
.562

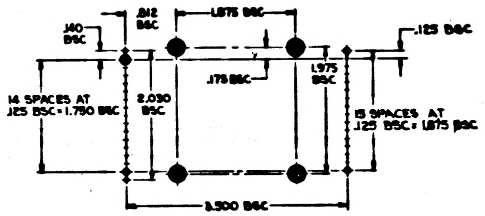
SECTION L-L


.625 BSC
.812 BSC
1.875 BSC
.812 BSC
E
20.375 BSC
18.375 BSC
18.000 BSC
16.500 BSC
14.625 BSC
12.250 BSC
10.375 BSC
8.010 BSC
6.125 BSC
4.250 BSC
1.875 BSC
1.100
.06
.06
DIA THRU
.04 DIA
80 HOLES MARKED A
.075
.073
DIA THRU
.04 DIA
103 HOLES

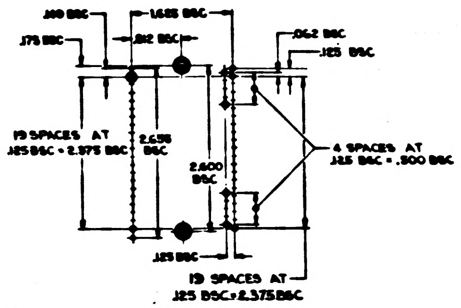
2008432 REV SHEET 2


1.625 BSC
.812 BSC
6 SPACES AT .125 BSC =.750 BSC
1.050
.125 BSC
.140 BSC
.250 BSC
7 SPACES AT .125 BSC =.875 BSC
.062 BSC
1.125 BSC
1.155 BSC
2.975 BSC

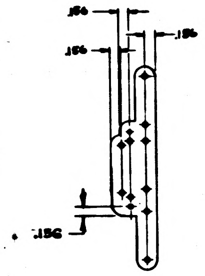
DETAIL A


.140 BSC
.812 BSC
1.875 BSC
.125 BSC
.175 BSC
1.975 BSC
14 SPACES AT .125 BSC=1.750 BSC
2.030 BSC
15 SPACES AT .125 BSC= 1.875 BSC
3.500 BSC

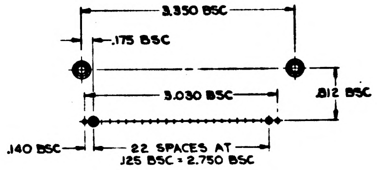
DETAIL B


.140 BSC
1.625 BSC
.175 BSC
.812 BSC
.062 BSC
.125 BSC
19 SPACES AT .125 BSC= 2.375 BSC
2.658 BSC
2.600 BSC
4 SPACES AT .125 BSC = .500 BSC
.125 BSC
19 SPACES AT .125 BSC=2.375 BSC

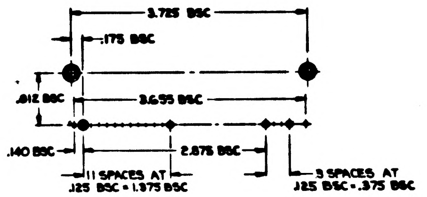
DETAIL C


.156
.156
.156
.156

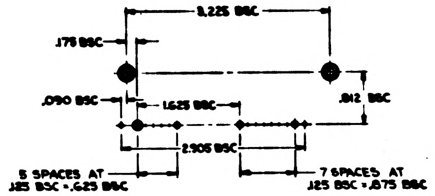
DETAIL H


3.350 BSC
.175 BSC
3.030 BSC
.812 BSC
.140 BSC
22 SPACES AT .125 BSC = 2.750 BSC

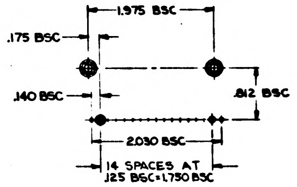
DETAIL D


3.725 BSC
.175 BSC
.812 BSC
3.695 BSC
.140 BSC
2.875 BSC
11 SPACES AT .125 BSC=1.375 BSC
3 SPACES AT .125 BSC=.375 BSC

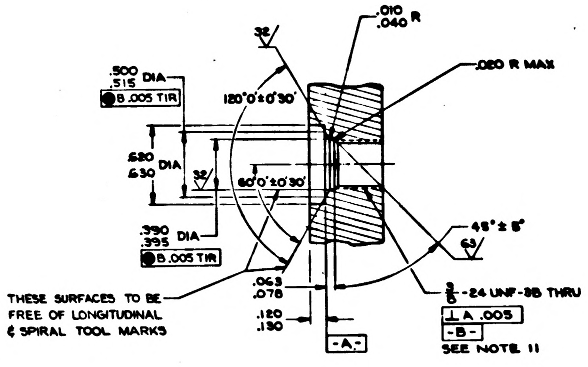
DETAIL E


3.225 BSC
.175 BSC
.812 BSC
.090 BSC
1.625 BSC
2.905 BSC
5 SPACES AT .125 BSC=.625 BSC
7 SPACES AT .125 BSC =.875 BSC

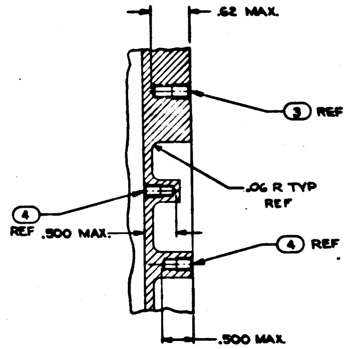
DETAIL F


1.975 BSC
.175 BSC
.140 BSC
.812 BSC
2.030 BSC
14 SPACES AT .125 BSC=1.750 BSC

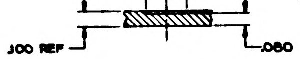
DETAIL G


32
.010 .040 R
.020 R MAX
.500 .515 DIA
B .005 TIR
120°0'±0°30'
.620 .630 DIA
32
60°0'±0°30'
.390 .395 DIA
B .005 TIR
45° ± 5°
63
THESE SURFACES TO BE FREE OF LONGITUDINAL & SPIRAL TOOL MARKS
.063 .078
.120 .130
-A-
3/8 -24 UNF-3B THRU
⊥ A .005
-B-
SEE NOTE 11

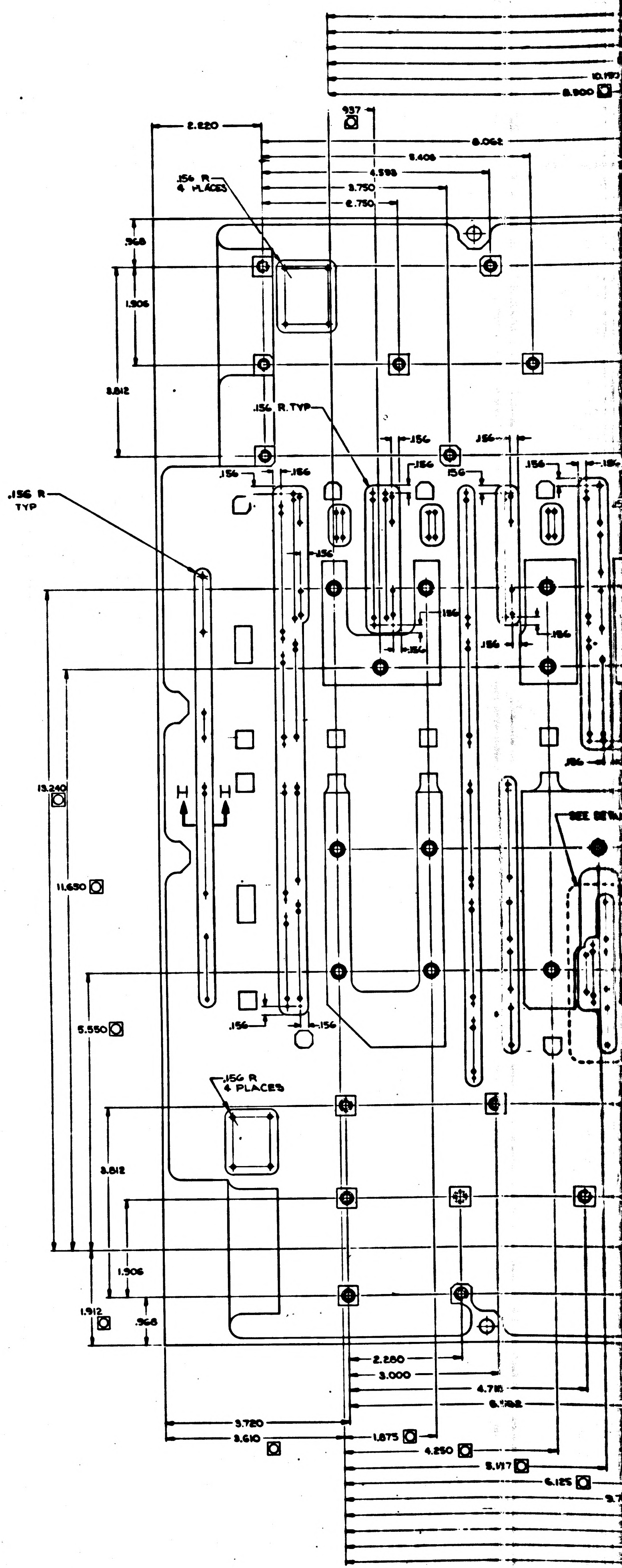
SECTION F-F
SCALE 2/1

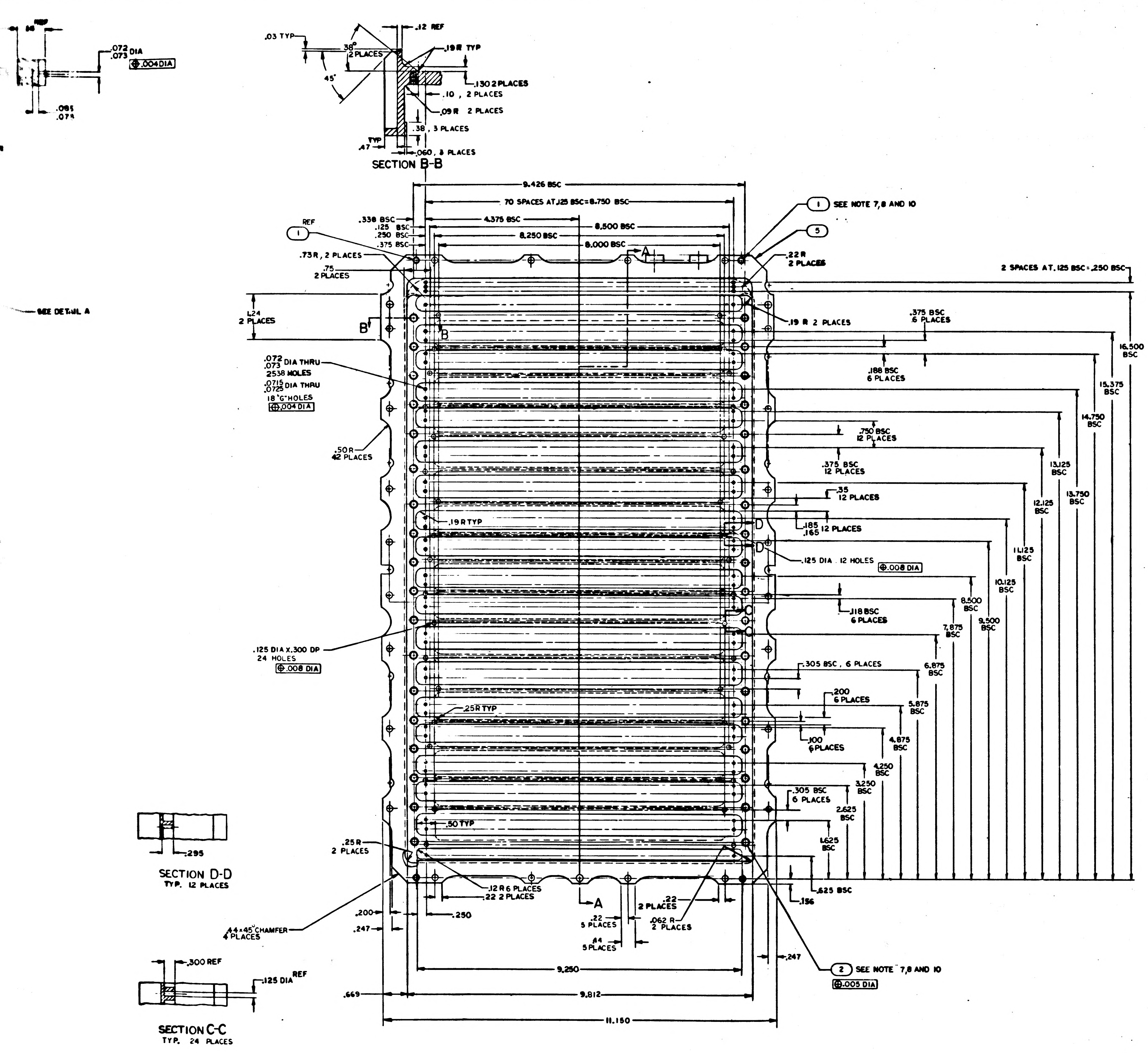

.62 MAX.
3 REF
.06 R TYP REF
4 REF .500 MAX.
4 REF
.500 MAX.

SECTION G-G


.31
.100 REF
.080

SECTION H-H
SCALE 2/1
TYPICAL


10.193
8.900
2.820
.937
8.062
5.406
.154 R 4 PLACES
4.593
3.750
2.750
.968
1.906
3.812
.156 R TYP
.156
.156 R TYP
H
H
13.240
11.630
SEE DETAIL
5.550
.156 R 4 PLACES
3.812
1.906
1.912
.968
2.280
3.000
4.718
3.720
3.610
1.875
4.250
5.117
6.125


SECTION B-B
.12 REF
.03 TYP
38° 2 PLACES
45°
.19 R TYP
.130 2 PLACES
.10 , 2 PLACES
.09 R 2 PLACES
.38 , 3 PLACES
.47 TYP
.060 , 3 PLACES
.072 .073 DIA
⊕ .004 DIA
SEE DETAIL A
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
① SEE NOTE 7, 8 AND 10
⑤
① REF
.73 R, 2 PLACES
.75 2 PLACES
.22 R 2 PLACES
1.24 2 PLACES
2 SPACES AT .125 BSC = .250 BSC
.19 R 2 PLACES
.375 BSC 6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
13.750 BSC
13.125 BSC
12.125 BSC
11.125 BSC
10.125 BSC
9.500 BSC
8.500 BSC
7.875 BSC
6.875 BSC
5.875 BSC
4.875 BSC
4.250 BSC
3.250 BSC
2.625 BSC
1.625 BSC
.625 BSC
.156
.188 BSC 6 PLACES
.750 BSC 12 PLACES
.375 BSC 12 PLACES
.35 12 PLACES
.185 .165 12 PLACES
.125 DIA 12 HOLES ⊕ .008 DIA
.118 BSC 6 PLACES
.305 BSC , 6 PLACES
.200 6 PLACES
.100 6 PLACES
.305 BSC 6 PLACES
.072 .073 DIA THRU 2538 HOLES
.0715 .0725 DIA THRU 18 "G" HOLES
⊕ .004 DIA
.50 R 42 PLACES
.19 R TYP
.25 R TYP
.50 TYP
.125 DIA x .300 DP 24 HOLES ⊕ .008 DIA
.25 R 2 PLACES
.12 R 6 PLACES
.22 2 PLACES
.44 x 45° CHAMFER 4 PLACES
.200
.247
.250
.22 5 PLACES
.44 5 PLACES
.22 2 PLACES
.062 R 2 PLACES
② SEE NOTE 7, 8 AND 10
⊕ .005 DIA
9.250
9.812
11.160
.669
.247
A
B
C
D
SECTION D-D TYP. 12 PLACES
.295
SECTION C-C TYP. 24 PLACES
.300 REF
.125 DIA REF

REVISIONS 27175

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2008433-001	TRAY S	5
2	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	4
2	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	3
36	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
4	MS21208C0610	INSERT, SCREW THREAD	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007227	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.0013 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

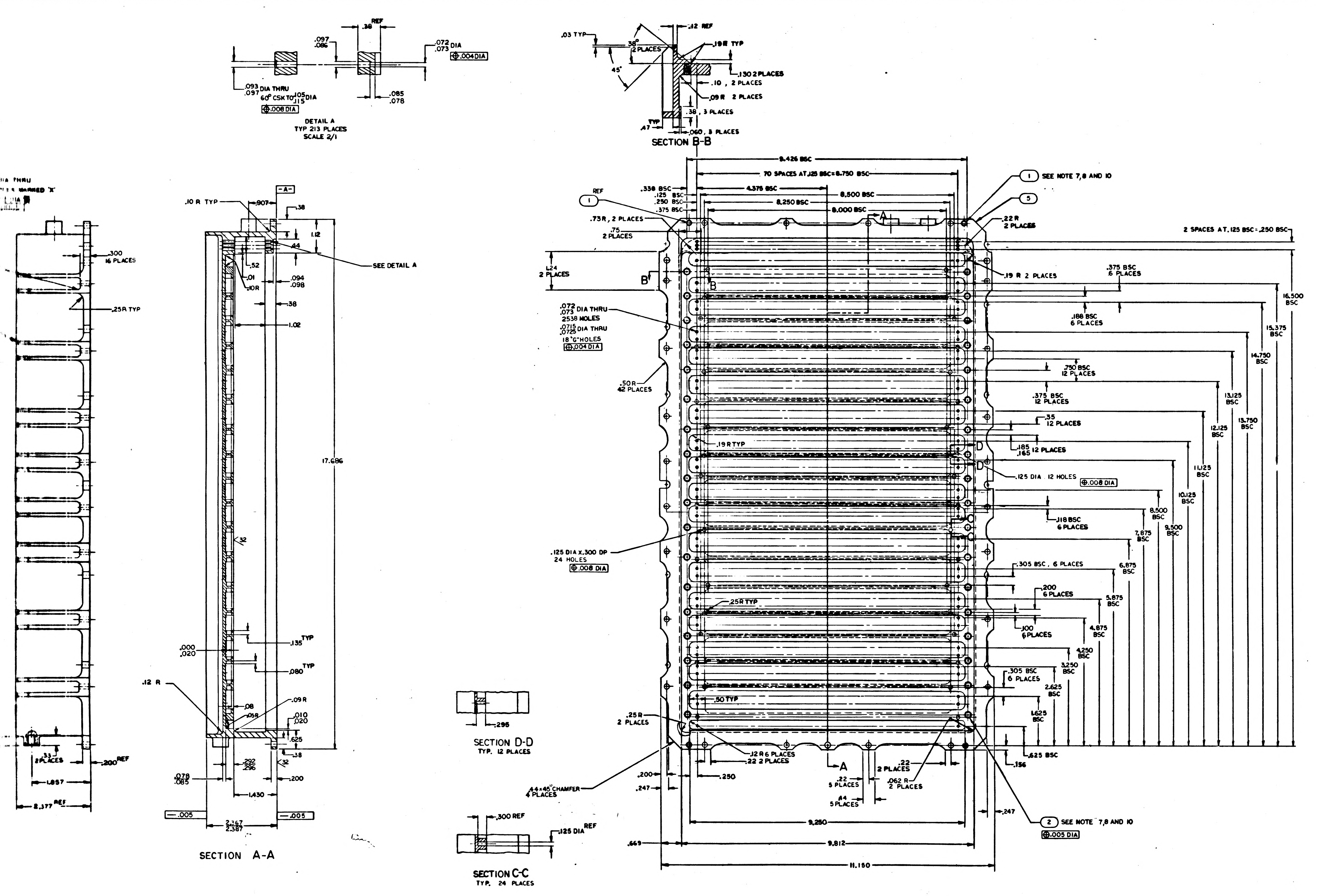
DRAWN De Zenzo 26 Jul 66
CHECKED 28 Sep 66
APPROVED 14 Nov 66
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

TRAY S, CDU
INSEPERABLE ASSEMBLY

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2008433
SCALE FULL | SHEET 1 OF 1

2008433

MASTER


5
4
3
2
.097
.086
.38
REF
.072
.073 DIA
.004 DIA
.093
.097 DIA THRU
60° CSK TO .105
.115 DIA
.008 DIA
.085
.078
DETAIL A
TYP 213 PLACES
SCALE 2/1
.03 TYP
30°
2 PLACES
.12 REF
.19 R TYP
45°
.130 2 PLACES
.10 , 2 PLACES
.09 R 2 PLACES
.38 , 3 PLACES
TYP
.47
.060, 3 PLACES
SECTION B-B
9.426 BSC
70 SPACES AT .125 BSC=8.750 BSC
.338 BSC
.125 BSC
.250 BSC
.375 BSC
4.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
1 SEE NOTE 7,8 AND 10
5
.22 R
2 PLACES
REF
1
.73 R, 2 PLACES
.75
2 PLACES
2 SPACES AT .125 BSC=.250 BSC
1.24
2 PLACES
B
.19 R 2 PLACES
.375 BSC
6 PLACES
.188 BSC
6 PLACES
16.500 BSC
15.375 BSC
14.750 BSC
13.750 BSC
13.125 BSC
12.125 BSC
11.125 BSC
10.125 BSC
9.500 BSC
8.500 BSC
7.875 BSC
6.875 BSC
5.875 BSC
4.875 BSC
4.250 BSC
3.250 BSC
2.625 BSC
1.625 BSC
.072
.073 DIA THRU
2538 HOLES
.0715
.0725 DIA THRU
18 "G" HOLES
.004 DIA
.750 BSC
12 PLACES
.375 BSC
12 PLACES
.50 R
42 PLACES
.35
12 PLACES
.19 R TYP
.185
.165 12 PLACES
D
.125 DIA 12 HOLES
.008 DIA
.118 BSC
6 PLACES
C
.125 DIA x .300 DP
24 HOLES
.008 DIA
.305 BSC , 6 PLACES
.200
6 PLACES
.25R TYP
.100
6 PLACES
.305 BSC
6 PLACES
.50 TYP
.25 R
2 PLACES
.12 R 6 PLACES
.22 2 PLACES
A
.22
2 PLACES
.062 R
2 PLACES
.625 BSC
.156
.22
5 PLACES
.44
5 PLACES
.200
.247
.250
.44 x 45° CHAMFER
4 PLACES
2 SEE NOTE 7,8 AND 10
.005 DIA
.247
9.250
.669
9.812
11.150
.10 R TYP
.907
-A-
.38
1.12
.44
.52
.01
.10R
.094
.098
.38
1.02
SEE DETAIL A
17.686
.32
.000
.020
.135 TYP
.080 TYP
.12 R
.08
.058
.09 R
.010
.020
.625
.38
.32
.292
.296
.200
.078
.085
1.430
.005
2.367
2.387
.005
SECTION A-A
.300
16 PLACES
.25R TYP
.33
2 PLACES
.200 REF
1.857
2.377 REF
.295
SECTION D-D
TYP. 12 PLACES
.300 REF
.125 DIA REF
SECTION C-C
TYP. 24 PLACES

QTY REQD	PART OR IDENTIFYING NO.
1	2008433-001
2	MS21209-C061
3	MS21209-F1-1
5	MS21209C0815
1	MS21208C0610

2007227	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS .XXX ±.005 .XX ±.01 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL

SEE NOTE 2

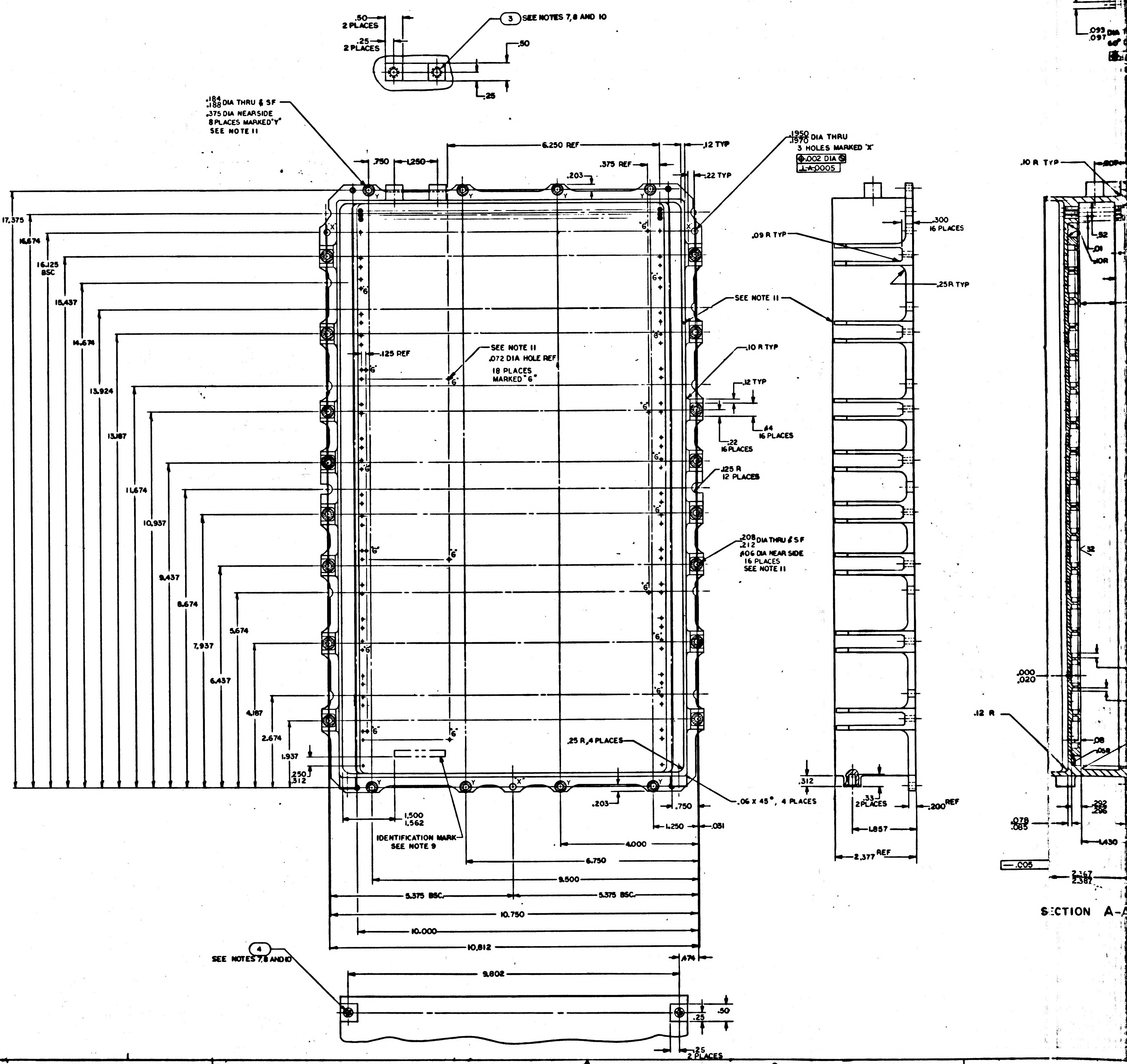
MIT
INSTRUMENTATION LA
CAMBRIDGE, MASS

DRAWN De Zenzo
CHECKED
APPROVED
APPROVED
APPROVED IT
A. L. [illegible]
APPROVED
DSC

MASTER

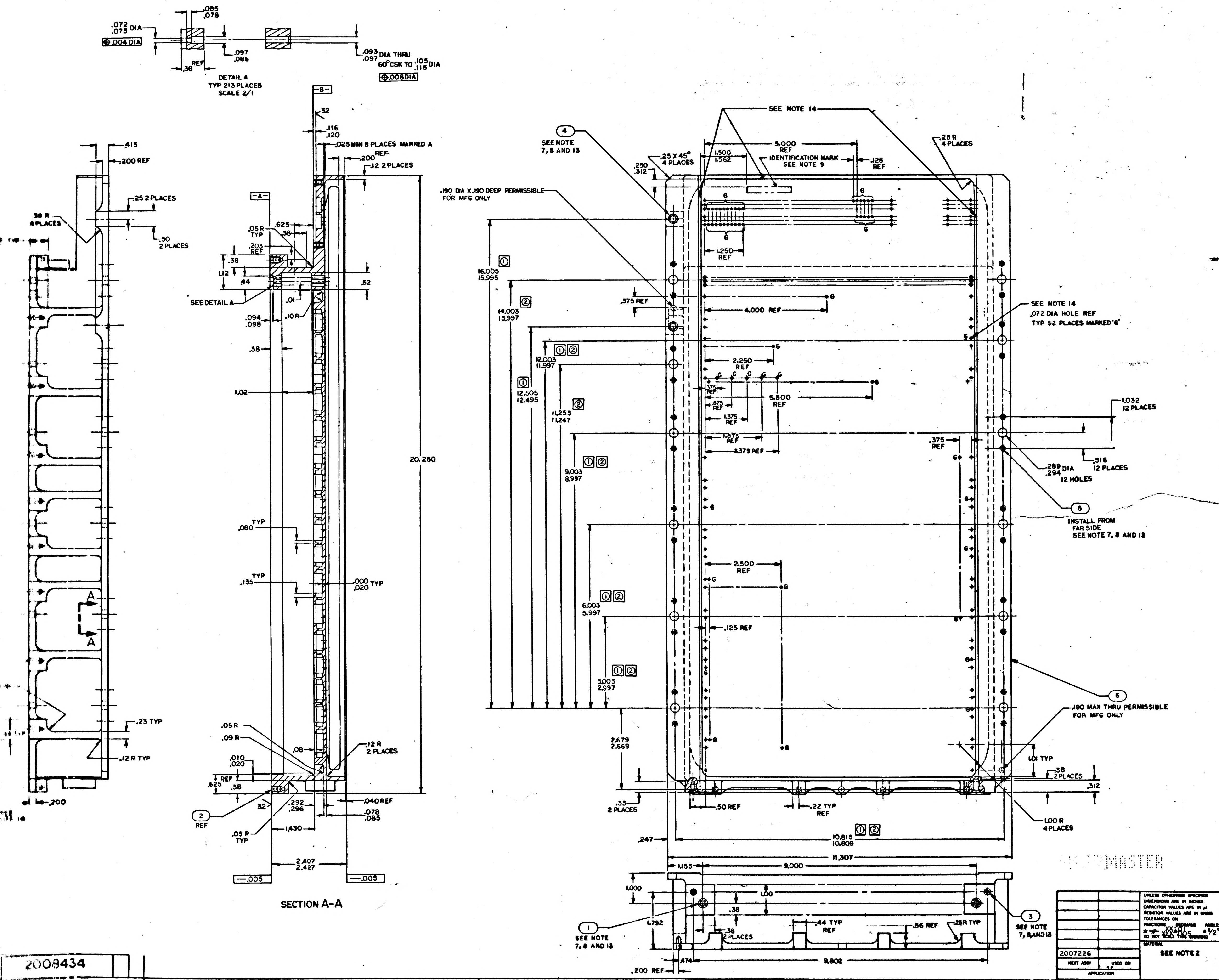
2008433

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.50 2 PLACES
.25 2 PLACES
3 SEE NOTES 7,8 AND 10
.50
.25
.184 .188 DIA THRU & SF
.375 DIA NEARSIDE
8 PLACES MARKED "Y"
SEE NOTE 11
.750
1.250
6.250 REF
.375 REF
.203
.12 TYP
.22 TYP
.1950 .1970 DIA THRU
3 HOLES MARKED "X"
⊕ .002 DIA Ⓢ
⊥ A .0005
17.375
16.674
16.125 BSC
15.437
14.674
13.924
13.187
11.674
10.937
9.437
8.674
7.937
6.437
5.674
4.187
2.674
1.937
.250 .312
.125 REF
SEE NOTE 11
.072 DIA HOLE REF
18 PLACES MARKED "6"
Y
X
6
.09 R TYP
SEE NOTE 11
.10 R TYP
.12 TYP
.44 16 PLACES
.22 16 PLACES
.125 R 12 PLACES
.208 .212 DIA THRU & SF
.406 DIA NEAR SIDE
16 PLACES
SEE NOTE 11
.300 16 PLACES
.25R TYP
.25 R, 4 PLACES
.06 X 45°, 4 PLACES
.203
.750
1.250
.031
1.500 1.562
IDENTIFICATION MARK SEE NOTE 9
4.000
6.750
9.500
5.375 BSC.
5.375 BSC.
10.750
10.000
10.812
.474
4 SEE NOTES 7,8 AND 10
9.802
.50
.25
.25 2 PLACES
.312
.33 2 PLACES
1.857
2.377 REF
.200 REF
.093 .097 DIA
60°
.10 R TYP
.52
.01
.10R
.32
.000 .020
.12 R
.08
.058
.292 .296
.078 .085
1.430
.005
2.367 2.387
SECTION A-

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. COAT THREADS OF FIND NO. 1, 2, 3 AND 4 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NO. 1, 2, 3 AND 4 WET PER MS33646 THREAD CLASS 2B REMOVE DRIVING TANG THE SURFACES OF FIND NO. 1, 2, 3 AND 4 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1, 2, 3 AND 4 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED & DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1, 2, 3 & 4 THREADS
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND1002019.
10. HOLES FOR FIND NO. 1, 2, 3 AND 4 MUST BE FREE OF ANODIZE
11. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE COAT PER ND1002040 (DO NOT EPOXY COAT)

2008433


DETAIL A
TYP 213 PLACES
SCALE 2/1
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38 REF
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
SEE DETAIL A
SECTION A-A
20.250
.025 MIN 8 PLACES MARKED A
.12 2 PLACES
.25 2 PLACES
.50 2 PLACES
38 R 4 PLACES
.415
.200 REF
.23 TYP
.12 R TYP
.12 R 2 PLACES
.040 REF
.078 .085
1.430
2.407 2.427
.005
SEE NOTE 7, 8 AND 13
SEE NOTE 14
5.000 REF
IDENTIFICATION MARK SEE NOTE 9
.25 X 45° 4 PLACES
.25 R 4 PLACES
.190 DIA X .190 DEEP PERMISSIBLE FOR MFG ONLY
.072 DIA HOLE REF TYP 52 PLACES MARKED 'G'
4.000 REF
2.250 REF
5.500 REF
2.375 REF
2.500 REF
.125 REF
1.032 12 PLACES
.516 12 PLACES
.289 .294 DIA 12 HOLES
INSTALL FROM FAR SIDE SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MFG ONLY
1.00 R 4 PLACES
1.01 TYP
.38 2 PLACES
.33 2 PLACES
.50 REF
.22 TYP REF
16.005 15.995
14.003 13.997
12.505 12.495
12.003 11.997
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
2.679 2.669
10.815 10.809
11.307
1.153
9.000
9.802
1.792
.44 TYP REF
.56 REF
.25R TYP
.200 REF
SEE NOTE 7, 8 AND 13
MASTER
4
3
2

16	MS21209-F1-15	INSERT, SCREW THREAD, SELF LOCKING	7
1	2008434-001	TRAY X	6
24	MS21209-C0415	INSERT, SCREW THREAD, SELF LOCKING	5
2	MS21209-F4-15	INSERT, SCREW THREAD, SELF LOCKING	4
6	MS21209-C0615	INSERT, SCREW THREAD, SELF LOCKING	3
52	MS21209C0815	INSERT, SCREW THREAD, SELF LOCKING	2
2	MS21208-F4-10	INSERT, SCREW THREAD	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007226	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.01 .XXX ±.005 ANGLES ±1/2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Tracy 25 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

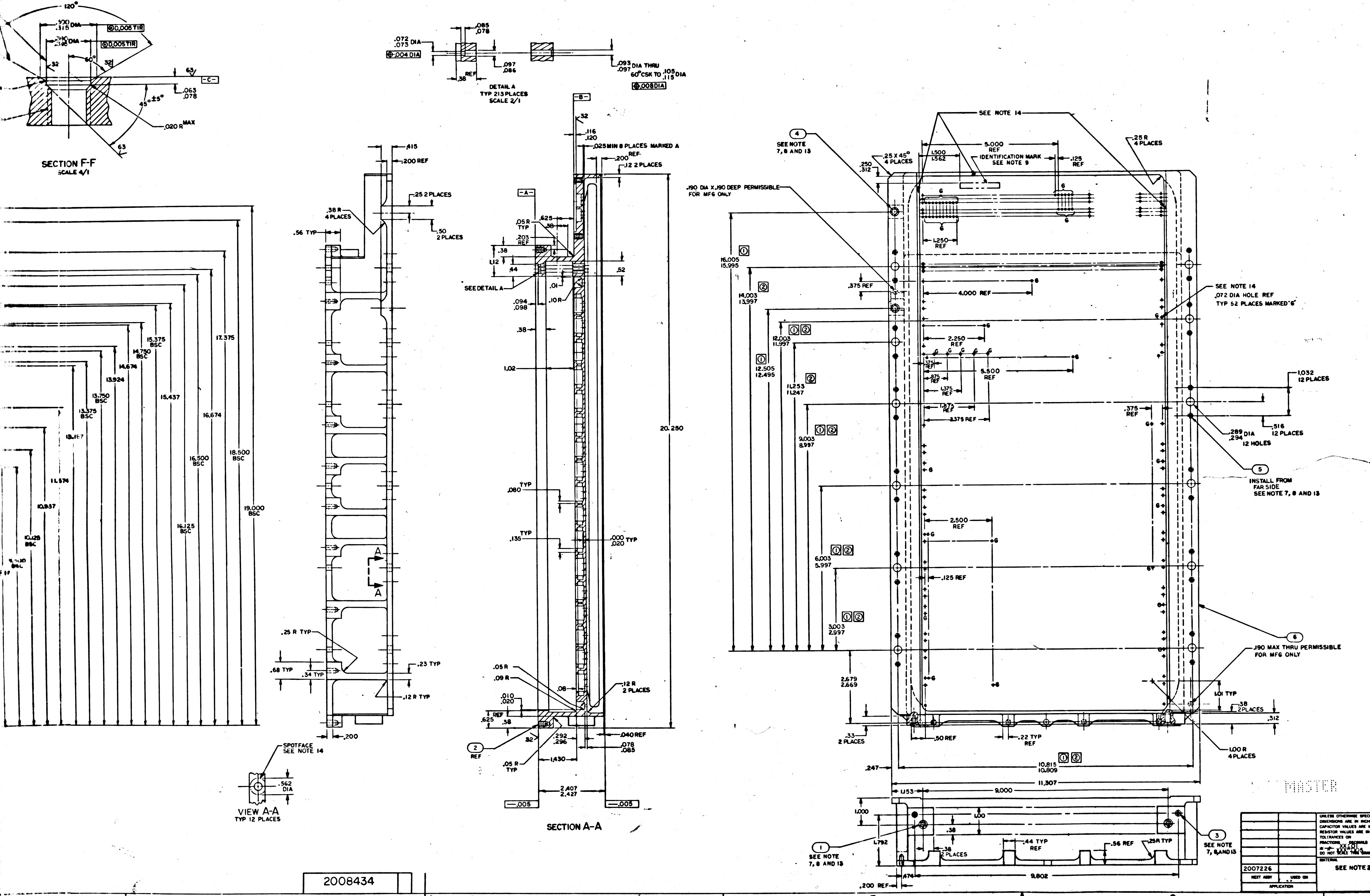
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRAY X CDU
INSEP ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008434
SCALE 1/1
SHEET OF

REVISIONS

2008434


SECTION F-F
SCALE 4/1
120°
.300 .315 DIA
.005 TIR
60°
32
63
-C-
.063 .078
45°±5°
.020 R MAX
.072 .073 DIA
.004 DIA
.085 .078
.097 .086
.38 REF
DETAIL A
TYP 213 PLACES
SCALE 2/1
.093 .097 DIA THRU
60° CSK TO .105 .115 DIA
.008 DIA
-B-
-A-
.116 .120
.025 MIN 8 PLACES MARKED A
.200 REF
.12 2 PLACES
.415
.200 REF
.25 2 PLACES
.38 R 4 PLACES
.50 2 PLACES
.56 TYP
.05 R TYP
.625
.203 REF
SEE DETAIL A
.094 .098
.10 R
1.02
.080 TYP
.135 TYP
.000 .020 TYP
20.250
.05 R
.09 R
.010 .020
.625 REF
.38
.292 .296
1.430
.040 REF
.078 .085
.05 R TYP
2.407 2.427
.005
SECTION A-A
.12 R 2 PLACES
.25 R TYP
.68 TYP
.34 TYP
.23 TYP
.12 R TYP
.200
SPOTFACE SEE NOTE 14
.562 DIA
VIEW A-A
TYP 12 PLACES
17.375
18.500 BSC
19.000 BSC
16.674
16.500 BSC
16.125 BSC
15.437
15.375 BSC
14.750 BSC
14.674
13.924
13.750 BSC
13.375 BSC
13.167
11.574
10.937
10.125 BSC
SEE NOTE 14
5.000 REF
1.500 1.562
IDENTIFICATION MARK SEE NOTE 9
.125 REF
.25 X 45° 4 PLACES
.250 .312
.25 R 4 PLACES
SEE NOTE 7, 8 AND 13
.190 DIA X .190 DEEP PERMISSIBLE FOR MF6 ONLY
1.250 REF
16.005 15.995
14.003 13.997
12.003 11.997
12.505 12.495
11.253 11.247
9.003 8.997
6.003 5.997
3.003 2.997
.375 REF
4.000 REF
2.250 REF
5.500 REF
.875 REF
1.375 REF
1.875 REF
2.375 REF
2.500 REF
.125 REF
SEE NOTE 14
.072 DIA HOLE REF
TYP 52 PLACES MARKED "6"
1.032 12 PLACES
.516 12 PLACES
.289 .294 DIA
12 HOLES
INSTALL FROM FAR SIDE
SEE NOTE 7, 8 AND 13
.190 MAX THRU PERMISSIBLE FOR MF6 ONLY
1.01 TYP
.38 2 PLACES
.312
1.00 R 4 PLACES
2.679 2.669
.33 2 PLACES
.50 REF
.22 TYP REF
10.815 10.809
11.307
.247
1.153
9.000
1.000
1.00
.38
1.792
.44 TYP REF
.56 REF
.25 R TYP
.38 2 PLACES
.474
9.802
.200 REF
SEE NOTE 7, 8 AND 13
1
2
3
4
5
6
MASTER

QTY REQD	PART OR IDENTIFYING NO.
16	MS21209-…
1	2008434
24	MS21209-…
2	MS21209-…
6	MS21209-…
52	MS21209…
2	MS21208-…

2007226	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLE
± — XX ± .01 XXX ± .005 ± 1/2°
DO NOT SCALE THIS DRAWING

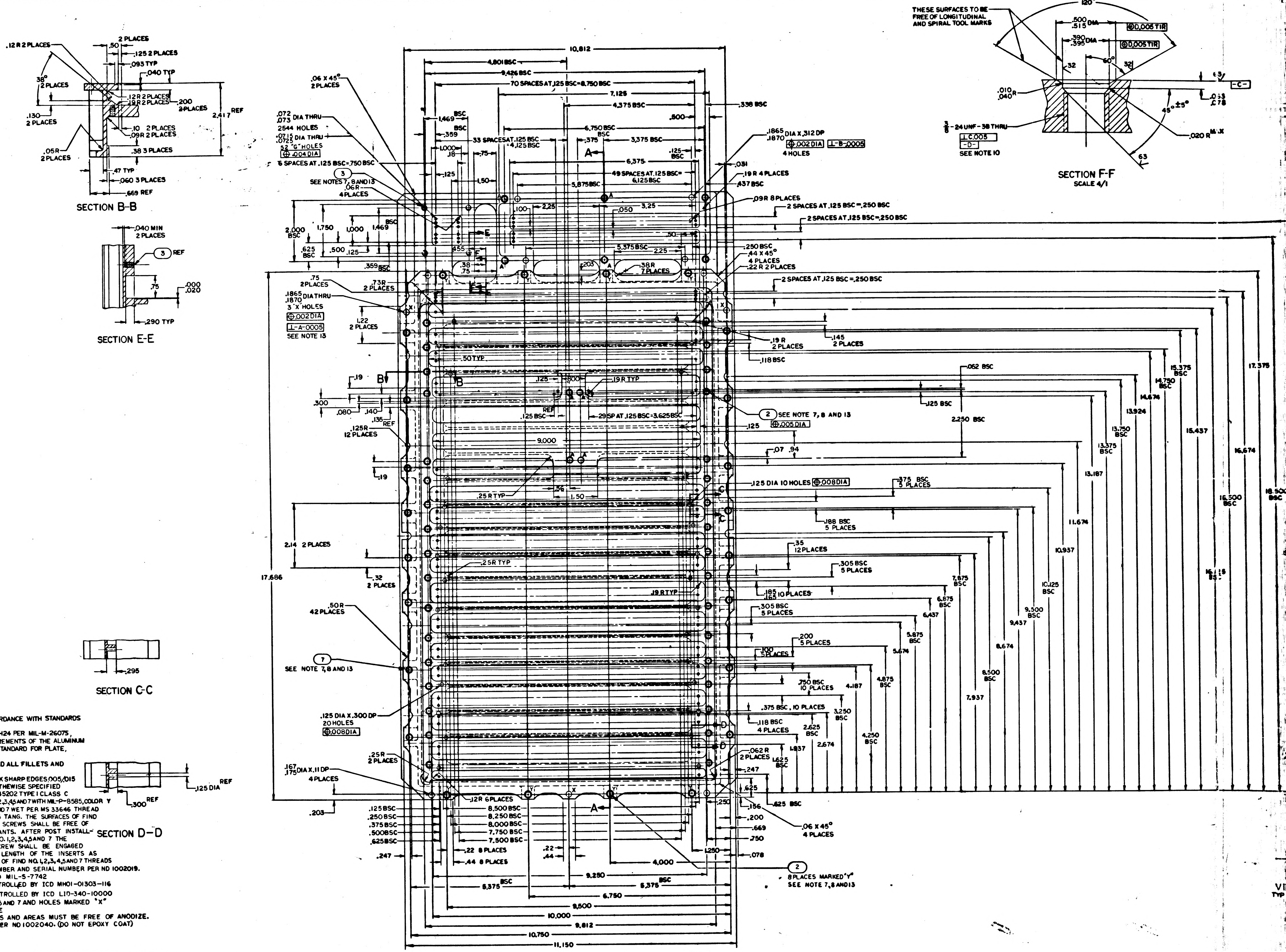
MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION
CAMBRIDGE

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NASC

2008434

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


9
8
7
6
D
C
B
A
SECTION B-B
SECTION E-E
SECTION C-C
SECTION D-D
SECTION F-F
SCALE 4/1
THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS
120°
.500 .515 DIA
.390 .395 DIA
⊚0.005 TIR
60°
45° ±5°
3/8 - 24 UNF - 3B THRU
SEE NOTE 10
.020 R MAX
10.812
4.801 BSC
9.426 BSC
70 SPACES AT .125 BSC = 8.750 BSC
7.125
4.375 BSC
.338 BSC
6.750 BSC
3.375 BSC
6.375
49 SPACES AT .125 BSC = 6.125 BSC
5.875 BSC
.072 .073 DIA THRU 2544 HOLES
.0715 .0725 DIA THRU 32 "G" HOLES
⊕ .004 DIA
6 SPACES AT .125 BSC = .750 BSC
33 SPACES AT .125 BSC = 4.125 BSC
.1865 .1870 DIA X .312 DP 4 HOLES
⊕ .002 DIA
⊥ -B- .0005
.19 R 4 PLACES
.09 R 8 PLACES
2 SPACES AT .125 BSC = .250 BSC
.1865 .1870 DIA THRU 3 "X" HOLES
⊕ .002 DIA
⊥ -A- .0005
SEE NOTE 13
SEE NOTES 7, 8 AND 13
SEE NOTE 7, 8 AND 13
.125 DIA 10 HOLES ⊕ .008 DIA
.125 DIA X .300 DP 20 HOLES ⊕ .008 DIA
.167 .175 DIA X .11 DP 4 PLACES
.50 R 42 PLACES
.125 R 12 PLACES
.25 R TYP
.19 R TYP
29 SP AT .125 BSC = 3.625 BSC
9.000
17.686
17.375
16.674
15.437
.06 X 45° 4 PLACES
8 PLACES MARKED "Y" SEE NOTE 7, 8 AND 13
9.250
6.750
9.500
10.000
9.812
10.750
11.150
8.375 BSC
8.500 BSC
8.250 BSC
8.000 BSC
7.750 BSC
7.500 BSC
4.000
A
B
C
D
E
F
X
Y

3H

1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2 MATERIAL: MAGNESIUM HK31A-H24 PER MIL-M-26075, MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATION'S ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND AND RADII TO BE .005/.015
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\surd}$ UNLESS OTHEWISE SPECIFIED
6. FINISH-ANODIZE PER MIL-M-45202 TYPE I CLASS C
7. COAT THREADS OF FIND NO. 1,2,3,4,5 AND 7 WITH MIL-P-8585, COLOR Y
8. INSTALL FIND NOS. 1,2,3,4,5 AND 7 WET PER MS 33646 THREAD CLASS 2B REMOVE DRIVING TANG. THE SURFACES OF FIND NO. 1,2,3,4,5 AND 7 MATING WITH SCREWS SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF FIND NO. 1,2,3,4,5 AND 7 THE APPROPRIATE STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED THE FULL LENGTH OF THE INSERTS AS A FINAL STEP IN CLEANING OF FIND NO. 1,2,3,4,5 AND 7 THREADS
9. IDENTIFY USING DRAWING NUMBER AND SERIAL NUMBER PER ND 1002019.
10. THREADS MUST CONFORM TO MIL-S-7742
11. ① THIS DIMENSION IS CONTROLLED BY ICD MH01-01303-116
12. ② THIS DIMENSION IS CONTROLLED BY ICD L10-340-10000
13. HOLES FOR FIND NO. 1,2,3,4,5 AND 7 AND HOLES MARKED "X" MUST BE FREE OF ANODIZE
14. INDICATED HOLES, SURFACES AND AREAS MUST BE FREE OF ANODIZE. AFTER ANODIZE COAT PER ND 1002040. (DO NOT EPOXY COAT)

2008434

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL : MAGNESIUM ALLOY AZ31B-H24 PER QQ-M-44, AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS FOR THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS.
   FINISHED SIZE : 16.700 X 6.000 X 0.750.

3. VENDOR ITEM : SEE SPECIFICATION CONTROL DRAWING.

4. IDENTIFY USING DRAWING NUMBER PER ND1002019.

5. THIS IS AN INCOMPLETE DRAWING.

REVISIONS 27828

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		11 MAR 66	

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 3		8	1010957-010	INSERT, SCREW, SELF-LOCKING
SEE NOTE 3		30	1010957-009	INSERT, SCREW, SELF-LOCKING
SEE NOTE 2		1	2008435-001	HEADER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2007270-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + ___ −
3 PLACE DECIMALS + ___ −
ANGLES + ___ −

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN B. J. Flack DATE 7-MAR-66
CHECKED B. GRIEB 8 MAR 66
APPROVAL Geo Lundin
CONTRACT NAS 9-497

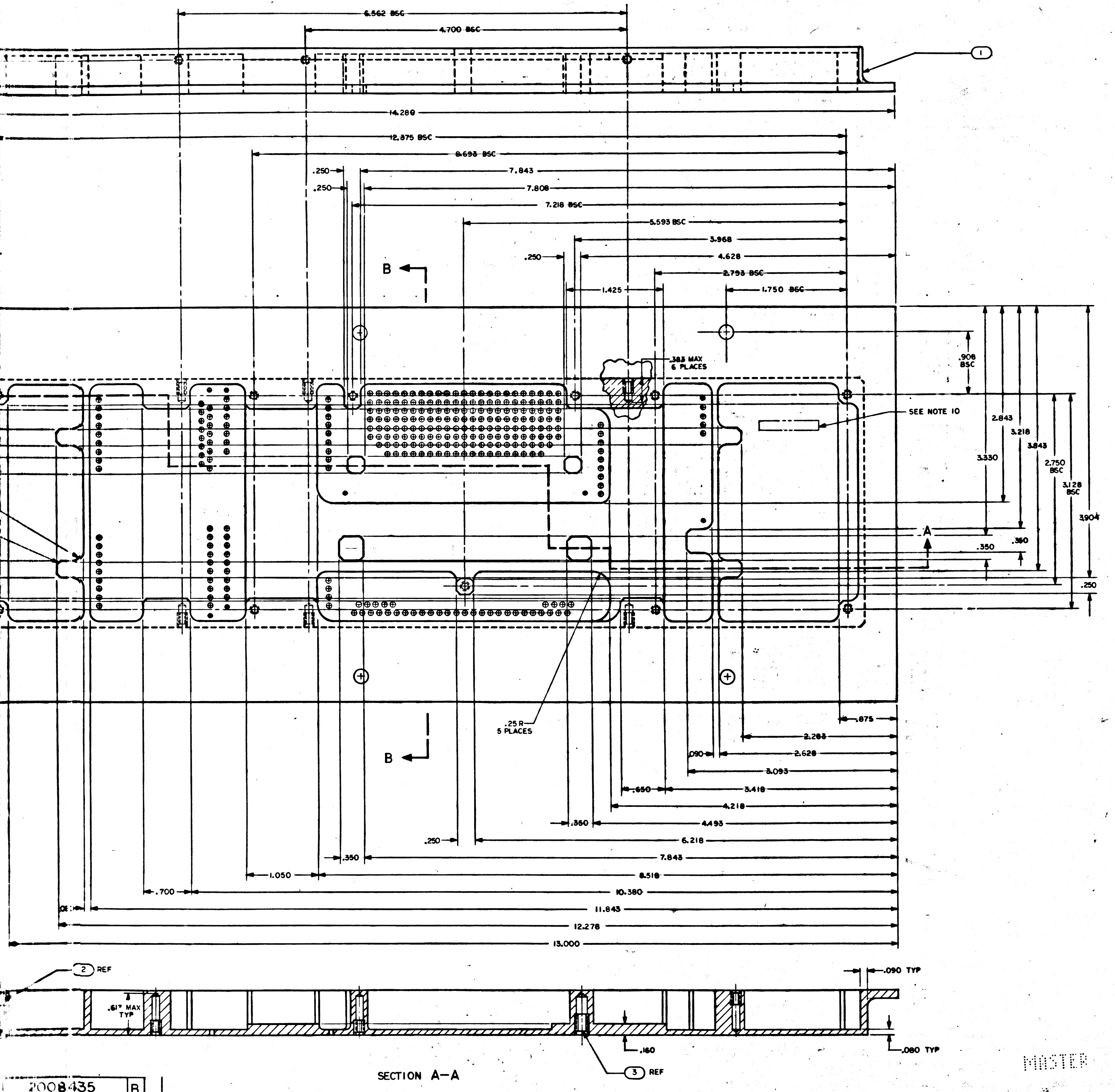
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
(INSEPARABLE ASSEMBLY)

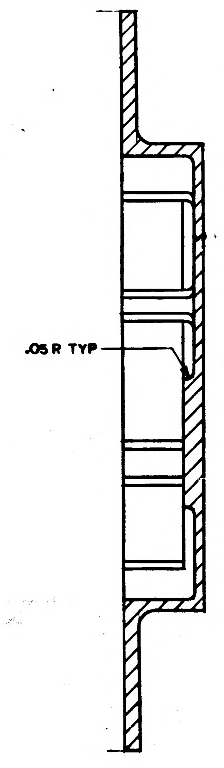
SIZE C
CODE IDENT NO. 80230
2008435
SCALE —
SHEET 1 OF 1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 29/23			5/17/66	



6.562 BSC
4.700 BSC
①
14.280
12.875 BSC
8.693 BSC
.250
7.843
.250
7.808
7.218 BSC
5.593 BSC
3.968
.250
4.628
2.793 BSC
1.425
1.750 BSC
B
.383 MAX
6 PLACES
.908 BSC
SEE NOTE 10
2.843
3.218
3.843
3.330
2.750 BSC
3.128 BSC
3.904
A
.350
.350
.250
.25 R
5 PLACES
B
.875
2.283
.090
2.628
3.093
.650
3.418
4.218
.350
4.493
.250
6.218
.350
7.843
1.050
8.518
.700
10.380
11.843
12.278
13.000
② REF
.61" MAX TYP
.090 TYP
.160
.080 TYP
③ REF

SECTION A–A



SECTION B–B

MASTER

8	1010957-010	INSERT, SCREW THREAD, LOCKING	3
23	1010957-008	INSERT, SCREW THREAD, LOCKING	2
1	2008435-001	HEADER	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007268	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEP ASSY
SIGNAL CONDITIONER
C/M OPERATIONAL

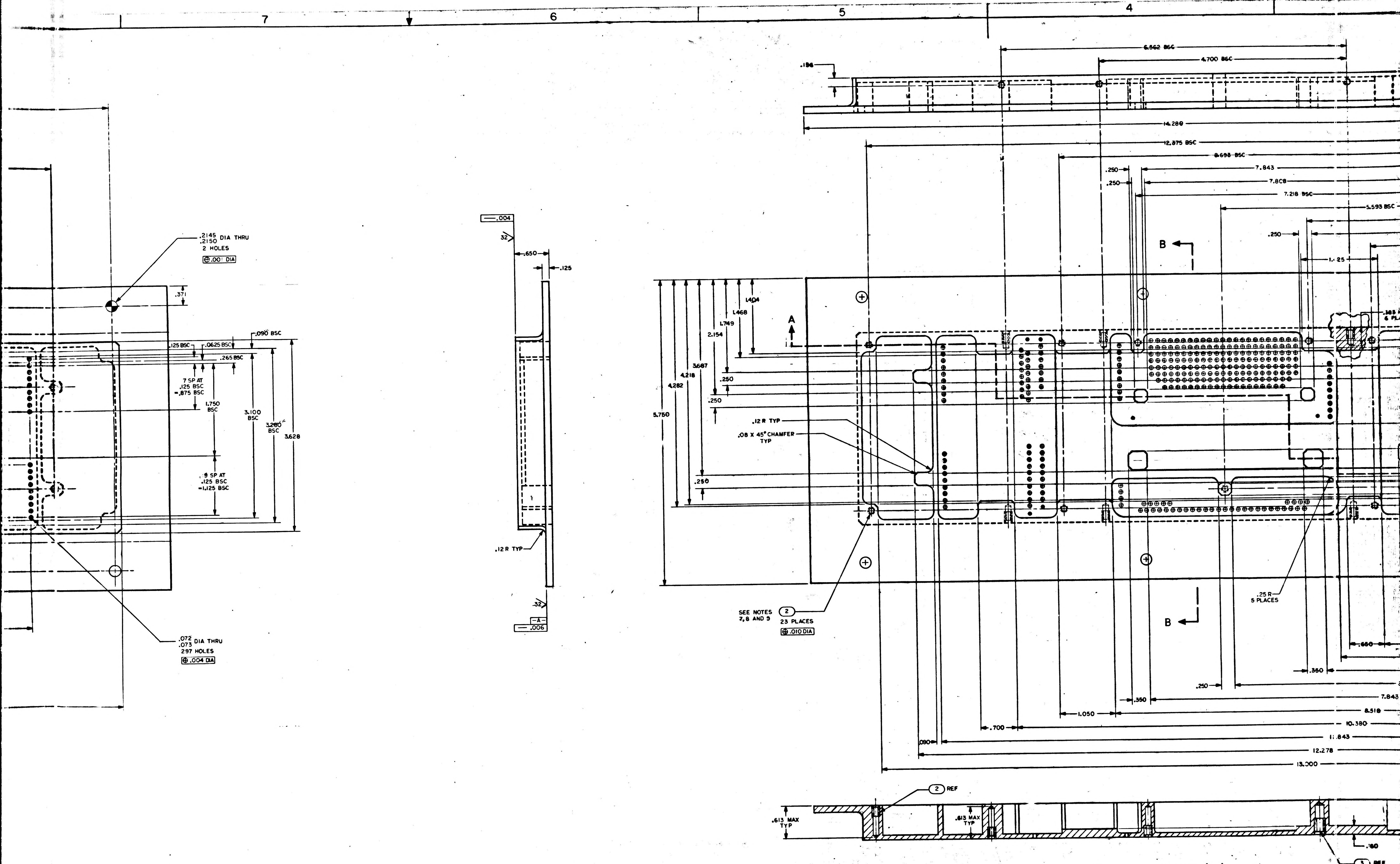
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008435

SCALE 2/1 SHEET 1 OF 1

2008435 B

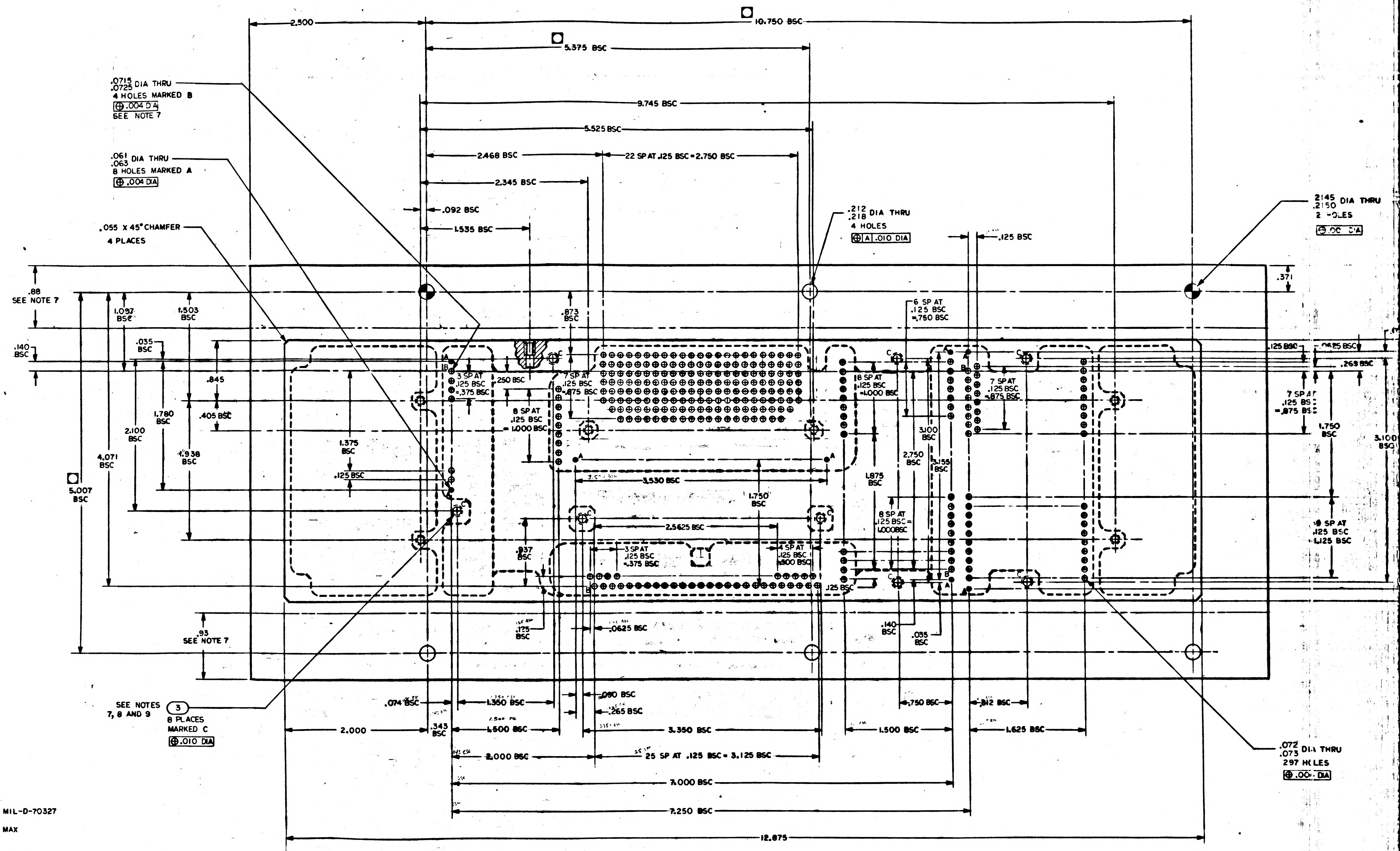
2008435 B

F-3


7
6
5
4
.2145
.2150 DIA THRU
2 HOLES
⊕ .001 DIA
.371
.090 BSC
.125 BSC
.0625 BSC
.265 BSC
7 SP AT
.125 BSC
=.875 BSC
1.750
BSC
3.100
BSC
3.280
BSC
3.628
9 SP AT
.125 BSC
=1.125 BSC
.072
.073 DIA THRU
297 HOLES
⊕ .004 DIA
—.004
32
.650
.125
.12 R TYP
32
—A—
— .006
1.404
1.468
1.749
2.154
3.687
4.218
4.282
5.750
.250
.250
.250
A
.12 R TYP
.08 X 45° CHAMFER
TYP
SEE NOTES
7,8 AND 9
2
23 PLACES
⊕ .010 DIA
.196
6.562 BSC
4.700 BSC
14.280
12.375 BSC
8.693 BSC
.250
7.843
.250
7.808
7.218 BSC
5.593 BSC
.250
B
1.125
.385
6 PL
.25 R
5 PLACES
B
.660
.350
.250
7.843
.350
8.518
1.050
10.380
.700
11.843
.090
12.278
13.000
2 REF
.613 MAX
TYP
.613 MAX
TYP
.180
3 REF
SECTION A-A
7
6
5
4

2008435 B

F-2



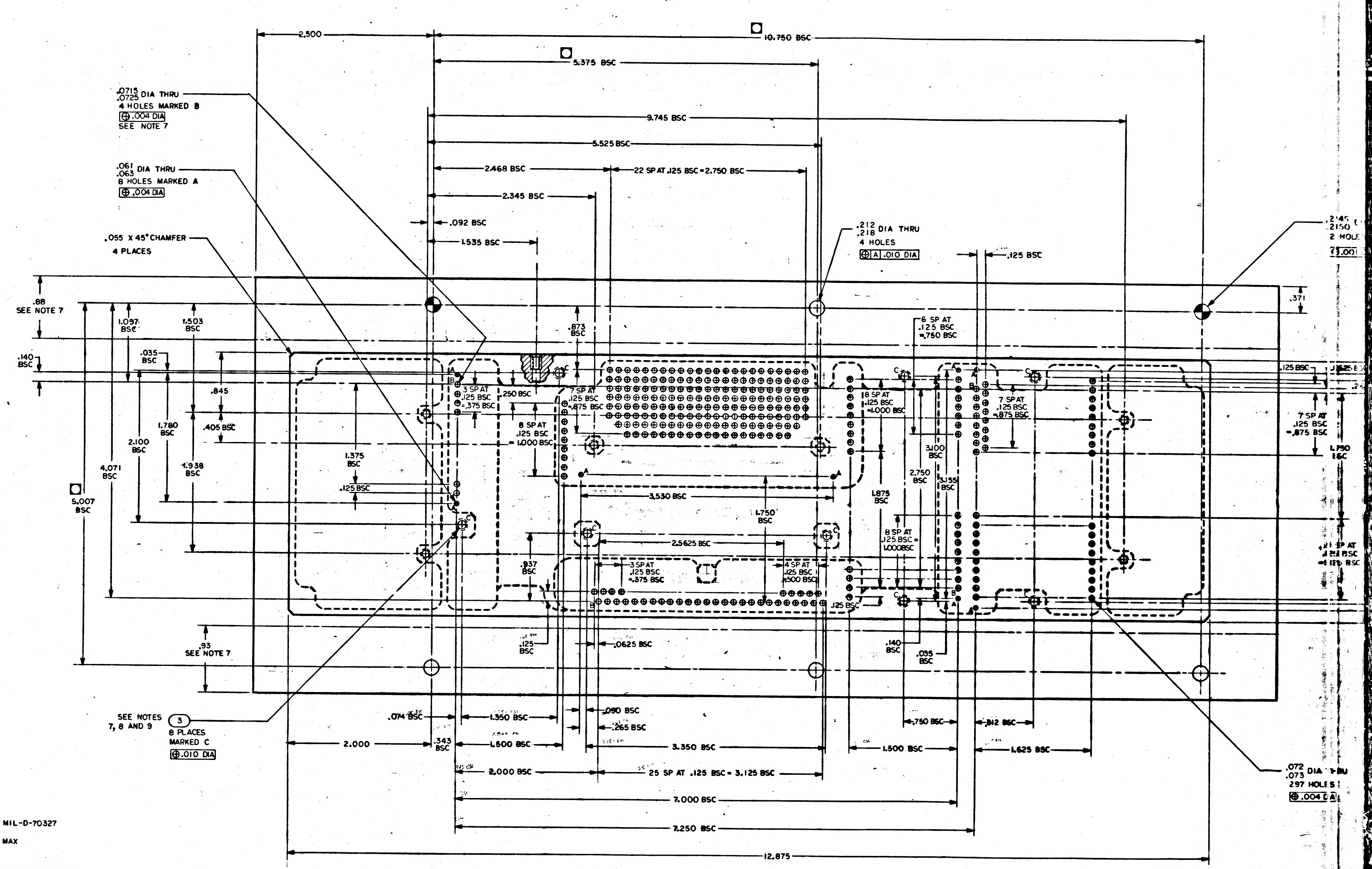
10.750 BSC
2.500
5.375 BSC
9.745 BSC
5.525 BSC
2.468 BSC
22 SP AT .125 BSC = 2.750 BSC
2.345 BSC
.092 BSC
1.535 BSC
.0715
.0725 DIA THRU
4 HOLES MARKED B
⊕ .004 DIA
SEE NOTE 7
.061
.063 DIA THRU
8 HOLES MARKED A
⊕ .004 DIA
.055 X 45° CHAMFER
4 PLACES
.212
.218 DIA THRU
4 HOLES
⊕ A .010 DIA
.125 BSC
2145
.2150 DIA THRU
2 HOLES
.371
.88
SEE NOTE 7
1.097 BSC
1.503 BSC
.873 BSC
.140 BSC
.035 BSC
.845
.405 BSC
1.780 BSC
2.100 BSC
4.071 BSC
1.938 BSC
5.007 BSC
1.375 BSC
.125 BSC
3 SP AT .125 BSC =.375 BSC
.250 BSC
7 SP AT .125 BSC =.875 BSC
8 SP AT .125 BSC = 1.000 BSC
6 SP AT .125 BSC =.750 BSC
18 SP AT .125 BSC =1.000 BSC
7 SP AT .125 BSC =.875 BSC
.125 BSC
.0625 BSC
.265 BSC
7 SP AT .125 BSC =.875 BSC
1.750 BSC
3.100 BSC
3.100 BSC
2.750 BSC
3.155 BSC
1.875 BSC
3.530 BSC
1.750 BSC
2.5625 BSC
8 SP AT .125 BSC = 1.000 BSC
9 SP AT .125 BSC 1.125 BSC
3 SP AT .125 BSC =.375 BSC
4 SP AT .125 BSC =.500 BSC
.937 BSC
.125 BSC
.125 BSC
.0625 BSC
.140 BSC
.035 BSC
.93
SEE NOTE 7
SEE NOTES
7, 8 AND 9
3
8 PLACES
MARKED C
⊕ .010 DIA
.074 BSC
1.350 BSC
.090 BSC
.265 BSC
.750 BSC
.812 BSC
2.000
.343 BSC
1.500 BSC
3.350 BSC
1.500 BSC
1.625 BSC
2.000 BSC
25 SP AT .125 BSC = 3.125 BSC
7.000 BSC
7.250 BSC
12.875
.072
.073 DIA THRU
297 HOLES
A
B
C

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUM ALY 6061-T6 PER QQ-A-250/11, TEMPER T6
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .015 TO .040
5. ALL SURFACES $\sqrt[125]{}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR UNLESS OTHERWISE SPECIFIED
7. HOLES AND SURFACES INDICATED SHALL BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
8. COAT THREADS OF FIND NO. 2 AND 3 WITH MIL-P-8585 COLOR Y
9. INSTALL FIND NO. 2 AND 3 WET PER MS33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED FOR FULL LENGTH OF INSERT AS A FINAL STEP IN CLEANING INSERT THREADS
10. IDENTIFY WITH PART NO. PER ND1002019
11. ○ THIS DIMENSION IS CONTROLLED BY ICD-MH01-01304-116

2008435 B

E1

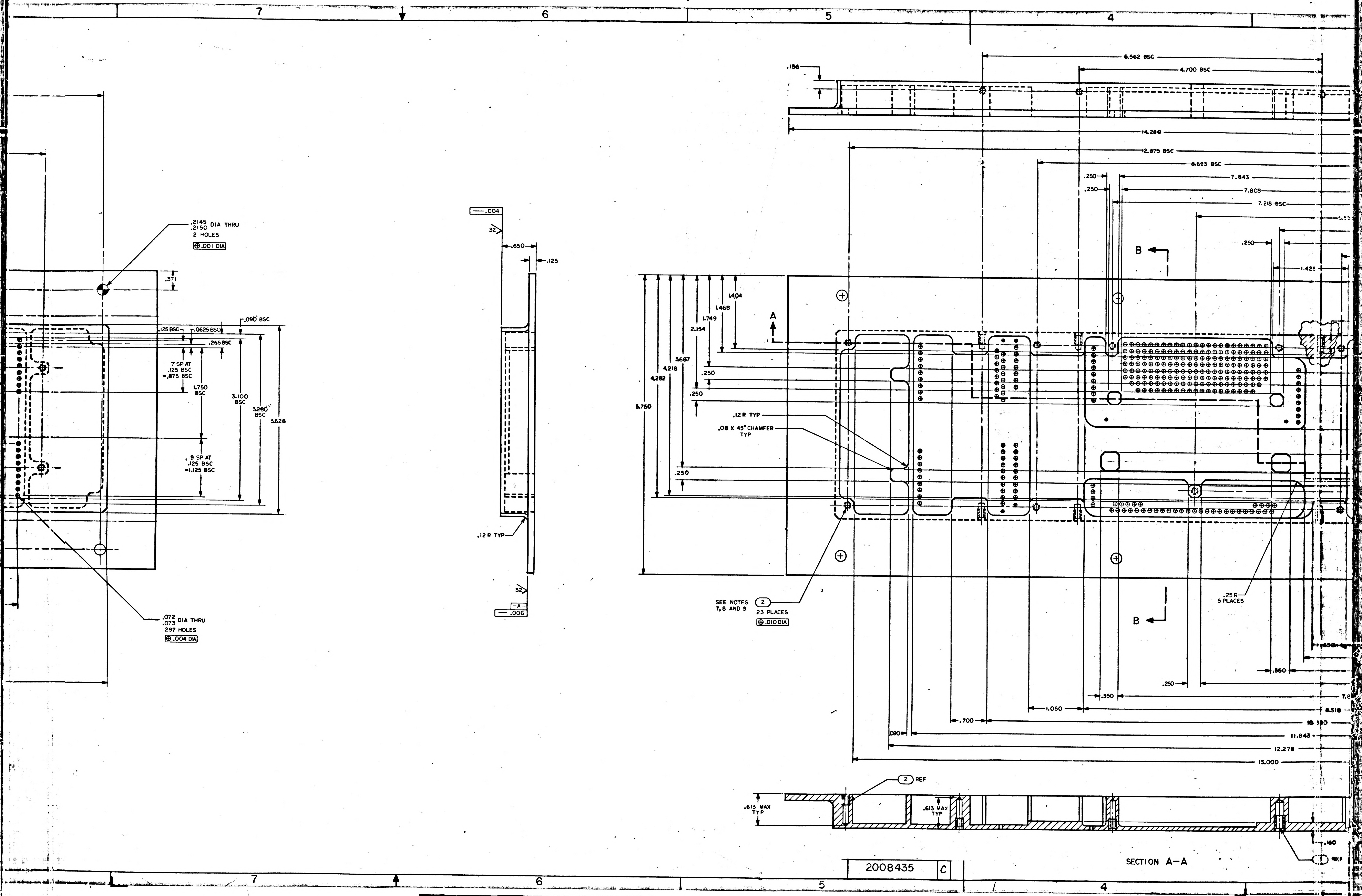
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



11
10
9
8
D
C
B
A
2.500
10.750 BSC
5.375 BSC
9.745 BSC
5.525 BSC
2.468 BSC
22 SP AT .125 BSC = 2.750 BSC
2.345 BSC
.092 BSC
1.535 BSC
.0715 .0725 DIA THRU
4 HOLES MARKED B
⊕ .004 DIA
SEE NOTE 7
.061 .063 DIA THRU
8 HOLES MARKED A
⊕ .004 DIA
.055 X 45° CHAMFER
4 PLACES
.212 .218 DIA THRU
4 HOLES
⊕ A .010 DIA
.125 BSC
.2145 .2150
2 HOLE
.001
.371
.88
SEE NOTE 7
1.097 BSC
1.503 BSC
.873 BSC
.140 BSC
.035 BSC
.845
.405 BSC
1.780 BSC
2.100 BSC
4.071 BSC
1.938 BSC
5.007 BSC
1.375 BSC
.125 BSC
3 SP AT .125 BSC = .375 BSC
.250 BSC
7 SP AT .125 BSC = .875 BSC
8 SP AT .125 BSC = 1.000 BSC
6 SP AT .125 BSC = .750 BSC
8 SP AT .125 BSC = 1.000 BSC
7 SP AT .125 BSC = .875 BSC
.125 BSC
7 SP AT .125 BSC = .875 BSC
1.750 BSC
3.100 BSC
2.750 BSC
3.155 BSC
1.875 BSC
3.530 BSC
1.750 BSC
2.5625 BSC
8 SP AT .125 BSC = 1.000 BSC
.937 BSC
3 SP AT .125 BSC = .375 BSC
4 SP AT .125 BSC = .500 BSC
.125 BSC
A
B
C
.93
SEE NOTE 7
.125 BSC
.0625 BSC
.140 BSC
.035 BSC
SEE NOTES 7, 8 AND 9
3
8 PLACES MARKED C
⊕ .010 DIA
.074 BSC
1.350 BSC
.090 BSC
.265 BSC
.750 BSC
.812 BSC
2.000
.343 BSC
1.500 BSC
3.350 BSC
1.500 BSC
1.625 BSC
2.000 BSC
25 SP AT .125 BSC = 3.125 BSC
7.000 BSC
7.250 BSC
12.875
.072 .073 DIA THRU
297 HOLES
⊕ .004 DIA

NOTES:

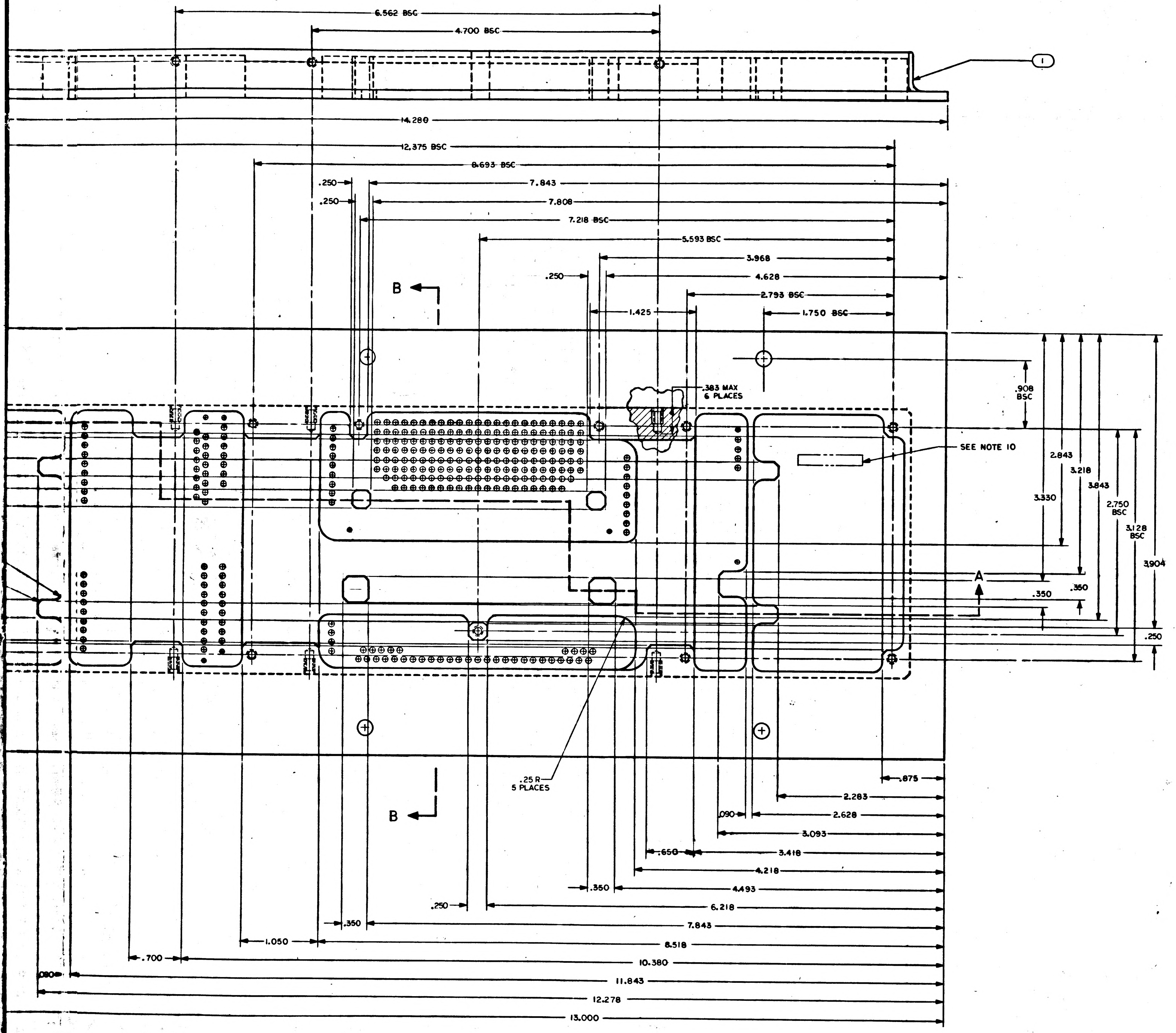
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUM ALY 6061-T6 PER QQ-A-250/11, TEMPER T6
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .015 TO .040
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR UNLESS OTHERWISE SPECIFIED
7. HOLES AND SURFACES INDICATED SHALL BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
8. COAT THREADS OF HOLES FOR FIND NO. 2 AND 3 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 9 WHILE PRIMER IS WET.
9. INSTALL FIND NO. 2 AND 3 WET PER MS33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED FOR THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
10. IDENTIFY WITH PART NO. PER ND1002019
11. ☐ THIS DIMENSION IS CONTROLLED BY ICD-MH01-01304-116


7
6
5
4
.2145 .2150 DIA THRU
2 HOLES
⊕ .001 DIA
.371
.125 BSC
.0625 BSC
.090 BSC
.265 BSC
7 SP AT .125 BSC =.875 BSC
1.750 BSC
3.100 BSC
3.280 BSC
3.628
9 SP AT .125 BSC =1.125 BSC
.072 .073 DIA THRU
297 HOLES
⊕ .004 DIA
.004
32
.650
.125
.12 R TYP
-A-
.006
.156
6.562 BSC
4.700 BSC
14.280
12.375 BSC
8.693 BSC
.250
7.843
7.808
7.218 BSC
.250
1.425
B
A
1.404
1.468
1.749
2.154
3.687
4.218
4.282
5.750
.250
.12 R TYP
.08 X 45° CHAMFER TYP
SEE NOTES 7, 8 AND 9
② 23 PLACES
⊕ .010 DIA
.25 R 5 PLACES
.650
.360
.250
.350
1.050
8.510
.700
10.380
.090
11.843
12.278
13.000
② REF
.613 MAX TYP
.613 MAX TYP
.160
SECTION A–A

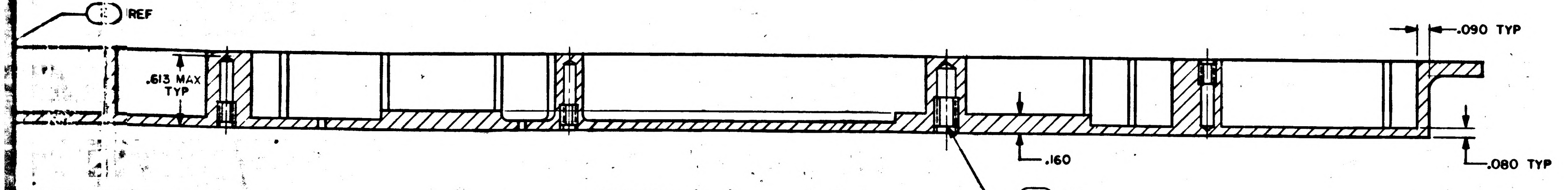
2008435 C

2/2008435

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓝ B		REPLACES WORD DWG REV A PER TDRR 29123			5/17/66	
C		REVISED PER TDRR 32775	DR		2FEB 67	

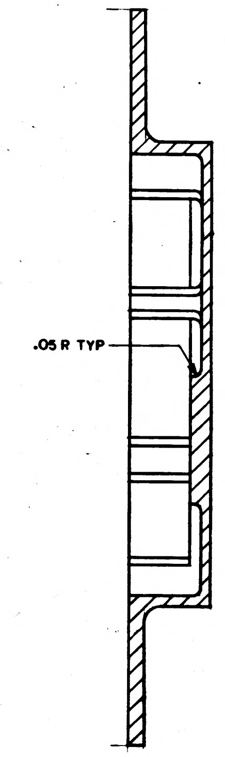


6.562 BSC
4.700 BSC
①
14.280
12.375 BSC
8.693 BSC
.250
7.843
.250
7.808
7.218 BSC
5.593 BSC
3.968
.250
4.628
2.793 BSC
1.425
1.750 BSC
B
.383 MAX
6 PLACES
.908
BSC
SEE NOTE 10
2.843
3.218
3.843
3.330
2.750
BSC
3.128
BSC
3.904
A
.350
.350
.250
.25 R
5 PLACES
B
.875
2.283
.090
2.628
3.093
.650
3.418
4.218
.350
4.493
.250
6.218
.350
7.843
1.050
8.518
.700
10.380
.080
11.843
12.278
13.000



② REF
.613 MAX
TYP
.090 TYP
.160
.080 TYP
③ REF

SECTION A–A



SECTION B–B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
8	1010957-010	INSERT, SCREW THREAD, LOCKING	3
23	1010957-008	INSERT, SCREW THREAD, LOCKING	2
1	2008435-001	HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007268	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .01 XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

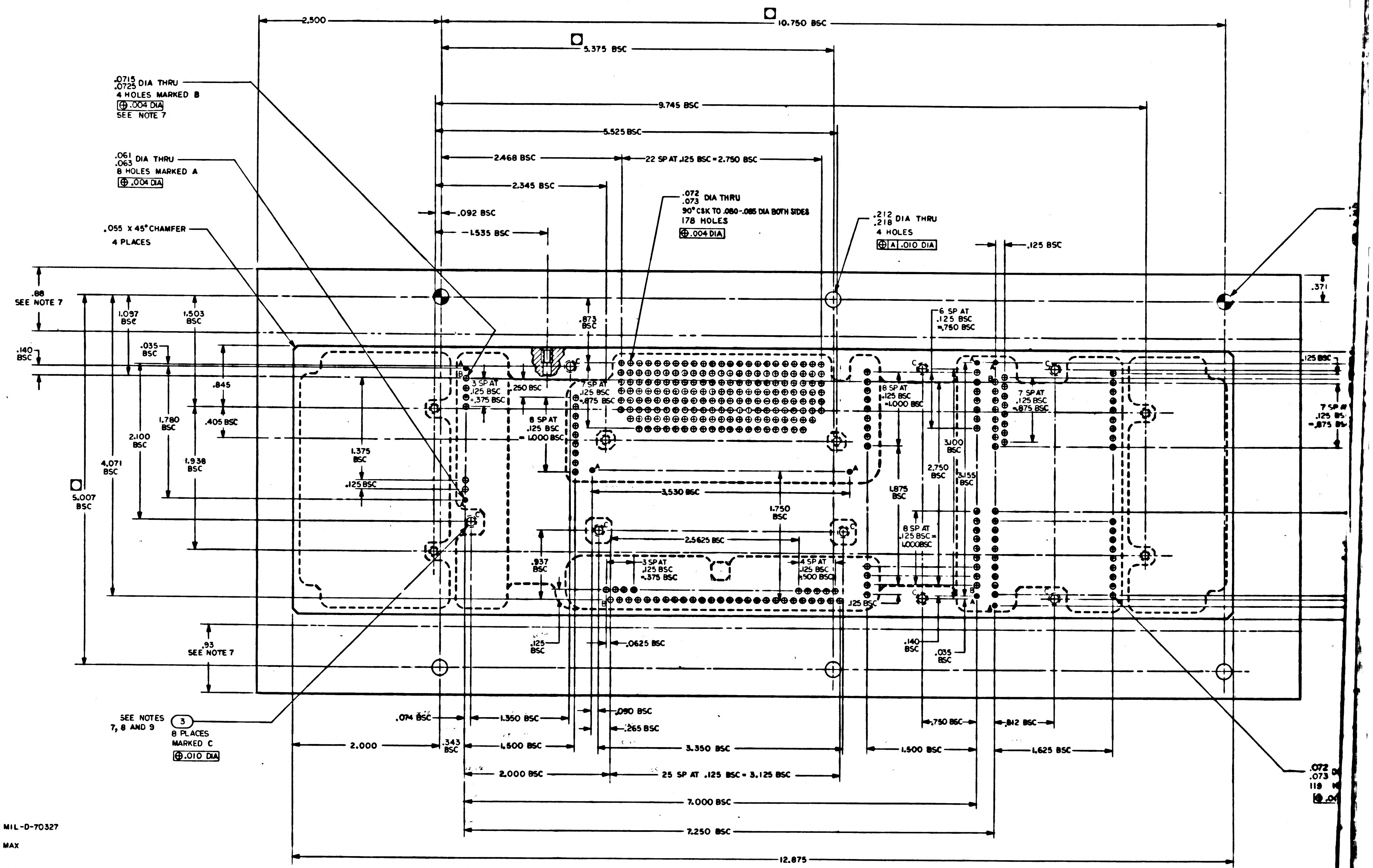
DRAWN 27 APR 66
CHECKED
APPROVED 17 MAY 66
APPROVED
APPROVED MIT 6-21-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEP ASSY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008435
SCALE 2/1
SHEET 1 OF 1

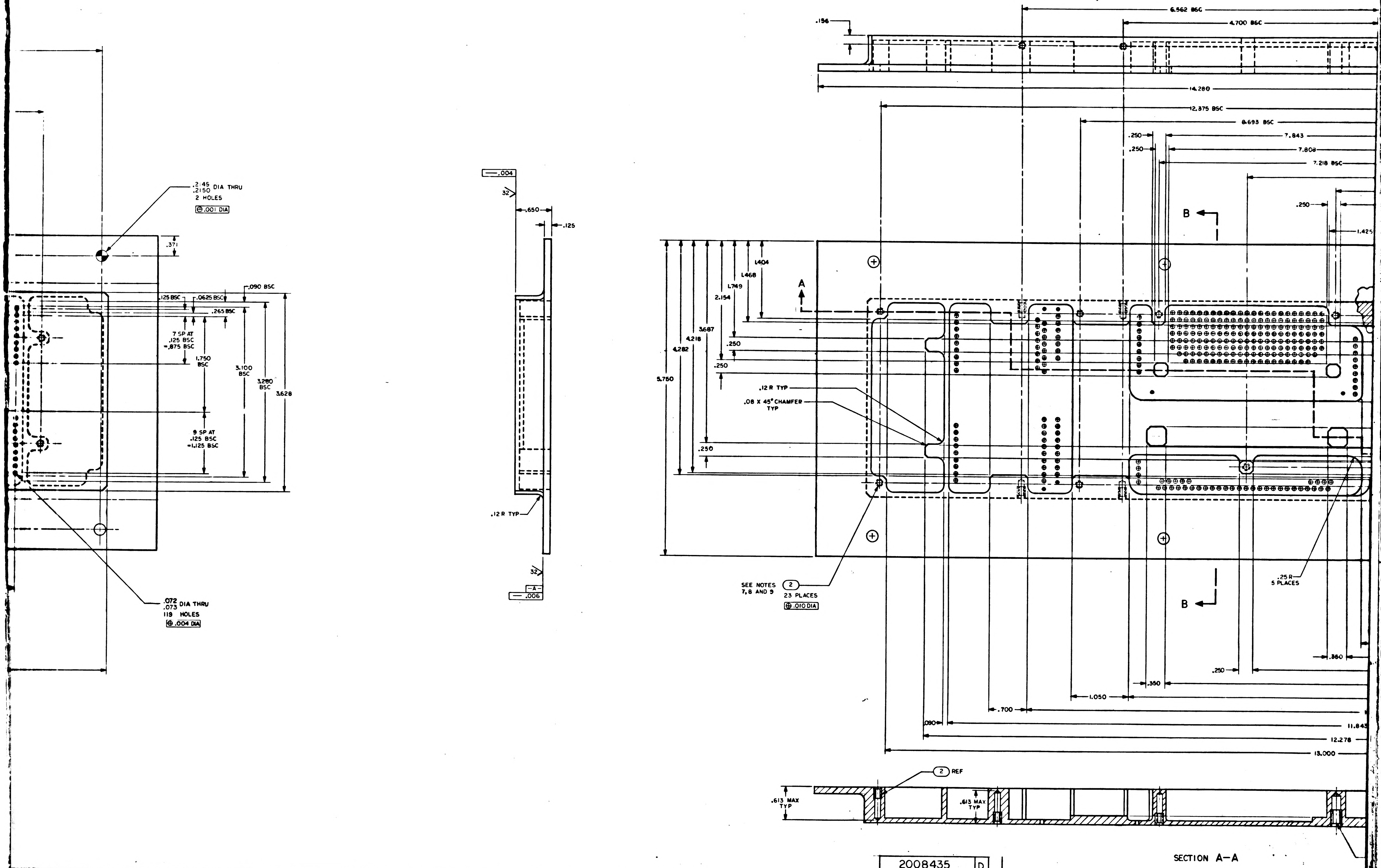
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


2.500
10.750 BSC
5.375 BSC
9.745 BSC
5.525 BSC
2.468 BSC
22 SP AT .125 BSC = 2.750 BSC
2.345 BSC
.092 BSC
1.535 BSC
.0715 .0725 DIA THRU
4 HOLES MARKED B
⊕ .004 DIA
SEE NOTE 7
.061 .063 DIA THRU
8 HOLES MARKED A
⊕ .004 DIA
.055 X 45° CHAMFER
4 PLACES
.072 .073 DIA THRU
90° CSK TO .080-.085 DIA BOTH SIDES
178 HOLES
⊕ .004 DIA
.212 .218 DIA THRU
4 HOLES
⊕ A .010 DIA
.125 BSC
.371
.88
SEE NOTE 7
1.097 BSC
1.503 BSC
.873 BSC
.140 BSC
.035 BSC
.845
.405 BSC
1.780 BSC
2.100 BSC
1.938 BSC
4.071 BSC
5.007 BSC
1.375 BSC
.125 BSC
3 SP AT .125 BSC =.375 BSC
.250 BSC
7 SP AT .125 BSC =.875 BSC
8 SP AT .125 BSC = 1.000 BSC
6 SP AT .125 BSC =.750 BSC
18 SP AT .125 BSC =1.000 BSC
7 SP AT .125 BSC =.875 BSC
.125 BSC
7 SP AT .125 BSC =.875 BSC
3.100 BSC
2.750 BSC
3.155 BSC
1.875 BSC
8 SP AT .125 BSC = 1.000BSC
3.530 BSC
1.750 BSC
2.5625 BSC
.937 BSC
3 SP AT .125 BSC =.375 BSC
4 SP AT .125 BSC =.500 BSC
.125 BSC
.125 BSC
.0625 BSC
.140 BSC
.035 BSC
.93
SEE NOTE 7
SEE NOTES 7, 8 AND 9
3
8 PLACES MARKED C
⊕ .010 DIA
.074 BSC
1.350 BSC
.090 BSC
.265 BSC
.750 BSC
.812 BSC
2.000
.343 BSC
1.500 BSC
3.350 BSC
1.500 BSC
1.625 BSC
2.000 BSC
25 SP AT .125 BSC = 3.125 BSC
7.000 BSC
7.250 BSC
12.875
.072 .073
119
A
B
C

NOTES:

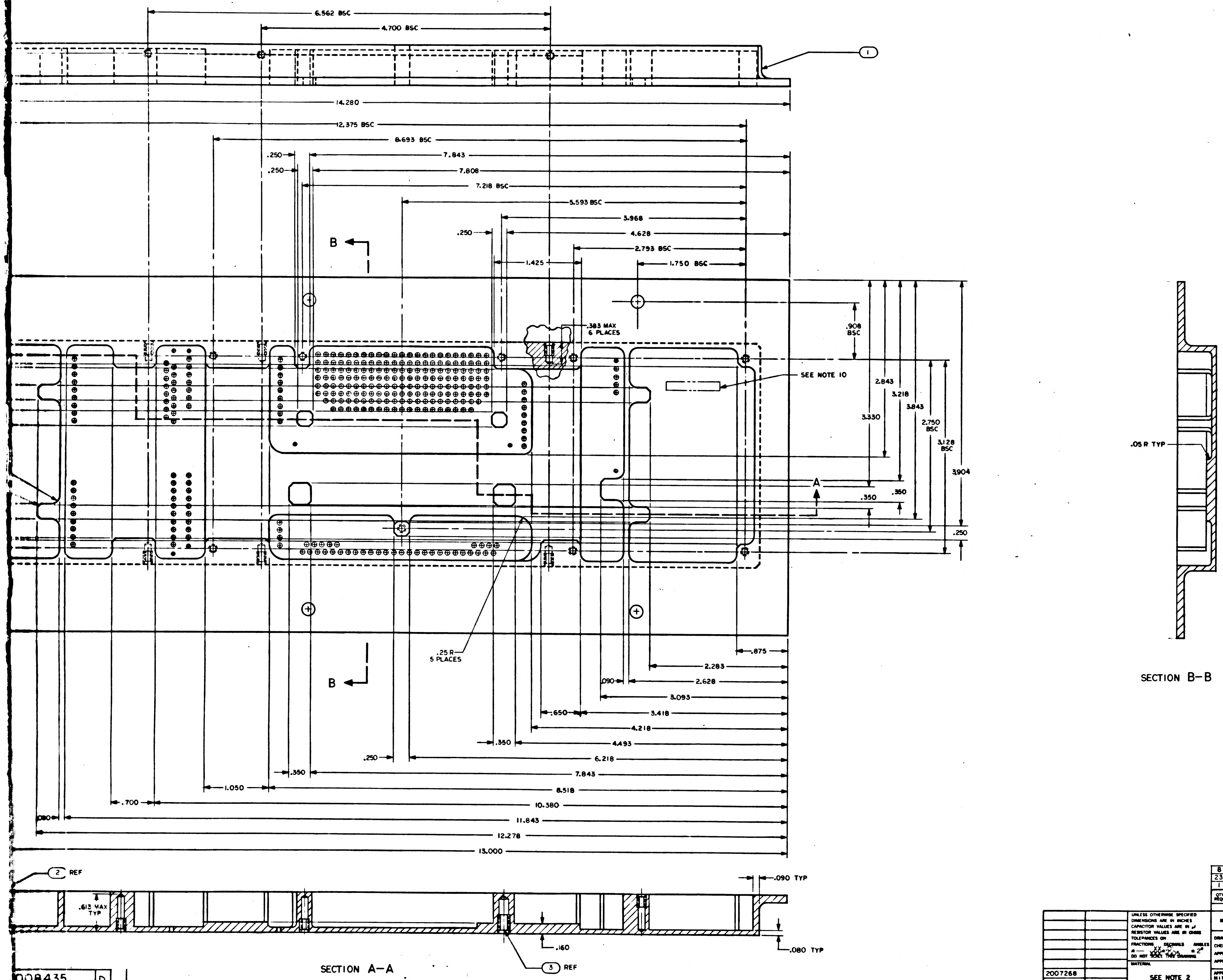
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUM ALY 6061-T6 PER QQ-A-250/11, TEMPER T6
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .015 TO .040
5. ALL SURFACES $\sqrt[125]{}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR UNLESS OTHERWISE SPECIFIED
7. HOLES AND SURFACES INDICATED SHALL BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
8. COAT THREADS OF HOLES FOR FIND NO. 2 AND 3 WITH MIL-P-8585, COLOR Y AND INSTALL PER NOTE 9 WHILE PRIMER IS WET.
9. INSTALL FIND NO. 2 AND 3 WET PER MS33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED FOR THE FULL LENGTH OF EACH INSERT, BEFORE PRIMER IS FIRMLY SET, AS A FINAL STEP IN CLEANING INSERT THREADS.
10. IDENTIFY WITH PART NO. PER ND1002019
11. ☐ THIS DIMENSION IS CONTROLLED BY ICD-MH01-01304-116

2008435 D


.2145
.2150 DIA THRU
2 HOLES
⊕ .001 DIA
.371
.125 BSC
.0625 BSC
.090 BSC
.265 BSC
7 SP AT
.125 BSC
=.875 BSC
1.750
BSC
3.100
BSC
3.280
BSC
3.628
9 SP AT
.125 BSC
=1.125 BSC
.072
.073 DIA THRU
119 HOLES
⊕ .004 DIA
.004
32
.650
.125
.12 R TYP
32
-A-
.006
.156
6.562 BSC
4.700 BSC
14.280
12.375 BSC
8.693 BSC
.250
7.843
.250
7.808
7.218 BSC
.250
1.425
B
A
1.404
1.468
1.749
2.154
3.687
4.218
4.282
5.750
.250
.250
.250
.12 R TYP
.08 X 45° CHAMFER
TYP
SEE NOTES
7,8 AND 9
2
23 PLACES
⊕ .010 DIA
.25 R
5 PLACES
B
.360
.250
.350
1.050
.700
.090
11.843
12.278
13.000
2 REF
.613 MAX
TYP
.613 MAX
TYP
SECTION A—A

2008435 D

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ B		REPLACES WORD DWG REV A PER TDRR 29/23			4/17/66	
Ⓜ C		REVISED PER TDRR 32775	DR		2 FEB 67	
D		REVISED PER TDRR 33834	+.N.		10 AUG 67	



6.562 BSC
4.700 BSC
①
14.280
12.375 BSC
8.693 BSC
.250
7.843
.250
7.808
7.218 BSC
5.593 BSC
3.968
.250
4.628
2.793 BSC
1.425
1.750 BSC
B
.383 MAX
6 PLACES
.908 BSC
SEE NOTE 10
2.843
3.218
3.330
3.843
2.750 BSC
3.128 BSC
3.904
A
.350
.350
.250
.25 R
5 PLACES
B
.875
2.283
.090
2.628
3.093
.650
3.418
4.218
.350
4.493
.250
6.218
.350
7.843
1.050
8.518
.700
10.380
.080
11.843
12.278
13.000
② REF
.613 MAX TYP
.090 TYP
.160
.080 TYP
③ REF
SECTION A–A
.05 R TYP
SECTION B–B

8	1010957-010	INSERT, SCREW THREAD, LOCKING	3
23	1010957-008	INSERT, SCREW THREAD, LOCKING	2
1	2008435-001	HEADER	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007268	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 27 APR 66
CHECKED
APPROVED 27 APR 66
APPROVED
APPROVED MIT
APPROVED MSC A. C.
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEP ASSY
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008435
SCALE 2/1
SHEET 1 OF 1

REVISIONS 27828					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		11 MAR 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM ALLOY AZ 31B-H24 PER QQ-M-44, AND CAPABLE OF MEETING THE CLASS B REQUIREMENTS FOR THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARDS FOR PLATE, EXTRUSIONS AND FORGINGS.
   FINISHED SIZE: 16.700 X 6.000 X 0.750
3. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. THIS IS AN INCOMPLETE DRAWING.

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 3		12	1010957-010	INSERT, SCREW, SELF-LOCKING
SEE NOTE 3		30	1010957-009	INSERT, SCREW, SELF-LOCKING
SEE NOTE 2		1	2008436-001	HEADER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2007271-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + — −
3 PLACE DECIMALS + — −
ANGLES + — −

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT

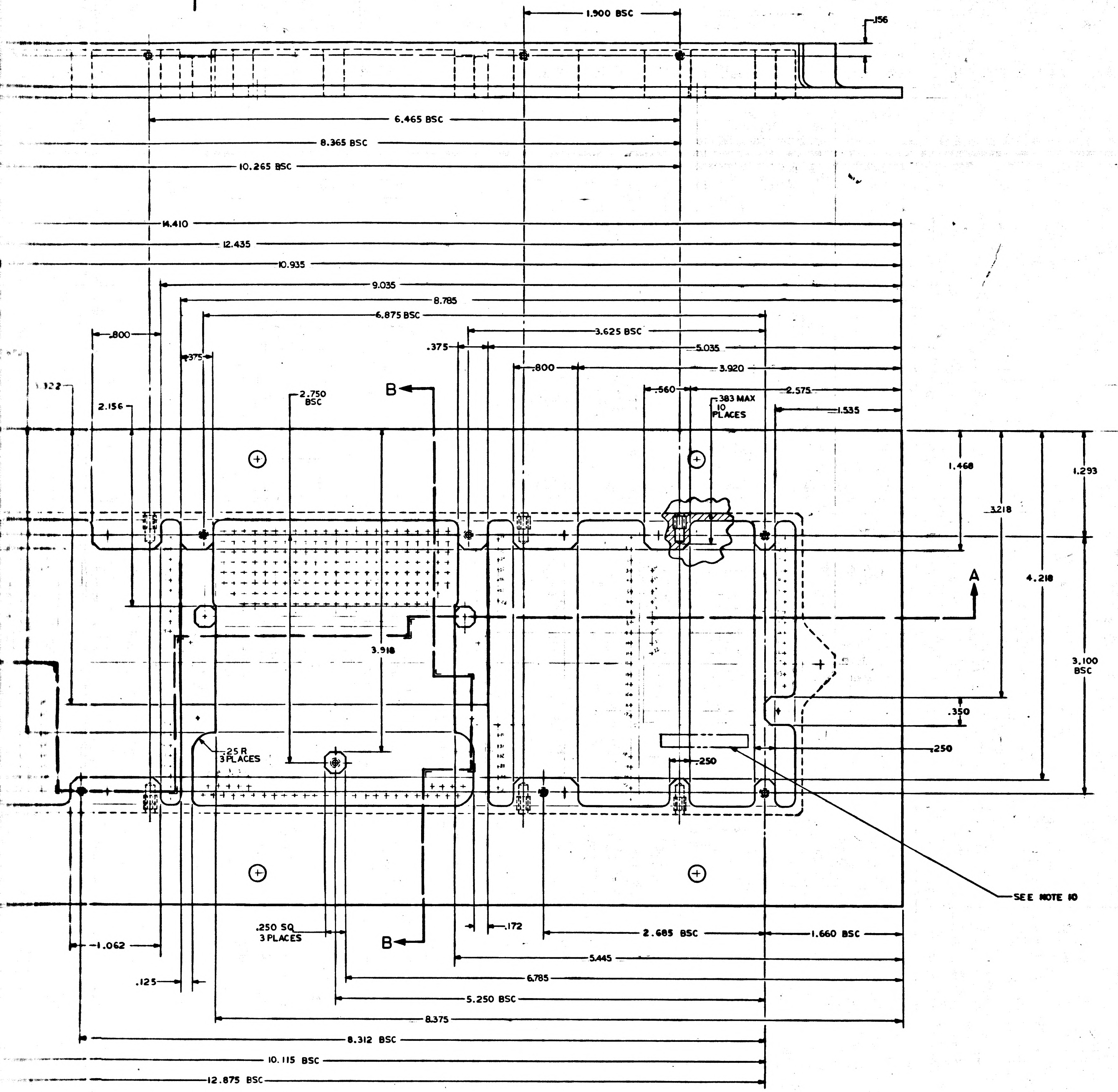
DRAWN W. Munson DATE 8 MAR 66
CHECKED J. GRIEB 8 MAR 66
APPROVAL Geo Lundin
CONTRACT NAS 9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER
(INSEPARABLE ASSEMBLY)

SIZE C
CODE IDENT NO. 80230
2008436
SCALE —
SHEET 1 OF 1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 28630	EM		5 MAY 66	



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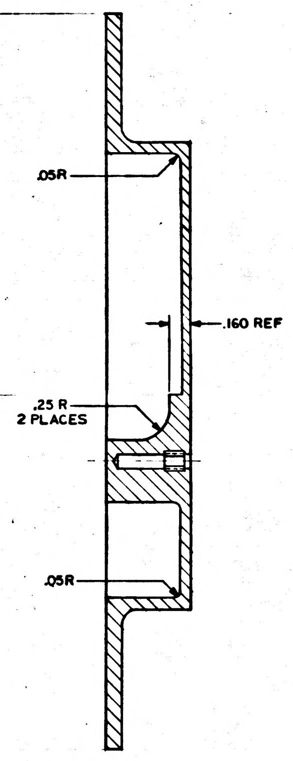
6.465 BSC
8.365 BSC
10.265 BSC
14.410
12.435
10.935
9.035
8.785
6.875 BSC
.800
.375
.375
3.625 BSC
5.035
.800
3.920
.560
2.575
.383 MAX 10 PLACES
1.535
.322
2.156
2.750 BSC
B
1.468
1.293
3.218
A
4.218
3.918
3.100 BSC
.350
.25 R 3 PLACES
.250
.250
SEE NOTE 10
.250 SQ 3 PLACES
B
.172
2.685 BSC
1.660 BSC
1.062
5.445
.125
6.785
5.250 BSC
8.375
8.312 BSC
10.115 BSC
12.875 BSC



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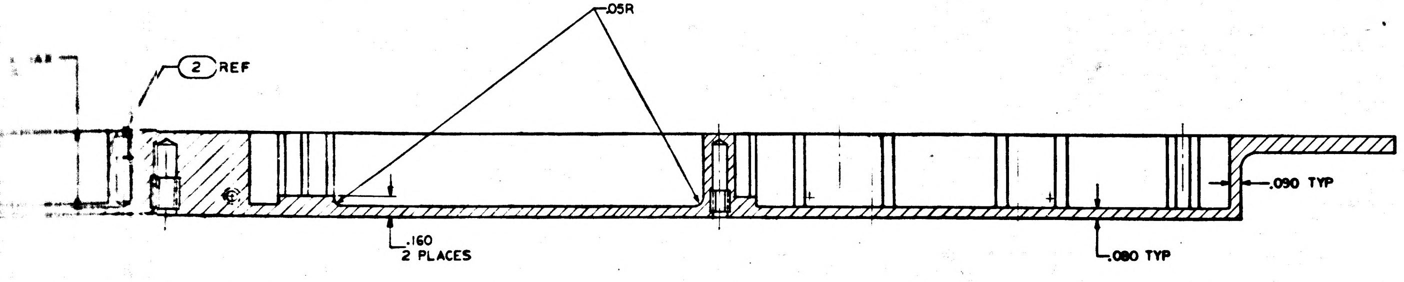
.160 REF
.25 R 2 PLACES
.05R

PARTIAL SECTION B-B



2 REF
.05R
.090 TYP
.160 2 PLACES
.080 TYP

SECTION A-A

MASTER

13	1010957-010	INSERT, SCREW THREAD, LOCKING	3
25	1010957-008	INSERT, SCREW THREAD, LOCKING	2
1	2008436-001	HEADER	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007269	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Sam J. De Salvo 25 Apr 66
CHECKED 10 May 66
APPROVED V. G. Kaminski 10 May 66
APPROVED 10 May 66
APPROVED MIT 5-10-66
D. G. HOAG
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEP ASSY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

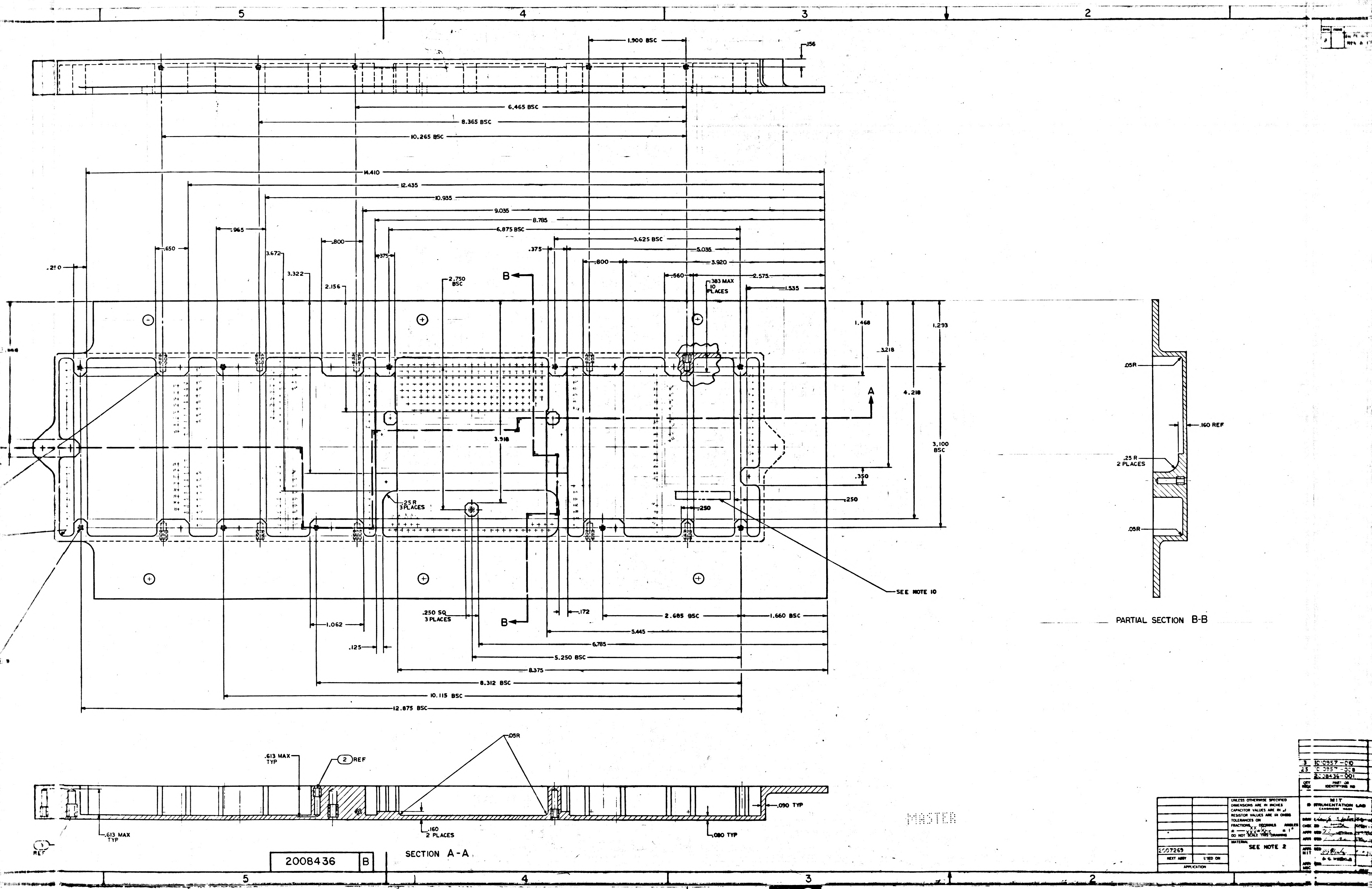
CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008436

SCALE 2/1 SHEET 1 OF 1

2008436 B

4r

F4



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4
3
2
1.900 BSC
.156
6.465 BSC
8.365 BSC
10.265 BSC
14.410
12.435
10.935
9.035
8.785
6.875 BSC
.965
3.625 BSC
.375
5.035
.650
3.672
.800
.375
.800
3.920
.210
3.322
2.156
2.750 BSC
B
.560
.383 MAX 10 PLACES
2.575
1.535
1.468
1.293
3.218
4.218
A
3.918
3.100 BSC
.350
.25 R 3 PLACES
.250
.250
SEE NOTE 10
.250 SQ 3 PLACES
.172
2.685 BSC
1.660 BSC
1.062
5.445
.125
6.785
5.250 BSC
8.375
8.312 BSC
10.115 BSC
12.875 BSC
.05R
.160 REF
.25 R 2 PLACES
.05R
PARTIAL SECTION B-B
.05R
.613 MAX TYP
2 REF
.090 TYP
.160 2 PLACES
.080 TYP
.613 MAX TYP
REF
SECTION A-A
MASTER

2008436 B

3	1010957-010
25	1010957-008
	2008436-001
QTY REQD	PART OR IDENTIFYING NO

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

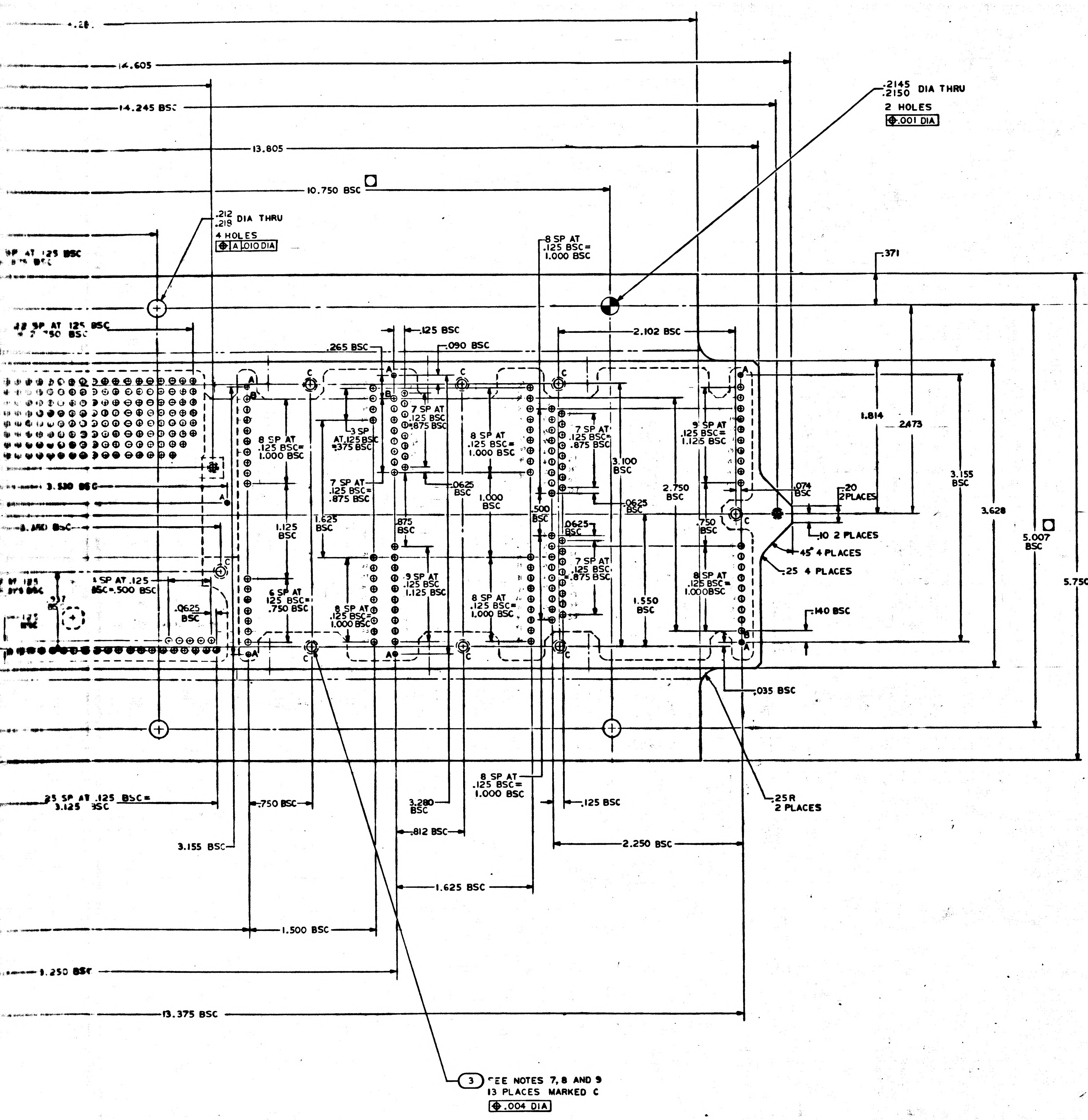
MATERIAL
SEE NOTE 2

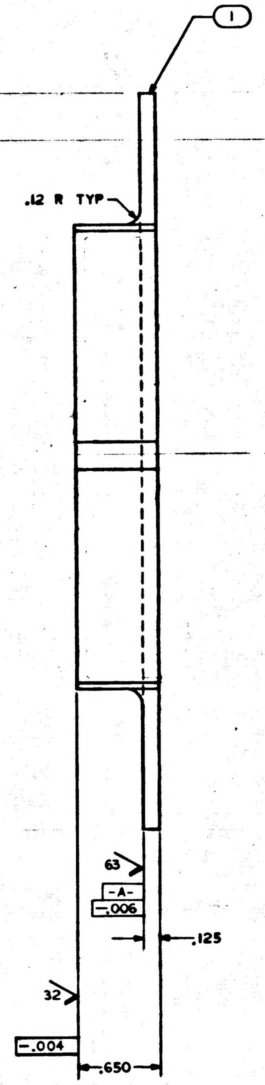
2007269
NEXT ASSY
USED ON
APPLICATION

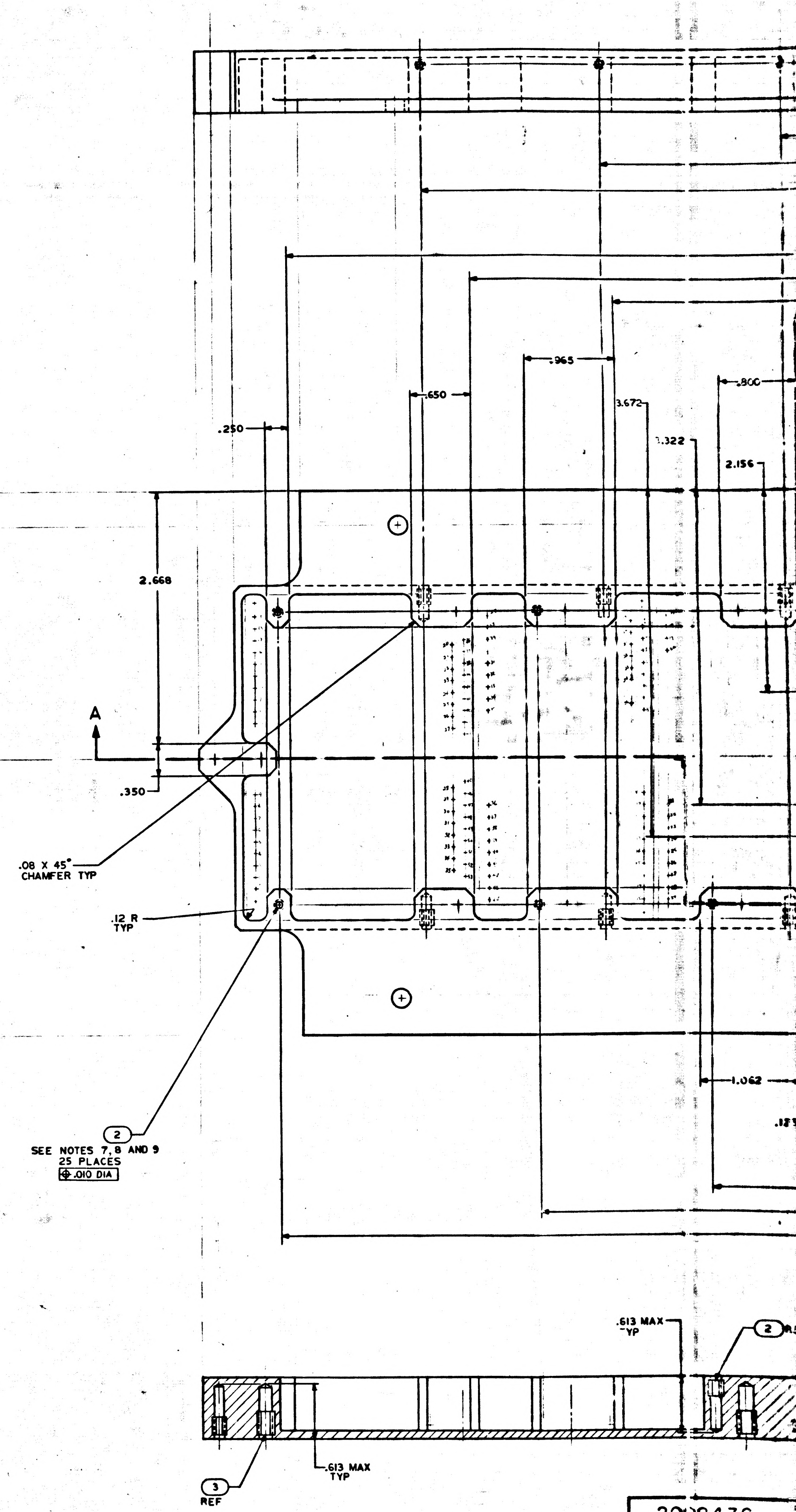
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

F3


4.28
14.605
14.245 BSC
13.805
10.750 BSC
.212 .218 DIA THRU
4 HOLES
A .010 DIA
.2145 .2150 DIA THRU
2 HOLES
.001 DIA
8 SP AT .125 BSC= 1.000 BSC
.371
.125 BSC
.090 BSC
.265 BSC
2.102 BSC
3 SP AT .125 BSC= .375 BSC
7 SP AT .125 BSC= .875 BSC
8 SP AT .125 BSC= 1.000 BSC
9 SP AT .125 BSC= 1.125 BSC
3.100 BSC
2.750 BSC
1.814
2.473
3.155 BSC
3.628
5.007 BSC
5.750
.074 BSC
.20 2 PLACES
.10 2 PLACES
45° 4 PLACES
.25 4 PLACES
.0625 BSC
1.000 BSC
1.625 BSC
1.125 BSC
.875 BSC
.500 BSC
.750 BSC
1.550 BSC
6 SP AT .125 BSC= .750 BSC
7 SP AT .125 BSC= .875 BSC
8 SP AT .125 BSC= 1.000 BSC
.140 BSC
.035 BSC
.25R 2 PLACES
3.530 BSC
25 SP AT .125 BSC= 3.125 BSC
.750 BSC
3.155 BSC
3.280 BSC
.812 BSC
1.625 BSC
1.500 BSC
.125 BSC
2.250 BSC
3.250 BSC
13.375 BSC
A
B
C
③ SEE NOTES 7, 8 AND 9
13 PLACES MARKED C
.004 DIA


①
.12 R TYP
63
-A-
.006
.125
32
.004
.650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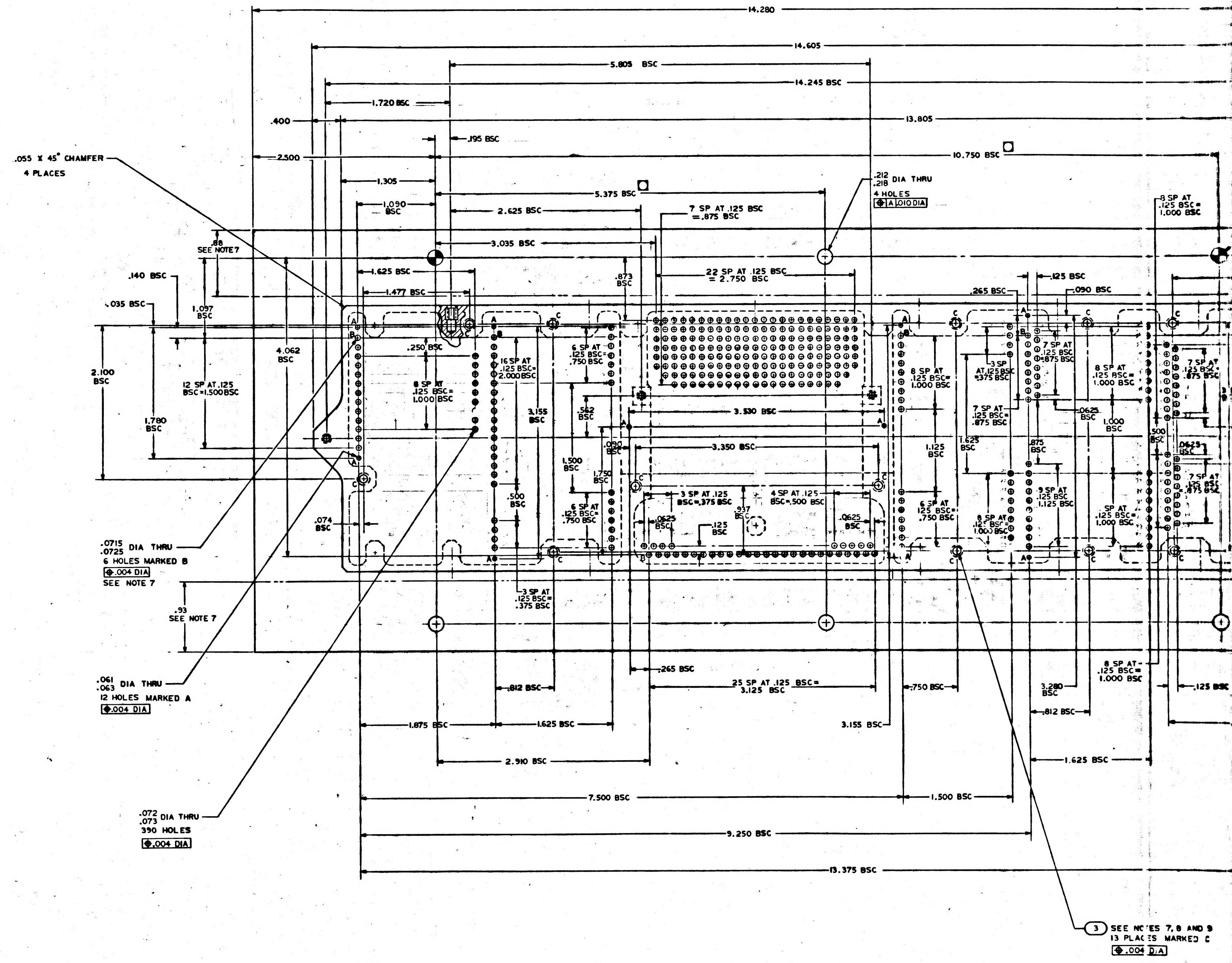
.650
.965
3.672
1.322
.800
2.156
2.668
A
.350
.08 X 45° CHAMFER TYP
.12 R TYP
② SEE NOTES 7, 8 AND 9
25 PLACES
.010 DIA
1.062
.613 MAX TYP
②
③ REF
.613 MAX TYP

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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14.245 BSC
1.720 BSC
.400
13.805
.195 BSC
2.500
10.750 BSC
1.305
5.375 BSC
.055 X 45° CHAMFER
4 PLACES
1.090 BSC
2.625 BSC
7 SP AT .125 BSC =.875 BSC
.212 .218 DIA THRU
4 HOLES
A .010 DIA
8 SP AT .125 BSC= 1.000 BSC
3.035 BSC
.88 SEE NOTE 7
1.625 BSC
.873 BSC
22 SP AT .125 BSC = 2.750 BSC
.125 BSC
.140 BSC
1.477 BSC
.265 BSC
.090 BSC
.035 BSC
1.097 BSC
.250 BSC
6 SP AT .125 BSC= .750 BSC
4.062 BSC
2.100 BSC
16 SP AT .125 BSC= 2.000 BSC
8 SP AT .125 BSC= 1.000 BSC
12 SP AT .125 BSC=1.500 BSC
8 SP AT .125 BSC= 1.000 BSC
3 SP AT .125 BSC =.375 BSC
7 SP AT .125 BSC= .875 BSC
3.530 BSC
3.155 BSC
.562 BSC
1.780 BSC
.0625 BSC
1.000 BSC
1.625 BSC
1.125 BSC
.875 BSC
.500 BSC
3.350 BSC
1.500 BSC
1.750 BSC
.050 BSC
9 SP AT .125 BSC 1.125 BSC
3 SP AT .125 BSC=.375 BSC
4 SP AT .125 BSC=.500 BSC
.500 BSC
6 SP AT .125 BSC= .750 BSC
.937 BSC
.0625 BSC
.125 BSC
.0625 BSC
6 SP AT .125 BSC= .750 BSC
8 SP AT .125 BSC= 1.000 BSC
.074 BSC
.0715 .0725 DIA THRU
6 HOLES MARKED B
.004 DIA
SEE NOTE 7
3 SP AT .125 BSC= .375 BSC
.93 SEE NOTE 7
.061 .063 DIA THRU
12 HOLES MARKED A
.004 DIA
.265 BSC
.812 BSC
25 SP AT .125 BSC= 3.125 BSC
.750 BSC
3.280 BSC
8 SP AT .125 BSC= 1.000 BSC
.125 BSC
.812 BSC
1.875 BSC
1.625 BSC
3.155 BSC
2.910 BSC
1.625 BSC
7.500 BSC
1.500 BSC
.072 .073 DIA THRU
390 HOLES
.004 DIA
9.250 BSC
13.375 BSC
3 SEE NOTES 7, 8 AND 9
13 PLACES MARKED C
.004 DIA
A
B
C

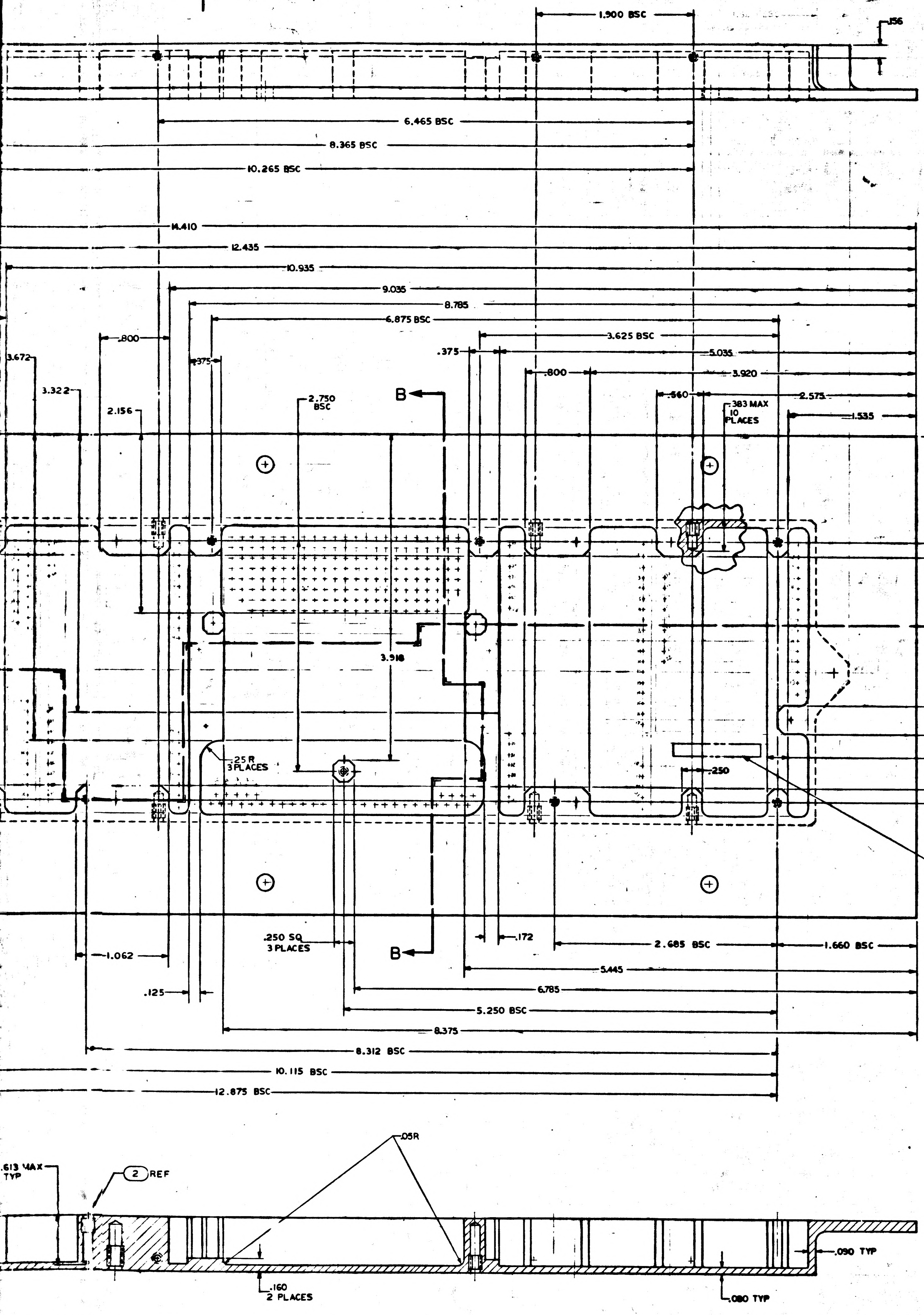
NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL : ALUM ALY 6061-T6 AL PER QQ-A-250/11, TEMPER T6
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .015 TO .040
5. ALL SURFACES $\sqrt{}^{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C UNLESS OTHERWISE SPECIFIED
7. HOLES AND SURFACES INDICATED SHALL BE FREE OF ANODIZE. COAT PER ND1002040 USING MIL-M-3171, TYPE VI. DO NOT EPOXY COAT
8. COAT THREADS OF FIND NO. 2 AND 3 WITH MIL-P-8585 COLOR Y
9. INSTALL FIND NO. 2 AND 3 WET PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED FOR FULL LENGTH OF INSERT AS A FINAL STEP IN CLEANING INSERT THREADS
10. IDENTIFY WITH PART NO. PER ND1002019
11. ☐ THIS DIMENSION IS CONTROLLED BY ICD-LID-340-10000

600
270
100
48
148

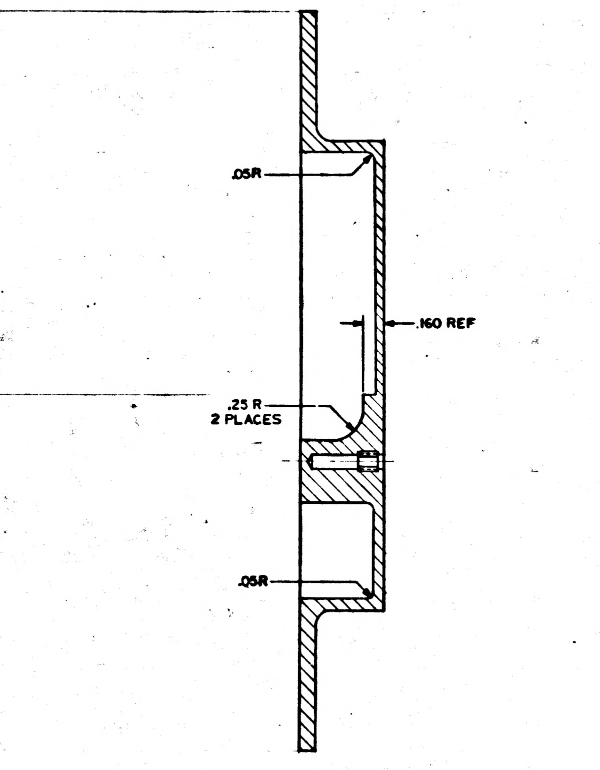
2008436 B

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 28650			5 MAY 66	
C		REVISED PER TDRR 29453			66	



1.900 BSC
.156
6.465 BSC
8.365 BSC
10.265 BSC
11.410
12.435
10.935
9.035
8.785
6.875 BSC
3.625 BSC
.375
5.035
.800
.800
3.920
3.672
3.322
.375
.640
.383 MAX
10 PLACES
2.575
1.535
2.156
2.750
BSC
B
1.468
3.218
4.218
1.293
A
3.100
BSC
3.918
.350
.250
.250
.25 R
3 PLACES
SEE NOTE 18
.250 SQ
3 PLACES
B
.172
2.685 BSC
1.660 BSC
1.062
.125
5.445
6.785
5.250 BSC
8.375
8.312 BSC
10.115 BSC
12.875 BSC
.613 MAX
TYP
2 REF
.05R
.090 TYP
.160
2 PLACES
.080 TYP

SECTION A-A



.05R
.160 REF
.25 R
2 PLACES
.05R

PARTIAL SECTION B-B

MASTER

4it

13	1010957-010	INSERT, SCREW THREAD, LOCKING	3
25	1010957-008	INSERT, SCREW THREAD, LOCKING	2
1	2008436-001	HEADER	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	

LIST OF MATERIALS

2007269	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	Louis J. De Salvo	25 Apr 66
CHECKED		
APPROVED	D.G.	
APPROVED		10 May 66
APPROVED MIT		5-10-66
	G.	
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

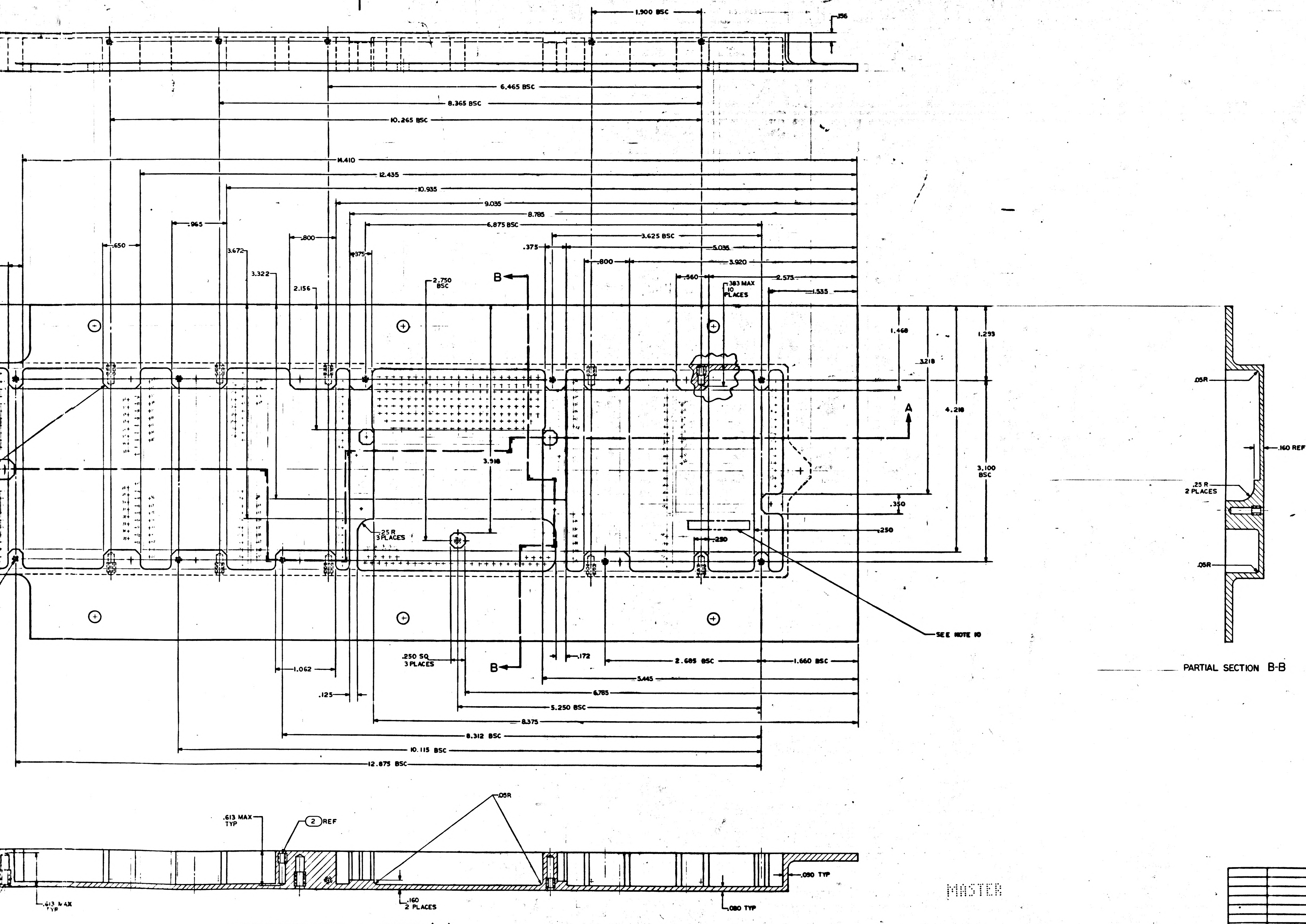
HEADER INSEP ASSY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008436
SCALE 2/1		SHEET 1 OF 1

2008436 C

2008436 C

F-4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4
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2
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6.465 BSC
8.365 BSC
10.265 BSC
14.410
12.435
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9.035
8.785
6.875 BSC
3.625 BSC
5.035
3.920
.965
.650
.800
.375
.375
.800
3.672
3.322
2.156
2.750 BSC
B
.560
.383 MAX 10 PLACES
2.575
1.535
1.468
3.218
4.218
1.293
3.100 BSC
A
3.918
.350
.250
.290
.25 R 3 PLACES
SEE NOTE 10
.250 SQ 3 PLACES
B
.172
2.685 BSC
1.660 BSC
1.062
5.445
.125
6.785
5.250 BSC
8.375
8.312 BSC
10.115 BSC
12.875 BSC
.05R
.160 REF
.25 R 2 PLACES
.05R
PARTIAL SECTION B-B
.05R
.613 MAX TYP
2 REF
.090 TYP
.613 MAX TYP
.160 2 PLACES
.080 TYP
SECTION A-A

SYM	ZONE	DESCRIPTION
B		REPLACES WORD DWG REV A PER TDRR 28650
C		REVISED PER TDRR 29453

QTY REQD	PART OR IDENTIFYING NO.	
13	1010957-010	INSERT, SCREW T
25	1010957-008	INSERT, SCREW T
1	2008436-001	HEADER

LIST OF MATERIALS

NEXT ASSY	USED ON
2007269	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 25 Apr 66
CHECKED
APPROVED
APPROVED 1 May 66
APPROVED MIT 5-10-66
D. C. HOAG
APPROVED NASA
DATE

MANNED SP

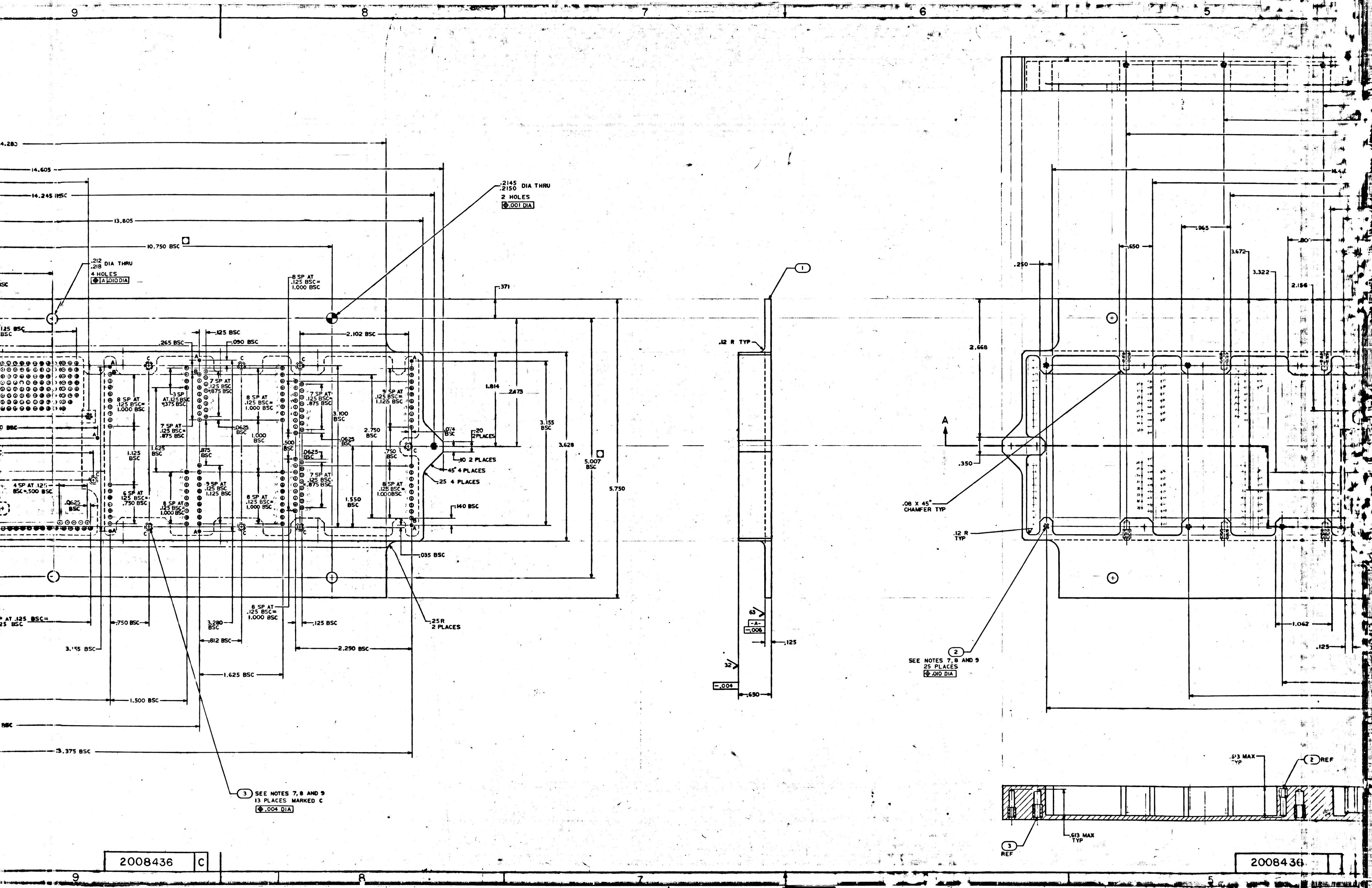
HEADER
SIGNAL
C/M F

IDENT NO.
2230

MASTER

2008436 C

F3


9
8
7
6
5
14.280
14.605
14.245 BSC
13.805
10.750 BSC
.2145
.2150 DIA THRU
2 HOLES
.001 DIA
.212
.218 DIA THRU
4 HOLES
A .010 DIA
8 SP AT
.125 BSC=
1.000 BSC
.371
2.102 BSC
.265 BSC
.125 BSC
.090 BSC
8 SP AT
.125 BSC=
1.000 BSC
7 SP AT
.125 BSC
.875 BSC
3 SP
AT .125 BSC
=.375 BSC
7 SP AT
.125 BSC=
.875 BSC
9 SP AT
.125 BSC=
1.125 BSC
1.814
2.473
3.155
BSC
3.628
5.007
BSC
5.750
3.100
BSC
2.750
BSC
.0625
BSC
1.000
BSC
1.125
BSC
1.625
BSC
.875
BSC
.500
BSC
.074
BSC
.20
2 PLACES
.10 2 PLACES
45° 4 PLACES
.25 4 PLACES
.750
BSC
1.550
BSC
.140 BSC
4 SP AT .125
BSC=.500 BSC
6 SP AT
.125 BSC=
.750 BSC
8 SP AT
.125 BSC=
1.000 BSC
9 SP AT
.125 BSC
1.125 BSC
8 SP AT
.125 BSC=
1.000 BSC
.035 BSC
.25 R
2 PLACES
3.280
BSC
8 SP AT
.125 BSC=
1.000 BSC
.125 BSC
.750 BSC
3.155 BSC
.812 BSC
2.250 BSC
1.625 BSC
1.500 BSC
3.375 BSC
3 SEE NOTES 7, 8 AND 9
13 PLACES MARKED C
.004 DIA
1
.12 R TYP
63
-A-
.006
.125
32
.004
.650
.250
.650
.965
3.672
3.322
2.156
2.668
A
.350
.08 X 45°
CHAMFER TYP
.12 R
TYP
2 SEE NOTES 7, 8 AND 9
25 PLACES
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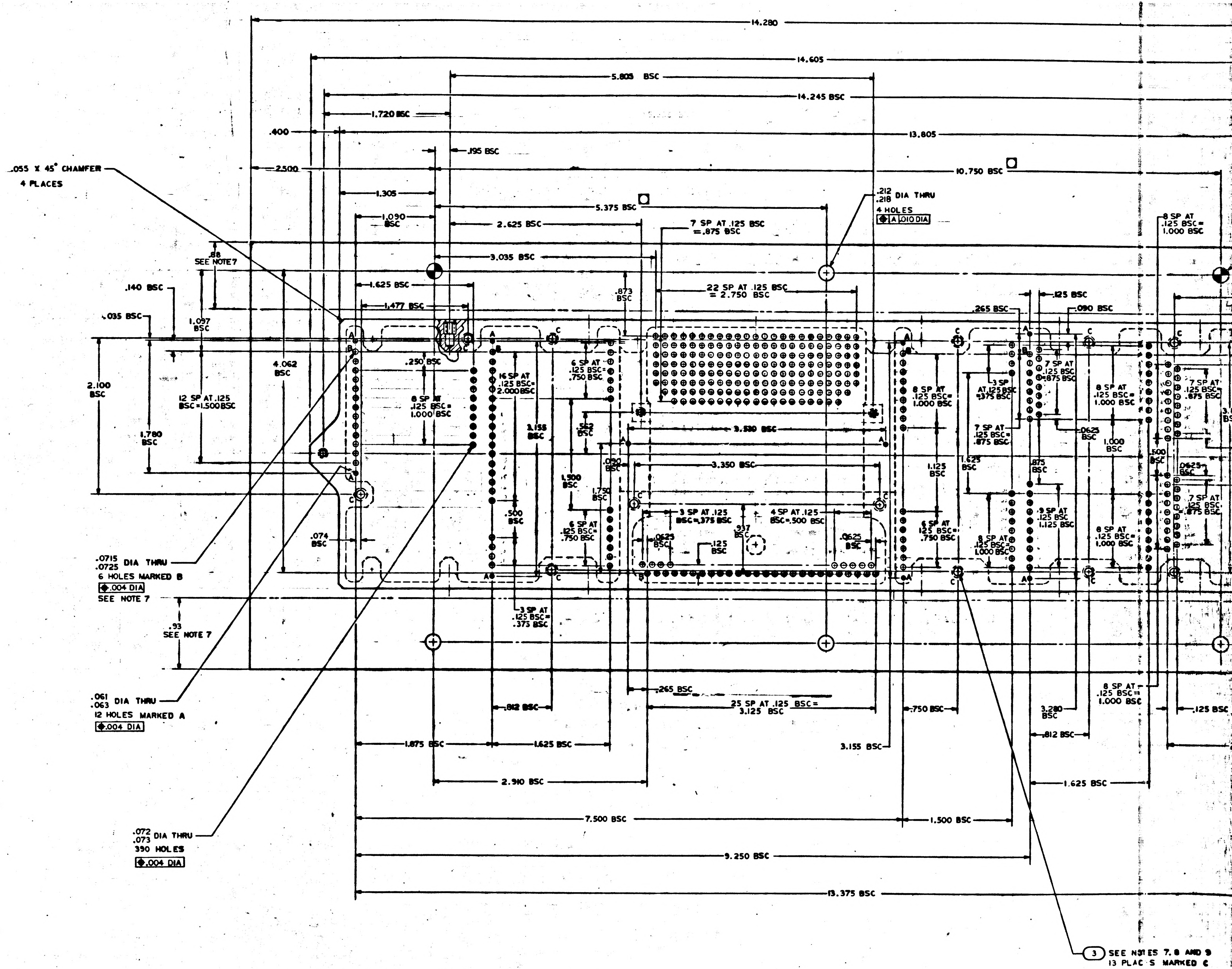
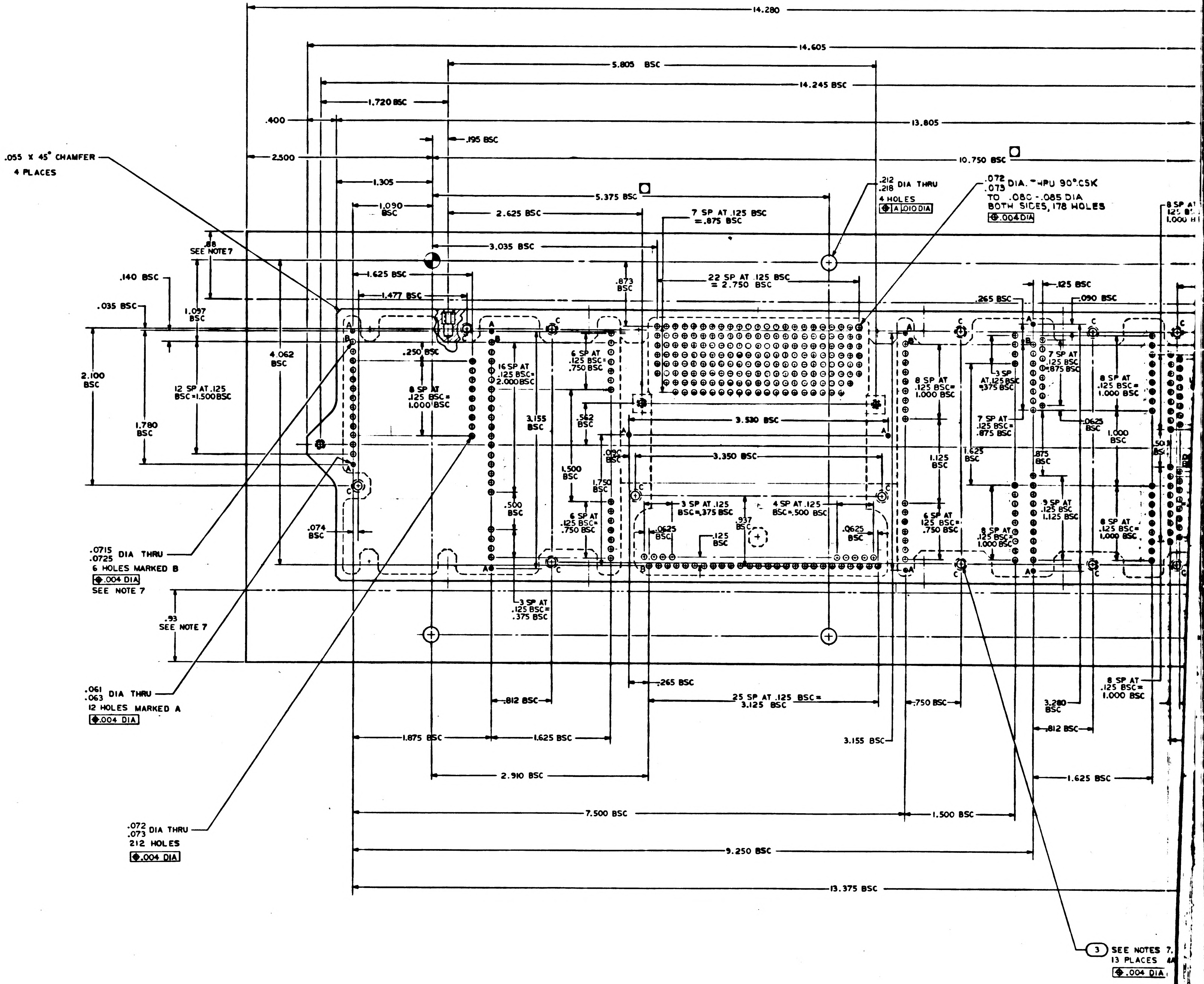
1.062
.125
.613 MAX
TYP
2 REF
3 REF
.613 MAX
TYP
2008436 C
2008436


14.280
14.605
5.805 BSC
14.245 BSC
1.720 BSC
.400
13.805
.195 BSC
2.500
10.750 BSC ▢
1.305
5.375 BSC ▢
1.090 BSC
2.625 BSC
7 SP AT .125 BSC =.875 BSC
.212 .218 DIA THRU
4 HOLES
⌖ A .010 DIA
8 SP AT .125 BSC= 1.000 BSC
.055 X 45° CHAMFER
4 PLACES
.88 SEE NOTE 7
3.035 BSC
.140 BSC
1.625 BSC
.873 BSC
22 SP AT .125 BSC = 2.750 BSC
.125 BSC
.265 BSC
.090 BSC
.035 BSC
1.097 BSC
1.477 BSC
4.062 BSC
.250 BSC
2.100 BSC
12 SP AT .125 BSC=1.500 BSC
8 SP AT .125 BSC= 1.000 BSC
16 SP AT .125 BSC= 2.000 BSC
6 SP AT .125 BSC= .750 BSC
1.780 BSC
3.155 BSC
.562 BSC
3.530 BSC
3.350 BSC
1.500 BSC
.090 BSC
1.750 BSC
.500 BSC
.074 BSC
6 SP AT .125 BSC= .750 BSC
3 SP AT .125 BSC=.375 BSC
4 SP AT .125 BSC=.500 BSC
.937 BSC
.0625 BSC
.125 BSC
.0625 BSC
8 SP AT .125 BSC= 1.000 BSC
1.125 BSC
6 SP AT .125 BSC= .750 BSC
3 SP AT .125 BSC =.375 BSC
7 SP AT .125 BSC= .875 BSC
1.625 BSC
8 SP AT .125 BSC= 1.000 BSC
7 SP AT .125 BSC .875 BSC
.875 BSC
9 SP AT .125 BSC 1.125 BSC
.0625 BSC
1.000 BSC
8 SP AT .125 BSC= 1.000 BSC
8 SP AT .125 BSC= 1.000 BSC
.500 BSC
.0625 BSC
7 SP AT .125 BSC .875 BSC
7 SP AT .125 BSC .875 BSC
A
B
C
.0715 .0725 DIA THRU
6 HOLES MARKED B
⌖.004 DIA
SEE NOTE 7
.93 SEE NOTE 7
3 SP AT .125 BSC= .375 BSC
.265 BSC
25 SP AT .125 BSC= 3.125 BSC
.750 BSC
8 SP AT .125 BSC= 1.000 BSC
.125 BSC
3.280 BSC
.812 BSC
.061 .063 DIA THRU
12 HOLES MARKED A
⌖.004 DIA
.812 BSC
1.875 BSC
1.625 BSC
3.155 BSC
1.625 BSC
2.910 BSC
7.500 BSC
1.500 BSC
.072 .073 DIA THRU
390 HOLES
⌖.004 DIA
9.250 BSC
13.375 BSC
3
SEE NOTES 7, 8 AND 9
13 PLACES MARKED C
⌖.004 DIA

NOTES :

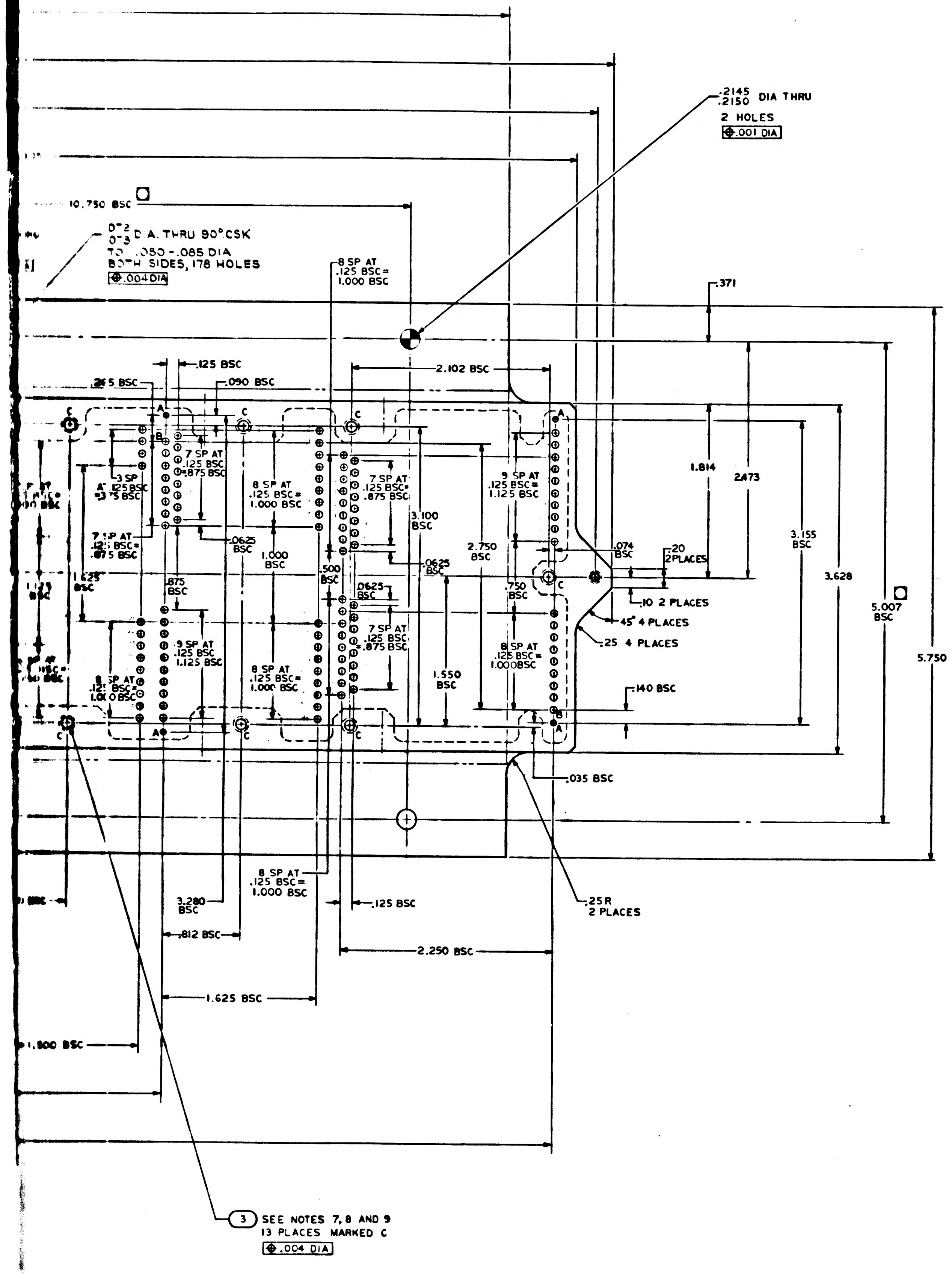
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL : ALUM ALY 6061-T6 AL PER QQ-A-250/11, TEMPER T6
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .015 TO .040
5. ALL SURFACES $\sqrt{125}$ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR UNLESS OTHERWISE SPECIFIED
7. HOLES AND SURFACES INDICATED SHALL BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
8. COAT THREADS OF FIND NO. 2 AND 3 WITH MIL-P-8585 COLOR Y
9. INSTALL FIND NO. 2 AND 3 WET PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED FOR FULL LENGTH OF INSERT AS A FINAL STEP IN CLEANING INSERT THREADS
10. IDENTIFY WITH PART NO. PER ND1002019
11. ▢ THIS DIMENSION IS CONTROLLED BY ICD-MH01-01304-116


14.280
14.605
5.805 BSC
14.245 BSC
1.720 BSC
.400
13.805
.195 BSC
2.500
10.750 BSC
1.305
5.375 BSC
1.090 BSC
2.625 BSC
7 SP AT .125 BSC =.875 BSC
.212 .218 DIA THRU 4 HOLES
A .010 DIA
.072 .073 DIA. THRU 90°CSK TO .080 - .085 DIA BOTH SIDES, 178 HOLES
.004 DIA
.055 X 45° CHAMFER 4 PLACES
.88 SEE NOTE 7
3.035 BSC
.140 BSC
1.625 BSC
.873 BSC
22 SP AT .125 BSC = 2.750 BSC
.035 BSC
1.097 BSC
1.477 BSC
.265 BSC
.125 BSC
.090 BSC
2.100 BSC
4.062 BSC
.250 BSC
12 SP AT .125 BSC=1.500 BSC
8 SP AT .125 BSC= 1.000 BSC
16 SP AT .125 BSC= 2.000 BSC
6 SP AT .125 BSC= .750 BSC
1.780 BSC
3.155 BSC
.562 BSC
3.530 BSC
3.350 BSC
.090 BSC
1.500 BSC
1.750 BSC
8 SP AT .125 BSC= 1.000 BSC
3 SP AT .125 BSC =.375 BSC
7 SP AT .125 BSC =.875 BSC
7 SP AT .125 BSC= .875 BSC
.0625 BSC
1.000 BSC
1.125 BSC
1.625 BSC
.875 BSC
9 SP AT .125 BSC 1.125 BSC
6 SP AT .125 BSC= .750 BSC
8 SP AT .125 BSC= 1.000 BSC
8 SP AT .125 BSC= 1.000 BSC
.500 BSC
.074 BSC
3 SP AT .125 BSC=.375 BSC
4 SP AT .125 BSC=.500 BSC
.937 BSC
.0625 BSC
.125 BSC
.0625 BSC
A
B
C
.0715 .0725 DIA THRU 6 HOLES MARKED B
.004 DIA
SEE NOTE 7
3 SP AT .125 BSC= .375 BSC
.93 SEE NOTE 7
.265 BSC
.061 .063 DIA THRU 12 HOLES MARKED A
.004 DIA
.812 BSC
25 SP AT .125 BSC= 3.125 BSC
.750 BSC
8 SP AT .125 BSC= 1.000 BSC
3.280 BSC
1.875 BSC
1.625 BSC
3.155 BSC
.812 BSC
2.910 BSC
1.625 BSC
.072 .073 DIA THRU 212 HOLES
.004 DIA
7.500 BSC
1.500 BSC
9.250 BSC
13.375 BSC
3 SEE NOTES 7, 13 PLACES
.004 DIA

NOTES :

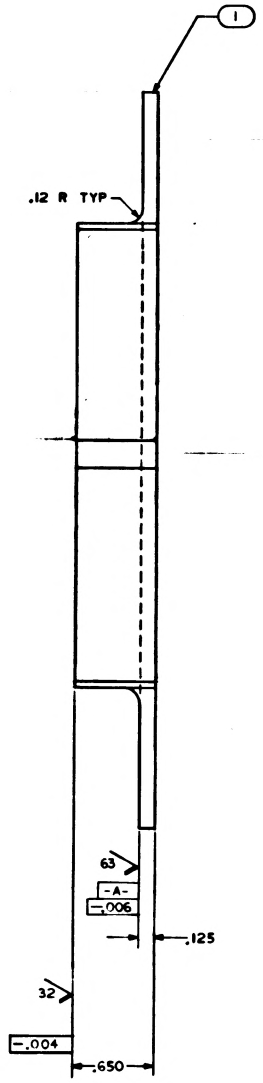
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL : ALUM ALY 6061-T6 AL PER QQ-A-250/11, TEMPER T6
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .015 TO .040
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR UNLESS OTHERWISE SPECIFIED
7. HOLES AND SURFACES INDICATED SHALL BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
8. COAT THREADS OF FIND NO. 2 AND 3 WITH MIL-P-8585 COLOR Y
9. INSTALL FIND NO. 2 AND 3 WET PER MS 33646. REMOVE DRIVING TANG. INSERT SURFACES MATING WITH SCREW SHALL BE FREE OF PRIMER OR OTHER CONTAMINANTS. AFTER POST-INSTALLATION CLEANING OF INSERTS, A STANDARD SCREW SHALL BE ENGAGED AND DISENGAGED FOR FULL LENGTH OF INSERT AS A FINAL STEP IN CLEANING INSERT THREADS
10. IDENTIFY WITH PART NO. PER ND1002019
11. ▢ THIS DIMENSION IS CONTROLLED BY ICD-MH01-01304-116

2008436 D

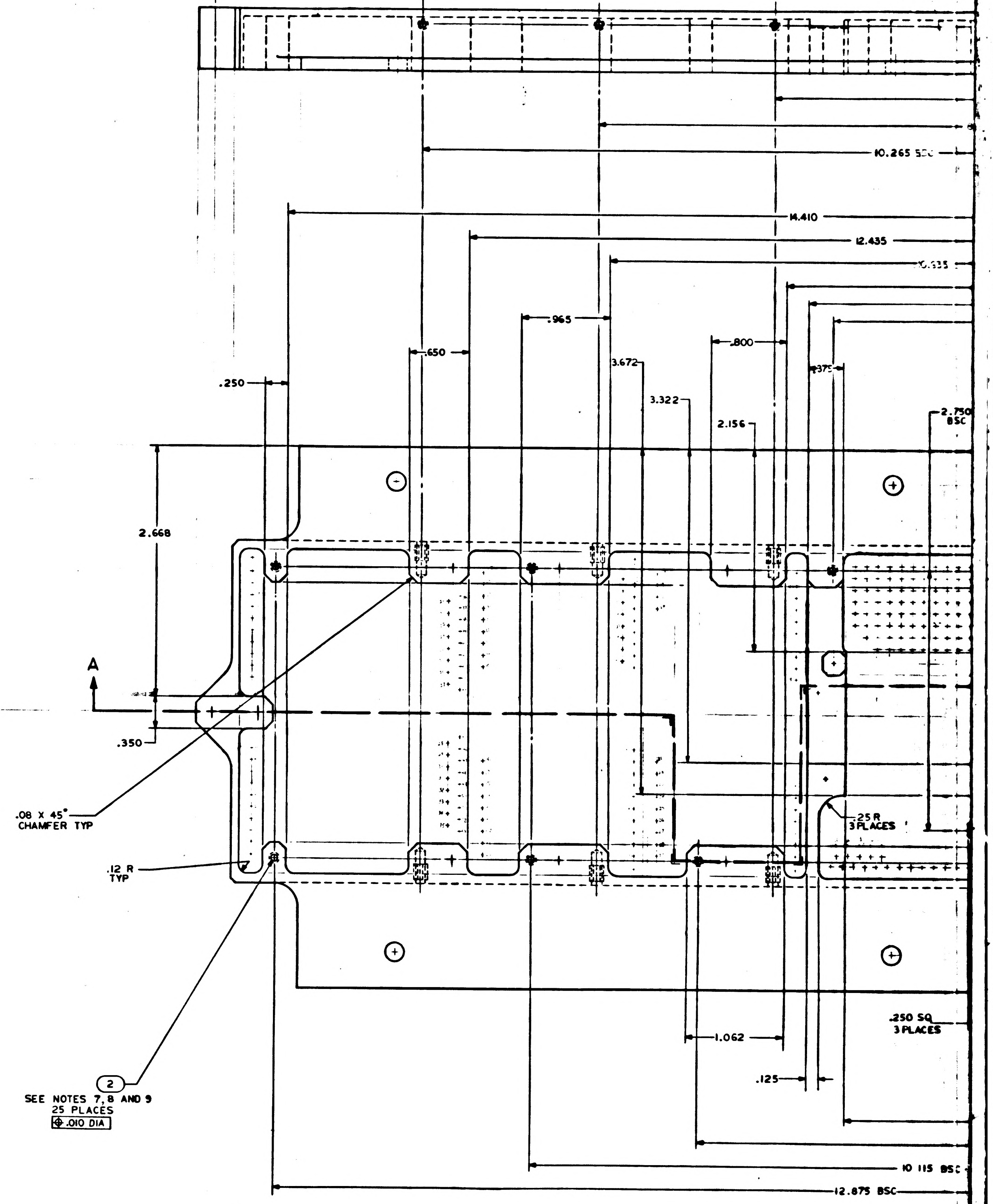


.2145
.2150 DIA THRU
2 HOLES
⊕ .001 DIA
10.750 BSC ☐
.0̄72
.073 DIA. THRU 90°CSK
TO .080 - .085 DIA
BOTH SIDES, 178 HOLES
⊕ .004 DIA
8 SP AT
.125 BSC=
1.000 BSC
.371
2.102 BSC
.125 BSC
.265 BSC
.090 BSC
A
B
C
7 SP AT
.125 BSC
.875 BSC
3 SP
AT .125 BSC
.375 BSC
8 SP AT
.125 BSC=
1.000 BSC
7 SP AT
.125 BSC=
.875 BSC
3.100
BSC
9 SP AT
.125 BSC=
1.125 BSC
1.814
2.473
7 SP AT
.125 BSC=
.875 BSC
.0625
BSC
1.000
BSC
.500
BSC
.0625
BSC
2.750
BSC
.074
BSC
.20
2 PLACES
3.155
BSC
3.628
1.625
BSC
.875
BSC
.0625
BSC
.750
BSC
.10 2 PLACES
45° 4 PLACES
.25 4 PLACES
5.007
BSC ☐
5.750
9 SP AT
.125 BSC
1.125 BSC
7 SP AT
.125 BSC
.875 BSC
8 SP AT
.125 BSC=
1.000BSC
8 SP AT
.125 BSC=
1.000 BSC
1.550
BSC
8 SP AT
.125 BSC=
1.000 BSC
.140 BSC
.035 BSC
8 SP AT
.125 BSC=
1.000 BSC
3.280
BSC
.125 BSC
.25 R
2 PLACES
.812 BSC
2.250 BSC
1.625 BSC
1.800 BSC

③ SEE NOTES 7, 8 AND 9
13 PLACES MARKED C
⊕ .004 DIA

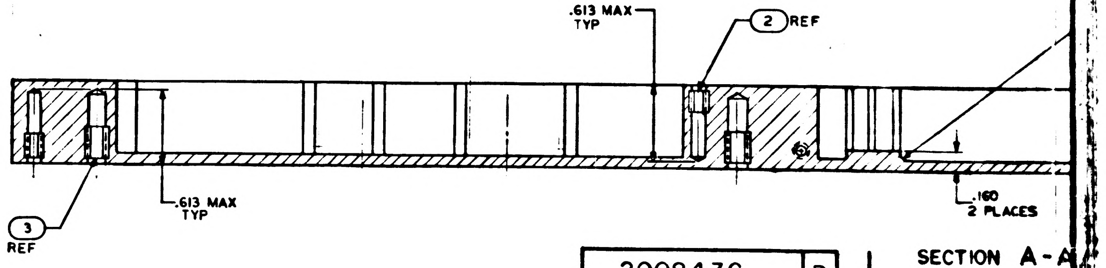


①
.12 R TYP
63
-A-
.006
.125
32
.004
.650



10.265 BSC
14.410
12.435
10.935
.965
.650
.800
.375
3.672
3.322
2.156
.250
2.750
BSC
2.668
A
.350
.08 X 45°
CHAMFER TYP
.12 R
TYP
.25 R
3 PLACES
.250 SQ
3 PLACES
1.062
.125
10.115 BSC
12.875 BSC

② SEE NOTES 7, 8 AND 9
25 PLACES
⊕ .010 DIA



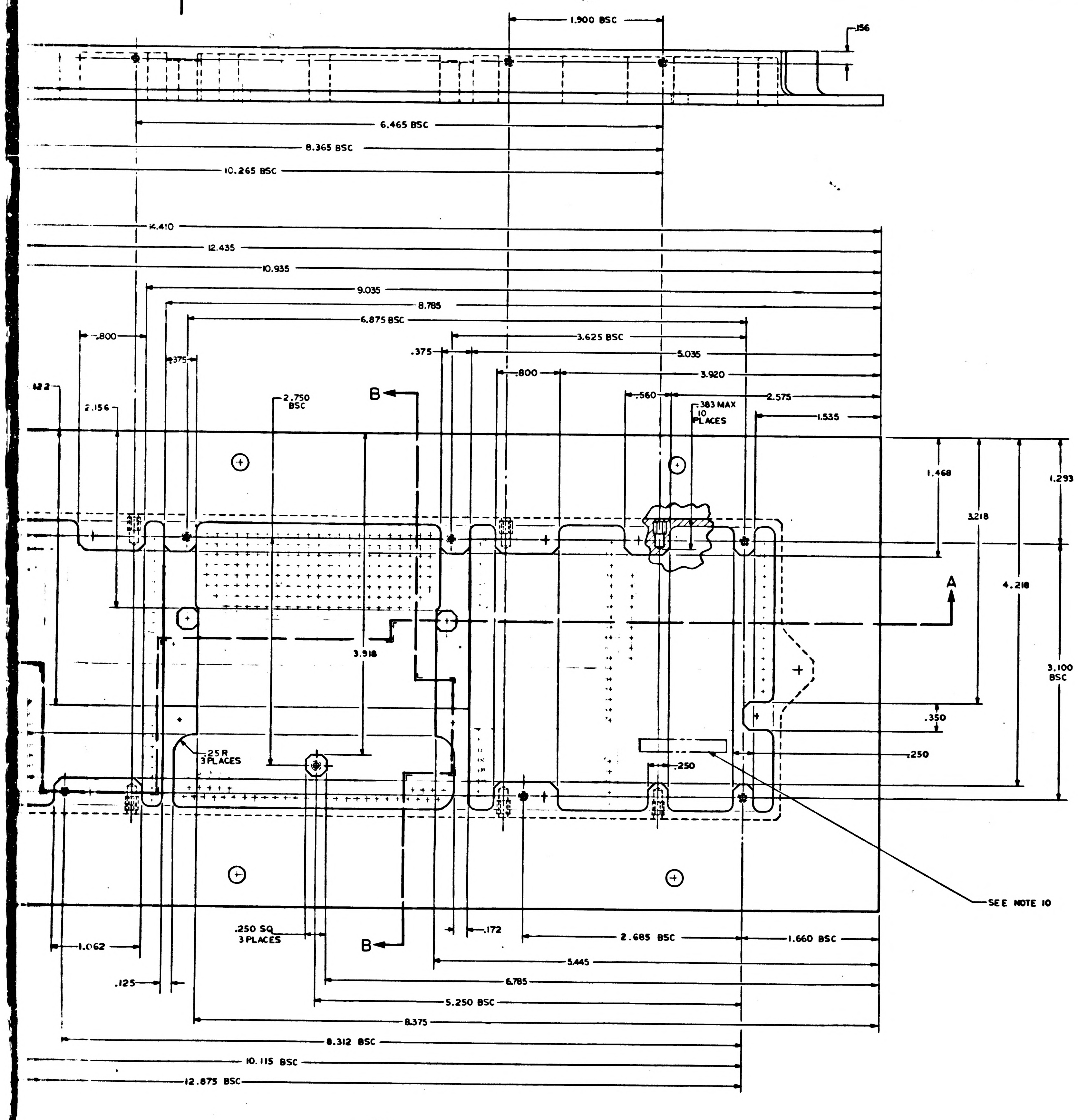
.613 MAX
TYP
② REF
③
REF
.613 MAX
TYP
.160
2 PLACES

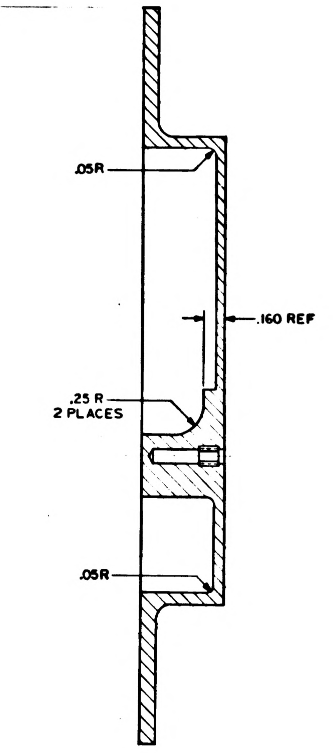
SECTION A-A

2008436 D

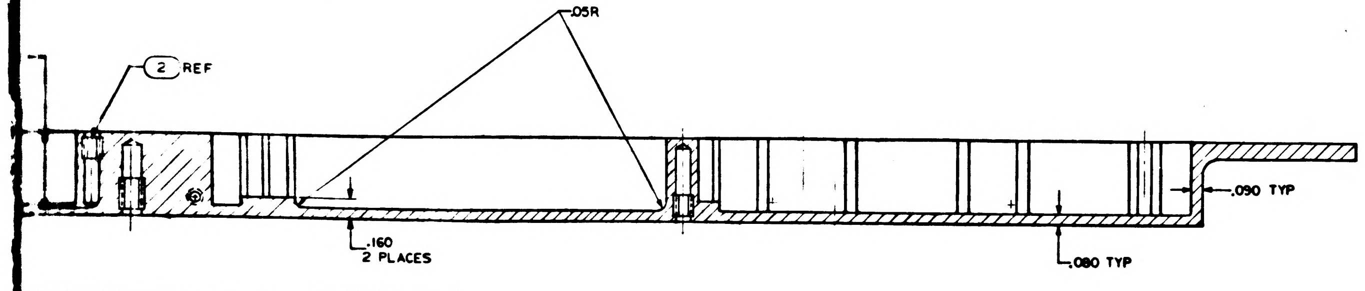
008436 D

2/2008436


1.900 BSC
.156
6.465 BSC
8.365 BSC
10.265 BSC
14.410
12.435
10.935
9.035
8.785
6.875 BSC
.800
.375
3.625 BSC
.375
5.035
.800
3.920
.560
.383 MAX 10 PLACES
2.575
1.535
122
2.156
2.750 BSC
B
1.468
3.218
1.293
4.218
A
3.100 BSC
3.918
.350
.25 R 3 PLACES
.250
.250
SEE NOTE 10
.250 SQ 3 PLACES
B
.172
1.062
2.685 BSC
1.660 BSC
5.445
.125
6.785
5.250 BSC
8.375
8.312 BSC
10.115 BSC
12.875 BSC


.05R
.160 REF
.25 R 2 PLACES
.05R

PARTIAL SECTION B-B


.05R
2 REF
.090 TYP
.160 2 PLACES
.080 TYP

SECTION A-A

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REPLACES WORD DWG REV A PER TDRR 28650			5 MAY 66	
C		REVISED PER TDRR 29453	KEN		JUN 66	
D		REVISED PER TDRR 33989		RB	8 AUG 67	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
13	1010957-010	INSERT, SCREW THREAD, LOCKING	3
25	1010957-008	INSERT, SCREW THREAD, LOCKING	2
1	2008436-001	HEADER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007269	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT 5-10-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HEADER INSEP ASSY
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO	SIZE	DRAWING NO.
80230	J	2008436

SCALE 2/1 SHEET 1 OF 1

2008436 D

008436 D

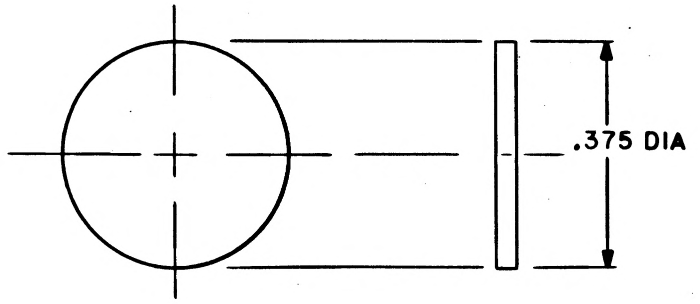
4H

3/2008436

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 23514

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-D-18177, TYPE GEE
3. IDENTIFY WITH PART NO. PER ND 1002019

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007131	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.005	± —

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

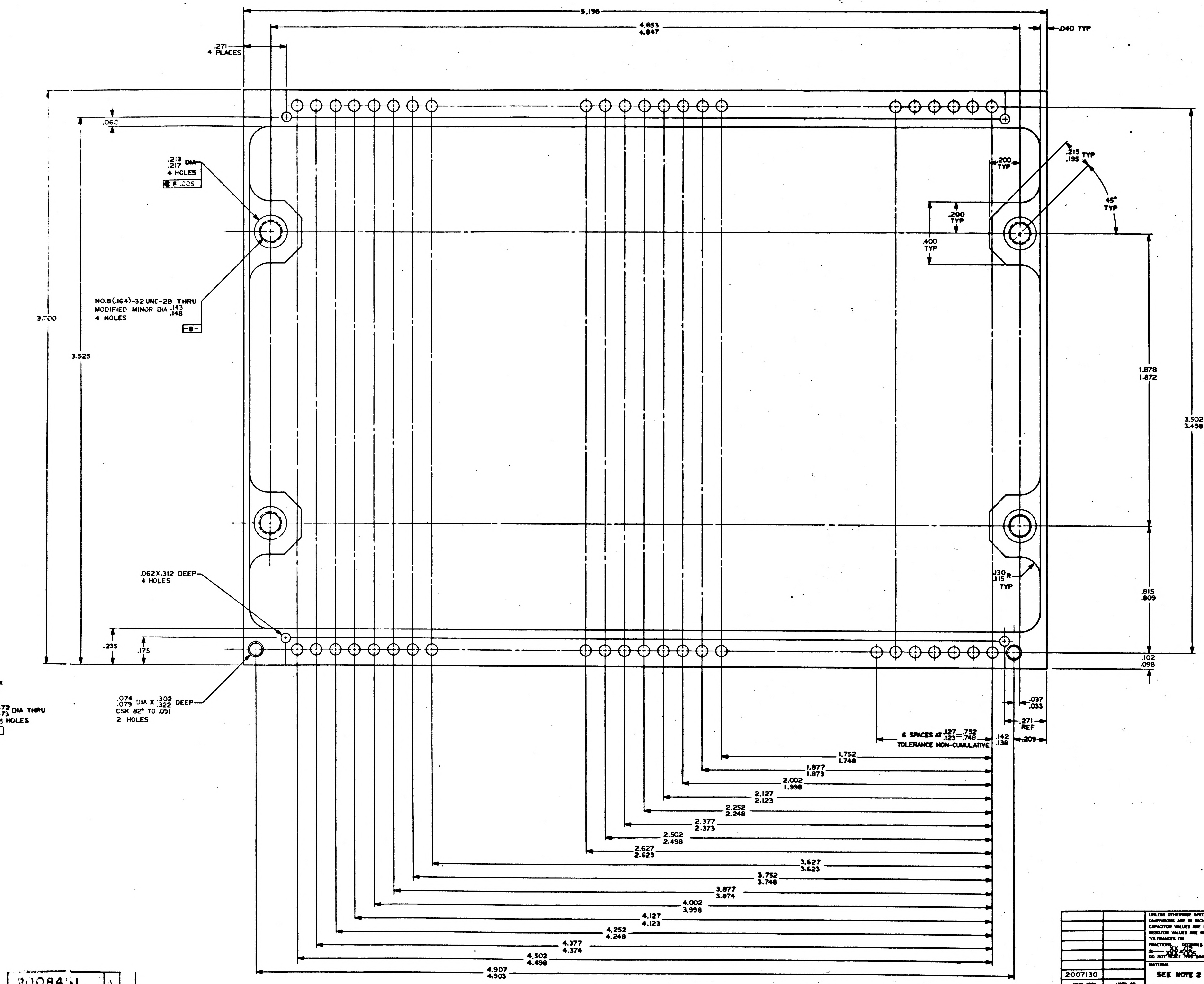
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	A. Addazio Jr.	7 OCT 65
CHECKED	R. P. [illegible]	25 OCT 65
APPROVED	[illegible]	25 Oct 65
APPROVED		
APPROVED MIT	A. C. METZGER	[illegible]
APPROVED MSC		DATE

INSULATOR
PHOTOMETER

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008450
SCALE 5/1
SHEET 1 OF 1

REVISIONS 23676						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 24559				WK



4
3
2
5.198
4.853
4.847
.040 TYP
.271
4 PLACES
.060
.213
.217 DIA
4 HOLES
B .005
NO.8(.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143
.148
4 HOLES
-B-
3.700
3.525
.200
TYP
.215
.195 TYP
45°
TYP
.200
TYP
.400
TYP
1.878
1.872
3.502
3.498
.130
.115 R
TYP
.815
.809
.062X.312 DEEP
4 HOLES
.235
.175
.102
.098
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091
2 HOLES
.072
.073 DIA THRU
5 HOLES
.037
.033
.271
REF
6 SPACES AT .127
.123 = .752
.748
TOLERANCE NON-CUMULATIVE
.142
.138
.209
1.752
1.748
1.877
1.873
2.002
1.998
2.127
2.123
2.252
2.248
2.377
2.373
2.502
2.498
2.627
2.623
3.627
3.623
3.752
3.748
3.877
3.874
4.002
3.998
4.127
4.123
4.252
4.248
4.377
4.374
4.502
4.498
4.907
4.903

D

C

B

A

4H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ±.02 .XXX ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007130	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
TRACKER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008451

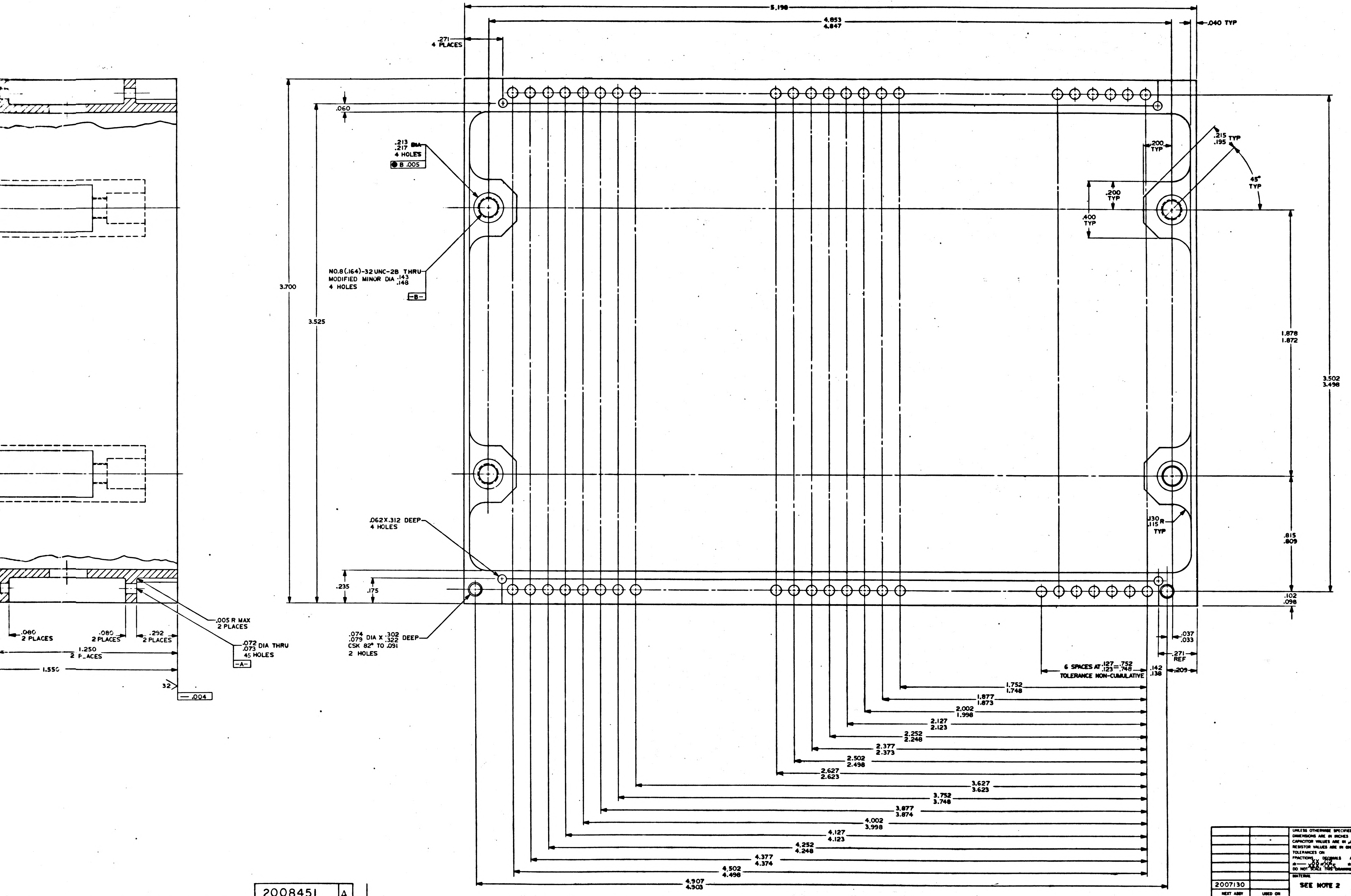
SCALE 5/1 SHEET 1 OF 1

2008451 A

2008451 A

F4

SYM	ZONE	DESCRIPTION
A		REVISED PER TMR



5.198
4.853
4.847
.040 TYP
.271
4 PLACES
.060
.213 DIA
.217
4 HOLES
B .005
.215
.195 TYP
.200
TYP
45°
TYP
.200
TYP
.400
TYP
NO.8(.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143
.148
4 HOLES
-B-
3.700
3.525
1.878
1.872
3.502
3.498
.062 X .312 DEEP
4 HOLES
.130
.115 R
TYP
.815
.809
.235
.175
.102
.098
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
.005 R MAX
2 PLACES
.072
.073 DIA THRU
45 HOLES
-A-
32
.004
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091
2 HOLES
.037
.033
.271
REF
6 SPACES AT .127
.123 = .752
.748
TOLERANCE NON-CUMULATIVE
.142
.138
.209
1.752
1.748
1.877
1.873
2.002
1.998
2.127
2.123
2.252
2.248
2.377
2.373
2.502
2.498
2.627
2.623
3.627
3.623
3.752
3.748
3.877
3.874
4.002
3.998
4.127
4.123
4.252
4.248
4.377
4.374
4.502
4.498
4.907
4.903

2008451 A

QTY REQD	PART OR IDENTIFYING NO.	
		LIST OF MATERIA

2007130	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

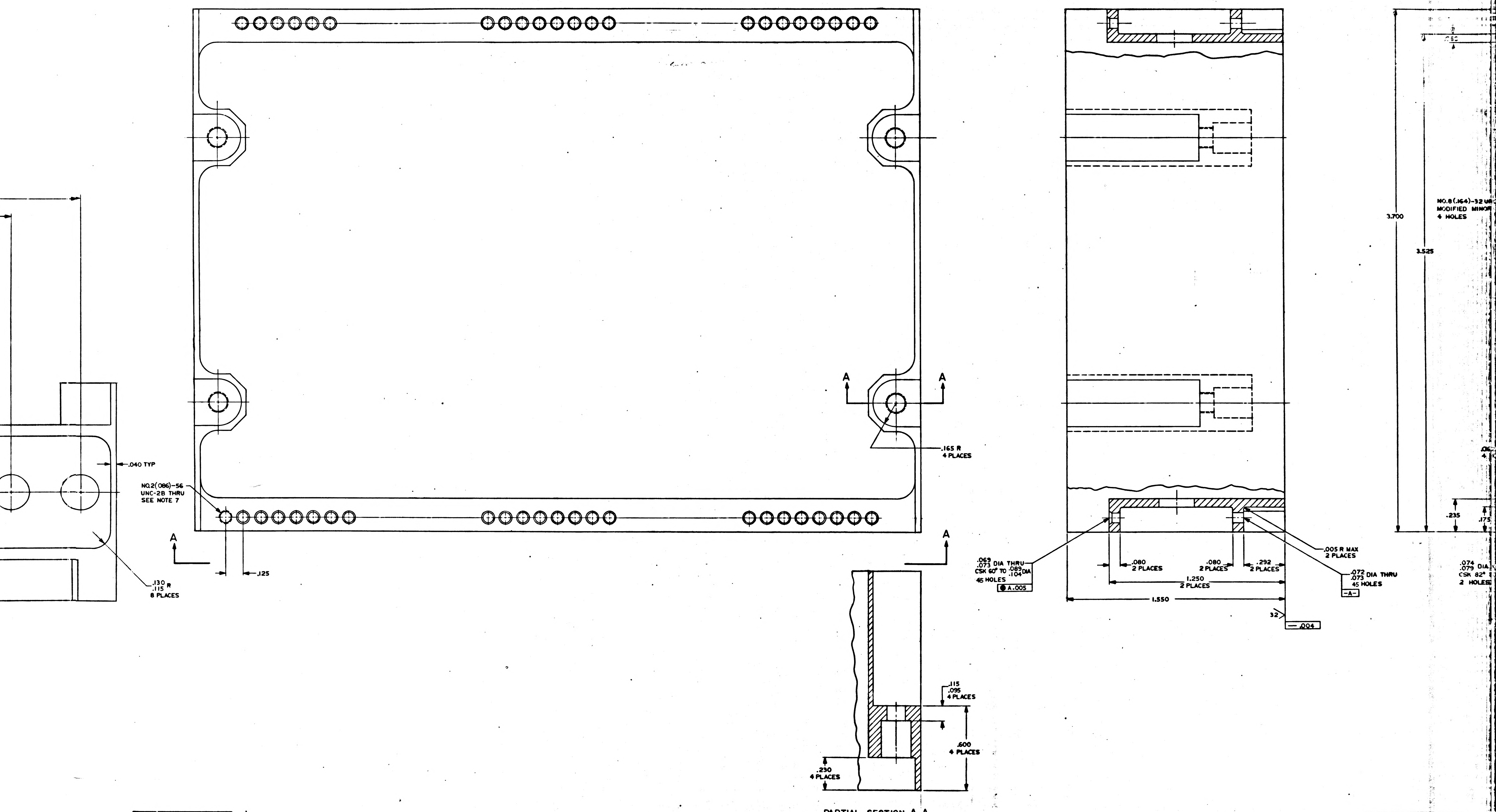
DRAWN
CHECKED
APPROVED
APPROVED

APPROVED MIT
A. C. METZ...

APPROVED MSC

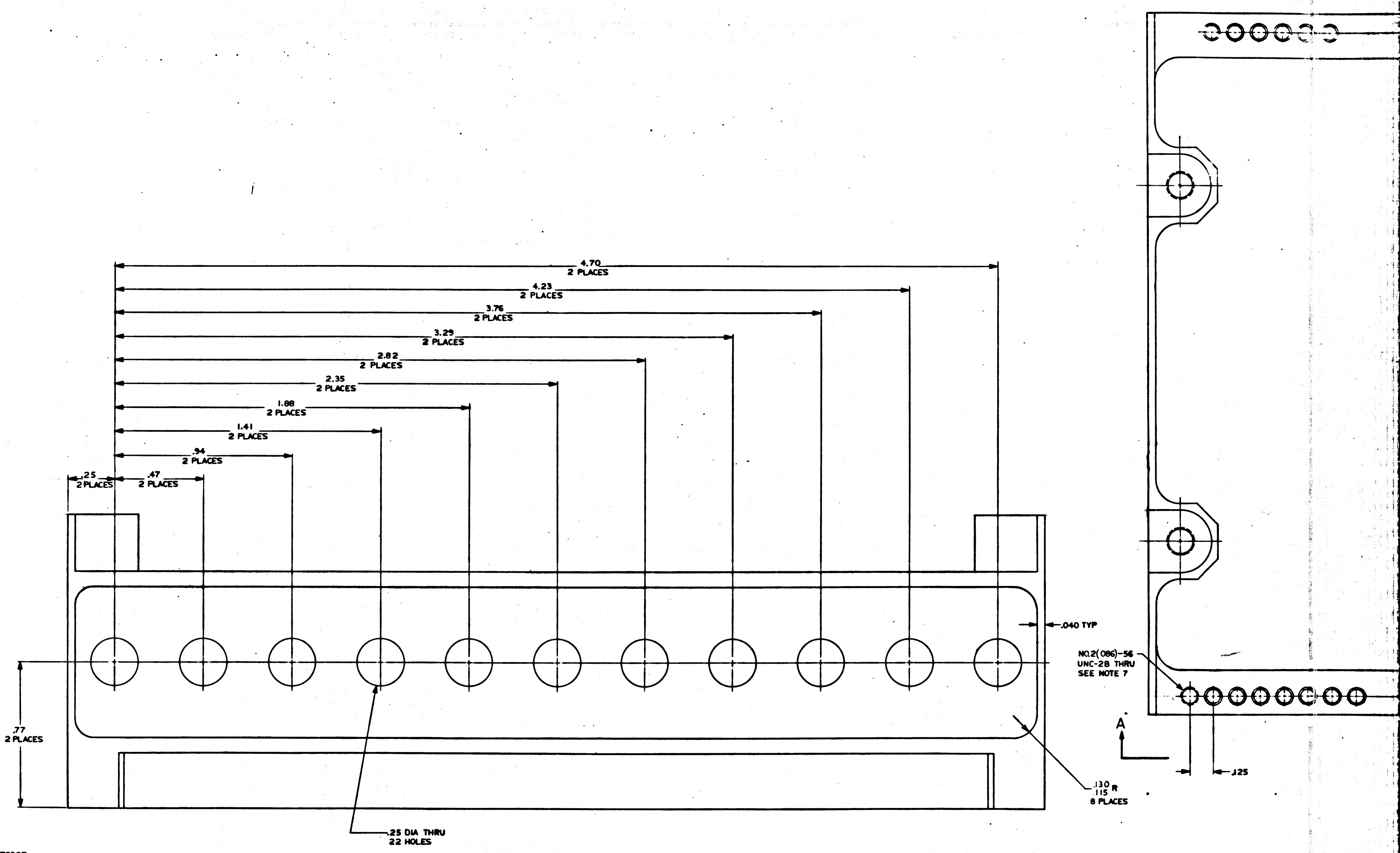
MANNE

CODE IDENT NO. 3C230
SIZE J
SCALE 2/1


.040 TYP
NO.2(.086)-56
UNC-2B THRU
SEE NOTE 7
.130
.115 R
8 PLACES
.125
A
A
A
A
.165 R
4 PLACES
.115
.095
4 PLACES
.600
4 PLACES
.230
4 PLACES
.069
.073 DIA THRU
CSK 60° TO .089
.104 DIA
45 HOLES
A .005
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
1.250
2 PLACES
1.550
32
.004
.005 R MAX
2 PLACES
.072
.073 DIA THRU
45 HOLES
-A-
3.700
3.525
NO.8(.164)-32 UN
MODIFIED MINOR
4 HOLES
.235
.175
.074
.079 DIA
CSK 82°
2 HOLES

PARTIAL SECTION A-A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

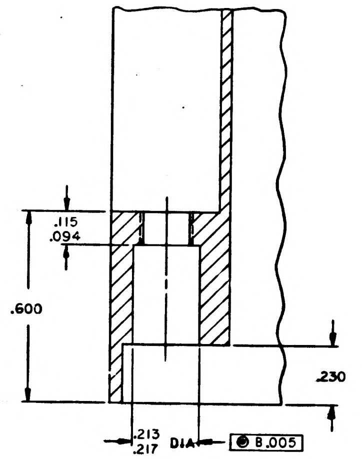

4.70
2 PLACES
4.23
2 PLACES
3.76
2 PLACES
3.29
2 PLACES
2.82
2 PLACES
2.35
2 PLACES
1.88
2 PLACES
1.41
2 PLACES
.94
2 PLACES
.25
2 PLACES
.47
2 PLACES
.040 TYP
NO.2(086)-56
UNC-2B THRU
SEE NOTE 7
.77
2 PLACES
A
.125
.130
.115 R
8 PLACES
.25 DIA THRU
22 HOLES

VIEW A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES $\overset{125}{\surd}$ UNLESS OTHERWISE SPECIFIED
6. ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. THREAD TO BE FREE OF ANODIZE AND TREAT PER ND 1002040. DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND 1002019

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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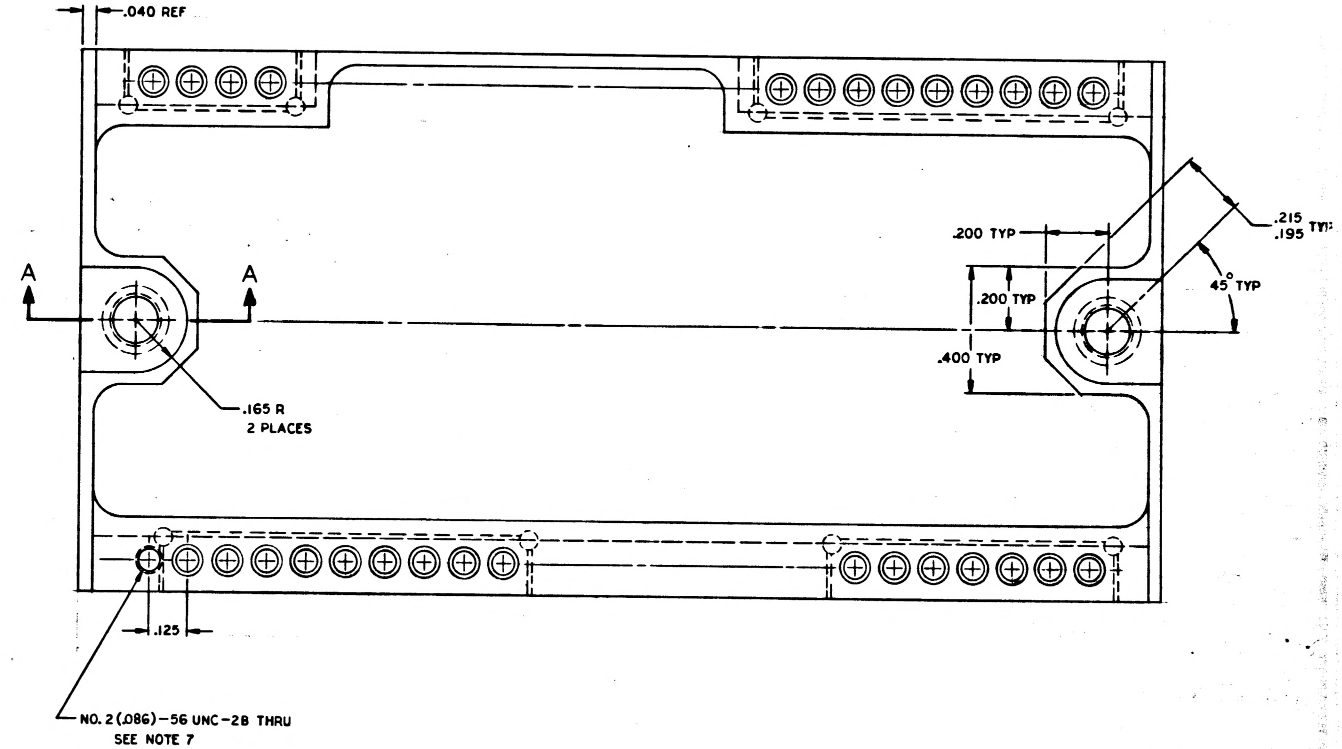
◎ B .005

PARTIAL SECTION A-A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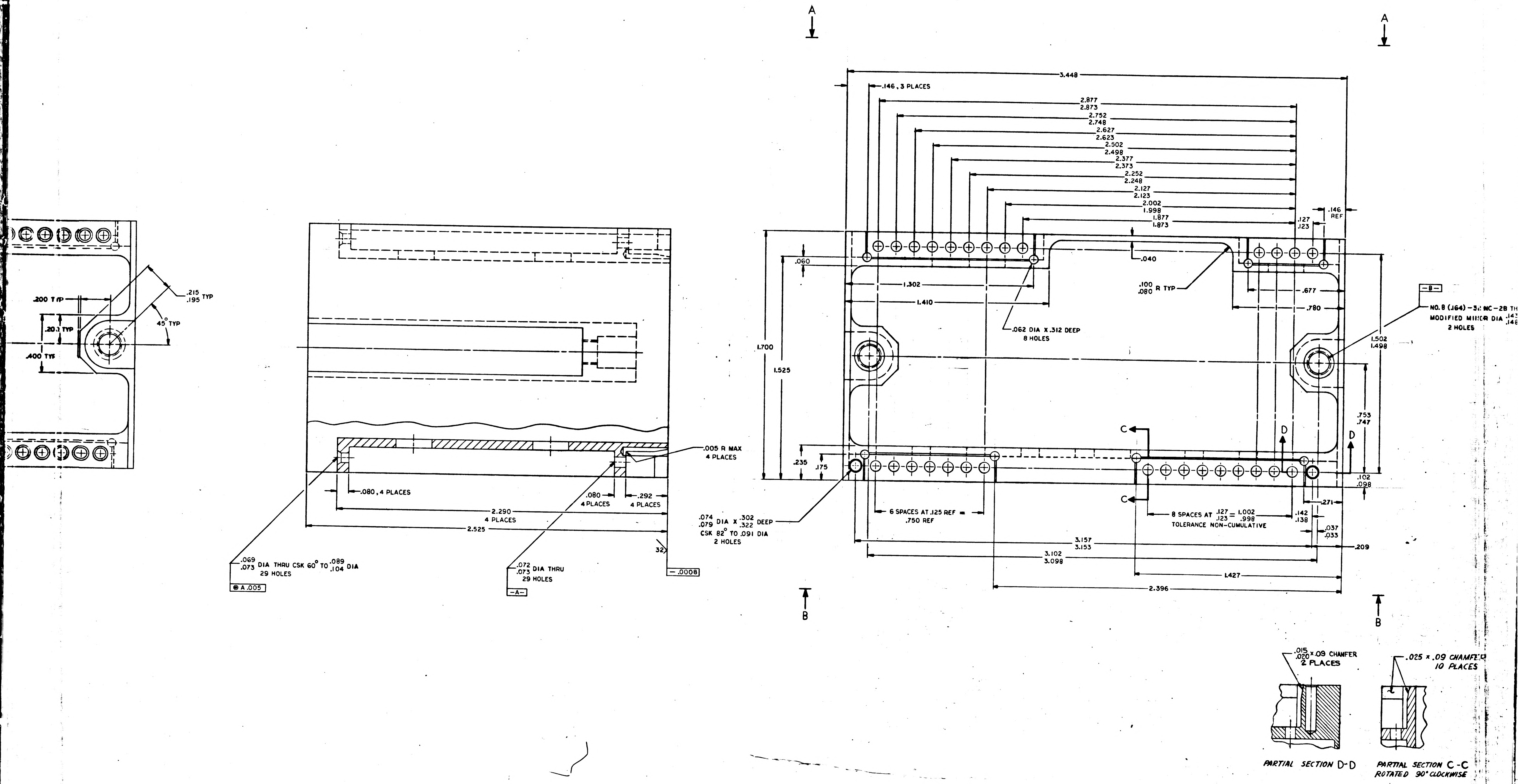
A
A
.165 R
2 PLACES
.200 TYP
.200 TYP
.400 TYP
.215
.195 TY
45° TYP
.125
NO. 2(.086)-56 UNC-2B THRU
SEE NOTE 7

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125✓ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019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.215
.195 TYP
45° TYP
.005 R MAX
4 PLACES
.080, 4 PLACES
.080
4 PLACES
.292
4 PLACES
2.290
4 PLACES
2.525
32
— .0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
29 HOLES
◉ A .005
.072
.073 DIA THRU
29 HOLES
—A—
A
A
3.448
.146, 3 PLACES
2.877
2.873
2.752
2.748
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2.498
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2.373
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.146
REF
.060
.040
1.302
1.410
.062 DIA X .312 DEEP
8 HOLES
.100
.080 R TYP
.677
.780
—B—
NO. 8 (.164) – 32 NC – 2B THD
MODIFIED MINOR DIA .143
.148
2 HOLES
1.700
1.525
1.502
1.498
.753
.747
C
C
D
D
.235
.175
.102
.098
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
6 SPACES AT .125 REF =
.750 REF
8 SPACES AT .127
.123 = 1.002
.998
TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
.209
3.157
3.153
3.102
3.098
1.427
2.396
B
B
.015
.020 x .09 CHAMFER
2 PLACES
.025 x .09 CHAMFER
10 PLACES
PARTIAL SECTION D-D
PARTIAL SECTION C-C
ROTATED 90° CLOCKWISE

REVISIONS 26027						
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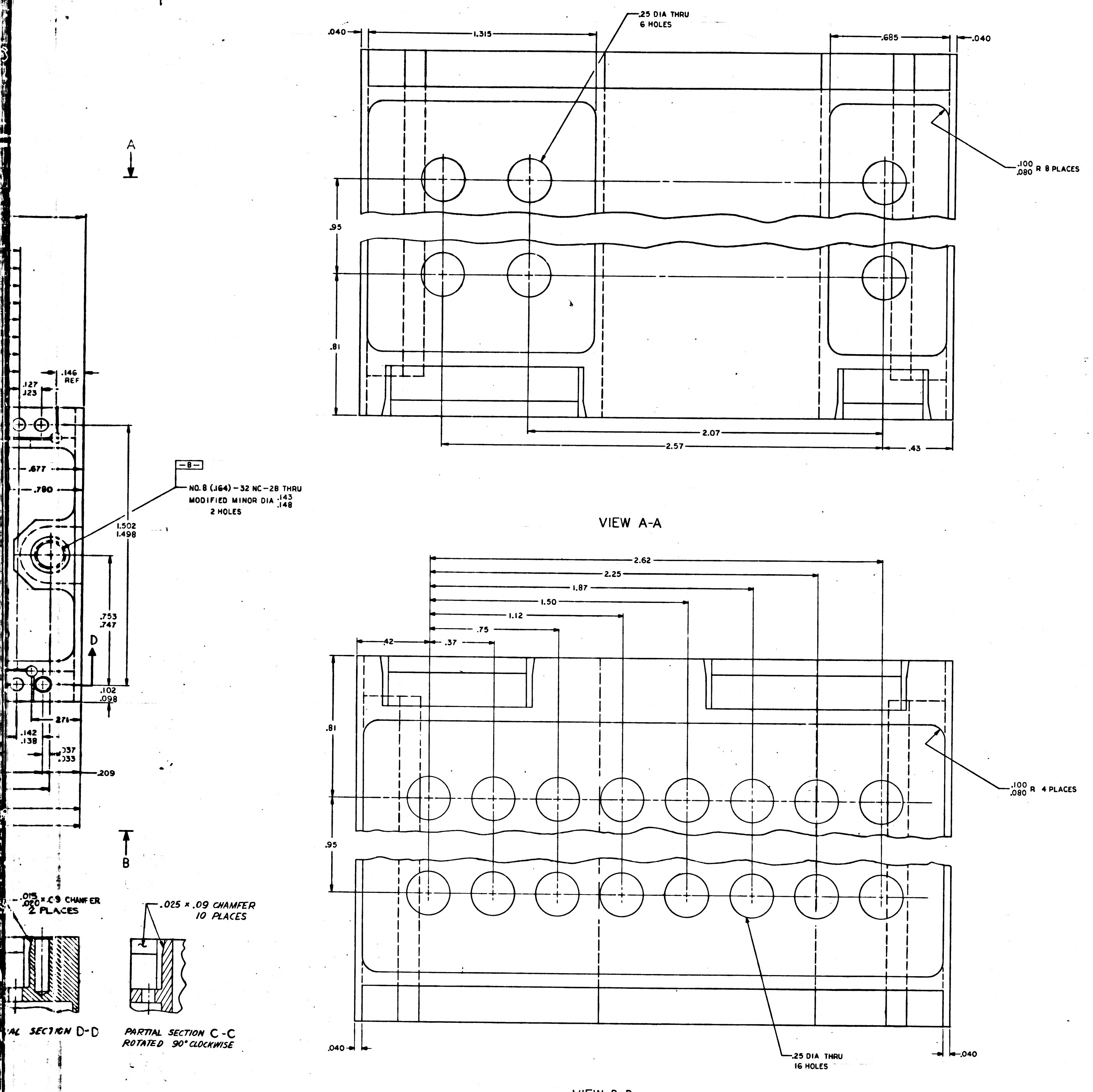
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2.57
.43
.127
.123
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REF
.677
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-B-
NO. 8 (.164) - 32 NC - 2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
1.502
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D
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B
VIEW A-A
2.62
2.25
1.87
1.50
1.12
.75
.42
.37
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.080 R 4 PLACES
.81
.95
.015
.020 × .09 CHAMFER
2 PLACES
.025 × .09 CHAMFER
10 PLACES
AL SECTION D-D
PARTIAL SECTION C-C
ROTATED 90° CLOCKWISE
.040
.040
.25 DIA THRU
16 HOLES
VIEW B-B

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION		FIND NO.
LIST OF MATERIALS					

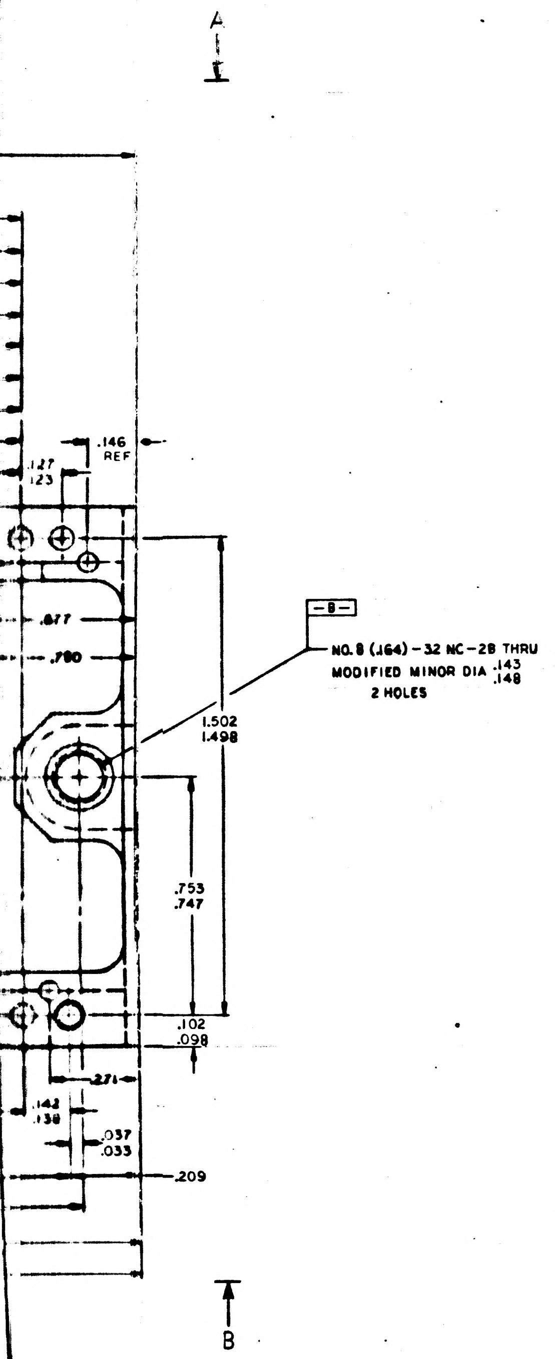
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
		MATERIAL SEE NOTE 2	DRAWN Ed Powers 17 Dec 65 CHECKED APPROVED 7 Feb 66 APPROVED 7 Feb 66	FRAME SIGNAL CONDITIONER GIMBAL RESOLVER	
2007230			APPROVED MIT A. C. METZGER	CODE IDENT NO. 80230	SIZE J
NEXT ASSY	USED ON		APPROVED MSC	DRAWING NO. 2008452	
APPLICATION			DATE	SCALE 5/1	SHEET 1 OF 1

2008452 A

2C08452 A

3/2008452

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS 2602						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.127 .123
.877
.780
-B-
NO. 8 (.164) - 32 NC - 2B THRU
MODIFIED MINOR DIA .143 .148
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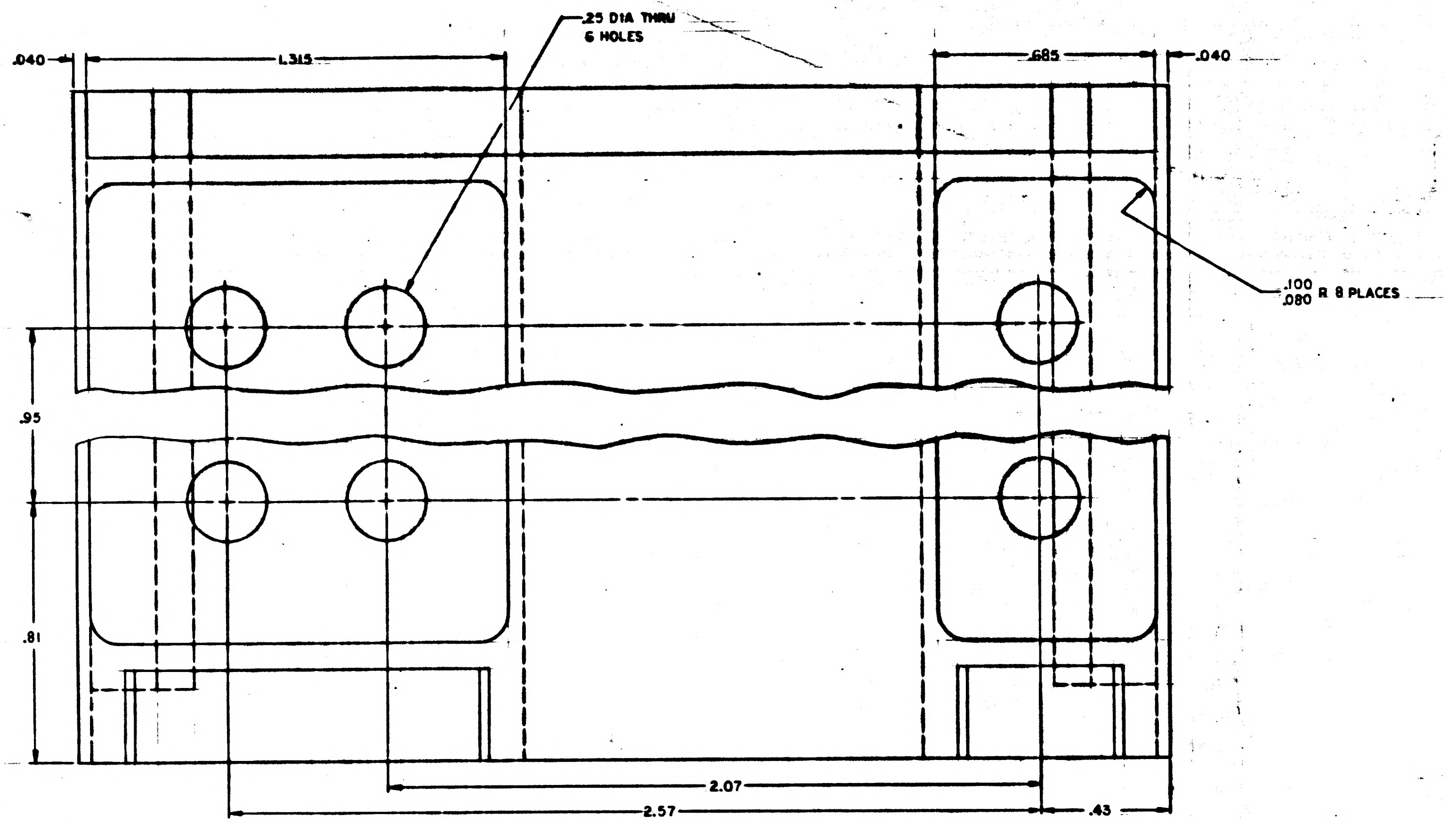
B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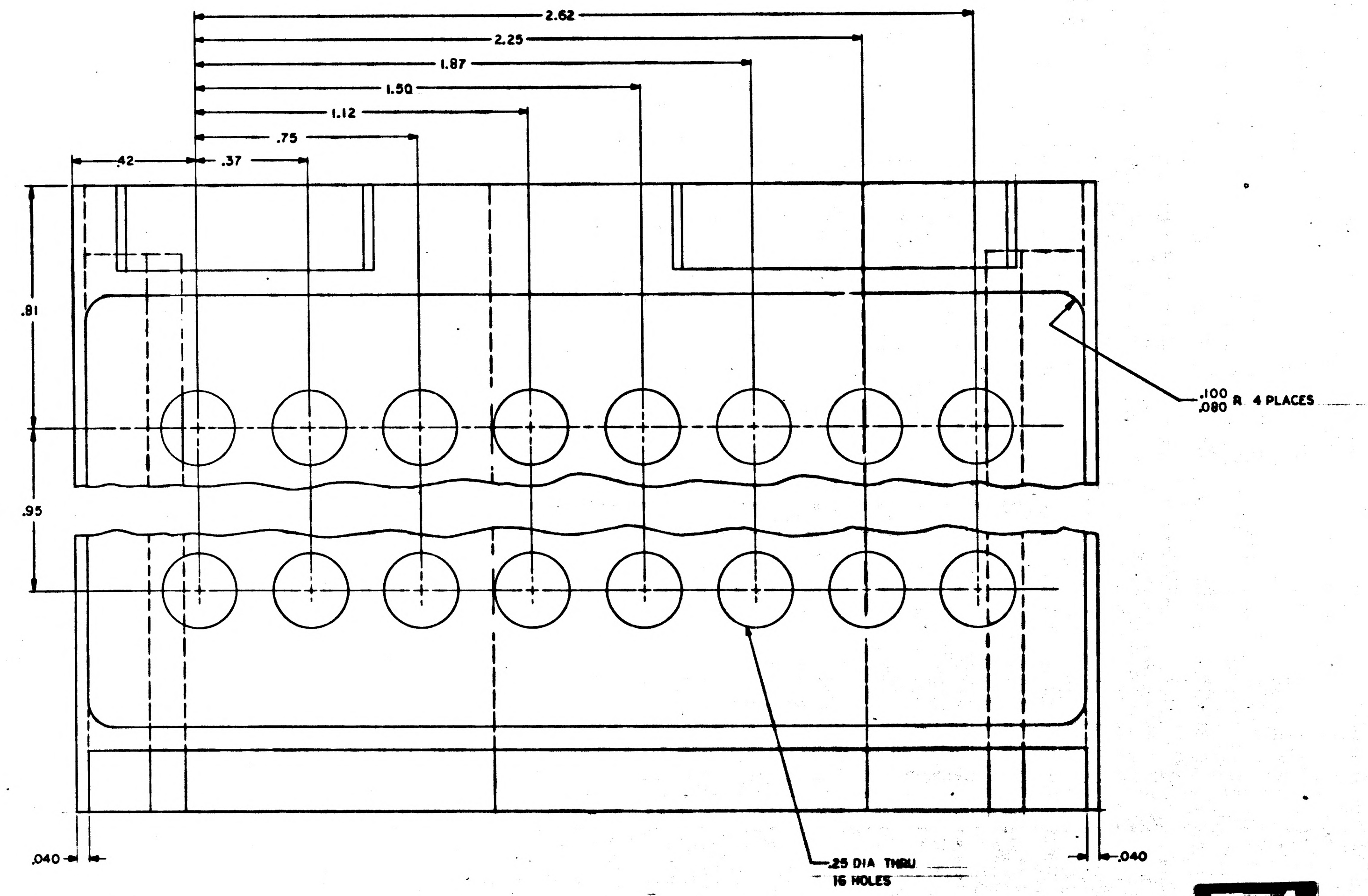
VIEW A-A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1.50
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.100 .080 R 4 PLACES
.95
.040
.040
.25 DIA THRU
16 HOLES

VIEW B-B

F4

MASTER

4H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007230	

APPLICATION

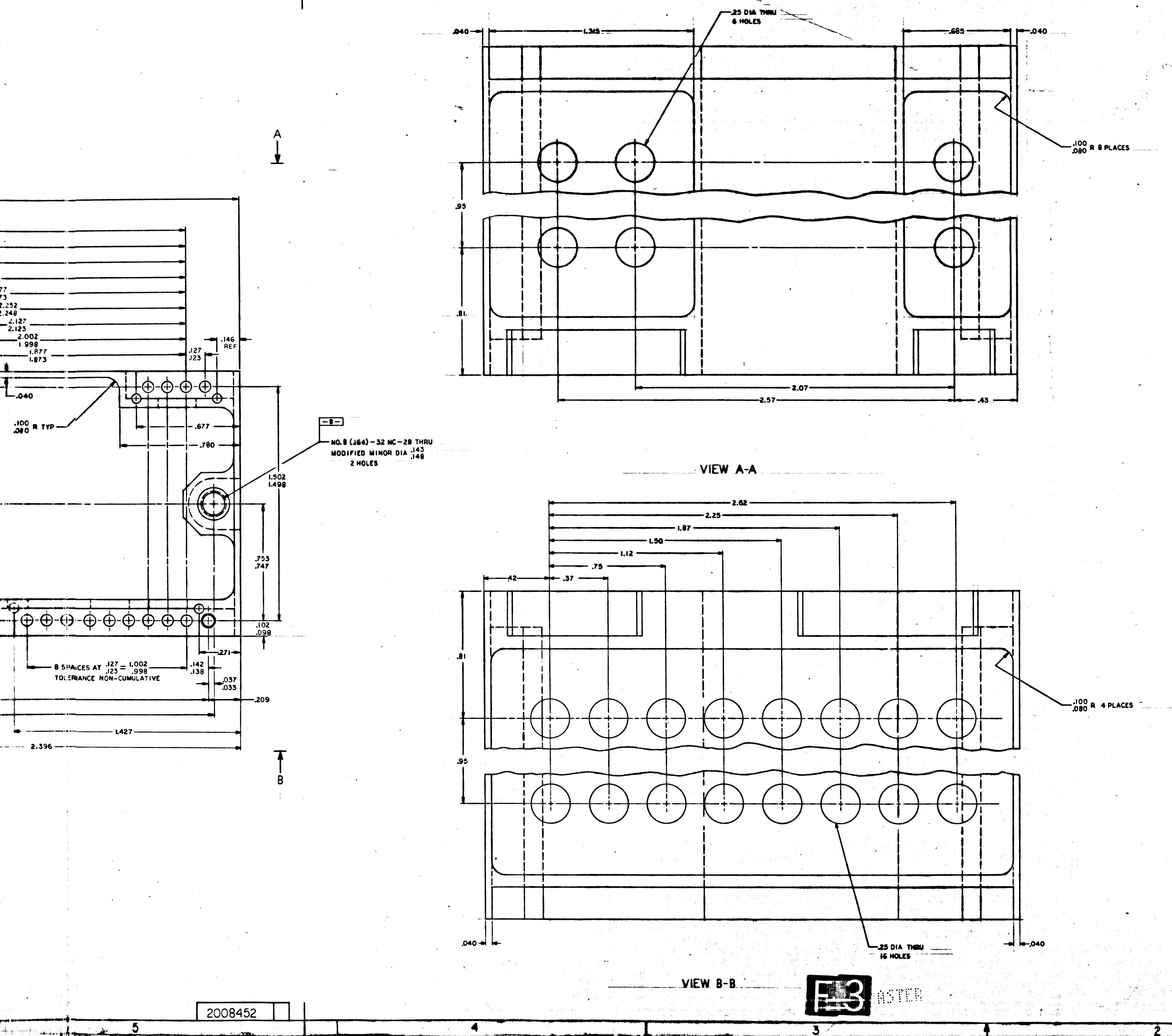
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Ed. Powers 22 Dec 65
CHECKED
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT A. C. Metzger
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008452
SCALE 5/1
SHEET 1 OF 1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6 HOLES
.040
1.315
.685
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.100
.080 R 8 PLACES
.95
.81
2.07
2.57
.43
VIEW A-A
A
B
.146
REF
.127
.123
2.252
2.248
2.127
2.123
2.002
1.998
1.877
1.873
.040
.100
.080 R TYP
.677
.780
-B-
NO. 8 (.164) - 32 NC - 2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
1.502
1.498
.753
.747
.102
.098
.271
8 SPACES AT .127
.123 = 1.002
.998
TOLERANCE NON-CUMULATIVE
.142
.138
.037
.035
.209
1.427
2.396
2.62
2.25
1.87
1.50
1.12
.75
.42
.37
.81
.100
.080 R 4 PLACES
.95
.040
.25 DIA THRU
16 HOLES
.040
VIEW B-B
2008452

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

2007230	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

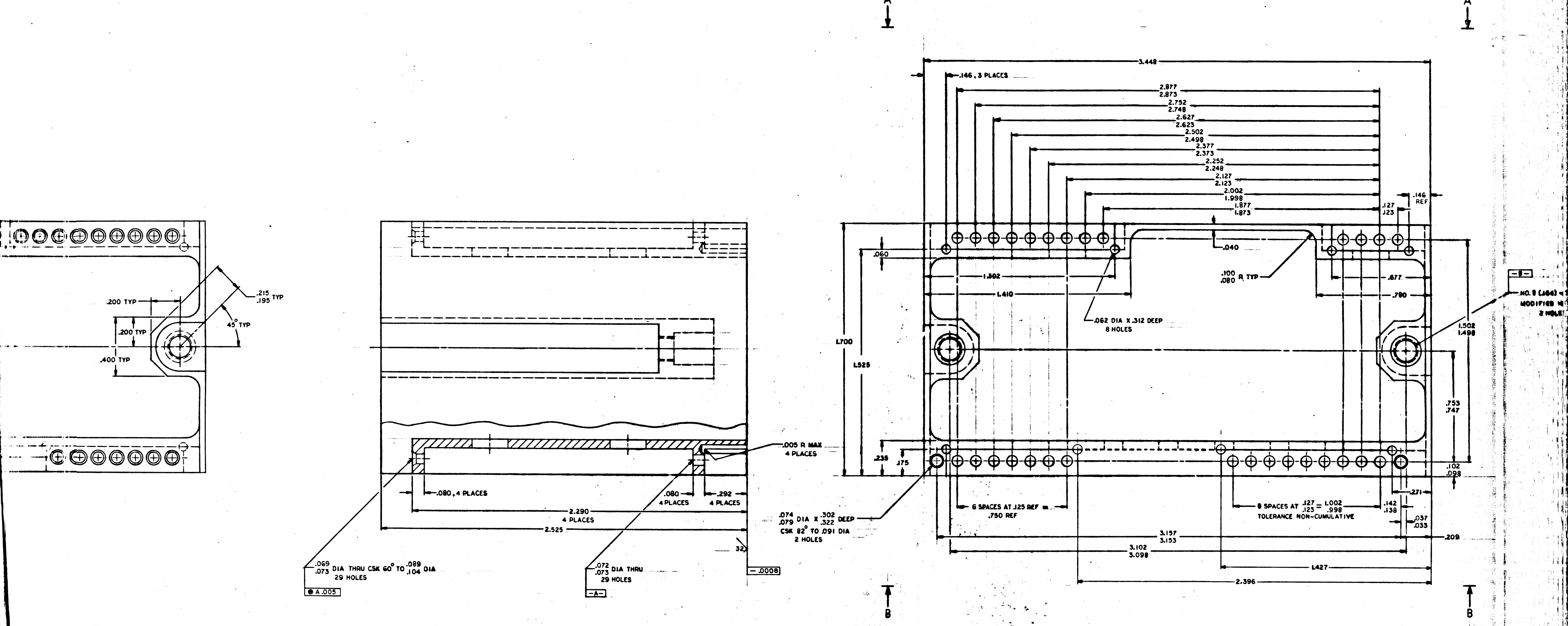
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Ed. Powers 17 Dec 65
CHECKED
APPROVED Feb 66
APPROVED
APPROVED MIT
A. C/[illegible]
APPROVED NSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008452
SCALE 5/1
SHEET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.215
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45° TYP
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4 PLACES
.080, 4 PLACES
.080
4 PLACES
.292
4 PLACES
2.290
4 PLACES
2.525
32
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
29 HOLES
● A .005
.072
.073 DIA THRU
29 HOLES
-A-
— .0008
A
A
B
B
3.448
.146, 3 PLACES
2.877
2.873
2.752
2.748
2.627
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2.502
2.498
2.377
2.373
2.252
2.248
2.127
2.123
2.002
1.998
1.877
1.873
.146
REF
.127
.123
.060
.040
1.302
1.410
.100
.080 R TYP
.677
.790
.062 DIA X .312 DEEP
8 HOLES
1.700
1.525
-B-
NO. 8 (.164)
MODIFIES
2 HOLE
1.502
1.498
.753
.747
.102
.098
.235
.175
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
6 SPACES AT .125 REF
.750 REF
8 SPACES AT .127
.123 = 1.002
.998
TOLERANCE NON-CUMULATIVE
.142
.138
.271
.037
.033
3.157
3.153
.209
3.102
3.098
1.427
2.396

F-2

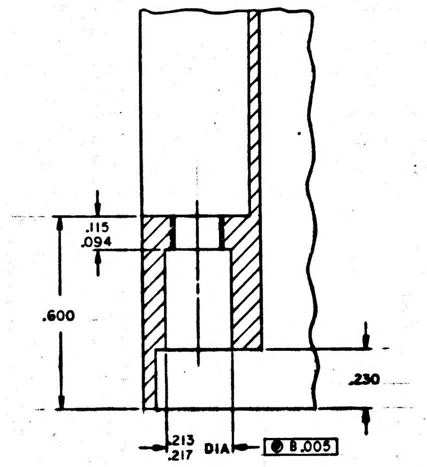
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D

C

B

A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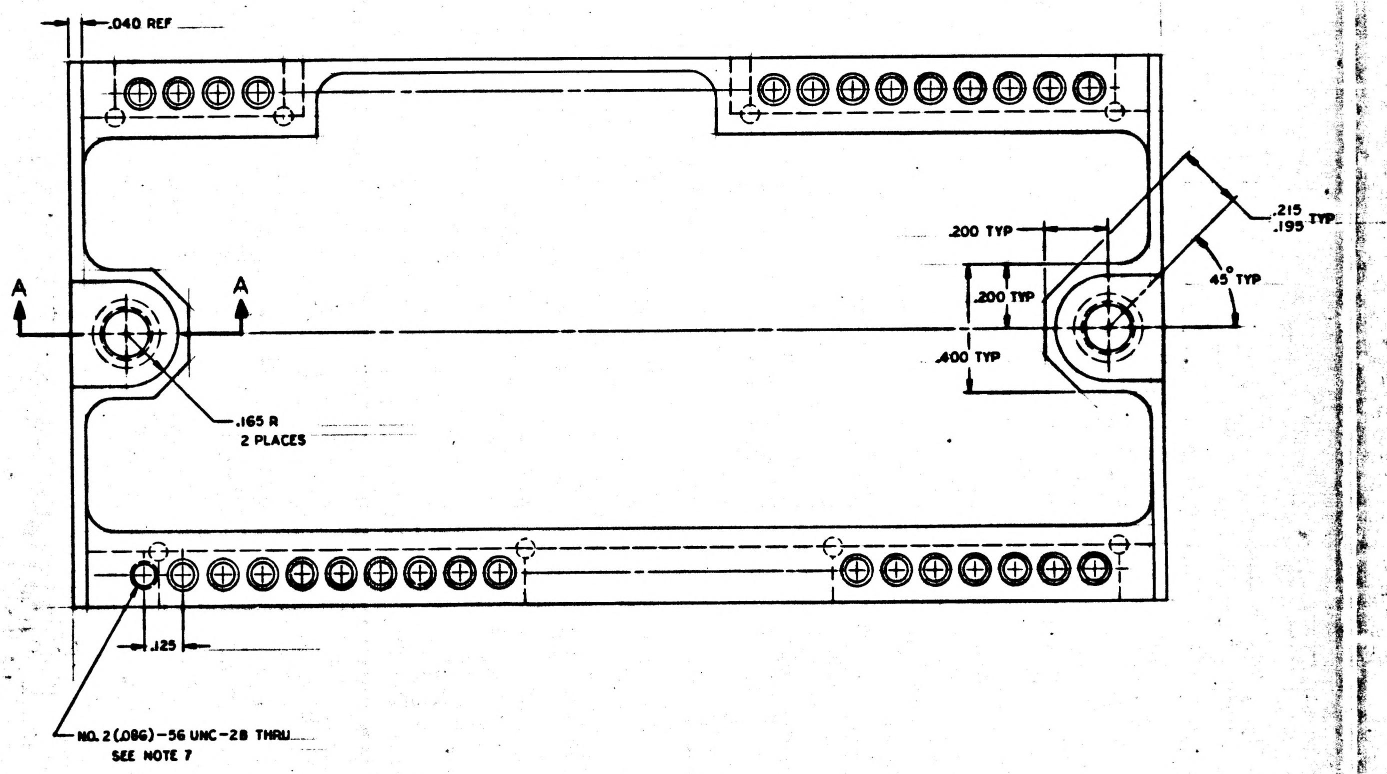
DIA
⊕ B .005

PARTIAL SECTION A-A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.215
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45° TYP
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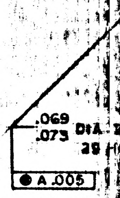
.165 R
2 PLACES
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7


.069
.073 DIA
29
● A .005

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125✓ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019

F1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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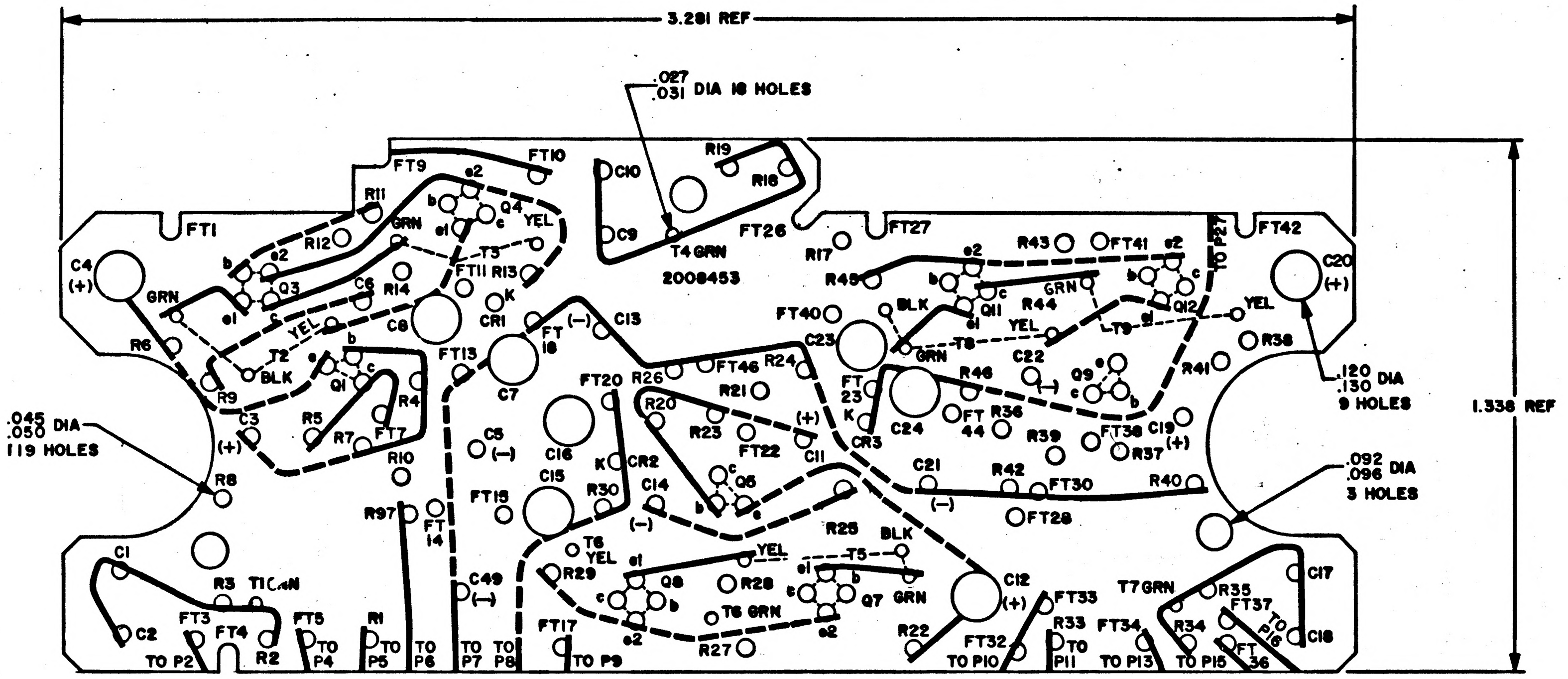
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.050 DIA
119 HOLES
.120
.130 DIA
9 HOLES
.092
.096 DIA
3 HOLES
T4 GRN
2008453
FT1
FT9
FT10
C10
C9
R19
R18
FT26
FT27
FT42
C4
(+)
C20
(+)
R11
R12
GRN
Q3
Q4
YEL
T3
R13
FT11
R14
C6
C8
CR1
K
FT18
C13
R17
R43
FT41
R49
Q11
BLK
GRN
R44
YEL
T8
T9
Q12
R38
FT40
C23
R6
T2
BLK
Q1
R9
C3
(+)
R5
R7
FT7
R4
R10
FT13
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FT20
R26
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R24
R21
R20
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FT22
C11
(+)
CR3
FT23
K
R46
C22
Q9
R41
C24
FT44
R36
R39
FT38
C19
(+)
R37
C5
(-)
C16
CR2
K
C15
R30
C14
(-)
Q5
C21
(-)
R42
FT30
R40
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R8
R97
FT14
FT15
R25
BLK
T5
YEL
C1
R3
T1GRN
C49
(-)
T6
YEL
R29
Q8
R28
Q7
GRN
T6 GRN
C12
(+)
FT33
T7GRN
R35
FT37
C17
C18
C2
FT3
FT4
FT5
R1
FT17
R27
R22
R33
FT34
R34
FT36
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R2
TO P4
TO P5
TO P6
TO P7
TO P8
TO P9
FT32
TO P10
TO P11
TO P13
TO P15
TO P16
TO P17
b
c
e1
e2

REF: DRAWING NO. 2008454 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177, TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINES DENOTE SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ken Healy	8 Dec 65
CHECKED	[illegible]	3 Feb 66
APPROVED	[illegible]	7 Feb 66
APPROVED	[illegible]	7 Feb 66
APPROVED MIT	W Kupfer A. C. HECKER	9 Feb 66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008453

SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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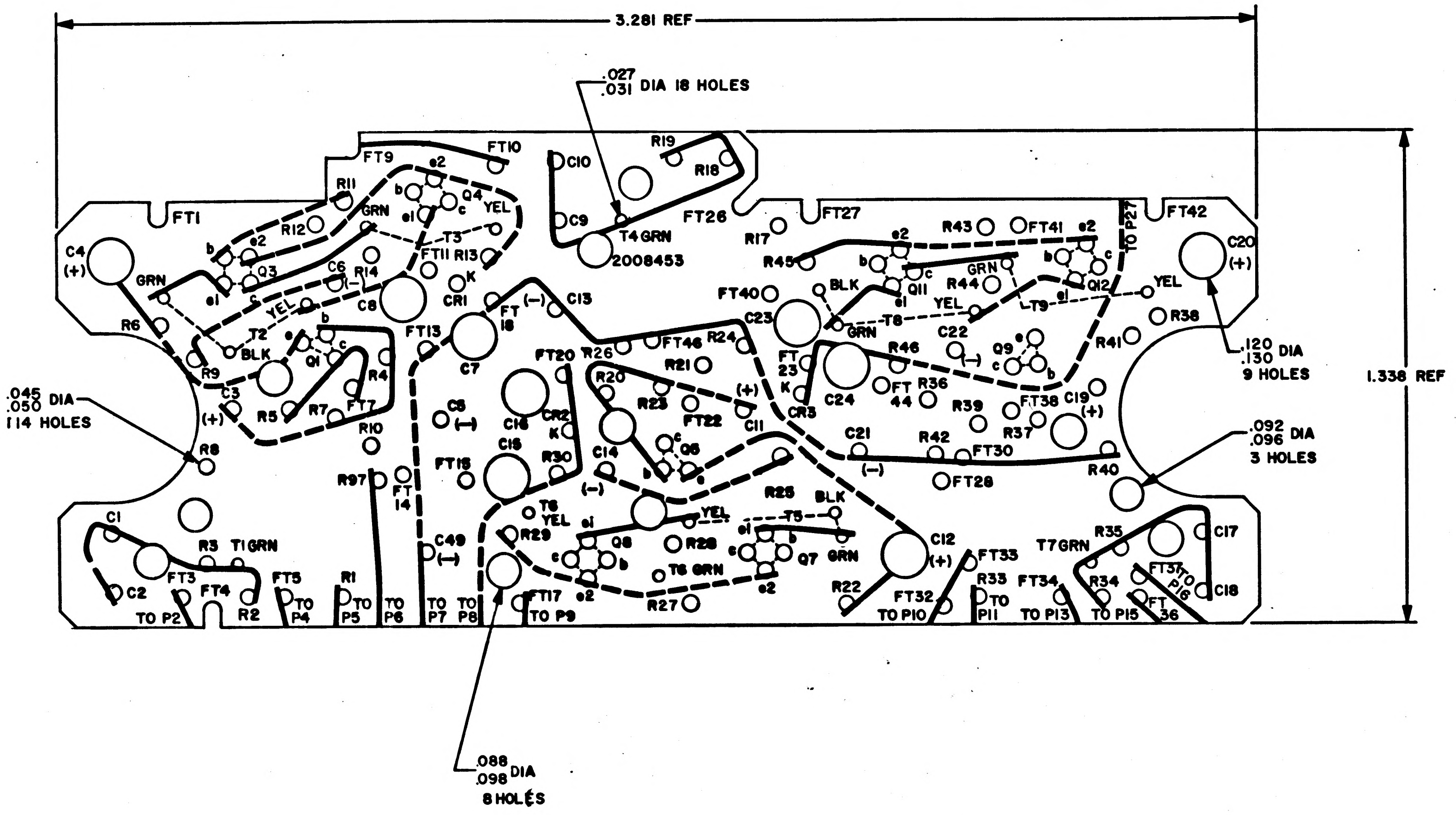
B		REVISED PER TDRR 27969	AA.	LJB	4/12/66	WK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.050 DIA
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.120
.130 DIA
9 HOLES
.092
.096 DIA
3 HOLES
.088
.098 DIA
8 HOLES
FT1
FT9
FT10
R11
R12
e2
b
Q4
c
YEL
GRN
e1
Q3
T3
FT11 R13
C6
R14
(–)
C8
CR1
K
C4
(+)
GRN
R6
T2
YEL
BLK
Q1
R4
R9
C3
(+)
R5
R7
FT7
R10
R8
R97
FT
14
FT13
C7
FT
18
(–)
C13
C5
(–)
FT15
C16
CR2
K
C15
R30
FT20
R26
FT46
R24
R21
R20
R23
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C14
Q6
(–)
C11
(+)
T6
YEL
R29
Q8
R28
T6 GRN
R27
R25
BLK
T5
YEL
Q7
GRN
C49
(–)
C1
R3
T1 GRN
C2
FT3
FT4
TO P2
R2
FT5
TO
P4
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TO
P5
TO
P6
TO
P7
TO
P8
FT17
TO P9
C10
C9
T4 GRN
2008453
R19
R18
FT26
R17
FT27
R45
FT40
C23
BLK
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GRN
T8
YEL
R44
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FT41
Q12
T9
TO P27
FT42
C20
(+)
YEL
R38
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C22
(–)
Q9
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FT
23
K
CR3
C24
FT
44
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36
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REF: DRAWING NO. 2008454 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177, TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINES DENOTE SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 20 DEC 65
CHECKED [illegible] 3 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED MIT W Kupfer 9 Feb 66 A. C. [illegible]EGER
APPROVED MSC DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

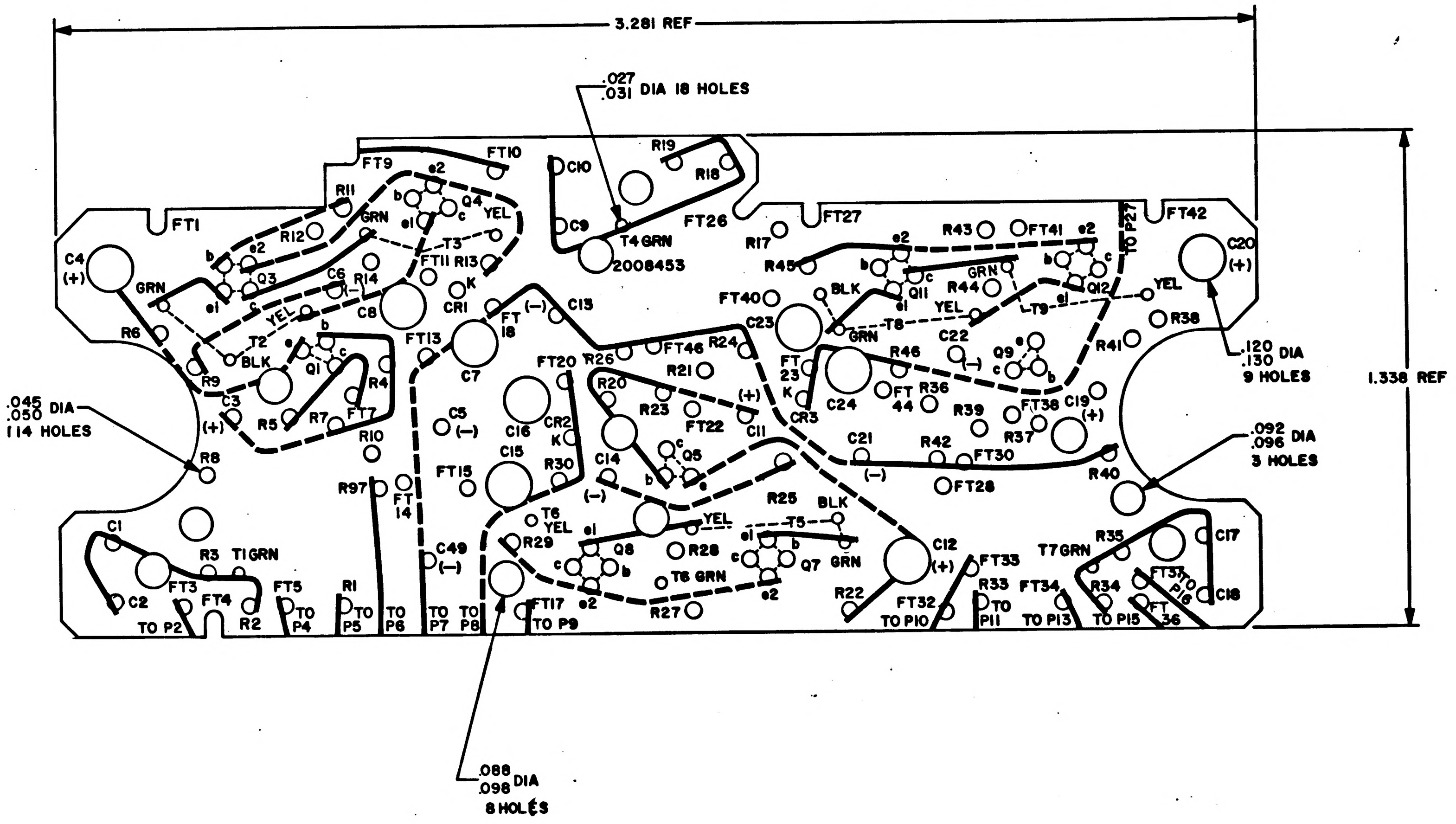
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008453
SCALE 5/1
SHEET 1 OF 1

2008453 B

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 27176	WFH	LJB	3/18/66		WR
B		REVISED PER TDRR 27969	AA.	LJB	4/26/66		WR
C		REVISED PER TDRR 28478	LL	LJB	5.17.66	Wom	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1.338 REF
.120
.130 DIA
9 HOLES
.092
.096 DIA
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.045
.050 DIA
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REF: DRAWING NO. 2008454 FOR
PHOTOGRAPHIC MASTER

NOTES:
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MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 20 Dec 65
CHECKED 3 Feb 66
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT W Kupfer 9 Feb 66
A. C. [illegible]ECKER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008453
SCALE 5/1
SHEET 1 OF 1

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REVISIONS 26027						
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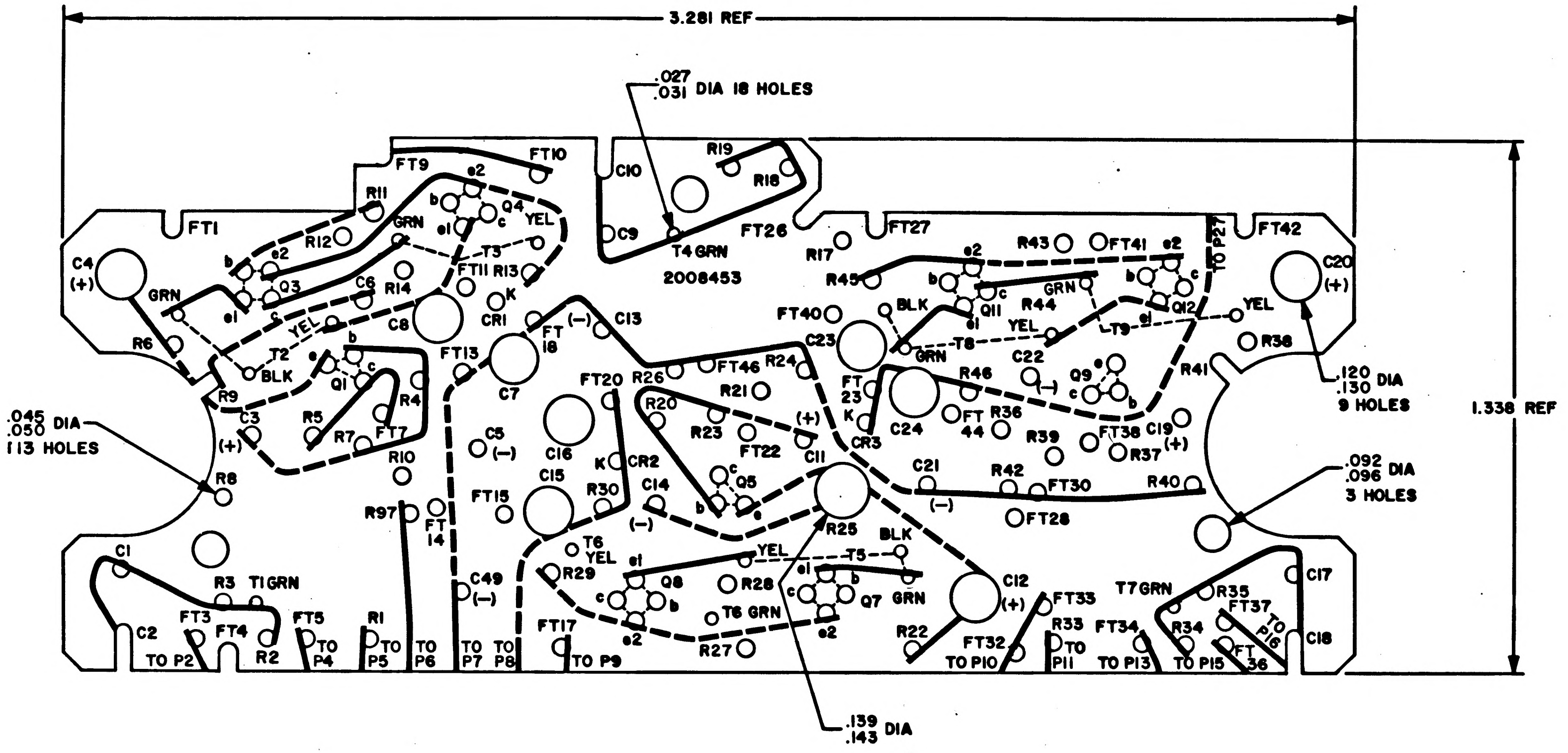

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.027
.031 DIA 18 HOLES
1.338 REF
.045
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113 HOLES
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.130 DIA
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.092
.096 DIA
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REF: DRAWING NO. 2008454 FOR PHOTOGRAPHIC MASTER

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2007230	
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MATERIAL
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INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Ken Healy	20 Dec 65
CHECKED		3 Feb 66
APPROVED		7 Feb 66
APPROVED		7 Feb 66
APPROVED MIT	A. C.	9 Feb 66
APPROVED MSC		DATE

WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008453
SCALE 5/1		SHEET 1 OF 1

2008453

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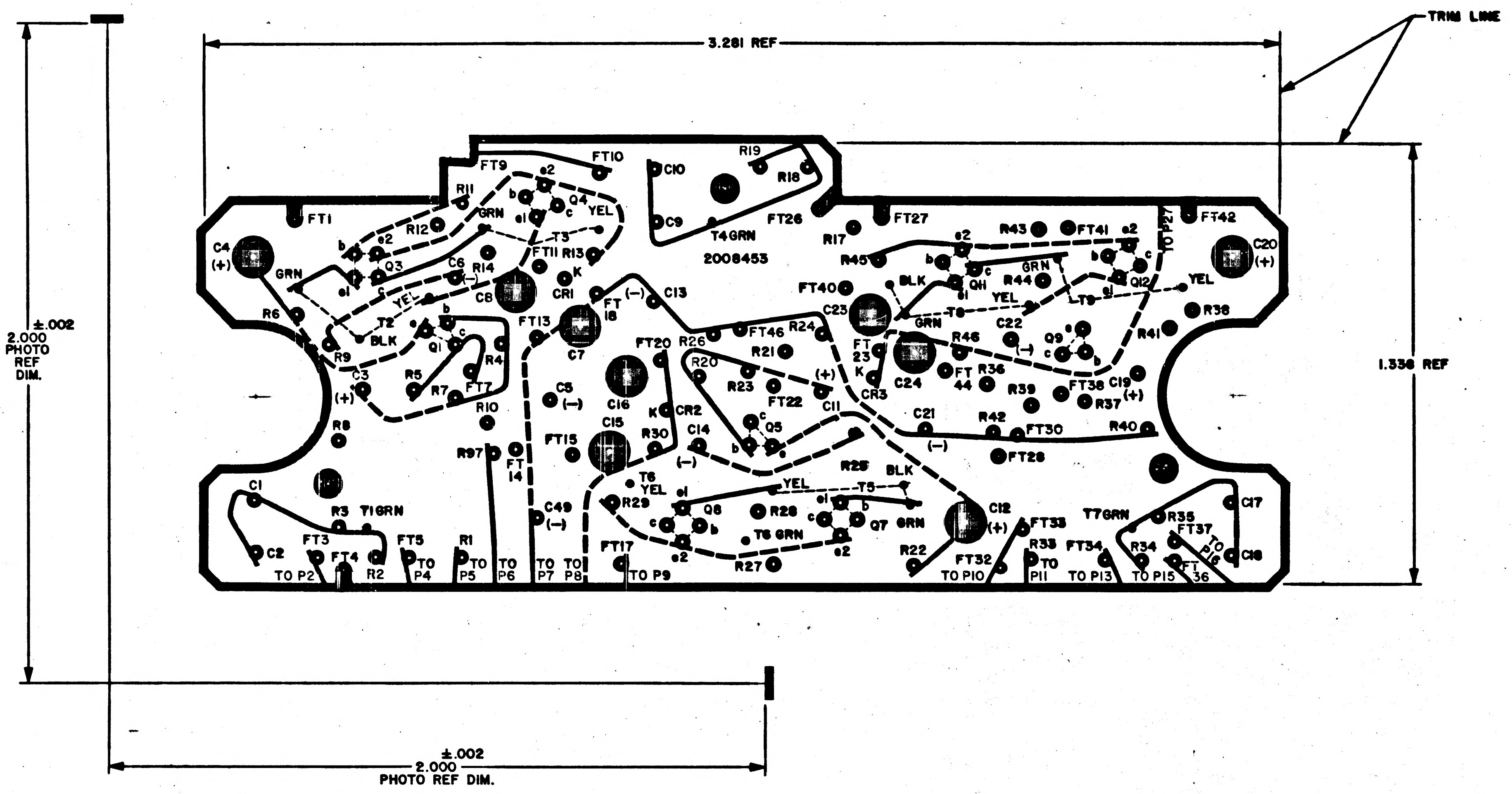
REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27176	BFH	KTB	3/18/66	WK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NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
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MATERIAL

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CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Gm Healy 21 Dec 65
CHECKED 3 Feb 66
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT W Kupfer 9 Feb 66
APPROVED MSC A. C. METZGER
DATE

PHOTOGRAPHIC MASTER
WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008454

SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

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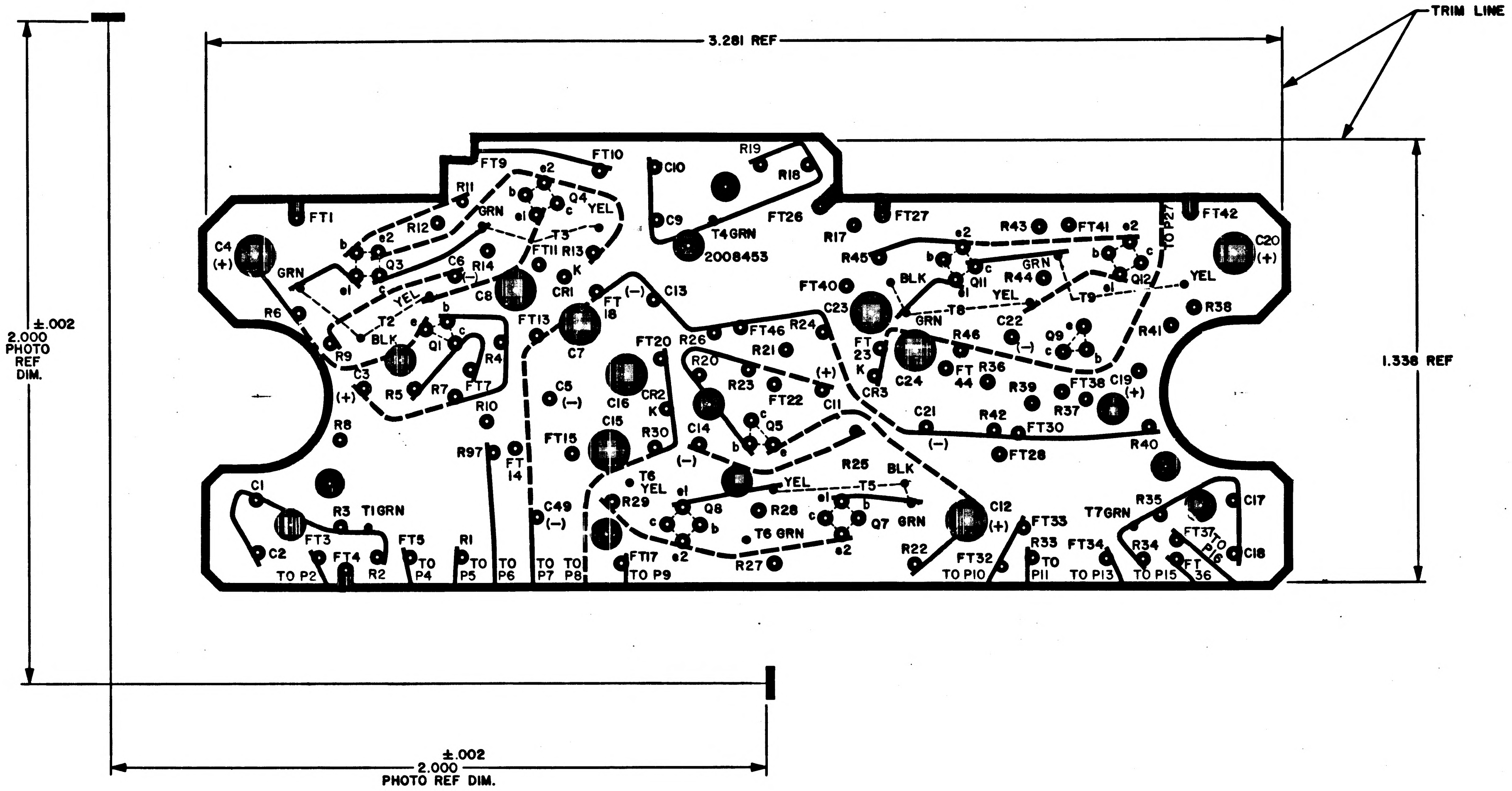
B		REVISED PER TDRR 27969	AA.	LTB	4/26/66	



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NOTES:
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DRAWN Ken Healy 21 Dec 65
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APPROVED 7 Feb 66
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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008454
SCALE 5/1
SHEET 1 OF 1

2008454 B

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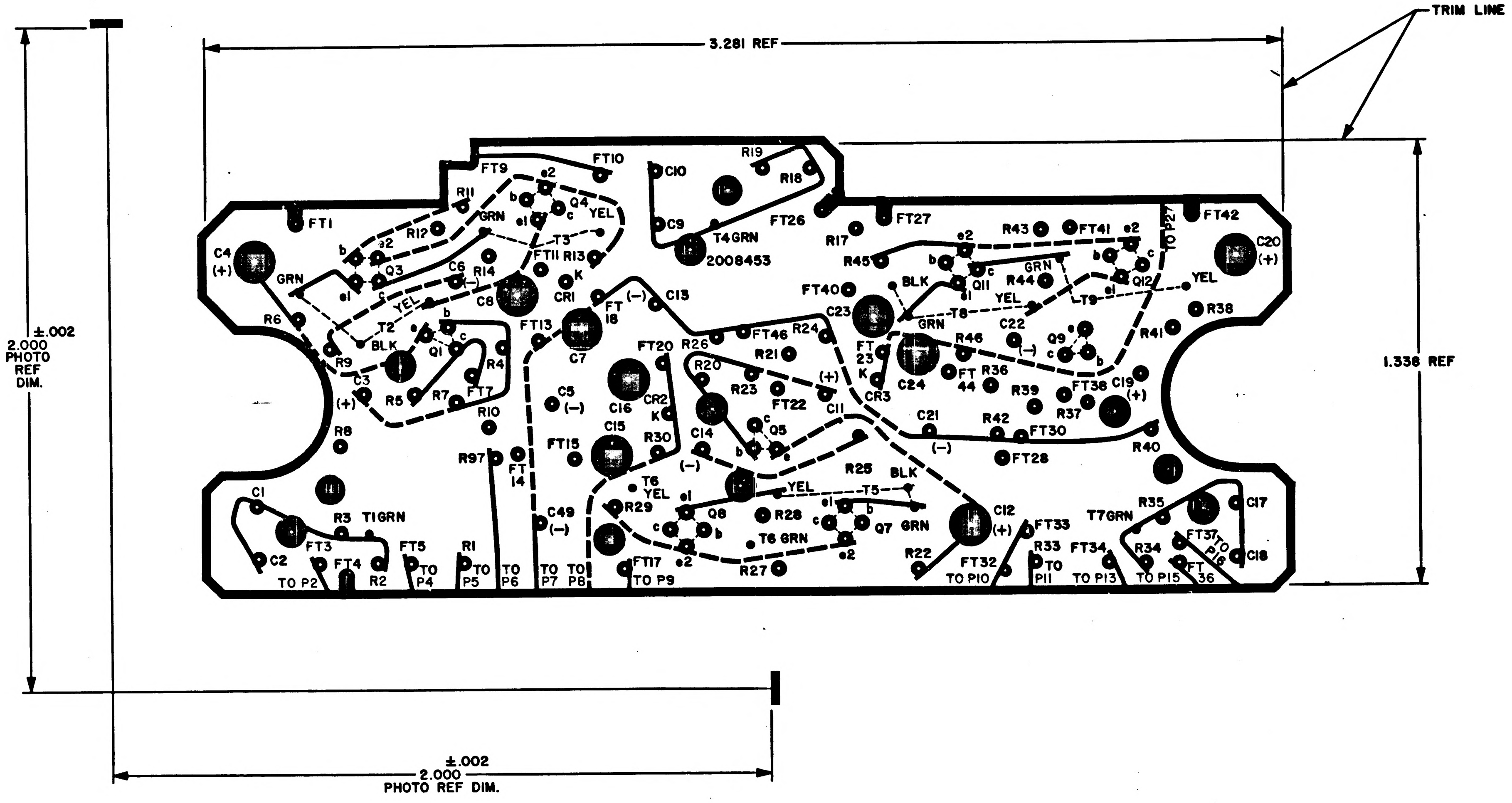
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2008453
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APPROVED 7 Feb 66
APPROVED MIT 9 Feb 66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

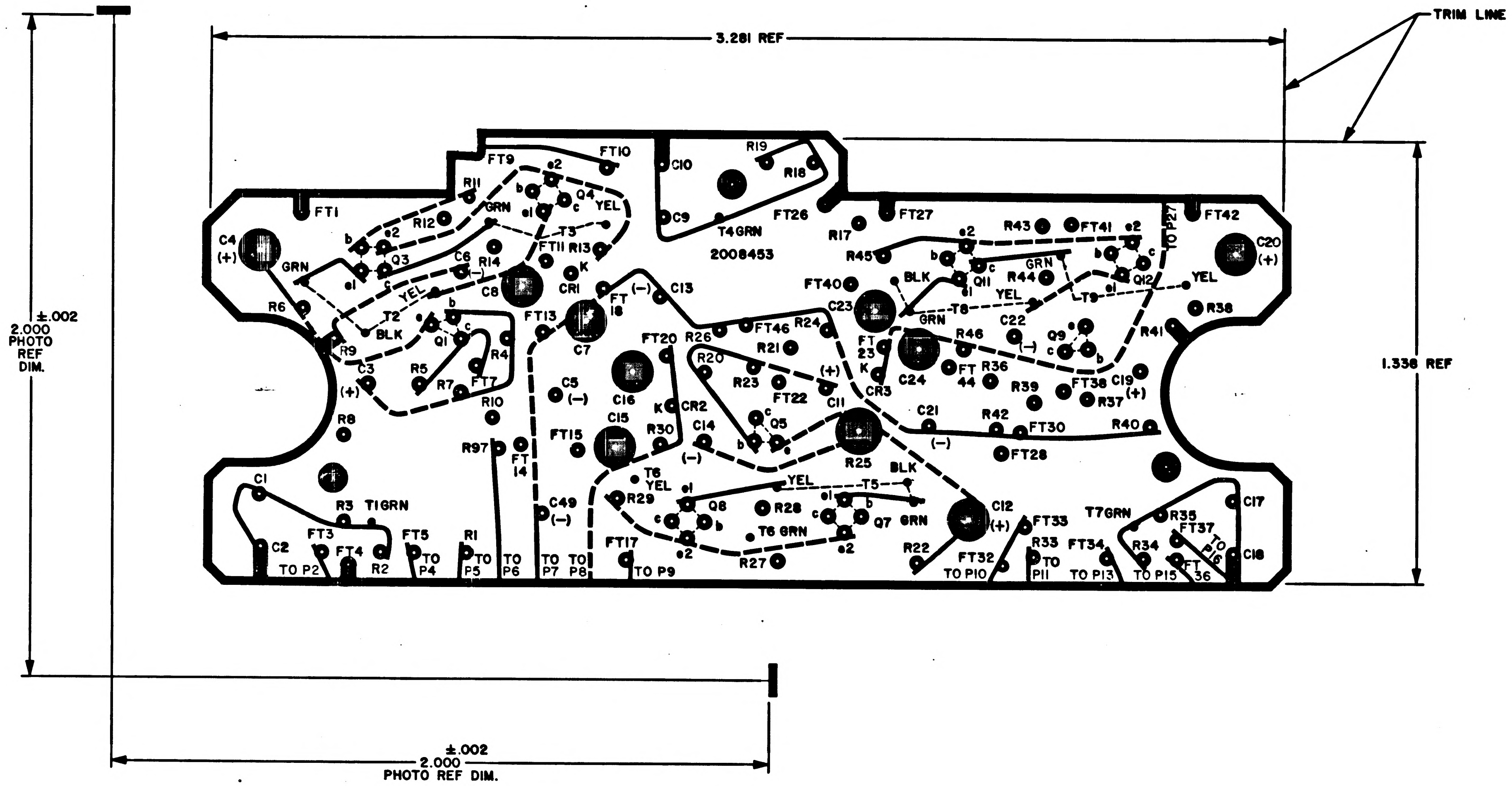
PHOTOGRAPHIC MASTER
WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008454
SCALE 5/1
SHEET 1 OF 1

2008454 C

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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1.338 REF
±.002
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PHOTO
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DIM.
±.002
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FT1
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R43
FT41
e2
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GRN
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CR1
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BLK
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b
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C7
FT20
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FT46
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GRN
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Q9
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C3
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R20
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R23
(+)
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C24
FT
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R36
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FT38
C19
(+)
R37
C5
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C16
R10
K
CR2
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CR3
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Q5
C21
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R97
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FT5
R1
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R34
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TO
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TO
TO
FT17
e2
R27
e2
FT32
TO
FT
36
C18
TO P2
R2
P4
P5
P6
P7
P8
TO P9
TO P10
P11
TO P13
TO P15

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 21 Dec 65
CHECKED 3 Feb 66
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT W Kopfer 9 Feb 66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008454

SCALE 5/1 SHEET 1 OF 1

2008454

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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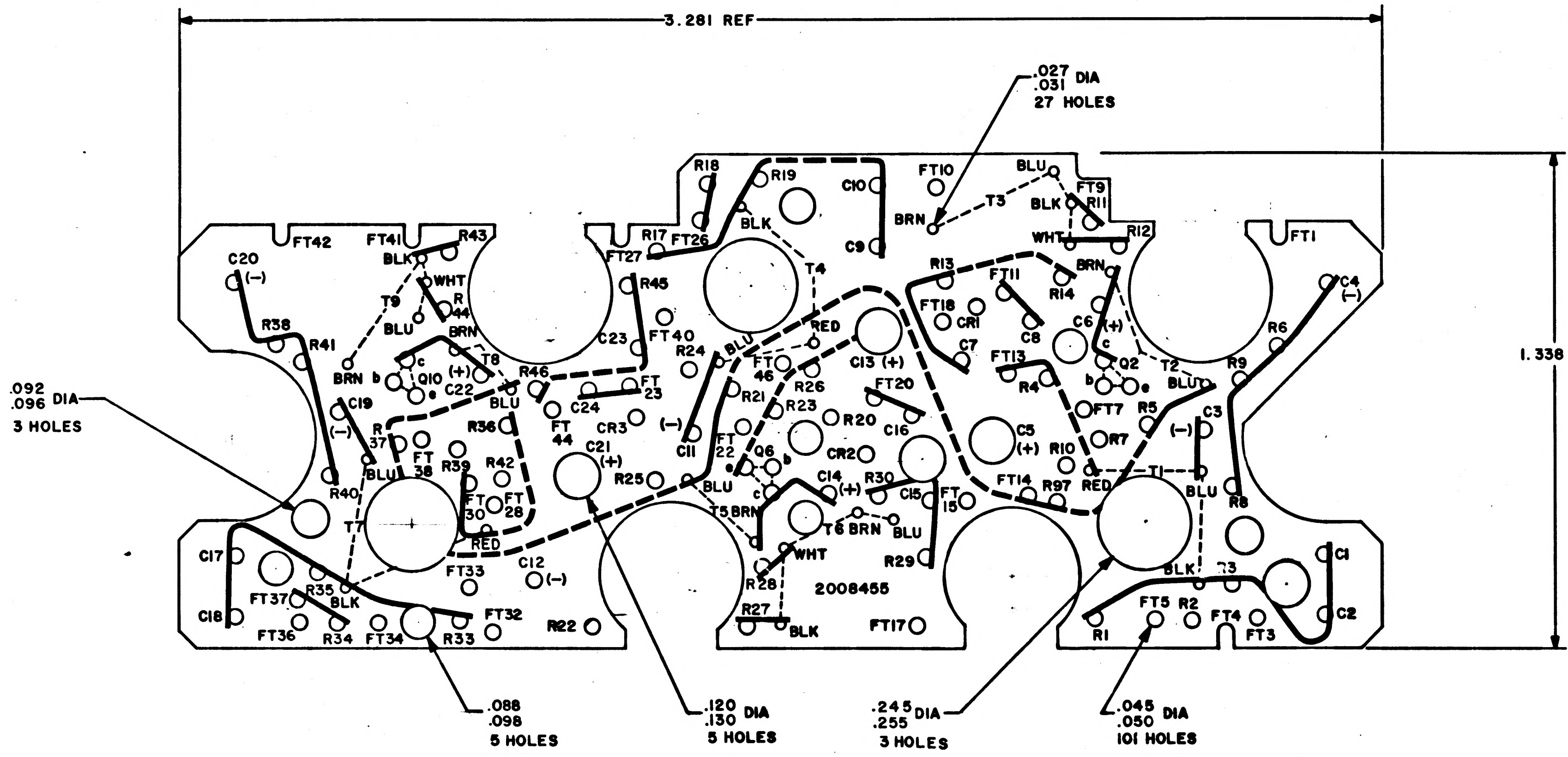
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1.338 REF
.027 .031 DIA 27 HOLES
.092 .096 DIA 3 HOLES
.088 .098 5 HOLES
.120 .130 DIA 5 HOLES
.245 .255 DIA 3 HOLES
.045 .050 DIA 101 HOLES
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FT42
FT41
R43
BLK
C20 (−)
T9
WHT
R 44
BLU
BRN
R38
R41
BRN
Q10
C22
T8
R46
C19 (−)
R 37
BLU
FT 38
R36
R39
R42
FT 30
FT 28
R40
T7
RED
C17
C18
FT37
R35
BLK
FT36
R34
FT34
R33
FT33
C12 (−)
FT32
R22
R18
R19
FT27
R17
FT26
C10
C9
T4
R45
C23
FT40
R24
FT 23
C24
CR3
FT 44
C21 (+)
(−)
C11
R25
BLU
FT 46
RED
C13 (+)
R21
R26
R23
FT20
R20
C16
FT 22
Q6
CR2
C14 (+)
R30
C15
FT 15
T5
BRN
T6
BRN
BLU
WHT
R28
R27
BLK
R29
FT17
FT10
BRN
T3
BLU
FT9
BLK
R11
WHT
R12
R13
CR1
FT18
FT11
BRN
R14
C7
C8
C6 (+)
FT13
R4
Q2
T2
BLU
C5 (+)
FT7
R5
R7
R10
FT14
R97
RED
T1
BLU
C3 (−)
R9
R6
FT1
C4 (−)
R8
BLK
R3
C1
C2
FT5
R2
FT4
FT3
R1

REF: DRAWING NO. 2008456 FOR PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177, TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTE SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007230	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. Horgan 30 Dec 65
CHECKED R. P. Kingsbury 3 Feb 66
APPROVED Rudger 7 Feb 66
APPROVED L. Harris 7 Feb 66
APPROVED MIT W. Kupfer 9 Feb 66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008455
SCALE 5/1
SHEET 1 OF 1

2008455 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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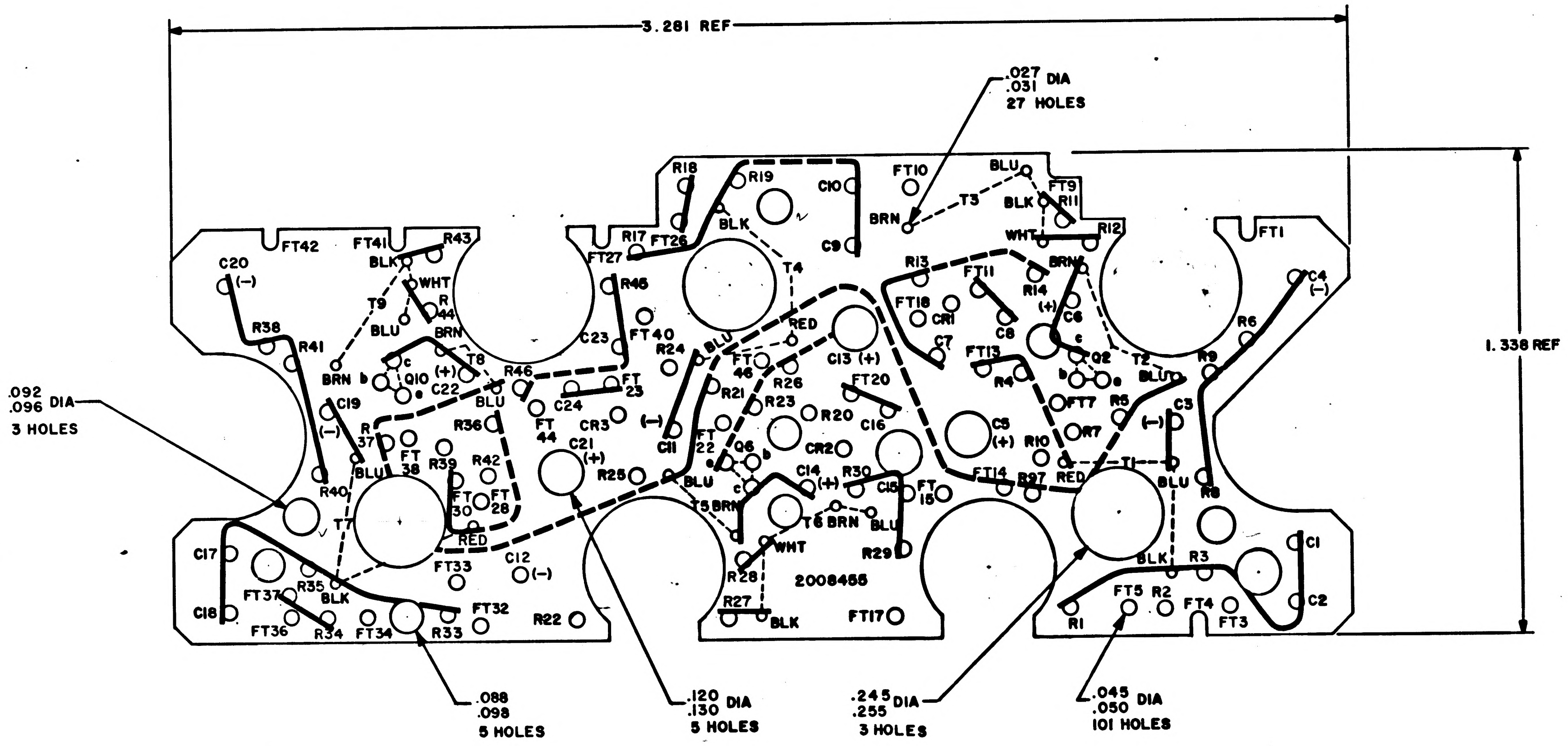
B		REVISED RER TDRR 28478			5-17-66	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1.338 REF
.027 DIA
.031
27 HOLES
.092
.096 DIA
3 HOLES
.088
.098
5 HOLES
.120
.130 DIA
5 HOLES
.245
.255 DIA
3 HOLES
.045
.050 DIA
101 HOLES
2008455
FT42
FT41
R43
BLK
WHT
C20
(−)
T9
R
44
BLU
BRN
R38
R41
BRN
b
c
Q10
e
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C22
T8
R46
BLU
C19
(−)
R
37
BLU
FT
38
R36
R39
R42
FT
30
FT
28
RED
R40
T7
C17
C18
FT37
R35
BLK
FT36
R34
FT34
R33
FT32
FT33
C12
(−)
R22
FT27
R17
FT26
R18
R19
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C9
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C23
FT40
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C24
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C11
FT
22
BLU
T4
RED
FT
46
R21
R26
R23
Q6
e
b
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C13 (+)
FT20
R20
CR2
C16
C14
(+)
R30
C15
FT
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T5 BRN
T6 BRN
BLU
WHT
R28
R27
BLK
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FT17
FT10
BRN
T3
BLU
BLK
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FT18
CR1
C7
FT11
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BRN
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R97
RED
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BLU
C3
(−)
BLU
R8
R9
R6
C4
(−)
FT1
BLK
R3
C1
C2
FT5
R2
FT4
FT3
R1

REF: DRAWING NO. 2008456 FOR
PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177, TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTE SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. Horgan 30 Dec 65
CHECKED 3 Feb 66
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT W Kupfer 8 Feb 66
A. L. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008455
SCALE 5/1
SHEET 1 OF 1

2008455 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027						
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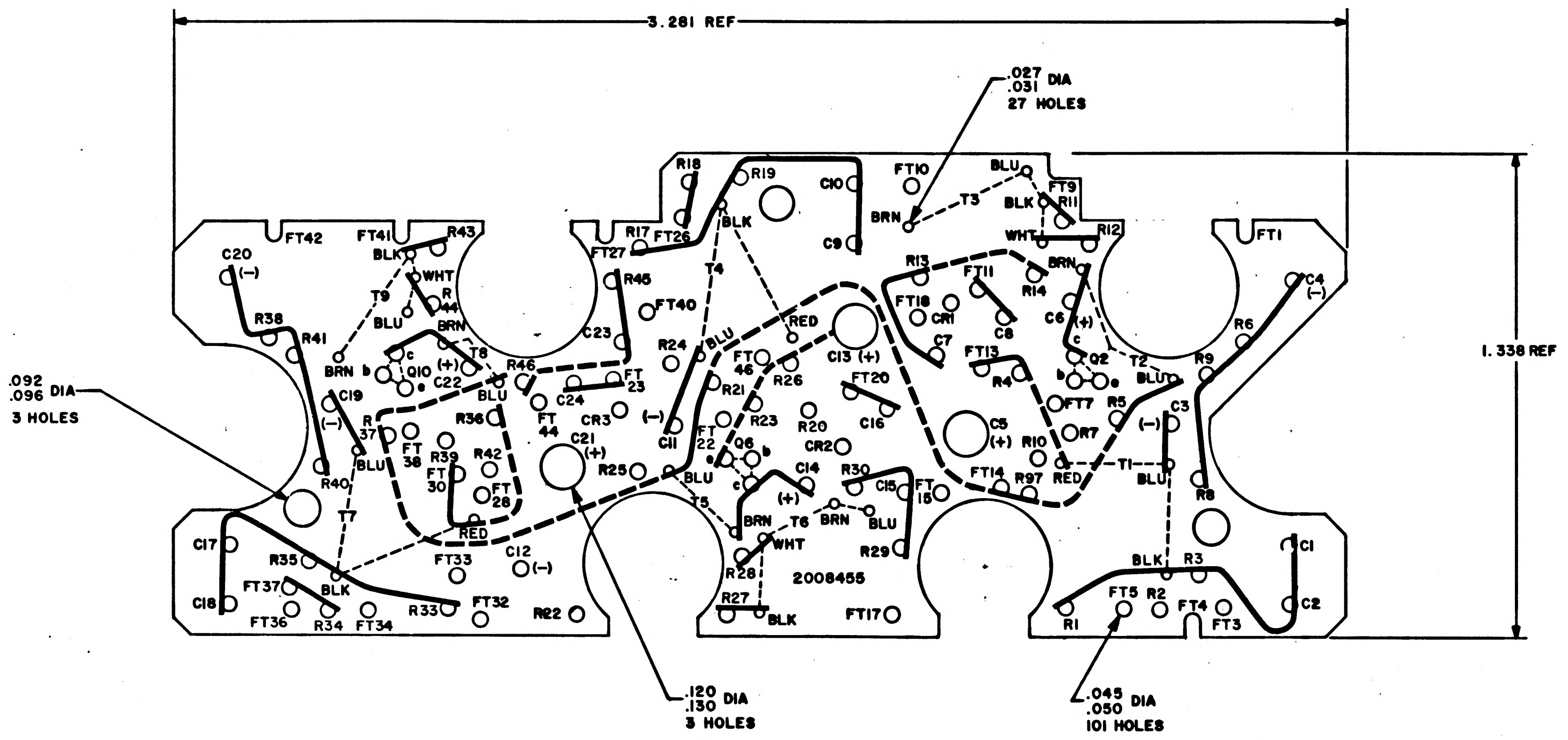
3.281 REF
1.338 REF
.027
.031 DIA
27 HOLES
.092
.096 DIA
3 HOLES
.120
.130 DIA
3 HOLES
.045
.050 DIA
101 HOLES
2008455
FT1 FT3 FT4 FT5 FT9 FT10 FT11 FT13 FT14 FT15 FT17 FT18 FT20 FT22 FT23 FT26 FT27 FT28 FT30 FT32 FT33 FT34 FT36 FT37 FT38 FT40 FT41 FT42 FT44 FT46
R1 R2 R3 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R33 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45 R46 R97
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24
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Q2 Q6 Q10
T1 T2 T3 T4 T5 T6 T7 T8 T9
BLK BLU BRN WHT RED
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REF: DRAWING NO. 2008456 FOR PHOTOGRAPHIC MASTER

NOTES:
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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
	LIST OF MATERIALS		

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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007230	
NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	W. Horgan	20 Dec 65
CHECKED		3 Feb 66
APPROVED		7 Feb 66
APPROVED		7 Feb 66
APPROVED MIT	W Kupfer	
APPROVED MSC		
		DATE

WIRING BOARD B
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008455
SCALE 5/1		SHEET 1 OF 1

2008455

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REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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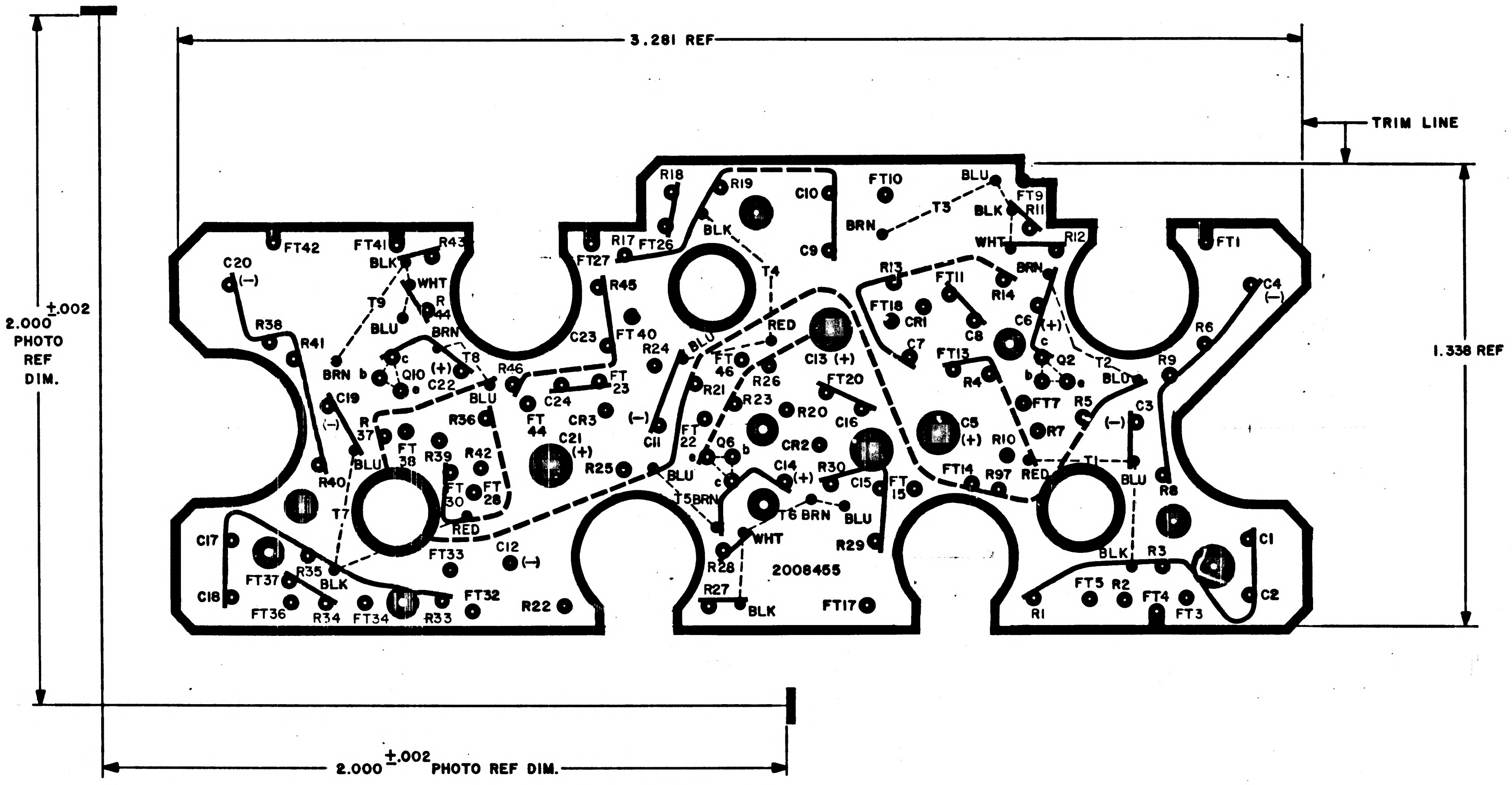
3.281 REF
TRIM LINE
1.338 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
2008455
FT1
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C2
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C4 (−)
C5 (+)
C6 (+)
C7
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C12 (−)
C13 (+)
C14 (+)
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C16
C17
C18
C19 (−)
C20 (−)
C21 (+)
C22 (+)
C23
C24
CR1
CR2
CR3
R1
R2
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R6
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T1
T2
T3
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T5
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T7
T8
T9
BLK
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BRN
WHT
RED
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c

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powers	12/20/65
CHECKED	R. P. Kingsbury	3 Feb 66
APPROVED	Richner	7 Feb 66
APPROVED		7 Feb 66
APPROVED MIT	A. C. METZGER	9 Feb 66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD B
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008456
SCALE 5/1		SHEET 1 OF 1

2008456 A

8 7 6 5 4 3 2 1

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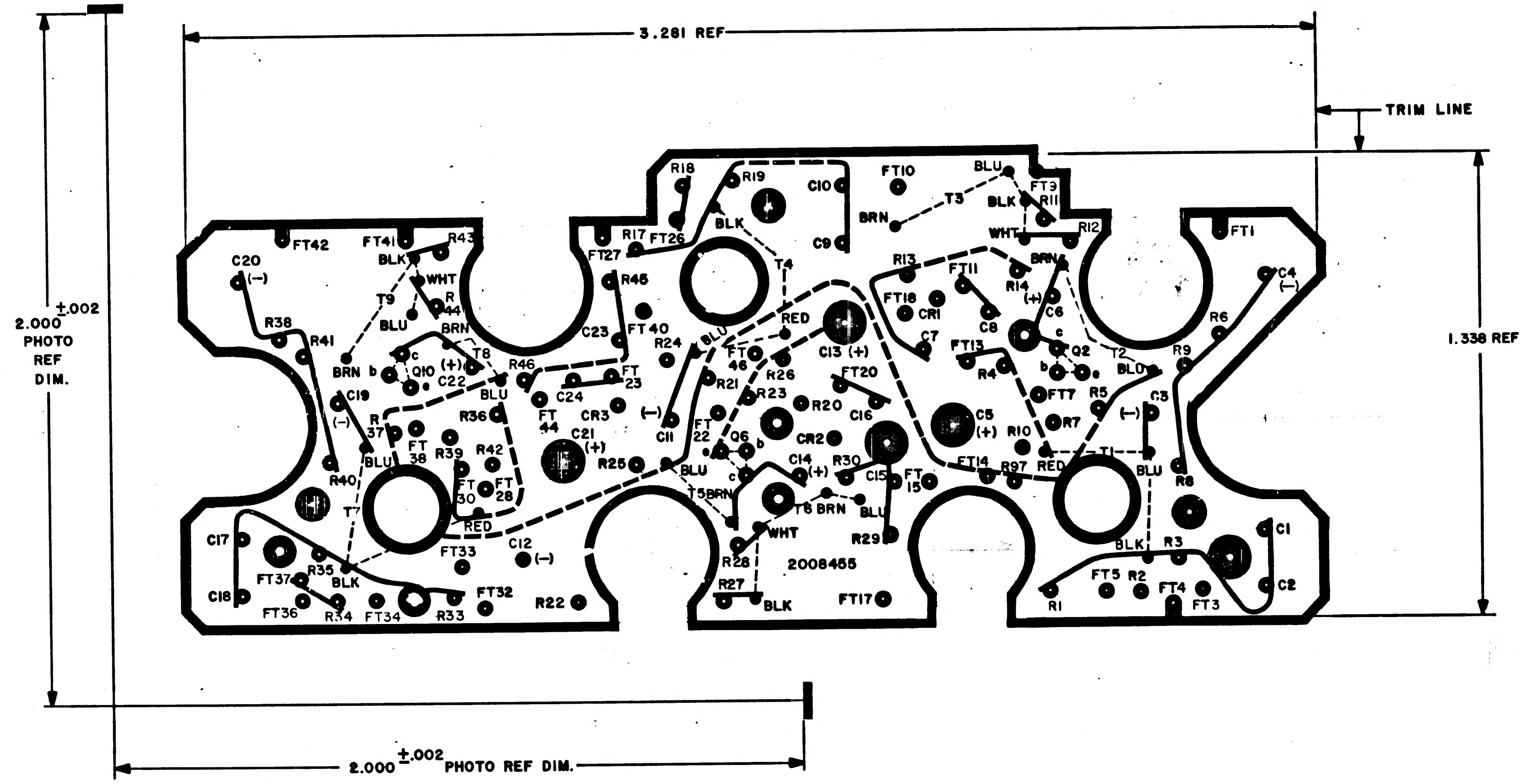
REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27969		KTB	1/24/66	
B		REVISED PER TDRR 28478	"	KTB	5/17/66	


3.281 REF
TRIM LINE
1.338 REF
2.000 ±.002 PHOTO REF DIM.
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2008455
FT42
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BLK
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R 44
T9
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R38
R41
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e
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C22
T8
C19 (−)
R 37
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RED
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FT37
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FT40
R24
FT 23
C24
CR3
FT 44
C21 (+)
R25
(−)
C11
FT 22
BLU
RED
FT 46
R26
R21
R23
R20
C13 (+)
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C16
CR2
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C14 (+)
R30
C15
FT 15
T5 BRN
T8 BRN
BLU
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FT18
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R4
FT7
R5
R7
R10
C5 (+)
FT14
R97
RED
T1
T2
BLU
FT1
C4 (−)
R6
R9
C3 (−)
BLU
R8
BLK
R3
C1
C2
FT5
R2
FT4
FT3
R1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powers	12/20/65
CHECKED	R. P. Kingsbury	3 Feb 66
APPROVED	Rucker	7 Feb 66
APPROVED		7 Feb 66
APPROVED MIT	W. Kupfer	9 Feb 66
	A. G. METZGER	
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD B
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008456

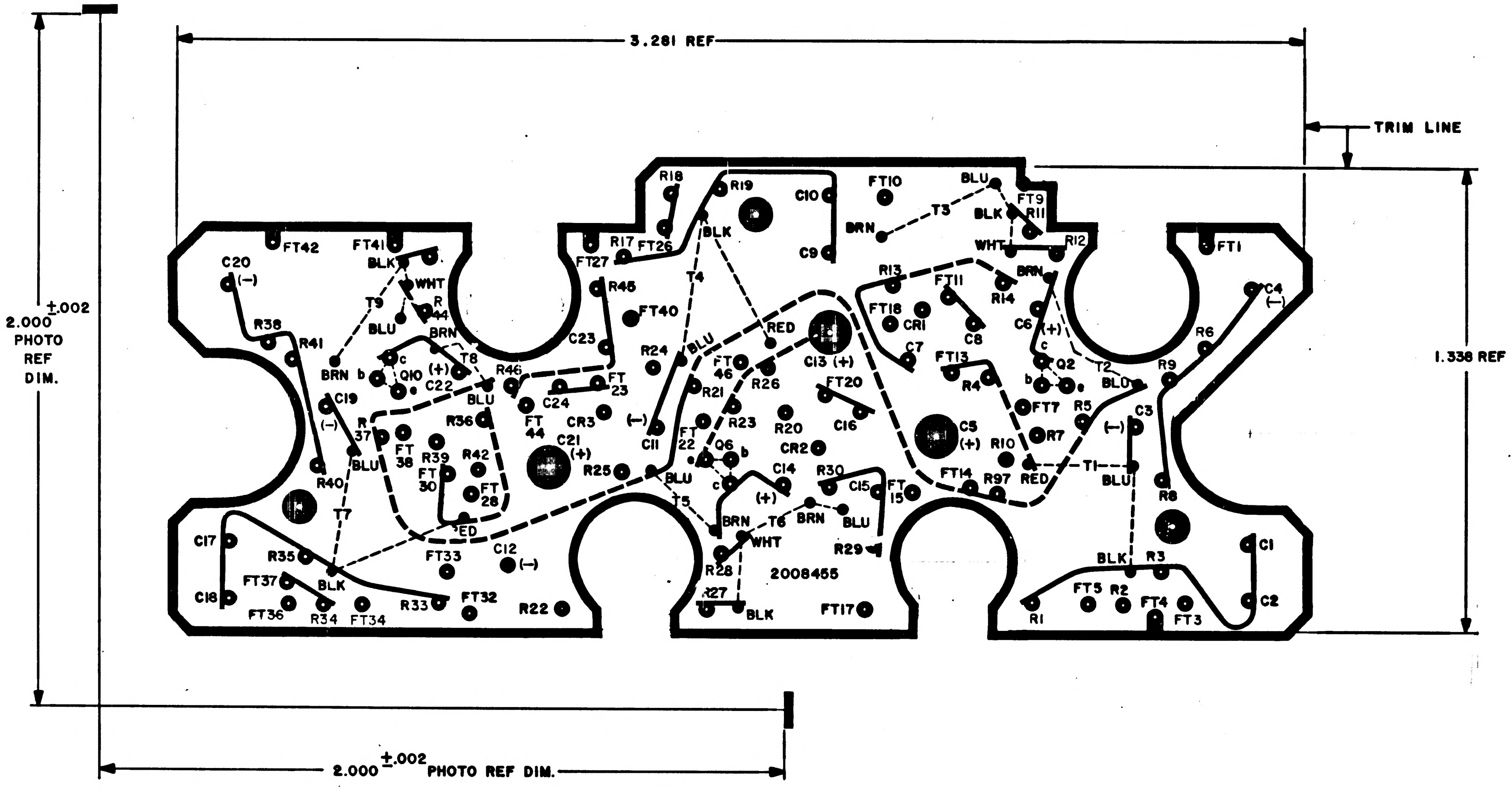
SCALE 5/1 SHEET 1 OF 1

8 7 6 5 4 3 2 1

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER: AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING TH HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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TRIM LINE
1.338 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
2008455
R18
R19
C10
FT10
BLU
T3
BLK
FT9
R11
R12
WHT
BRN
C9
R17
FT26
FT27
R45
FT40
C23
R24
BLU
RED
T4
C13 (+)
R13
FT11
FT18
CR1
R14
C6 (+)
C7
C8
FT13
R4
Q2
T2
BLU
R9
R6
C4 (–)
FT1
FT42
FT41
BLK
WHT
C20 (–)
R38
R41
T9
BLU
R 44
BRN
T8
Q10
(+) C22
BLU
R46
C24
FT 23
BRN
C19 (–)
R 37
BLU
R36
FT 44
C21 (+)
CR3
(–)
C11
FT 22
R21
FT 46
R26
FT20
R23
R20
C16
C5 (+)
R10
FT7
R7
R5
(–)
C3
T1
BLU
RED
R97
FT14
R8
R40
T7
FT 38
R39
FT 30
R42
FT 28
R25
Q6
BLU
T5
C14
CR2
R30
C15
FT 15
(+)
BRN
T6
BRN
BLU
WHT
RED
C17
C18
R35
FT37
FT36
BLK
R34
FT34
R33
FT33
FT32
C12 (–)
R22
R28
R27
BLK
R29
FT17
BLK
R3
R2
FT5
FT4
FT3
R1
C1
C2
b
c

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Ed Powers	12/20/65
CHECKED	R.P. Kingsbury	3 Feb 66
APPROVED	Richer	7 Feb 66
APPROVED	I. Ritros	7 Feb 66
APPROVED MIT	W. Kupfer A. G. METZGER	9 Feb 66
APPROVED MSC		DATE

PHOTOGRAPHIC MASTER
WIRING BOARD B
SIGNAL CONDITIONER
GIMBAL RESOLVER

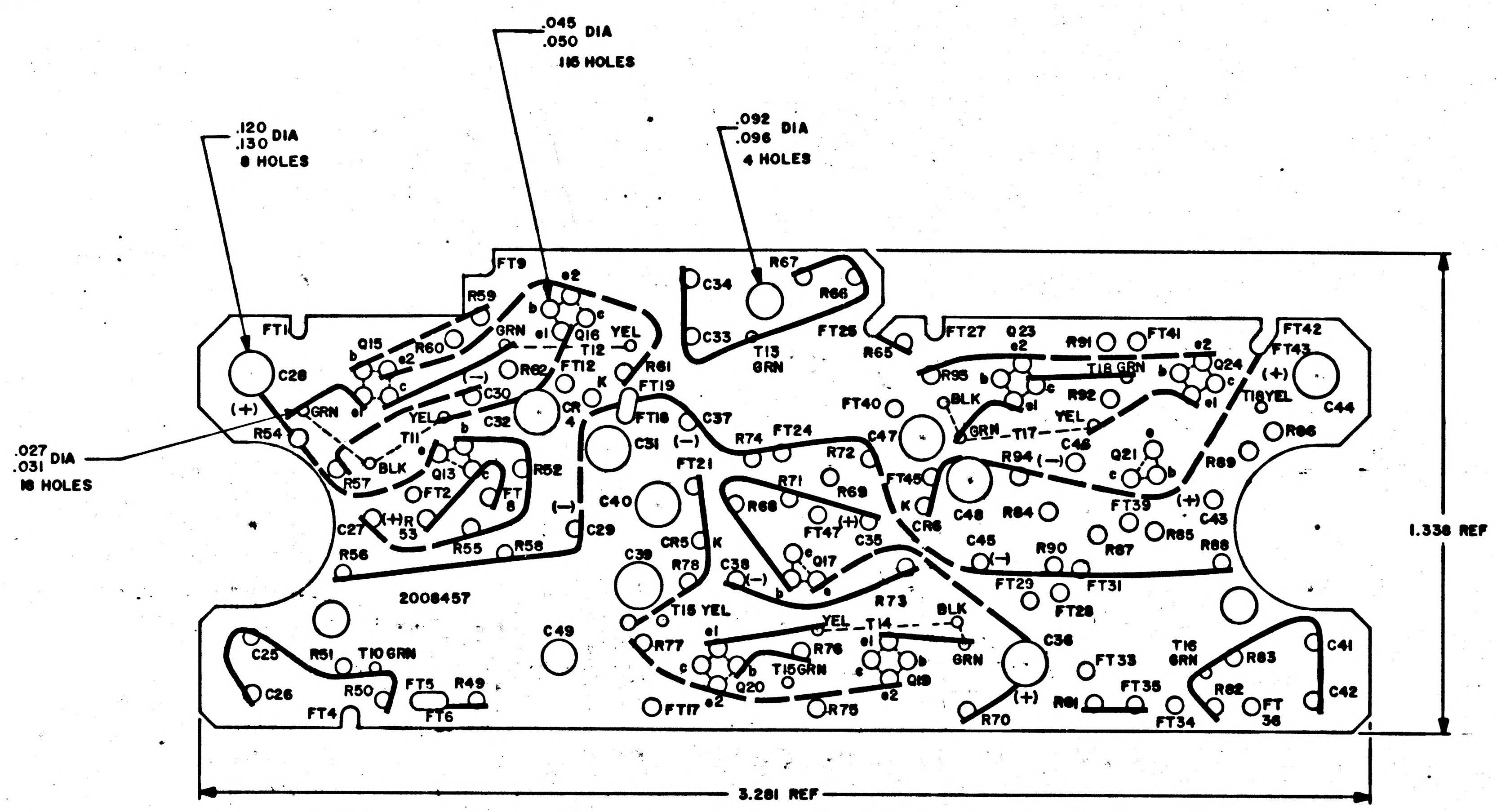
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008456

SCALE 5/1 SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27176	wfn	LSB	3/14/66	WK



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.050 DIA
116 HOLES
.120
.130 DIA
8 HOLES
.092
.096 DIA
4 HOLES
.027
.031 DIA
16 HOLES
FT1
C28
(+)
R54
GRN
e1
Q15
b
e2
c
R60
R59
FT9
e2
b
c
GRN
e1
Q16
YEL
T12
R62
FT12
R61
K
FT19
(–)
C30
YEL
C32
CR
4
FT18
T11
BLK
R57
Q13
b
c
e
FT2
FT
8
R52
(–)
C27
(+)R
53
R55
R56
R58
C29
C31
(–)
C37
C40
FT21
2008457
C34
R67
R66
C33
T13
GRN
FT25
R65
R74
FT24
R72
C47
FT40
R71
R69
R68
FT47
(+)
C35
Q17
c
b
e
C38
(–)
CR5
K
R78
C39
T15 YEL
R73
YEL
T14
BLK
GRN
e1
Q19
b
e
e2
R77
e1
c
Q20
b
e2
T15GRN
R76
FT17
R75
C49
C25
R51
T10GRN
C26
R50
FT4
FT5
R49
FT6
FT45
K
CR6
C48
C36
(+)
R70
FT27
Q23
e2
b
c
e1
R95
BLK
GRN
T17
YEL
R91
FT41
T18 GRN
R92
e2
Q24
b
c
e1
FT42
FT43
(+)
C44
T18YEL
R96
C46
R94
(–)
Q21
e
c
b
R89
FT39
(+)
C43
R84
R85
R87
C45
(–)
R90
R88
FT29
FT31
FT28
FT33
FT35
R81
FT34
T16
GRN
R83
R82
FT
36
C41
C42
1.338 REF
3.281 REF

REF DRAWING
DWG NO. 2008458 FOR PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Ed Powers 30Dec65
CHECKED R P Kingsbury 3Feb66
APPROVED 7Feb66
APPROVED 7Feb66
APPROVED MIT W Kupfer 9Feb66
APPROVED MSC
DATE

WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

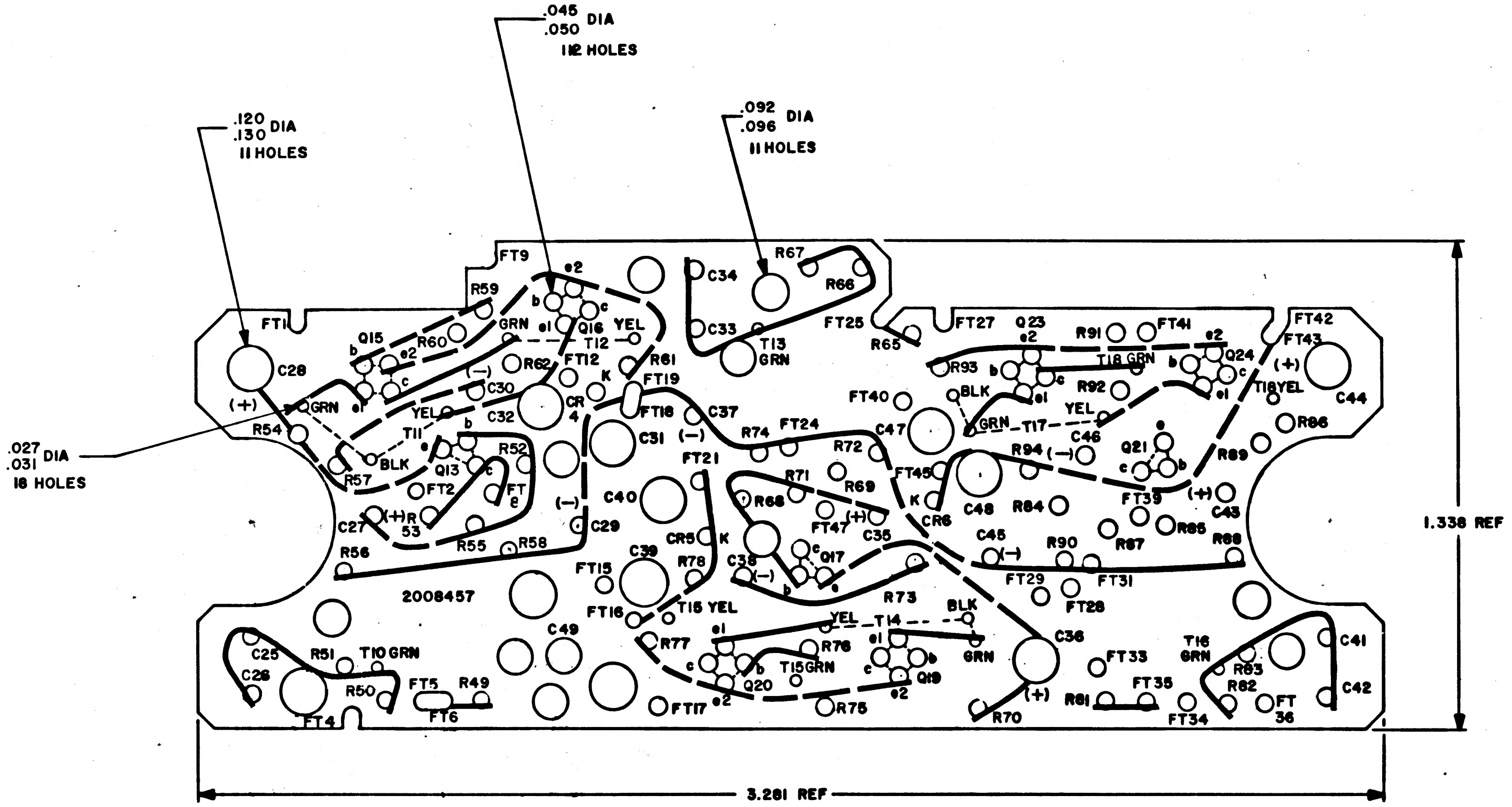
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008457

SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27176	WFH	LSC	3/18/66	WR
B		REVISED PER TDRR 27969	JCF	LTB	4/26/66	WR


.045 DIA
.050
112 HOLES
.120 DIA
.130
11 HOLES
.092 DIA
.096
11 HOLES
.027 DIA
.031
18 HOLES
1.338 REF
3.281 REF
2008457
FT1
FT9
C28
(+)
R54
GRN
Q15
R59
R60
e2
b
c
e1
(–)
C30
C32
YEL
T11
BLK
Q13
R52
R57
FT2
FT 8
(+)R 53
C27
R55
R58
R56
C29
(–)
C40
GRN
Q16
T12
YEL
R62
CR 4
K
R61
FT12
FT19
FT18
C31
C37
(–)
FT21
CR5
C39
FT15
FT16
R78
C38
T15 YEL
C49
R77
Q20
T15GRN
FT17
R76
R75
C34
R67
R66
C33
T13 GRN
FT25
R65
R74
FT24
R72
R71
R68
R69
FT47
(+)
C35
Q17
R73
T14
BLK
Q19
GRN
C36
(+)
R70
R81
FT40
C47
FT45
CR6
C48
R84
C45
R90
R87
FT29
FT31
FT28
FT33
FT35
FT34
FT27
Q23
R93
BLK
R91
FT41
T18 GRN
Q24
R92
YEL
T17
C46
R94
Q21
R89
FT39
(+)
C43
R85
R88
R86
FT42
FT43
T19YEL
C44
T16 GRN
R83
R82
FT 36
C41
C42
C25
C26
R51
T10 GRN
R50
FT4
FT5
FT6
R49

REF DRAWING
DWG NO. 2008458 FOR PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007230	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ——— ± ——— ± ———
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Powers 28 Dec 65
CHECKED R P Kingsbury 3 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED MIT [illegible] 9 Feb 66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

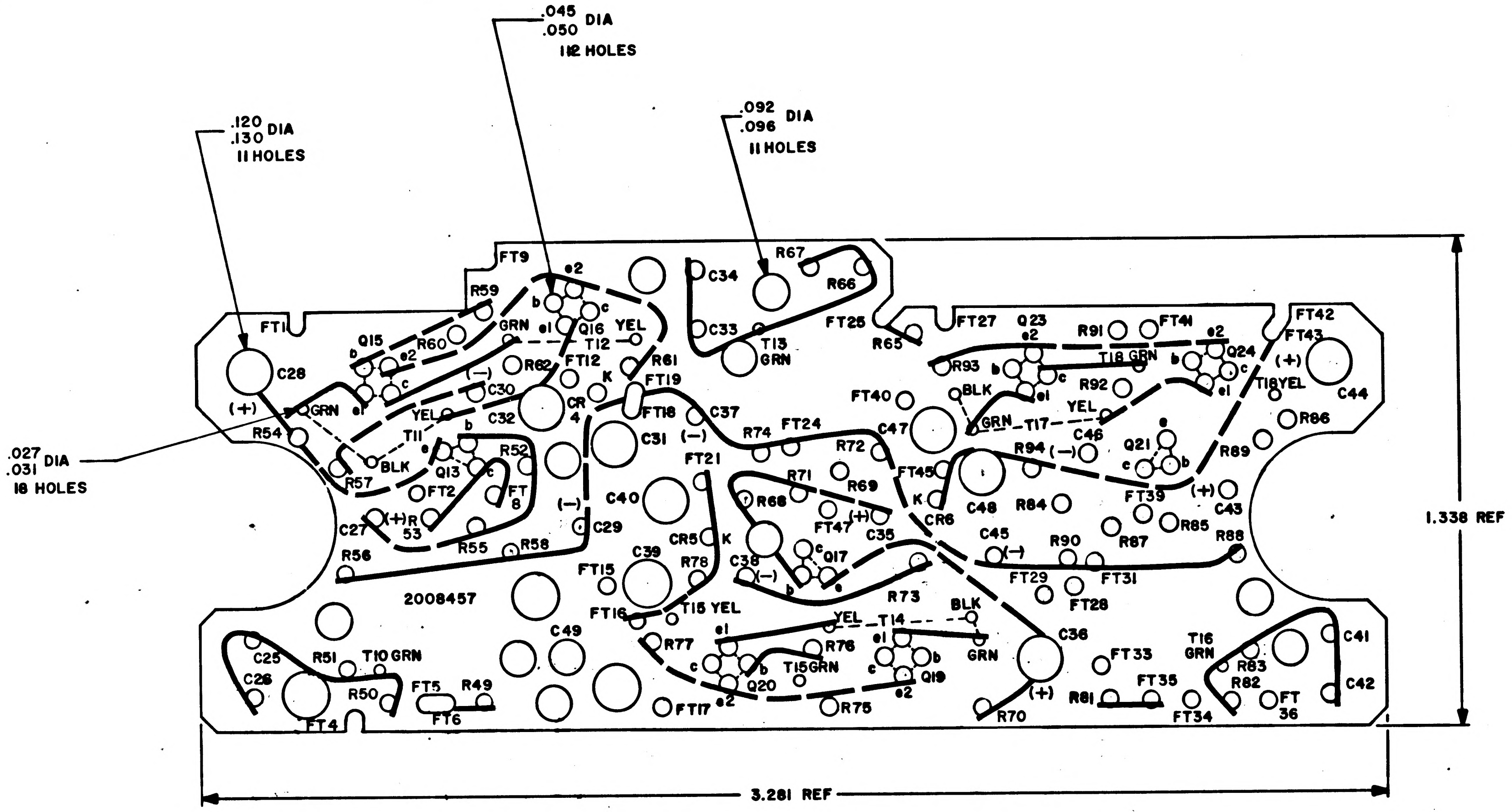
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008457
SCALE 5/1
SHEET 1 OF 1

2008457 B

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27176	JFH	LSB	3/18/66	WR
B		REVISED PER TDRR 27969	JCF	LSB	4/26/66	WR
C		REVISED PER TDRR 28478	✓	LSB	5-17-66	[illegible]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.050 DIA
112 HOLES
.120
.130 DIA
11 HOLES
.092
.096 DIA
11 HOLES
.027
.031 DIA
18 HOLES
1.338 REF
3.281 REF
2008457
FT1
C28
(+)
GRN
e1
R54
Q15
b
e2
c
R60
R59
FT9
e2
b
c
GRN
e1
Q16
YEL
T12
R62
FT12
R61
K
FT19
(−)
C30
YEL
T11
b
C32
CR 4
FT18
C37
BLK
e
Q13
c
R52
FT2
FT 8
R57
C27
(+)R 53
R55
R58
(−)
C29
R56
C31
(−)
FT21
C40
CR5
K
C39
R78
FT15
FT16
T15 YEL
C34
C33
T13 GRN
R67
R66
FT25
R65
FT27
Q23
e2
R91
FT41
e2
Q24
FT42
FT43
(+)
C44
R93
b
c
e1
T18 GRN
b
c
e1
T18 YEL
BLK
R92
GRN
T17
YEL
C46
FT40
C47
R74
FT24
R72
R94
(−)
Q21
e
c
b
R86
R89
R71
R69
FT45
K
CR6
C48
R84
FT39
(+)
C43
R68
FT47
(+)
C35
R85
R87
R88
C38
(−)
c
Q17
b
e
C45
(−)
R90
FT29
FT31
FT28
R73
BLK
YEL
T14
e1
R76
e1
b
c
Q19
e2
GRN
C36
(+)
R70
C49
R77
e1
c
b
T15GRN
Q20
e2
FT17
R75
R81
FT35
FT33
FT34
T16 GRN
R83
R82
FT 36
C41
C42
C25
C26
R51
T10 GRN
R50
FT4
FT5
R49
FT6

REF DRAWING
DWG NO. 2008458 FOR PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Powers 20Dec65
CHECKED R P Kingsbury 3Feb66
APPROVED [illegible] 7 Feb 66
APPROVED [illegible] 7Feb66
APPROVED MIT [illegible] 9Feb66
A.C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

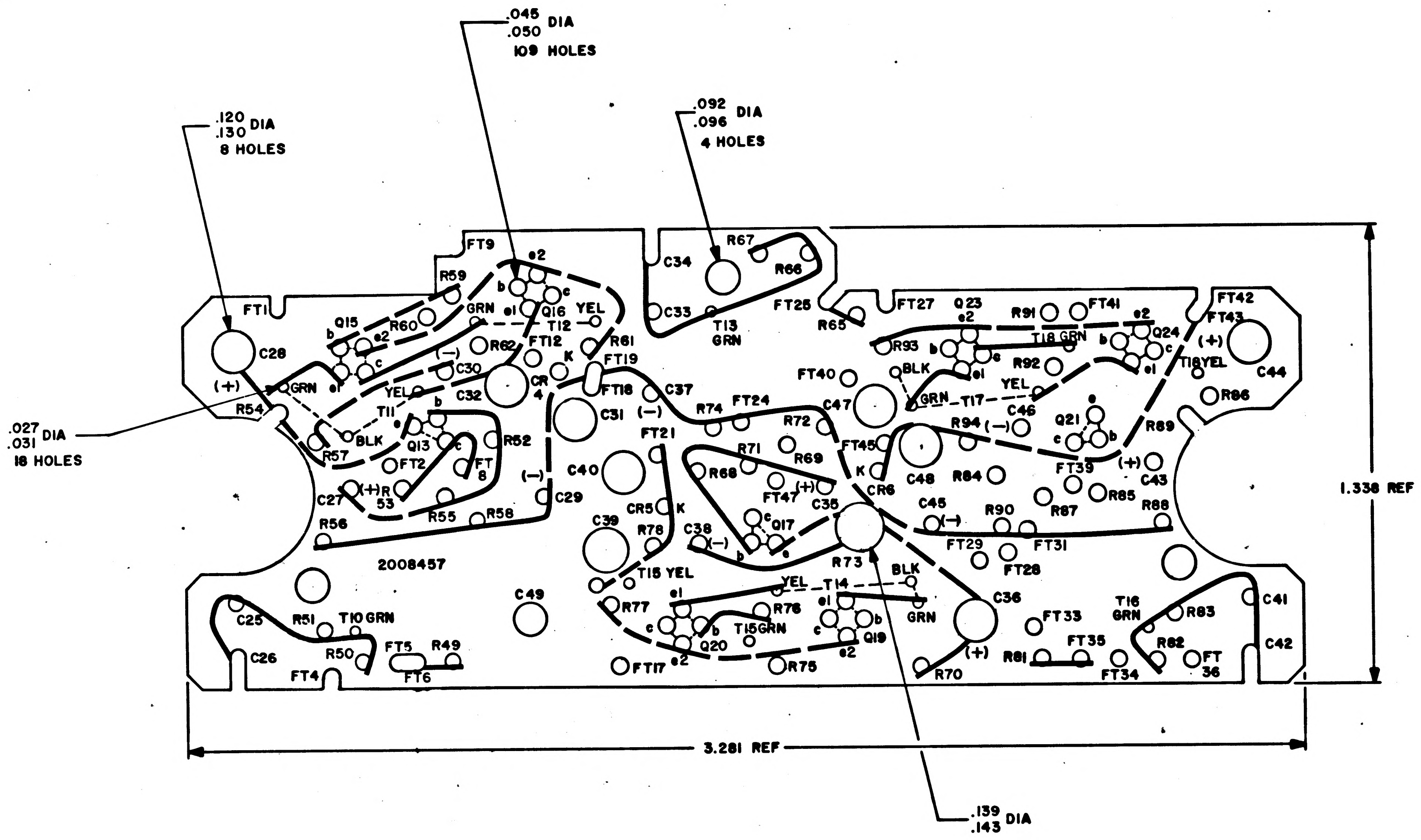
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008457
SCALE 5/1
SHEET 1 OF 1

2008457 C

NOTICE -- WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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8 HOLES
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109 HOLES
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4 HOLES
.027 DIA
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18 HOLES
.139 DIA
.143
1.338 REF
3.281 REF
2008457
FT1
C28
(+)
R54
GRN
R57
BLK
Q15
b
e2
e1
c
R60
R59
FT9
e2
b
c
e1
Q16
GRN
YEL
T12
R62
FT12
R61
K
FT19
CR 4
(−)
C30
YEL
C32
T11
b
e
Q13
c
FT2
FT 8
R52
C27
(+)R 53
R55
R58
R56
(−)
C29
C31
FT18
C37
(−)
C34
R67
R66
C33
T13 GRN
FT25
R65
FT21
C40
CR5
K
C39
R78
C38
(−)
R74
FT24
R72
R71
R68
R69
(+)
FT47
C35
c
Q17
b
e
T15 YEL
R77
e1
c
b
Q20
e2
T15GRN
R76
YEL
T14
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c
b
Q19
e2
FT17
R75
R73
BLK
GRN
C25
R51
T10 GRN
C26
R50
FT4
FT5
R49
FT6
C49
FT40
C47
FT45
K
CR6
C48
R84
FT27
Q23 e2
R93
b
e
e1
BLK
GRN
T17
YEL
R91
FT41
T18 GRN
R92
C46
R94 (−)
Q21
e
c
b
FT39
e2
b
Q24
c
e1
T18YEL
FT42
FT43
(+)
C44
R86
R89
(+)
C43
R85
R87
R88
C45
(−)
R90
FT29
FT31
FT28
C36
(+)
R70
R81
FT33
FT35
FT34
T16 GRN
R83
R82
FT 36
C41
C42

REF DRAWING
DWG NO. 2008458 FOR PHOTOGRAPHIC MASTER

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007230	
NEXT ASSY	USED ON
APPLICATION	

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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ——— DECIMALS ± ——— ANGLES ± ———
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powers	28Dec65
CHECKED	R.P. Kingsbury	3 Feb 66
APPROVED		7 Feb 66
APPROVED		7 Feb 66
APPROVED MIT		6 Feb 66
	A.C. METZGER	
APPROVED MSC		
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008457
SCALE 5/1		SHEET 1 OF 1

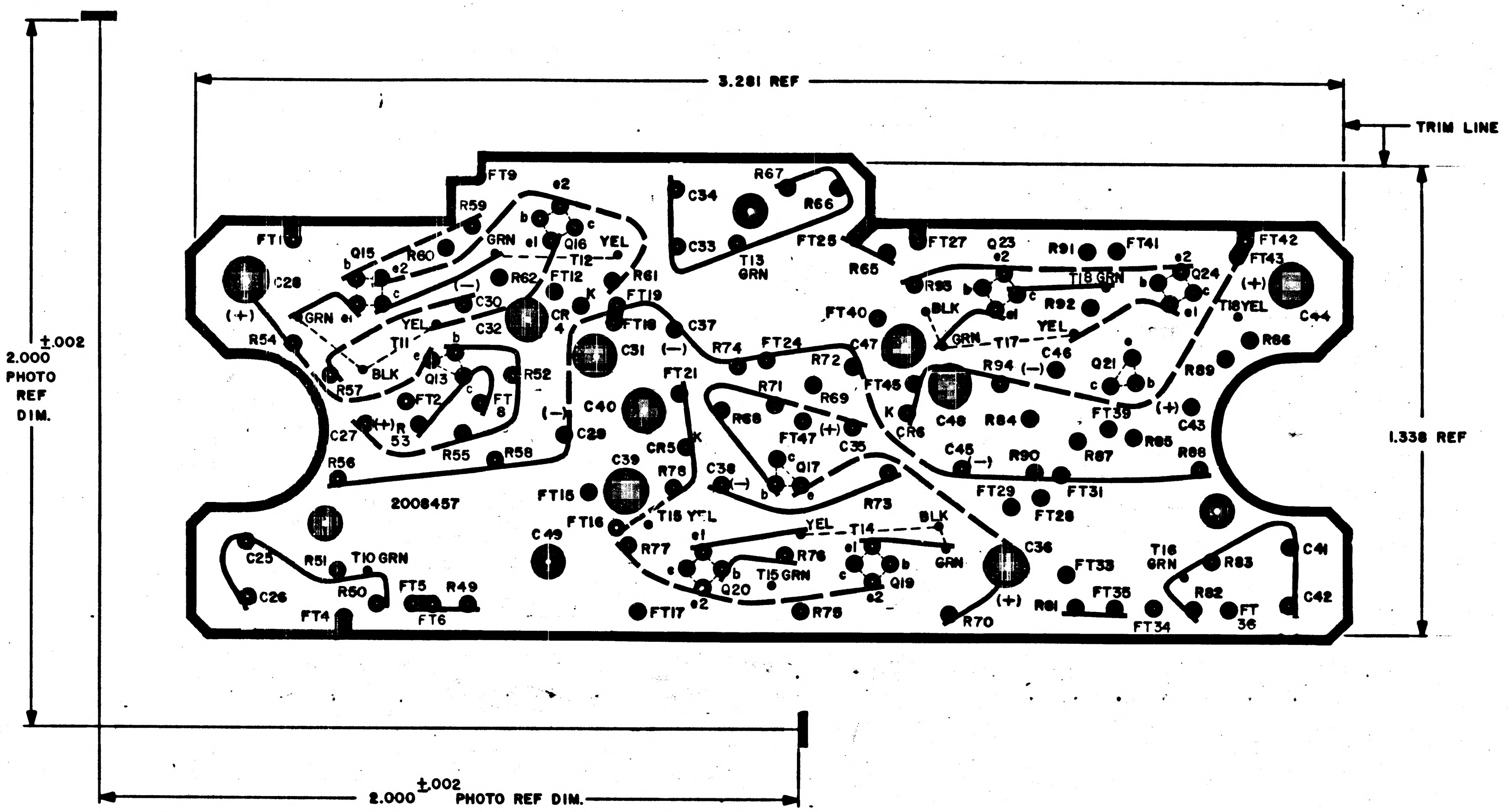
2008457

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27176	WFH	LTB	3/14/66	WK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1.338 REF
2.000 ±.002 PHOTO REF DIM.
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C28
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R60
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GRN
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Q16
YEL
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C30
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C37
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BLK
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FT41
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FT28
C36
(+)
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R81
FT35
FT34
T16 GRN
R83
R82
FT 36
C41
C42

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Powers 22Dec65
CHECKED R.P. Kingsbury 3Feb66
APPROVED Ruggi 7Feb66
APPROVED [illegible] 7Feb66
APPROVED MIT W. Kupfer 9Feb66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

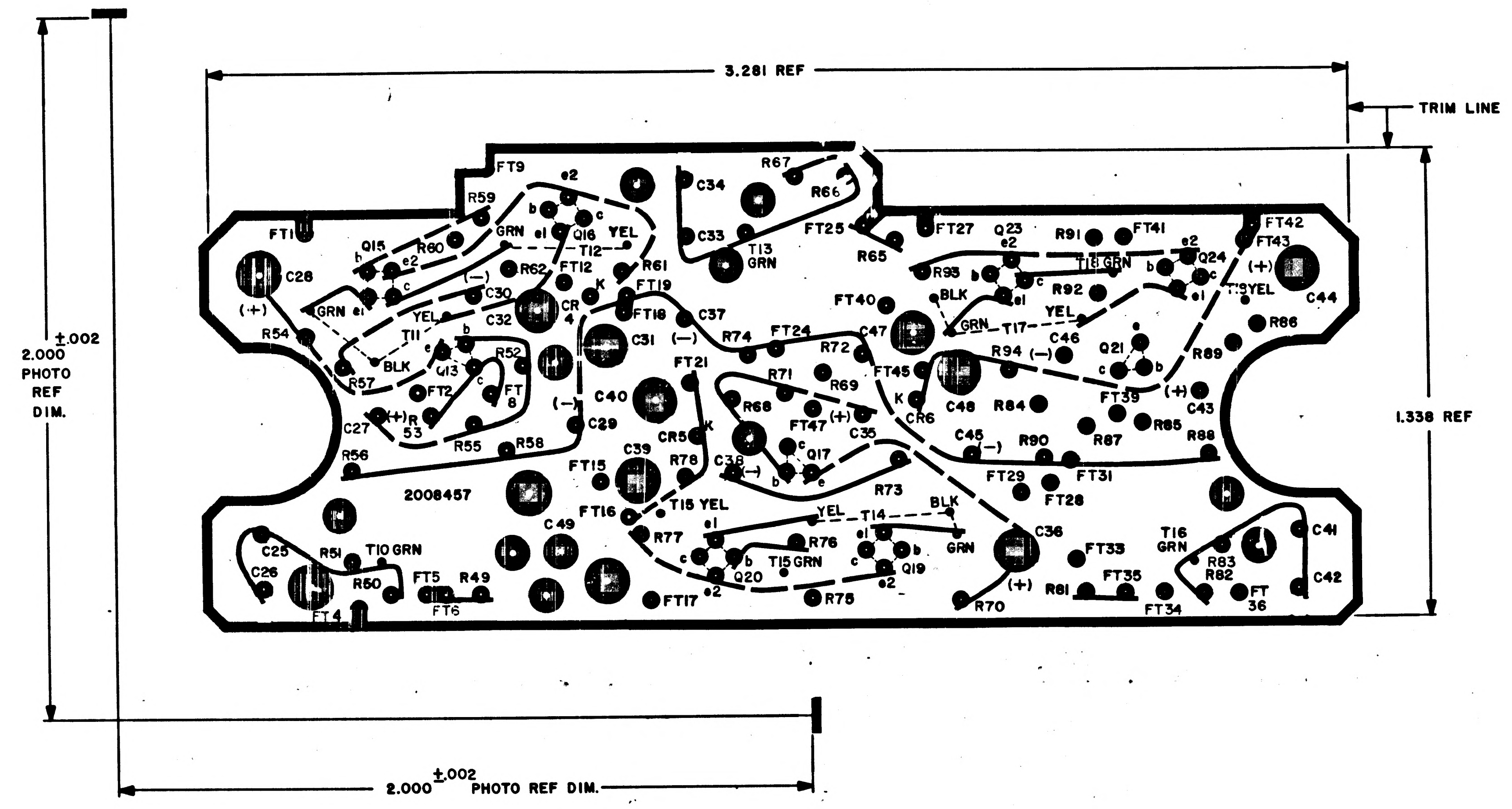
PHOTOGRAPHIC MASTER
WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008458
SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27176	WFH	LFB	3/18/66	
B		REVISED PER TDRR 27969	JCF	LFB	4/26/66	WK



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TRIM LINE
1.338 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
2008457
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R59
Q15
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FT33
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R83
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FT17
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FT 36
C42
FT4

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ——— DECIMALS ± ——— ANGLES ± ———
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powers	22Dec65
CHECKED	R.P. King-Tung	3Feb66
APPROVED	Ruger	7 Feb 66
APPROVED	D. Hoag	7Feb66
APPROVED MIT	W. Kupfer A. C. METZGER	9Feb66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER

WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008458

SCALE 5/1 SHEET 1 OF 1

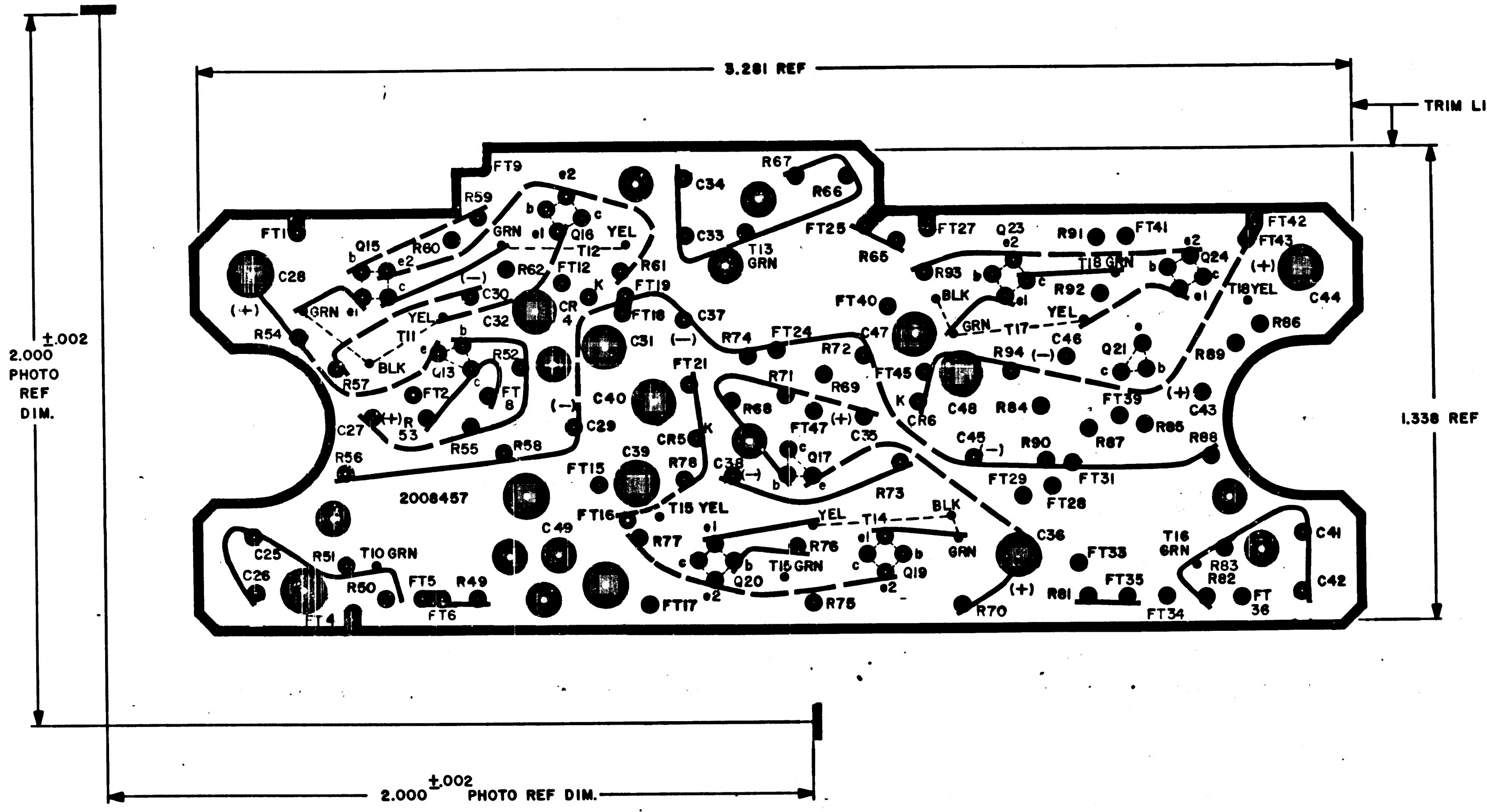
2008458 B

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 27176	WFH	LFB	3/14/66		GWC
B		REVISED PER TDRR 27969	JCF	LFB	4/26/66	WK	
C		REVISED PER TDRR 28478	"	LFB	5/17/6	WJM	



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DIM.
1.338 REF
2.000 ±.002 PHOTO REF DIM.
2008457
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C42

NOTES

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3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Ed Powers	22 Dec 65
CHECKED	R.P. Kingsbury	3 Feb 66
APPROVED	Ruger	7 Feb 66
APPROVED	D. Hines	7 Feb 66
APPROVED MIT	W. Kupfer A. C. METZGER	9 Feb 66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

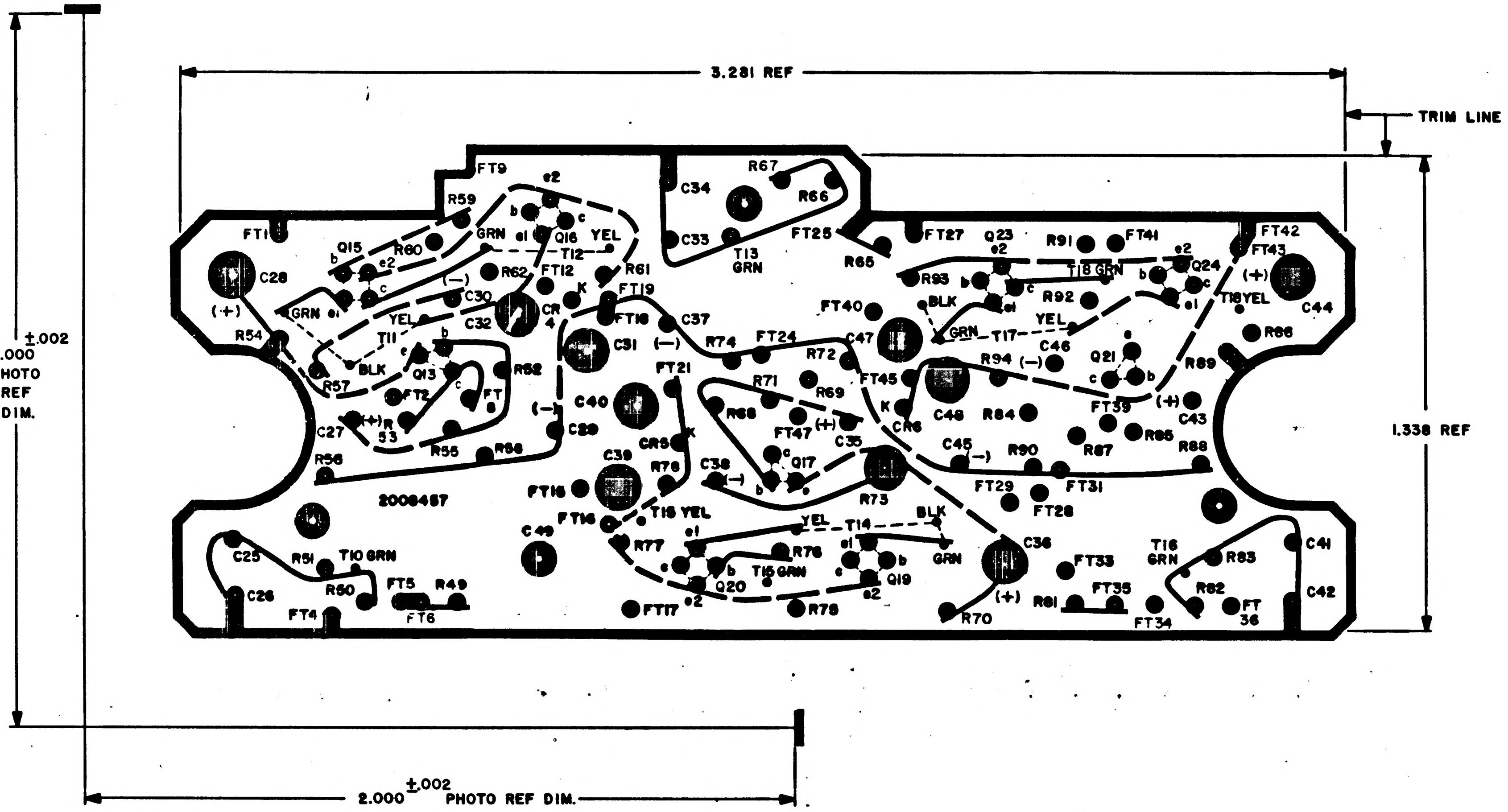
PHOTOGRAPHIC MASTER
WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008458
SCALE 5/1		SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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1.338 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
2008457
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YEL
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T16 GRN
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FT 36

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ——— DECIMALS ± ——— ANGLES ± ———
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Ed Powers 22 Dec 65
CHECKED R. P. Kingsbury 3 Feb 66
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT 9 Feb 66
A. C. METZGER
APPROVED MSC
DATE

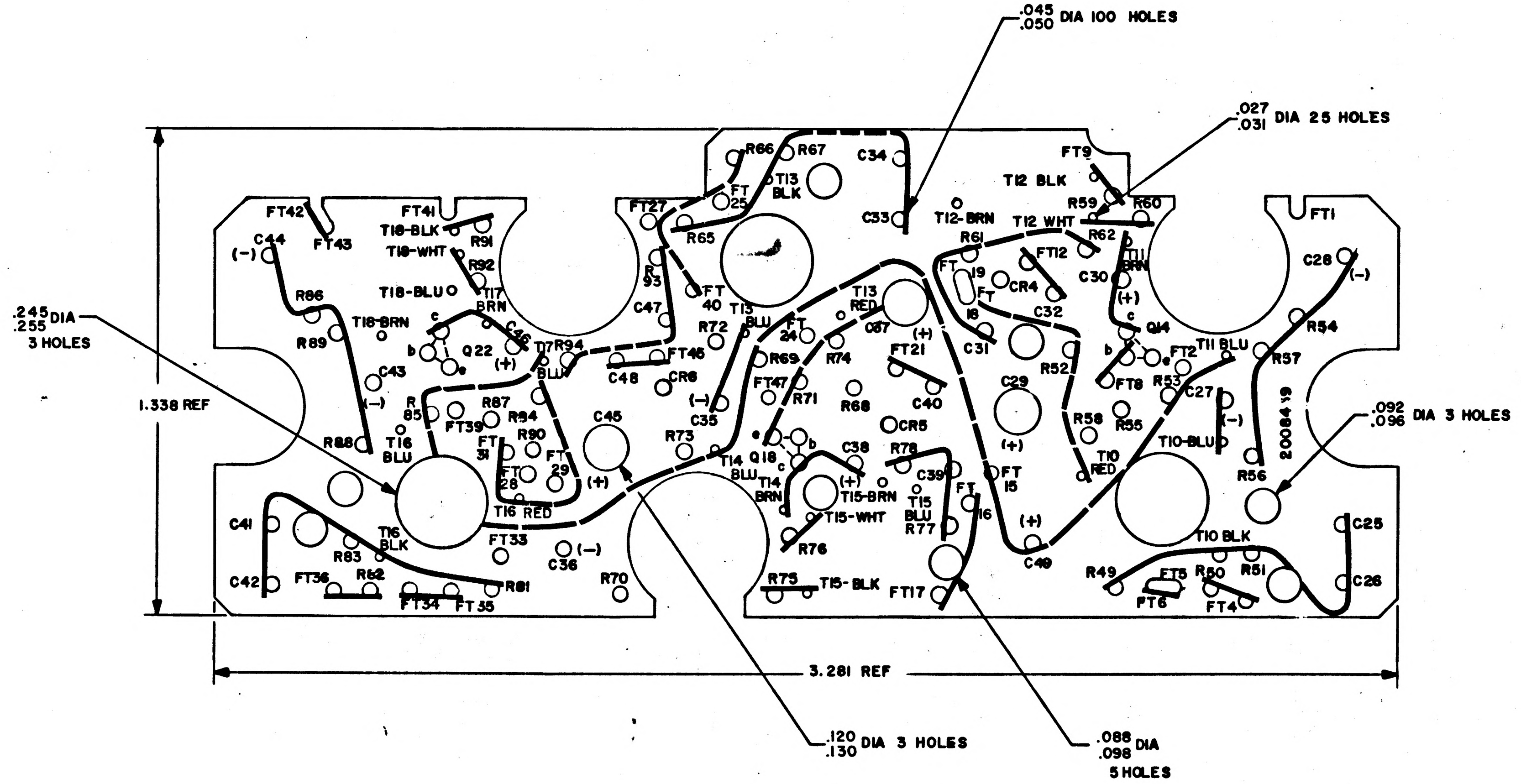
PHOTOGRAPHIC MASTER
WIRING BOARD C
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008458
SCALE 5/1
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27969	A.A.	[illegible]	[illegible]	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.098 DIA
5 HOLES
FT42
FT43
C44
(−)
FT41
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R91
R92
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T17 BRN
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FT1
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R54
R57
R56
2008459
C25
C26

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTE SLEEVING

REF:
DRAWING NO. 2008460 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Louis Long	30 Dec 65
CHECKED	R.P. Kingsbury	3 Feb 66
APPROVED	[illegible]	7 Feb 66
APPROVED	[illegible]	7 Feb 66
APPROVED MIT	W. Kupfer	9 Feb 66
APPROVED MSC	J. G. METCKER	
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008459

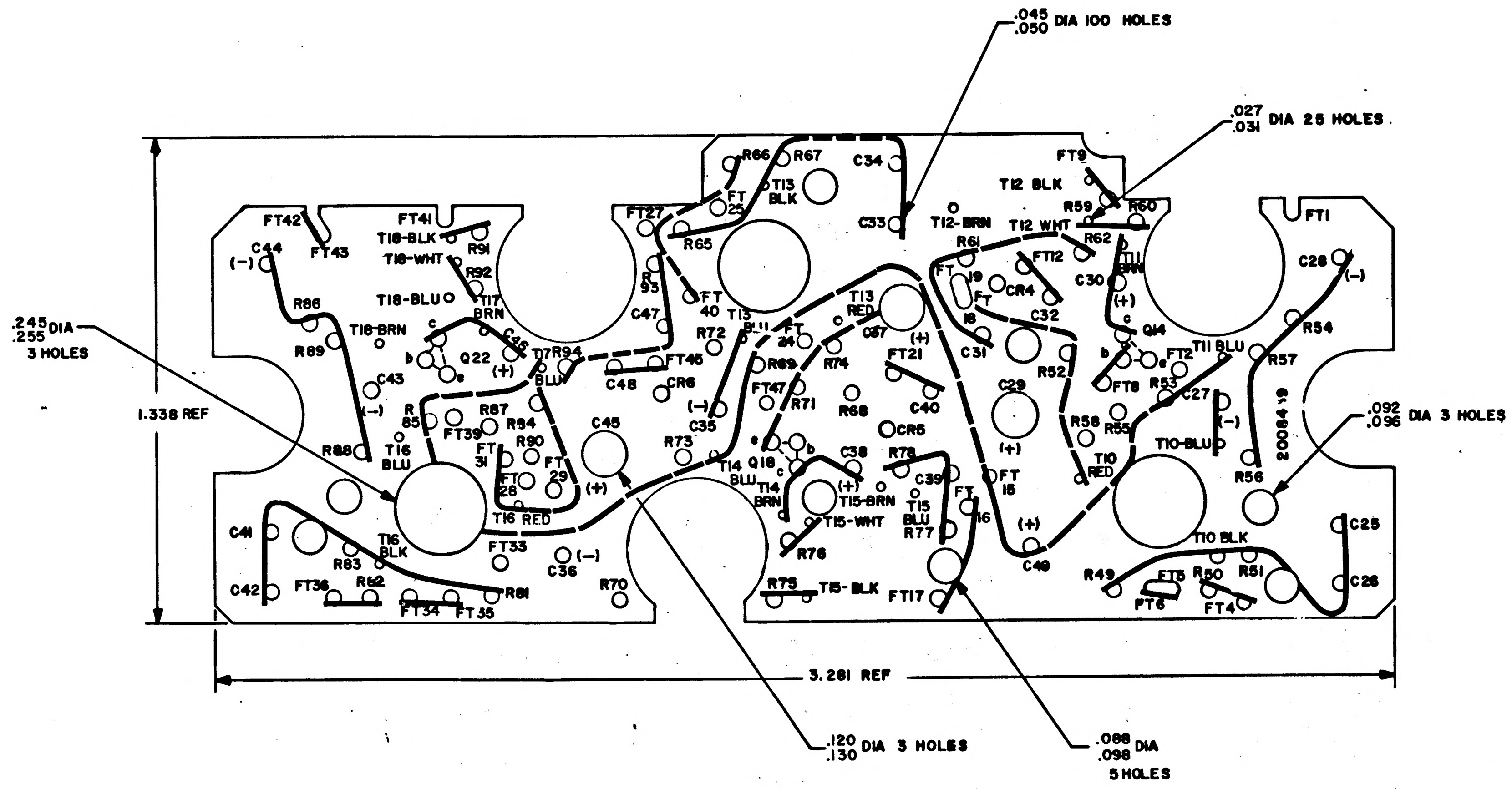
SCALE 5/1 SHEET 1 OF 1

2008459 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27969	A.A	GSB	4/26/66	GK
B		REVISED PER TDRR 28478	--	KSB	5/7/66	Sm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.050 DIA 100 HOLES
.027
.031 DIA 25 HOLES
.245
.255 DIA
3 HOLES
1.338 REF
.092
.096 DIA 3 HOLES
3.281 REF
.120
.130 DIA 3 HOLES
.088
.098 DIA
5 HOLES
2008459
FT42
FT43
FT41
T18-BLK
R91
T18-WHT
R92
T18-BLU
T17 BRN
T18-BRN
C44
(−)
R86
R89
C43
(−)
R88
R 85
T16 BLU
Q22
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C46
(+)
T17 BLU
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FT39
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FT 31
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T16 RED
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T16 BLK
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CR6
R66
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FT 25
T13 BLK
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T13 BLU
R72
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C35
(−)
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R69
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T14 BLU
Q18
T14 BRN
C34
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T13 RED
C37
(+)
FT21
R68
C40
CR5
C38
(+)
T15-BRN
T15-WHT
R76
R75
T15-BLK
R78
C39
T15 BLU
R77
FT 16
FT17
FT9
T12 BLK
T12-BRN
T12 WHT
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R60
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R62
FT12
FT 19
FT 18
CR4
C32
C31
C29
(+)
R52
FT 15
(+)
C49
C30
T11 BRN
(+)
Q14
FT2
T11 BLU
FT8
R53
C27
(−)
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R55
T10-BLU
T10 RED
T10 BLK
R49
FT5
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R50
R51
FT4
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C28
(−)
R54
R57
R56
C25
C26

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTE SLEEVING

REF:
DRAWING NO. 2008460 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Louis Lang 30 Dec 65
CHECKED R.P. Kangalung 3 Feb 66
APPROVED 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT W Kupfer 9 Feb 66
A. G. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
SIGNAL CONDITIONER GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008459
SCALE 5/1
SHEET 1 OF 1

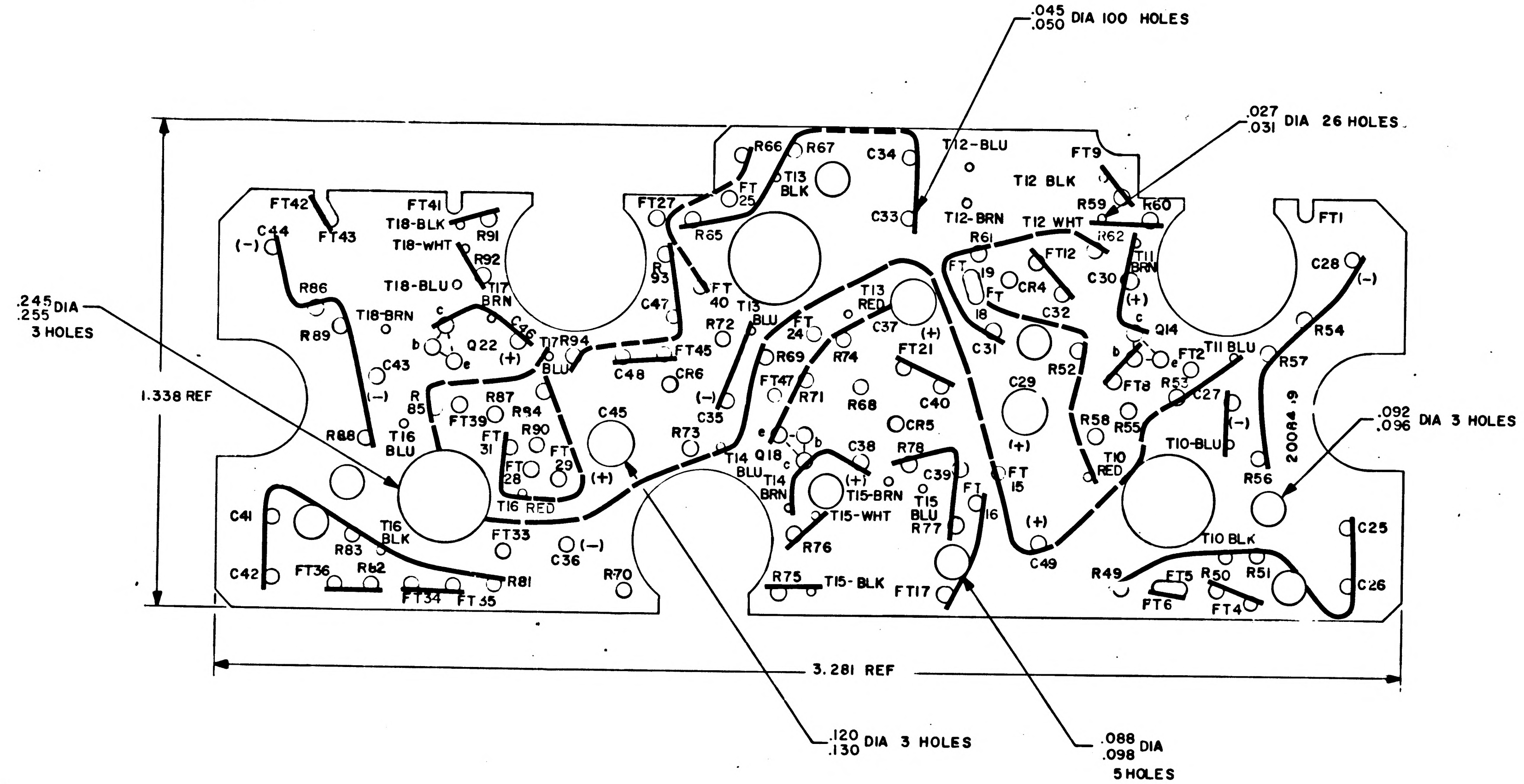
MASTER

2008459 B

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 27969	A.A.	LTP			
B		REVISED PER TDRR 28478		LTP			
C		REVISED PER TDRR 29948	A.N.		18 JUL 66		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.027
.031 DIA 26 HOLES
.245
.255 DIA
3 HOLES
1.338 REF
.092
.096 DIA 3 HOLES
3.281 REF
.120
.130 DIA 3 HOLES
.088
.098 DIA
5 HOLES
FT42
FT43
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T18-BLK
T18-WHT
R91
R92
T18-BLU
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C44 (−)
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C43 (−)
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T16 BLU
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c b e Q22
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T17 BLU
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T16 RED
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T12-BLU
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C49 (+)
C30 (+)
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R53
T11 BLU
C27 (−)
T10-BLU
R49
FT5
FT6
R50
R51
FT4
T10 BLK
FT1
C28 (−)
R54
R57
R56
2008459
C25
C26

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTE SLEEVING

REF:
DRAWING NO. 2008460 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007230	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	Louis Lowe	30 Dec 65
CHECKED		3 Feb 66
APPROVED		7 Feb 66
APPROVED		
APPROVED MIT	W Kupfer	4 Feb 66
APPROVED MSC		
	DATE	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO	SIZE	DRAWING NO
80230	D	2008459

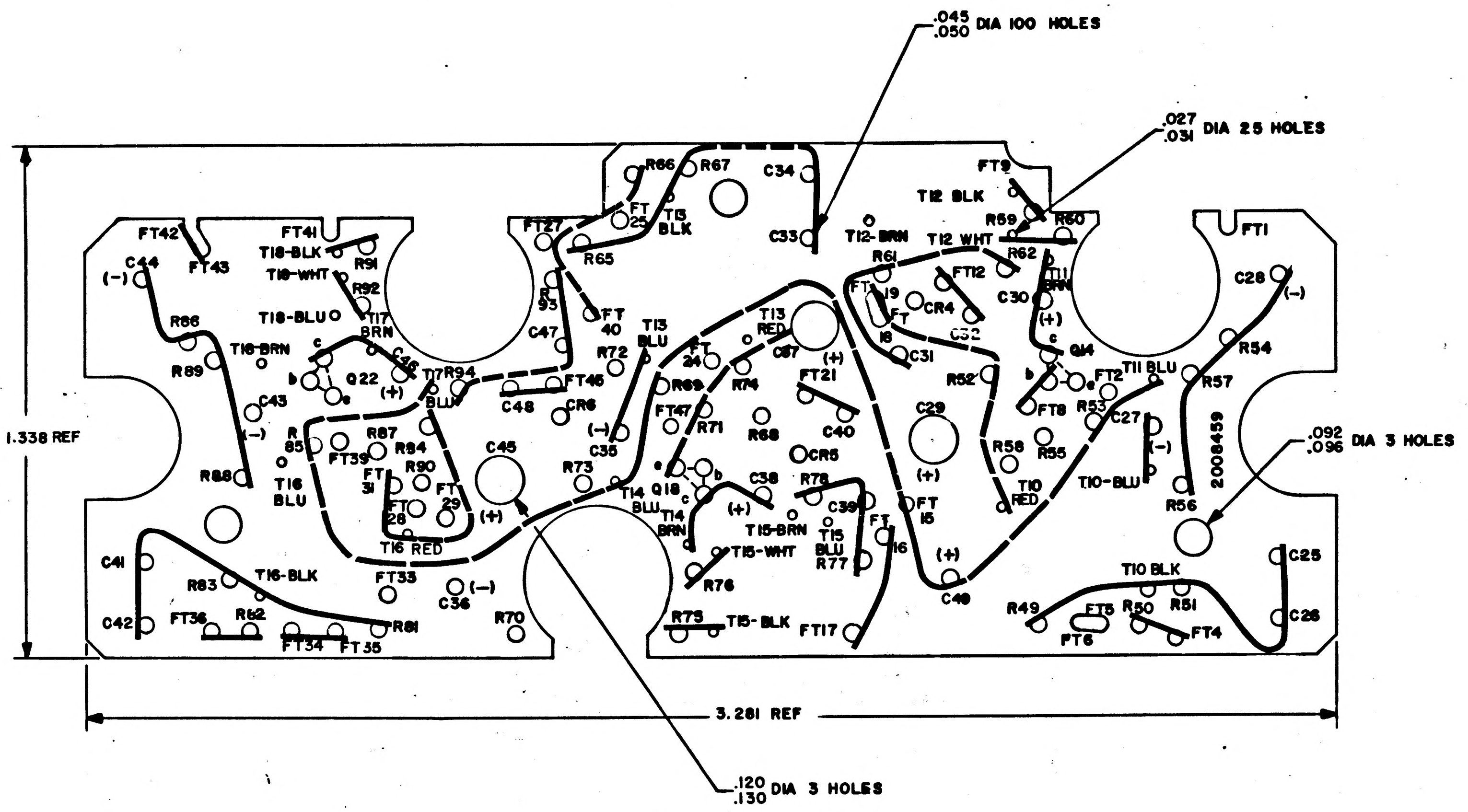
SCALE 5/1 | SHEET 1 OF 1

2008459 C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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.027
.031 DIA 25 HOLES
.092
.096 DIA 3 HOLES
.120
.130 DIA 3 HOLES
1.338 REF
3.281 REF
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FT42
FT43
FT41
T18-BLK
R91
T18-WHT
R92
T18-BLU
T17 BRN
C44
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R86
T16-BRN
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T17 BLU
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R 85
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T16 BLU
T16 RED
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C41
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T13 BLK
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R73
T14 BLU
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T14 BRN
FT 24
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T13 RED
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FT21
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T15-WHT
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T15 BLU
R77
C39
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R75
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FT17
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T12 WHT
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R60
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R62
FT 19
FT 18
CR4
FT12
C32
C31
C30
T11 BRN
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Q14
FT2
T11 BLU
R52
C29
(+)
FT8
R53
C27
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R58
R55
T10 RED
T10-BLU
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FT1
C28
(–)
R54
R57
R56
C25
C26
T10 BLK
R49
FT5
R50
R51
FT6
FT4

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTE SLEEVING

REF:
DRAWING NO. 2008460 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007230	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Louis Lang 30 Dec 65
CHECKED R.P. Kangalung 3 Feb 66
APPROVED Eusner 7 Feb 66
APPROVED 7 Feb 66
APPROVED MIT W Kupfer 6 Feb 66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008459
SCALE 5/1
SHEET 1 OF 1

2008459

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

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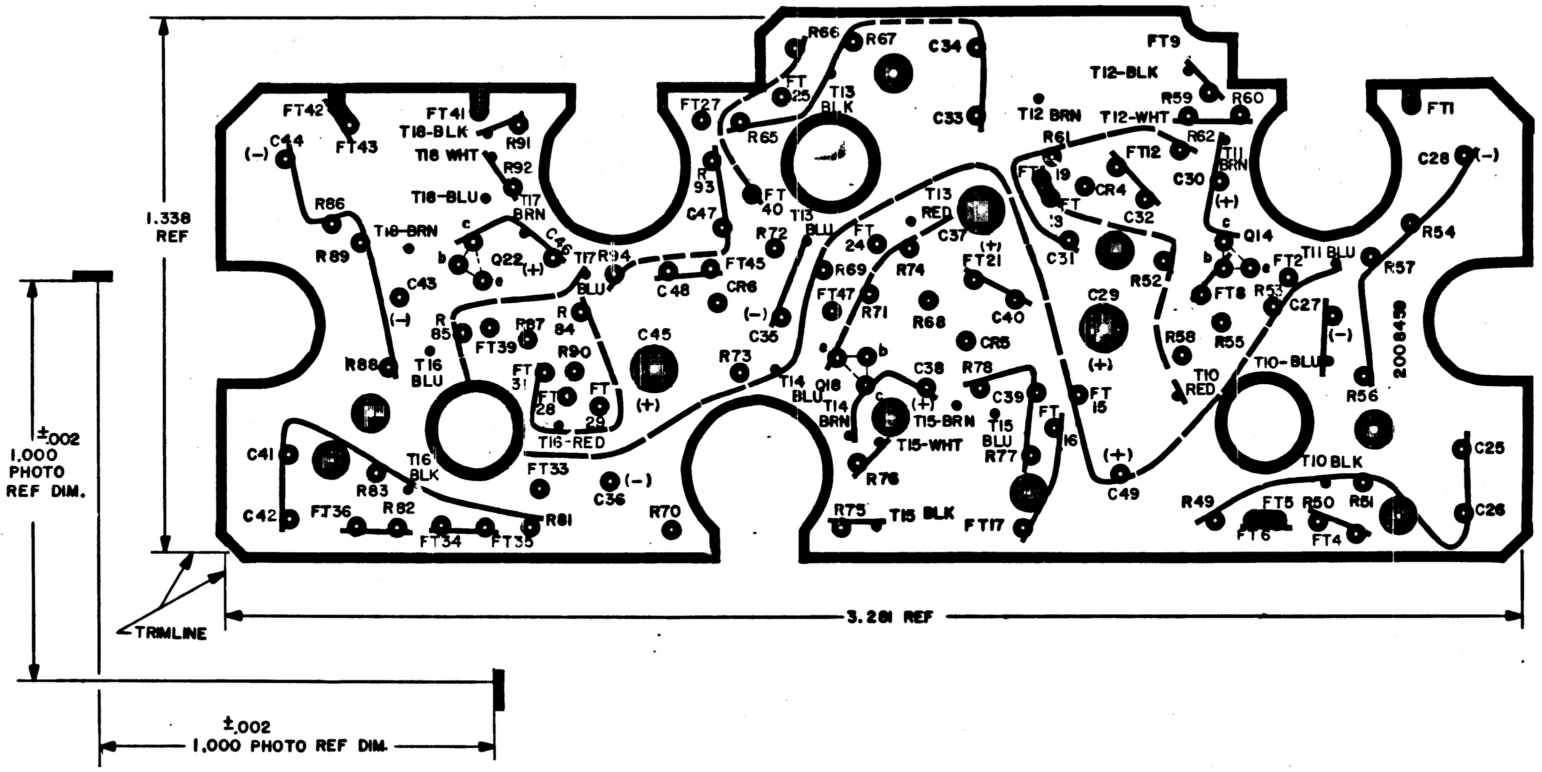

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±.002 1.000 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.
3.281 REF
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FT43
FT41
T18-BLK
R91
T18 WHT
R92
T18-BLU
T17 BRN
C44 (–)
R86
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T18-BRN
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BLU
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FT39
R88
T16 BLU
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FT 31
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C45
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T16-RED
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T16 BLK
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C36 (–)
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FT 40
FT 25
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T13 BLK
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R72
T13 BLU
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C48
CR6
(–)
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R73
T14 BLU
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FT47
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FT 24
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C40
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R75
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FT 19
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C29
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FT8
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C27
(–)
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FT 15
(+)
C49
FT1
C28 (–)
R54
R57
2008459
R56
T10 BLK
C25
C26
R49
FT5
R50
R51
FT6
FT4

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Louis Large	16 Dec 65
CHECKED	R. Kaisenberg	3 Feb 66
APPROVED		7 Feb 66
APPROVED		7 Feb 66
APPROVED MIT	W. Kupfer	9 Feb 66
APPROVED MSC		DATE

PHOTOGRAPHIC MASTER
WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL PESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008460
SCALE 5/1		SHEET 1 OF 1

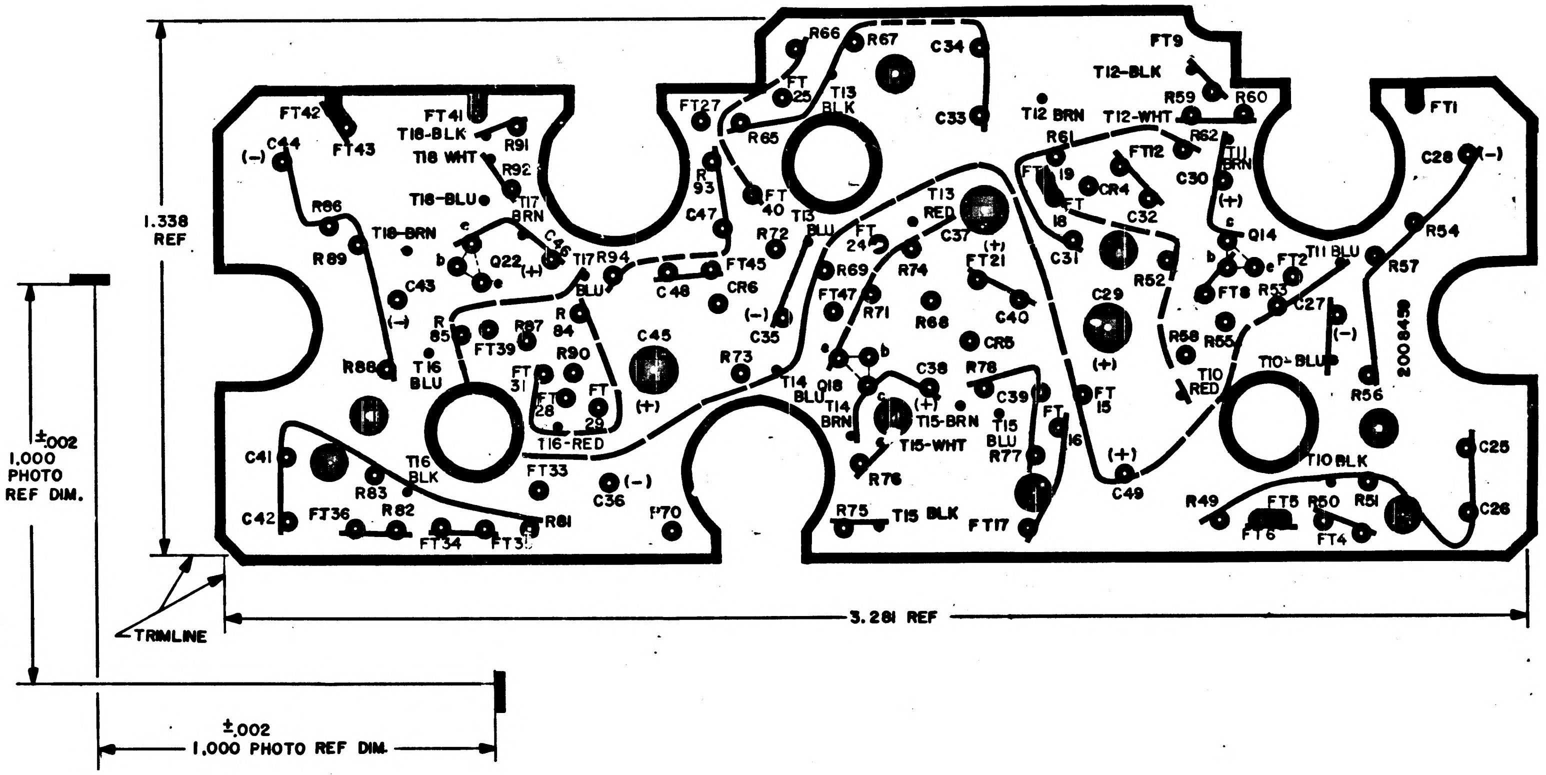
2008460 A

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27969	AA.	LSB	[illegible]	[illegible]
B		REVISED PER TDRR 28478		LSB	5-17-66	[illegible]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±.002
1.000 PHOTO REF DIM.
TRIMLINE
3.281 REF
±.002
1.000 PHOTO REF DIM.
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FT43
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T18-BLK
R91
T18 WHT
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NOTES:

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3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Louis [illegible] [illegible] Dec 65
CHECKED R. P. Kingsbury 3 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED MIT [illegible] [illegible]
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

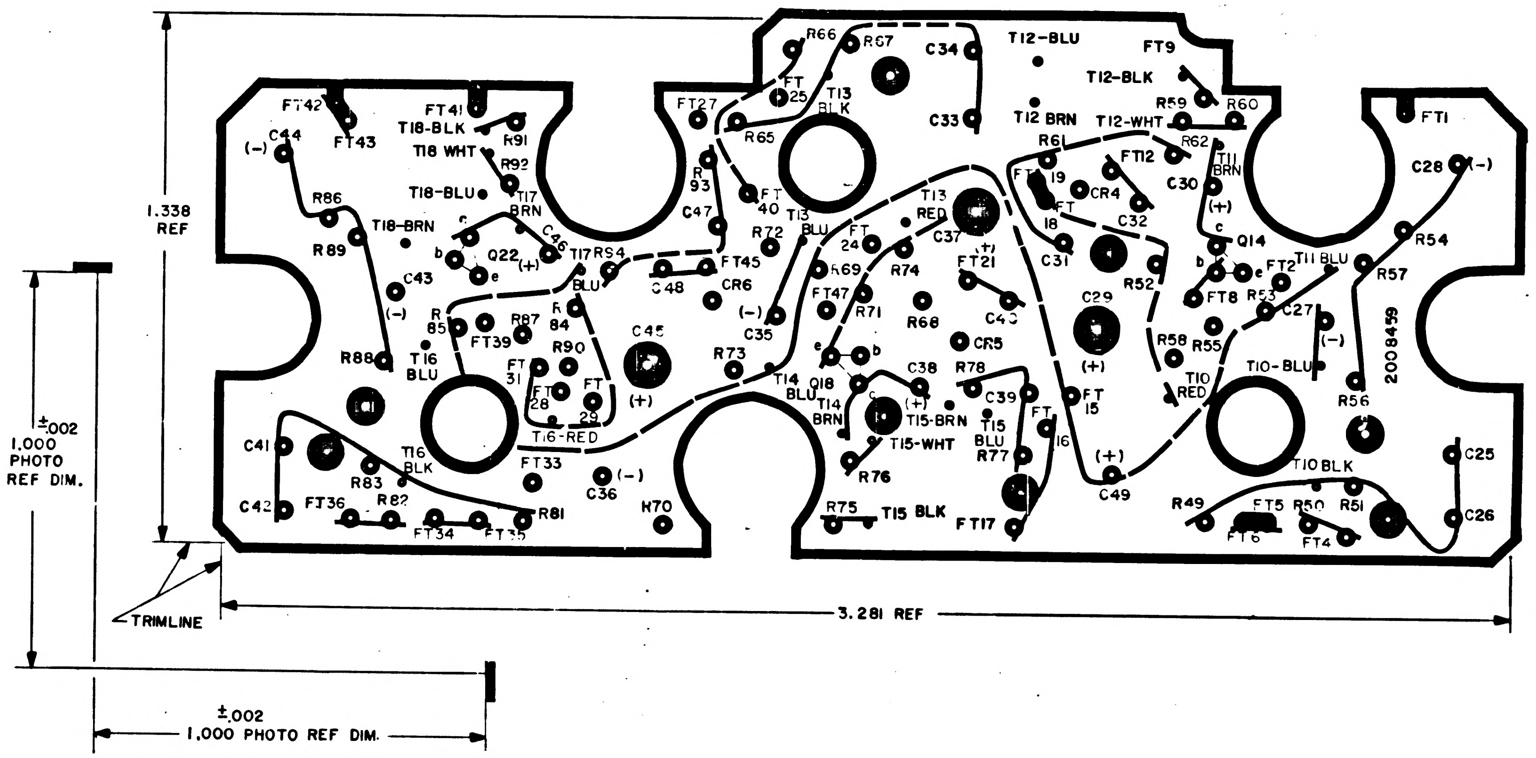
PHOTOGRAPHIC MASTER
WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL PESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008460
SCALE 5/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REVISED PER TDRR 27969	AA.	LFB			
B		REVISED PER TDRR 28478		LFB			
C		REVISED PER TDRR 29948	A.N.		18 JUL 66		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R71
R68
Q18
T14 BLU
T14 BRN
C38
(+)
T15-BRN
T15-WHT
R76
R75
T15 BLK
FT17
T12-BLU
T12-BLK
FT9
T12 BRN
T12-WHT
R59
R60
R61
R62
FT 19
FT12
CR4
T11 BRN
C30
(+)
FT 18
C32
C31
FT21
C40
CR5
R78
C39
FT 16
T15 BLU
R77
C29
(+)
FT 15
R52
R58
R55
T10 RED
(+)
C49
Q14
R53
FT2
T11 BLU
FT8
C27
(−)
T10-BLU
R56
R57
R54
C28
(−)
FT1
C25
C26
T10 BLK
R49
FT5
R50
R51
FT6
FT4
2008459
1.338 REF
±.002
1.000 PHOTO REF DIM.
TRIMLINE
3.281 REF
±.002
1,000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 20 Dec 65
CHECKED 9 Feb 66
APPROVED 7 Feb 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL RESOLVER

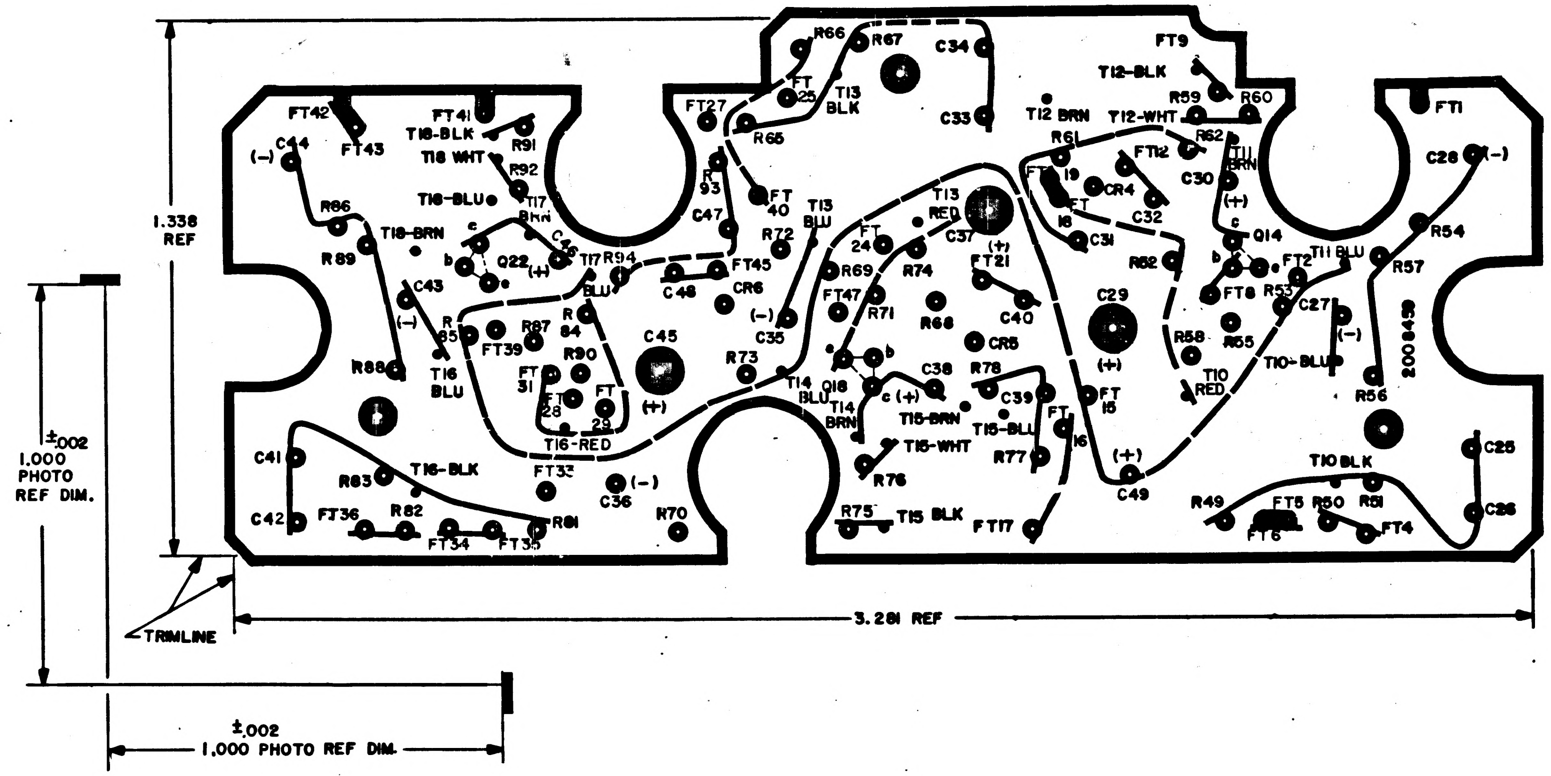
CODE IDENT NO 80230
SIZE D
DRAWING NO 2008460
SCALE 5/1
SHEET 1 OF 1

2008460 C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26027

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


1.338 REF
±.002
1.000
PHOTO
REF DIM.
TRIMLINE
3.281 REF
±.002
1.000 PHOTO REF DIM.
FT42
FT43
FT41
T18-BLK
T18 WHT
R91
R92
T18-BLU
T17 BRN
C44
(–)
R86
T18-BRN
R89
c
b
Q22
e
(+)
C46
T17
R94
BLU
C43
(–)
R 85
T16 BLU
R88
R87
FT39
R 84
R90
FT 31
FT 28
FT 29
T16-RED
C45
(+)
C41
R83
T16-BLK
C42
FT36
R82
FT34
FT35
R81
FT33
(–)
C36
R70
FT27
R 93
C47
FT 40
R65
FT45
C48
CR6
(–)
C35
R72
T13 BLU
R73
T14 BLU
T14 BRN
R66
R67
FT 25
T13 BLK
C34
C33
FT 24
R69
FT47
R71
T13 RED
C37
(+)
R74
FT21
R68
C40
CR5
Q18
e
b
c (+)
C38
R78
T15-BRN
T15-BLU
C39
T15-WHT
R76
R77
FT 16
R75
T15 BLK
FT17
FT 15
FT9
T12-BLK
T12 BRN
T12-WHT
R59
R60
R61
R62
FT12
FT 19
FT 18
CR4
C32
C31
C30
T11 BRN
(+)
C29
(+)
(+)
C49
R52
R58
T10 RED
c
Q14
b
e
FT8
FT2
T11 BLU
R53
R55
C27
(–)
T10-BLU
FT1
C28
(–)
R54
R57
R56
2008459
T10 BLK
R49
FT5
FT6
R50
R51
FT4
C25
C26

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

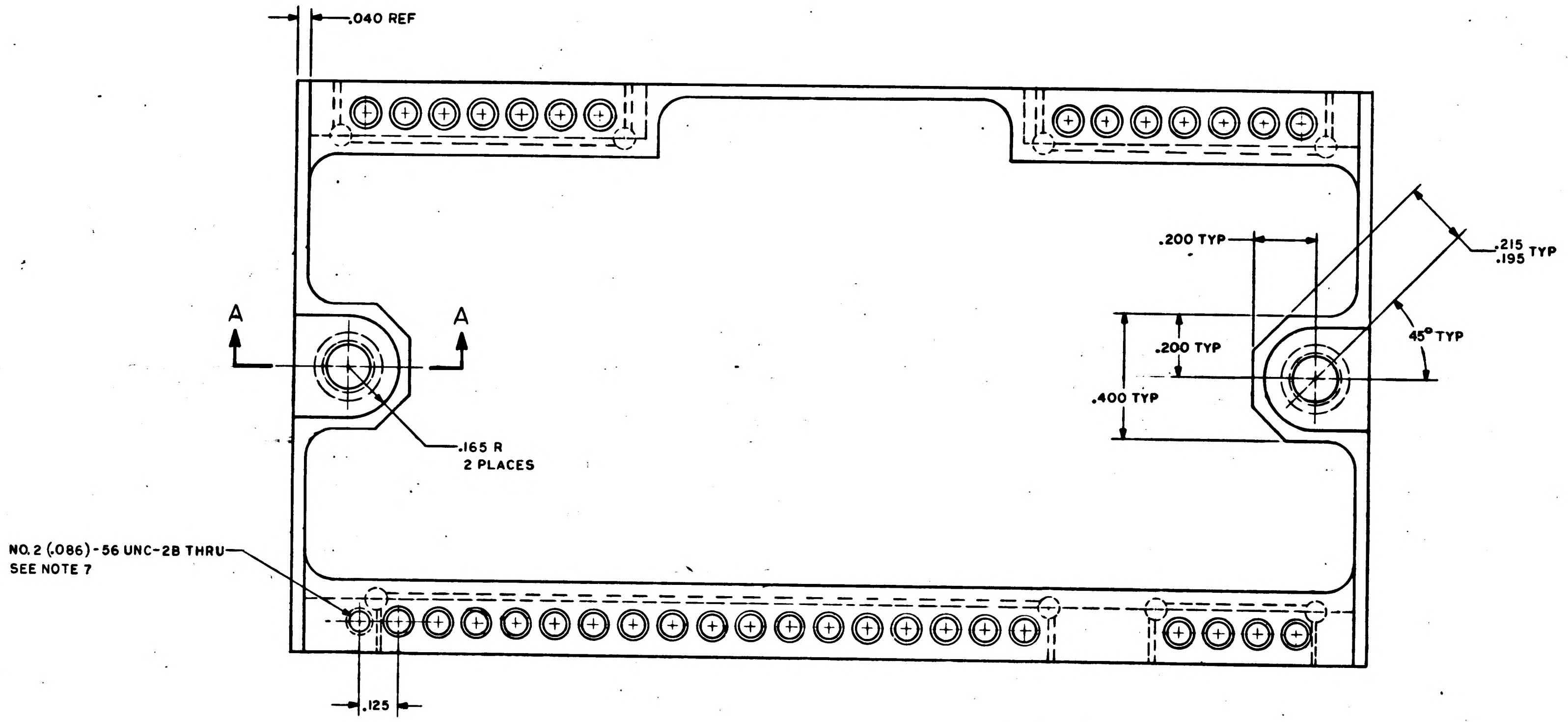
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

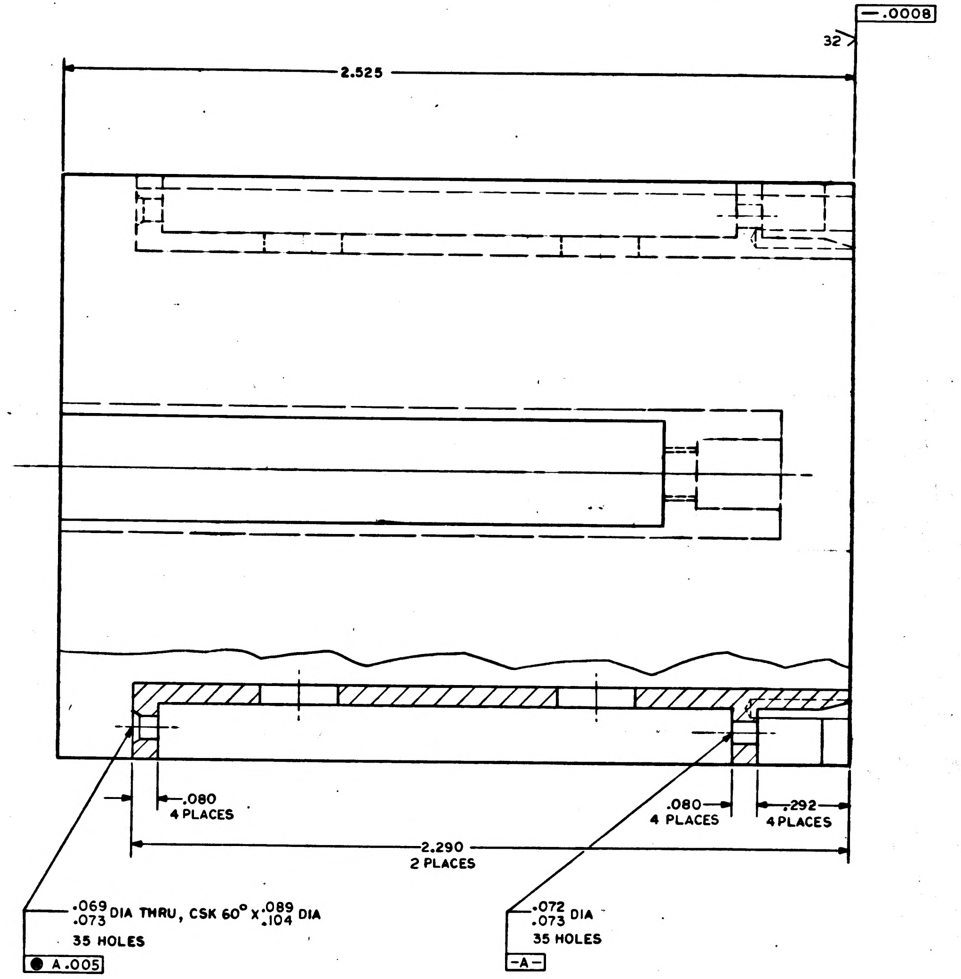
DRAWN Louis [illegible] [illegible] Dec 65
CHECKED R.P. [illegible] 3 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED [illegible] 7 Feb 66
APPROVED MIT [illegible] 9 Feb 66
APPROVED MSC
DATE

PHOTOGRAPHIC MASTER
WIRING BOARD D
SIGNAL CONDITIONER
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008460
SCALE 5/1
SHEET 1 OF 1

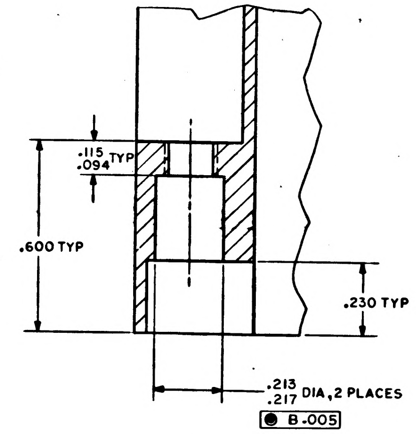
2008460


.040 REF
.200 TYP
.215
.195 TYP
A
A
.200 TYP
45° TYP
.400 TYP
.165 R
2 PLACES
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125

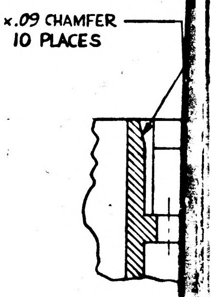

— .0008
32
2.525
.080
4 PLACES
.080
4 PLACES
.292
4 PLACES
2.290
2 PLACES
.069
.073 DIA THRU, CSK 60° X .089
.104 DIA
35 HOLES
● A .005
.072
.073 DIA
35 HOLES
-A-

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE COAT PER ND1002040. DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019


.115
.094 TYP
.600 TYP
.230 TYP
.213
.217 DIA, 2 PLACES
● B .005

SECTION A-A

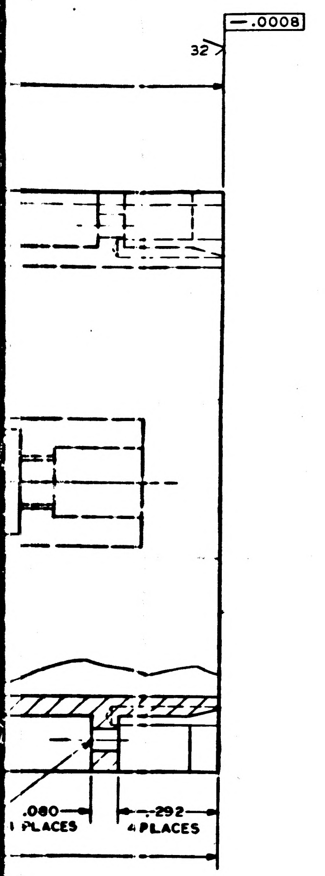

.025 x .09 CHAMFER
10 PLACES

PARTIAL SECTION
ROTATED 90° COU

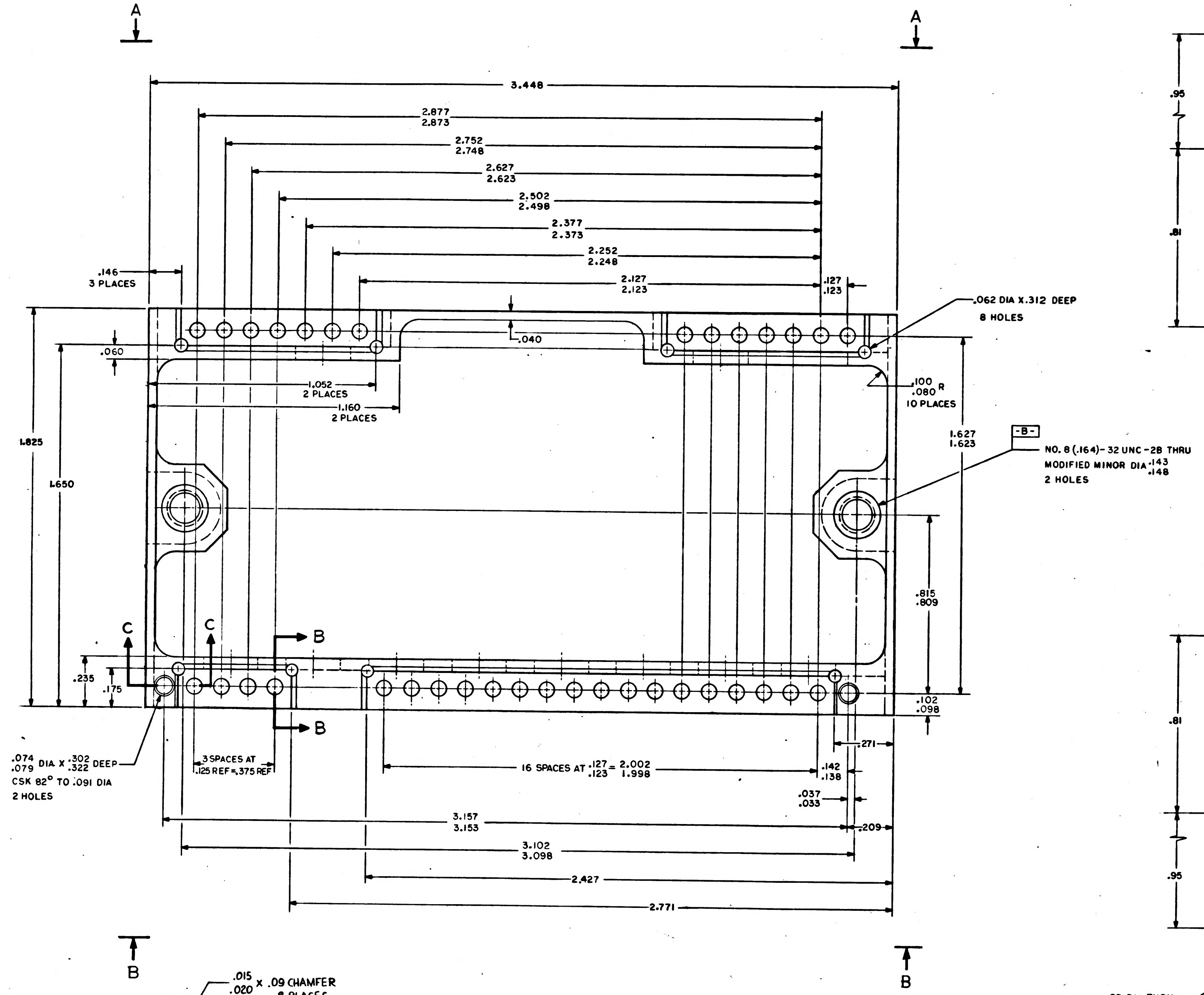
3H

2008461	A

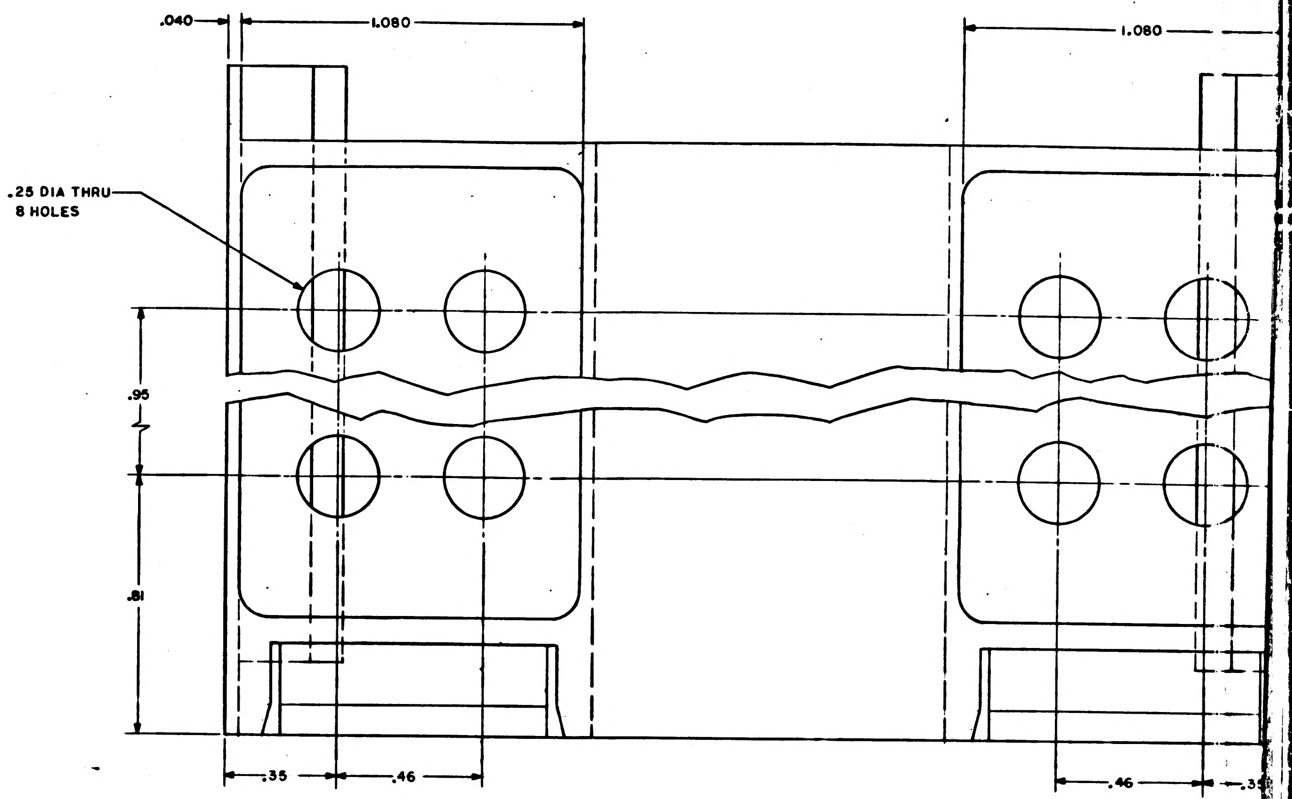
1/2008461



32
.0008
.080
4 PLACES
.292
4 PLACES

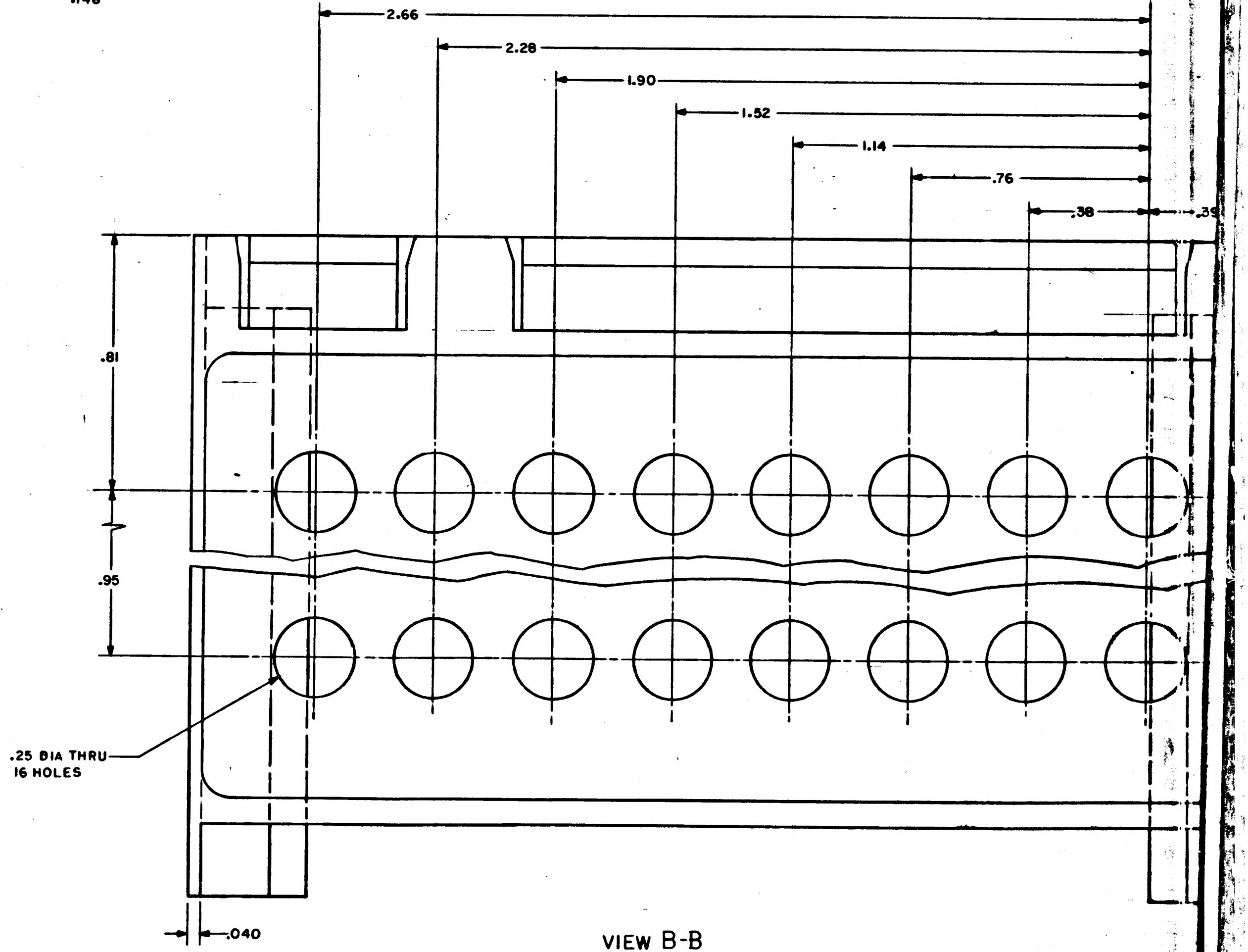


A
A
3.448
2.877
2.873
2.752
2.748
2.627
2.623
2.502
2.498
2.377
2.373
2.252
2.248
2.127
2.123
.127
.123
.146
3 PLACES
.040
.060
.062 DIA X .312 DEEP
8 HOLES
1.052
2 PLACES
1.160
2 PLACES
.100
.080 R
10 PLACES
1.825
1.650
1.627
1.623
-B-
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.815
.809
C
C
B
B
.235
.175
.102
.098
.271
.074
.079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
3 SPACES AT .125 REF = .375 REF
16 SPACES AT .127 .123 = 2.002 1.998
.142
.138
.037
.033
3.157
3.153
.209
3.102
3.098
2.427
2.771
B
B



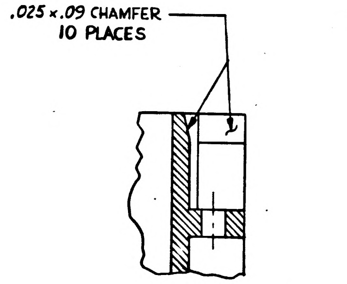
.040
1.080
1.080
.25 DIA THRU
8 HOLES
.95
.81
.35
.46
.46
.35

VIEW A-A



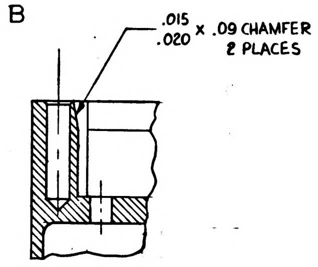
2.66
2.28
1.90
1.52
1.14
.76
.38
.35
.81
.95
.25 DIA THRU
16 HOLES
.040

VIEW B-B



.025 x .09 CHAMFER
10 PLACES

PARTIAL SECTION B-B
ROTATED 90° COUNTERCLOCKWISE



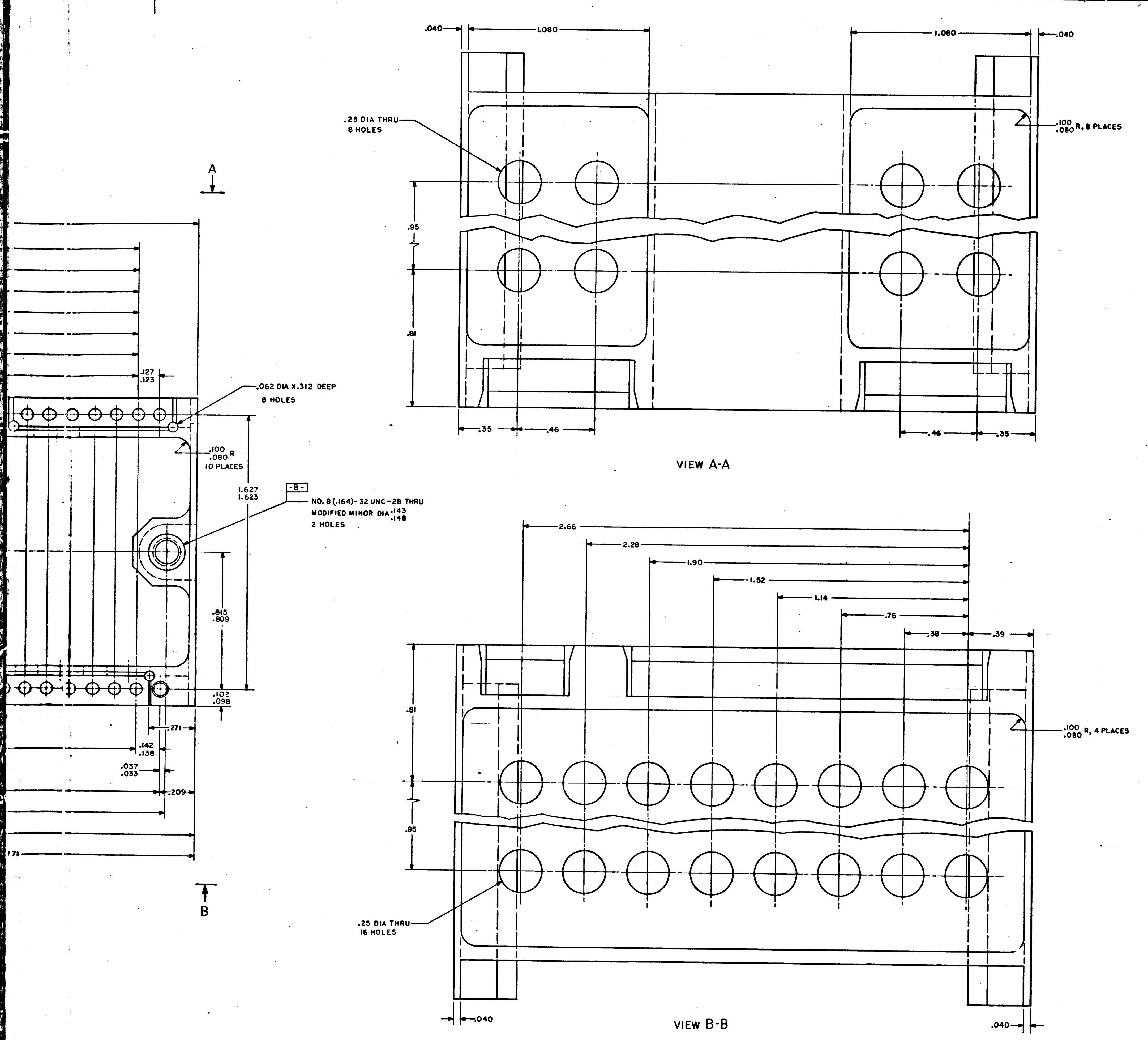
.015
.020 x .09 CHAMFER
2 PLACES

PARTIAL SECTION C-C

2008461 A

2/2008461

REVISIONS 27408			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 32434	9JAN67	AF N.L.



A
B
.040
1.080
1.080
.040
.25 DIA THRU
8 HOLES
.100 .080 R, 8 PLACES
.95
.81
.35
.46
.46
.35
VIEW A-A
.127 .123
.062 DIA X .312 DEEP
8 HOLES
.100 .080 R
10 PLACES
1.627 1.623
-B-
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.815 .809
.102 .098
.271
.142 .138
.037 .033
.209
.271
2.66
2.28
1.90
1.52
1.14
.76
.38
.39
.81
.100 .080 R, 4 PLACES
.95
.25 DIA THRU
16 HOLES
.040
VIEW B-B
.040

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS XX±.02 XXX±.005 ANGLES ±2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
MATERIAL SEE NOTE 2	DRAWN W. Horgan DATE 11 FEB 66 CHECKED [illegible] 17 MAR 66 APPROVAL Rizzo 18 MAR 66 APPROVAL [illegible] 21 MAR 66	FRAME OPTICS AND ATTITUDE ERROR SIGNAL CONDITIONER	
HEAT TREATMENT —	NASA APPROVAL A. C. METZGER	CODE IDENT NO. 80230	SIZE J
FINAL FINISH SEE NOTE 6	MIT APPROVAL [illegible]	SCALE 5/1	WT

NASA DRAWING NO. 2008461
SHEET 1 OF 1

NEXT ASSY	USED ON
2007240	
APPLICATION	

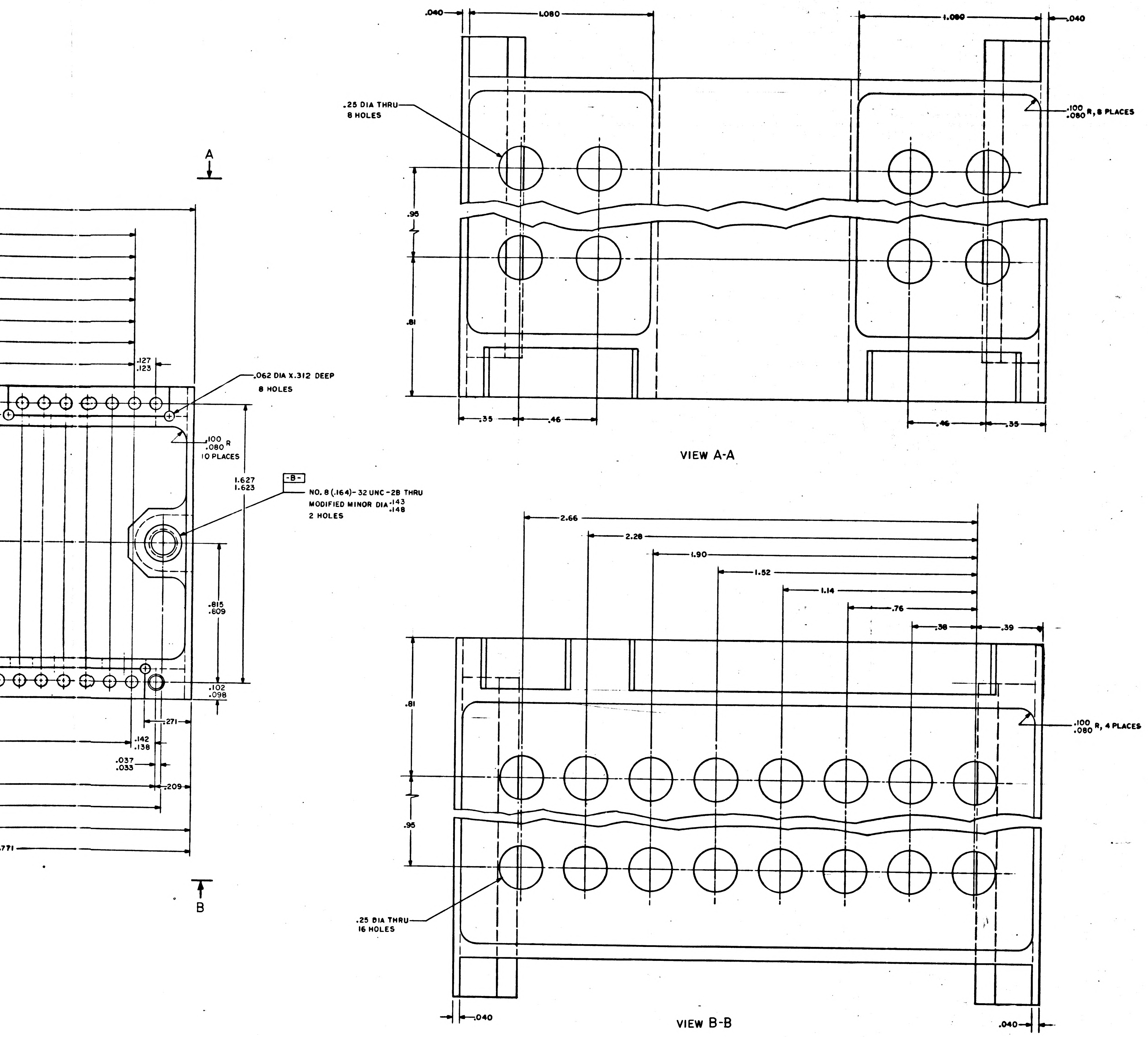
2008461 A

3H

2008461 A

3-/-2008461

REVISIONS	27408		
SYM	DESCRIPTION	DATE	APPROVAL


.040
1.080
1.080
.040
.25 DIA THRU
8 HOLES
.100 R, 8 PLACES
.080
A
.95
.81
.35
.46
.46
.35
VIEW A-A
.127
.123
.062 DIA X .312 DEEP
8 HOLES
.100 R
.080
10 PLACES
1.627
1.623
-B-
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
.815
.809
.102
.098
.271
.142
.138
.037
.033
.209
.771
B
2.66
2.28
1.90
1.52
1.14
.76
.38
.39
.81
.100 R, 4 PLACES
.080
.95
.25 DIA THRU
16 HOLES
.040
.040
VIEW B-B

3H

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

2007240	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ±.02 XXX ±.005 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT ——
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Horgan DATE 4 FEB 66
CHECKED
APPROVAL 10 MAR 66
APPROVAL
NASA APPROVAL
MIT APPROVAL

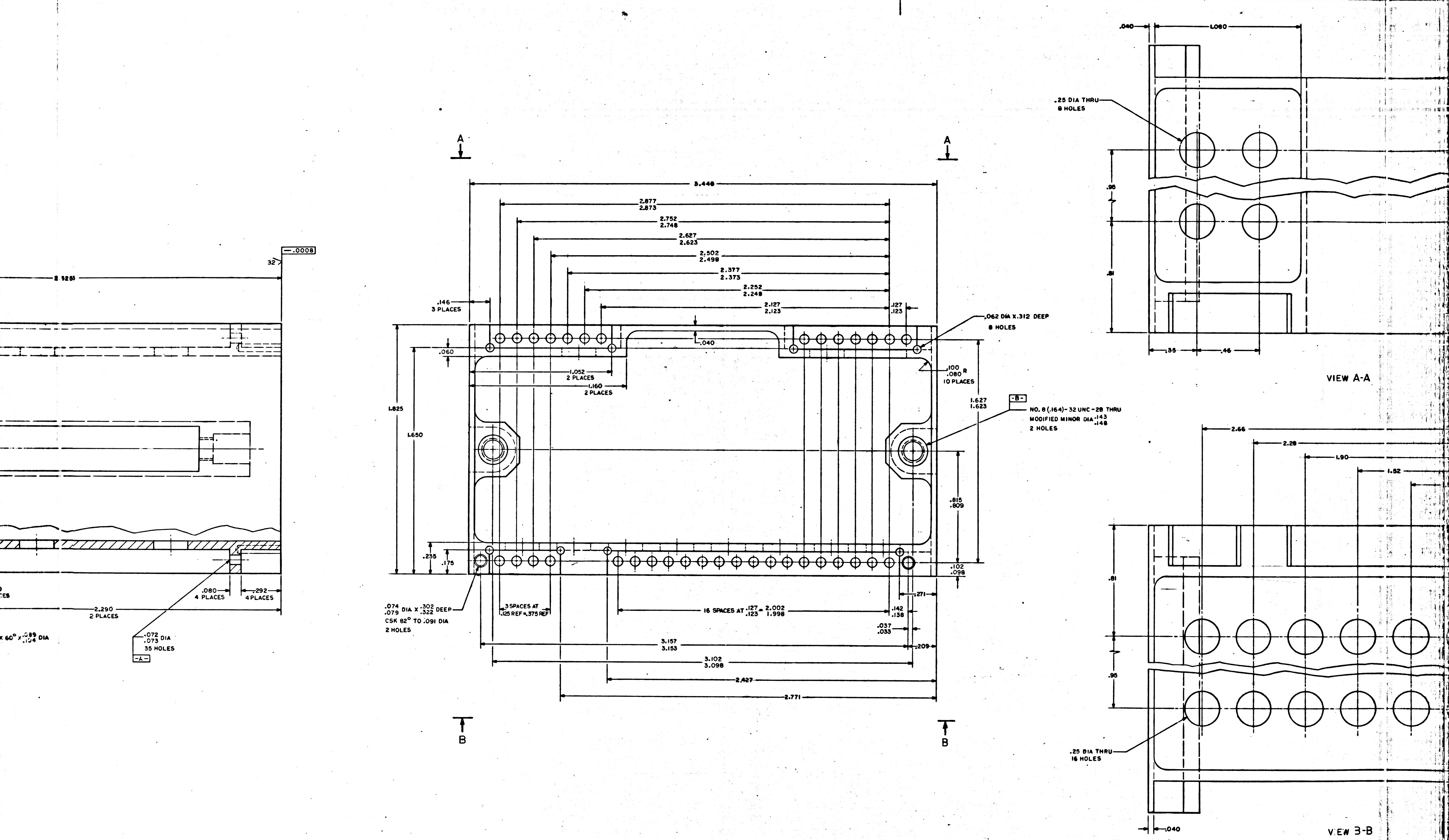
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

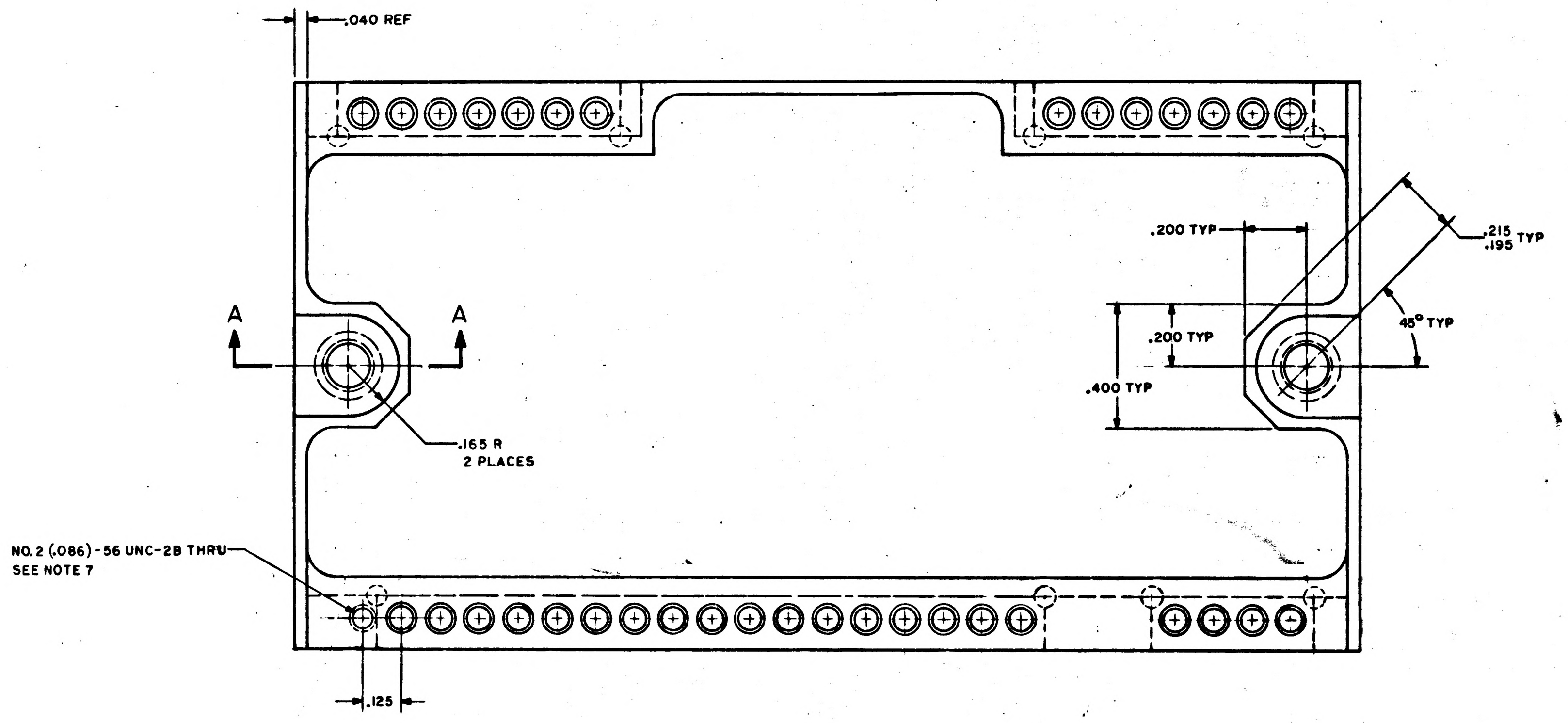
FRAME
OPTICS AND ATTITUDE ERROR
SIGNAL CONDITIONER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2008461
SCALE 5/1	WT	SHEET 1 OF 1

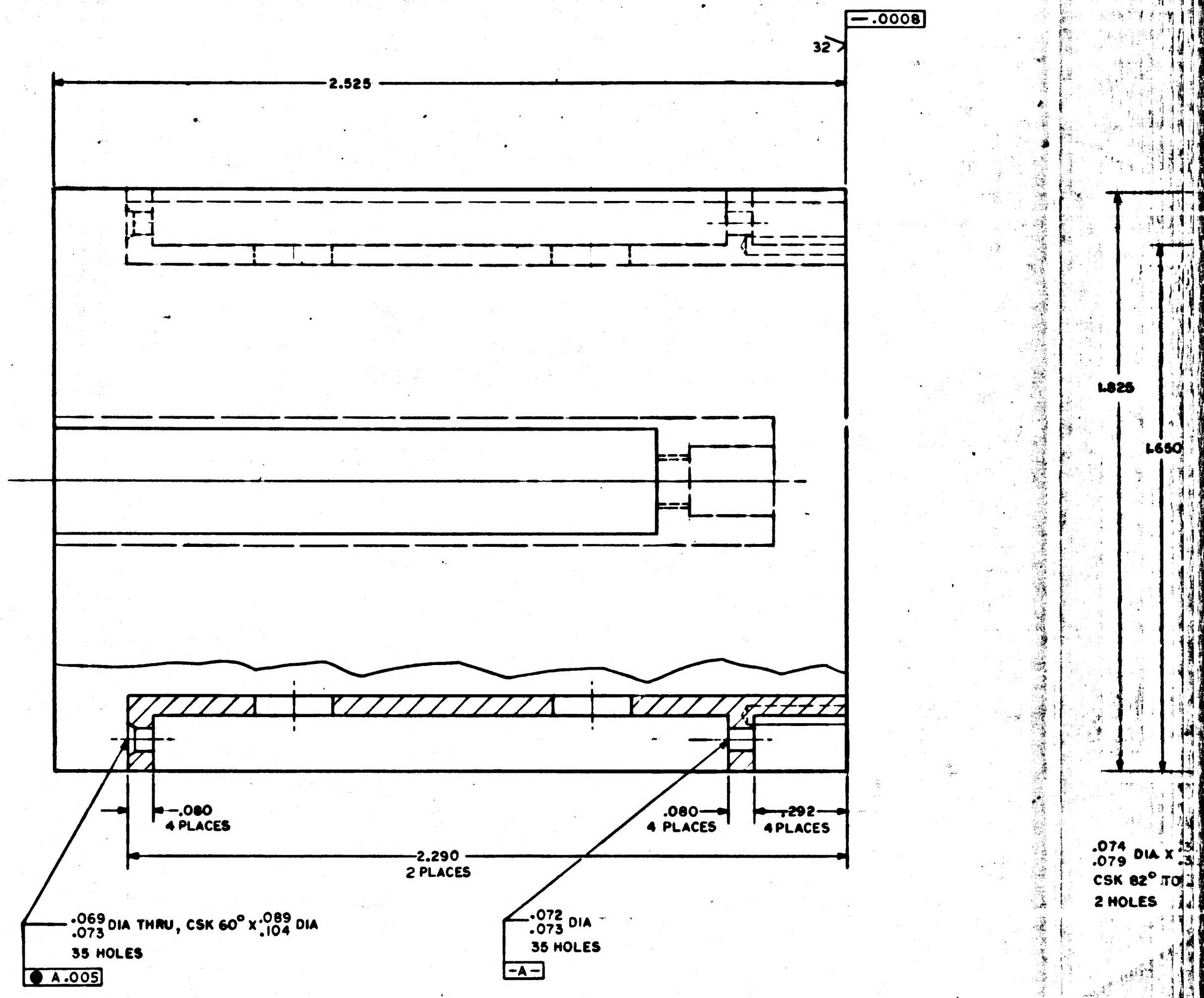
2008461

2008461


7
6
5
4
3
2.5255
32
—.0008
.080
4 PLACES
.292
4 PLACES
2.290
2 PLACES
x 60° x .089 .104 DIA
.072 .073 DIA
35 HOLES
-A-
A
A
3.448
2.877 2.873
2.752 2.748
2.627 2.623
2.502 2.498
2.377 2.373
2.252 2.248
2.127 2.123
.146
3 PLACES
.127 .123
.062 DIA X .312 DEEP
8 HOLES
.060
.040
1.052
2 PLACES
1.160
2 PLACES
.100 .080 R
10 PLACES
1.825
1.650
1.627 1.623
-B-
NO. 8 (.164)-32 UNC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.815 .809
.235
.175
.102 .098
.271
.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
3 SPACES AT
.125 REF = .375 REF
16 SPACES AT .127 .123 = 2.002 1.998
.142 .138
.037 .033
3.157 3.153
.209
3.102 3.098
2.427
2.771
B
B
.040
1.080
.25 DIA THRU
8 HOLES
.95
.81
.35
.46
VIEW A-A
2.66
2.28
1.90
1.52
.81
.95
.25 DIA THRU
16 HOLES
.040
VIEW B-B



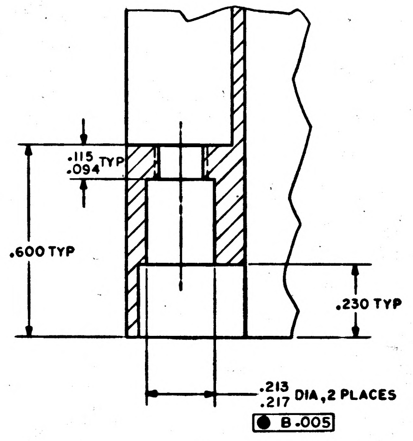
.040 REF
A
A
.200 TYP
.215
.195 TYP
.200 TYP
45° TYP
.400 TYP
.165 R
2 PLACES
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7
.125



—.0008
32
2.525
1.825
1.650
.080
4 PLACES
.080
4 PLACES
.292
4 PLACES
2.290
2 PLACES
.069
.073 DIA THRU, CSK 60° X .089
.104 DIA
35 HOLES
● A.005
.072
.073 DIA
35 HOLES
-A-
.074
.079 DIA X
CSK 82° TO
2 HOLES

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt[125]{}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202 TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE COAT PER ND1002040. DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019



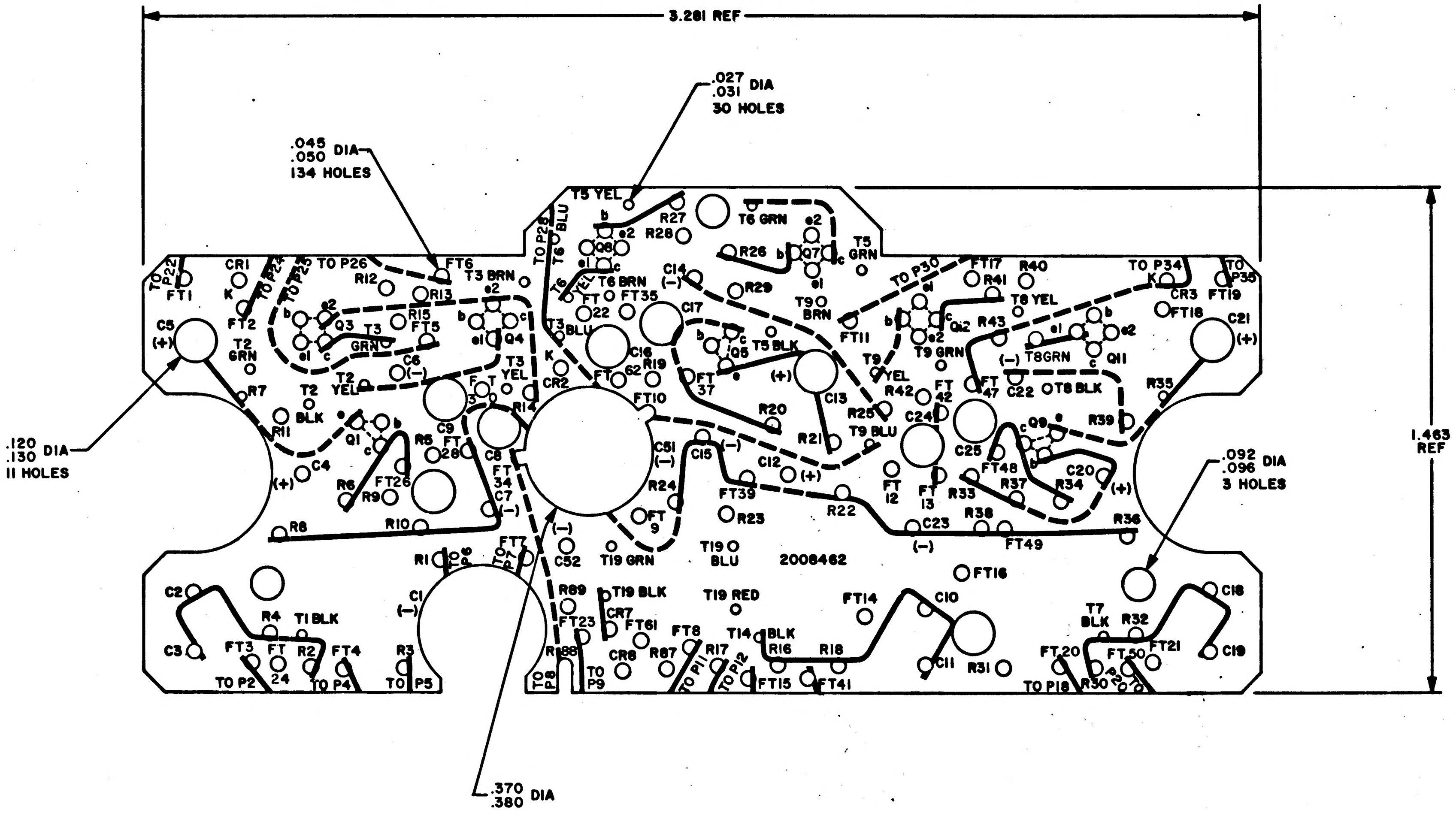
.115
.094 TYP
.600 TYP
.230 TYP
.213
.217 DIA, 2 PLACES
● B.005

SECTION A-A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27408

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.281 REF
.027
.031 DIA
30 HOLES
.045 DIA
.050
134 HOLES
.120 DIA
.130
11 HOLES
1.463
REF
.092 DIA
.096
3 HOLES
.370 DIA
.380
TO P22
FT1
CR1
K
TO P24
TO P25
TO P26
FT6
R12
R13
T3 BRN
e2
C5
(+)
FT2
T2
GRN
b
Q3
e1
c
T3
GRN
R15
FT5
Q4
C6
(−)
T2
YEL
T3
YEL
R7
T2
BLK
R11
Q1
R5
FT
28
C9
C8
FT
34
C7
(−)
R14
C4
(+)
R6
R9
FT26
R8
R10
R1
TO P6
TO P7
FT7
C2
C3
R4
T1 BLK
FT3
FT
24
R2
FT4
TO P2
TO P4
R3
TO P5
C1
(−)
TO P28
T6
BLU
T5 YEL
Q8
R27
R28
T6 GRN
R26
Q7
T5
GRN
T6
YEL
T6 BRN
FT
22
FT35
C14
(−)
R29
T3
BLU
K
CR2
C16
62
R19
FT
C17
Q5
T5 BLK
FT
37
FT10
(+)
C13
R20
R21
T9
BRN
FT11
TO P30
FT17
R41
R40
Q12
T9 GRN
T8 YEL
R43
T9
YEL
R42
R25
T9 BLU
FT
42
FT
47
C22
T8GRN
Q11
T8 BLK
TO P34
K
CR3
TO P35
FT19
FT18
C21
(+)
R35
R39
C24
C25
Q9
FT48
C20
(+)
R37
R34
R33
R38
R36
FT
12
FT
13
C23
(−)
FT49
C51
(−)
C15
(−)
C12
(+)
R24
FT39
R23
R22
FT
9
(−)
C52
T19 GRN
T19
BLU
2008462
R89
T19 BLK
T19 RED
FT23
CR7
FT61
FT8
CR8
R87
R17
T14
BLK
R16
R18
R88
TO P8
TO P9
TO P11
TO P12
FT15
FT41
FT14
C10
C11
R31
FT16
T7
BLK
R32
FT20
FT50
FT21
C18
C19
TO P18
R30
TO P20
b
c
e
e1
e2

REF: DRAWING NO. 2008463 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007240	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 2-24-66
CHECKED
APPROVED 10 MAR 66
APPROVED
APPROVED MIT W. Metzger
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

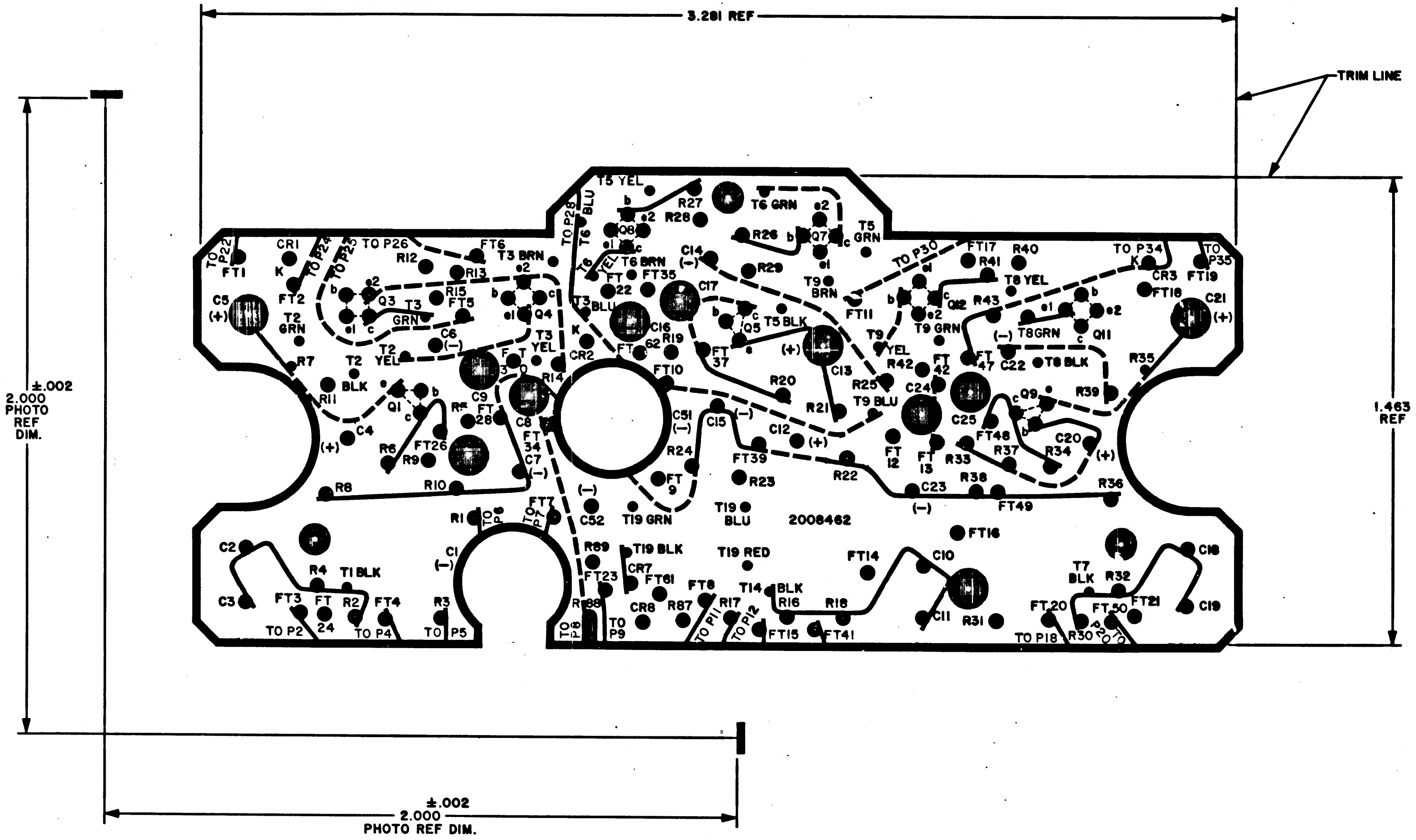
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008462

SCALE 5/1 SHEET 1 OF 1

2008462

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS 27408						
Ⓐ						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TRIM LINE
1.463 REF
±.002
2.000
PHOTO
REF
DIM.
±.002
2.000
PHOTO REF DIM.
2008462
T5 YEL
R27
T6 GRN
T5 GRN
R28
Q8
Q7
R26
TO P28
T6 BLU
C14 (−)
T6 BRN
FT35
FT22
C17
R29
T9 BRN
FT11
TO P30
FT17
R40
T8 YEL
TO P34
CR3
FT19
TO P35
FT18
C21 (+)
TO P22
FT1
CR1
K
TO P24
TO P25
TO P26
R12
FT6
T3 BRN
R13
R15
Q3
T3 GRN
FT5
Q4
C5 (+)
FT2
T2 GRN
C6 (−)
T2 YEL
T3 YEL
R14
CR2
T3 BLU
C16
R19
Q5
T5 BLK
FT37
C13 (+)
T9 YEL
R42
T9 GRN
Q12
R43
FT42
FT47
C22
T8 GRN
T8 BLK
Q11
R35
R7
T2 BLK
Q1
R11
C4
C9
FT28
C8
FT10
R20
R25
R21
T9 BLU
C24
C25
Q9
R39
C51 (−)
C15
C12 (+)
FT48
R37
R34
C20 (+)
R6
R9
FT26
FT34
C7 (−)
R24
FT39
R23
R22
FT12
FT13
R33
R38
C23 (−)
R36
FT49
R8
R10
R1
TO P6
TO P7
FT7
C52
FT9
T19 GRN
T19 BLU
FT16
C2
R4
T1 BLK
C1 (−)
R69
T19 BLK
T19 RED
FT14
C10
T7 BLK
R32
C18
C3
FT3
FT24
R2
FT4
R3
TO P2
TO P4
TO P5
R68
FT23
CR7
FT61
FT8
CR8
R87
R17
T14 BLK
R16
R18
C11
R31
FT20
FT50
FT21
C19
TO P8
TO P9
TO P11
TO P12
FT15
FT41
TO P18
R30
TO P20

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Ken Healy	24 Feb 66
CHECKED		
APPROVED		18 Mar 66
APPROVED		21 Mar 66
APPROVED MIT	W Kupfer	
APPROVED MSC	A.C. ...ZCER	
		DATE

PHOTOGRAPHIC MASTER
WIRING BOARD A
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008463

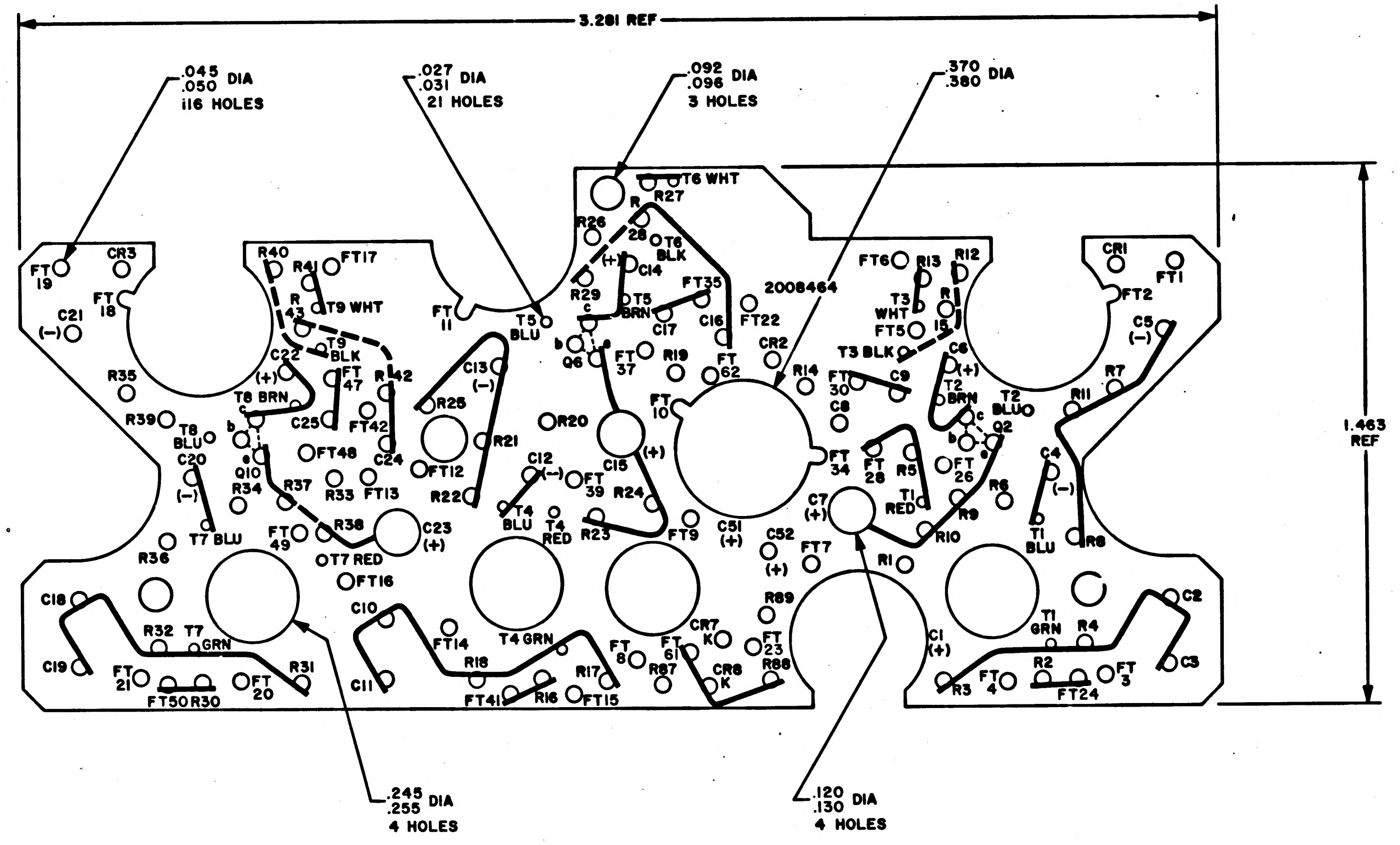
SCALE 5/1
SHEET 1 OF 1

2008463

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27408

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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.045 .050 DIA 116 HOLES
.027 .031 DIA 21 HOLES
.092 .096 DIA 3 HOLES
.370 .380 DIA
1.463 REF
.245 .255 DIA 4 HOLES
.120 .130 DIA 4 HOLES
2008464
T6 WHT
R27
R26
R 28
T6 BLK
C14
R29
T5 BRN
FT35
C16
FT22
CR2
FT6
R13
R12
T3 WHT
FT5
R 15
T3 BLK
CR1
FT1
FT2
C5 (−)
FT 19
CR3
FT 18
C21 (−)
R40
R41
FT17
R 43
T9 WHT
T9 BLK
C22 (+)
FT 47
R 42
FT 11
T5 BLU
C13 (−)
Q6
FT 37
C17
R19
FT 62
R14
FT 30
C9
C6 (+)
T2 BRN
Q2
T2 BLU
R11
R7
R35
R39
T8 BRN
C25
FT42
R25
R20
FT 10
C8
FT 34
FT 28
R5
FT 26
C4 (−)
T8 BLU
C20 (−)
Q10
FT48
C24
FT12
R21
C12 (−)
C15 (+)
T1 RED
R6
R34
R37
R33
FT13
R22
FT 39
R24
C7 (+)
R9
T1 BLU
R8
T7 BLU
FT 49
R38
C23 (+)
T4 BLU
T4 RED
R23
FT9
C51 (+)
C52 (+)
FT7
R10
R36
T7 RED
FT16
R1
C18
C10
CR7 K
R89
FT 23
C2
R32
T7 GRN
FT14
T4 GRN
FT 8
FT 61
C1 (+)
T1 GRN
R4
C19
FT 21
R31
C11
R16
R17
R87
CR8 K
R88
R2
FT 3
C3
FT50
R30
FT 20
FT41
R16
FT15
R3
FT 4
FT24

REF: DRAWING NO. 2008465 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007240	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	Van Vleck	1 Mar 66
CHECKED	L. Kingsbury	18 Mar 66
APPROVED	[illegible]	18 MAR 66
APPROVED	[illegible]	24 Mar 66
APPROVED MIT	[illegible] & G. METZGER	[illegible]
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

CODE IDENT NO.	SIZE	DRAWING NO
80230	D	2008464

SCALE 5/1
SHEET 1 OF 1

2008464

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27408

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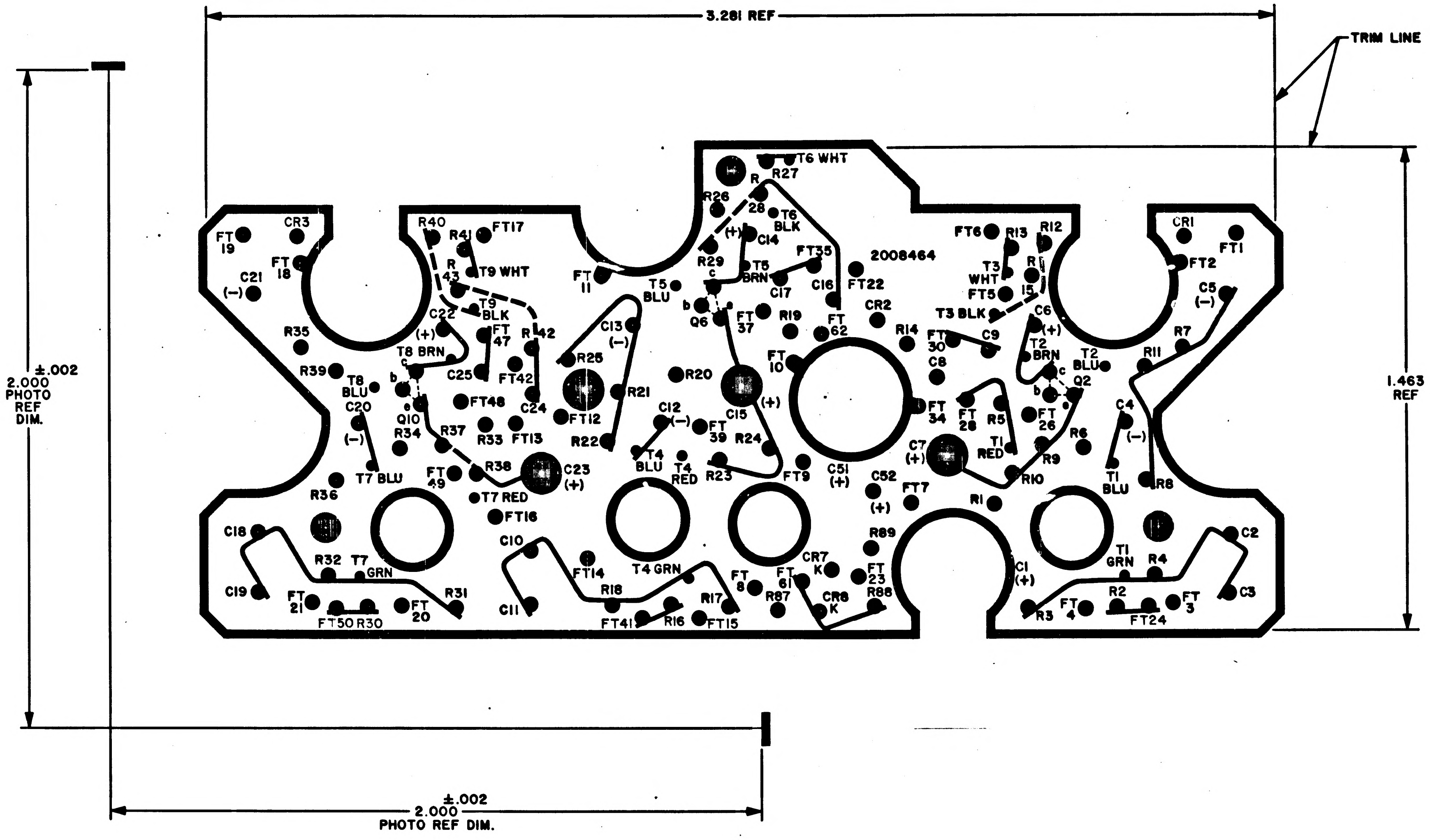

3.281 REF
TRIM LINE
1.463 REF
±.002
2.000
PHOTO REF DIM.
±.002
2.000
PHOTO REF DIM.
2008464
FT19
CR3
C21 (−)
FT18
R35
R39
T8 BLU
C20 (−)
T7 BLU
R36
C18
R32
T7 GRN
C19
FT21
FT50
R30
FT20
R31
R40
R41
FT17
R43
T9 WHT
C22 (+)
T9 BLK
T8 BRN
FT47
R42
C25
FT48
FT42
C24
Q10
R34
R37
R33
FT13
FT49
R38
T7 RED
C23 (+)
FT16
C10
C11
FT11
T5 BLU
C13 (−)
R25
R21
FT12
R22
R20
C12 (−)
T4 BLU
T4 RED
FT14
T4 GRN
R18
FT41
R16
FT15
R17
FT8
R87
T6 WHT
R27
R26
R28
(+)
T6 BLK
C14
R29
T5 BRN
FT35
C17
C16
FT22
Q6
FT37
R19
FT62
CR2
FT10
C15 (+)
FT39
R24
R23
FT9
C51 (+)
C52 (+)
FT7
R89
CR7 K
FT61
CR8 K
FT23
R88
R14
FT30
C8
C9
FT6
R13
R12
T3 WHT
FT5
R15
T3 BLK
C6 (+)
T2 BRN
T2 BLU
Q2
FT34
FT28
R5
C7 (+)
T1 RED
FT26
R9
R10
R1
R6
C1 (+)
R3
FT4
R2
FT24
FT3
T1 GRN
R4
CR1
FT1
FT2
C5 (−)
R7
R11
C4 (−)
T1 BLU
R8
C2
C3

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ken Healy 1 Mar 66
CHECKED R. L. Kingsbury 18 Mar 66
APPROVED 18 Mar 66
APPROVED 21 Mar 66
APPROVED MIT W. Kupfer
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD B
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

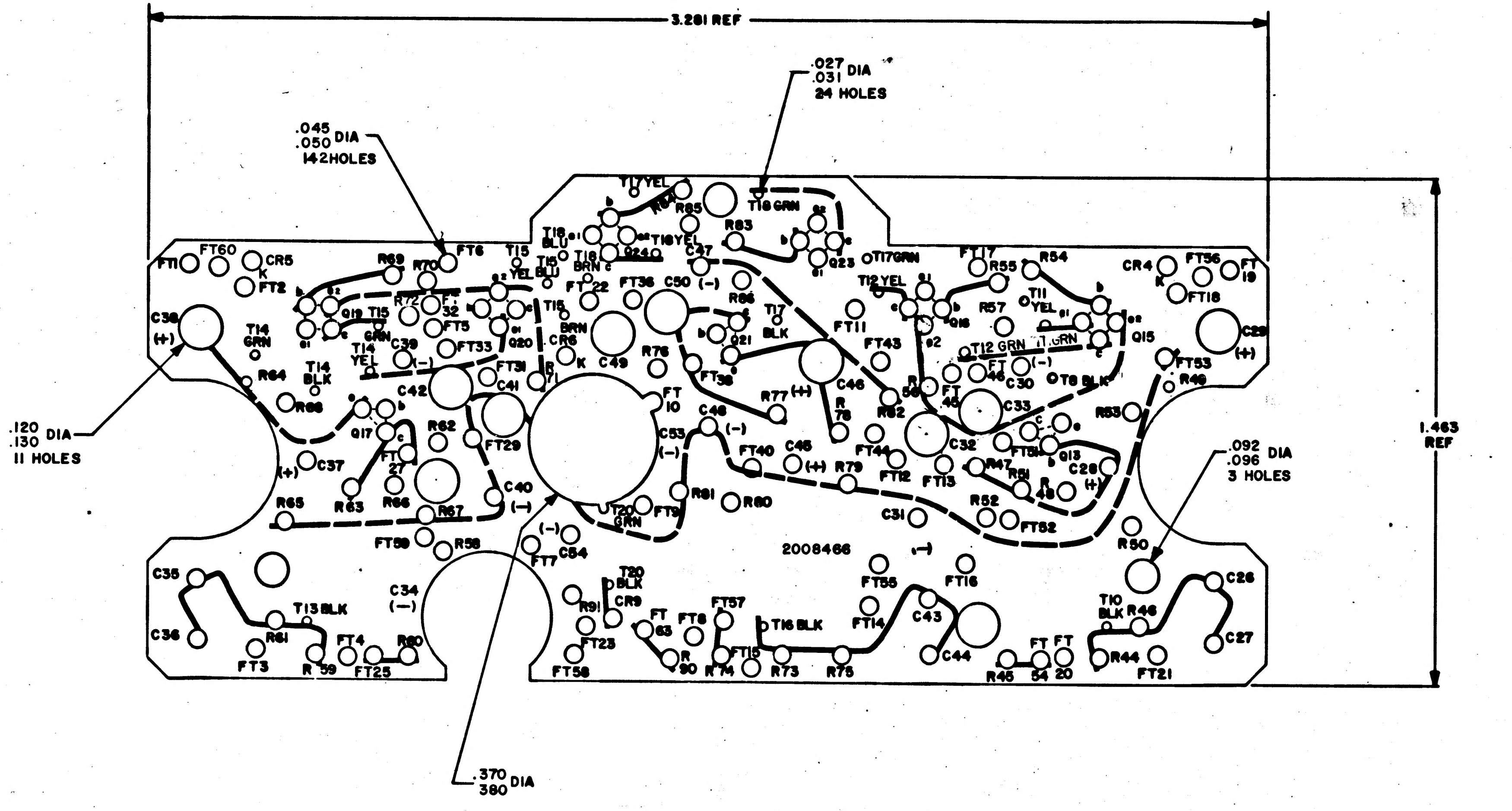
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008465

SCALE 5/1
SHEET 1 OF 1

2008465

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2740						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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.027 .031 DIA 24 HOLES
.045 .050 DIA 142 HOLES
.120 .130 DIA 11 HOLES
.092 .096 DIA 3 HOLES
.370 380 DIA
1.463 REF
2008466
FT1
FT60
CR5
K
FT2
R69
R70
FT6
T15
T15 YEL
T15 BLU
T18 BLU
T18 BRN
T17 YEL
R84
R85
T16 YEL
Q24
C47
T18 GRN
R83
Q23
T17 GRN
FT17
R55
R54
CR4
FT56
FT 19
FT18
C38 (+)
T14 GRN
Q19
T15 GRN
R72
FT 32
FT5
T14 YEL
C39 (-)
FT33
Q20
T15 BRN
CR6
K
FT 22
FT36
C50 (-)
R86
T17 BLK
Q21
FT11
T12 YEL
Q16
R57
T11 YEL
Q15
C29 (+)
T14 BLK
R64
R66
Q17
C42
C41
FT31
R 71
C49
R76
FT38
R77 (+)
C46
R 78
FT43
R 56
FT 46
T12 GRN
T1 GRN
FT 46
C30 (-)
T8 BLK
FT53
R49
FT 10
C48 (-)
C53 (-)
R62
FT29
FT 27
C37 (+)
R65
R63
R66
R67
C40 (-)
R91
R80
FT40
C45 (+)
R79
FT44
FT12
R82
C33
C32
FT13
R47
R51
FT51
Q13
R 48
C28 (+)
R52
R53
T20 GRN
FT9
FT59
R58
FT7
C54 (-)
C31
(-)
FT52
R50
C35
C36
T13 BLK
R61
FT3
R 59
FT4
FT25
R60
C34 (-)
T20 BLK
CR9
R91
FT23
FT 63
FT8
FT57
R 90
R74
FT15
T16 BLK
R73
R75
FT58
FT55
FT16
FT14
C43
C44
R45
FT 54
FT 20
T10 BLK
R46
R44
FT21
C26
C27

REF: DRAWING NO. 2008467 FOR PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007240	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Addonizio Jr. 8 Mar 66
CHECKED R. Kingsbury 10 Mar 66
APPROVED Rilyard 18 Mar 66
APPROVED 21 Mar 66
APPROVED MIT W. Kay Jr 22 Mar 66
E. C. METZGER
APPROVED MSC
DATE

WIRING BOARD C
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

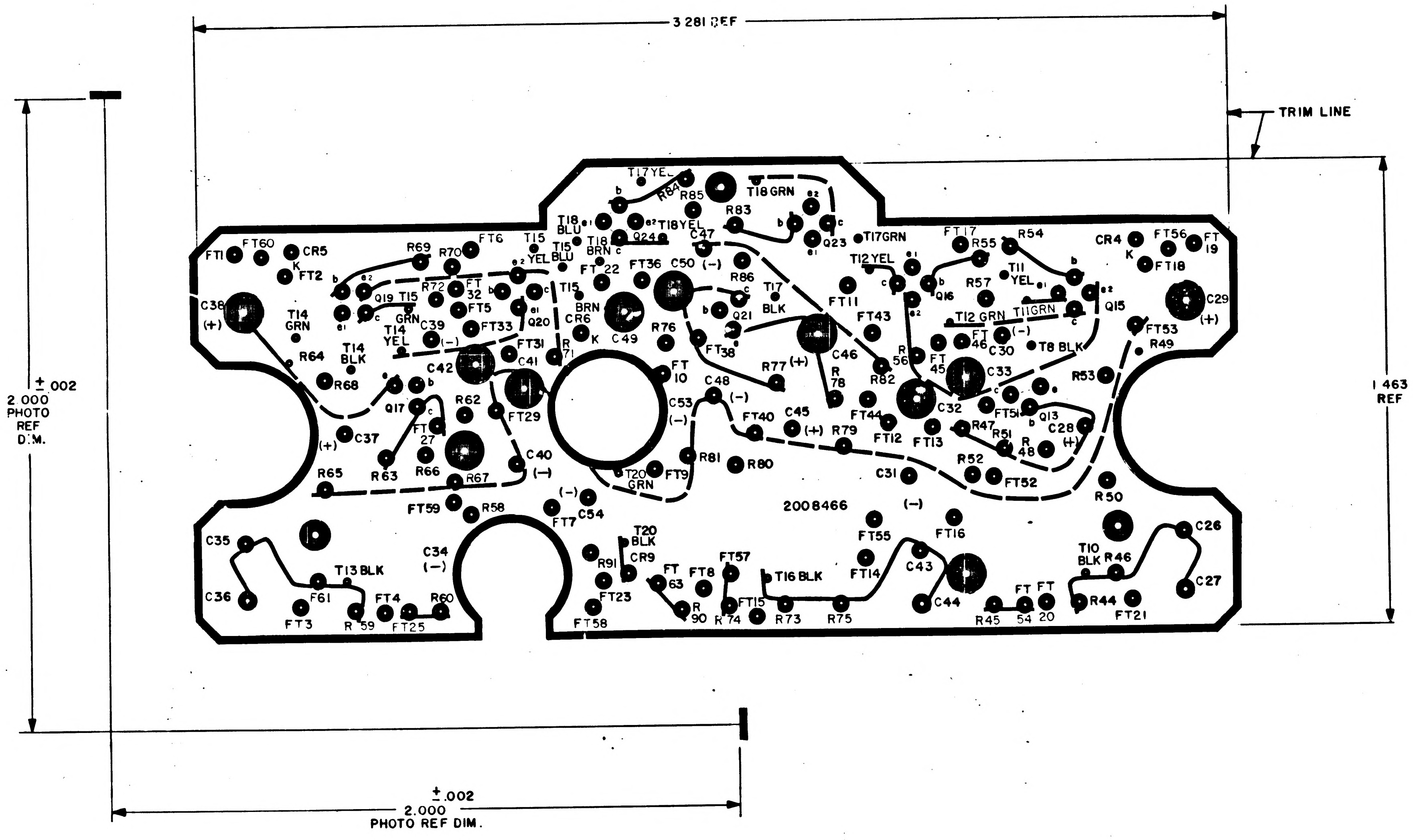
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008466
SCALE 8/1
SHEET OF

2008466

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27408

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 29765			27 JUN 66	



3.281 REF
TRIM LINE
1.463 REF
±.002
2.000
PHOTO
REF
DIM.
±.002
2.000
PHOTO REF DIM.
2008466
FT1
FT60
CR5
K
FT2
R69
R70
FT6
T15
YEL
T18
BLU
T18
BRN
T17YEL
R84
R85
T18YEL
Q24
T18GRN
R83
Q23
T17GRN
FT17
R55
R54
CR4
FT56
FT19
FT18
C38
(+)
T14
GRN
Q19
T15
GRN
T14
YEL
C39
FT32
R72
FT5
FT33
Q20
T15
BRN
CR6
K
FT22
FT36
C50
(−)
C47
R86
T17
BLK
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C49
R76
FT38
FT11
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Q16
R57
T11
YEL
T12 GRN
T11GRN
Q15
C29
(+)
FT53
R49
R64
T14
BLK
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C42
C41
FT31
R71
FT10
C48
(−)
R77
(+)
C46
R78
R82
R56
FT45
FT46
C30
(−)
T8 BLK
C33
R53
Q17
R62
FT29
C53
(−)
FT40
C45
(+)
R79
FT44
FT12
FT13
C32
R47
R51
R48
FT51
Q13
C28
(+)
(+)
C37
FT27
R66
R67
C40
(−)
R81
R80
R52
FT52
R65
R63
T20
GRN
FT9
C31
(−)
R50
FT59
R58
(−)
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FT55
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C34
(−)
R91
FT63
FT8
FT57
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FT14
C43
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C36
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FT4
R60
FT23
R90
FT15
R74
R73
R75
C44
FT54
FT20
R44
FT3
R59
FT25
FT58
R45
FT21

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	A. Oddoms Jr.	8 Mar 66
CHECKED		18 Mar 66
APPROVED		15 Mar 66
APPROVED		
APPROVED MIT		22 Mar 66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD C
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

CODE IDENT NO	SIZE	DRAWING NO
80230	D	2008467

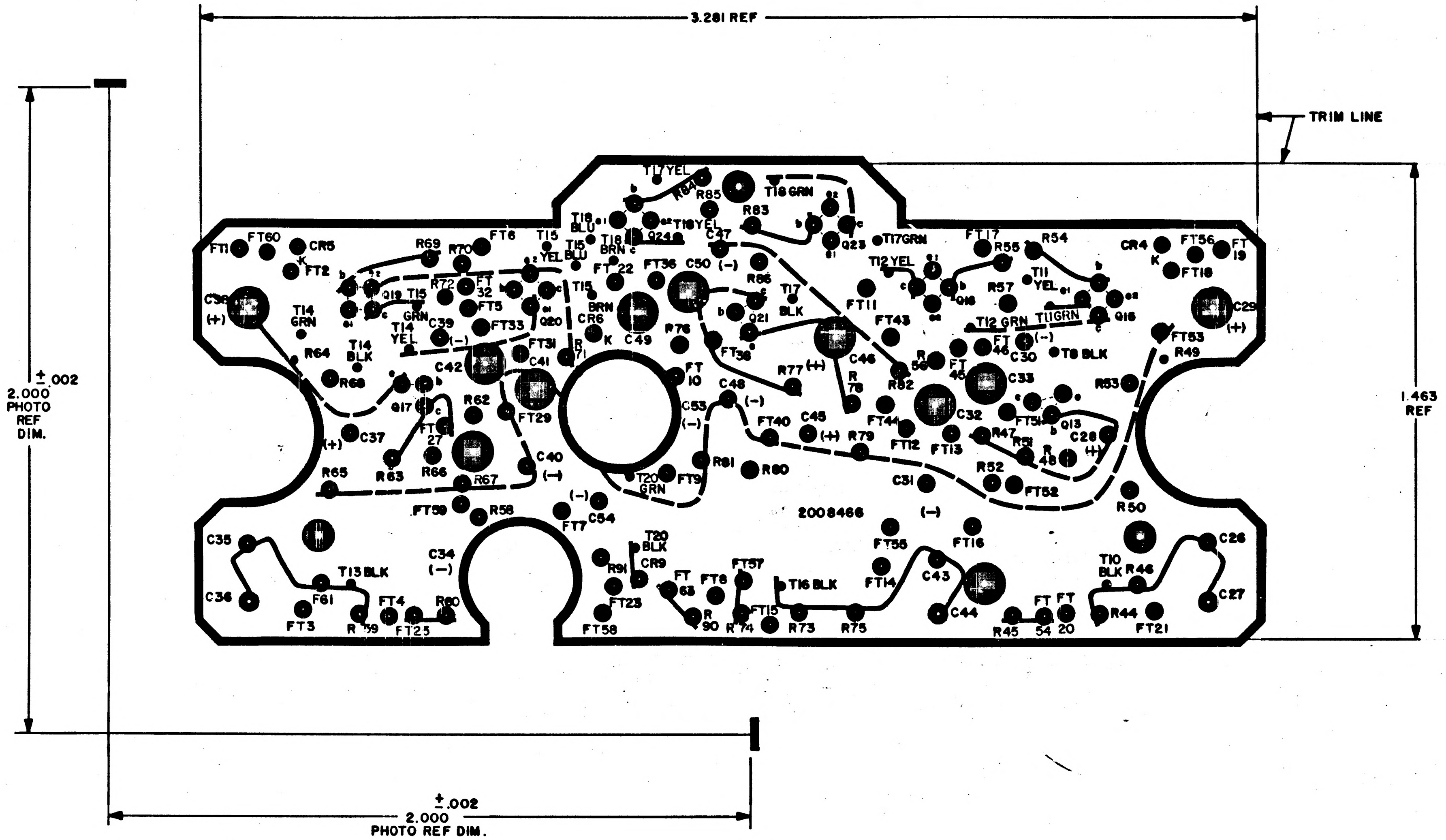
SCALE 5/1 SHEET 1 OF 1

2008467 A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2740F

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.281 REF
TRIM LINE
1.463 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
2008466
FT1
FT60
CR5
K
FT2
R69
R70
FT6
T15
T15 BLU
T18 BLU
T18 BRN
T17 YEL
R84
R85
T18 GRN
R83
T18 YEL
Q24
C47
Q23
T17GRN
FT17
R55
R54
CR4
K
FT56
FT 19
FT18
C38 (+)
T14 GRN
Q19
T15 GRN
T14 YEL
C39 (−)
R72
FT 32
FT5
FT33
Q20
T15 YEL
T15 BRN
CR6
K
C49
FT 22
FT36
C50 (−)
R86
Q21
T17 BLK
R76
FT38
T12 YEL
Q18
R57
T11 YEL
Q15
C29 (+)
FT11
FT43
T12 GRN
T11GRN
FT 46
C30 (−)
T8 BLK
FT53
R49
R64
T14 BLK
R68
Q17
FT 27
C42
FT31
C41
R 71
FT29
R62
FT 10
C53 (−)
C48 (−)
R77 (+)
C46
R 78
R 56
R82
FT 45
C33
C32
FT51
Q13
R63
C37 (+)
R65
R63
R66
R67
C40 (−)
T20 GRN
FT9
R81
R80
FT40
C45 (+)
R79
FT44
FT12
FT13
R47
R51
R 48
C28 (+)
R52
FT52
C31 (−)
R50
FT59
R58
FT7
C54 (−)
C35
C36
T13 BLK
F61
FT3
R 59
FT4
FT25
R60
C34 (−)
T20 BLK
CR9
R91
FT23
FT58
FT 63
R 90
FT8
FT57
R 74
FT15
T16 BLK
R73
R75
FT55
FT16
FT14
C43
C44
R45
FT 54
FT 20
T10 BLK
R46
R44
FT21
C26
C27

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN C. Addams Jr. 2 Mar 66
CHECKED R. P. Kung [illegible] 18 Mar 66
APPROVED [illegible] 18 Mar 66
APPROVED [illegible] 21 Mar 66
APPROVED MIT [illegible] A. C. METZGER 22 Mar 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD C
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008467

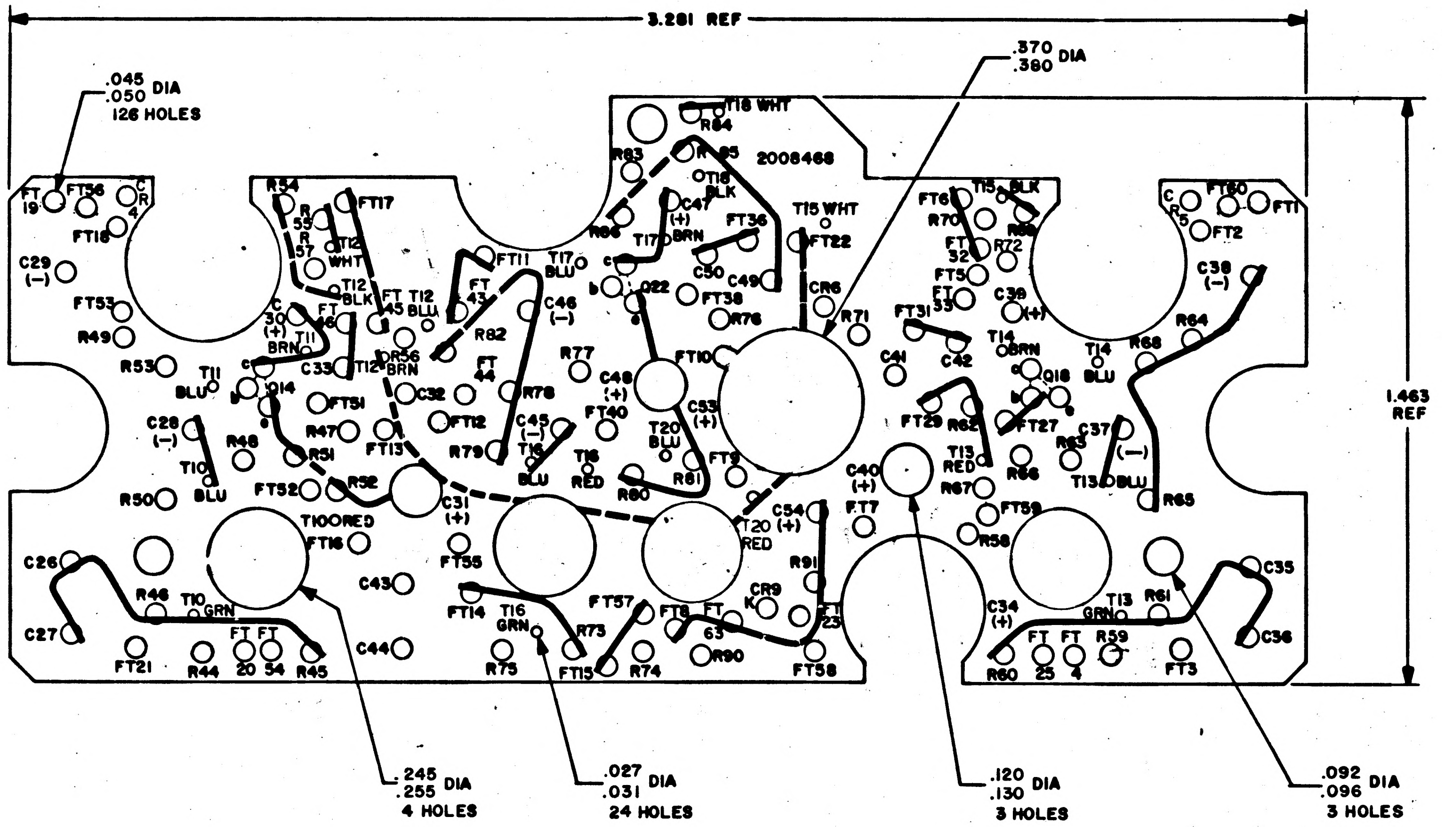
SCALE 5/1 SHEET 1 OF 1

2008467

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27408

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A						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.045 .050 DIA
126 HOLES
.370 .380 DIA
2008468
1.463 REF
.245 .255 DIA
4 HOLES
.027 .031 DIA
24 HOLES
.120 .130 DIA
3 HOLES
.092 .096 DIA
3 HOLES
T18 WHT
R84
R85
R83
T18 BLK
C47 (+)
BRN
T15 WHT
FT36
FT22
C49
C50
FT38
R76
CR6
R71
FT31
FT6
T15 BLK
R70
R69
FT 32
R72
FT5
FT 33
C39 (+)
T14 BRN
Q18
T14 BLU
R68
R64
FT60
FT1
FT2
C 5
C38 (-)
FT 19
FT56
C R 4
FT18
C29 (-)
FT53
R49
R53
T11 BLU
R54
R 55
R 57
T12 WHT
T12 BLK
FT17
C 30 (+)
T11 BRN
Q14
C33
FT 46
FT 45
T12 BLU
R56 BRN
C32
FT51
R47
FT13
FT11
FT 43
T17 BLU
C46 (-)
R82
FT 44
R78
R77
C48 (+)
FT40
FT12
C45 (-)
T16 BLU
R79
T16 RED
R80
T17
Q22
FT10
C53 (+)
T20 BLU
R81
FT9
C41
C42
FT29
R62
FT27
R63
C37
(-)
T13 BLU
R65
T13 RED
R66
R67
C40 (+)
FT7
C54 (+)
T20 RED
R91
FT59
R58
C28 (-)
T10 BLU
R48
R51
R52
R50
FT52
T10 RED
FT16
C31 (+)
FT55
C43
C26
R46
T10 GRN
C27
FT21
R44
FT 20
FT 54
R45
C44
FT14
T16 GRN
R73
R75
FT15
FT57
R74
FT8
FT 63
CR9 K
R90
FT 23
FT58
C34 (+)
R60
FT 25
FT 4
R59
T13 GRN
R61
FT3
C35
C36

REF: DRAWING NO. 2008469 FOR PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007240	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Mahoney March 66
CHECKED R.P. Kingsley
APPROVED
APPROVED
APPROVED MIT
R. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

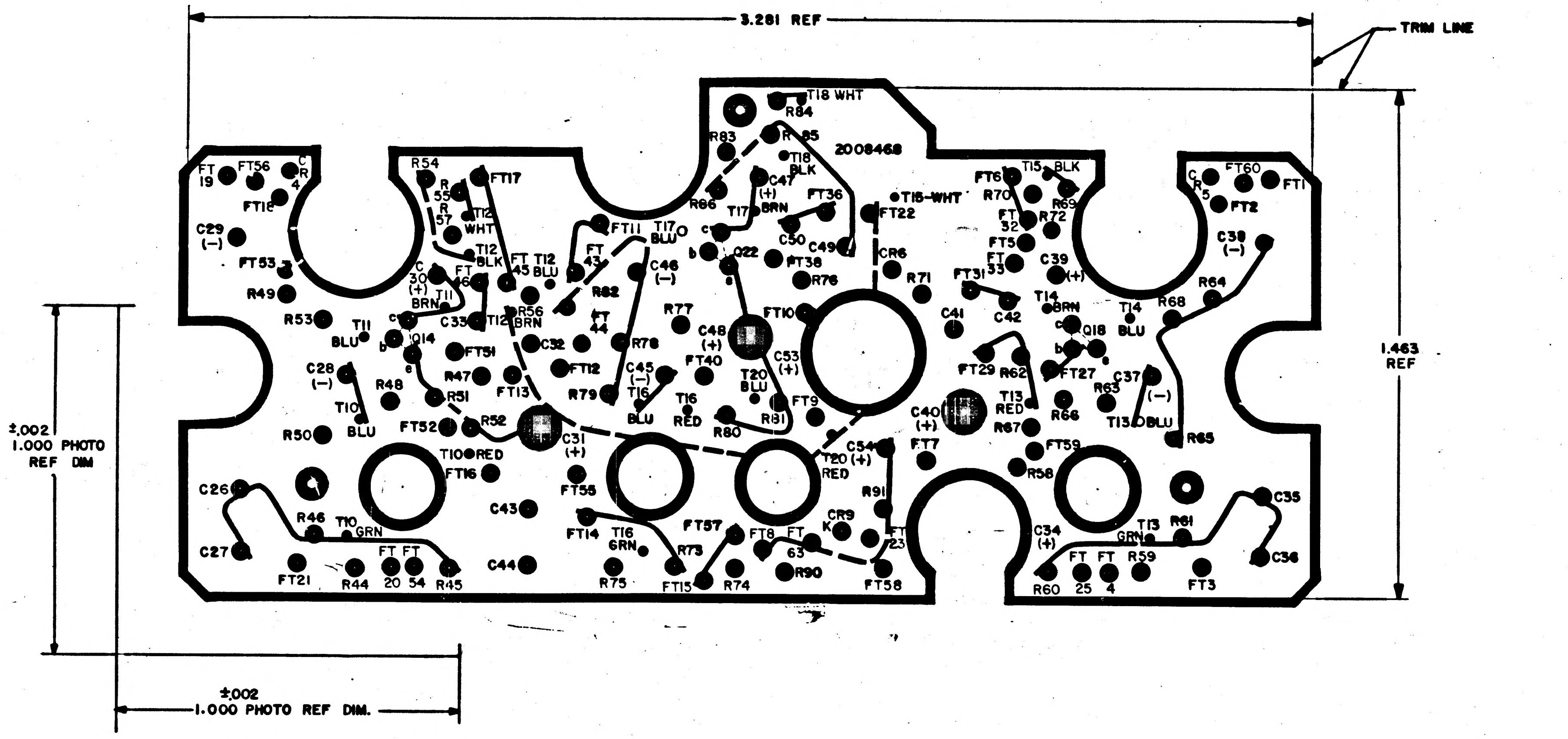
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008468

SCALE 5/1 SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27808

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.281 REF
TRIM LINE
1.463 REF
±.002 1.000 PHOTO REF DIM
±.002 1.000 PHOTO REF DIM.
2008468
T18 WHT
R84
R85
R83
T16 BLK
C47 (+)
BRN
T17
FT36
FT15-WHT
FT22
FT6
T15 BLK
R70
R69
FT 32
R72
FT5
FT 33
C39 (+)
FT60
FT1
FT2
C38 (−)
FT 19
FT56
C R 4
FT18
C29 (−)
FT53
R49
R53
R54
R 55
R 57
FT17
T12 WHT
T12 BLK
FT 46
FT 45
T12 BLU
FT 43
FT11
T17 BLU
R86
Q22
C50
C49
FT38
R76
CR6
R71
FT31
T14 BRN
C42
Q18
T14 BLU
R68
R64
C 30 (+)
T11 BRN
T11 BLU
C33
R56 BRN
R82
C46 (−)
R77
C48 (+)
FT10
C53 (+)
C41
Q14
FT51
C32
FT 44
R78
FT40
C45 (−)
T16 BLU
T16 RED
T20 BLU
R81
FT9
FT29
R62
FT27
C37 (−)
R63
T13 RED
R66
R67
T13 BLU
R65
C28 (−)
T10 BLU
R48
R47
R51
FT13
FT12
R79
R80
C40 (+)
C54
T20 RED
FT7
FT59
R58
R50
FT52
R52
C31 (+)
T10 RED
FT16
FT55
R91
C26
C43
C35
R46
T10 GRN
FT14
T16 GRN
FT57
FT8
FT 63
CR9
FT 23
C34 (+)
T13 GRN
R61
C27
C36
FT21
R44
FT 20
FT 54
R45
C44
R75
FT15
R73
R74
R90
FT58
R60
FT 25
FT 4
R59
FT3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Ed Mahoney 1 MARCH 66
CHECKED [illegible] 18 Mar 66
APPROVED [illegible] 18 Mar 66
APPROVED [illegible] 21 Mar 66
APPROVED MIT W. Wagner 22 Mar 64
C. METZGER
APPROVED MSC

DATE

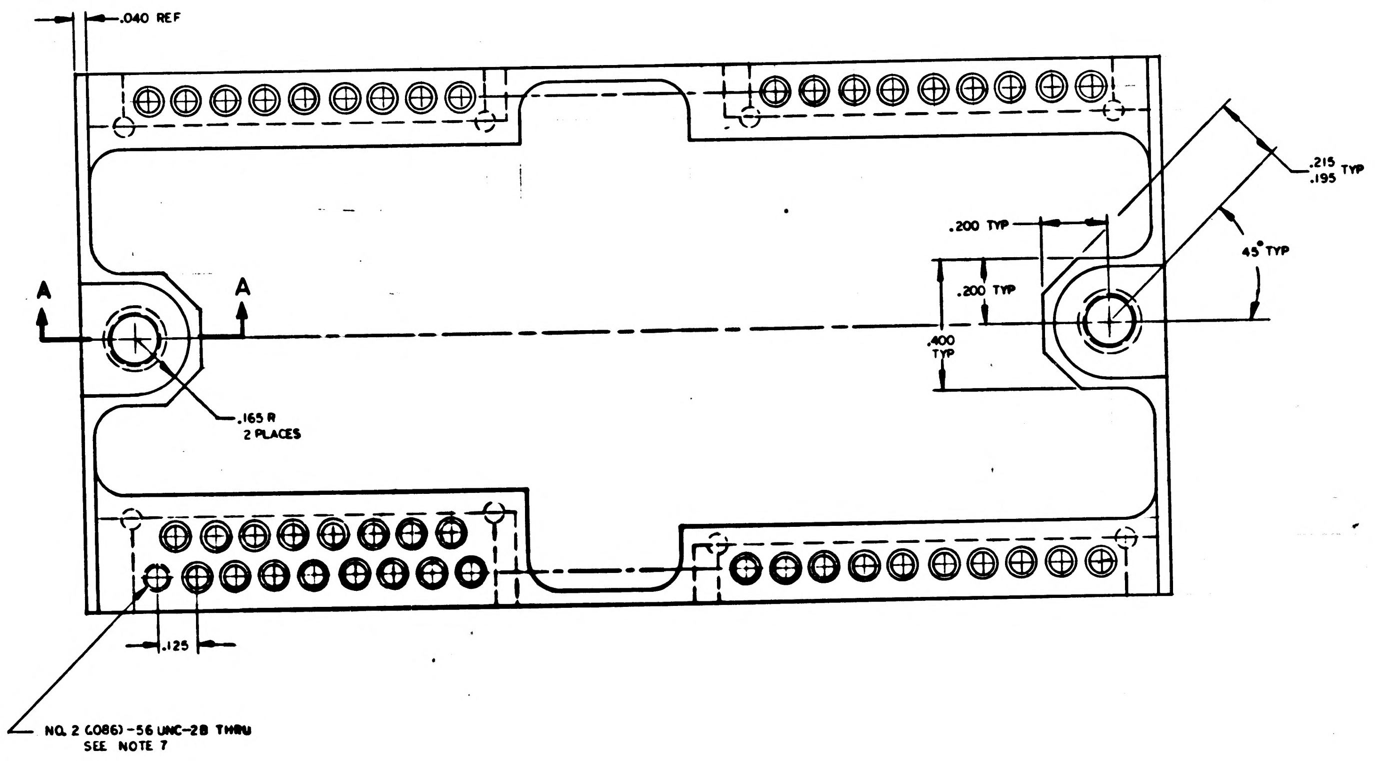
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

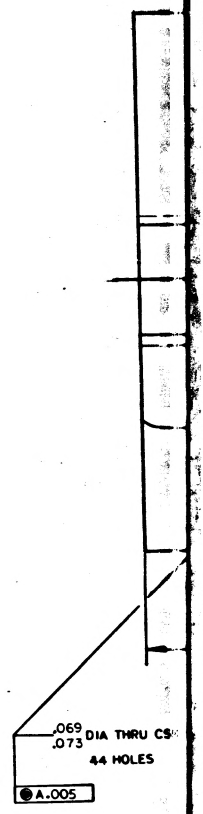
PHOTOGRAPHIC MASTER
WIRING BOARD D
SIGNAL CONDITIONER
OPTICS & ATTITUDE ERROR

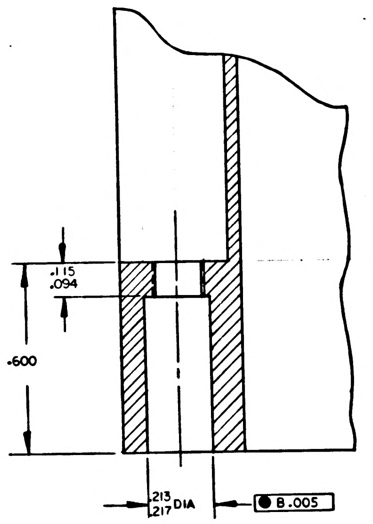
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008469
SCALE 5/1
SHEET 1 OF 1

2008469

NOTICE – [illegible]


.040 REF
A
A
.165 R
2 PLACES
.200 TYP
.200 TYP
.400
TYP
.215
.195 TYP
45° TYP
.125
NO. 2 (.086) -56 UNC-2B THRU
SEE NOTE 7

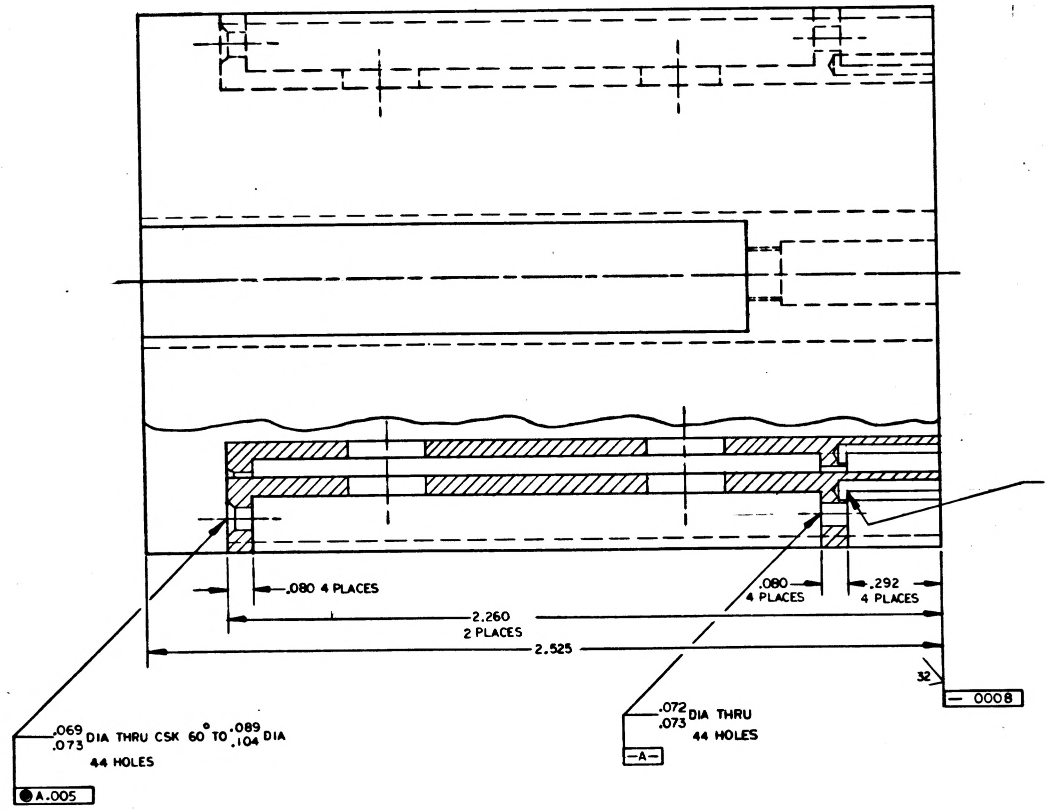

.069
.073 DIA THRU CS
44 HOLES
● A.005


.115
.094
.600
.213
.217 DIA
● B.005

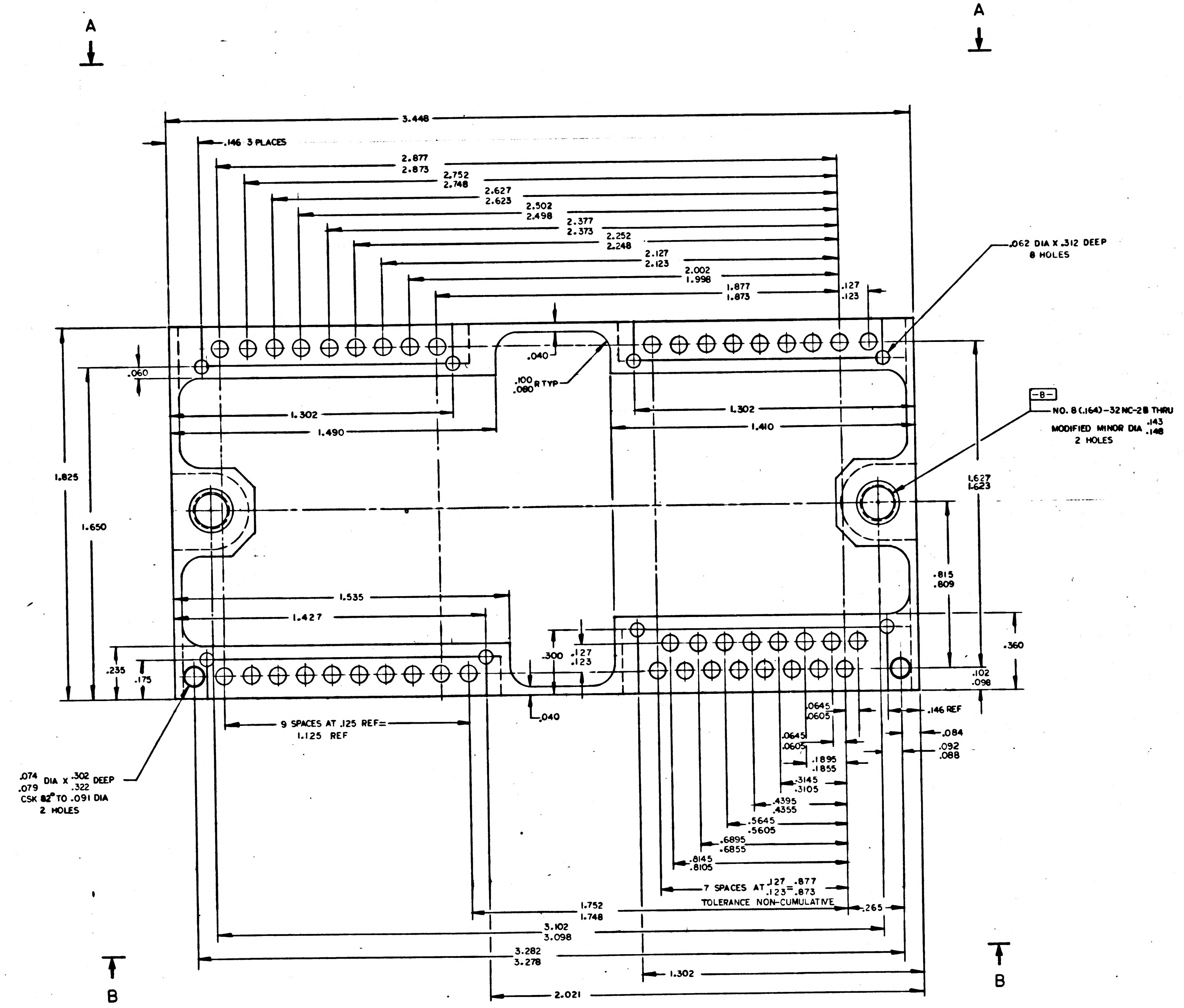
PARTIAL SECTION A–A

4H

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED √125 ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER NO. 1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019



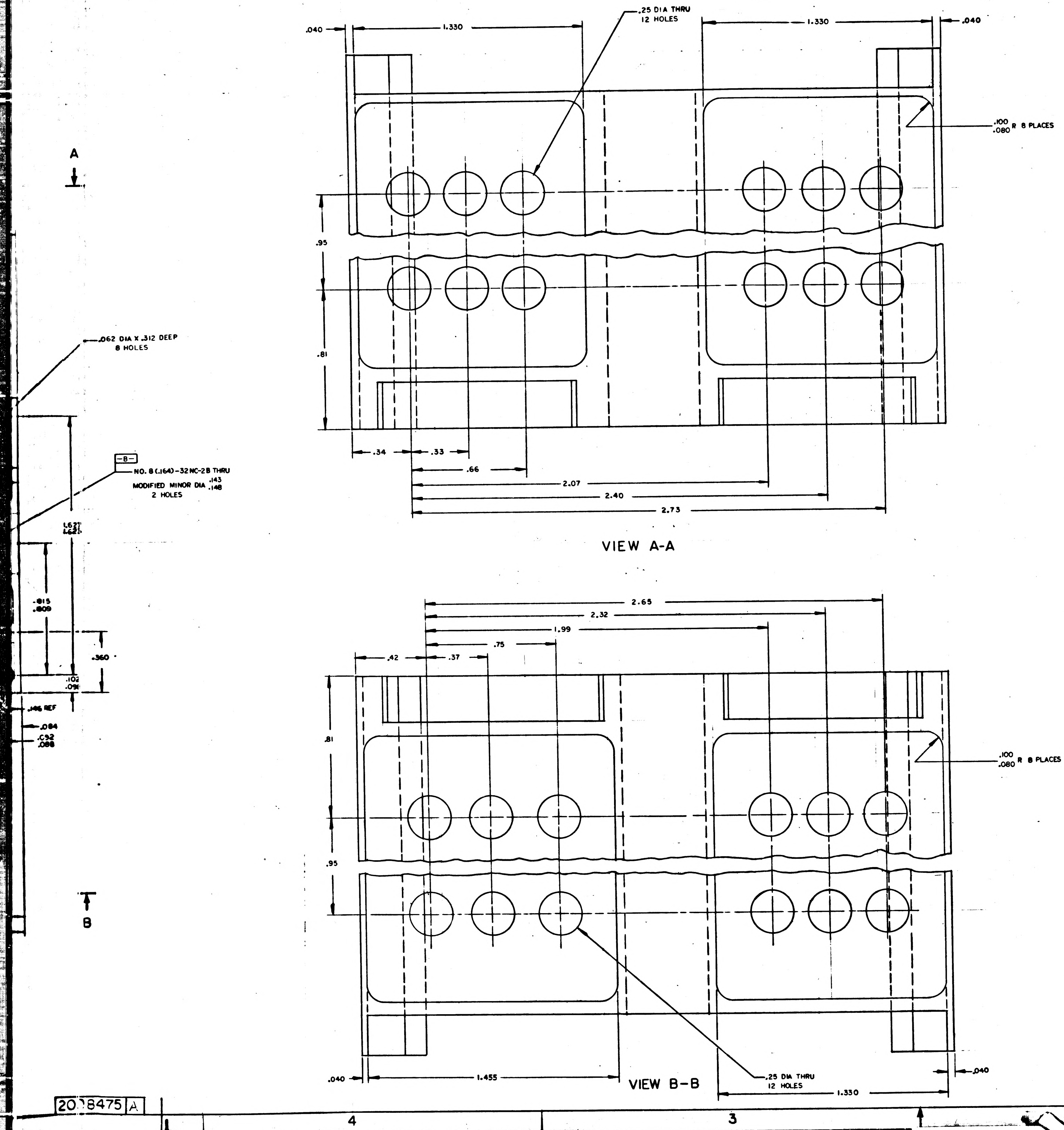
.215
.195 TYP
.005 R MAX
8 PLACES
.080 4 PLACES
.080
4 PLACES
.292
4 PLACES
2.260
2 PLACES
2.525
32
— .0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
44 HOLES
● A .005
.072
.073 DIA THRU
44 HOLES
—A—



A
A
3.448
.146 3 PLACES
2.877
2.873
2.752
2.748
2.627
2.623
2.502
2.498
2.377
2.373
2.252
2.248
2.127
2.123
2.002
1.998
1.877
1.873
.127
.123
.062 DIA X .312 DEEP
8 HOLES
.040
.100
.080 R TYP
.060
1.302
1.490
1.302
1.410
—B—
NO. 8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
1.825
1.650
1.627
1.623
.815
.809
1.535
1.427
.300
.127
.123
.360
.235
.175
.102
.098
.040
9 SPACES AT .125 REF=
1.125 REF
.0645
.0605
.146 REF
.084
.0645
.0605
.092
.088
.1895
.1855
.3145
.3105
.4395
.4355
.5645
.5605
.6895
.6855
.8145
.8105
7 SPACES AT .127
.123 = .877
.873
TOLERANCE NON-CUMULATIVE
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
1.752
1.748
.265
3.102
3.098
3.282
3.278
1.302
2.021
B
B

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	B-5	REVISED PER TDRR 31326	DG		5 OCT 66	

REVISIONS 27765



.040
1.330
.25 DIA THRU
12 HOLES
1.330
.040
.100
.080 R 8 PLACES
A
.95
.81
.062 DIA X .312 DEEP
8 HOLES
-B-
NO. 8 (.164)-32NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.627
1.621
.815
.809
.360
.102
.098
.146 REF
.084
.092
.088
.34
.33
.66
2.07
2.40
2.73
VIEW A-A
2.65
2.32
1.99
.75
.42
.37
.81
.100
.080 R 8 PLACES
.95
B
.040
1.455
VIEW B-B
.25 DIA THRU
12 HOLES
1.330
.040

4H

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ±2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007233	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN F. L. Eckert 14 MAR 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
A. C. METZGAR
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
DAC PIPA TEMP AND 2.5V BIAS SIGNAL CONDITIONER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008475

SCALE 5/1
SHEET OF

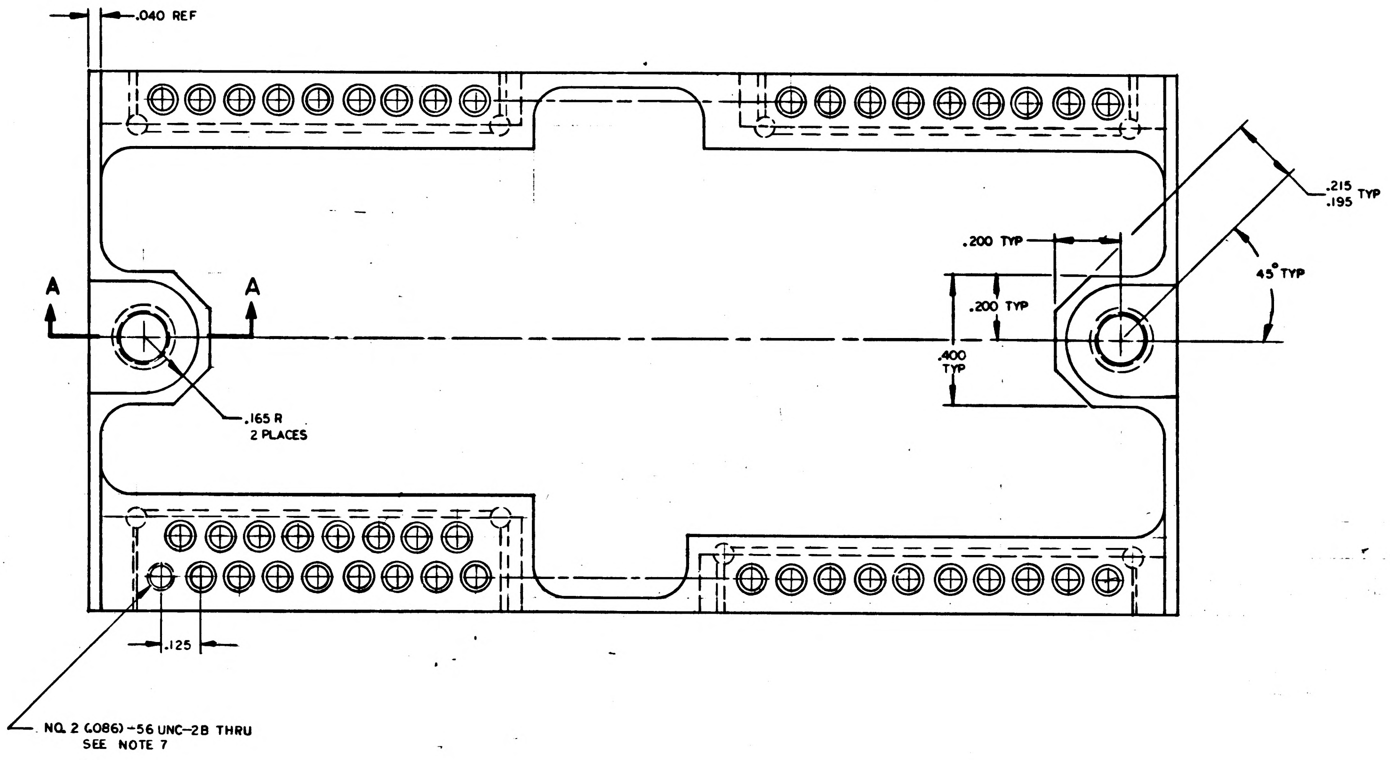
2008475 A

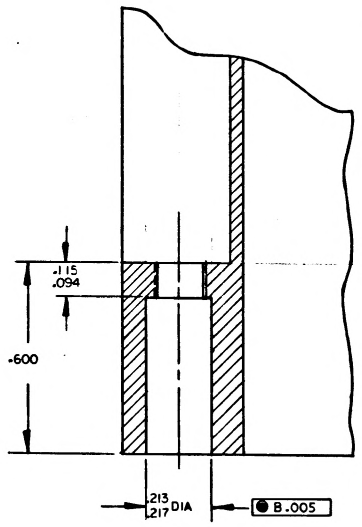
2008475 A

3720008475

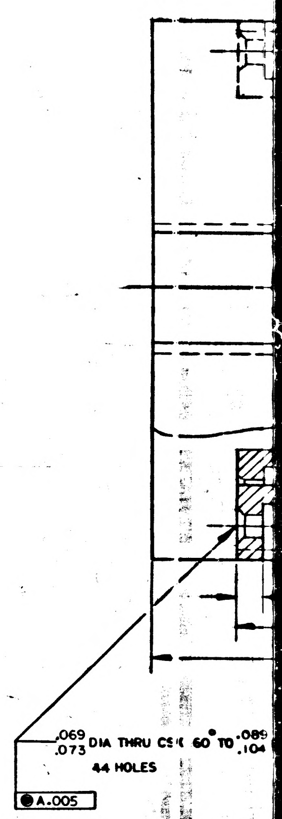
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

4H


.040 REF
A
A
.165 R
2 PLACES
.200 TYP
.200 TYP
.400
TYP
.215
.195 TYP
45° TYP
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

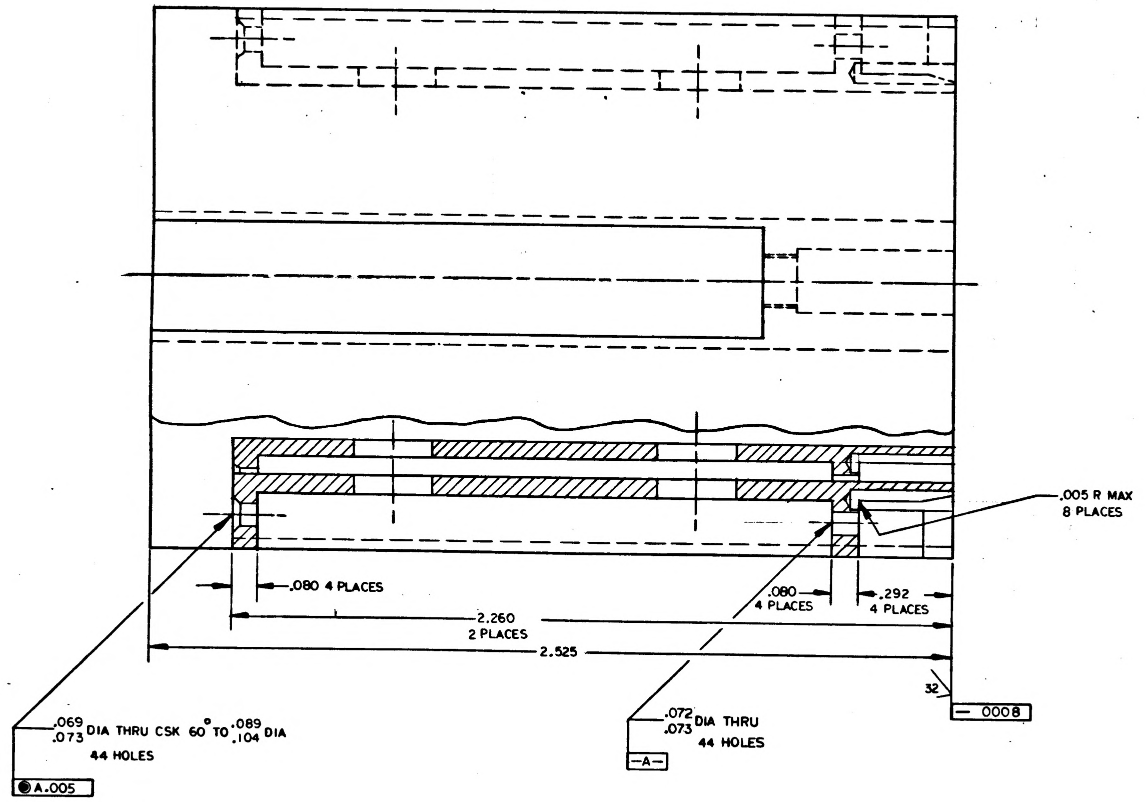

.115
.094
.600
.213
.217 DIA
● B.005

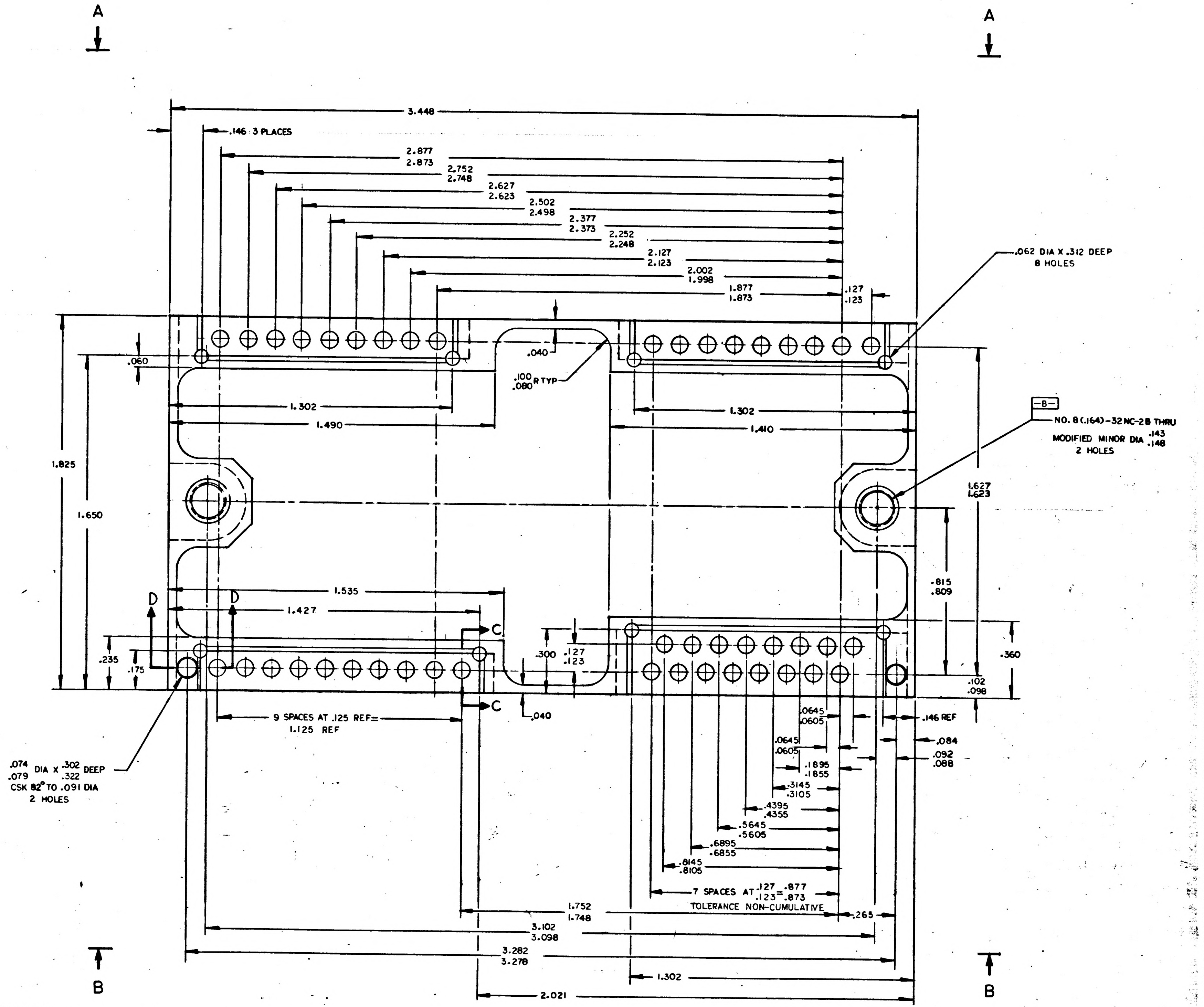
PARTIAL SECTION A-A

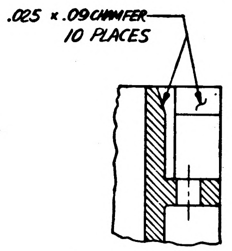

.069
.073 DIA THRU CSK 60° TO .089
.104
44 HOLES
● A.005

NOTES:

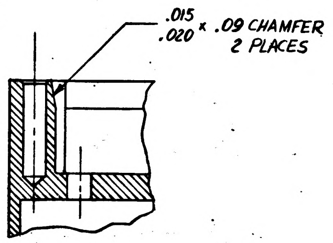
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED √125 ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER NO. 1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019


.215
.195 TYP
.005 R MAX
8 PLACES
.080 4 PLACES
.080
4 PLACES
.292
4 PLACES
2.260
2 PLACES
2.525
32
— .0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
44 HOLES
A .005
.072
.073 DIA THRU
44 HOLES
-A-


A
A
3.448
.146 3 PLACES
2.877
2.873
2.752
2.748
2.627
2.623
2.502
2.498
2.377
2.373
2.252
2.248
2.127
2.123
2.002
1.998
1.877
1.873
.127
.123
.062 DIA X .312 DEEP
8 HOLES
.040
.100
.080 R TYP
.060
1.302
1.490
1.302
1.410
-B-
NO. 8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 HOLES
1.825
1.650
1.627
1.623
.815
.809
1.535
1.427
D
D
C
C
.235
.175
.300
.127
.123
.360
.102
.098
.040
9 SPACES AT .125 REF=
1.125 REF
.146 REF
.0645
.0605
.084
.0645
.0605
.092
.088
.1895
.1855
.3145
.3105
.4395
.4355
.5645
.5605
.6895
.6855
.8145
.8105
7 SPACES AT .127
.123 = .877
.873
TOLERANCE NON-CUMULATIVE
.265
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
1.752
1.748
3.102
3.098
3.282
3.278
1.302
2.021
B
B

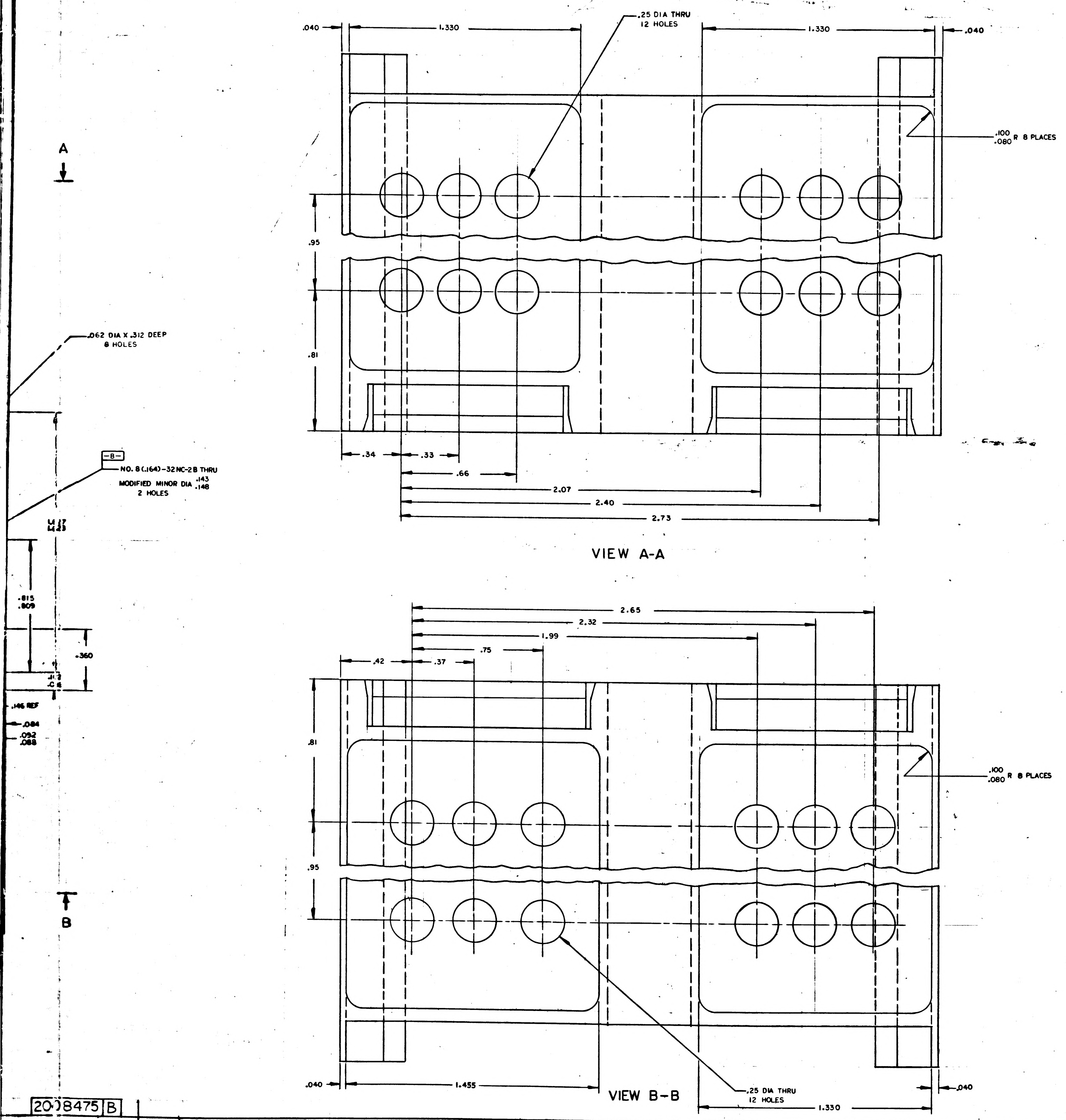

.025 x .09 CHAMFER
10 PLACES

PARTIAL SECTION C-C
ROTATED 90°
COUNTERCLOCKWISE


.015
.020 x .09 CHAMFER
2 PLACES

PARTIAL SECTION D-D

		REVISIONS 27765				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A	B-5	REVISED PER TDRR 31326	DG		5 OCT -66	
B		REVISED PER TDRR 32428	AF	NW	9JAN67	



4
3
2
.040
1.330
.25 DIA THRU
12 HOLES
1.330
.040
.100
.080 R 8 PLACES
A
.95
.81
.062 DIA X .312 DEEP
8 HOLES
-B-
NO. 8 (.164)-32NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.34
.33
.66
2.07
2.40
2.73
VIEW A-A
.815
.809
.360
.146 REF
.084
.092
.088
2.65
2.32
1.99
.75
.42
.37
.81
.100
.080 R 8 PLACES
.95
B
.040
1.455
VIEW B-B
.25 DIA THRU
12 HOLES
1.330
.040
2008475 B
4
3
2

D
C
B
A

4H

2008475 B

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± XX, DECIMALS ± .02 .005, ANGLES ± 2° DO NOT SCALE THIS DRAWING
2007233		MATERIAL SEE NOTE 2
NEXT ASSY	USED ON	
APPLICATION		

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS				

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN F. L. Eckert 66
CHECKED
APPROVED 1-4-66
APPROVED
APPROVED MIT.
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

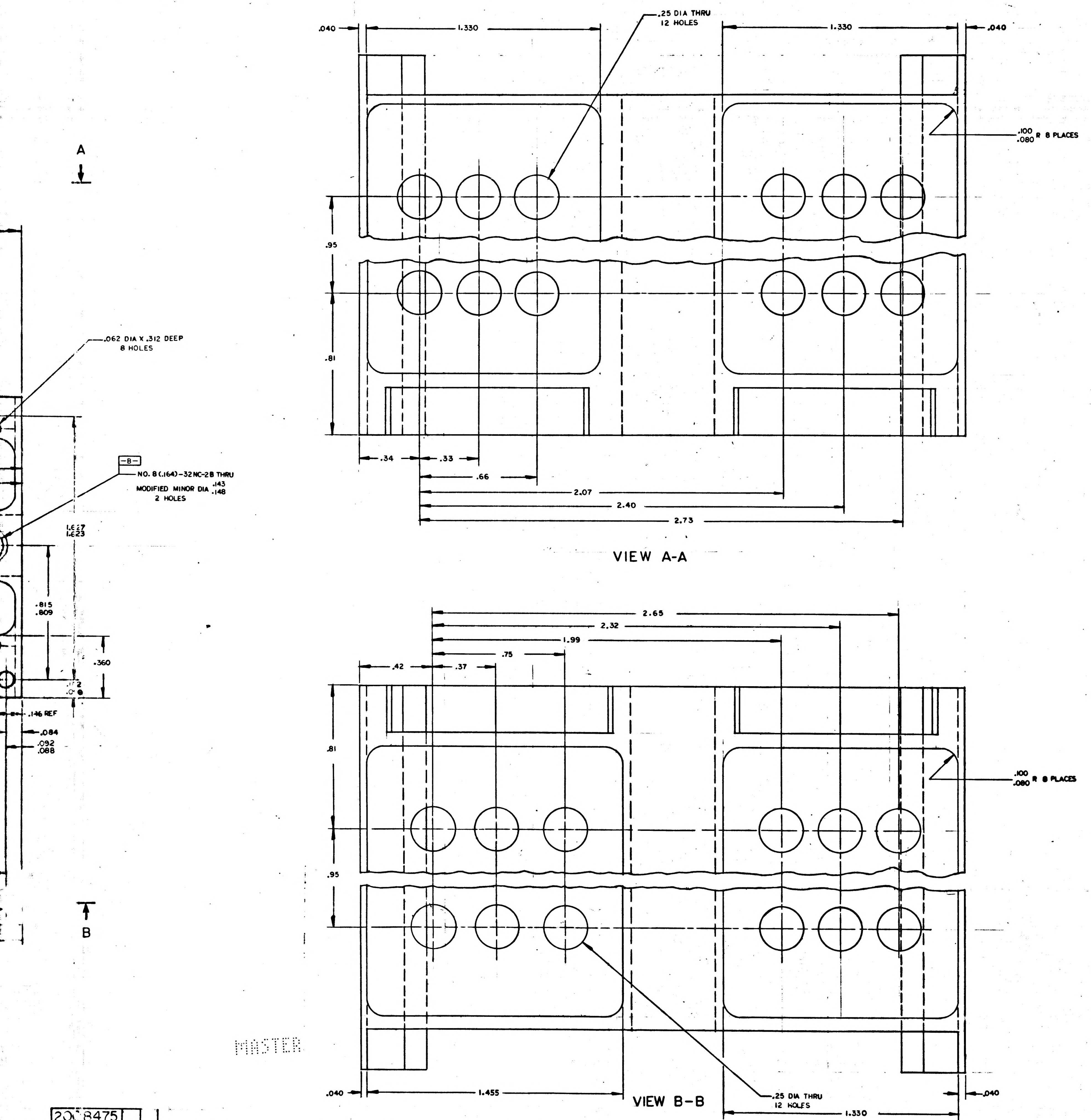
FRAME
DAC PIPA TEMP AND 2.5V BIAS
SIGNAL CONDITIONER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2008475
SCALE 5/1		SHEET OF

3/2008475

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



.25 DIA THRU
12 HOLES
.040
1.330
1.330
.040
.100
.080 R 8 PLACES
A
.95
.81
.062 DIA X .312 DEEP
8 HOLES
-B-
NO. 8 (.164)-32NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.627
1.623
.34
.33
.66
2.07
2.40
2.73
VIEW A-A
.815
.809
.360
.146 REF
.084
.092
.088
2.65
2.32
1.99
.75
.42
.37
.81
.100
.080 R 8 PLACES
.95
B
.040
1.455
VIEW B-B
.25 DIA THRU
12 HOLES
1.330
.040

MASTER

2007233	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± XX DECIMALS ±.02 XXX ±.005 ANGLES ±2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN F. L. Eibert 14 MAR 66
CHECKED 7 APR 66
APPROVED 8 APR 66
APPROVED
APPROVED MIT
APPROVED NASC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
DAC PIPA TEMP AND 2.5V BIAS
SIGNAL CONDITIONER

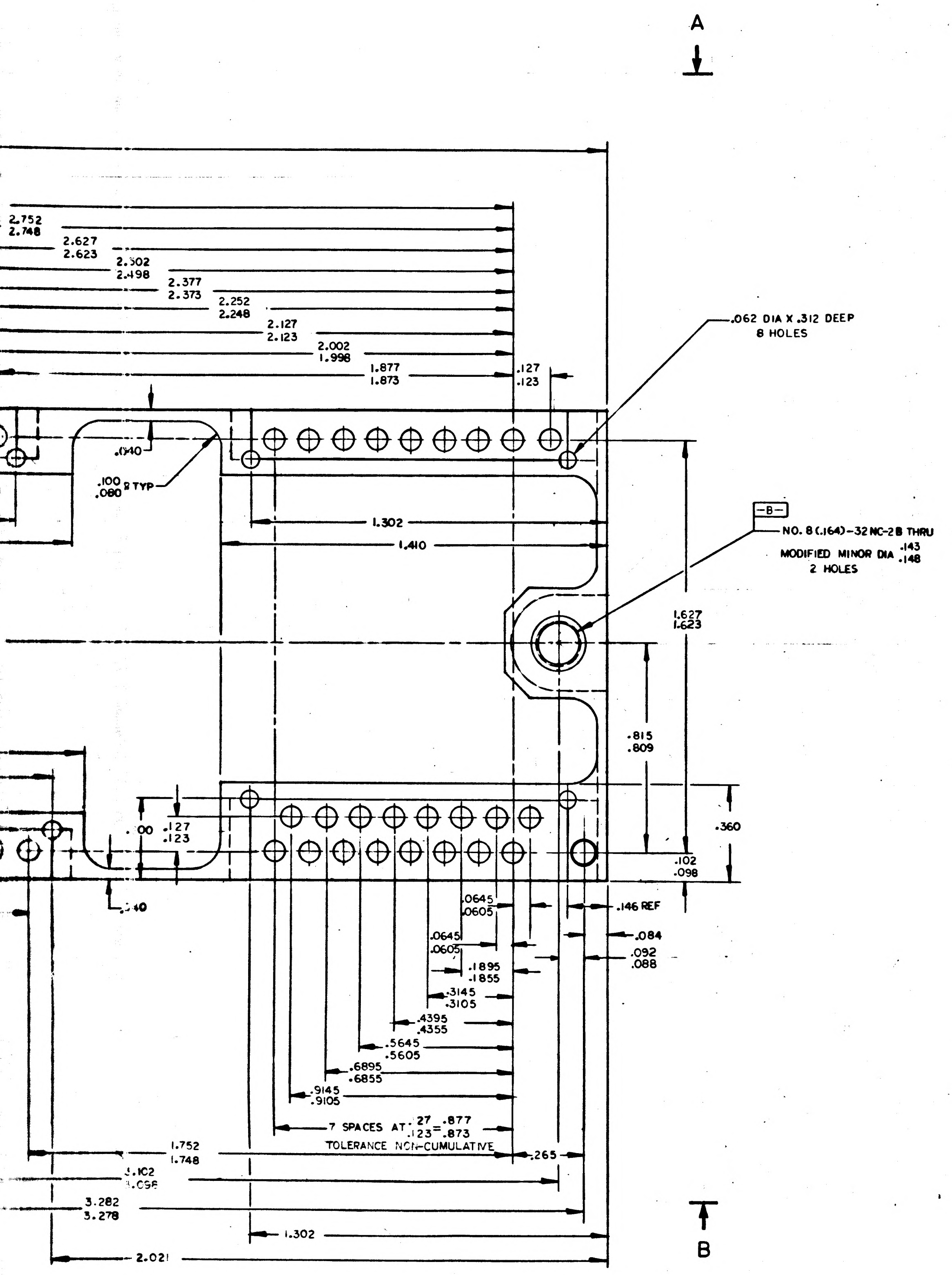
CODE IDENT NO. 80230
SIZE J
DRAWING NO 2008475
SCALE 5/1
SHEET OF

2008475

20C8475

E-4

4H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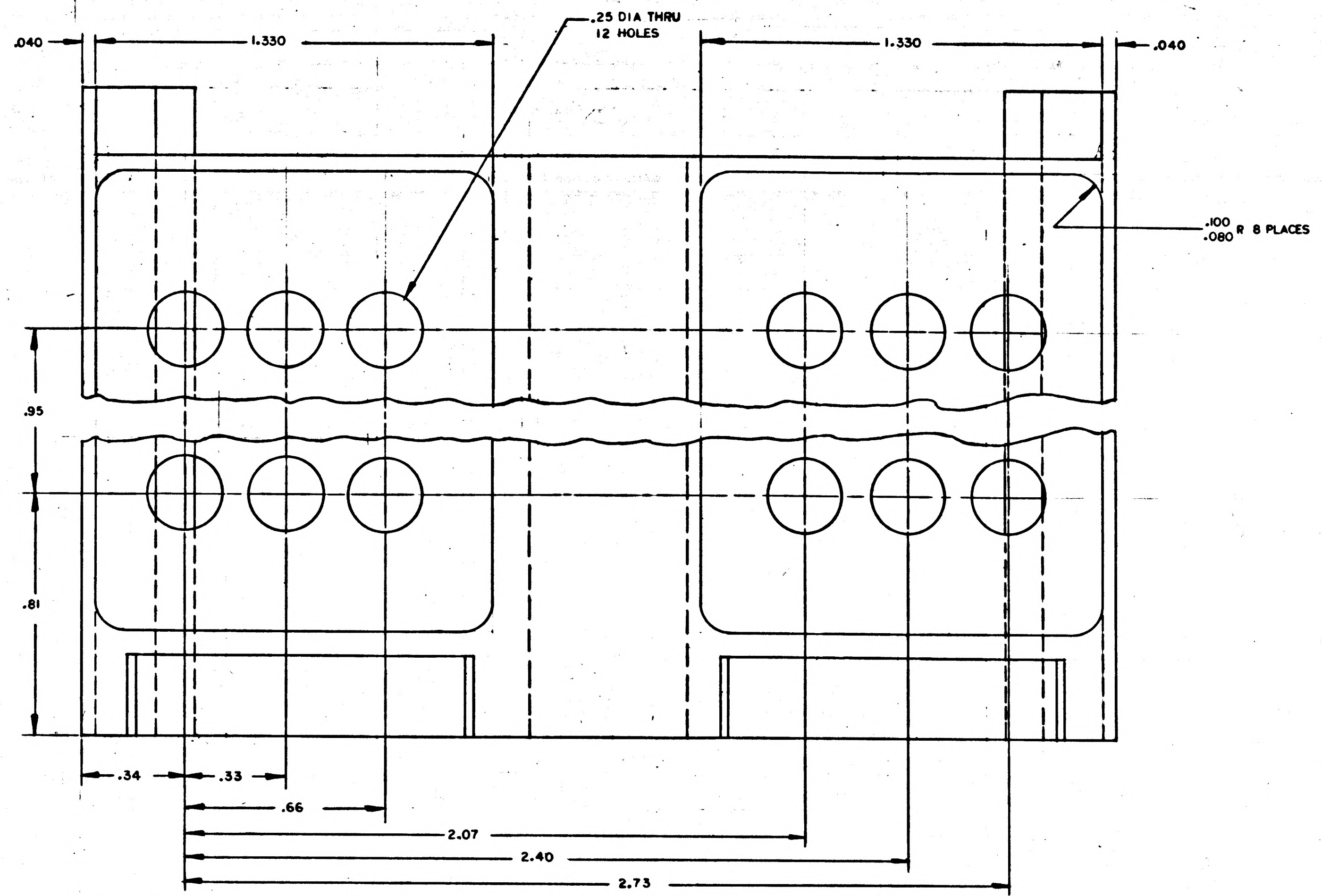
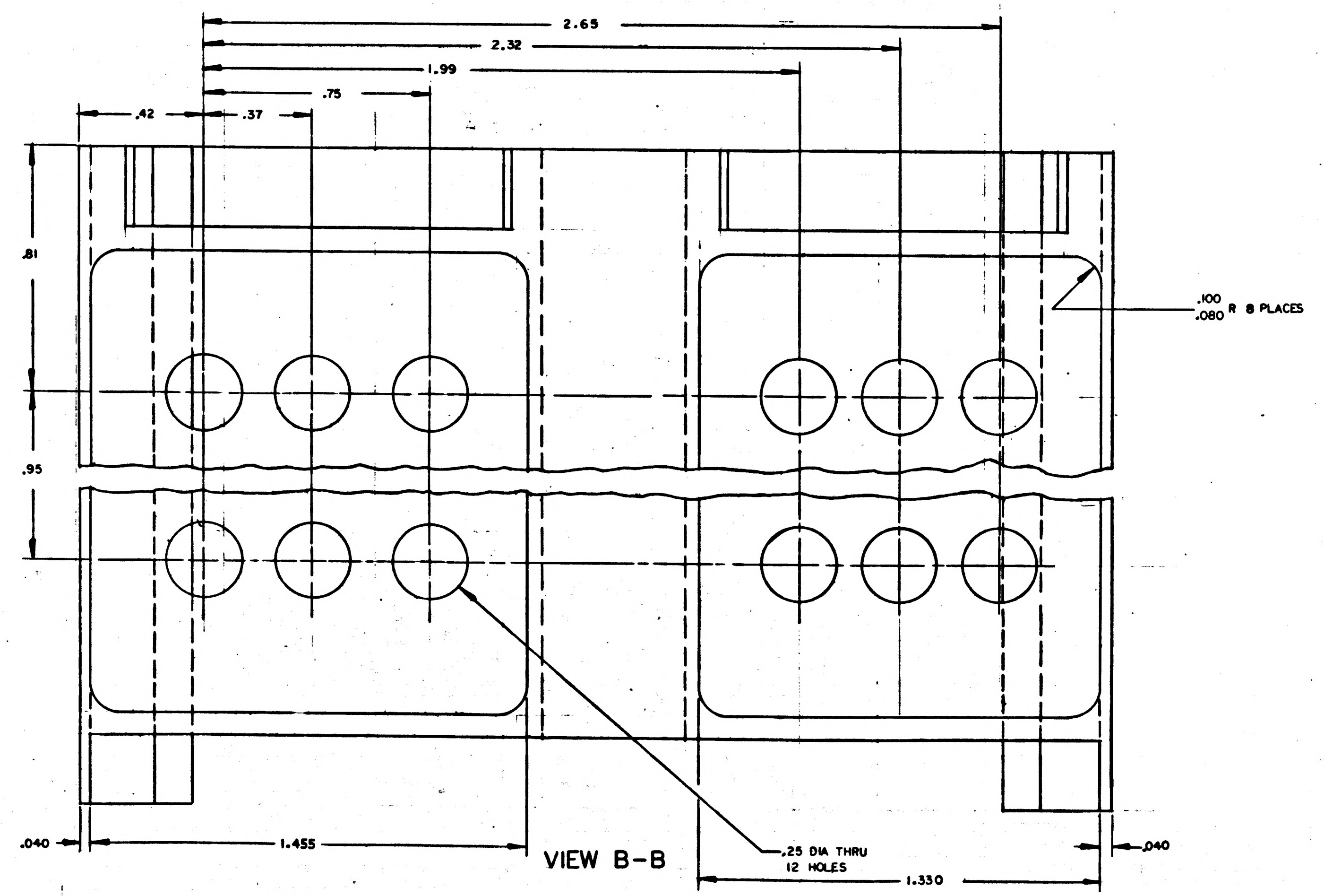
2.752
2.748
2.627
2.623
2.502
2.498
2.377
2.373
2.252
2.248
2.127
2.123
2.002
1.998
1.877
1.873
.127
.123
.062 DIA X .312 DEEP
8 HOLES
.040
.100
.080 R TYP
1.302
1.410
-B-
NO. 8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
1.627
1.623
.815
.809
.360
.00
.127
.123
.102
.098
.146 REF
.084
.092
.088
.0645
.0605
.0645
.0605
.1895
.1855
.3145
.3105
.4395
.4355
.5645
.5605
.6895
.6855
.9145
.9105
7 SPACES AT .127/.123 = .877/.873
TOLERANCE NON-CUMULATIVE
.265
1.752
1.748
3.102
3.098
3.282
3.278
1.302
2.021
.040
B


.040
1.330
.25 DIA THRU
12 HOLES
1.330
.040
.100
.080 R 8 PLACES
.95
.81
.34
.33
.66
2.07
2.40
2.73

VIEW A-A


2.65
2.32
1.99
.75
.42
.37
.81
.100
.080 R 8 PLACES
.95
.040
1.455
.25 DIA THRU
12 HOLES
1.330
.040

VIEW B-B

MASTER

2007233	
NEXT ASSY	USED ON
APPLICATION	

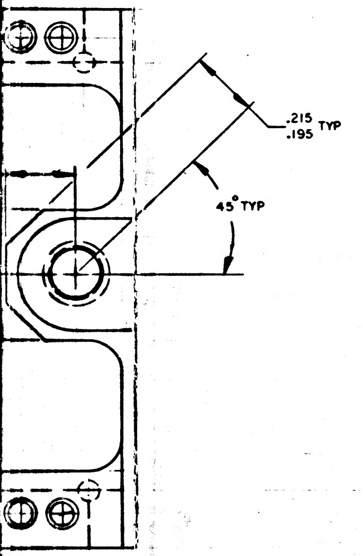
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

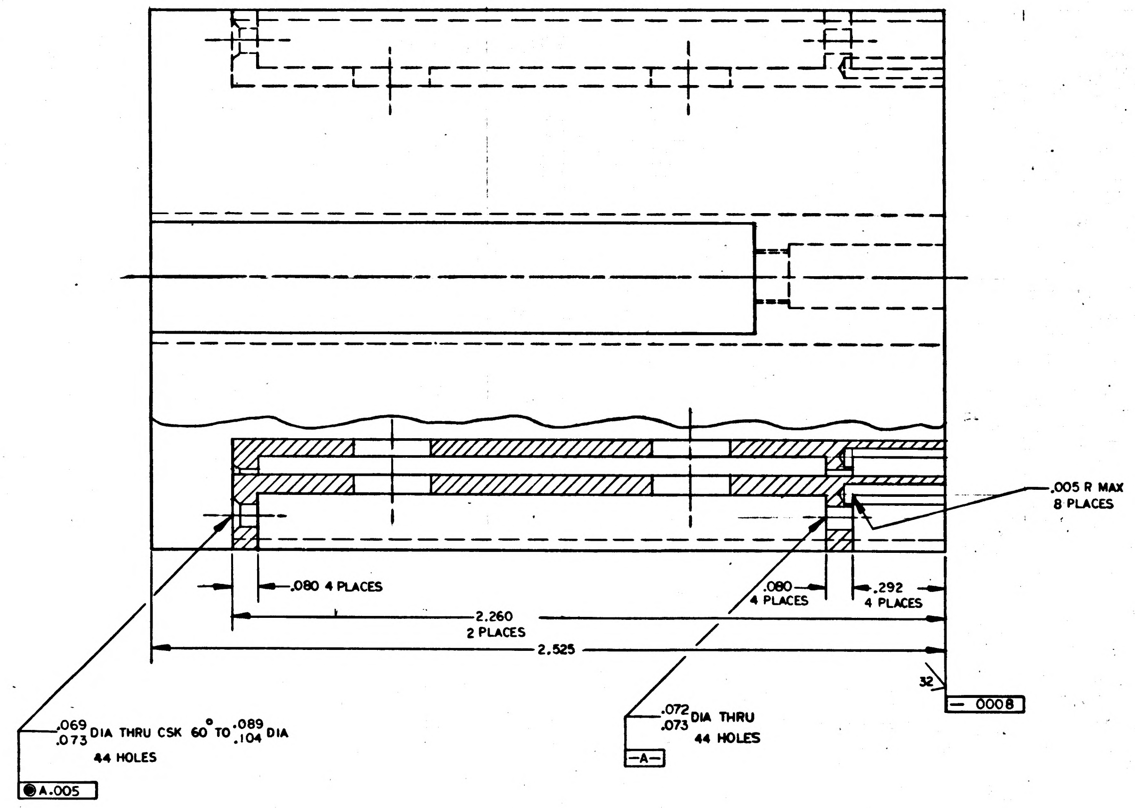
MATERIAL
SEE NOTE 2

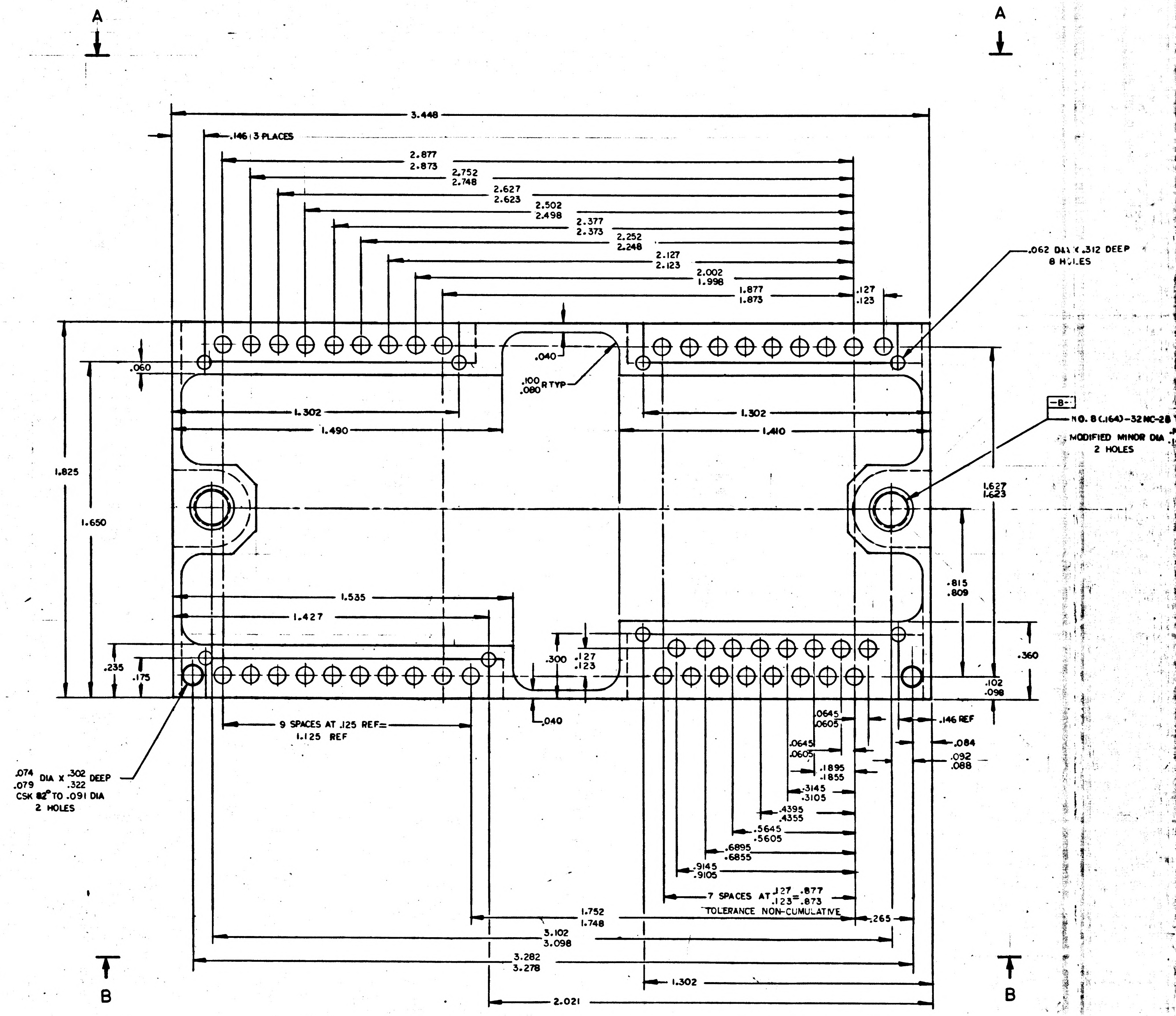
QTY REQD
PART OR IDENTIFYING NO.

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Elliot
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

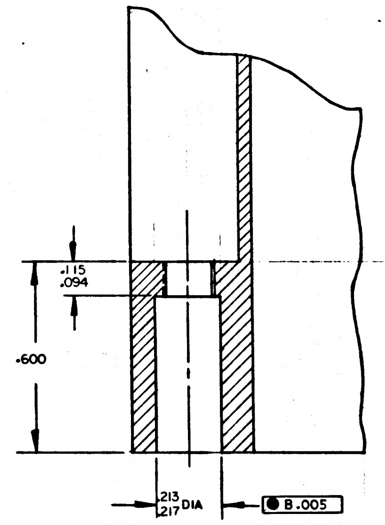

.215
.195 TYP
45° TYP


.005 R MAX
8 PLACES
.080 4 PLACES
.080
4 PLACES
.292
4 PLACES
2.260
2 PLACES
2.525
32
— .0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
44 HOLES
● A .005
.072
.073 DIA THRU
44 HOLES
—A—

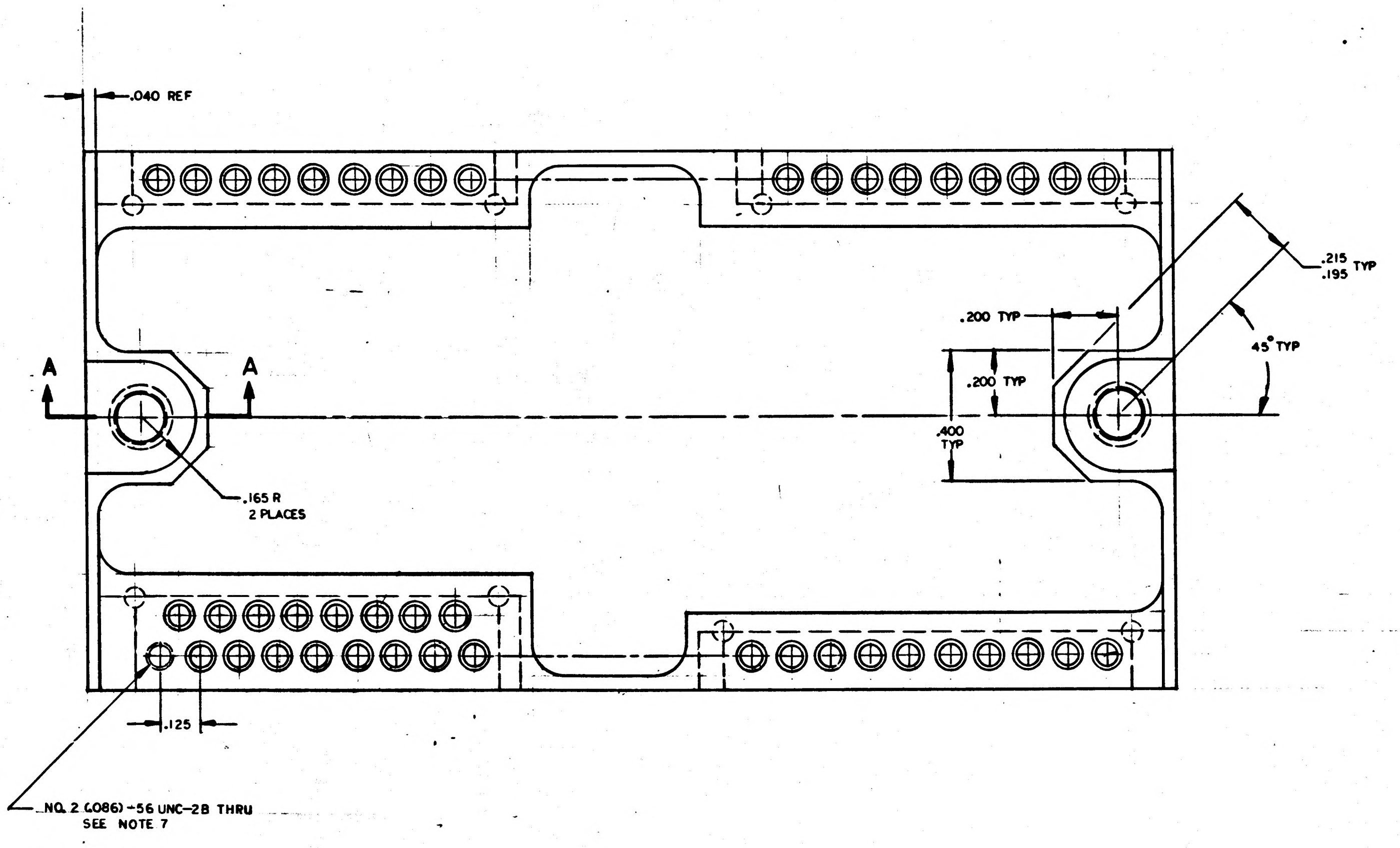

A
A
3.448
.146 3 PLACES
2.877
2.873
2.752
2.748
2.627
2.623
2.502
2.498
2.377
2.373
2.252
2.248
2.127
2.123
2.002
1.998
1.877
1.873
.127
.123
.062 DIA X .312 DEEP
8 HOLES
—B—
NO. 8 (.164)-32NC-2B
MODIFIED MINOR DIA
2 HOLES
.040
.100
.080 R TYP
.060
1.302
1.490
1.302
1.410
1.825
1.650
1.627
1.623
.815
.809
1.535
1.427
.235
.175
.300
.127
.123
.040
.360
.102
.098
.146 REF
.084
.092
.088
.0645
.0605
.0645
.0605
.1895
.1855
.3145
.3105
.4395
.4355
.5645
.5605
.6895
.6855
.9145
.9105
7 SPACES AT .127
.123 = .877
.873
TOLERANCE NON-CUMULATIVE
9 SPACES AT .125 REF=
1.125 REF
.074
.079 DIA X .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
1.752
1.748
.265
3.102
3.098
3.282
3.278
1.302
2.021
B
B

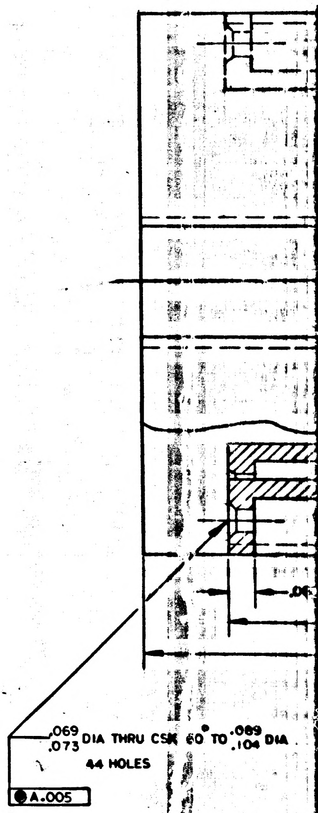
NOTICE – [illegible]

4H


.115
.094
.600
.213
.217 DIA
● B.005

PARTIAL SECTION A–A


.040 REF
A
A
.165 R
2 PLACES
.200 TYP
.200 TYP
.400
TYP
.215
.195 TYP
45° TYP
.125
NO. 2 (.086) –56 UNC–2B THRU
SEE NOTE 7

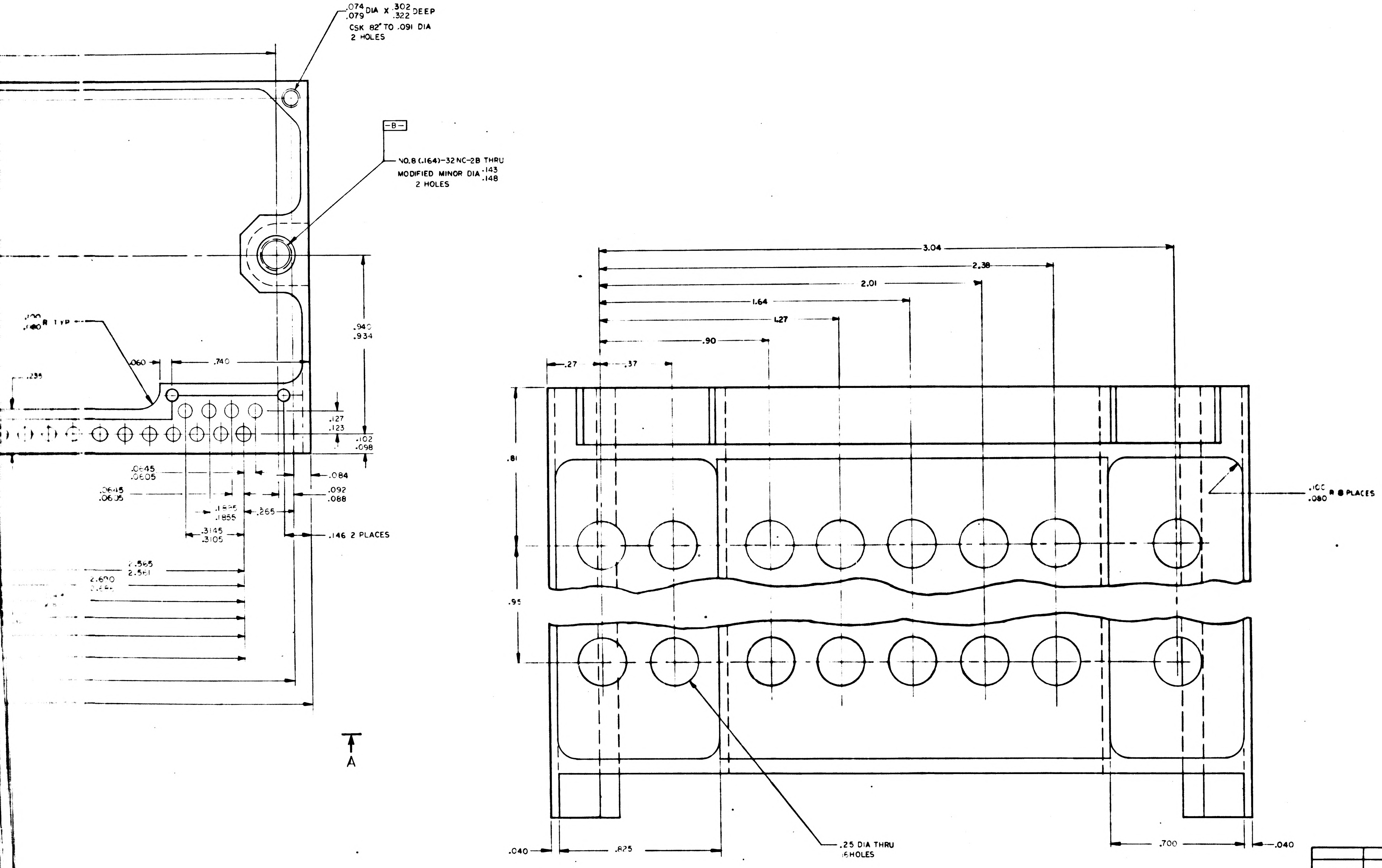

.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
44 HOLES
● A.005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL–D–70327
2. MATERIAL: MAGNESIUM ZK60A–T5 PER QQ–M–31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER
6. FINISH: ANODIZE PER MIL–M–45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER NO. 1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER TDRR 29455		13-JUL -66	JB.

REVISIONS 22201



.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
-B-
NO.8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.100 .080 R TYP
.060
.740
.235
.940 .934
.127 .123
.102 .098
.0645 .0605
.0645 .0605
.084
.092 .088
.1895 .1855
.265
.3145 .3105
.146 2 PLACES
2.565 2.561
2.690 2.686
A
3.04
2.38
2.01
1.64
1.27
.90
.27
.37
.81
.95
.100 .080 R 8 PLACES
.25 DIA THRU 16 HOLES
.040
.625
.700
.040

VIEW A-A

44

QTY REQD	PART OR IDENTIFYING NO		NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007231	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

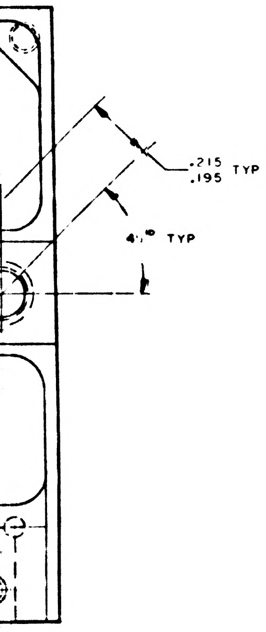
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	F.L. E. Bat	22 MAR 66
CHECKED	Bonarrigo	20 Jul 66
APPROVED		
APPROVED		
APPROVED MIT	W Kupler A. C. METZGER	
APPROVED MSC		DATE

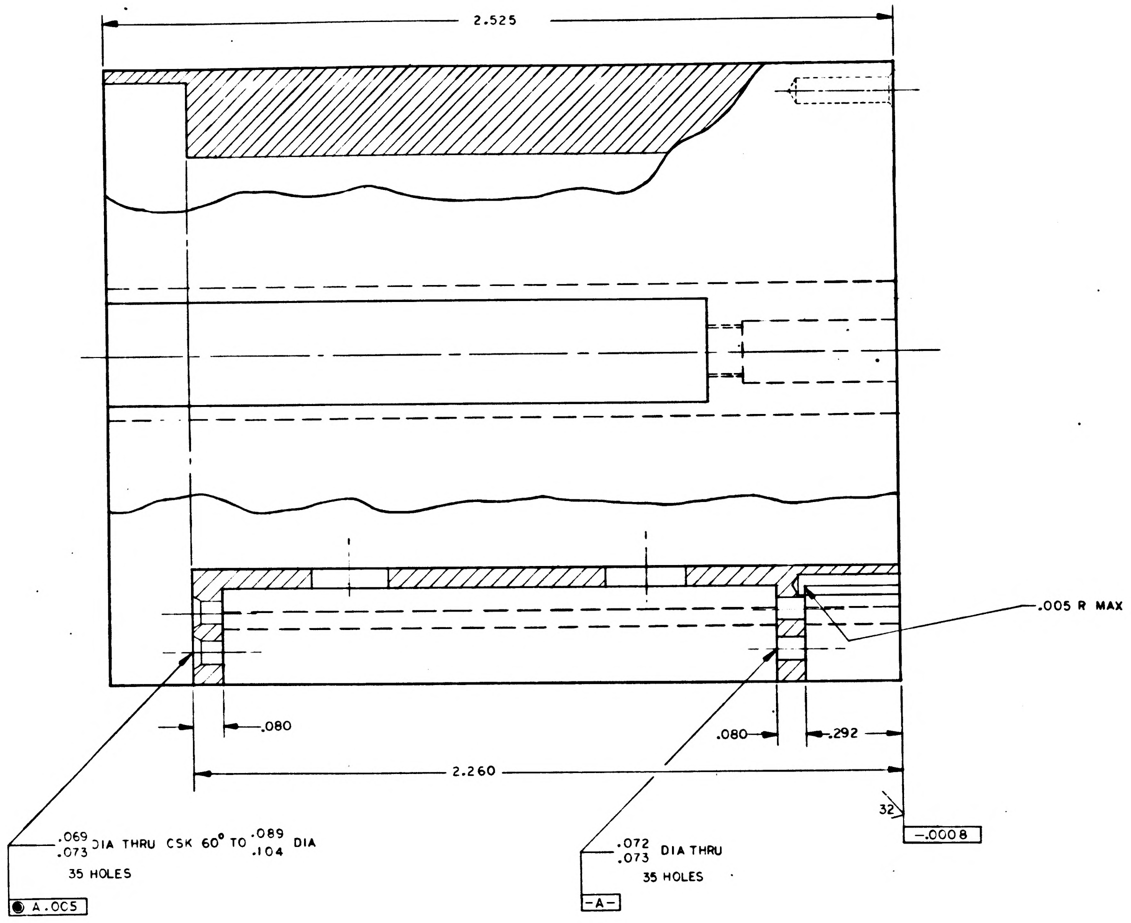
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
IRIG AND PIPA SIGNAL CONDITIONER ASSY

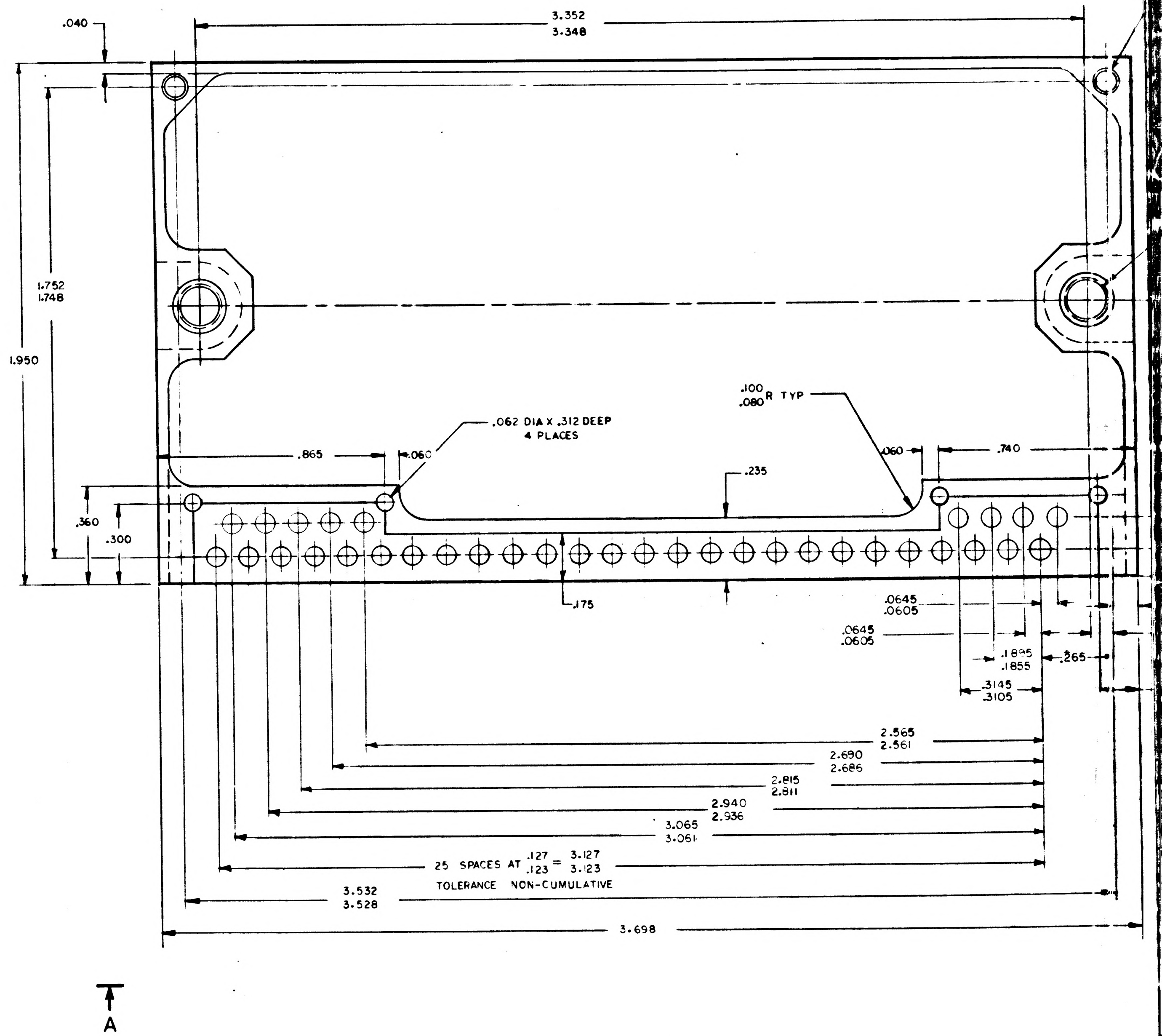
CODE IDENT NO	SIZE	DRAWING NO
80230	J	2008476
SCALE 5/1		SHEET 1 OF 1



.215
.195 TYP
45° TYP

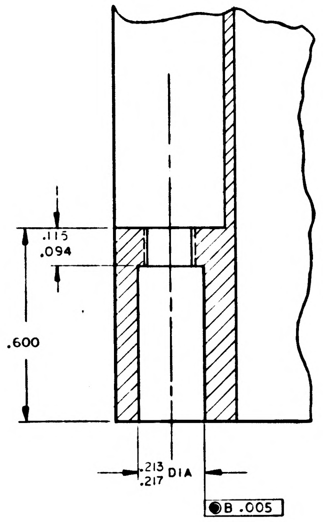


2.525
.005 R MAX
.080
.080
.292
2.260
32
-.0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
35 HOLES
● A .005
.072
.073 DIA THRU
35 HOLES
-A-

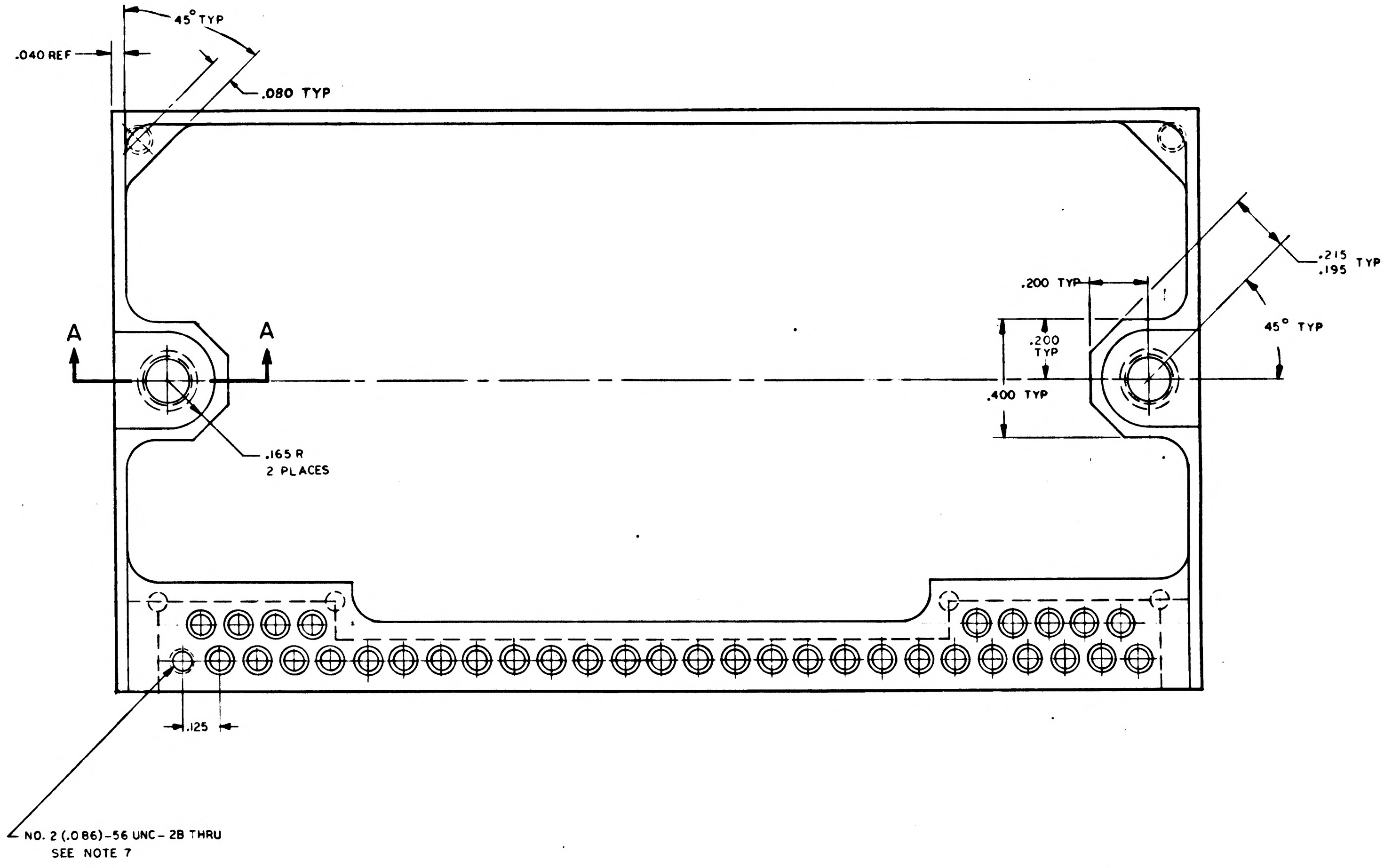


.040
3.352
3.348
1.752
1.748
1.950
.100
.080 R TYP
.062 DIA X .312 DEEP
4 PLACES
.865
.060
.060
.740
.235
.360
.300
.175
.0645
.0605
.0645
.0605
.1895
.1855
.265
.3145
.3105
2.565
2.561
2.690
2.686
2.815
2.811
2.940
2.936
3.065
3.061
25 SPACES AT .127
.123 = 3.127
3.123
TOLERANCE NON-CUMULATIVE
3.532
3.528
3.698
A

NOTICE - WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.115
.094
.600
.213
.217 DIA
●B .005

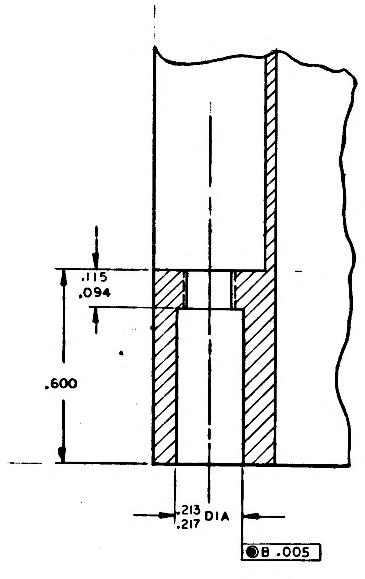
PARTIAL SECTION A-A


45° TYP
.040 REF
.080 TYP
A
A
.165 R
2 PLACES
.200 TYP
.200
TYP
.400 TYP
.215
.195 TYP
45° TYP
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{.125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8 IDENTIFY WITH PART NO. PER ND1002019

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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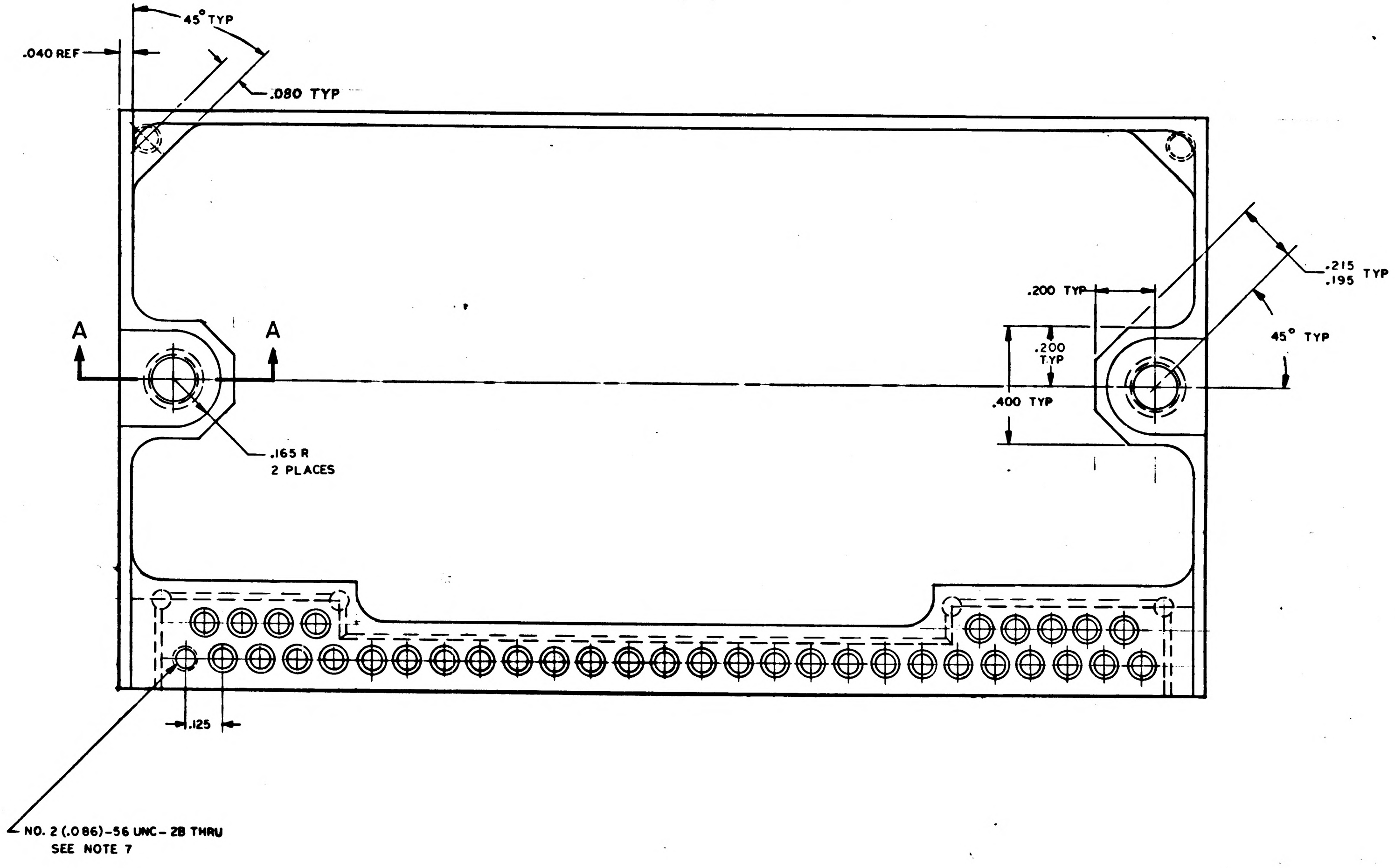
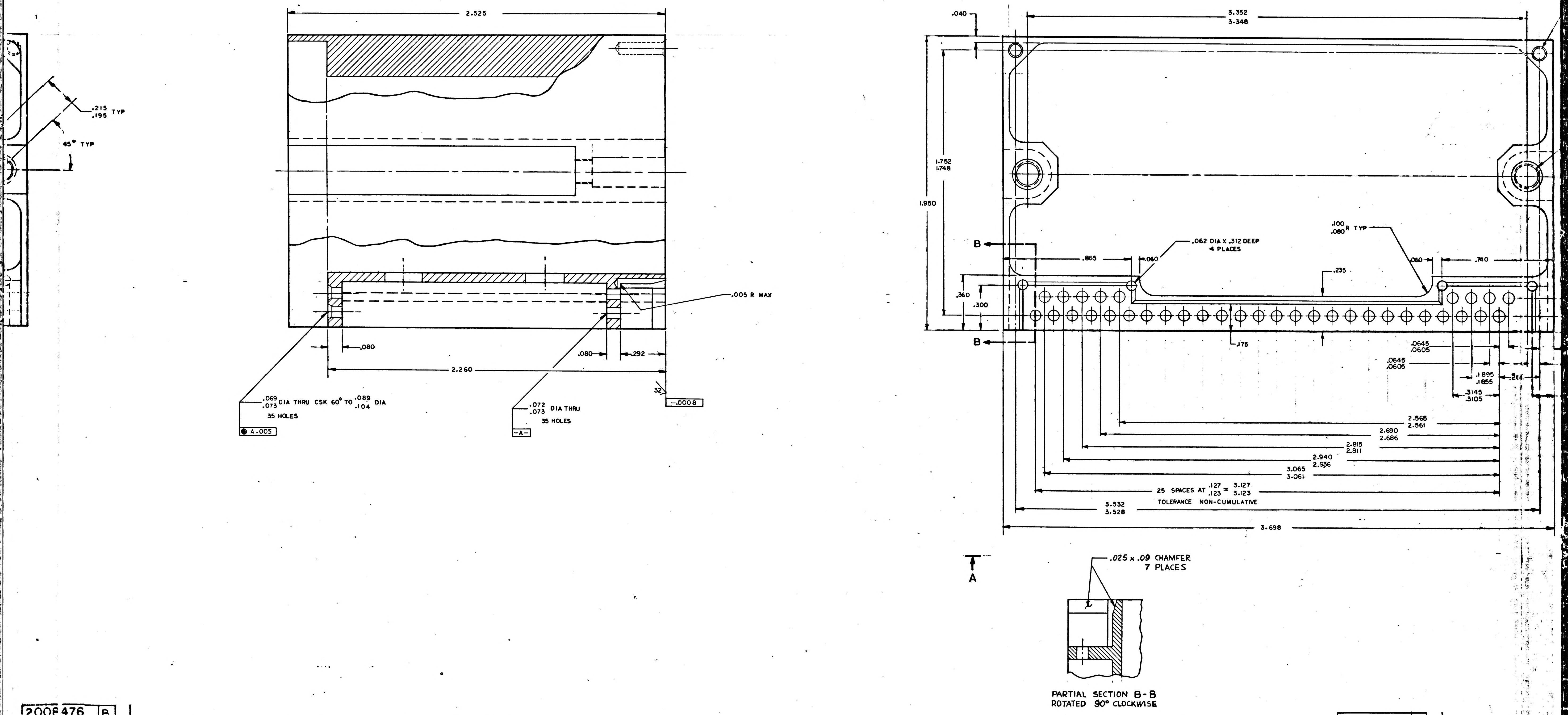
.094
.600
.213
.217
DIA
⊕B .005

PARTIAL SECTION A-A


45° TYP
.040 REF
.080 TYP
A
A
.165 R
2 PLACES
.200 TYP
.200 TYP
.400 TYP
.215
.195 TYP
45° TYP
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED √.125 ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019


.215
.195 TYP
45° TYP
2.525
.005 R MAX
.080
.080
.292
2.260
32
—.0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
35 HOLES
A .005
.072
.073 DIA THRU
35 HOLES
-A-
.040
3.352
3.348
1.752
1.748
1.950
B
B
.865
.060
.062 DIA X .312 DEEP
4 PLACES
.100
.080 R TYP
.235
.060
.740
.360
.300
.175
.0645
.0605
.0645
.0605
.1895
.1855
.265
.3145
.3105
2.565
2.561
2.690
2.686
2.815
2.811
2.940
2.936
3.065
3.061
25 SPACES AT .127
.123 = 3.127
3.123
TOLERANCE NON-CUMULATIVE
3.532
3.528
3.698
A
.025 x .09 CHAMFER
7 PLACES

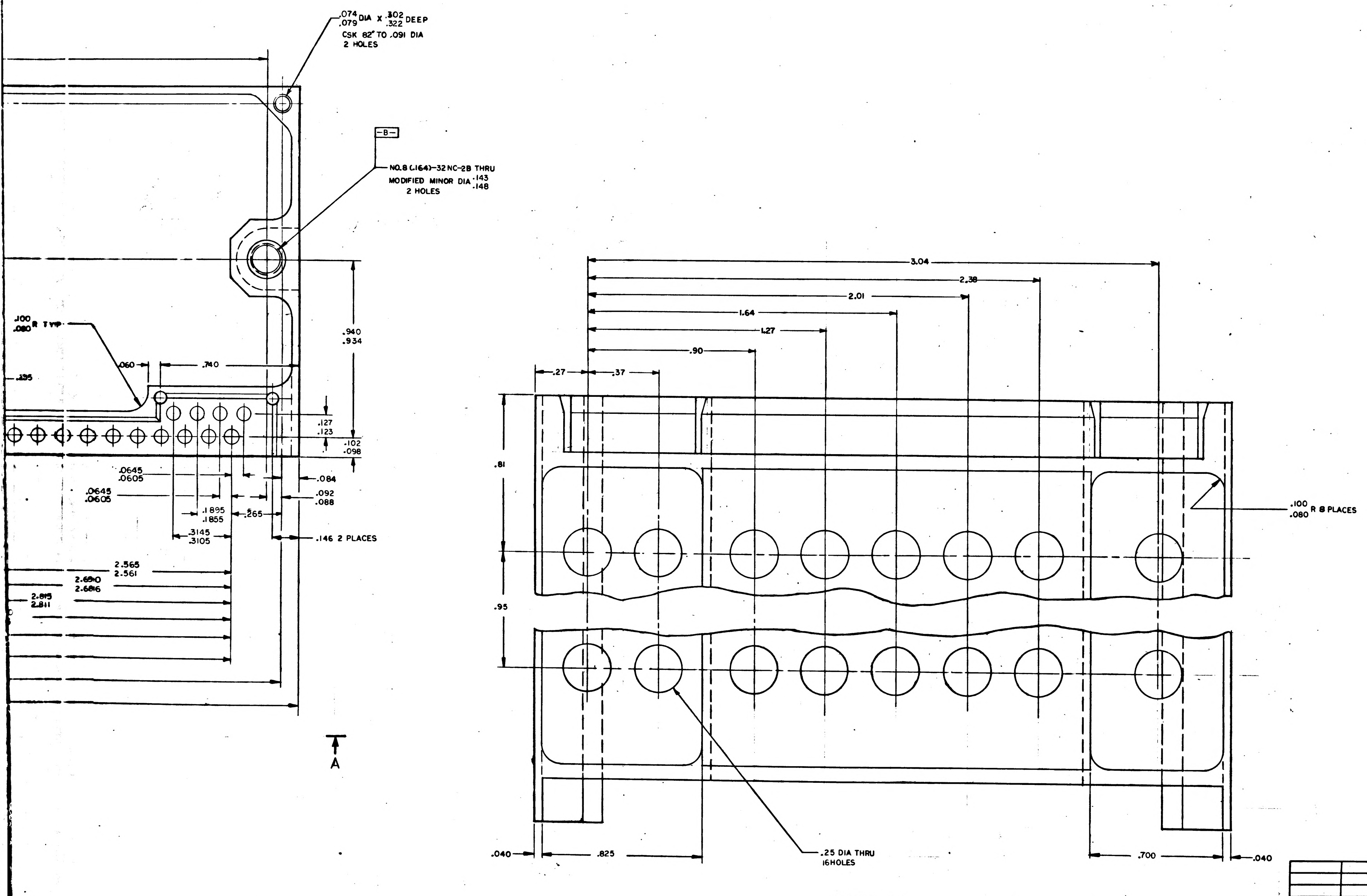
PARTIAL SECTION B-B
ROTATED 90° CLOCKWISE

Ⓜ

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER TDRR 29455		13-JUL-66	JB / PJ
	B	REVISED PER TDRR 32429		13JAN67	CF / N.W.

REVISIONS 2J 201

4H



.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
-B-
NO.8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.100 .080 R TYP
.060
.740
.135
.940 .934
.127 .123
.102 .098
.0645 .0605
.0645 .0605
.084
.092 .088
.1895 .1855
.265
.3145 .3105
.146 2 PLACES
2.565 2.561
2.6810 2.6816
2.815 2.811
A
3.04
2.38
2.01
1.64
1.27
.90
.27
.37
.81
.95
.100 .080 R 8 PLACES
.25 DIA THRU
16 HOLES
.040
.825
.700
.040

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007231	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN F.L. Eckert 66
CHECKED Bonarrigo 20 66
APPROVED V.O. [illegible] 1966
APPROVED [illegible]
APPROVED MIT W Kupfer A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
IRIG AND PIPA
SIGNAL CONDITIONER ASSY

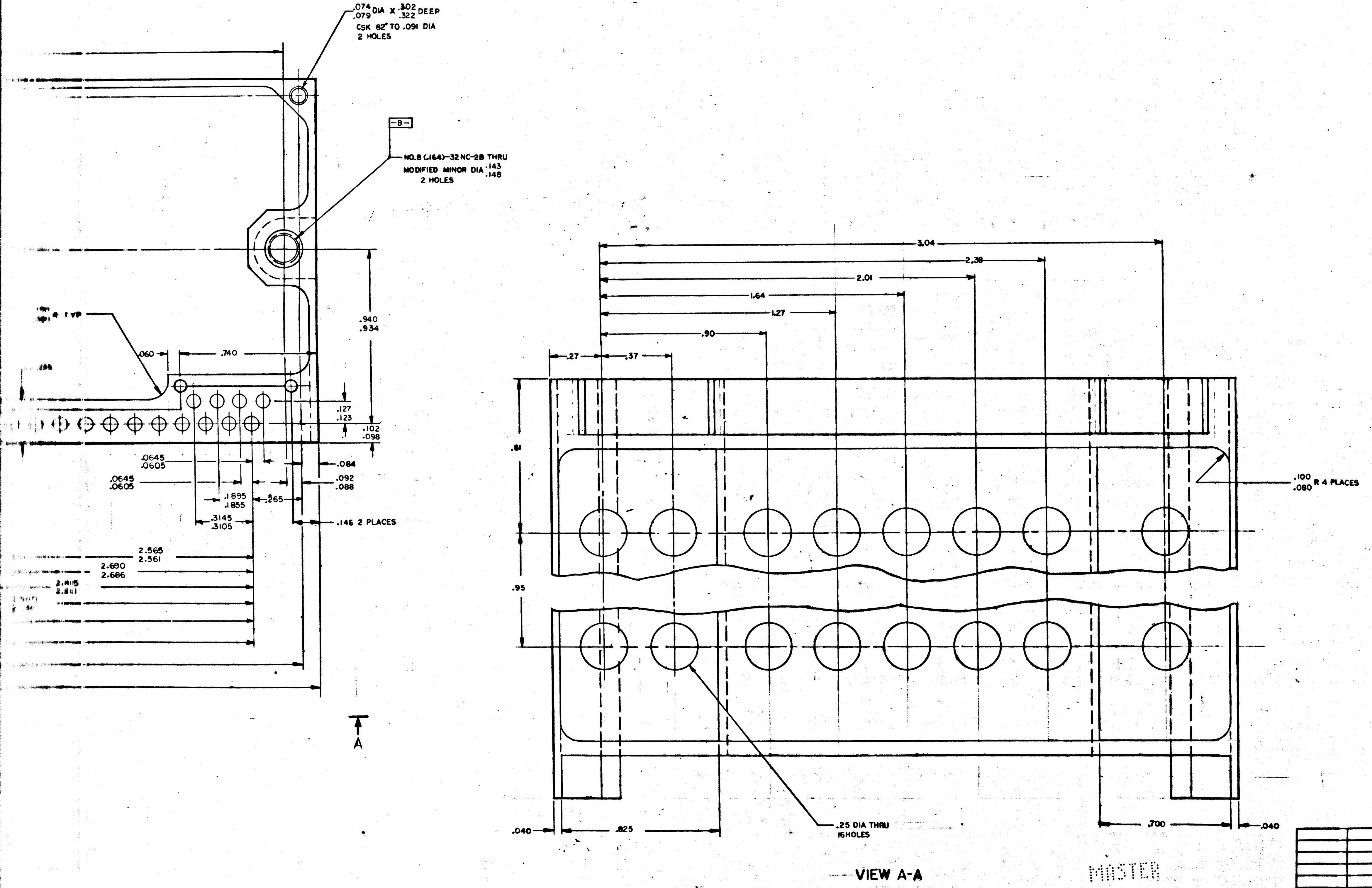
CODE IDENT NO 80230
SIZE J
DRAWING NO. 2008476
SCALE 5/1
SHEET 1 OF 1

2008476 B

2001476 B

3-/2008476

REVISIONS 28201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CSK 82° TO .091 DIA
2 HOLES
-B-
NO.8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
R TYP
.060
.740
.940 .934
.127 .123
.102 .098
.0645 .0605
.0645 .0605
.084
.092 .088
.1895 .1855
.265
.3145 .3105
.146 2 PLACES
2.565 2.561
2.690 2.686
A
3.04
2.38
2.01
1.64
1.27
.90
.27
.37
.81
.95
.100 .080 R 4 PLACES
.25 DIA THRU
16 HOLES
.040
.825
.700
.040
VIEW A-A
MASTER

HH

2007231	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

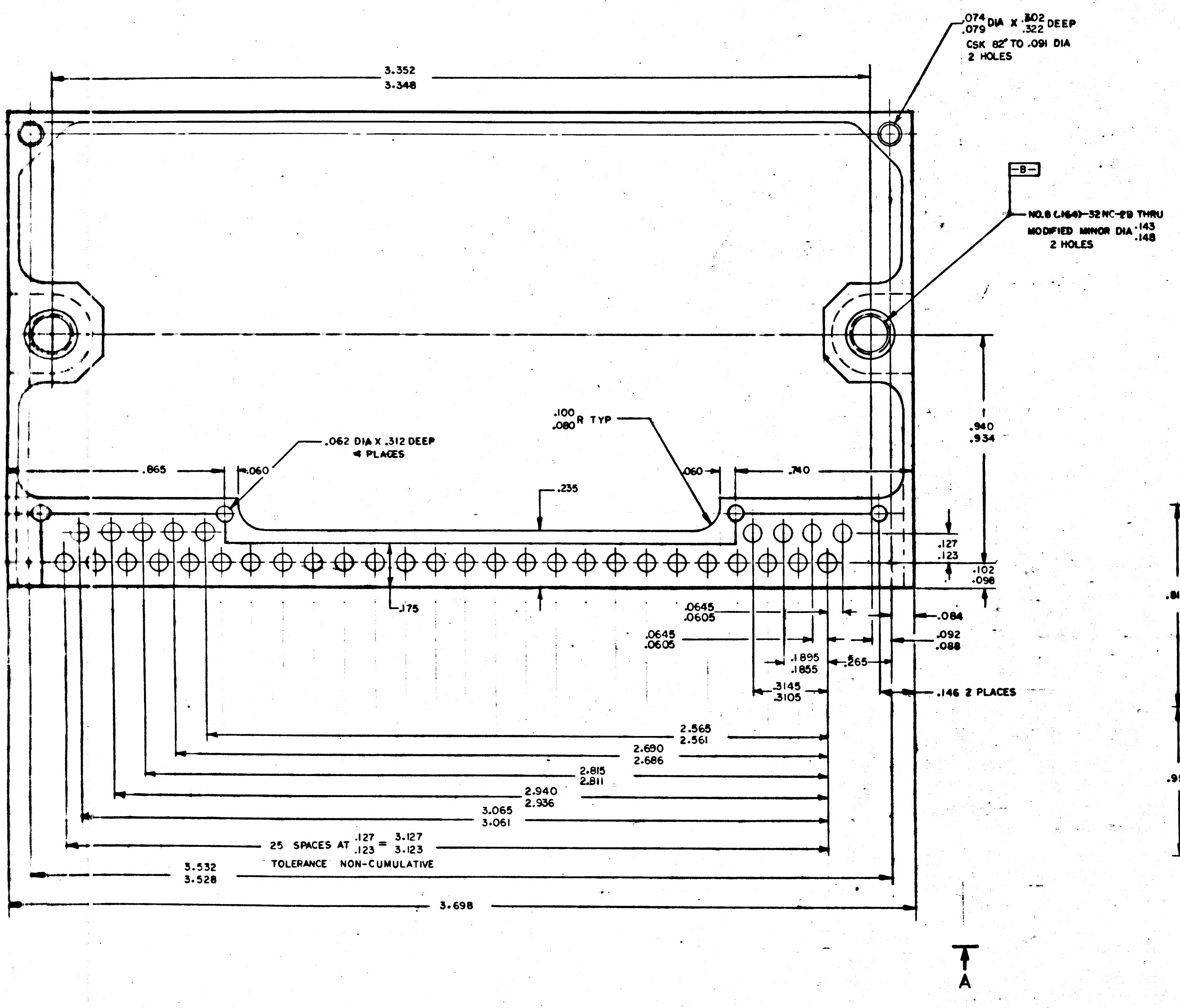
DRAWN F. L. Eckert
CHECKED Bonarrigo
APPROVED V. O. Ferrina
APPROVED
APPROVED MIT W Kupfer
A. C. METZGER
APPROVED MSC

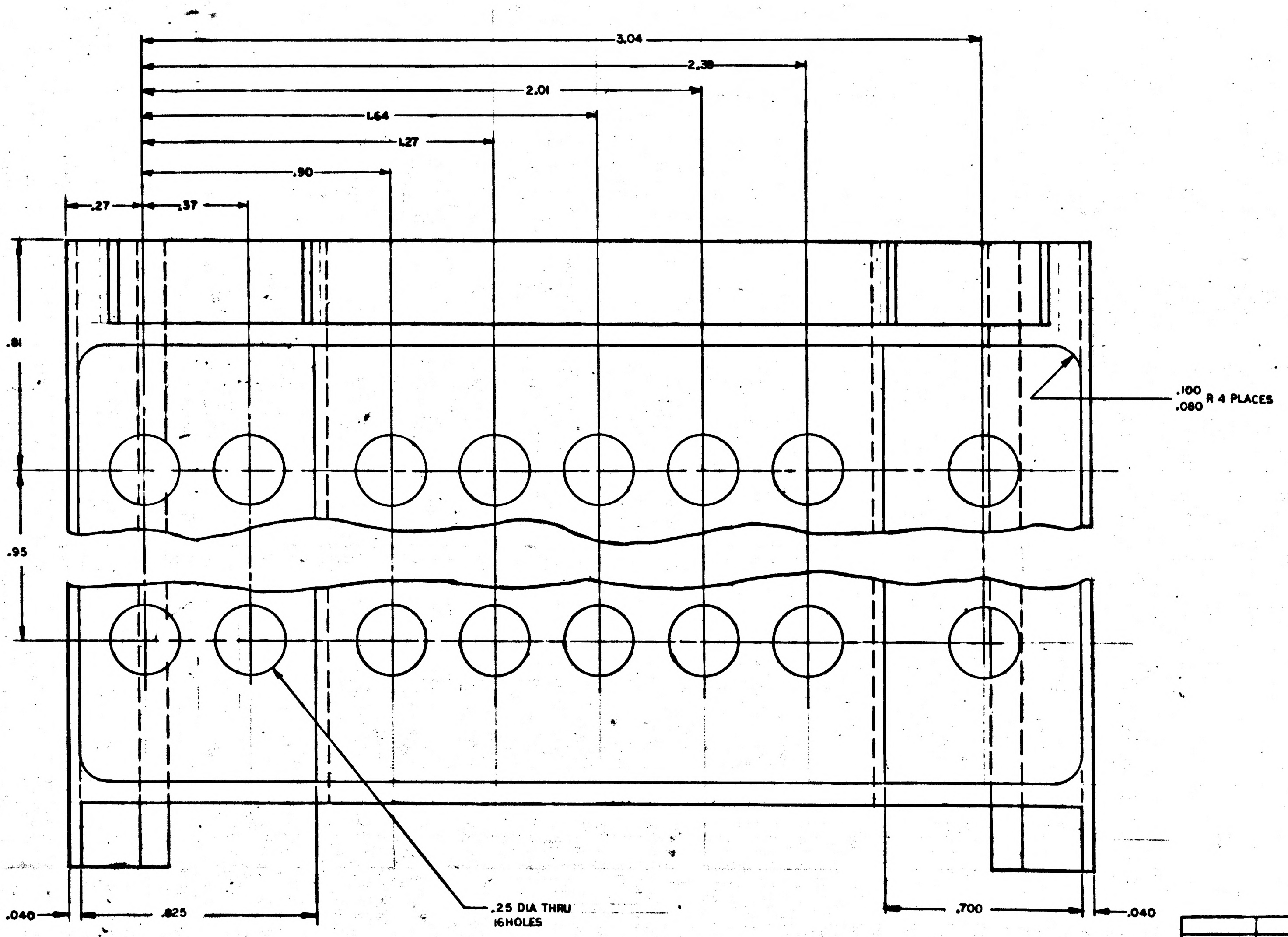
FRAME
IRIG AND PIPA
SIGNAL CONDITIONER ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008476
SCALE 5/1
SHEET 1 OF 1

2008476

F-4


.074 .079 DIA X .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
3.352
3.348
-B-
NO.8 (.164)-32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 HOLES
.100 .080 R TYP
.062 DIA X .312 DEEP
4 PLACES
.865
.060
.060
.740
.235
.940
.934
.127
.123
.102
.098
.175
.0645
.0605
.0645
.0605
.084
.092
.088
.1895
.1855
.265
.3145
.3105
.146 2 PLACES
2.565
2.561
2.690
2.686
2.815
2.811
2.940
2.936
3.065
3.061
25 SPACES AT .127 .123 = 3.127 3.123
TOLERANCE NON-CUMULATIVE
3.532
3.528
3.698
A


3.04
2.38
2.01
1.64
1.27
.90
.27
.37
.81
.95
.100 .080 R 4 PLACES
.25 DIA THRU
16 HOLES
.040
.825
.700
.040

VIEW A-A

MASTER

2008476

2007231	
NEXT ASSY	USED ON
APPLICATION	

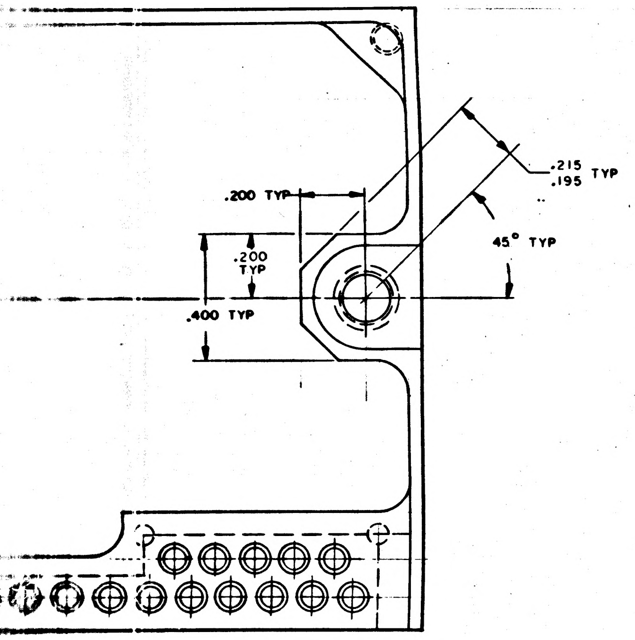
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

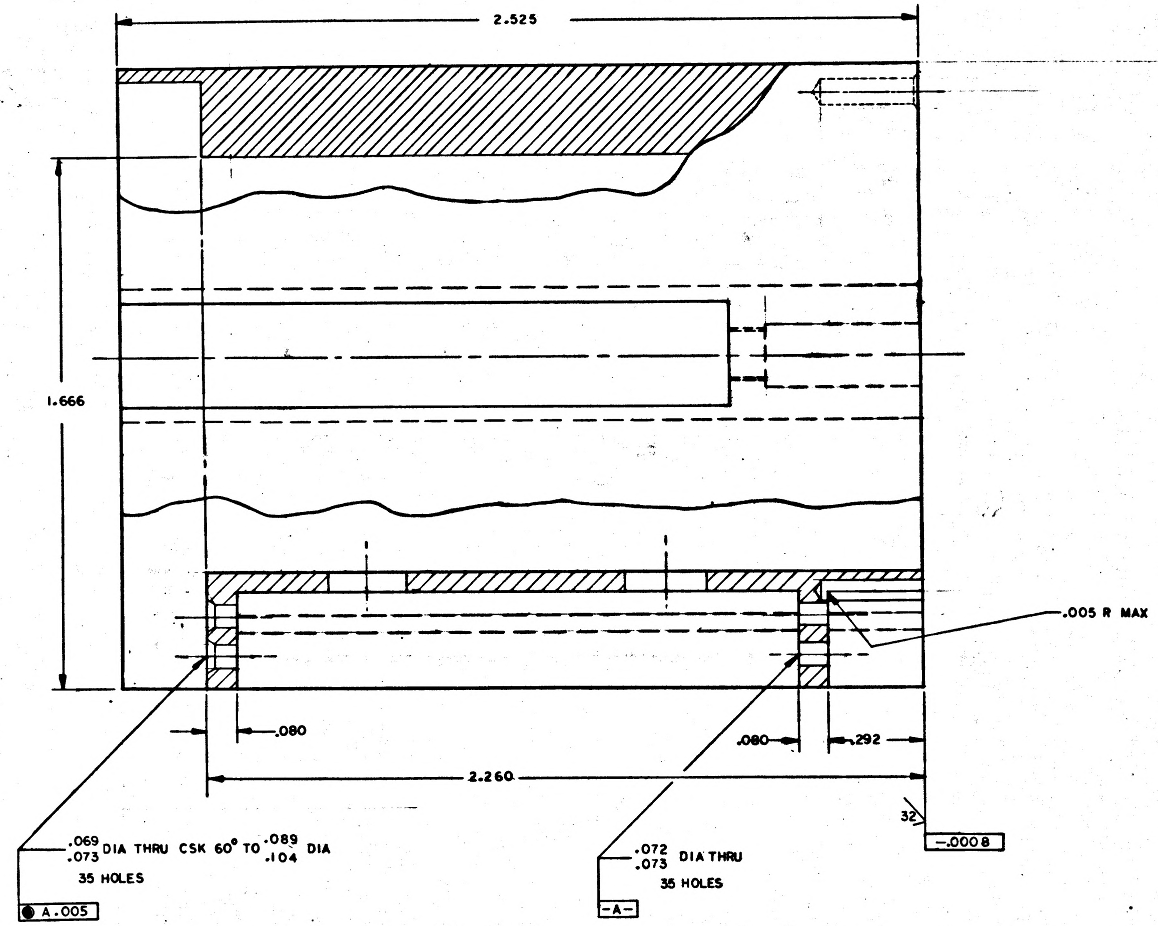
SEE NOTE 2

MIT
INSTRUMENTATION
CAMBRIDGE

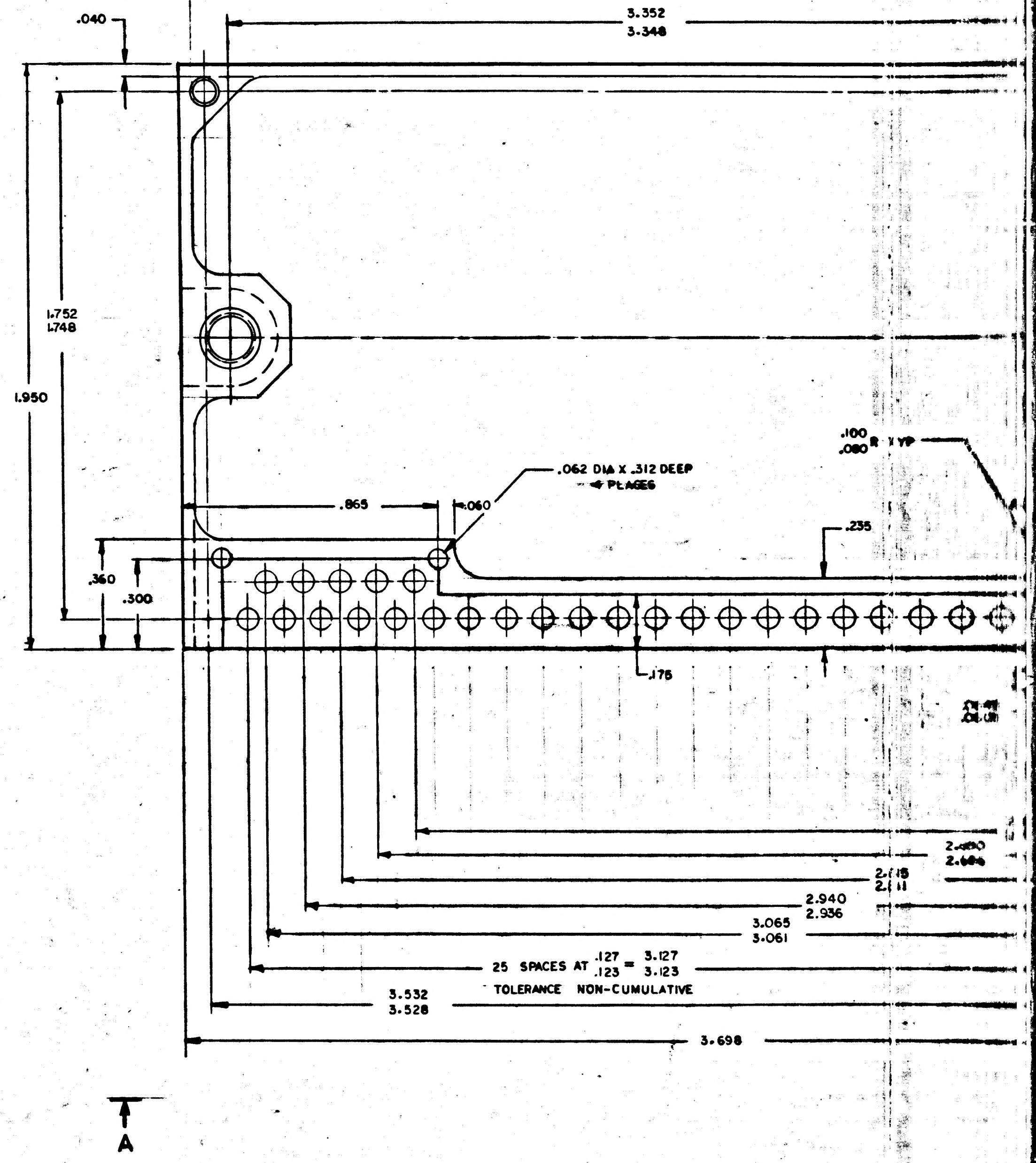
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED BY
A. C. [illegible]
APPROVED SC



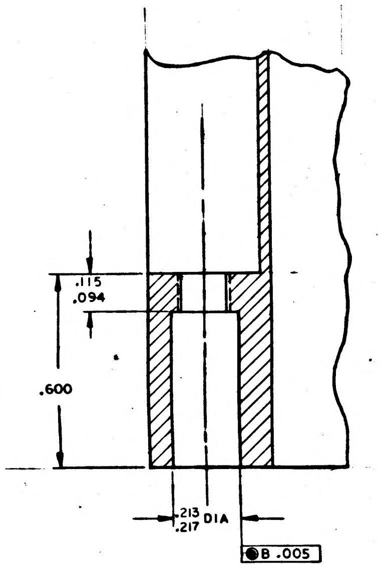
.200 TYP
.200 TYP
.400 TYP
.215
.195 TYP
45° TYP



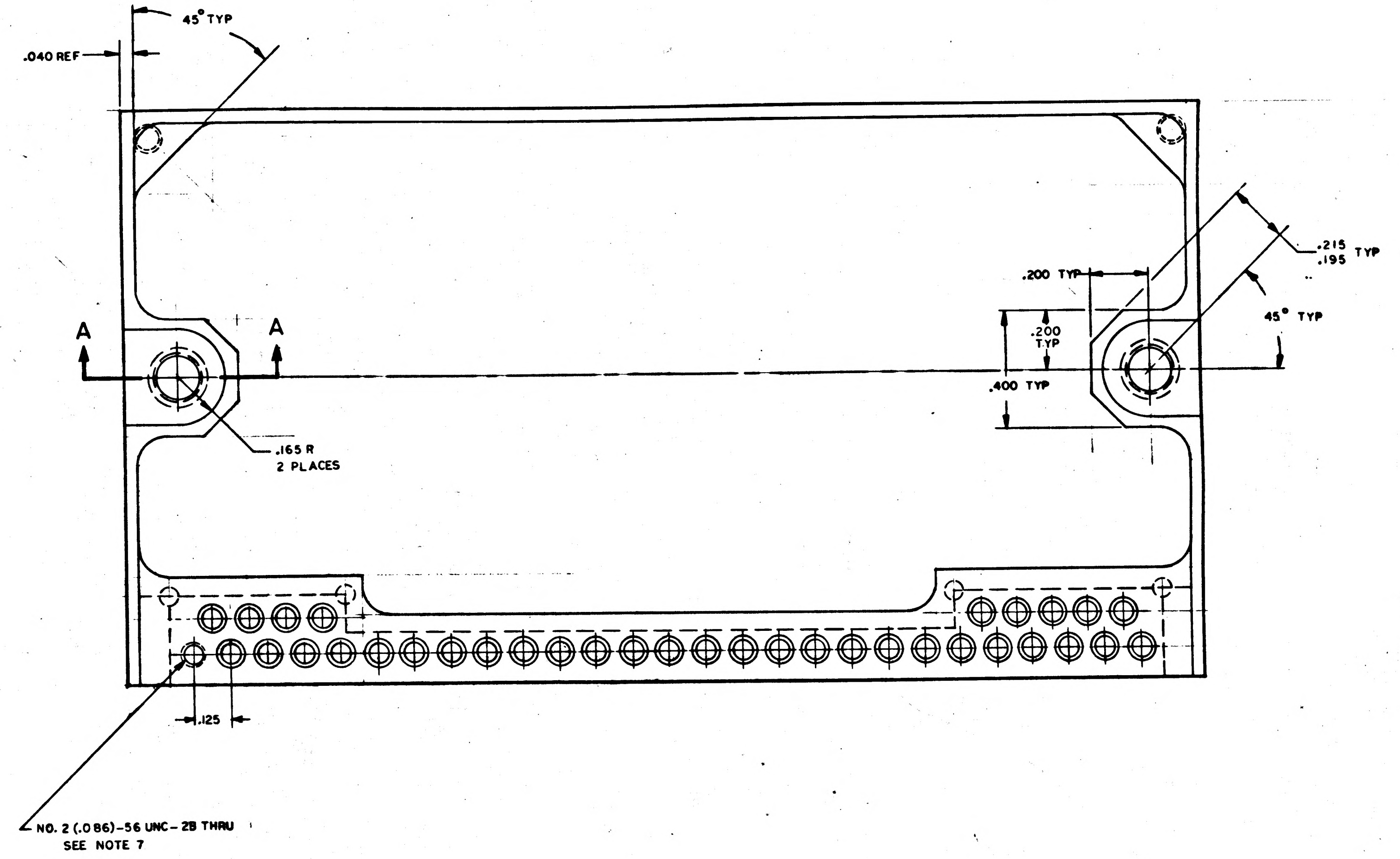
2.525
1.666
.005 R MAX
.080
.080
.292
2.260
32
—.0008
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
35 HOLES
⊕ A .005
.072
.073 DIA THRU
35 HOLES
-A-



.040
3.352
3.348
1.752
1.748
1.950
.100
.080 R TYP
.062 DIA X .312 DEEP
4 PLACES
.865
.060
.235
.360
.300
.175
2.940
2.936
3.065
3.061
25 SPACES AT .127
.123 = 3.127
3.123
TOLERANCE NON-CUMULATIVE
3.532
3.528
3.698
A

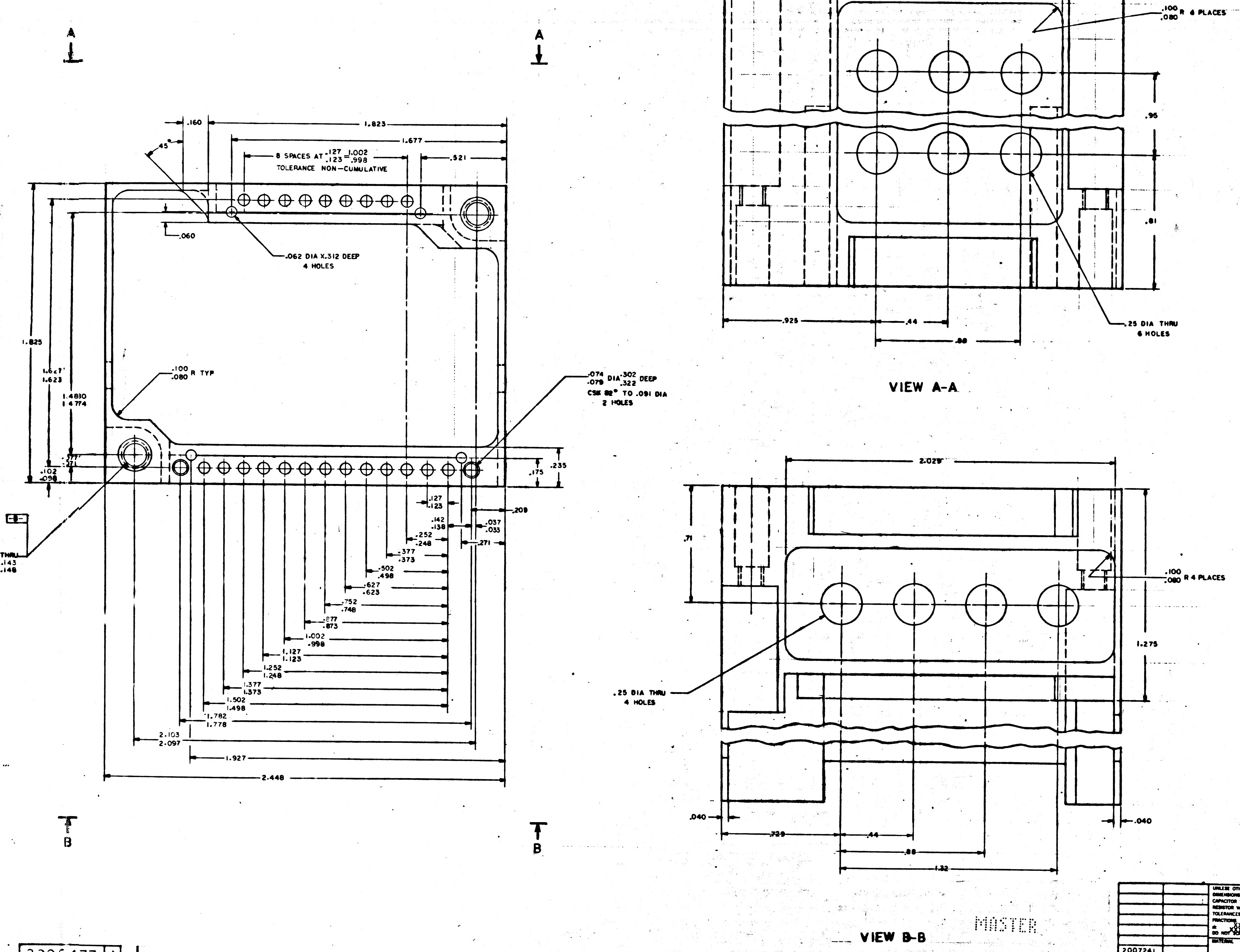

.115
.094
.600
.213
.217 DIA
B .005

PARTIAL SECTION A-A


45° TYP
.040 REF
A
A
.165 R
2 PLACES
.200 TYP
.200
TYP
.400 TYP
.215
.195 TYP
45° TYP
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{.125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8 IDENTIFY WITH PART NO. PER ND1002019

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPR
		REVISIONS 28509				
A		REVISED PER TDRR 29134				



A
A
B
B
.160
1.823
1.677
.521
45°
8 SPACES AT .127/.123 = 1.002/.998
TOLERANCE NON-CUMULATIVE
.060
.062 DIA X.312 DEEP
4 HOLES
1.825
1.627
1.623
1.4810
1.4774
.100
.080 R TYP
.074
.079 DIA .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.277
.271
.102
.098
THRU
.143
.148
.175
.235
.127
.123
.209
.142
.138
.037
.033
.252
.248
.271
.377
.373
.502
.498
.627
.623
.752
.748
.877
.873
1.002
.998
1.127
1.123
1.252
1.248
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
2.448
1.464
.379
.100
.080 R 4 PLACES
.95
.81
.925
.44
.88
.25 DIA THRU
6 HOLES
VIEW A-A
2.029
.71
.100
.080 R 4 PLACES
1.275
.25 DIA THRU
4 HOLES
.040
.729
.44
.88
1.32
.040
VIEW B-B

MASTER

4H

2007241	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN F.L. Elliott 4-11-66
CHECKED Bonarrigo
APPROVED
APPROVED
APPROVED MIT 3/4/66
APPROVED NSC
DATE

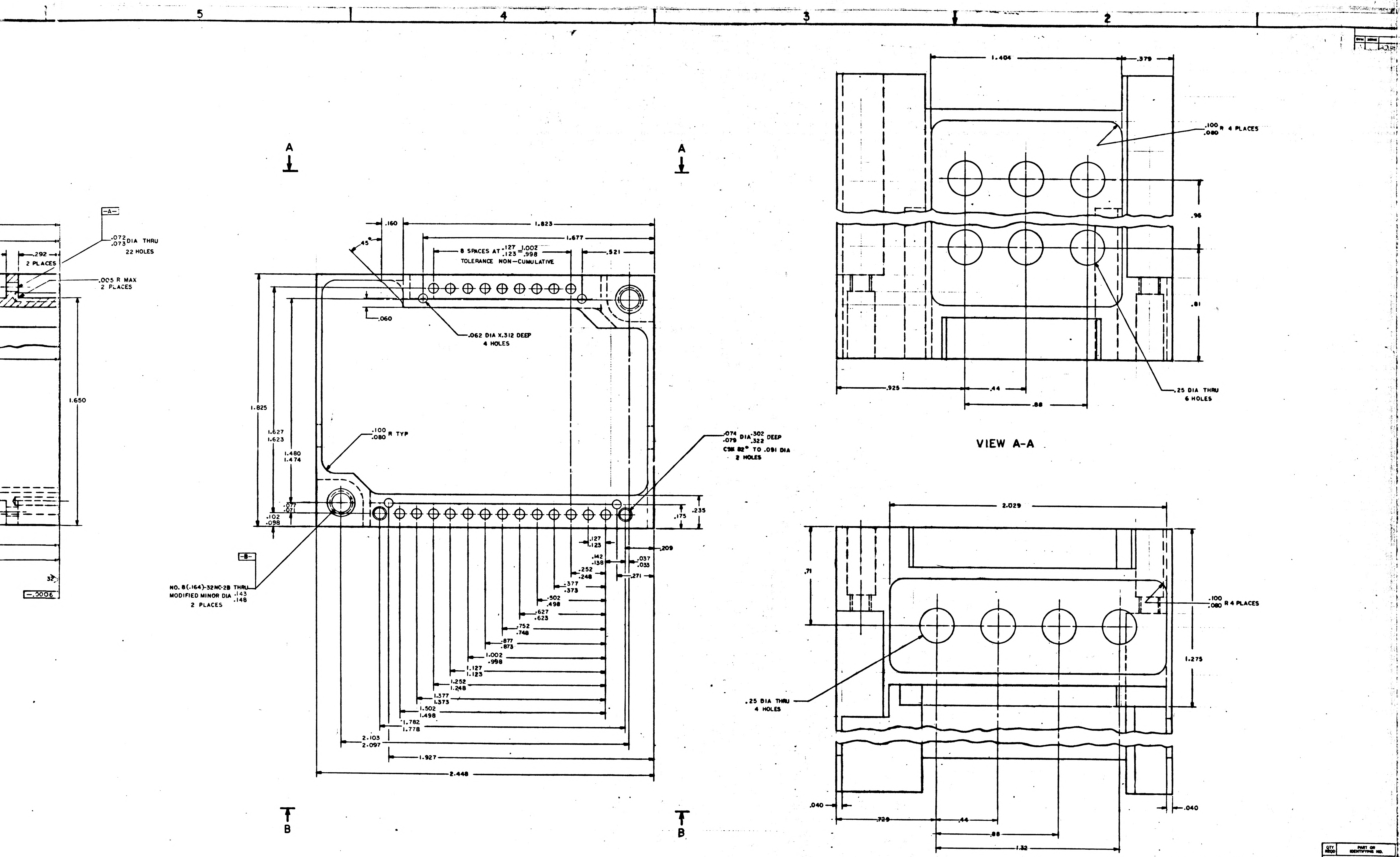
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
120V PIPA SUPPLY AND IRIG TEMP (FQ)
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008477
SCALE 5/1
SHEET OF

2008477 A

2008477 A


5
4
3
2
A
A
-A-
.072
.073 DIA THRU
22 HOLES
.292
2 PLACES
.005 R MAX
2 PLACES
1.650
-.0006
.160
1.823
45°
1.677
8 SPACES AT .127
.123 = 1.002
.998
TOLERANCE NON-CUMULATIVE
.521
.060
.062 DIA X.312 DEEP
4 HOLES
1.825
1.627
1.623
1.480
1.474
.100
.080 R TYP
.077
.071
.102
.098
.074
.079 DIA .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.175
.235
-B-
NO. 8(-.164)-32NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 PLACES
.127
.123
.142
.138
.037
.033
.209
.252
.248
.271
.377
.373
.502
.498
.627
.623
.752
.748
.877
.873
1.002
.998
1.127
1.123
1.252
1.248
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
2.448
B
B
1.404
.379
.100
.080 R 4 PLACES
.96
.81
.925
.44
.88
.25 DIA THRU
6 HOLES
VIEW A-A
2.029
.71
.100
.080 R 4 PLACES
1.275
.25 DIA THRU
4 HOLES
.040
.040
.729
.44
.88
1.32
VIEW B-B
MASTER

QTY REQD	PART OR IDENTIFYING NO.

MATERIAL OR NOTES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

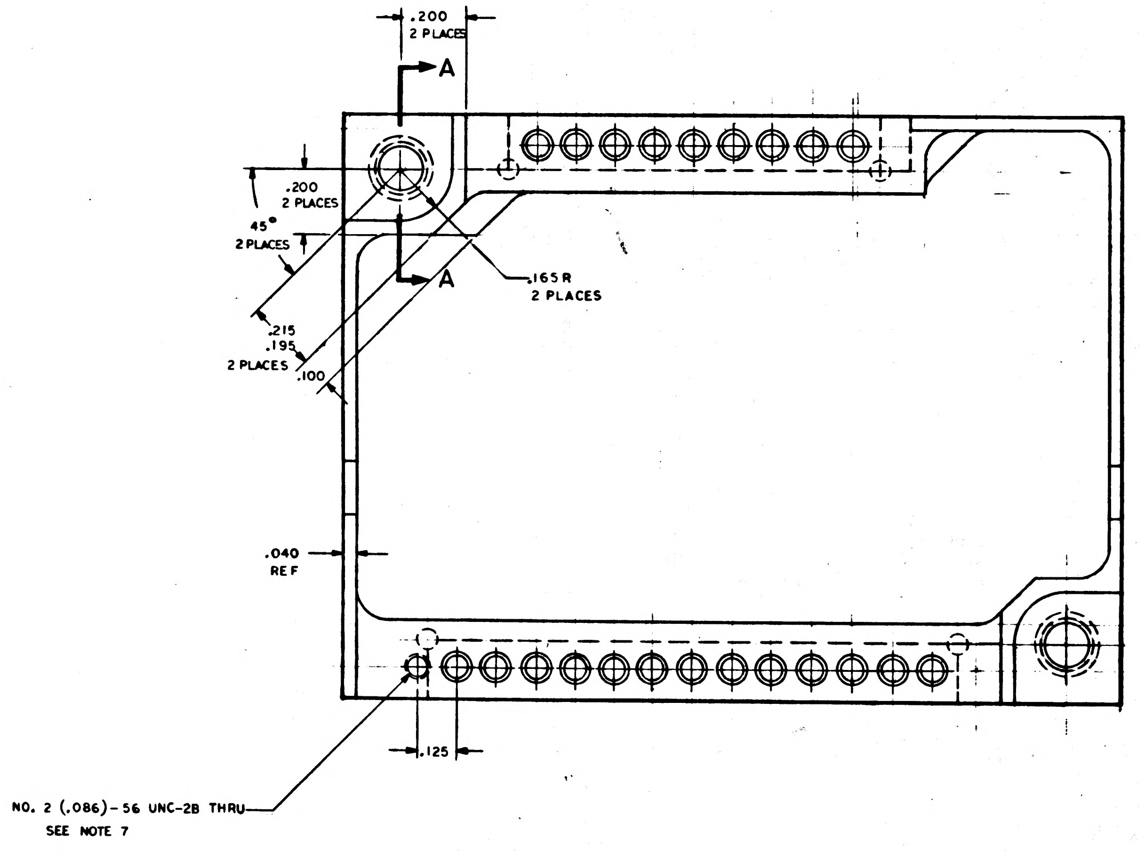
MATERIAL
SEE NOTE 2

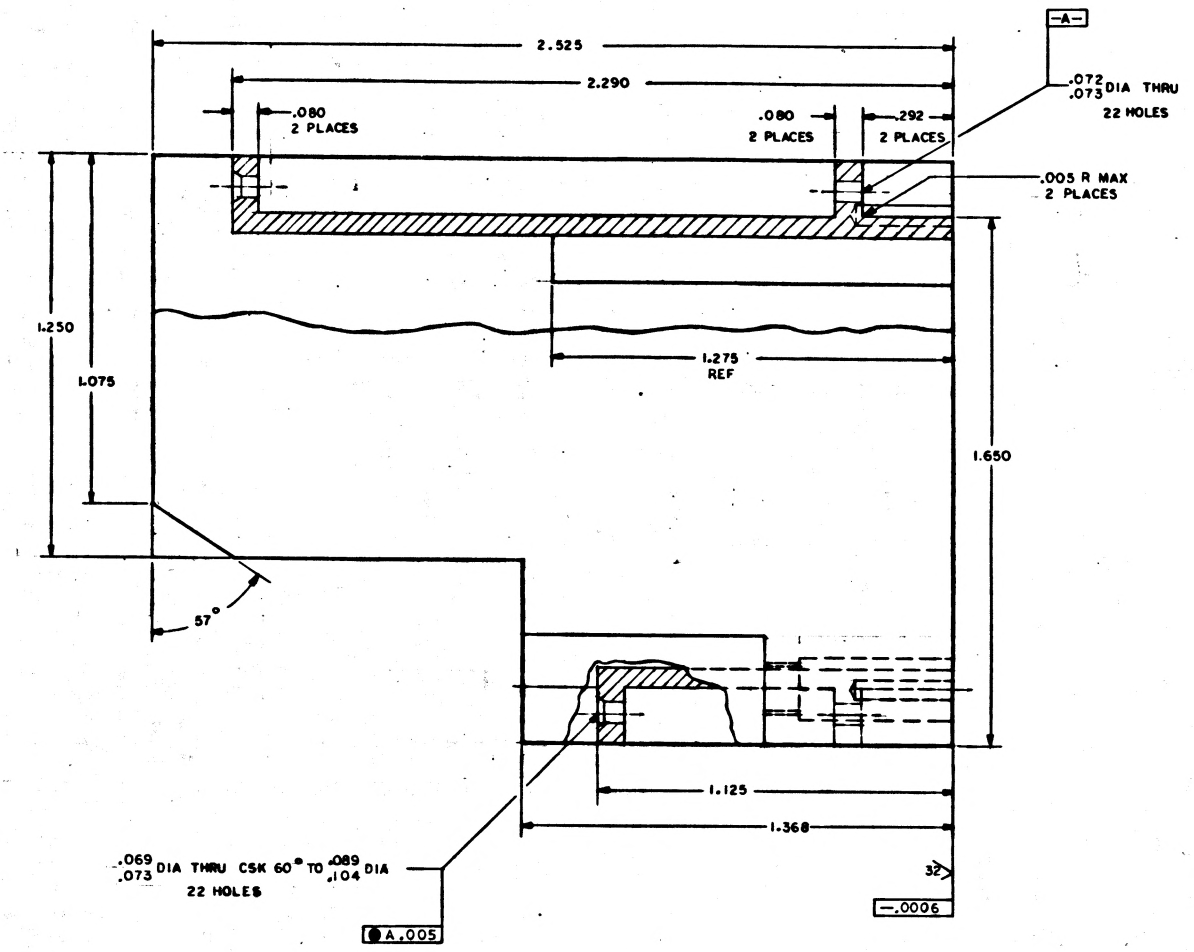
2007241	
NEXT ASSY	USED ON
APPLICATION	

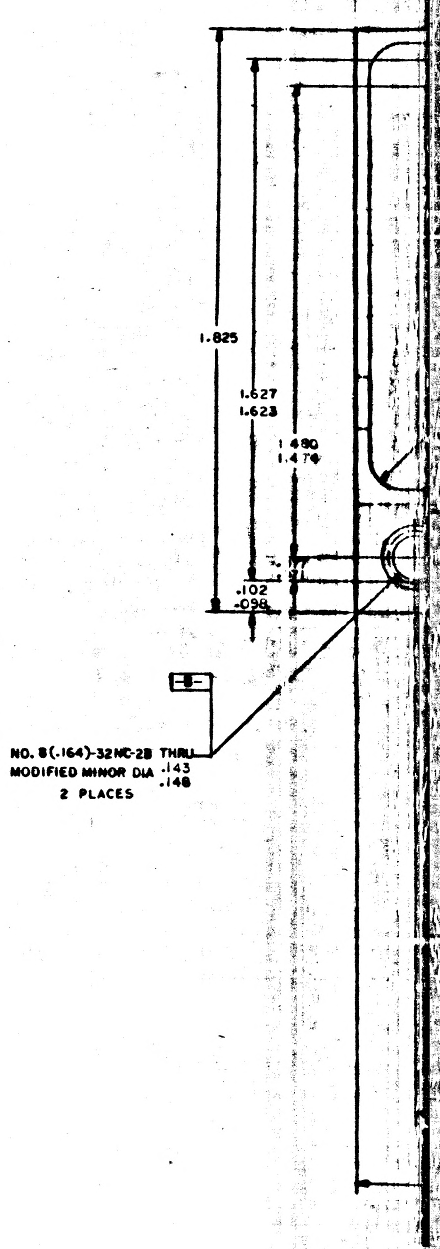
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 4-116
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED NSA

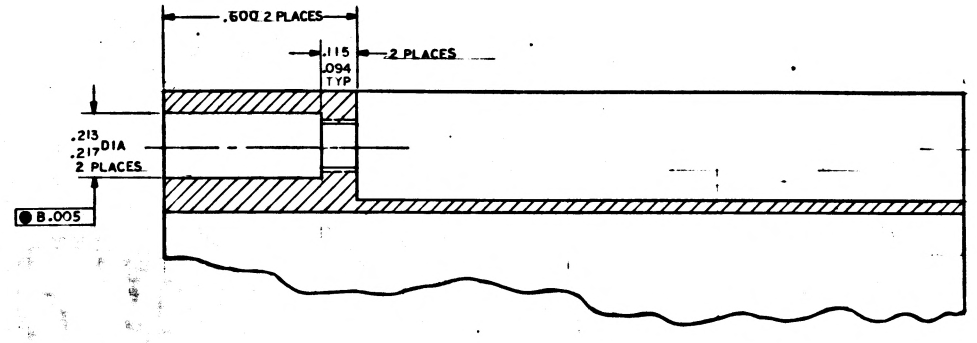
802


.200
2 PLACES
A
A
.200
2 PLACES
45°
2 PLACES
.165 R
2 PLACES
.215
.195
2 PLACES
.100
.040
REF
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7


2.525
2.290
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
-A-
.072
.073 DIA THRU
22 HOLES
.005 R MAX
2 PLACES
1.250
1.075
1.275
REF
1.650
57°
1.125
1.368
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
22 HOLES
A .005
32
—.0006


1.825
1.627
1.623
1.480
1.479
.102
.098
-B-
NO. 8(.164)-32NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 PLACES

[illegible]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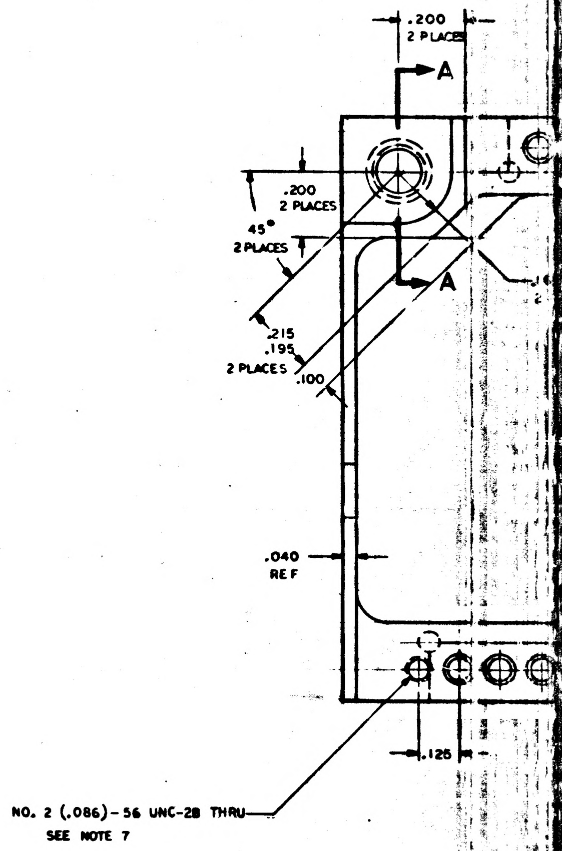
.115
.094
TYP
2 PLACES
.213
.217 DIA
2 PLACES
● B.005

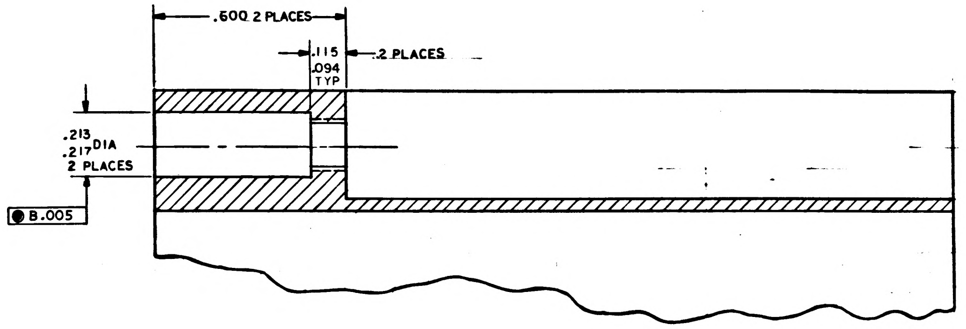
PARTIAL SECTION A-A


.200
2 PLACES
A
.200
2 PLACES
45°
2 PLACES
.215
.195
2 PLACES
.100
A
.040
REF
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

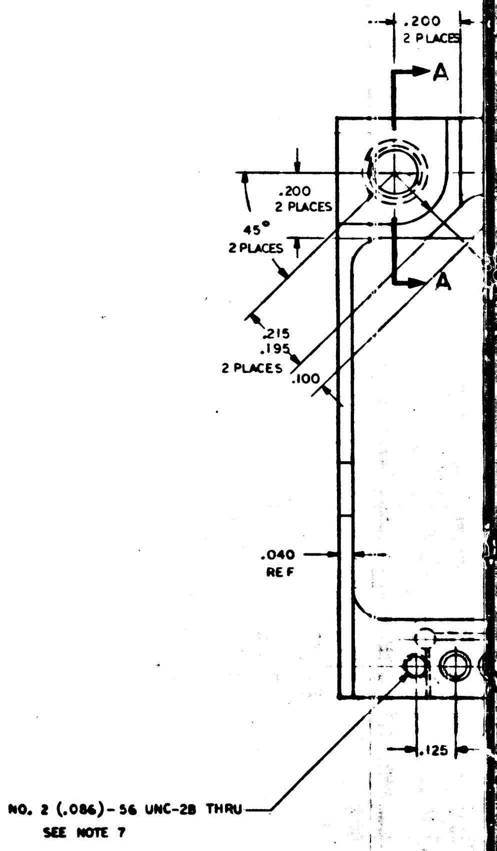
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


.600 2 PLACES
.115
.094
TYP
2 PLACES
.213
.217 DIA
2 PLACES
● B .005

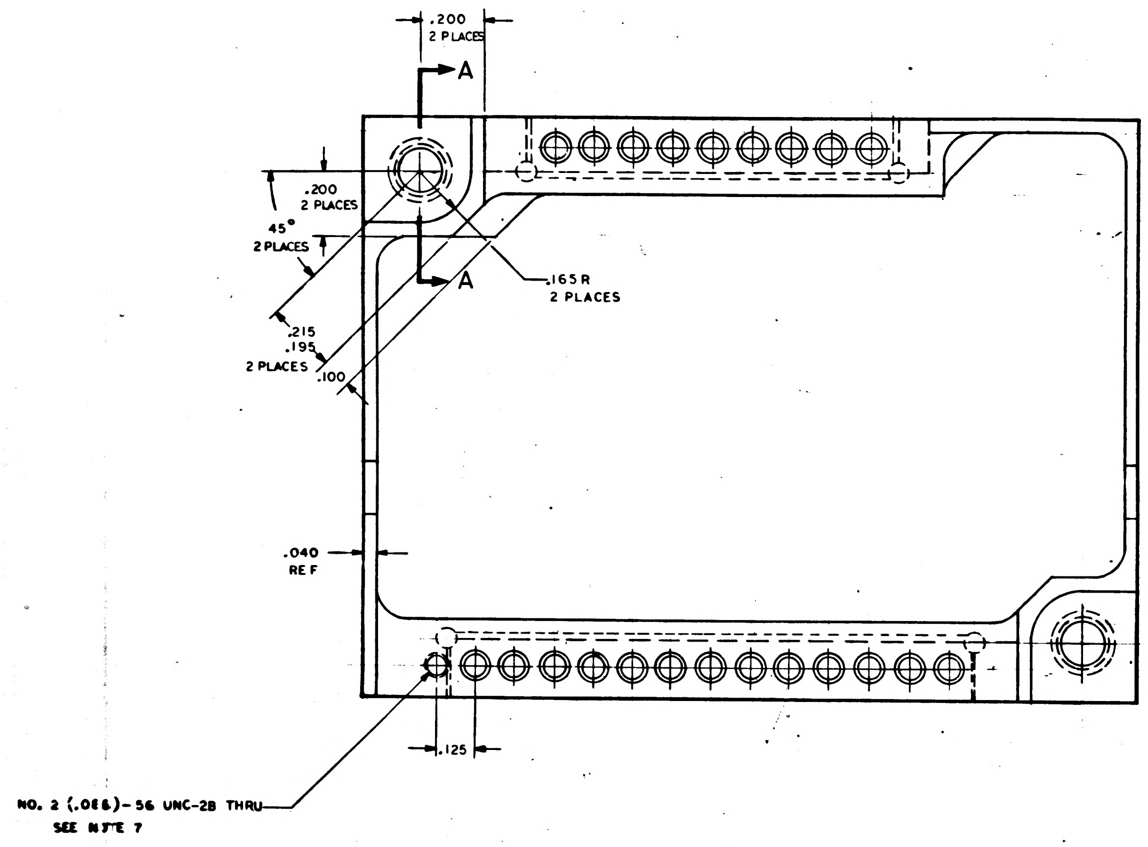
PARTIAL SECTION A-A

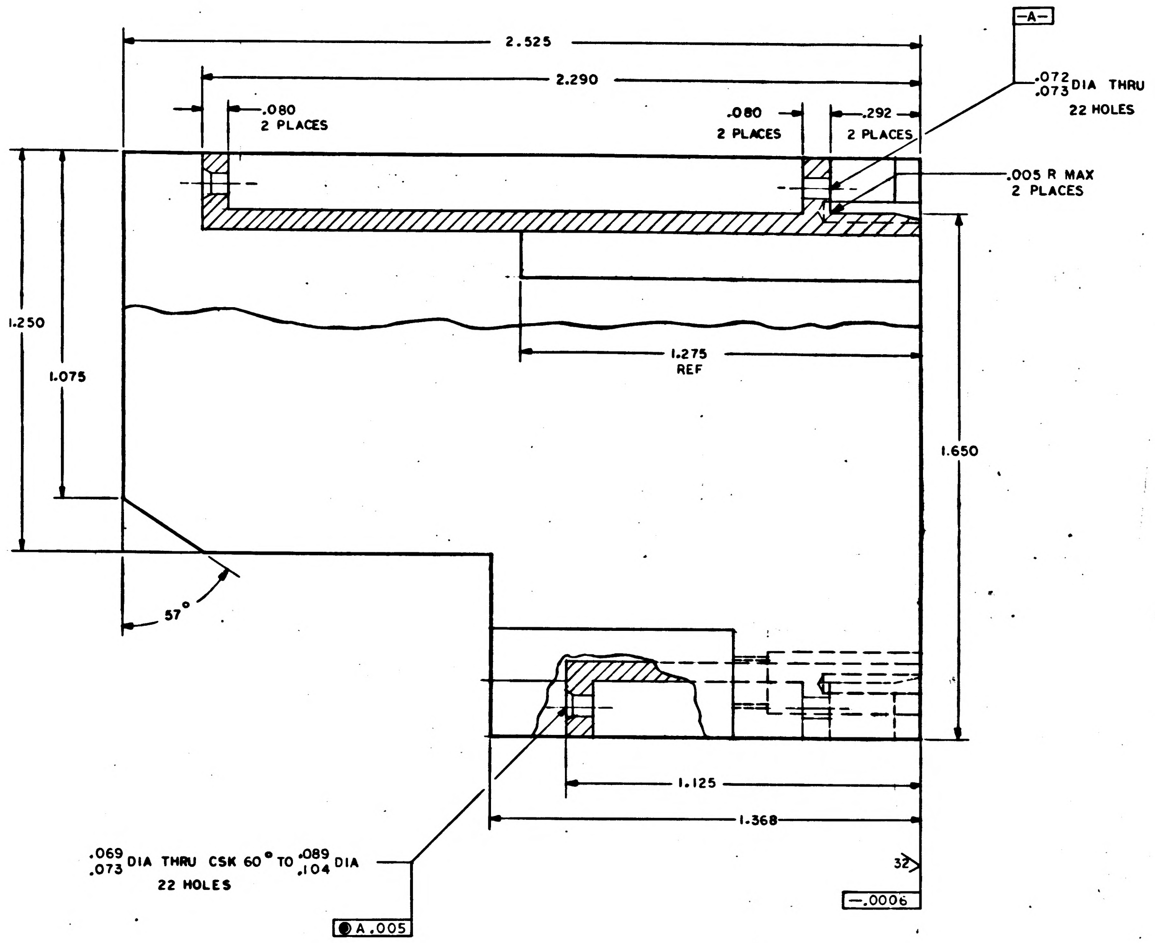

.200
2 PLACES
A
.200
2 PLACES
45°
2 PLACES
A
.215
.195
2 PLACES
.100
.040
REF
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

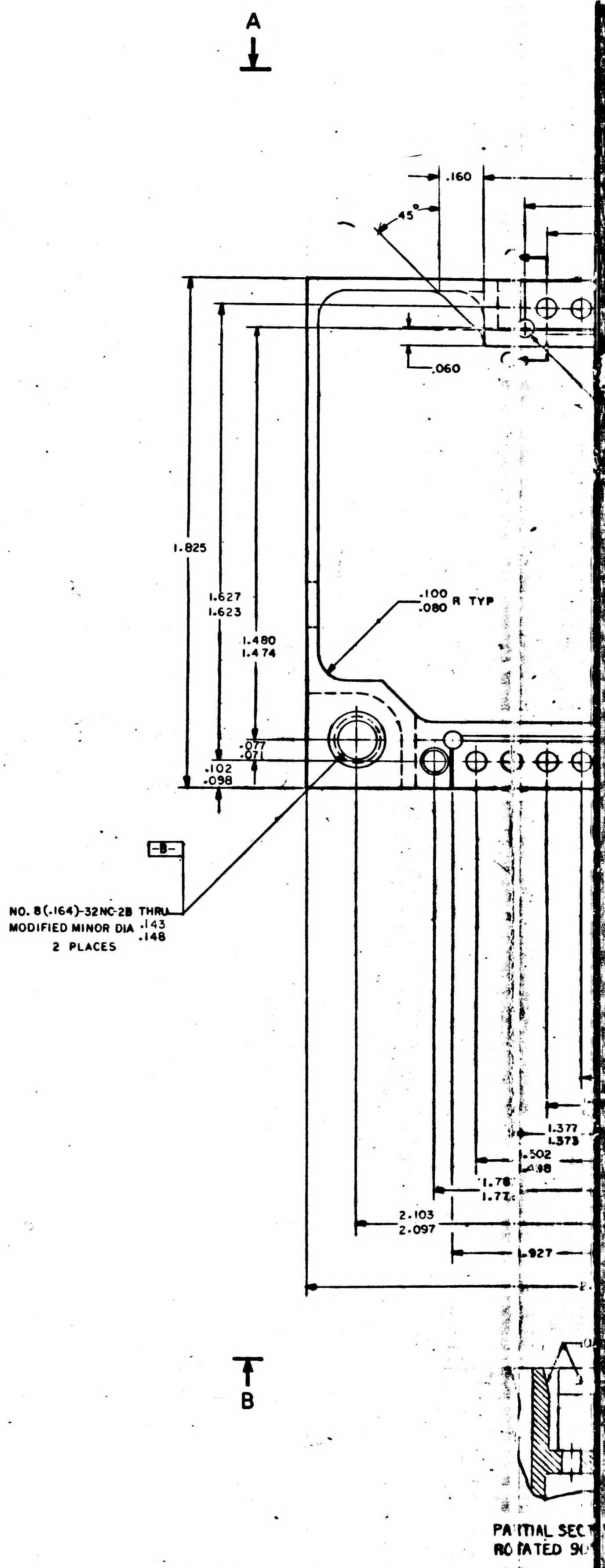
44

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED $\sqrt{125}$ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND1002019


.200
2 PLACES
A
A
.200
2 PLACES
45°
2 PLACES
.165 R
2 PLACES
.215
.195
2 PLACES
.100
.040
REF
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

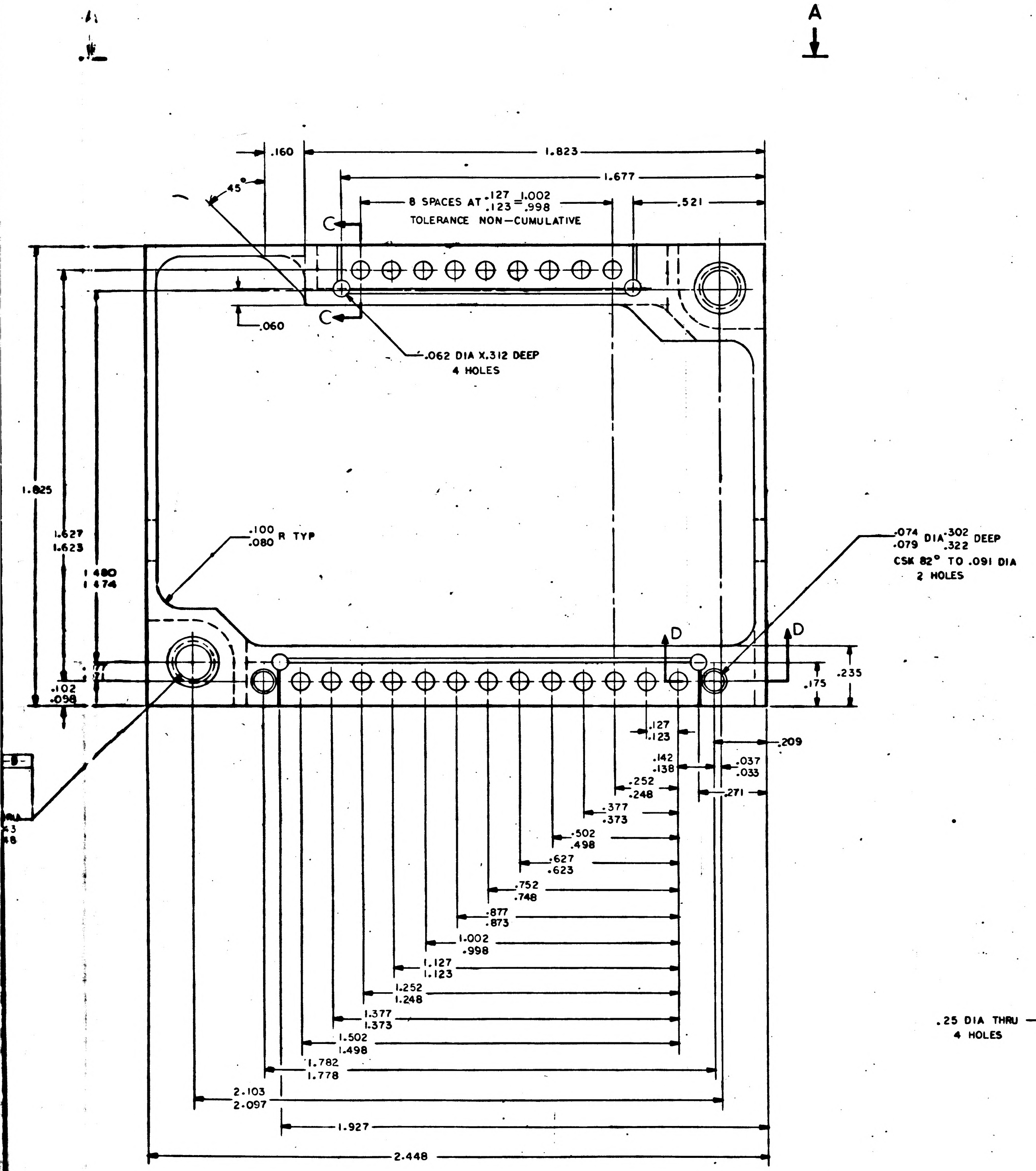

2.525
2.290
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
-A-
.072
.073 DIA THRU
22 HOLES
.005 R MAX
2 PLACES
1.250
1.075
1.275
REF
1.650
57°
1.125
1.368
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
22 HOLES
A .005
32
—.0006


A
.160
45°
.060
1.825
1.627
1.623
1.480
1.474
.100
.080 R TYP
.077
.071
.102
.098
-B-
NO. 8(.164)-32NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 PLACES
1.377
1.373
1.502
1.498
1.78
1.77
2.103
2.097
.927
B

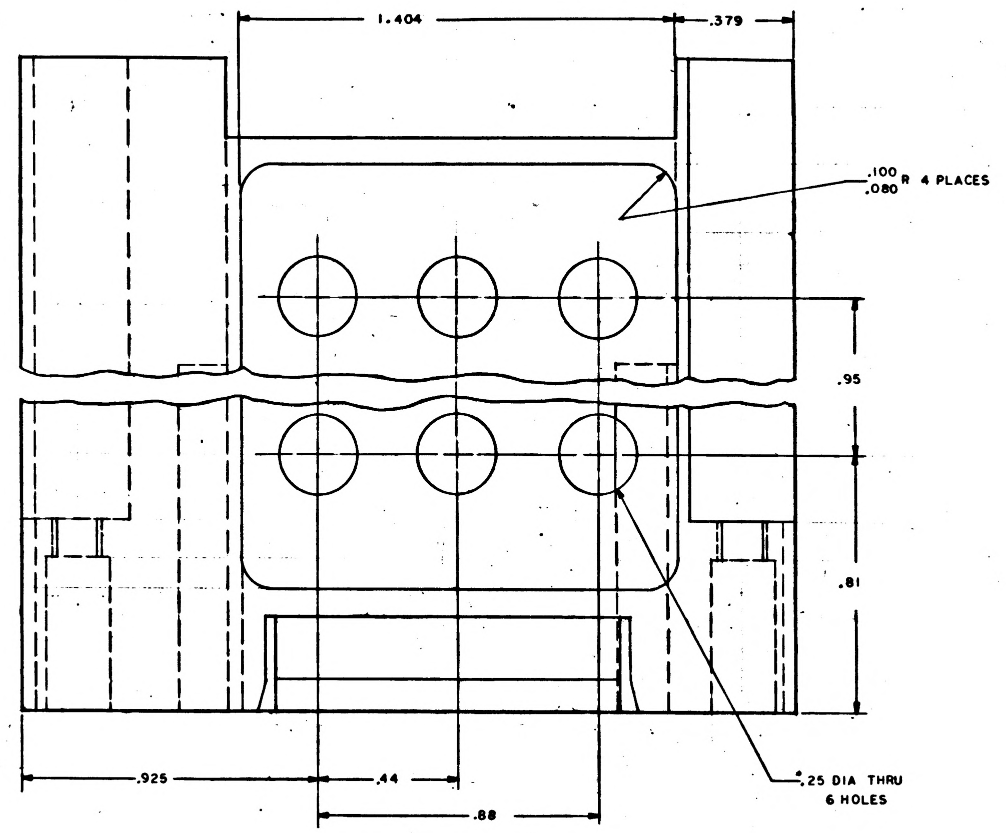
PA TIAL SEC
RO TATED 9

SYM	ZONE	DESCRIPTION				
A		REVISED PER TDRR 29134		μ 38	5/25/66	MGW 6-1-66
B		REVISED PER TDRR 32435	WA	A.W.	9 JAN 67	

RL. 28509

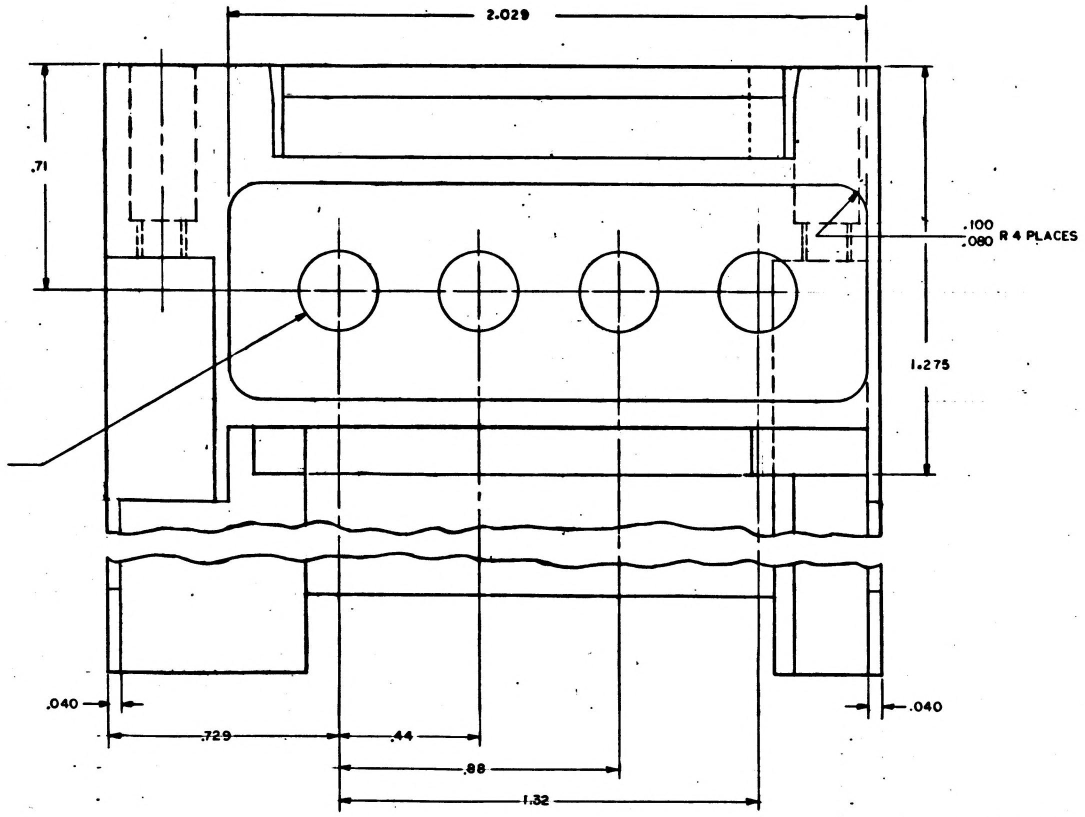


A
.160
1.823
45°
1.677
8 SPACES AT .127/.123 = 1.002/.998
TOLERANCE NON-CUMULATIVE
.521
C
C
.060
.062 DIA X.312 DEEP
4 HOLES
1.825
1.627
1.623
1.480
1.474
.100
.080 R TYP
.074/.079 DIA .302/.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
D
D
.102
.098
.235
.175
.209
.127
.123
.142
.138
.037
.033
.271
.252
.248
.377
.373
.502
.498
.627
.623
.752
.748
.877
.873
1.002
.998
1.127
1.123
1.252
1.248
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
2.448



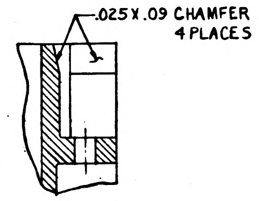
1.404
.379
.100/.080 R 4 PLACES
.95
.81
.925
.44
.88
.25 DIA THRU
6 HOLES

VIEW A-A



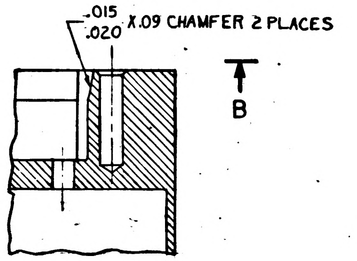
2.029
.71
.100/.080 R 4 PLACES
1.275
.25 DIA THRU
4 HOLES
.040
.040
.729
.44
.88
1.32

VIEW B-B



.025 X.09 CHAMFER
4 PLACES

PARTIAL SECTION C-C
ROTATED 90° CLOCKWISE



.015/.020 X.09 CHAMFER 2 PLACES
B

PARTIAL SECTION D-D

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007241	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN F.L. Eckert 4-11-66
CHECKED Bonarrigo 29 Apr 66
APPROVED 2 MAY 66
APPROVED 2 MAY 66
APPROVED MIT W. Kupfer 3 May 66
A. C. METZGER
APPROVED MSC
DATE

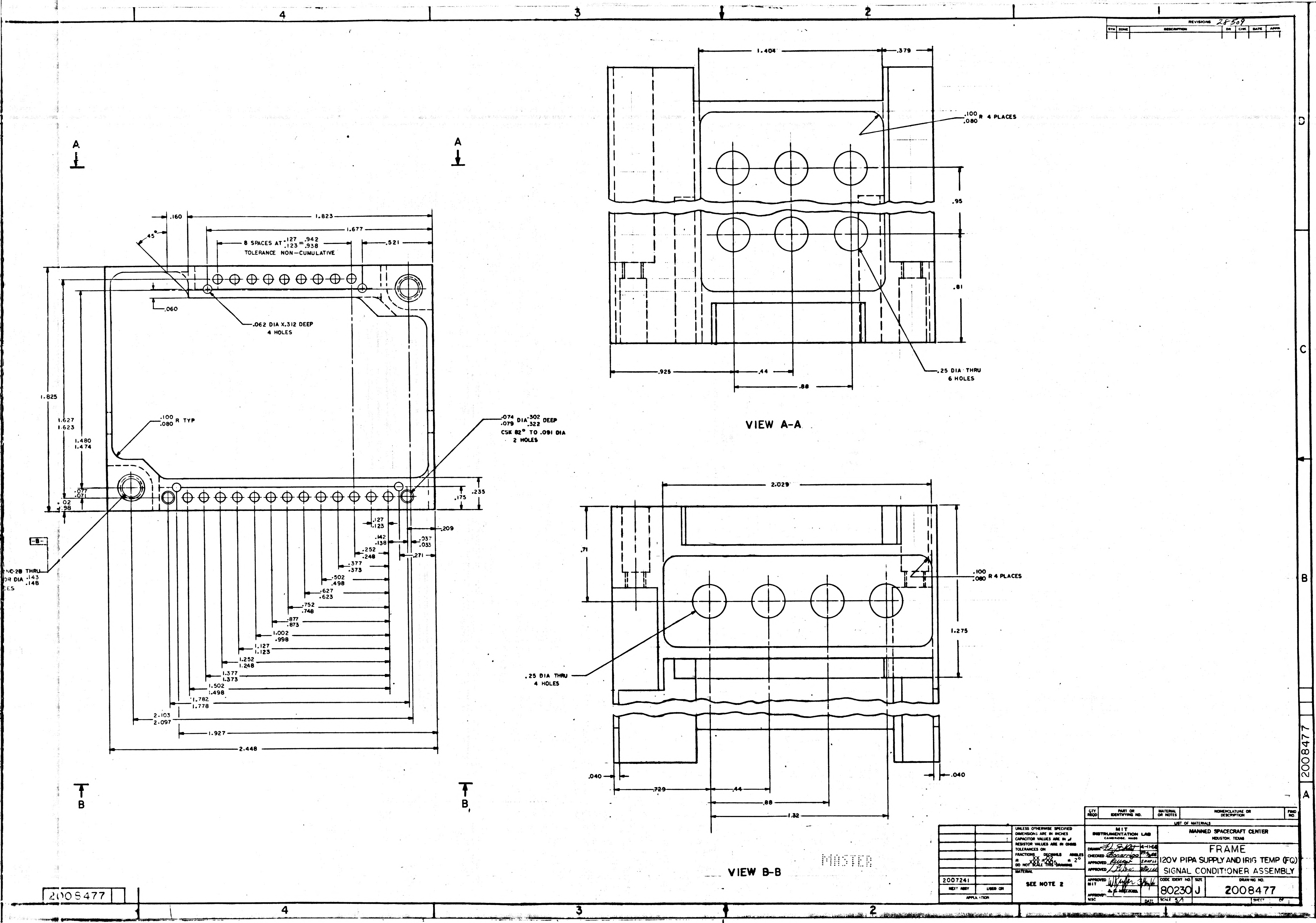
FRAME
120V PIPA SUPPLY AND IRIG TEMP (FQ) SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008477
SCALE 5/1
SHEET OF

2008477 B

4H

3/2008477


4
3
2
1
D
C
B
A
A
A
B
B,
.160
1.823
1.677
45°
8 SPACES AT .127/.123 = .942/.938
TOLERANCE NON-CUMULATIVE
.521
.060
.062 DIA X.312 DEEP
4 HOLES
1.825
1.627
1.623
1.480
1.474
.100/.080 R TYP
.074/.079 DIA .302/.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.077
.071
.02
.98
.235
.175
NO-28 THRU
OR DIA .143/.148
ES
.209
.127/.123
.142/.138
.037/.033
.252/.248
.271
.377/.373
.502/.498
.627/.623
.752/.748
.877/.873
1.002/.998
1.127/1.123
1.252/1.248
1.377/1.373
1.502/1.498
1.782/1.778
2.103/2.097
1.927
2.448
1.404
.379
.100/.080 R 4 PLACES
.95
.81
.925
.44
.88
.25 DIA THRU
6 HOLES
VIEW A-A
2.029
.71
.100/.080 R 4 PLACES
1.275
.25 DIA THRU
4 HOLES
.040
.729
.44
.88
1.32
.040
VIEW B-B
MASTER
REVISIONS 28509
SYM
ZONE
DESCRIPTION
DR
CHK
DATE
APPR
2008477
44

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS .XX ±.02 .XXX ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

NEXT ASSY	USED ON
2007241	

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

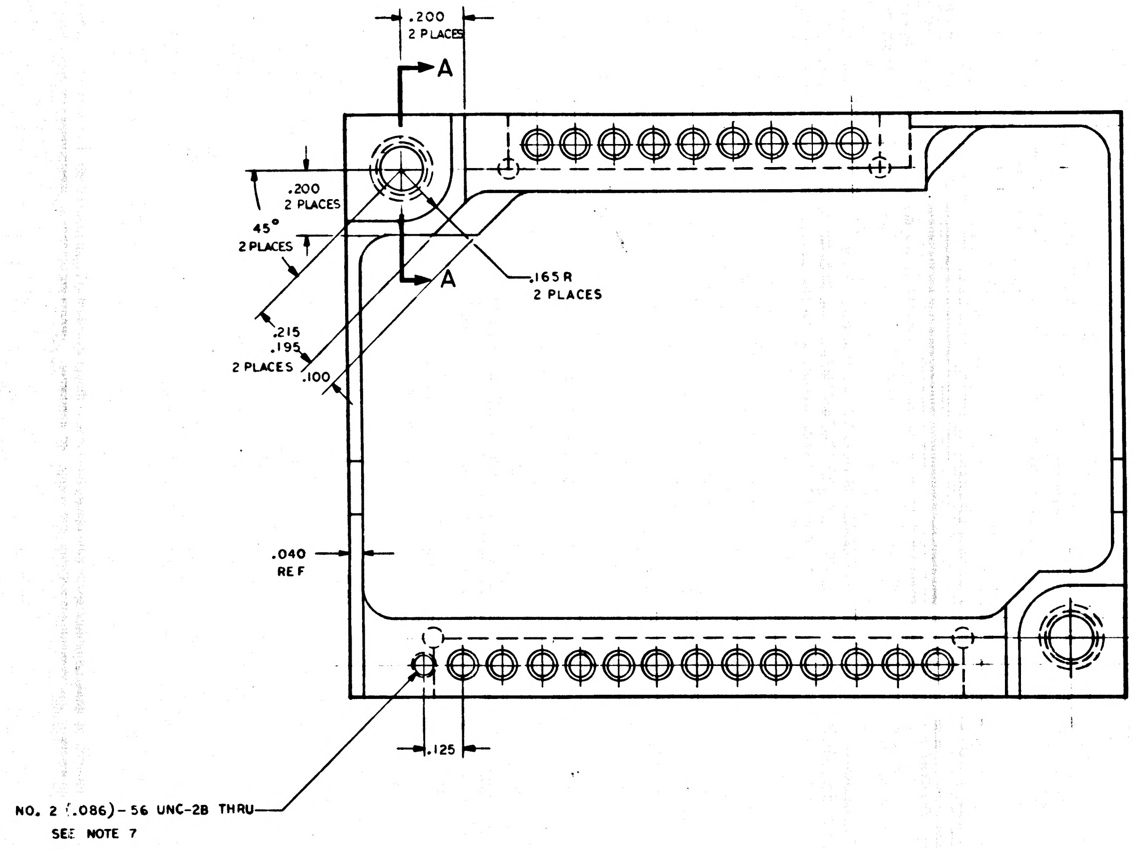
DRAWN F.L. Elliot 4-11-66
CHECKED Bonarrigo 29 Apr 66
APPROVED 2 MAY 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

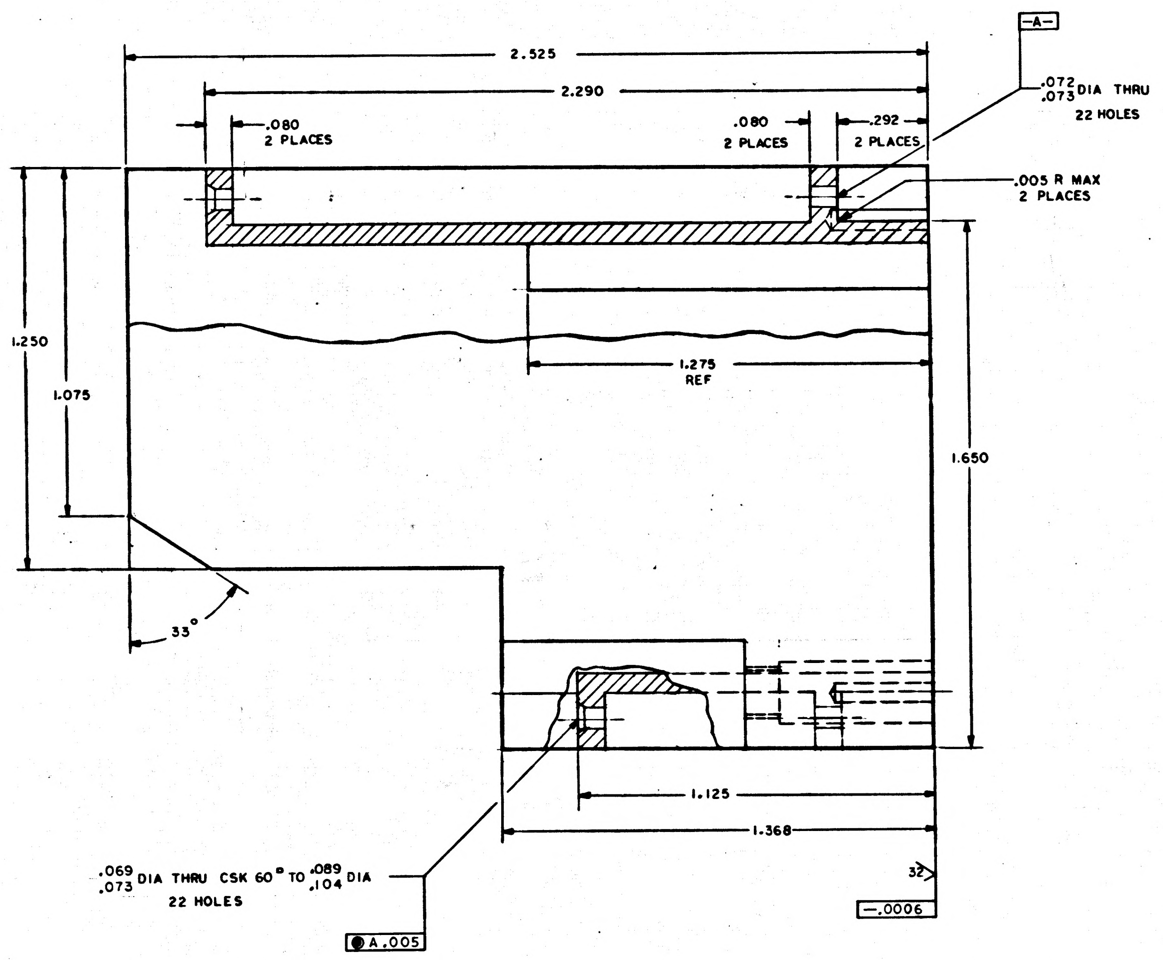
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

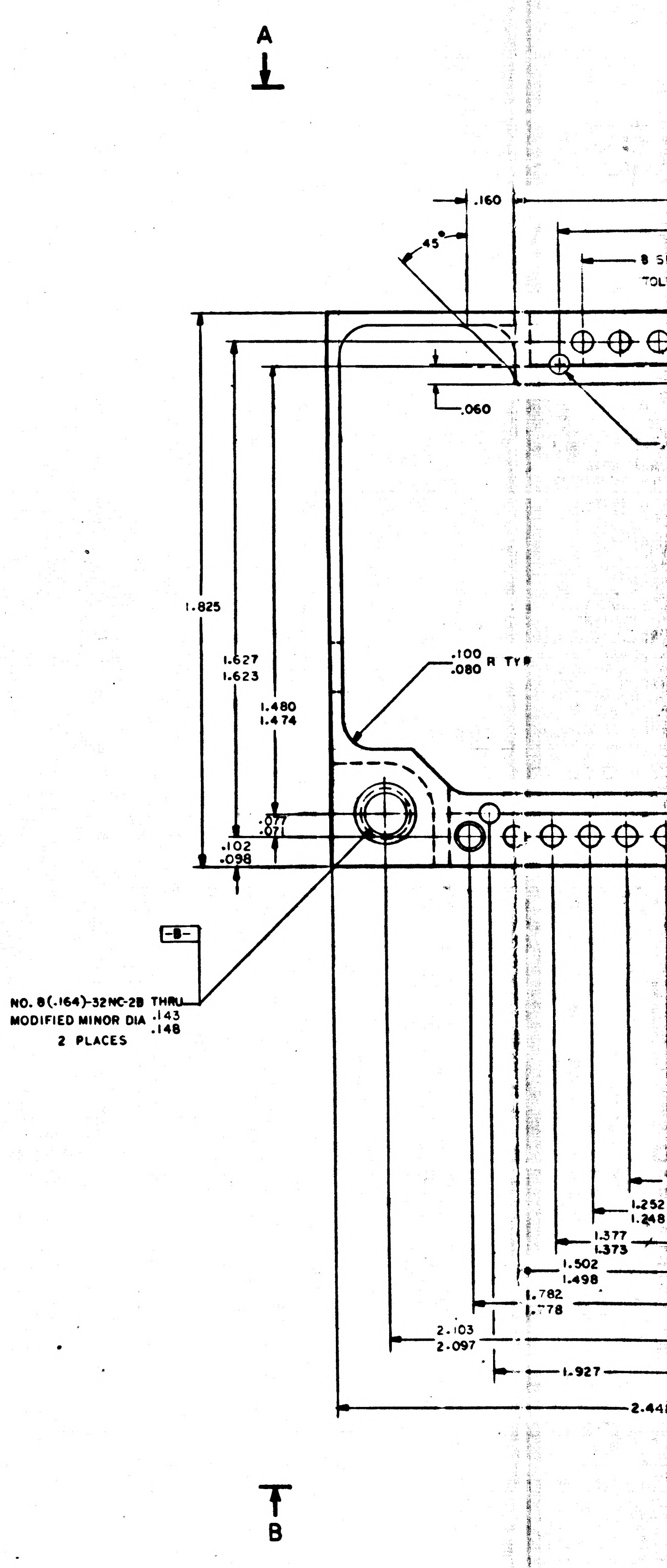
FRAME
120V PIPA SUPPLY AND IRIG TEMP (FQ)
SIGNAL CONDITIONER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008477
SCALE 5/1
SHEET OF

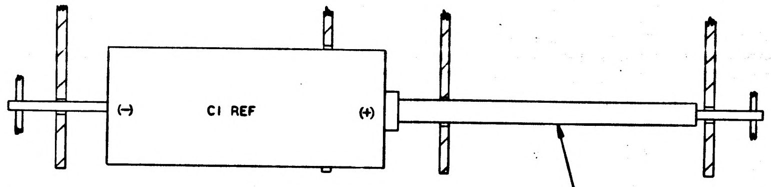
2008477


.200
2 PLACES
A
A
.200
2 PLACES
45°
2 PLACES
.165 R
2 PLACES
.215
.195
2 PLACES
.100
.040
REF
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

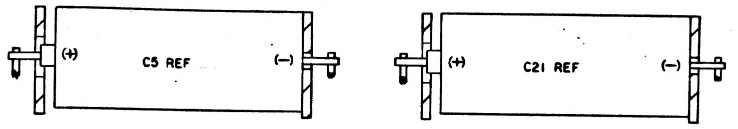

-A-
2.525
2.290
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
.072
.073 DIA THRU
22 HOLES
.005 R MAX
2 PLACES
1.250
1.075
1.275
REF
1.650
33°
1.125
1.368
.069
.073 DIA THRU CSK 60° TO .089
.104 DIA
22 HOLES
A .005
32
—.0006


A
.160
45°
8 S
TOL
.060
1.825
1.627
1.623
1.480
1.474
.100
.080 R TYP
.077
.071
.102
.098
-B-
NO. 8(.164)-32NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 PLACES
1.252
1.248
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
2.44
B

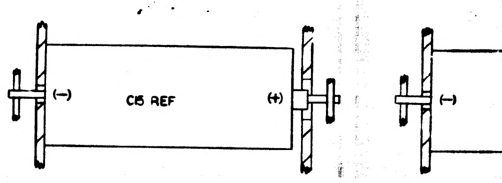
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



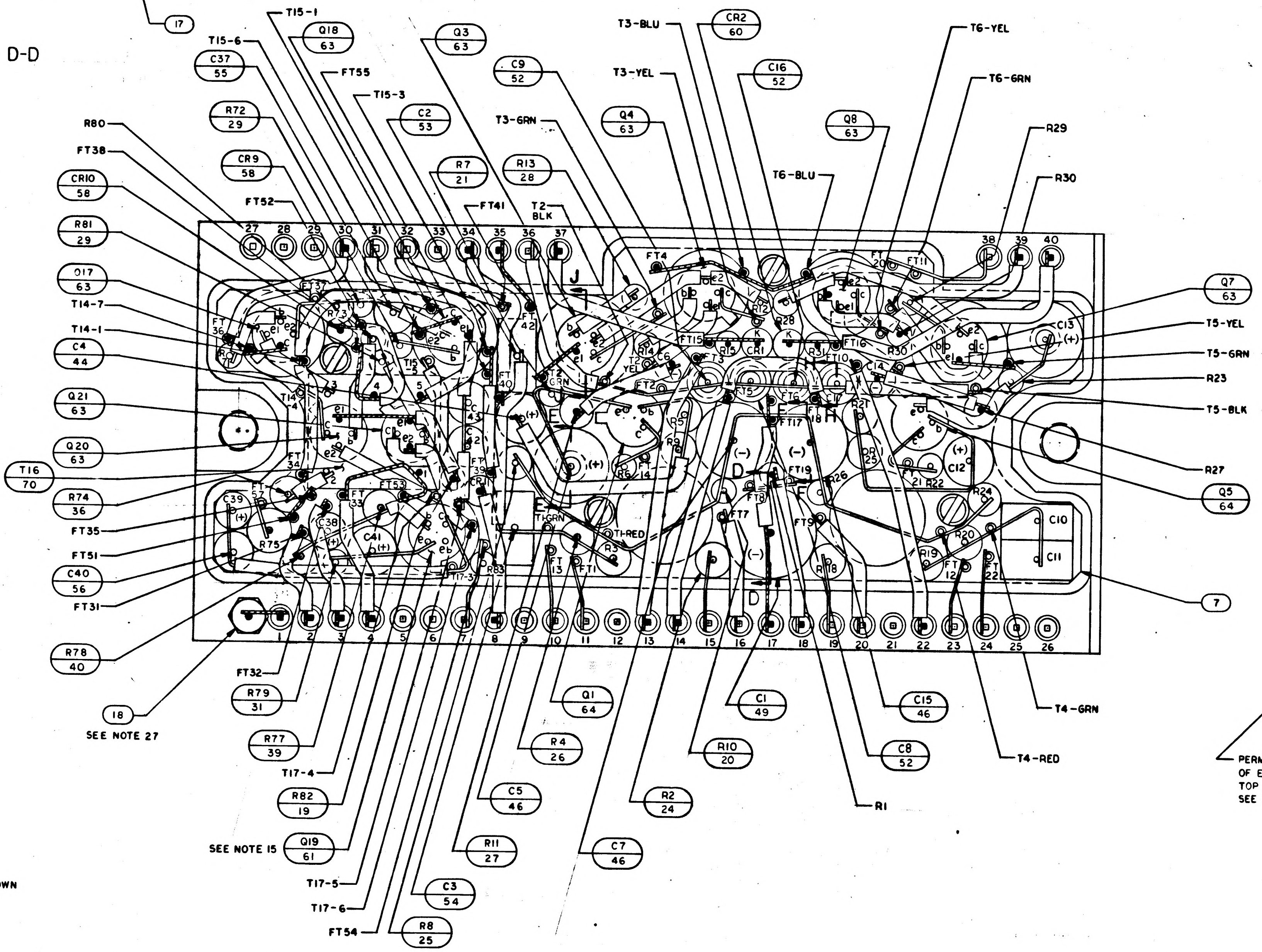
PARTIAL SECTION D-D


(+)
C5 REF
(−)
(+)
C21 REF
(−)

PARTIAL SECTION E-E
TYPICAL FOR C5, C13, C21 AND C29



PARTIAL SECTION F-F
TYPICAL FOR C7 C15, C23 AND C31


17
T15-1
Q18 63
T15-6
C37 55
FT55
T15-3
Q3 63
C9 52
T3-BLU
CR2 60
T3-YEL
C16 52
T6-YEL
T6-GRN
C2 53
R72 29
T3-GRN
Q4 63
Q8 63
R29
R80
FT38
CR9 58
R7 21
R13 28
T6-BLU
R30
CR10 58
FT52
FT41
T2-BLK
R81 29
Q17 63
T14-7
T14-1
C4 44
Q21 63
Q20 63
T16 70
R74 36
FT35
FT51
C40 56
FT31
R78 40
18
SEE NOTE 27
FT32
R79 31
R77 39
T17-4
R82 19
SEE NOTE 15
Q19 61
T17-5
T17-6
FT54
C3 54
R8 25
R11 27
C5 46
C7 46
R4 26
Q1 64
R2 24
C1 49
R10 20
R1
C15 46
C8 52
T4-RED
T4-GRN
Q7 63
T5-YEL
T5-GRN
R23
T5-BLK
R27
Q5 64
7
J
D
E
F
H
1
2
3
4
5
6
7
8
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11
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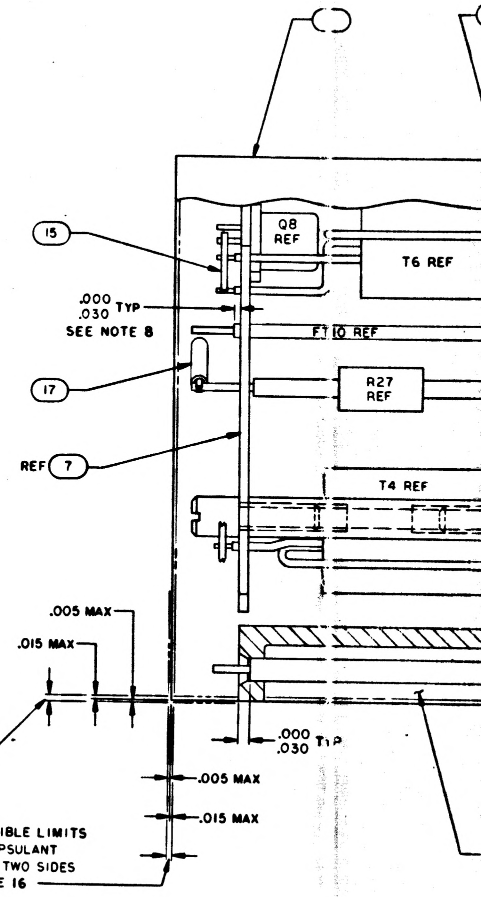
33
34
35
36
37
38
39
40
C10
C11
C12
C13
C38
C39
C41
R75
R83
T1-RED
T1-GRN
(+)
(−)

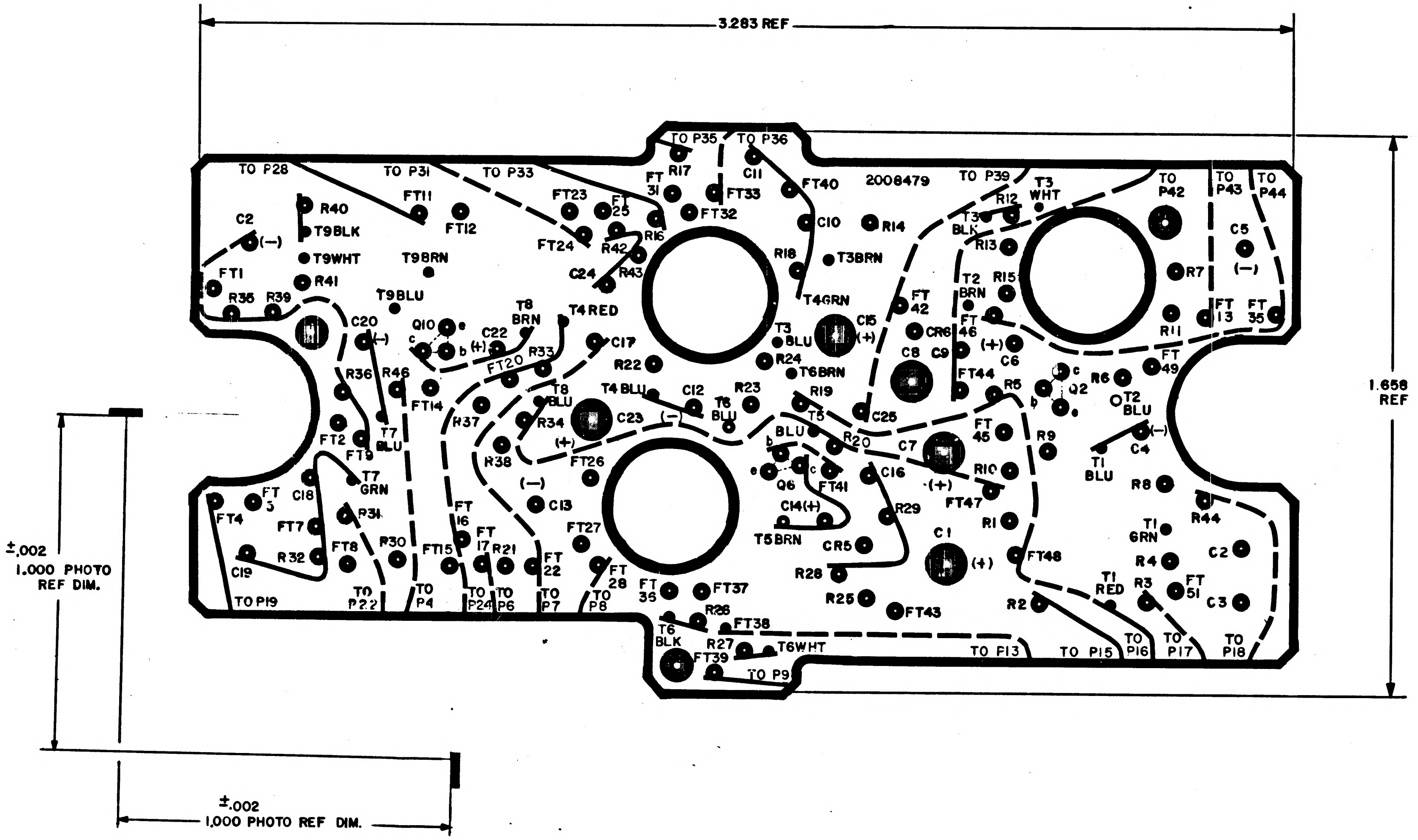

15
Q8 REF
T6 REF
.000 .030 TYP
SEE NOTE 8
FT 10 REF
17
R27 REF
REF 7
T4 REF
.005 MAX
.015 MAX
.000 .030 TYP
.005 MAX
.015 MAX
PERMISSIBLE LIMITS OF ENCAPSULANT TOP AND TWO SIDES SEE NOTE 16

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE FIND NO. 2 AND FIND NO. 3 TO FIND NO. 1 PER ND 1002136
3. AR DENOTES AS REQUIRED
4. FT DENOTES FEED THRU
5. K DENOTES CATHODE SIDE OF DIODE
6. + DENOTES POSITIVE SIDE OF CAPACITOR
7. WELD PER ND 1002005
8. TYPICAL SLEEVING FOR FEED THRU AND TRANSFORMER LEADS
9. MARK .10/.06 HIGH WHITE CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN
10. MARK .14/.10 HIGH WHITE CHARACTERS PER ND 1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
11. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
12. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
13. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
14. INDICATED AREA TO BE FREE OF ENCAPSULATION
15. TRIM UNUSED LEADS OF FIND NO. 61 AND 66 THRU 69 .060/.100 FROM CASE
16. ENCAPSULATE PER ND1002002. REMOVE FLASHING
17. TYPICAL SLEEVING FOR FIND NO. 19 THRU 41 AND 57 THRU 60
18. BOND FIND NO. 10 TO FIND NO. 1 PER ND 1002004 TYPE I
19. BOND Q1, Q3, Q4, Q5, Q7, Q8, Q17, Q18, Q19, Q20 AND Q21 TO FIND NO. 7 PER ND1002004 TYPE I
20. BOND Q2, Q6, T1, T2, T3, T4, T5, T6, T14, T15, T16 AND T17 TO FIND NO. 8 PER ND1002004 TYPE I
21. BOND Q9, Q11, Q12, Q13, Q15, Q16, T13 AND T18 TO FIND NO. 9 PER ND1002004 TYPE I
22. BOND Q10, Q14, Q22, Q23, T7, T8, T9, T10, T11 AND T12 TO FIND NO. 10 PER ND1002004 TYPE I
23. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH FREON AND ISO-PROPYL ALCOHOL PRIOR TO ENCAPSULATION
24. EXCEPT FOR MODULE MOUNTING SURFACE PAINT ALL SURFACES PER ND 1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. PIN BLADES AND INSULATORS TO BE FREE OF PAINT
25. SLEEVE FIND NO. 67 AND 69 LEADS USING FIND NO. 71
26. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007118
27. MOUNTING TORQUE FOR FIND NO. 18 TO BE 15-20 INCH OUNCES

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27965						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.283 REF
1.656 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.
2008479
TO P28
TO P31
TO P33
TO P35
TO P36
TO P39
TO P42
TO P43
TO P44
FT1
C2
(–)
R40
T9BLK
T9WHT
R41
R35
R39
FT11
FT12
T9BRN
T9BLU
FT23
FT 25
FT24
R42
R16
C24
R43
FT 31
R17
FT33
FT32
C11
FT40
C10
R14
R18
T3BRN
T4GRN
T3 BLU
C15
(+)
R24
T6BRN
C20
(–)
Q10
e
c
b
C22
(+)
T8 BRN
T4RED
C17
R22
FT20
R33
R36
R46
FT14
R37
T8 BLU
R34
C23
(+)
T4 BLU
C12
(–)
T6 BLU
R23
R19
T5
BLU
R20
FT2
FT9
T7 BLU
T7 GRN
R38
FT26
(–)
C13
Q6
e
b
c
FT41
C14(+)
T5BRN
CR5
R28
R25
FT43
C16
R29
C7
(+)
FT47
C1
(+)
FT4
FT 3
C18
FT7
R31
R32
C19
FT8
R30
FT15
FT 16
FT 17
R21
FT 22
FT27
FT 28
FT 36
FT37
R26
FT38
T6 BLK
R27
T6WHT
FT39
TO P9
TO P19
TO P22
TO P4
TO P24
TO P6
TO P7
TO P8
T3 WHT
R12
T3 BLK
R13
T2 BRN
R15
FT 42
CR6
C8
C9
FT 46
(+)
C6
FT44
R5
C25
FT 45
R10
R9
R1
FT48
Q2
c
b
e
R6
T2 BLU
C4
(–)
T1 BLU
R7
R11
C5
(–)
FT 13
FT 35
FT 49
R8
R44
T1 GRN
C2
R4
T1 RED
R3
FT 51
C3
R2
TO P13
TO P15
TO P16
TO P17
TO P18

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Bonarrigo	16 Mar 66
CHECKED		8 Apr 66
APPROVED		8 Apr 66
APPROVED		11 Apr 66
APPROVED MIT		
APPROVED MSC	A.C. METZGER	
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
DAC PIPA TEMP & 2.5V BIAS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008478

SCALE 5/1 SHEET 1 OF

2008478

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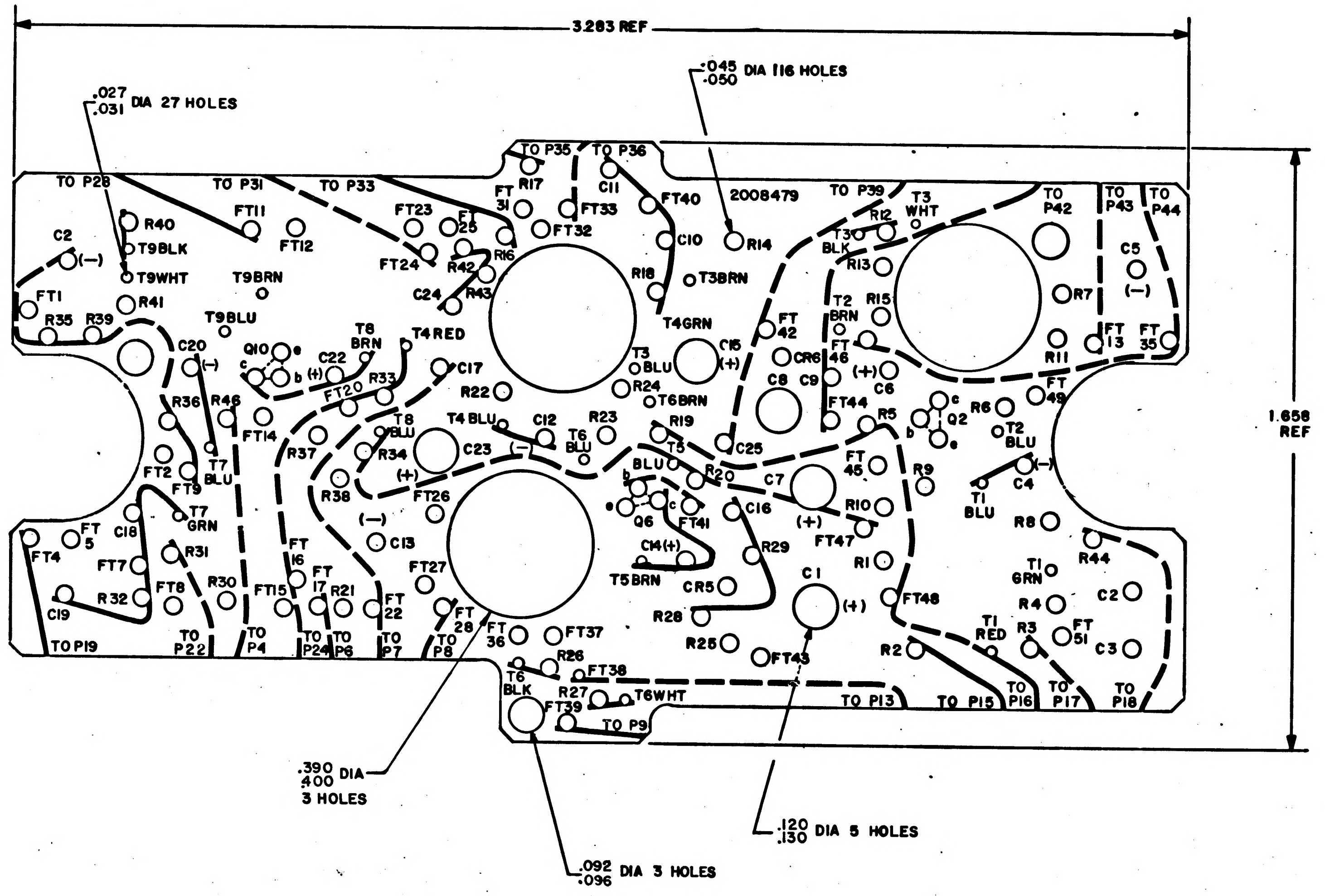
REVISIONS 27965						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.283 REF
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.027 .031 DIA 27 HOLES
2008479
TO P28
TO P31
TO P33
TO P35
TO P36
TO P39
TO P42
TO P43
TO P44
FT11
FT12
FT23
FT25
FT31
FT32
FT33
FT40
R40
T9BLK
T9WHT
T9BRN
T9BLU
C2
(−)
FT1
R35
R39
R41
C20
Q10
C22
T8 BRN
T4RED
C17
R22
FT20
R33
R36
R46
FT14
T7 BLU
FT2
FT9
T7 GRN
C18
FT5
FT4
FT7
C19
R32
FT8
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FT15
FT16
FT17
R21
FT22
R37
R38
T8 BLU
R34
(+)
C23
T4BLU
C12
T6 BLU
FT26
C13
FT27
FT28
FT36
C24
R42
R43
R16
R17
C11
C10
R14
R18
T3BRN
T4GRN
T3 BLU
R24
T6BRN
C15
(+)
R23
R19
T5 BLU
R20
C25
Q6
FT41
C14(+)
T5BRN
CR5
R28
R25
R29
C16
C7
FT42
CR6
C8
C9
FT46
FT44
FT45
R10
FT47
R1
C1
(+)
FT48
FT43
R2
R12
T3 WHT
T3 BLK
R13
T2 BRN
R15
C6
R5
Q2
R6
T2 BLU
R9
C4
T1 BLU
R8
T1 GRN
R4
R3
FT51
T1 RED
R44
C2
C3
C5
R7
R11
FT13
FT35
FT49
FT37
R26
FT38
T6 BLK
R27
T6WHT
FT39
TO P9
TO P13
TO P15
TO P16
TO P17
TO P18
TO P19
TO P22
TO P4
TO P24
TO P6
TO P7
TO P8
1.658 REF
.390 .400 DIA 3 HOLES
.092 .096 DIA 3 HOLES
.120 .130 DIA 5 HOLES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .031 PLASTIC SHEET PER MIL-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND 1002019
5. BROKEN LINE DENOTES SLEEVING

REF DWG:
DWG NO.2008478 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007233	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

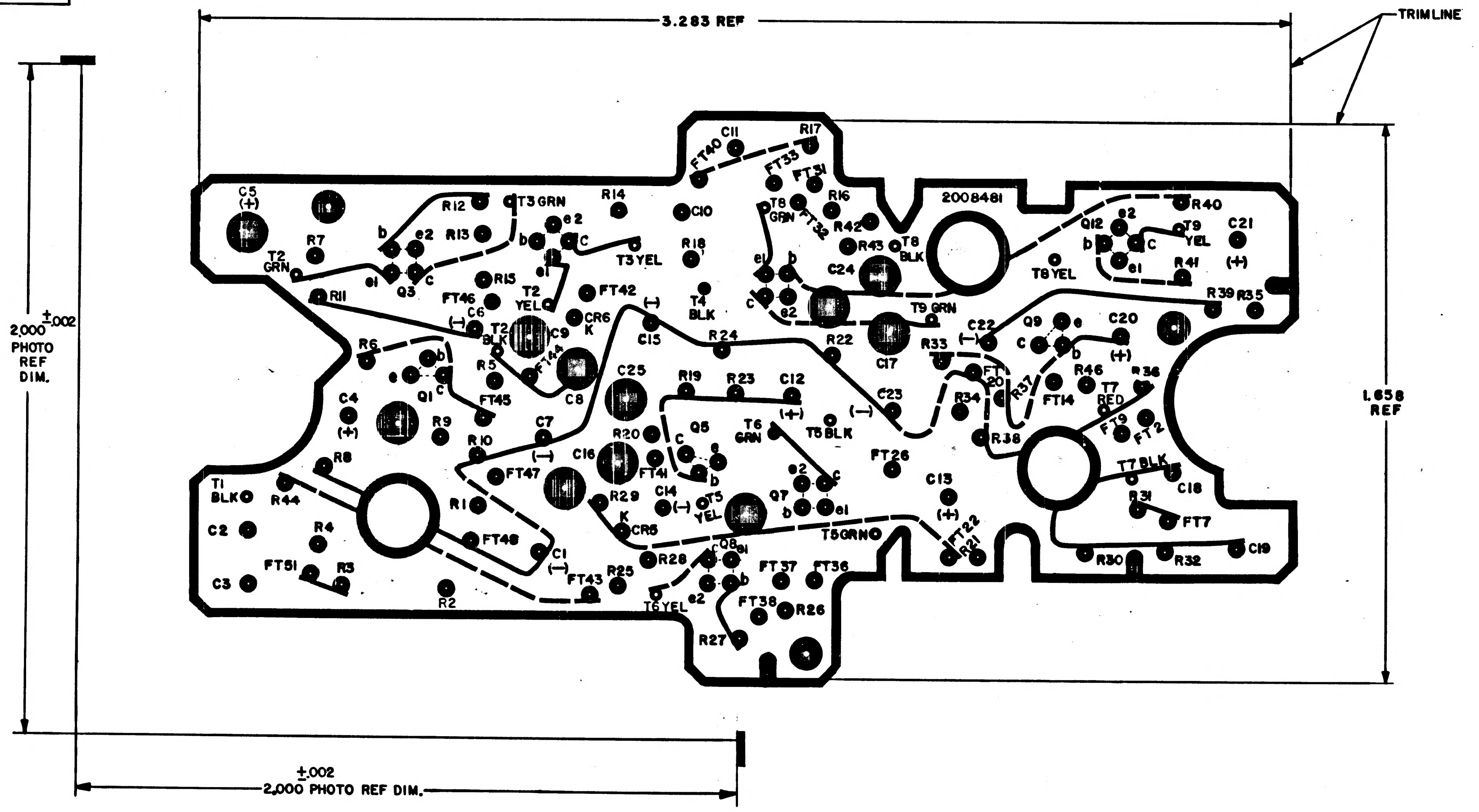
DRAWN	Bonarrigo	1/64/66
CHECKED		
APPROVED	V. G. Kadarin	8 APR 66
APPROVED		11 APR 66
APPROVED MIT		
APPROVED MSC	A. C. METZGER	
		DATE

WIRING BOARD A
DAC PIPA TEMP & 2.5V BIAS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008479
SCALE 5/1		SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27965						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



TRIMLINE
3.283 REF
1.658 REF
2,000 ±.002 PHOTO REF DIM.
±.002 2,000 PHOTO REF DIM.
2008481
C5 (+)
R7
T2 GRN
R11
R12
T3 GRN
R13
R14
C10
R18
T3 YEL
Q3
R15
FT46
T2 YEL
FT42
T4 BLK
C6
T2 BLK
C9
CR6 K
C15
R24
R6
R5
FT44
C25
C8
FT45
C4 (+)
Q1
R9
R10
C7
R19
R23
C12
R20
Q5
T6 GRN
T5 BLK
FT41
C16
R8
FT47
R29
C14
T5 YEL
Q7
T1 BLK
R44
R1
CR5
C2
R4
FT48
C1 (−)
FT43
R25
R28
Q8
FT37
FT36
T5 GRN
C3
FT51
R3
R2
T6 YEL
FT38
R26
R27
C11
R17
FT40
FT33
FT31
R16
T8 GRN
FT32
R42
R43
T8 BLK
C24
C17
T9 GRN
R22
R33
C23
FT26
C13 (+)
FT22
R21
T8 YEL
Q12
T9 YEL
R40
C21 (+)
R41
R39
R35
C22
Q9
C20 (+)
R46
R36
FT20
R37
R34
FT14
T7 RED
R38
FT9
FT2
T7 BLK
R31
C18
FT7
R30
R32
C19

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 14APR66
CHECKED R.P. Kingsbury 8APR66
APPROVED V.G. Kamph 8APR66
APPROVED 11APR66
APPROVED MIT 12APR66
A.C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD B
DAC PIPA TEMP AND 2.5V BIAS

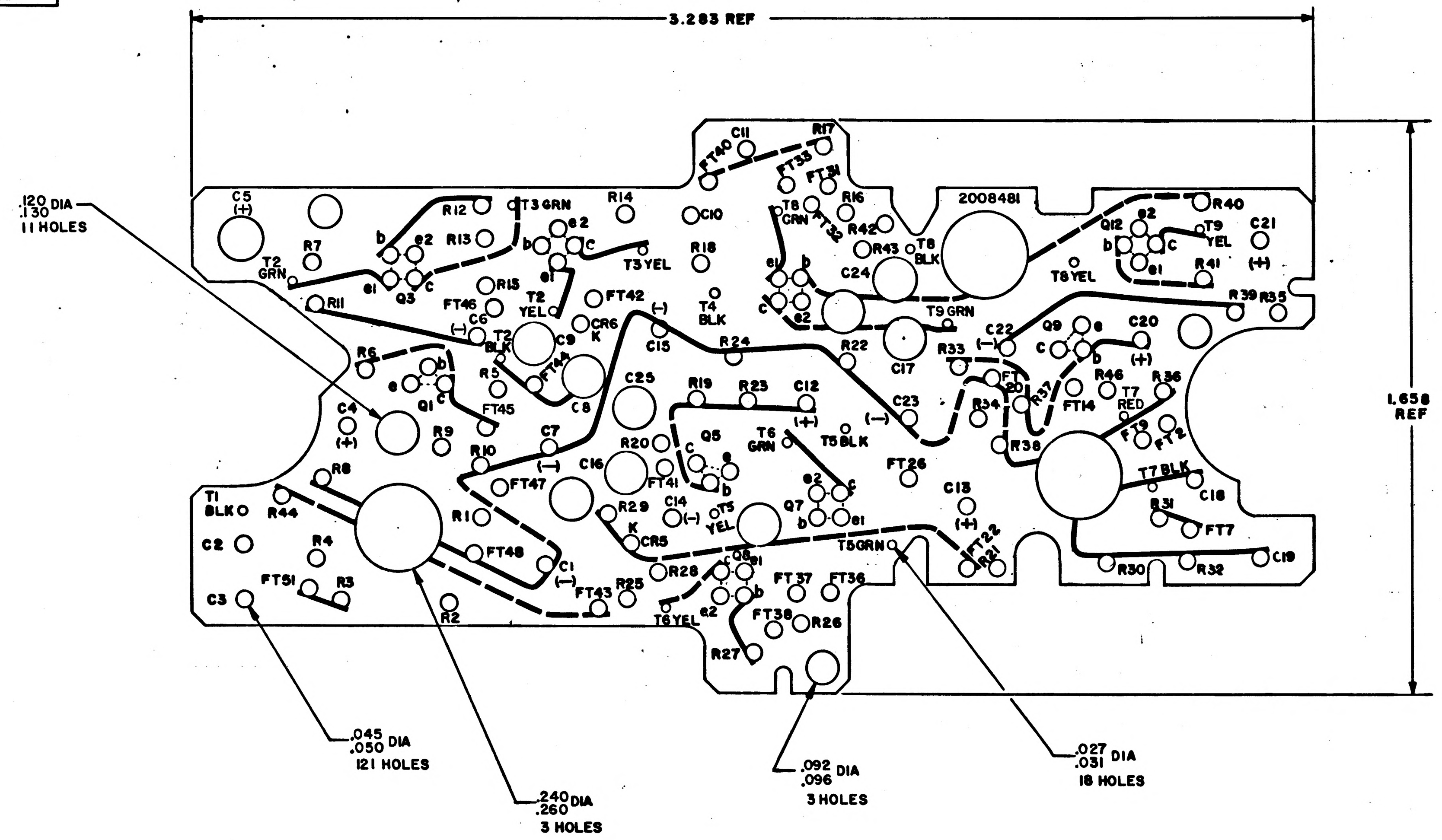
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008480
SCALE 5/1		SHEET 1 OF 1

2008480

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27965

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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1.658 REF
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.120 DIA
.130
11 HOLES
.045 DIA
.050
121 HOLES
.240 DIA
.260
3 HOLES
.092 DIA
.096
3 HOLES
.027 DIA
.031
18 HOLES
C5 (+)
T2 GRN
R7
R11
R12
R13
e2
b
e1
c
Q3
T3 GRN
R14
C10
T3 YEL
R18
T4 BLK
R15
FT46
C6 (-)
T2 YEL
T2 BLK
C9
FT42
CR6 K
(-)
C15
R24
FT44
R5
R6
Q1
FT45
C8
C25
C4 (+)
R9
R10
C7 (-)
C16
R20
FT41
R19
R23
C12 (+)
Q5
T6 GRN
T5 BLK
FT47
R8
T1 BLK
R44
C2
R4
FT51
R3
C3
R1
FT48
C1 (-)
FT43
R25
R2
R29
K
CR5
C14 (-)
T5 YEL
Q7
R28
Q8
T6 YEL
FT37
FT36
FT38
R26
R27
T5 GRN
C11
R17
FT40
FT33
FT31
T8 GRN
R16
FT32
R42
R43
T8 BLK
C24
T9 GRN
R22
C17
R33
C23
(-)
FT26
C13 (+)
FT22
R21
T8 YEL
R40
Q12
T9 YEL
C21 (+)
R41
R39
R35
C22 (-)
Q9
C20 (+)
FT20
R34
R37
R38
FT14
R46
T7 RED
R36
FT9
FT12
T7 BLK
C18
R31
FT7
R30
R32
C19

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINES DENOTES SLEEVING

REF DWG:
DWG NO. 2008480 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007233	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN 14Apr.66
CHECKED 8Apr66
APPROVED 8Apr66
APPROVED 11Apr66
APPROVED MIT 12Apr66
A. C. METZGER
APPROVED MSC
DATE

WIRING BOARD B
DAC PIPA TEMP AND 2.5V BIAS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008481

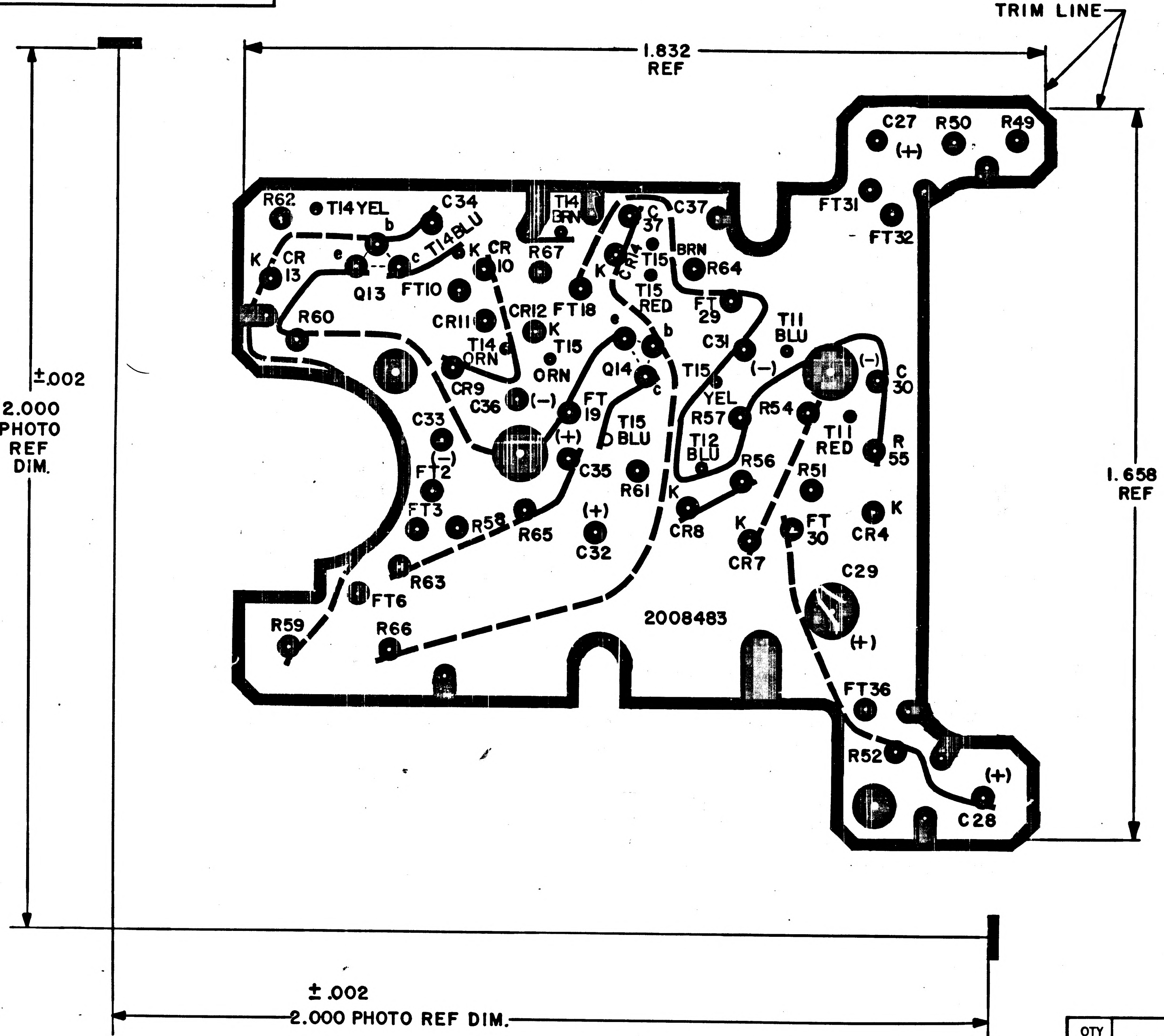
SCALE 5/1 SHEET 1 OF 1

2008481

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27965

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TRIM LINE
1.832 REF
1.658 REF
±.002
2.000 PHOTO REF DIM.
2.000 PHOTO REF DIM.
±.002
C27 R50 R49 (+)
FT31 FT32
R62 T14 YEL C34 b e c T14 BLU K CR 13 Q13 FT10 CR 10 R67 T14 BRN C 37 C37 T15 BRN R64
R60 CR11 CR12 FT18 T15 RED FT 29 T11 BLU C31
T14 ORN T15 ORN Q14 b c T15 YEL (−) C 30
CR9 C36 (−) FT 19 R57 R54 T11 RED R 55
C33 (+) T15 BLU T12 BLU R56 R51
FT2 (−) C35 R61 K CR8 K CR7 FT 30 CR4 K
FT3 R58 R65 (+) C32
R63 FT6 C29 (+)
R59 R66 2008483
FT36 R52 (+) C28

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN W. Horgan 29 MAR66
CHECKED R.P. Kingsbury 7APR66
APPROVED V.G. Kagolin 8APR66
APPROVED [illegible] 11Apr66
APPROVED MIT W Kupfer 12Apr66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD C
DAC PIPA TEMP AND 2.5V BIAS

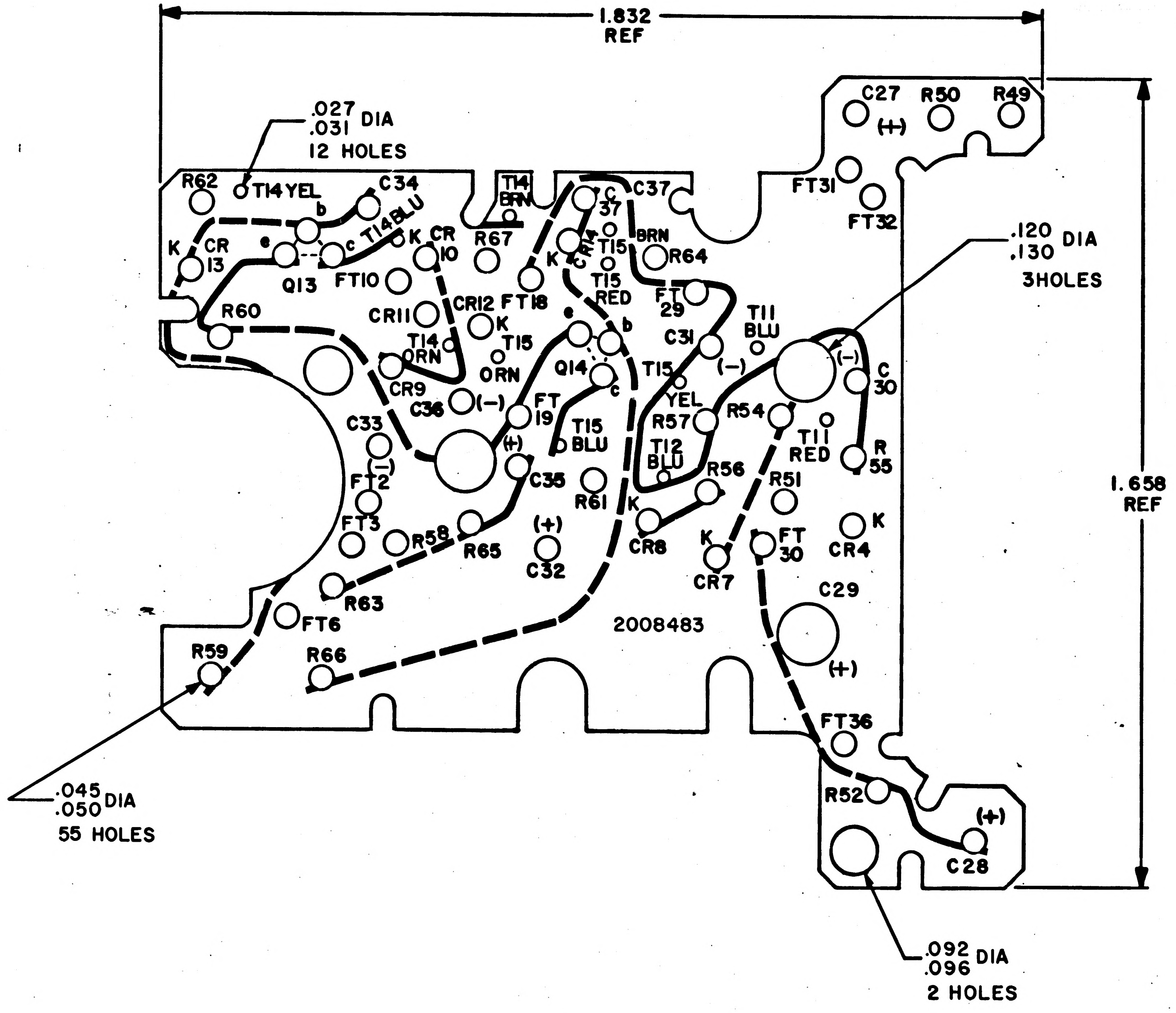
CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2008482
SCALE 5/1
SHEET 1 OF 1

2008482

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27965

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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REF
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REF
.027
.031 DIA
12 HOLES
.120
.130 DIA
3HOLES
.045
.050 DIA
55 HOLES
.092
.096 DIA
2 HOLES
2008483
R62
T14 YEL
b
C34
c T14 BLU
K
CR 13
Q13
FT10
K CR 10
R67
T14 BRN
C 37
C37
K CR14
T15 BRN
R64
T15 RED
b
FT 29
FT31
FT32
C27
R50
R49
(+)
R60
CR11
CR12 K
FT18
T14 ORN
T15 ORN
Q14
c
C31
(−)
T11 BLU
(−)
C 30
T15 YEL
CR9
C36
(−)
FT 19
(+)
R57
R54
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R 55
C33
(−)
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T15 BLU
T12 BLU
R56
C35
R61
K
R51
FT3
R58
R65
(+)
C32
CR8
K
CR7
FT 30
K
CR4
C29
R63
FT6
(+)
R59
R66
FT36
R52
(+)
C28

REF:
DWG NO. 2008482 FOR
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

NEXT ASSY	USED ON
2007233	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	W. Horgan	29 MAR 66
CHECKED	R.P. Kingsbury	7 Apr 66
APPROVED	V.A. Kaprov	8 APR 66
APPROVED		11 APR '66
APPROVED MIT	W Kupfer	12 Apr 66
APPROVED MSC	A. C. METZGER	
		DATE

WIRING BOARD C
DAC PIPA TEMP AND 2.5 V BIAS

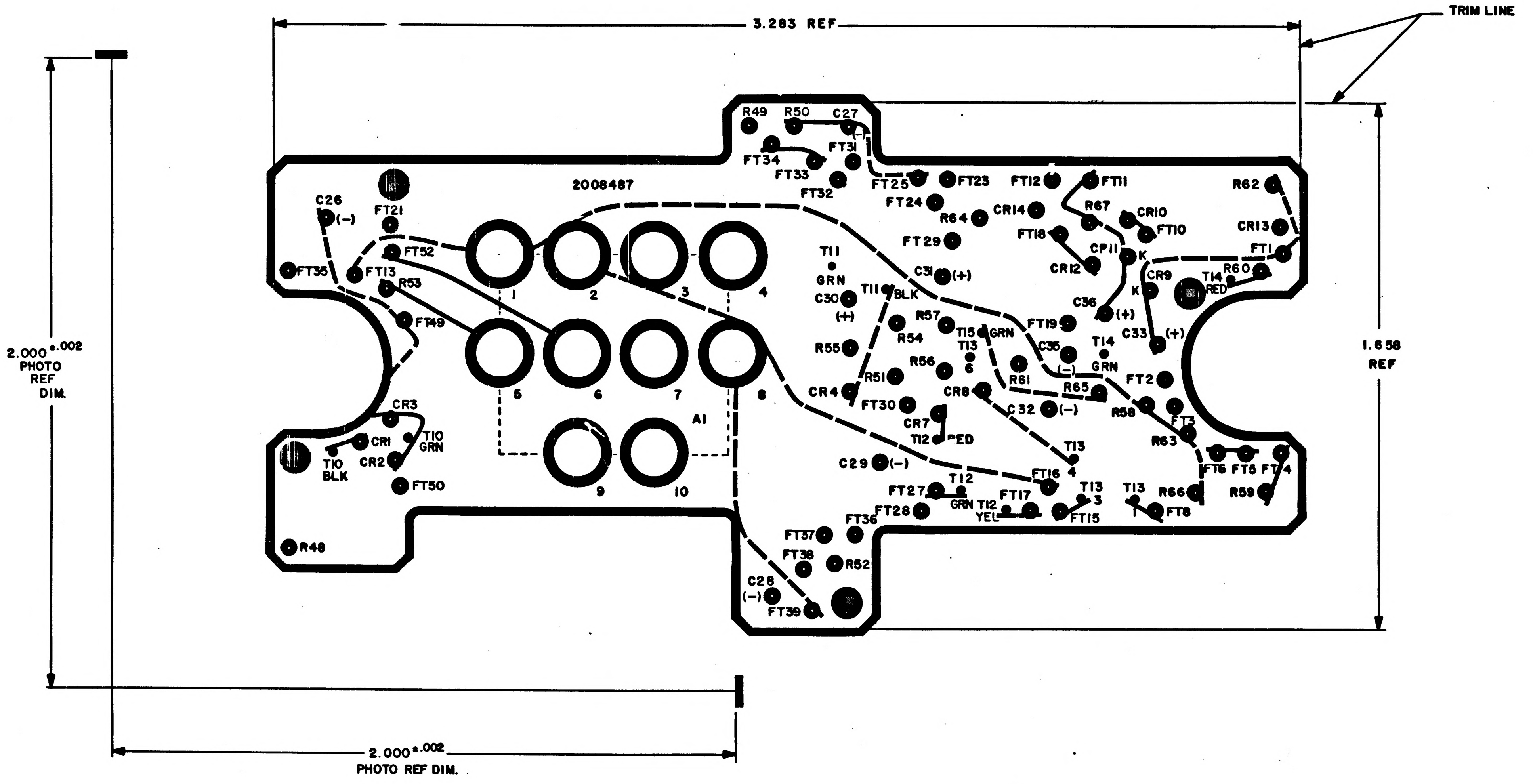
CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2008483
SCALE 5/1		SHEET 1 OF 1

2008483

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS 27965


3.283 REF
TRIM LINE
1.658 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
2008487
A1
1
2
3
4
5
6
7
8
9
10
R49
R50
C27
(-)
FT31
FT34
FT33
FT32
FT25
FT23
FT12
FT11
FT24
R64
CR14
R67
CR10
FT10
FT18
FT29
CP11
K
R62
CR13
FT1
CR12
CR9
K
T14
RED
R60
C26
(-)
FT21
FT35
FT52
FT13
R53
FT49
T11
GRN
C30
(+)
T11
BLK
C31
(+)
C36
(+)
C33
(+)
R57
R54
T15
GRN
T13
6
FT19
C35
(-)
T14
GRN
R55
R51
R56
R61
FT30
CR4
CR8
R65
FT2
C32
(-)
R58
CR7
T12
RED
FT3
R63
T13
CR3
CR1
CR2
T10
GRN
T10
BLK
FT50
C29
(-)
FT16
4
FT27
T12
GRN
T12
YEL
FT17
T13
3
T13
1
R66
FT6
FT5
FT4
R59
FT28
FT15
FT8
R48
FT37
FT36
FT38
R52
C28
(-)
FT39

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

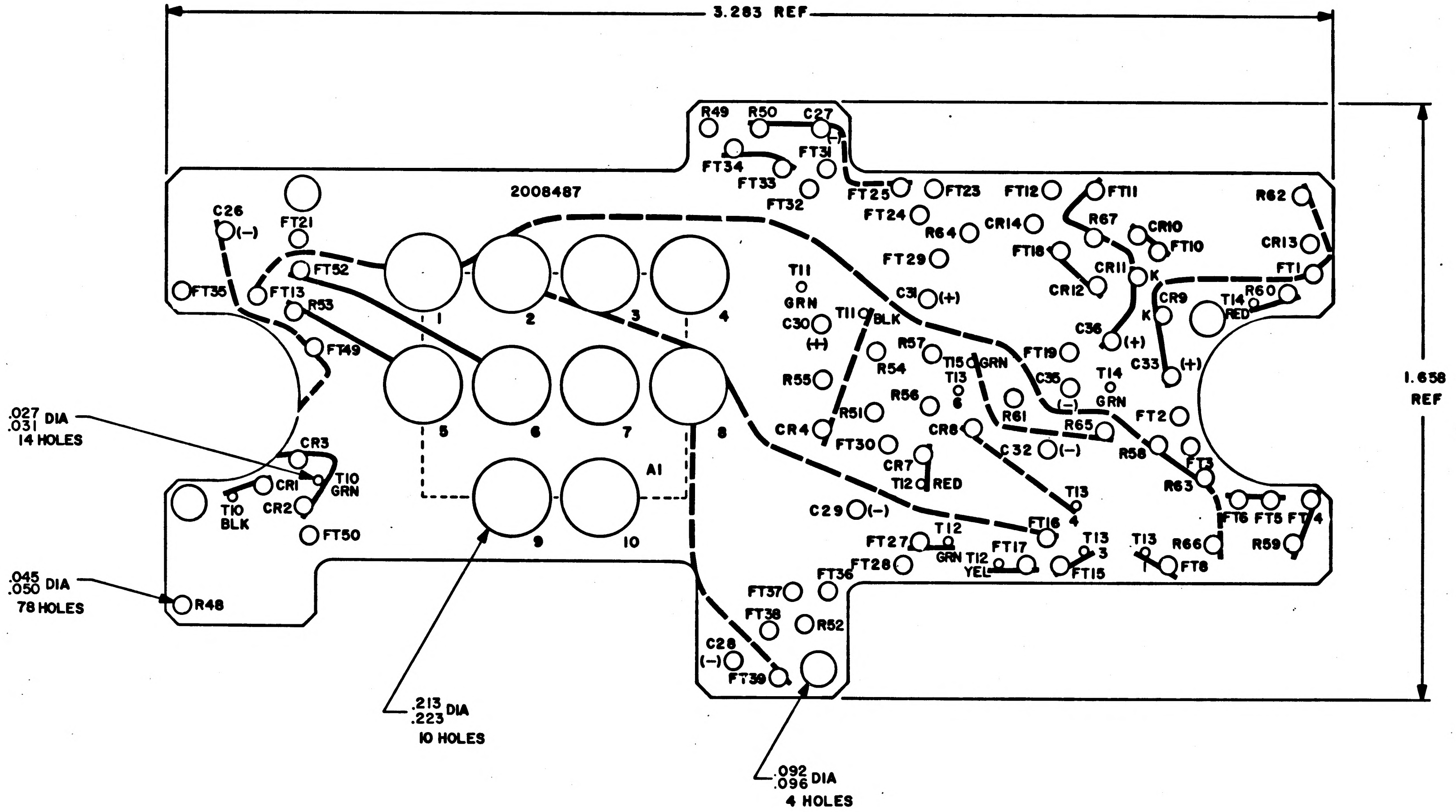
PHOTOGRAPHIC MASTER WIRING BOARD E
DAC PIPA TEMP AND 2.5V BIAS

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008486
SCALE 5/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27965

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


3.283 REF
2008487
1.658 REF
.027 .031 DIA 14 HOLES
.045 .050 DIA 78 HOLES
.213 .223 DIA 10 HOLES
.092 .096 DIA 4 HOLES
R49
R50
C27
FT31
FT34
FT33
FT32
C26 (–)
FT21
FT52
FT35
FT13
R53
FT49
1
2
3
4
5
6
7
8
9
10
A1
CR3
CR1
T10 GRN
T10 BLK
CR2
FT50
R48
FT25
FT23
FT12
FT11
R62
FT24
R64
CR14
R67
CR10
FT10
CR13
FT29
FT18
CR11
K
FT1
T11 GRN
C31 (+)
CR12
CR9
T14 RED
R60
C30 (+)
T11 BLK
C36 (+)
K
R57
R54
T15 GRN
FT19
C33 (+)
R55
T13 6
C35 (–)
T14 GRN
R56
R61
R51
FT2
R65
CR4
CR8
FT30
C32 (–)
R58
CR7
T12 RED
FT3
R63
T13 4
C29 (–)
FT16
FT6
FT5
FT4
FT27
T12 GRN
FT17
T13 3
T13 1
R66
R59
FT28
T12 YEL
FT15
FT8
FT36
FT37
FT38
R52
C28 (–)
FT39

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DRAWING NO. 2008486 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007233	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Addario Jr.
CHECKED R.P. Kreiling 7Apr66
APPROVED V.A. Kerdine 8Apr66
APPROVED 11Apr 66
APPROVED MIT 1Aug 66
APPROVED MSC A.C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD E
DAC PIPA TEMP AND 2.5V BIAS

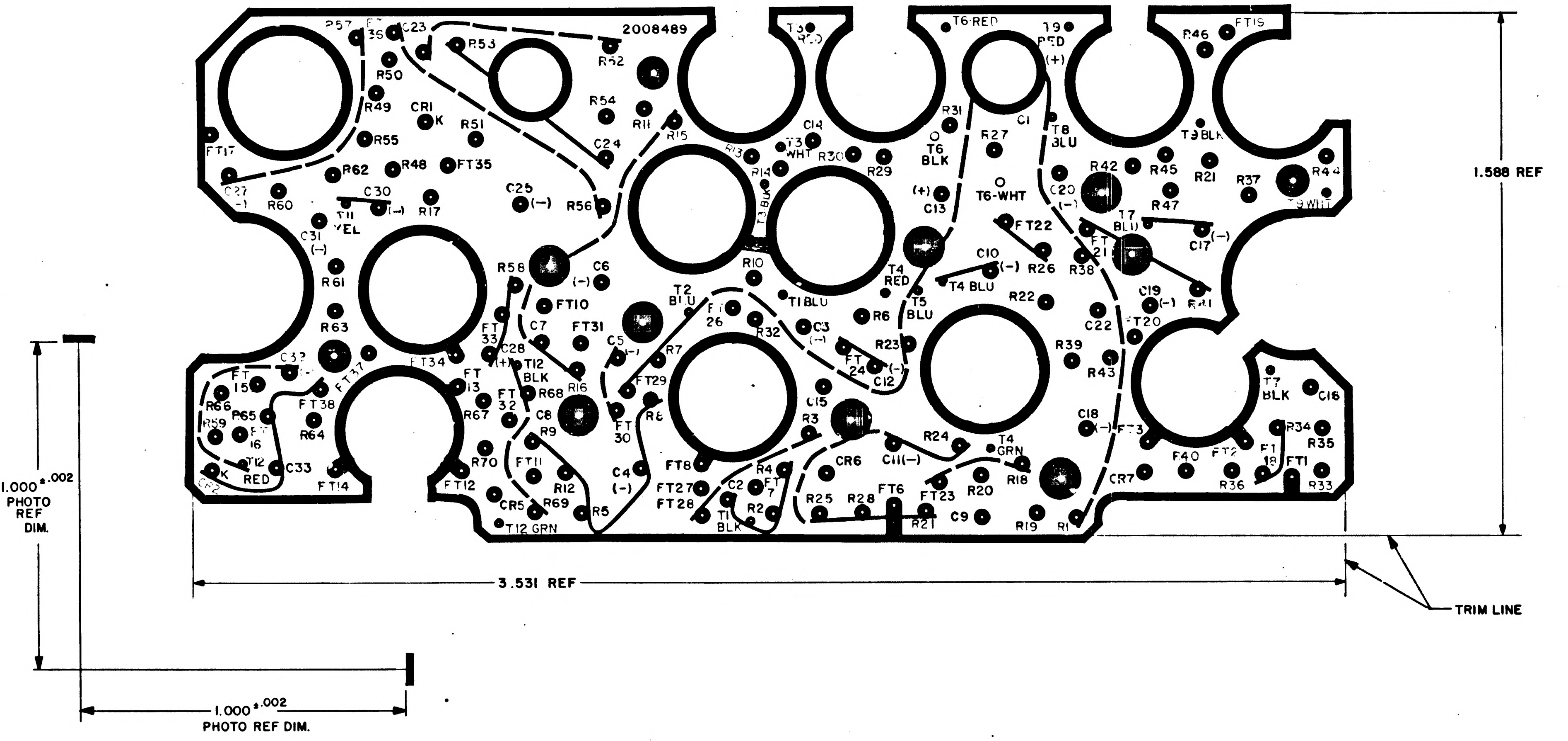
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008487
SCALE 5/1
SHEET 1 OF 1

MASTER

2008487

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30152	CN	Cm	20 JUL 66	

REVISIONS 2F201


2008489
1.588 REF
3.531 REF
TRIM LINE
1.000 ±.002 PHOTO REF DIM.
1.000 ±.002 PHOTO REF DIM.
R57
C23
R53
R52
R50
R49
CR1
R51
R54
R11
R15
C24
R55
FT17
R62
R48
FT35
C25 (-)
R56
C27 (-)
R60
C30
T11 YEL
R17
C31 (-)
R61
R63
R58
C6 (-)
FT10
C7
FT31
C5
C32
FT34
C28
T12 BLK
R16
R68
C8
R9
FT 15
R66
R59
R65
FT38
R64
T12 RED
C33
FT14
FT12
R67
R70
FT11
R12
CR5
R69
R5
T12 GRN
C4 (-)
FT27
FT28
C2
T1 BLK
R2
R4
T3 RED
T6 RED
T9 RED (+)
R46
FT15
T3 BLK
R21
R37
R44
T9 WHT
C14
T3 WHT
R30
R29
R14
T1 BLK
R31
T6 BLK
C1
R27
T8 BLU
R42
R45
R47
(+) C13
T6-WHT
C20 (-)
FT22
T7 BLU
C17 (-)
R10
T4 RED
C10 (-)
R26
R38
T2 BLU
T1 BLU
C3 (-)
R6
T5 BLU
T4 BLU
R22
C19 (-)
R41
FT20
R32
R7
FT29
R8
FT30
R23
C12
R39
C22
R43
C15
R3
R24
T4 GRN
C18 (-)
FT3
T7 BLK
C16
R34
R35
FT8
CR6
C11(-)
R18
CR7
F40
FT1
R36
R33
R25
R28
FT6
FT23
R20
C9
R21
R19
R1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN 010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN N. Horgan 11 APR 66
CHECKED Bonarrigo 18 APR 66
APPROVED
APPROVED
APPROVED MIT W Kapfer 20 Jul 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD B
IRIG & PIPA

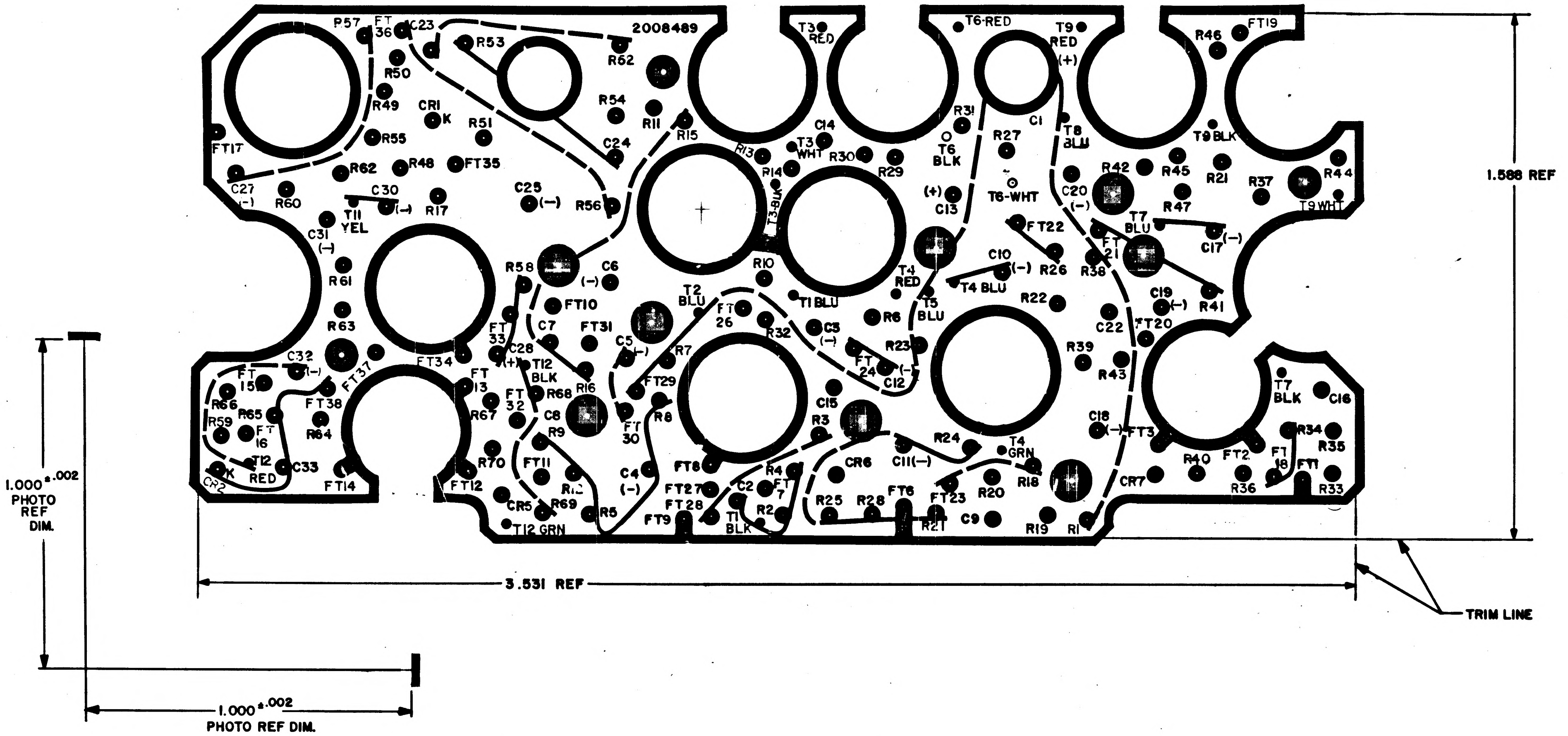
CODE IDENT NO 80230
SIZE D
DRAWING NO 2008488
SCALE 5/1
SHEET 1 OF 1

2008488 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

N

REVISIONS 28201						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


2008489
P57
FT 36
C23
R53
R62
FT19
R46
T3 RED
T6-RED
T9 RED (+)
R50
R49
CR1 K
R51
R54
R11
R15
C24
R13
R14
T3 WHT
C14
R30
R29
R31
T6 BLK
R27
C1
T8 BLU
T9 BLK
R55
R62
R48
FT35
FT17
C27 (–)
R60
T11 YEL
C30 (–)
R17
C25 (–)
R56
T3 BLU
T6-WHT
(+) C13
FT22
C20 (–)
R42
R45
R21
R37
R44
T9 WHT
R47
T7 BLU
C17 (–)
C31 (–)
R61
R58
C6 (–)
FT10
R10
T2 BLU
FT 26
T1 BLU
C10 (–)
T4 BLU
R26
FT 21
R38
T4 RED
T5 BLU
R6
R22
C19 (–)
R41
R63
FT 33
C28 (+)
C7
FT31
C5 (–)
R32
C3 (–)
R23
FT 24
C12 (–)
C22
FT20
R39
R43
C32 (–)
FT 15
FT37
FT34
FT 13
T12 BLK
R68
R16
FT29
R7
C15
T7 BLK
C16
R66
R65
FT38
FT 16
R59
R64
FT 32
R67
C8
R9
FT 30
R8
R3
C18 (–)
FT3
R24
T4 GRN
R34
R35
T12 RED
C33
CR2
K
FT14
FT12
R70
FT11
R12
R69
C4 (–)
FT8
FT27
FT28
R4
FT 7
C2
T1 BLK
R2
CR6
C11 (–)
R25
R28
FT6
FT23
R20
R18
CR7
R40
FT2
FT 18
FT1
R36
R33
CR5
R5
FT9
T12 GRN
R21
C9
R19
R1
1.588 REF
3.531 REF
TRIM LINE
1.000 ±.002 PHOTO REF DIM.
1.000 ±.002 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	W. Horgan	APR 66
CHECKED	Bonarrigo	18 Apr 66
APPROVED	D.G. Kryan	20 APR 66
APPROVED		20 April
APPROVED MIT	W Kupfer A.C. METZGER	20 Apr 66
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD B
IRIG & PIPA

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008488
SCALE 5/1		SHEET 1 OF 1

2008488

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2f 201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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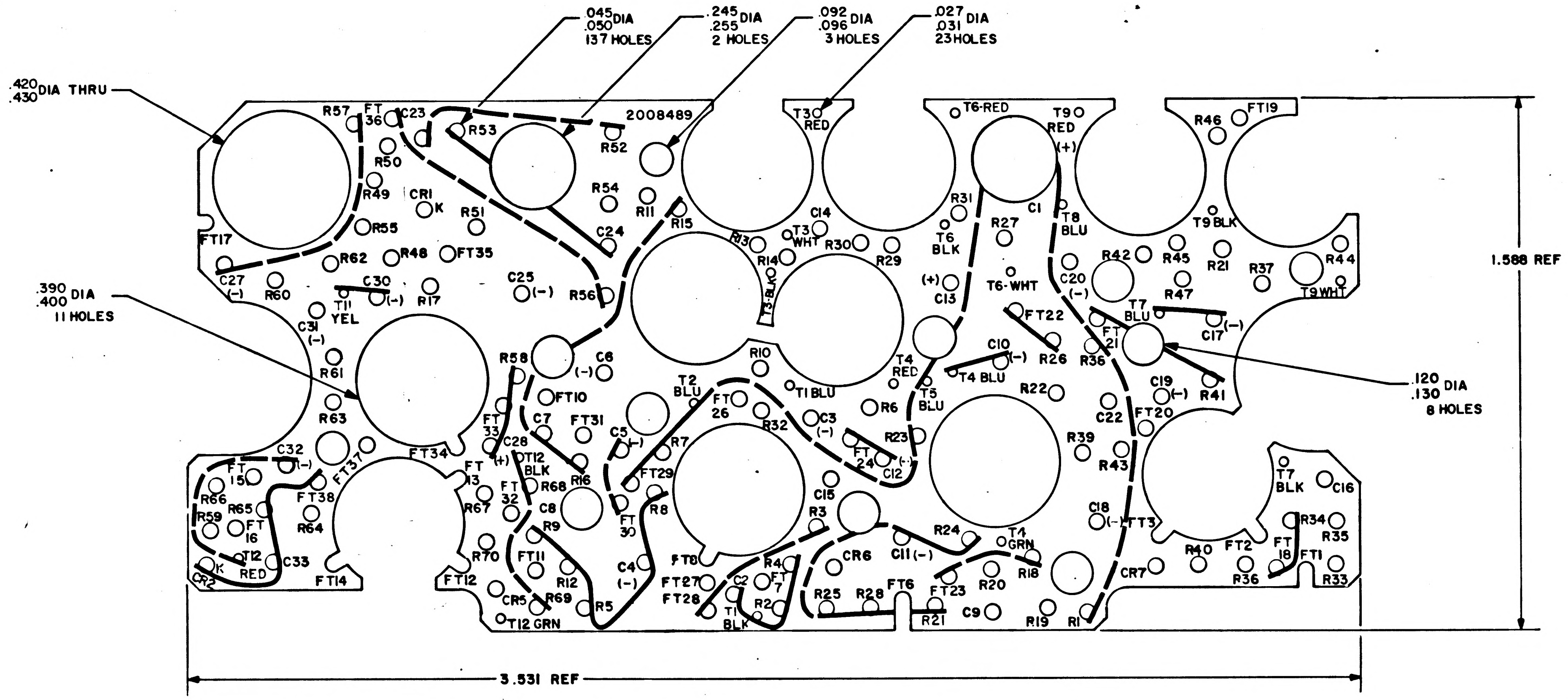

.045 .050 DIA 137 HOLES
.245 .255 DIA 2 HOLES
.092 .096 DIA 3 HOLES
.027 .031 DIA 23 HOLES
.420 .430 DIA THRU
.390 .400 DIA 11 HOLES
.120 .130 DIA 8 HOLES
1.588 REF
3.531 REF
2008489
R57
FT 36
C23
R53
R52
R50
R49
CR1
K
R51
R54
R11
R15
C24
R55
FT17
R62
R48
FT35
C27 (-)
R60
C30
(-)
T11 YEL
R17
C25 (-)
R56
C31 (-)
R61
R58
C6 (-)
FT10
R63
C32 (-)
FT37
FT34
FT 33
C28
(+)
T12 BLK
C7
FT31
R16
R68
C5 (-)
R7
FT29
FT 15
R66
R65
FT38
FT 13
FT 32
C8
R9
R59
FT 16
R64
R67
T12 RED
C33
K
CR2
FT14
FT12
R70
FT11
R12
CR5
R69
R5
T12 GRN
C4 (-)
FT8
FT27
FT28
FT 30
R8
T2 BLU
FT 26
R32
R10
T1 BLU
T3 RED
T3 WHT
C14
R13
R14
T3-BLK
R30
R29
R31
T6 BLK
T6-RED
T9 RED
(+)
C1
R27
T8 BLU
(+)
C13
T6-WHT
FT22
C10 (-)
R26
T4 RED
T4 BLU
T5 BLU
R6
C3 (-)
R23
FT 24
C12
(-)
R22
C15
R3
R24
T4 GRN
CR6
C11 (-)
R18
R20
C2
FT 7
R4
R2
T1 BLK
R25
R28
FT6
FT23
R21
C9
R19
R1
R46
FT19
T9 BLK
R42
R45
R21
R37
R44
T9 WHT
C20 (-)
R47
T7 BLU
FT 21
C17 (-)
R36
C19 (-)
R41
C22
FT20
R39
R43
C18 (-)
FT3
T7 BLK
C16
R34
R35
R40
FT2
FT 18
FT1
CR7
R36
R33

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DRAWING NO. 2008488 FOR
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007231	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2.

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN C. Horgan 11 Apr 66
CHECKED Bonarrigo 18 Apr 66
APPROVED V. B. Yancey
APPROVED
APPROVED MIT W. Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
IRIG & PIPA

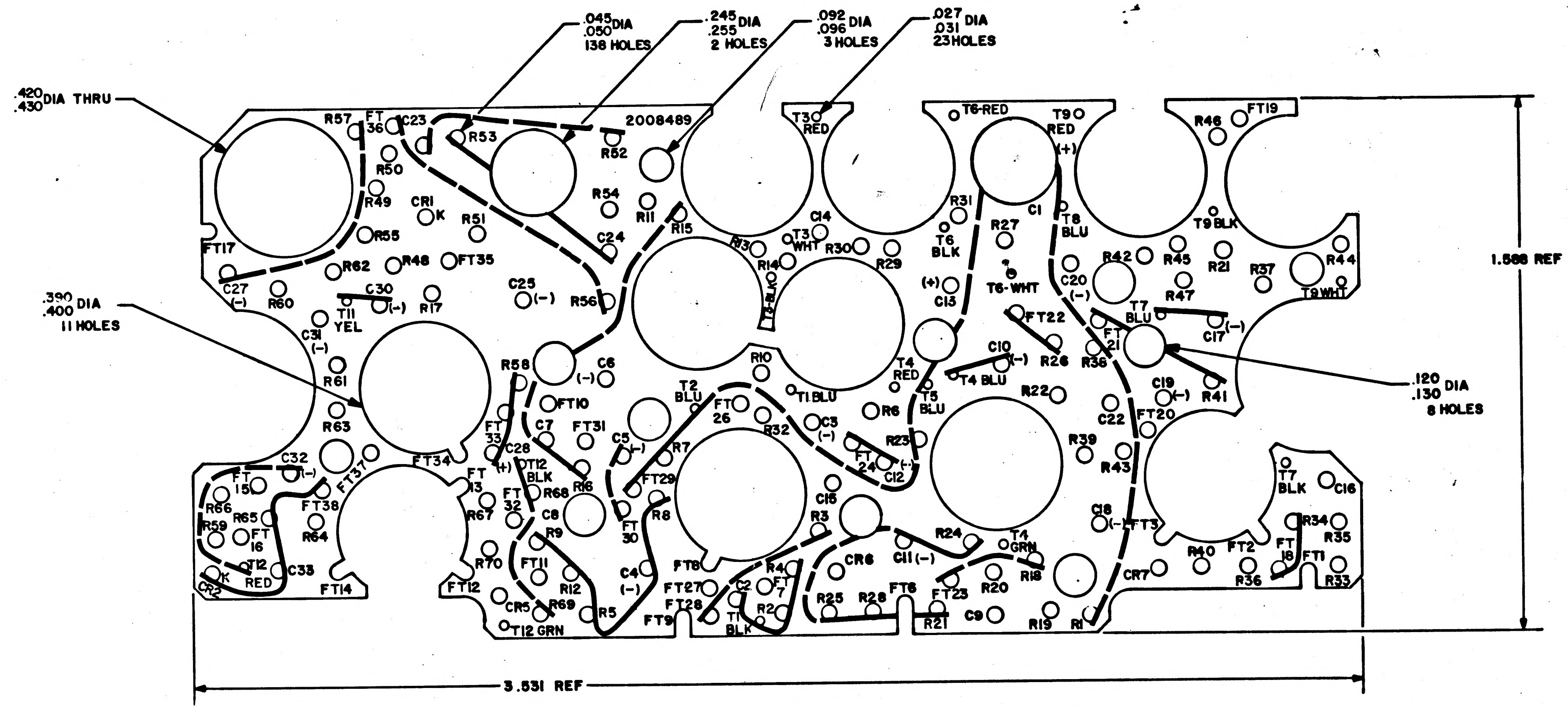
CODE IDENT NO 80230
SIZE D
DRAWING NO 2008489
SCALE 5/1
SHEET 1 OF 1

2008489 A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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.245 .255 DIA 2 HOLES
.092 .096 DIA 3 HOLES
.027 .031 DIA 23 HOLES
.420 .430 DIA THRU
.390 .400 DIA 11 HOLES
.120 .130 DIA 8 HOLES
1.588 REF
3.531 REF
2008489
R57
FT 36
C23
R53
R52
T3 RED
T6-RED
T9 RED (+)
R46
FT19
R50
R49
CR1 K
R51
R54
R11
R31
C1
R27
T8 BLU
T9 BLK
FT17
R55
C24
R15
R3
C14
T3 WHT
R30
R29
T6 BLK
R42
R45
R21
R37
R44
T9 WHT
C27 (-)
R60
R62
R48
FT35
C30
T11 YEL
(-)
R17
C25 (-)
R56
R14
T3-BLK
(+)
C13
T6-WHT
C20 (-)
FT22
T7 BLU
R47
C17 (-)
C31 (-)
R61
R58
C6 (-)
R10
T4 RED
C10 (-)
T4 BLU
R26
R36
FT 21
T2 BLU
FT10
T1 BLU
T5 BLU
R22
C19 (-)
R41
R63
C7
FT31
FT 26
R32
C3 (-)
R6
C22
FT20
R39
C32 (-)
FT34
FT 33
(+)
C28
C5 (-)
R7
R23
FT 24 (-)
C12
R43
FT 15
FT38
FT37
FT 13
T12 BLK
R68
R16
FT29
C15
T7 BLK
C16
R66
R65
FT 16
R59
R64
R67
FT 32
R9
C8
FT 30
R8
R3
C18 (-)
FT3
R34
R35
CR2
K
T12 RED
C33
FT14
FT12
R70
FT11
R12
C4 (-)
FT8
R4
FT 7
CR6
C11 (-)
R24
T4 GRN
R18
R40
FT2
FT 18
FT1
CR7
R36
R33
CR5
R69
R5
FT27
FT28
FT9
C2
R2
T1 BLK
R25
R28
FT6
FT23
R20
R21
C9
R19
R1
T12 GRN

REF:
DRAWING NO. 2008488 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007231	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2.

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	N. Horgan	Apr 66
CHECKED	Bonarrigo	18 Apr 66
APPROVED	V. J. Tynan	Apr 66
APPROVED		Apr 66
APPROVED MIT	W. Kupfer	Apr 66
APPROVED MSC	A. C. METZGER	DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

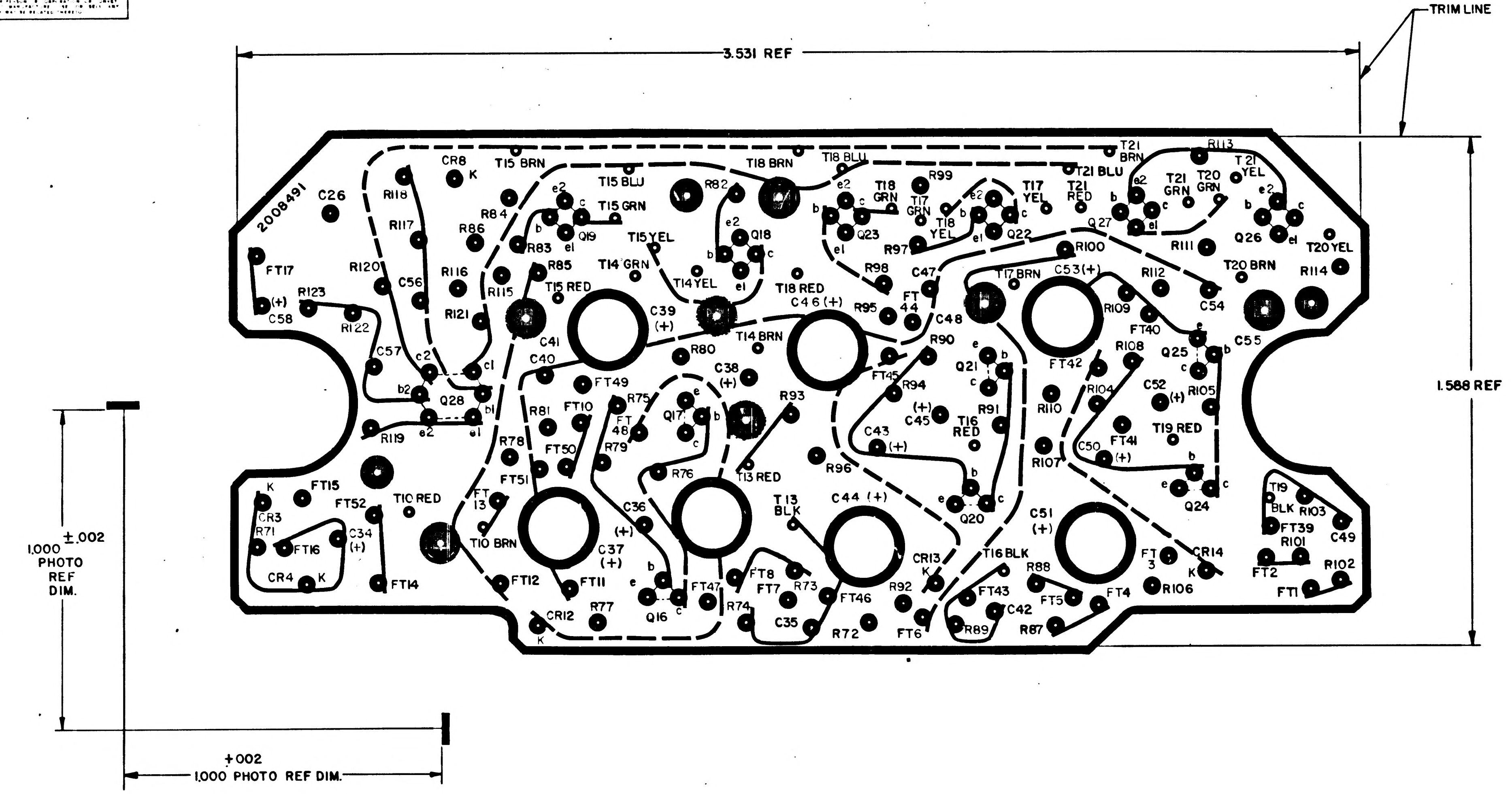
WIRING BOARD B
IRIG & PIPA

CODE IDENT NO.	SIZE	DRAWING NO
80230	D	2008489

SCALE 5/1 SHEET 1 OF 1

2008489

REVISIONS 28201						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 80152	WY		21 JUL 66	



TRIM LINE
3.531 REF
1.588 REF
1.000 ±.002 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.
2008491
C26
R118
R117
CR8
K
T15 BRN
T15 BLU
T15 GRN
R82
T18 BRN
T18 BLU
T18 GRN
T17 GRN
T18 YEL
R99
T17 YEL
T21 RED
T21 BLU
T21 BRN
R113
T21 YEL
T21 GRN
T20 GRN
R84
R86
R83
Q19
T15 YEL
Q18
Q23
R97
Q22
Q27
R100
R111
Q26
T20 YEL
FT17
R120
C56
R116
R85
T14 GRN
T14 YEL
T18 RED
R98
C47
T17 BRN
C53(+)
R112
T20 BRN
R114
(+) C58
R123
R122
R121
R115
T15 RED
C39 (+)
C46 (+)
R95
FT 44
C48
R109
C54
C41
C40
R80
T14 BRN
R90
FT40
R108
Q25
C55
C57
Q28
R119
C38 (+)
FT45
R94
Q21
FT42
R104
C52 (+)
R105
FT49
R81
FT10
R75
FT 48
Q17
R93
(+) C45
T16 RED
R91
R110
C43 (+)
C50
FT41 (+)
T19 RED
R78
FT50
R79
R76
T13 RED
R96
R107
Q24
CR3
R71
FT15
FT52
T10 RED
FT 13
FT51
C36 (+)
T13 BLK
C44 (+)
Q20
C51 (+)
T19 BLK
R103
FT39
R101
C49
C34 (+)
FT16
CR4
FT14
T10 BRN
C37 (+)
FT12
FT11
FT47
FT8
FT7
R73
R74
Q16
CR12
R77
C35
FT46
R72
CR13
R92
T16 BLK
R88
FT43
C42
R89
R87
FT6
FT5
FT4
FT 3
CR14
R106
FT2
R102
FT1

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	F. Pellini	6 MAR 66
CHECKED	Bonarrigo	18 Apr 66
APPROVED		
APPROVED		
APPROVED MIT		
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD D
IRIG AND PIPA

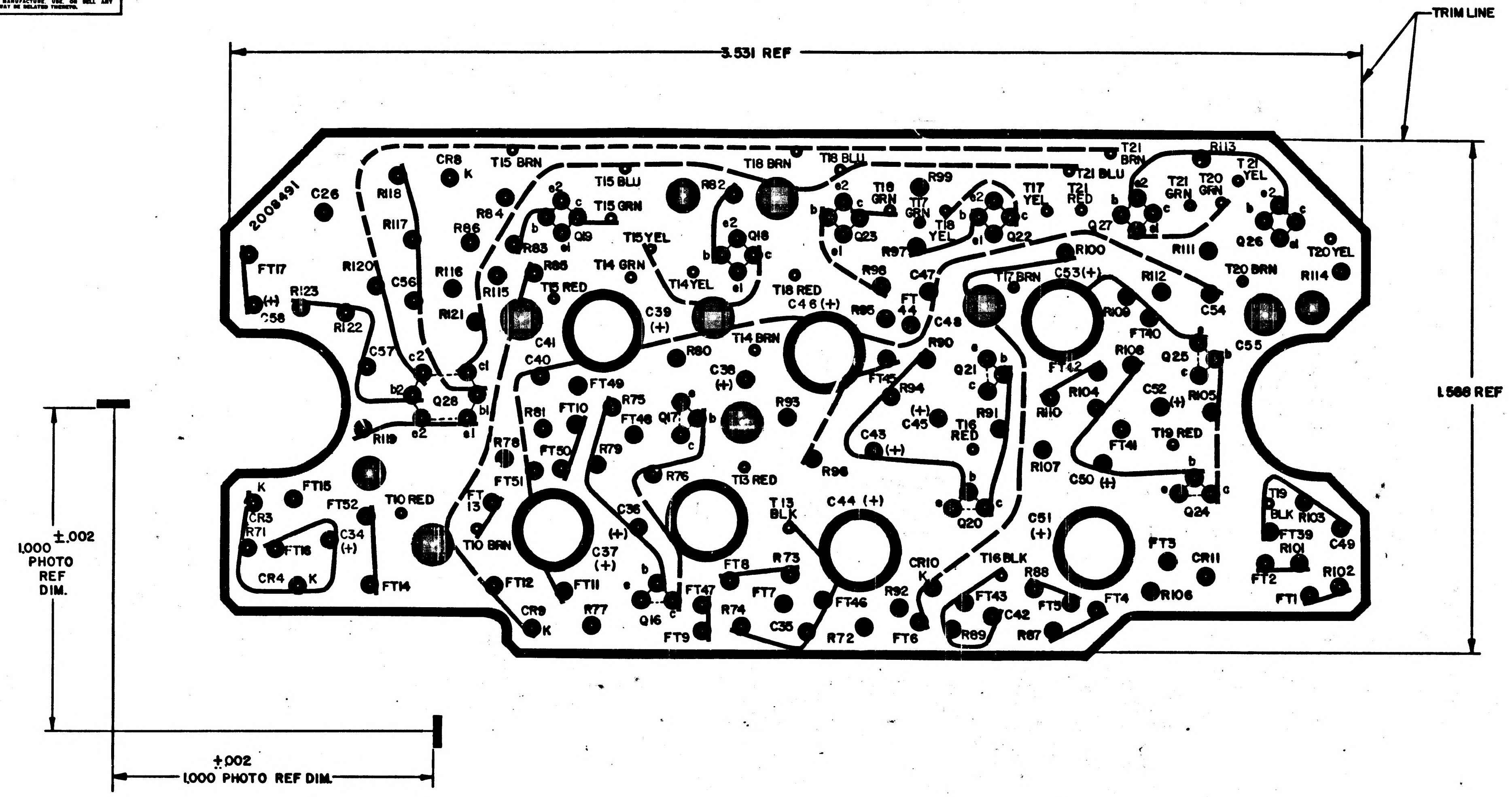
CODE IDENT NO	SIZE	DRAWING NO
80230	D	2008490

SCALE 5/1
SHEET 1 OF 1

2008490 A

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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±.002 1.000 PHOTO REF DIM.
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R117
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R86
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R116
R115
R123
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R121
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C41
C40
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C47
FT 44
C46 (+)
R95
C48
R109
C54
C55
FT40
C57
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c1
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b1
e2
e1
Q28
R119
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C38 (+)
FT49
R75
FT10
R81
FT48
Q17
R93
R90
FT45
R94
(+) C45
Q21
FT42
R108
Q25
R110
R104
C52 (+)
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C43 (+)
R96
R107
FT41
T19 RED
C50 (+)
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Q20
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CR4
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CR11
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FT1
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FT11
CR9
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FT47
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C35
FT46
R72
R92
FT6
FT43
R88
C42
R89
R87
FT5
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R106
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e

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN L. Rollins 6Mar66
CHECKED Bonarrigo 10 Mar 66
APPROVED U. A. Kaye 2Mar66
APPROVED [illegible] 20Apr66
APPROVED MIT W. Kupfer 20Apr66
APPROVED MSC A. C. METZGER
DATE

PHOTOGRAPHIC MASTER WIRING BOARD D
IRIG AND PIPA

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008490
SCALE 5/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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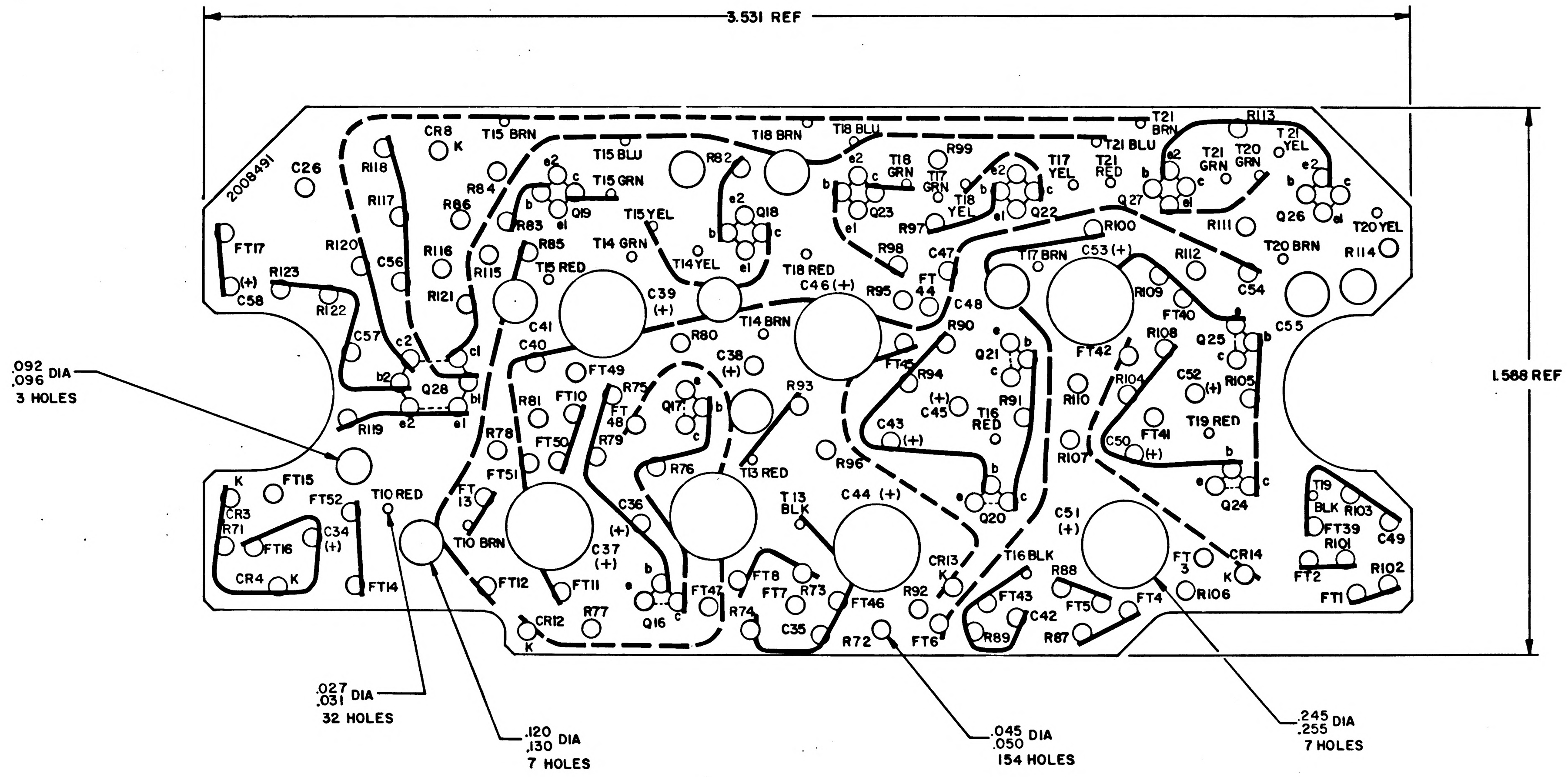

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1.588 REF
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.027 .031 DIA 32 HOLES
.120 .130 DIA 7 HOLES
.045 .050 DIA 154 HOLES
.245 .255 DIA 7 HOLES
CR8
K
T15 BRN
T18 BRN
T18 BLU
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R113
T21 YEL
C26
R118
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R86
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C48
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C55
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FT42
R108
Q25
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C52 (+)
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R81
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Q17
R93
C45 (+)
T16 RED
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C34 (+)
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C37 (+)
T16 BLK
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CR14
R101
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FT2
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FT1
CR12
R77
Q16
R74
C35
R72
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R89
C42
R87

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DWG NO. 2008490 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007231	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 6 MAR 66
CHECKED Bonarrigo 18 Mar 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
IRIG AND PIPA

CODE IDENT NO 80230
SIZE D
DRAWING NO 2008491
SCALE 5/1
SHEET 1 OF 1

2008491 A

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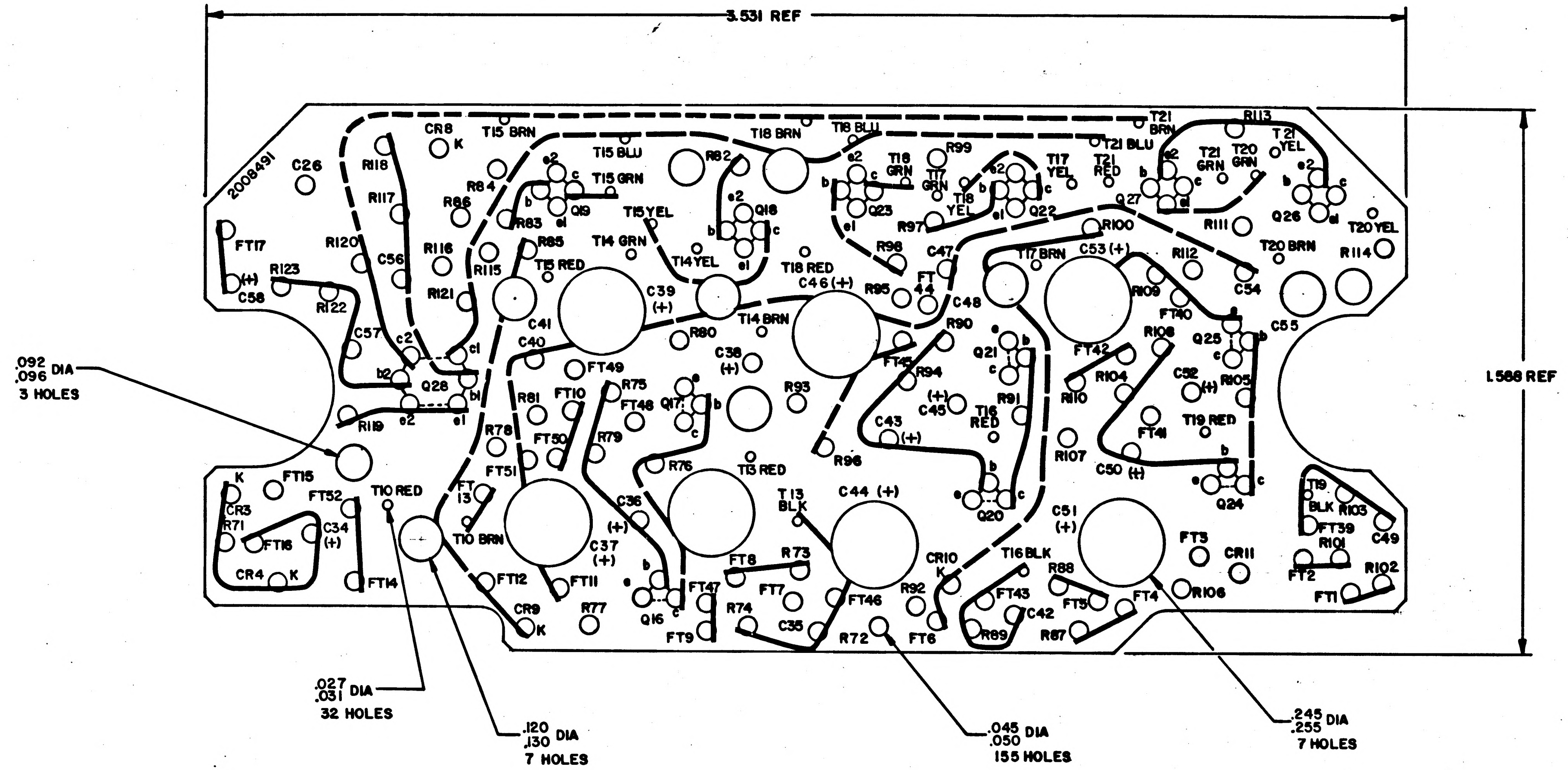
REVISIONS 2F201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.531 REF
1.588 REF
2008491
.092/.096 DIA 3 HOLES
.027/.031 DIA 32 HOLES
.120/.130 DIA 7 HOLES
.045/.050 DIA 155 HOLES
.245/.255 DIA 7 HOLES
T15 BRN
T15 BLU
T15 GRN
T15 YEL
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R123

NOTES:
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DWG NO. 2008490 PHOTOGRAPHIC MASTER

MASTER

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NEXT ASSY	USED ON
2007231	

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MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

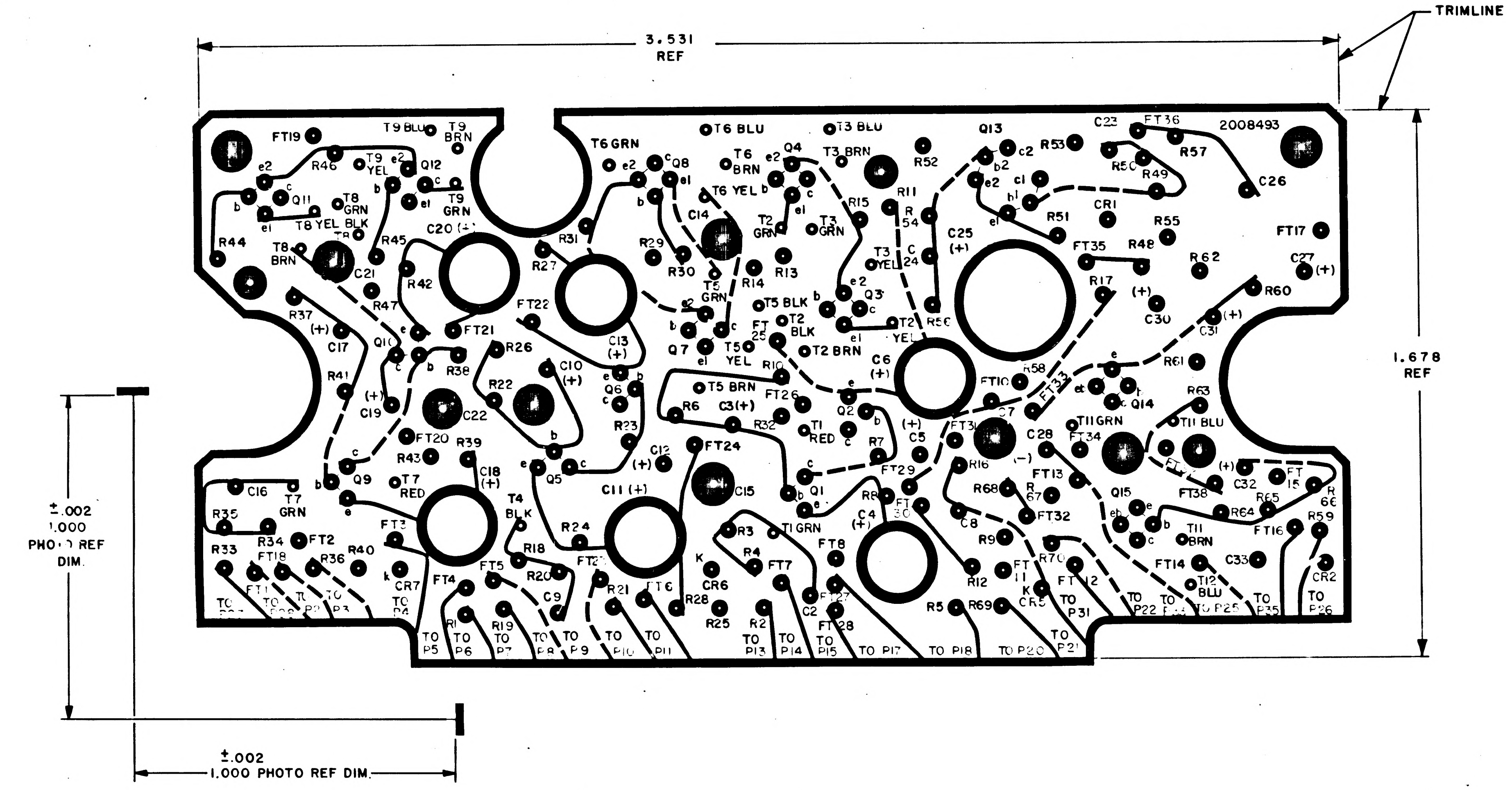
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN [illegible] 6 MAR 66
CHECKED Bonarrigo 18 [illegible] 66
APPROVED V.G. [illegible] [illegible] 66
APPROVED [illegible] 20 Apr 66
APPROVED MIT W. [illegible] A. C. METZGER
APPROVED MSC
DATE

WIRING BOARD D
IRIG AND PIPA

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008491
SCALE 5/1
SHEET 1 OF 1

REVISIONS 2f 201						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30152	ON	Cun	20 JUL 66	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R57
R46
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Q11
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Q8
T6 BRN
Q4
T3 BRN
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R50
R49
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R11
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C14
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T3 GRN
R15
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FT 25
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FT33
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Q14
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FT34
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TO P31
TO P35

NOTES:

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2008492 A

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R.C. Taylor 12 AUG 66
CHECKED Bolarrigo 18 Aug 66
APPROVED
APPROVED
APPROVED MIT W. Kupfer 20 Jul 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
IRIG AND PIPA

CODE IDENT NO 80230
SIZE D
DRAWING NO 2008492
SCALE 5/1
SHEET 1 OF

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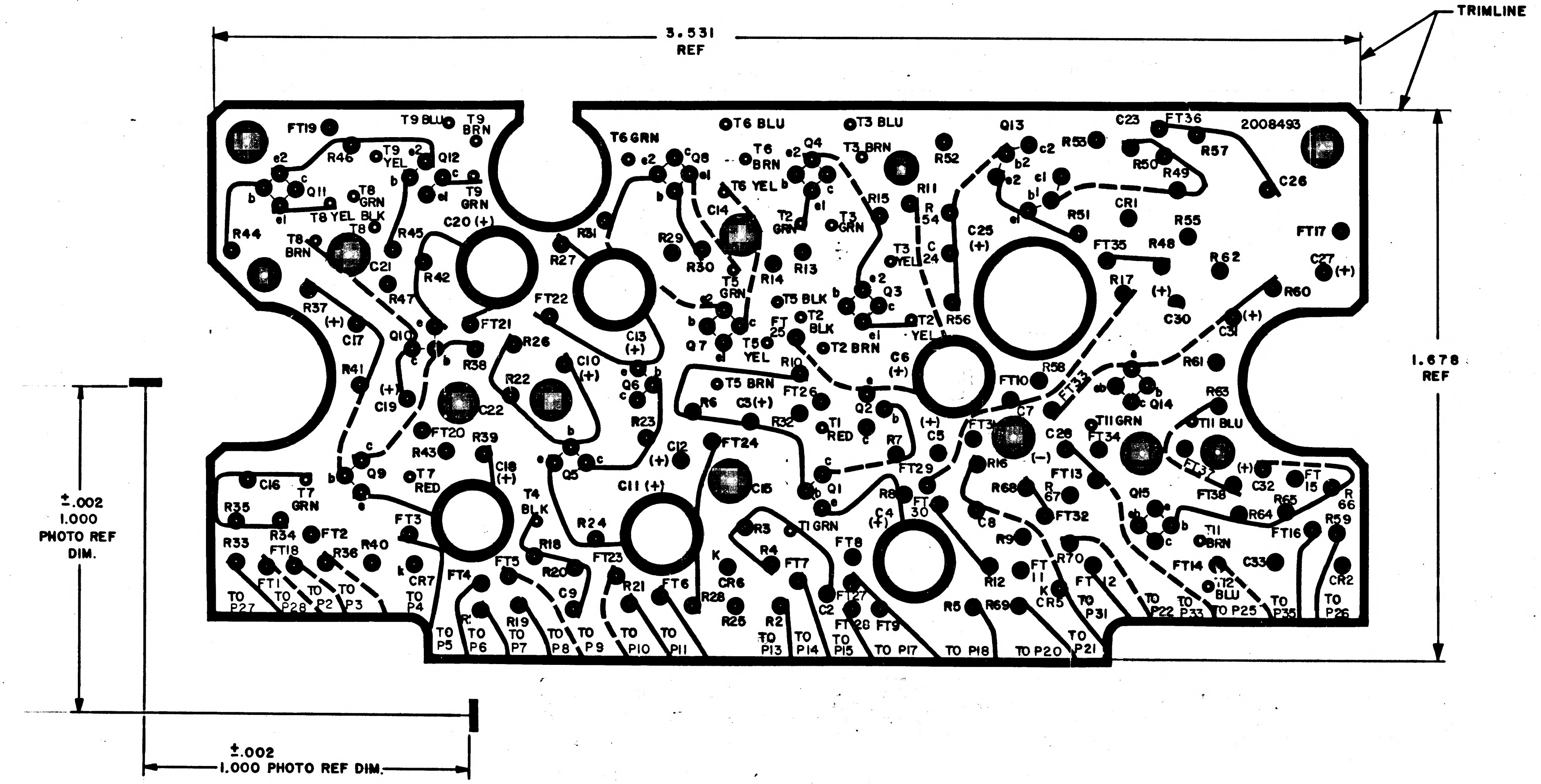
REVISIONS 2F201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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±.002
1.000 PHOTO REF DIM.
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R68
R 67
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FT 12
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R65
R 66
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Q15
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T11 BRN
FT16
R59
C33
FT14
T12 BLU
CR2

NOTES:

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MASTER

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CAPACITOR VALUES ARE IN μf
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TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.C. Taylor
CHECKED Bolarrigo 10/2/66
APPROVED V.G. Kaveino 20 APR 66
APPROVED 20 Apr 66
APPROVED MIT W Kupfer 20 Apr 66
R.G. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
IRIG AND PIPA

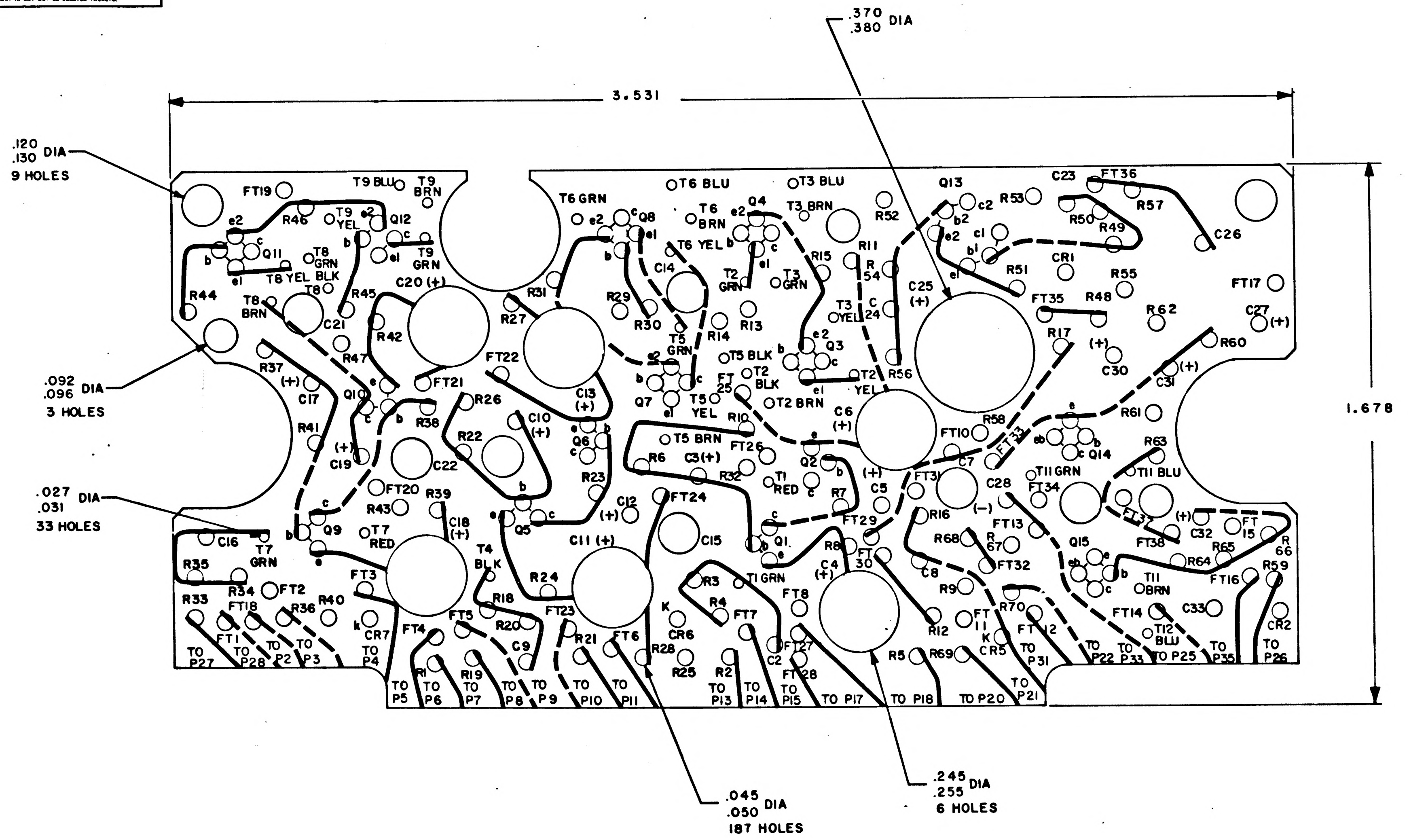
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008492
SCALE 5/1
SHEET 1 OF

2008492

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30152	ON	Am	20 JUL 66	



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9 HOLES
.092
.096 DIA
3 HOLES
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.031 DIA
33 HOLES
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.050 DIA
187 HOLES
.245
.255 DIA
6 HOLES
FT19
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T9 BRN
T6 GRN
T6 BLU
T3 BLU
Q13
C23
FT36
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T9 YEL
Q12
Q8
T6 BRN
Q4
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R52
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R57
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C26
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T8 GRN
T8 YEL BLK
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T6 YEL
T2 GRN
T3 GRN
R15
R11
R54
CR1
R51
R55
FT17
R44
T8 BRN
C21
R45
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R31
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R29
R30
R13
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FT35
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TO P25
TO P35
TO P26

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF: DWG NO 2008492 PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2007231	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	A.C. Gryder	12 Apr 66
CHECKED	Bonarrigo	18 Apr 66
APPROVED		20 Apr 66
APPROVED		
APPROVED MIT		
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
IRIG AND PIPA

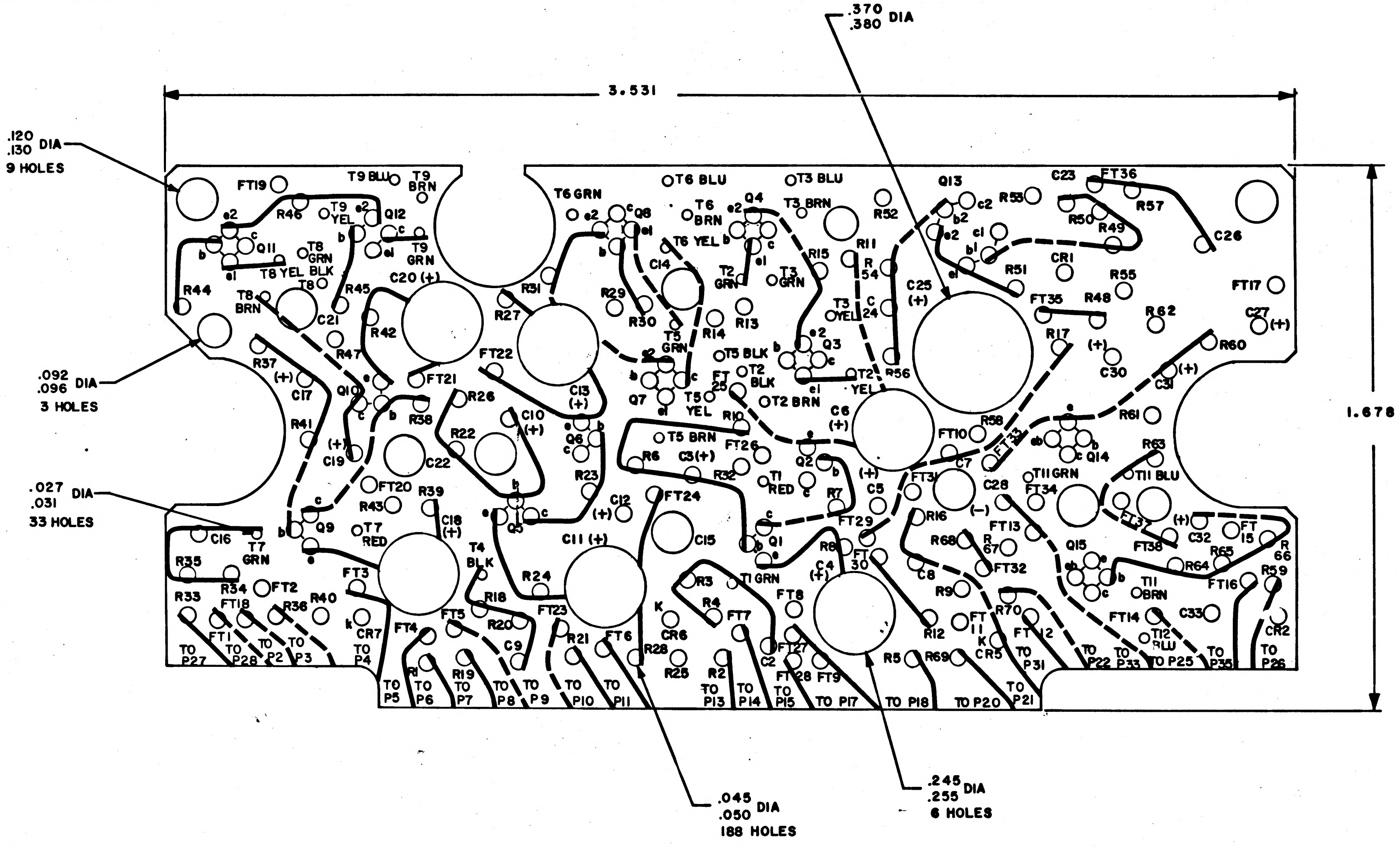
CODE IDENT NO	SIZE	DRAWING NO
80230	D	2008493
SCALE 5/1		SHEET 1 OF 1

2008493 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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.096 DIA
3 HOLES
.027
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1.678
.045
.050 DIA
188 HOLES
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.255 DIA
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T9 BRN
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T6 BLU
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R41
C19
Q9
C16
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R35
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FT9
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FT13
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FT22
FT23
FT24
FT26
FT29
FT32
FT34
FT35
FT38

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DWG NO. 2008492 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007231	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R.C. Gayden 12 Apr 66
CHECKED Bonarrigo 18 Apr 66
APPROVED V.G. Kassinis 20 Apr 66
APPROVED D. Wine 20 Apr 66
APPROVED MIT W. Metzger A. C. METZGER
APPROVED MSC
DATE

WIRING BOARD A
IRIG AND PIPA

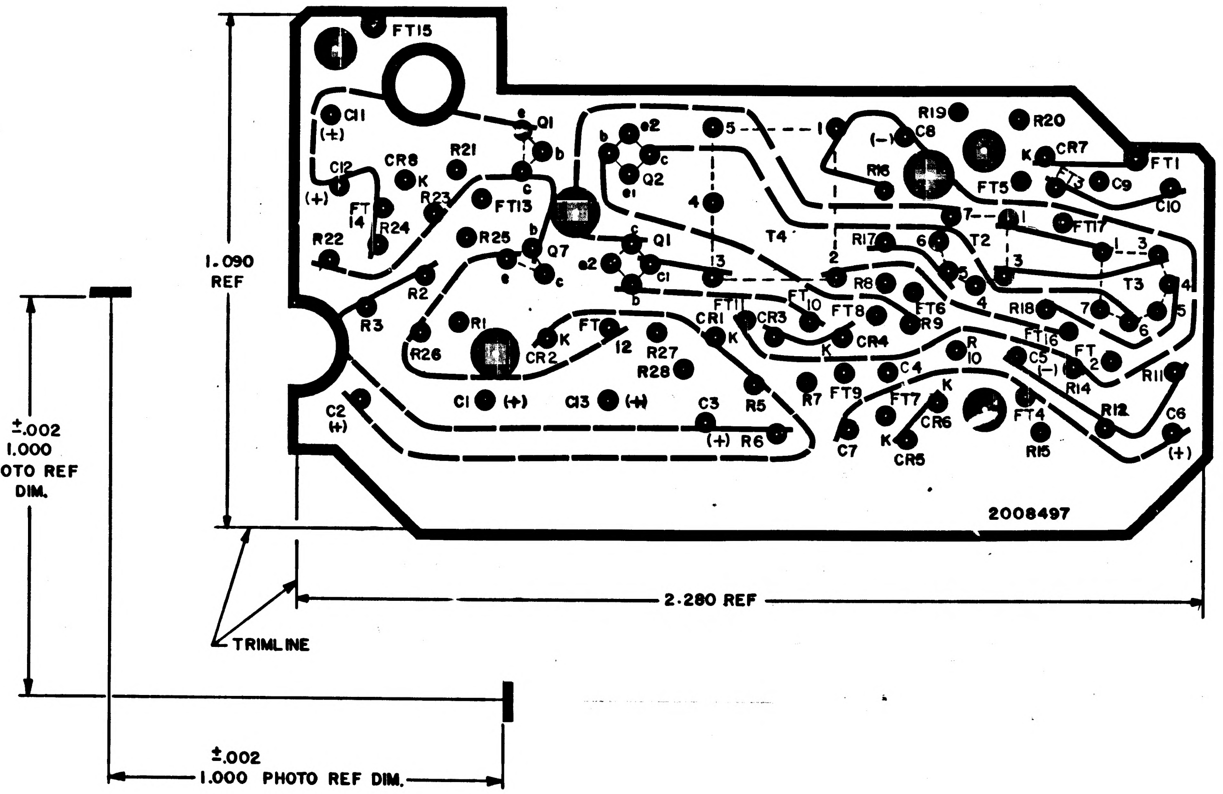
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008493
SCALE 5/1
SHEET 1 OF 1

2008493

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28509

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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C12
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R23
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R25
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b
c
Q7
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Q2
e1
4
5
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T4
R19
C8
(−)
R16
R20
K
CR7
FT1
FT5
FT3
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C10
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FT17
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T3
4
5
R8
R18
7
6
FT6
R9
FT16
R11
FT2
C5
(−)
R14
R12
C6
(+)
R3
R2
R1
R26
CR2
K
FT12
R27
R28
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CR3
FT11
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FT8
CR4
K
C4
R10
FT9
FT7
K
CR6
FT4
R15
C7
K
CR5
C2
(+)
C1 (+)
C13 (+)
C3
R5
R7
(+) R6
2008497
1.090 REF
±.002 1.000 PHOTO REF DIM.
2.280 REF
TRIMLINE
±.002 1.000 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Louis A Lowe	6 Apr 66
CHECKED	Bonarrigo	2 May 66
APPROVED	Rumsey	2 MAY 66
APPROVED	[illegible]	2 May 66
APPROVED MIT	[illegible] A. C. METZGER	3 May 66
APPROVED MSC		
		DATE

PHOTOGRAPHIC MASTER WIRING BOARD B
120 V PIPA SUPPLY AND IRIG TEMP (FQ)

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008496
SCALE 5 / 1		SHEET 1 OF 1

2008496

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28509

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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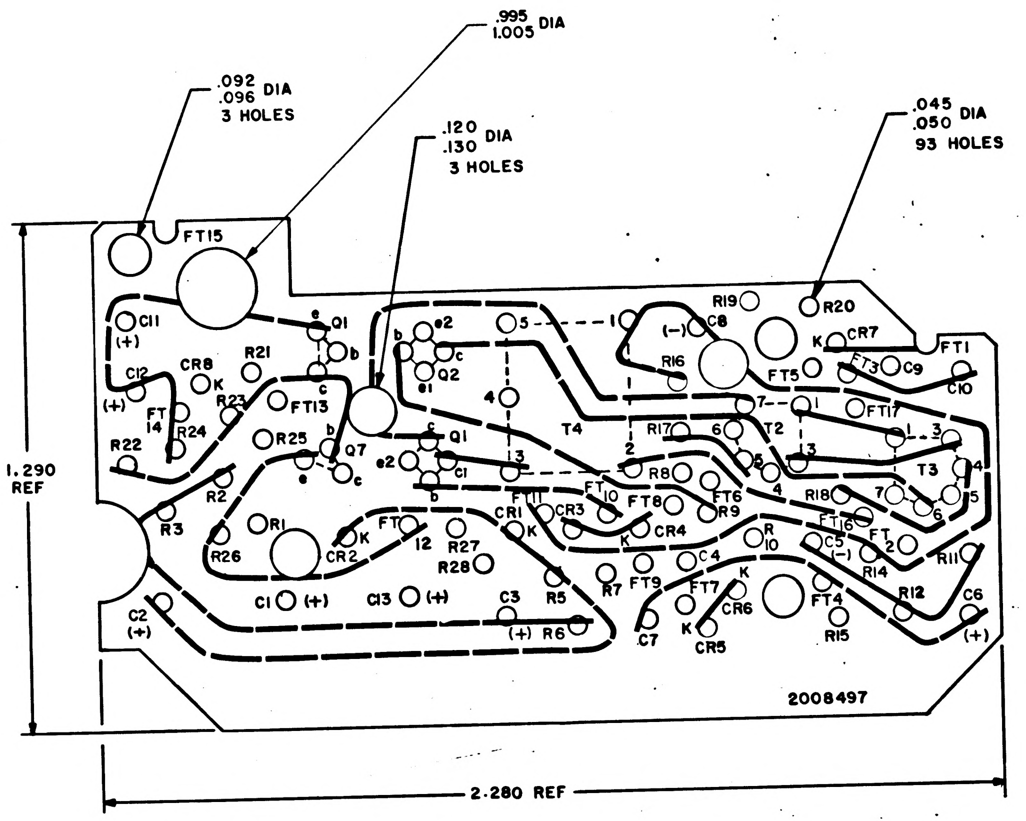

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3 HOLES
.045
.050 DIA
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C11
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C12
(+)
CR8
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R23
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R24
R22
FT13
R25
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b
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Q7
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R19
R20
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CR7
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C10
FT5
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FT17
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CR1
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CR3
CR4
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FT2
R11
R10
C5
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CR5
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C7
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R2
R1
R26
CR2
K
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R27
R28
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C13 (+)
C3
R5
(+) R6
C2
(+)
2008497
1.290
REF
2.280 REF

REF:
DWG NO.2008496 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007244	
2007241	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Louis A Lowe 6 APR 66
CHECKED Bonarrigo 2 May 66
APPROVED 2 MAY 66
APPROVED 3 May 66
APPROVED MIT W Kupfer 3 May 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
120 V PIPA SUPPLY AND IRIG TEMP (FQ)

CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008497
SCALE 5/1
SHEET 1 OF 1

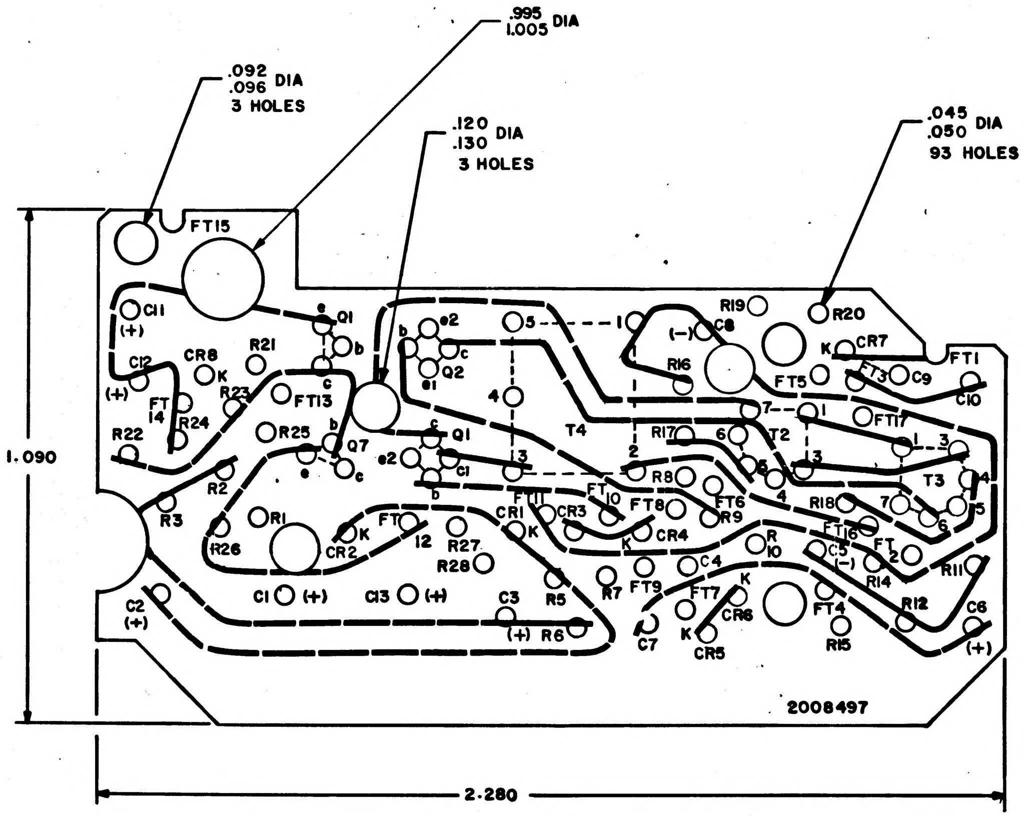
2008497 A

8 7 6 5 4 3 2 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28509

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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.096 DIA
3 HOLES
.995
1.005 DIA
.120
.130 DIA
3 HOLES
.045
.050 DIA
93 HOLES
1.090
2.280
FT15
C11 (+)
C12 (+)
CR8 K
R21
Q1 e b c
FT13
FT 14
R23
R24
R22
R25
Q7 b e c
R2
R3
R26
R1
CR2 K
FT 12
R27
R28
C1 (+)
C13 (+)
C2 (+)
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R7
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T4
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CR3
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2008497

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
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REF:
DWG NO. 2008496 PHOTOGRAPHIC MASTER

MASTER

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FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Louis A Lowe	6 APR 66
CHECKED	Bonarrigo	2 May 66
APPROVED	Ruger	2 MAY 66
APPROVED	[illegible]	2 May 66
APPROVED MIT	W Kupfer	3 May 66
APPROVED MSC	W. C. METZGER	
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
120 V PIPA SUPPLY AND IRIG TEMP (FQ)

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008497
SCALE 5/1		SHEET 1 OF 1

8 7 6 5 4 3 2 1

2008497

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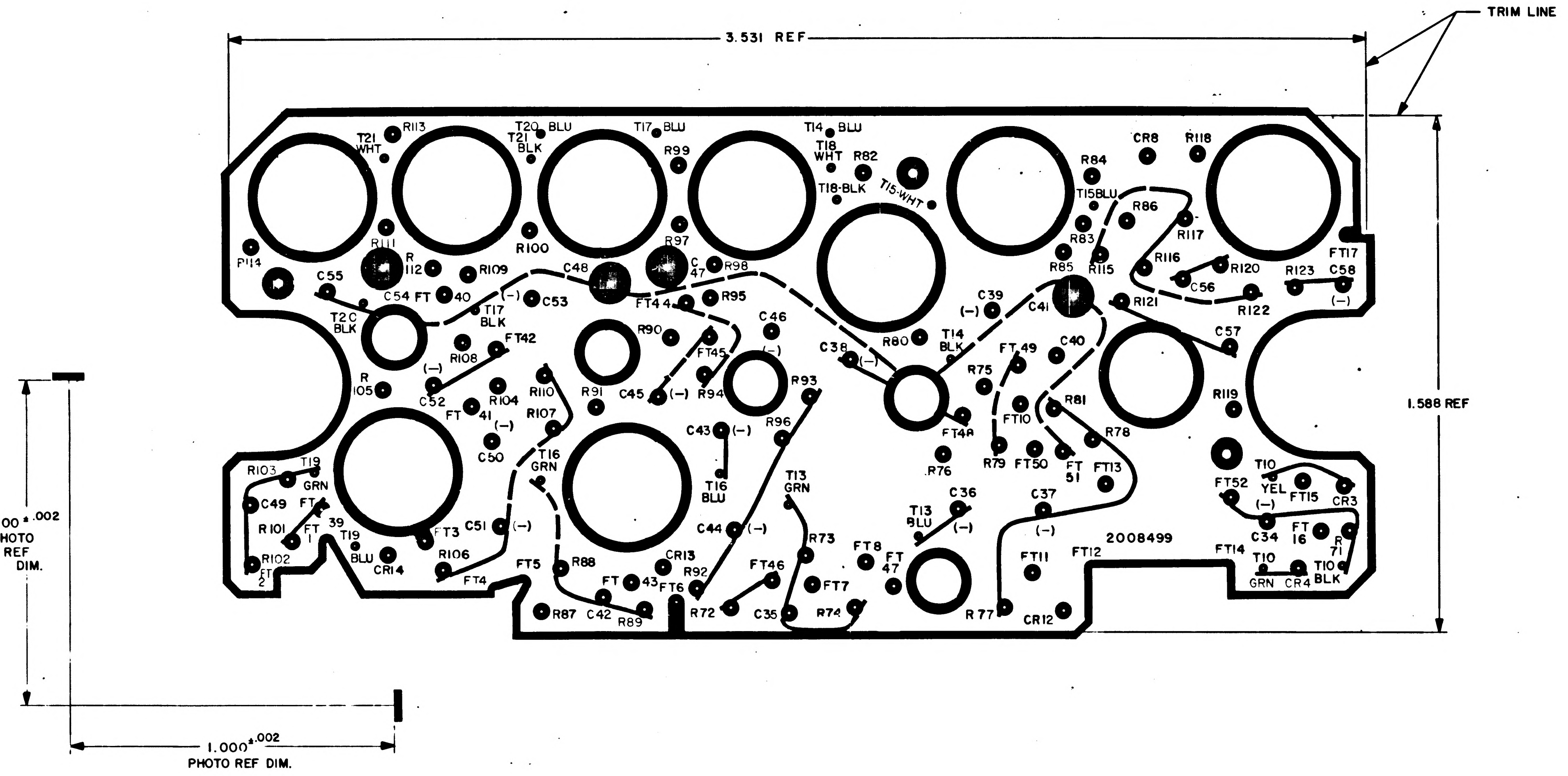
REVISIONS 2f201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30152	ON	Am	20 JUL 66	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1.588 REF
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1.000 ±.002 PHOTO REF DIM.
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R113
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R82
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R120
R123
C58
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R111
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R109
R100
C48
R97
C47
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C54
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T13 GRN
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C37
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CR3
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R87
C42
R89
R72
C35
R74
R77
CR12
(−)

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Addario Jr. 13 APR 66
CHECKED Bonarrigo 18 Apr 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD C
IRIG & PIPA

CODE IDENT NO 80230
SIZE D
DRAWING NO 2008498
SCALE 5/1
SHEET 1 OF 1

2008498 A

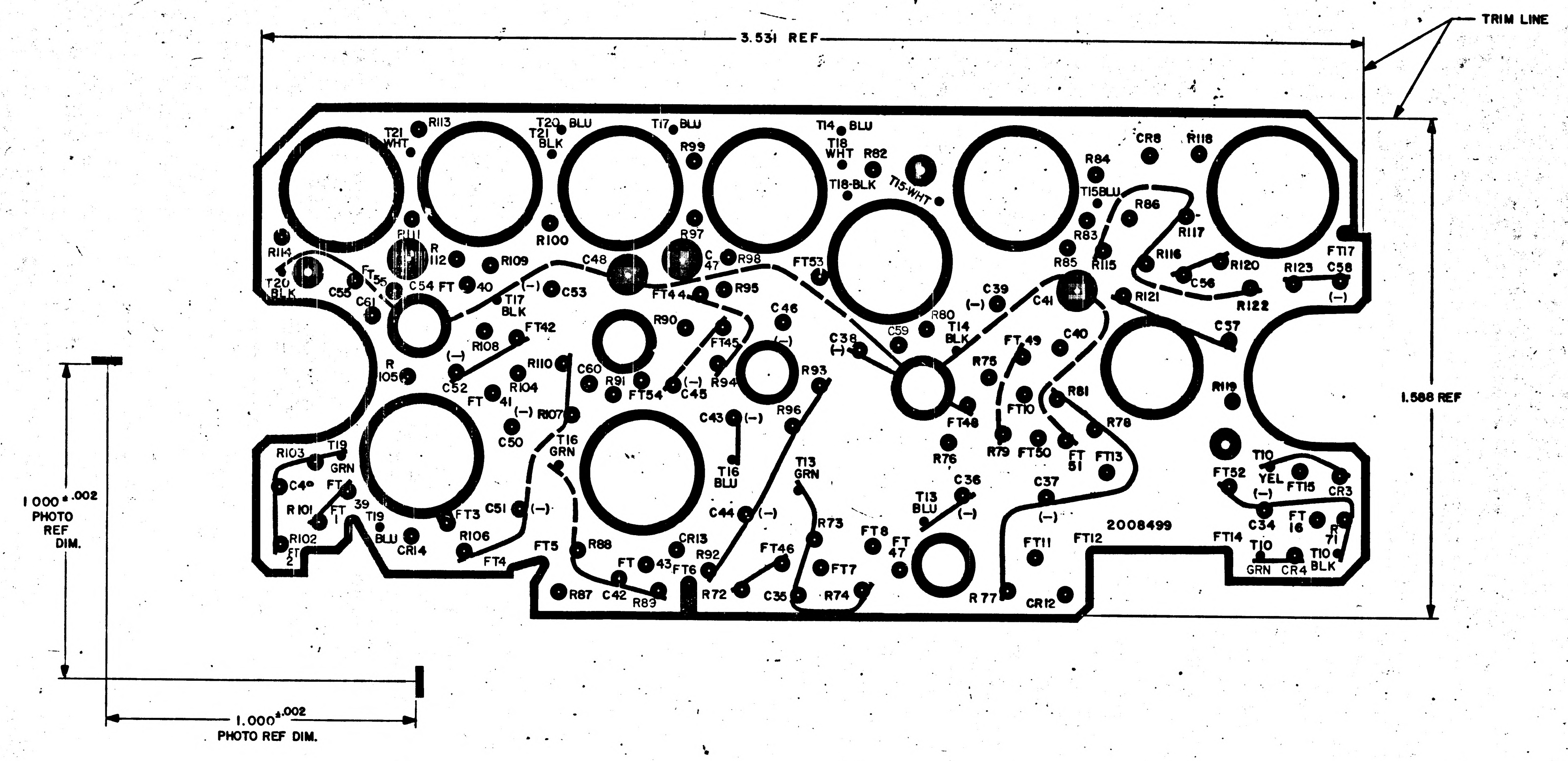
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2F201

M

DEC 6 1966

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30152	ON		20 JUL 66	
B		REVISED PER TDRR 32426	JR		24 JAN 67	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1.588 REF
1.000 ±.002 PHOTO REF DIM.
1.000 ±.002 PHOTO REF DIM.
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T20 BLU
T21 BLK
T17 BLU
R99
T14 BLU
T18 WHT
R82
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CR8
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T15BLU
R86
R117
R83
R85
R115
R116
R120
C56
R123
C58
FT17
(–)
R122
R121
C37
R114
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C55
FT55
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R112
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C47
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FT53
(–)
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C46
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C38 (–)
C59
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C40
FT49
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C52
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R104
R110
C60
R91
FT54
(–) C45
R94
FT45
R93
R96
C43 (–)
FT48
R76
R79
FT50
FT 51
FT13
(–) R107
C50
T16 GRN
T16 BLU
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T13 BLU
C36 (–)
C37 (–)
T10 YEL (–)
FT52
FT15
CR3
R103
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FT 1
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FT3
C51 (–)
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FT4
FT5
R88
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FT6
C44 (–)
R73
FT46
FT8
FT 47
FT7
R102
FT 2
R87
C42
R83
R72
C35
R74
R77
CR12
FT11
FT12
2008499
FT14
C34
FT 16
R 71
T10 GRN
CR4
T10 BLK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	A. Addario Jr.	13 APR 66
CHECKED	Bonar Higa	18 Apr 66
APPROVED	W. J. Kapusciński	20 APR 66
APPROVED		20 Apr 66
APPROVED MIT	A. C. Mueller	
APPROVED MSC		DATE

PHOTOGRAPHIC MASTER WIRING BOARD C
IRIG & PIPA

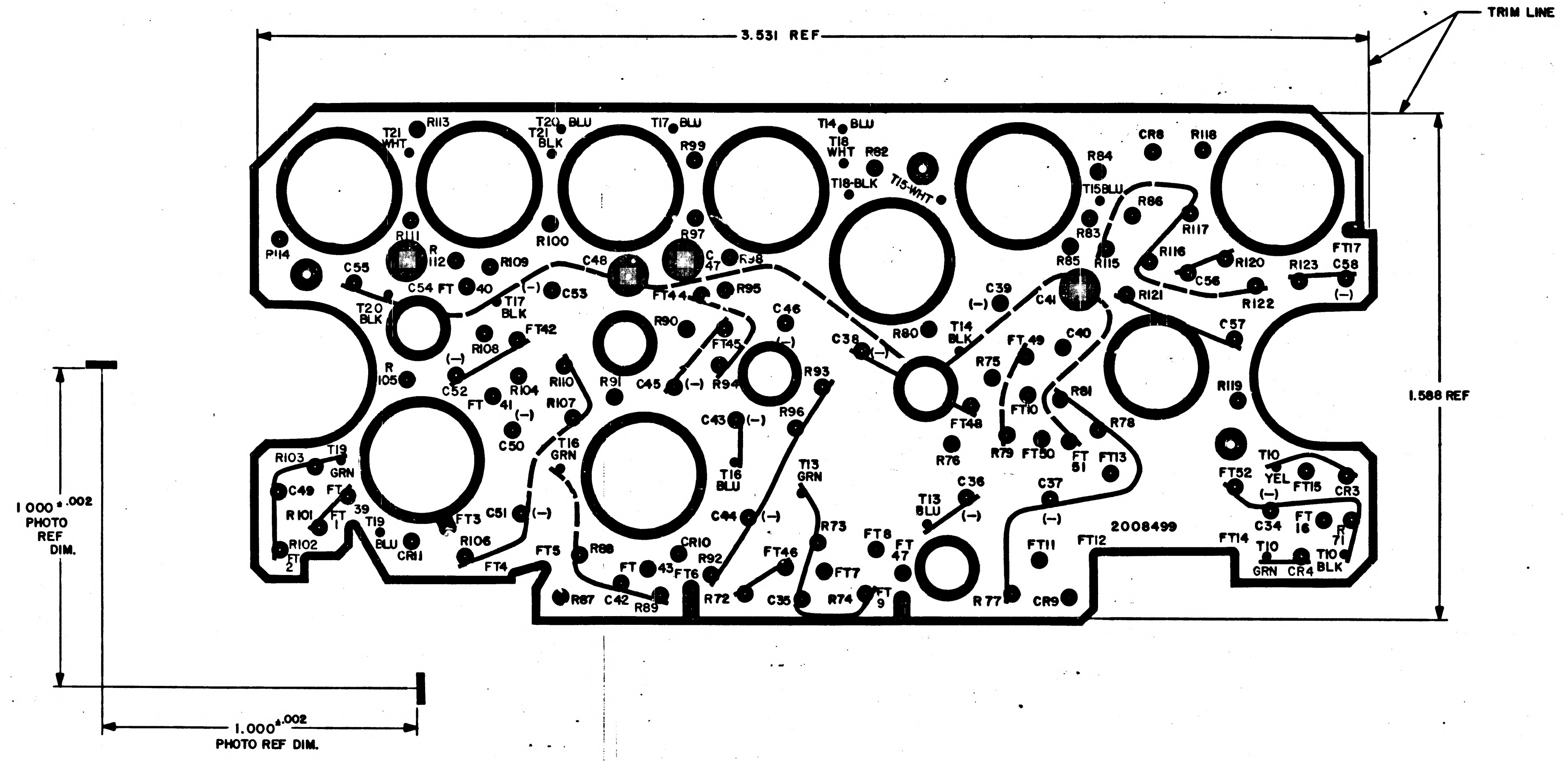
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008498
SCALE 5/1		SHEET 1 OF 1

2008498 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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1.588 REF
1.000 ±.002 PHOTO REF DIM.
1.000 ±.002 PHOTO REF DIM.
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R113
T20 BLU
T21 BLK
T17 BLU
R99
T14 BLU
T18 WHT
R82
T18-BLK
T15-WHT
CR8
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T15BLU
R86
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C56
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C 47
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C55
C54
FT 40
(−)
C53
FT44
R95
T17 BLK
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R108
R90
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T14 BLK
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CR3
R103
T19 GRN
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FT 39
R101
FT 1
T19 BLU
CR11
FT3
C51
R106
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FT5
R88
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FT8
FT 47
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C36
C37
2008499
FT11
FT12
FT14
C34
FT 16
R 71
T10 GRN
CR4
T10 BLK
R102
FT 2
R87
C42
R89
FT 43
CR10
R92
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R72
FT46
FT7
C35
R74
FT 9
R77
CR9

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Addonizio 13 Apr 66
CHECKED Boone Figo 18 Apr 66
APPROVED D. O. Tomeina 20 Apr 66
APPROVED D. Vines 20 Apr 66
APPROVED MIT W. Gregoffen A. C. METZGER
APPROVED MSC
DATE

PHOTOGRAPHIC MASTER WIRING BOARD C
IRIG & PIPA

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008498
SCALE 5/1
SHEET 1 OF 1

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2f201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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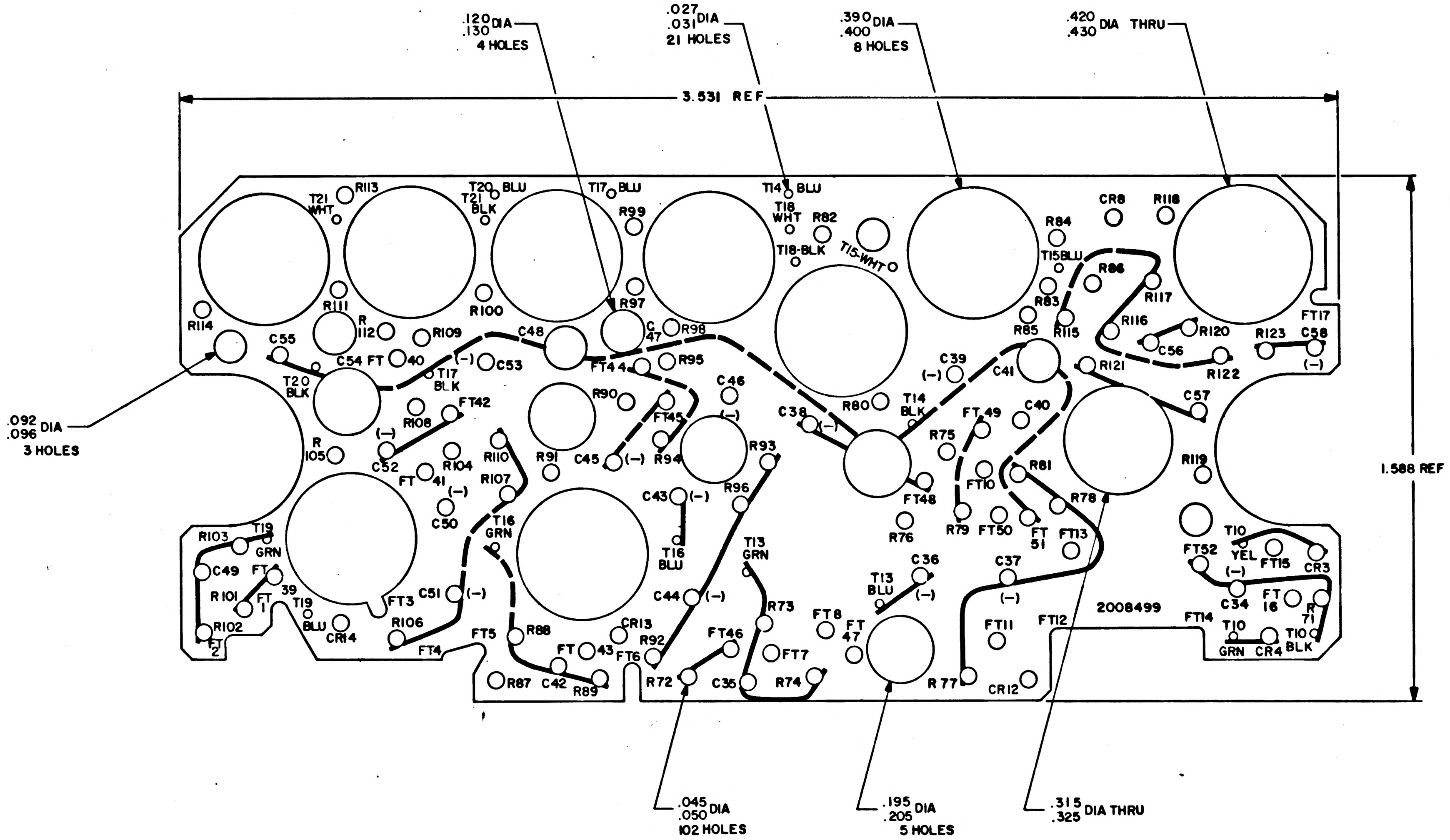
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8 HOLES
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1.588 REF
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.096
3 HOLES
.045 DIA
.050
102 HOLES
.195 DIA
.205
5 HOLES
.315 DIA THRU
.325
2008499
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R113
T20 BLU
T21 BLK
T17 BLU
R99
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T18 WHT
R82
T18-BLK
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R84
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CR8
R118
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R117
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C47
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FT 40
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C39
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R122
T20 BLK
T17 BLK
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R107
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C43
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FT48
FT10
R78
R103
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T16 GRN
T16 BLU
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R79
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FT 51
FT13
T10 YEL
FT15
CR3
C49
FT 1
FT 39
FT3
C51
(−)
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T10 BLK
R102
CR14
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FT5
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CR13
FT 43
R92
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FT46
FT7
R87
C42
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C35
R74
R77
CR12

REF:
DRAWING NO. 2008498 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
2007231	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Addario Jr. 13 Apr 66
CHECKED Bonarrigo 18 4/2 66
APPROVED
APPROVED
APPROVED MIT W Kaylor 20 Jul 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
IRIG & PIPA

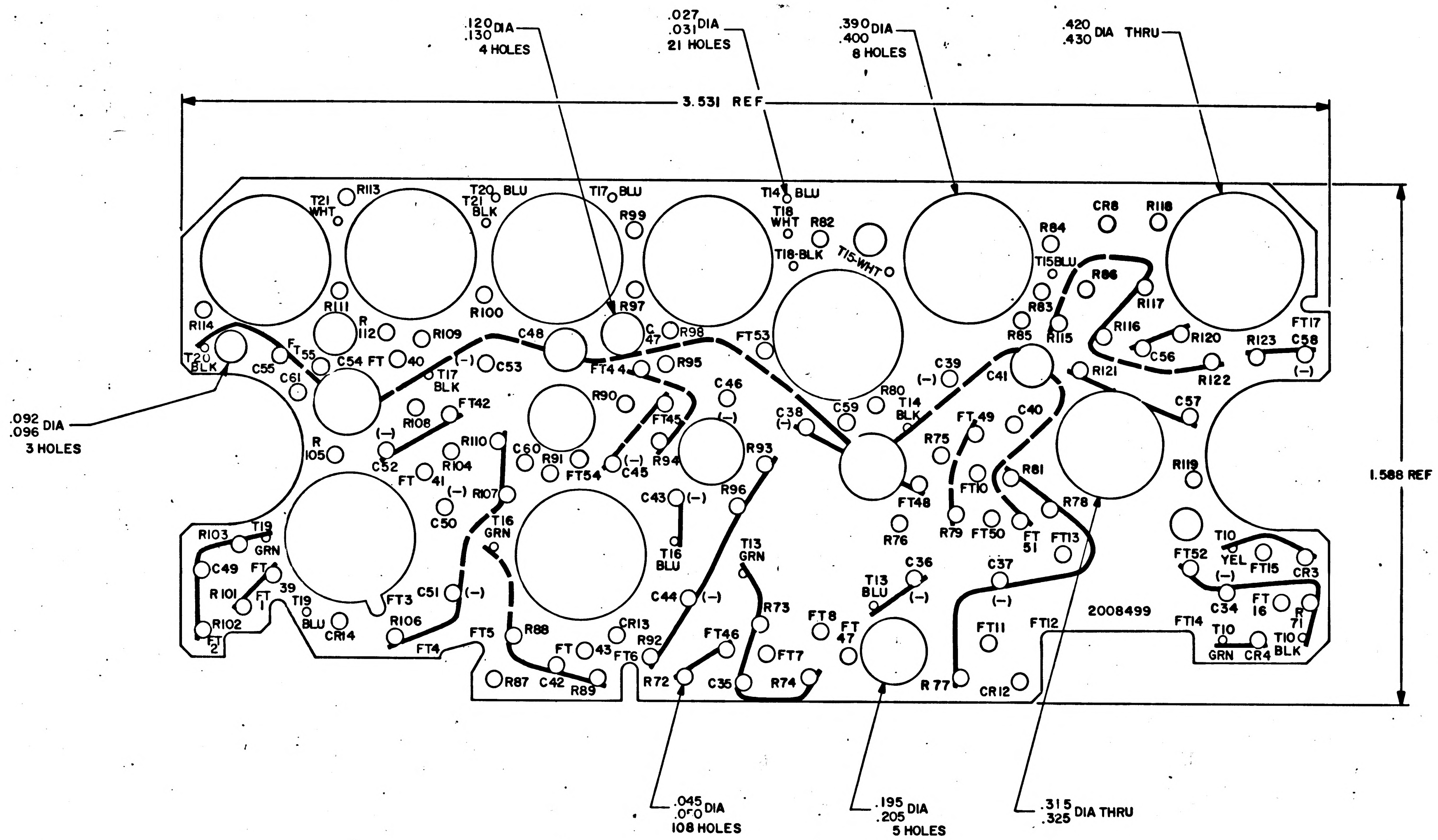
CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008499
SCALE 5/1
SHEET 1 OF 1

2008499 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2f201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓦ A		REVISED PER TDRR 30152	ON		20 JUL 66	
B		REVISED PER TDRR 32426	JA		19 JAN 67	



.120 / .130 DIA 4 HOLES
.027 / .031 DIA 21 HOLES
.390 / .400 DIA 8 HOLES
.420 / .430 DIA THRU
3.531 REF
1.588 REF
.092 / .096 DIA 3 HOLES
.045 / .050 DIA 108 HOLES
.195 / .205 DIA 5 HOLES
.315 / .325 DIA THRU
2008499
T21 WHT
R113
T20 BLU
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T18-BLK
T15-WHT
R84
CR8
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R86
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R115
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T13 BLU
C36
C37
FT11
FT12
R77
CR12

REF:
DRAWING NO. 2008498 FOR PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007231	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Addario Jr. 13 Apr 66
CHECKED Bonarrigo 4/7/66
APPROVED [illegible]
APPROVED [illegible]
APPROVED MIT [illegible]
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
IRIG & PIPA

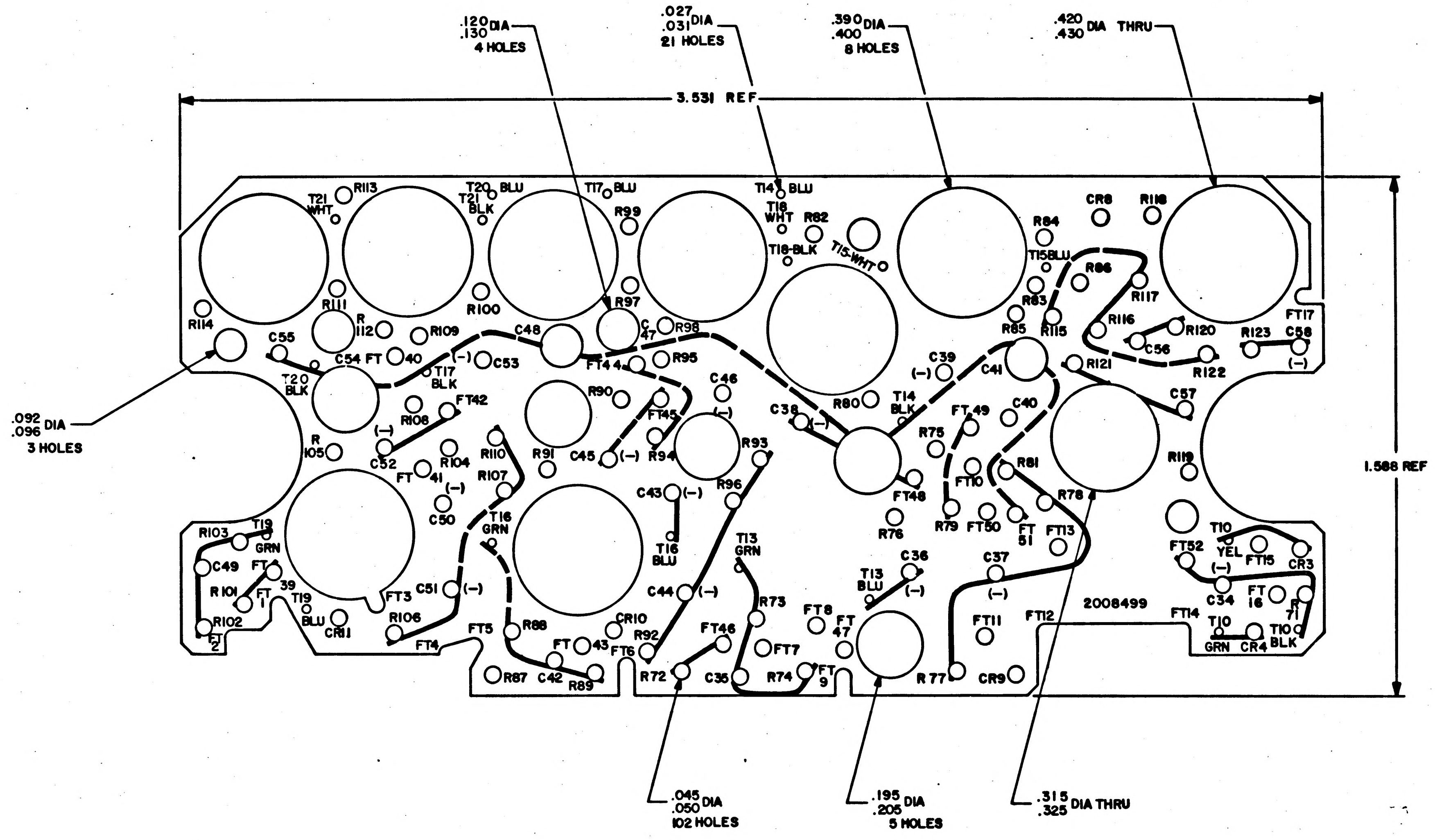
CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008499
SCALE 5/1
SHEET 1 OF 1

2008499 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28201

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DRAWING NO. 2008498 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

2007231	
NEXT ASSY	USED ON
APPLICATION	

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CAPACITOR VALUES ARE IN µf
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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Addario Jr. 13 Apr 66
CHECKED Bonarrigo 19 Apr 66
APPROVED V.G. Fagerin 20 Apr 66
APPROVED J.R. ... 20 Apr 66

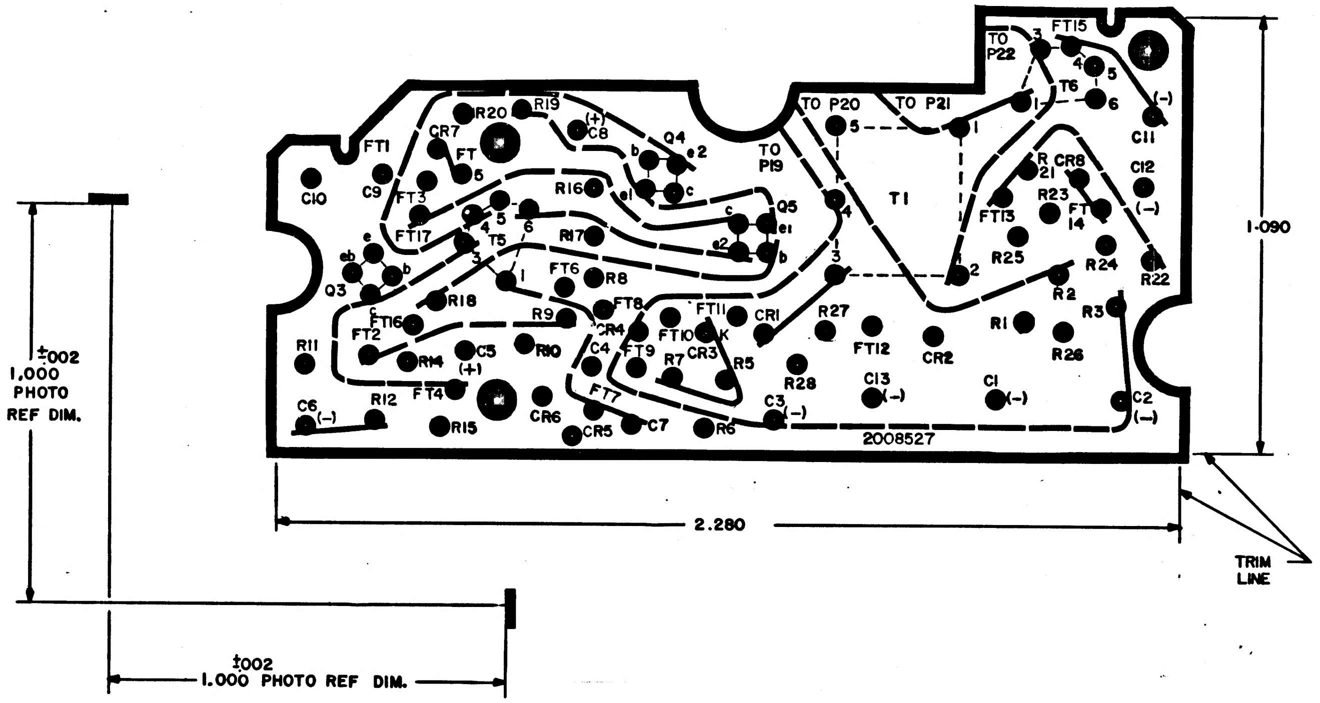
WIRING BOARD C
IRIG & PIPA

APPROVED MIT W Kupfer ... A. C. METZGER
APPROVED MSC
DATE

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008499
SCALE 5/1
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28509						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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FT
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C10
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NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Louis A Lowe	11 APR 66
CHECKED	Bonarrigo	3 May 66
APPROVED	Ruoser	2 MAY 66
APPROVED		2 May 66
APPROVED MIT		3 May 66
APPROVED MSC	A. C. METZGER	
		DATE

PHOTOGRAPHIC MASTER
WIRING BOARD A
120V PIPA SUPPLY AND IRIG TEMP (FQ)

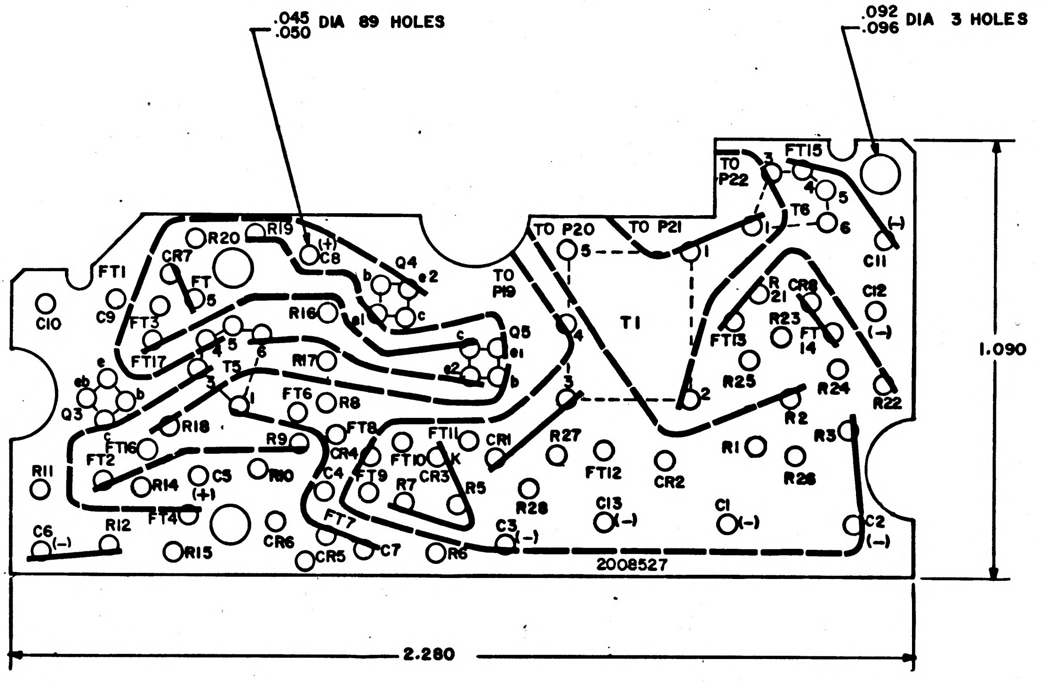
CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008526
SCALE 5/1		SHEET 1 OF 1

2008526

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 28509

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


.045 .050 DIA 89 HOLES
.092 .096 DIA 3 HOLES
1.090
2.280
2008527
TO P22
FT15
TO P20
TO P21
TO P19
T1
T5
T6
FT1
FT2
FT3
FT4
FT6
FT7
FT8
FT9
FT10
FT11
FT12
FT13
FT14
FT16
FT17
R1
R2
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R7
R8
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R10
R11
R12
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
Q3
Q4
Q5
(+)
(-)

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DWG NO. 2008526 PHOTOGRAPHIC MASTER

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007244	
2007241	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Louis A Lowe
CHECKED Bonarrigo 2 May 66
APPROVED Rueser 2 MAY 66
APPROVED 2 May 66
APPROVED MIT A. C. METZGER 3 May 66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
120V PIPA SUPPLY AND IRIG TEMP (FQ)

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008527
SCALE 5/1
SHEET 1 OF 1

REVISIONS 28510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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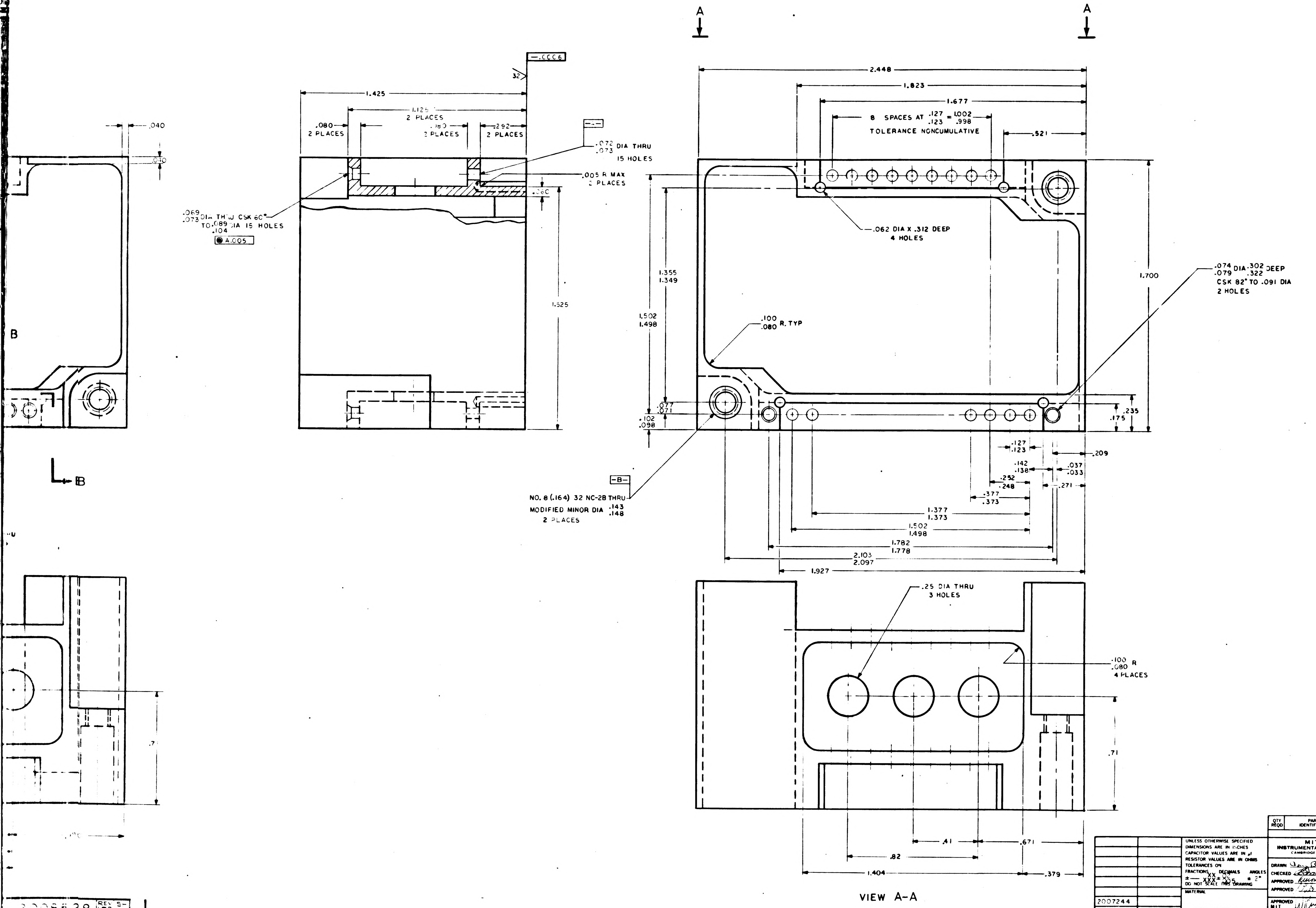


A
A
2.448
1.823
1.677
8 SPACES AT .127/.123 = 1.002/.998
TOLERANCE NONCUMULATIVE
.521
.062 DIA X .312 DEEP
4 HOLES
.074/.079 DIA .302/.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
1.700
1.355
1.349
1.502
1.498
.100/.080 R. TYP
.077/.071
.102/.098
.235
.175
NO. 8 (.164) 32 NC-2B THRU
MODIFIED MINOR DIA .143/.148
2 PLACES
-B-
.127/.123
.209
.142/.138
.037/.033
.252/.248
.271
.377/.373
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
1.425
.125
2 PLACES
.160
2 PLACES
.080
2 PLACES
.292
2 PLACES
— .0006
32
.072/.073 DIA THRU
15 HOLES
.005 R MAX
2 PLACES
.060
1.525
.069/.073 DIA THRU CSK 60° TO .089/.104 DIA 15 HOLES
◉ A .005
.040
.040
B
B
.7
.25 DIA THRU
3 HOLES
.100/.080 R
4 PLACES
.71
.41
.82
.671
1.404
.379
VIEW A-A

2007244	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — XX ± .02 XXX ± .005 ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Bell
CHECKED Bonarrigo 2 Mar 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC R. G. METZGER
DATE

FRAME
120V PIPA SUPPLY (OP)
SIGNAL CONDITIONER ASSY

CODE IDENT NO	SIZE	DRAWING NO.
80230	J	2008528

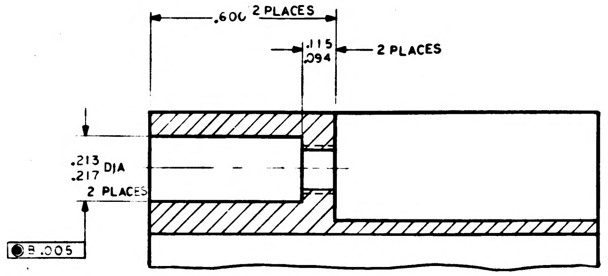
SCALE 5/1 SHEET 1 OF 1

2008528 A

2008528 REV LTR A

2720008528

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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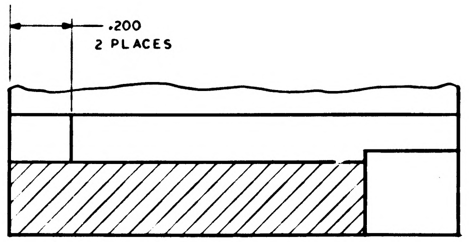
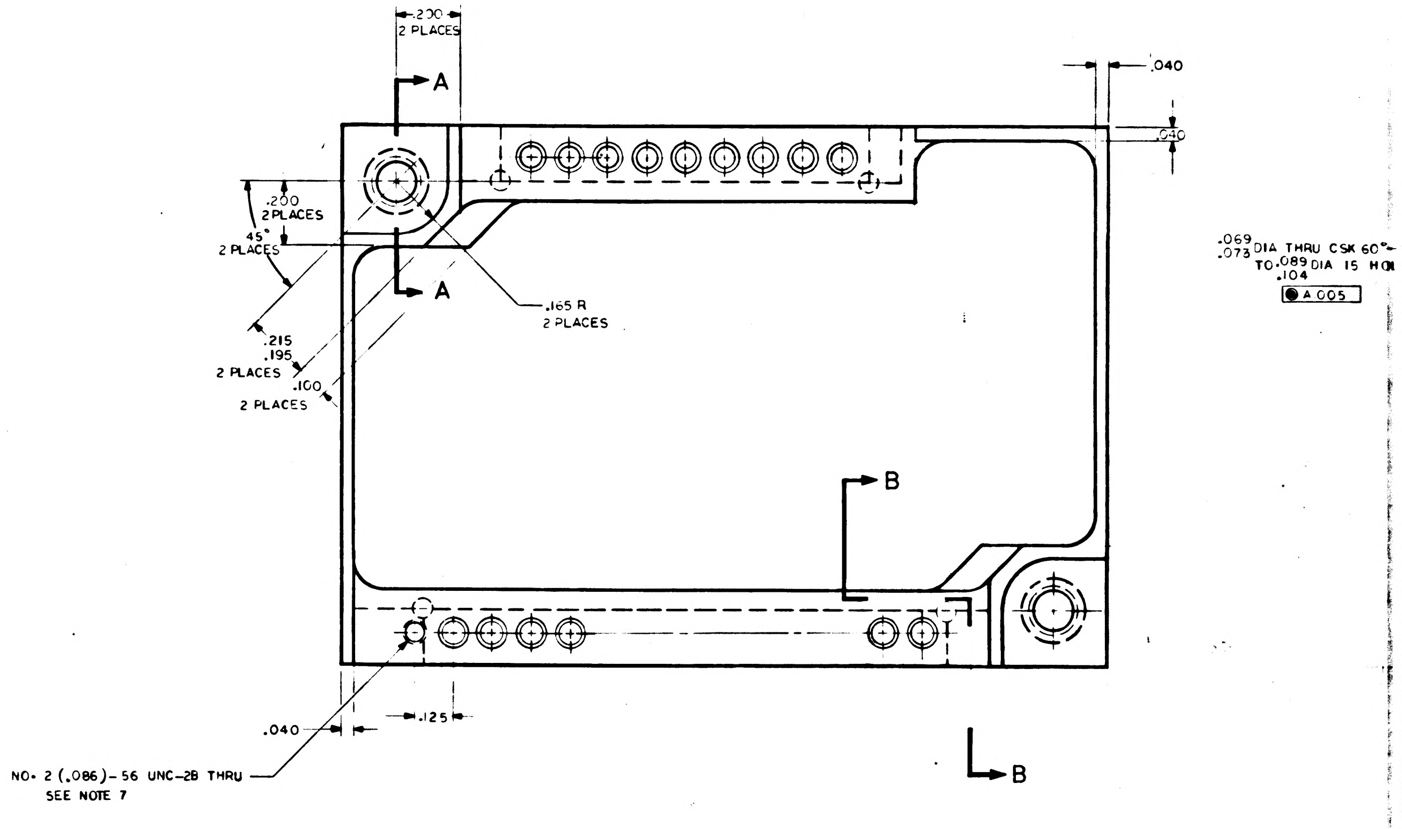
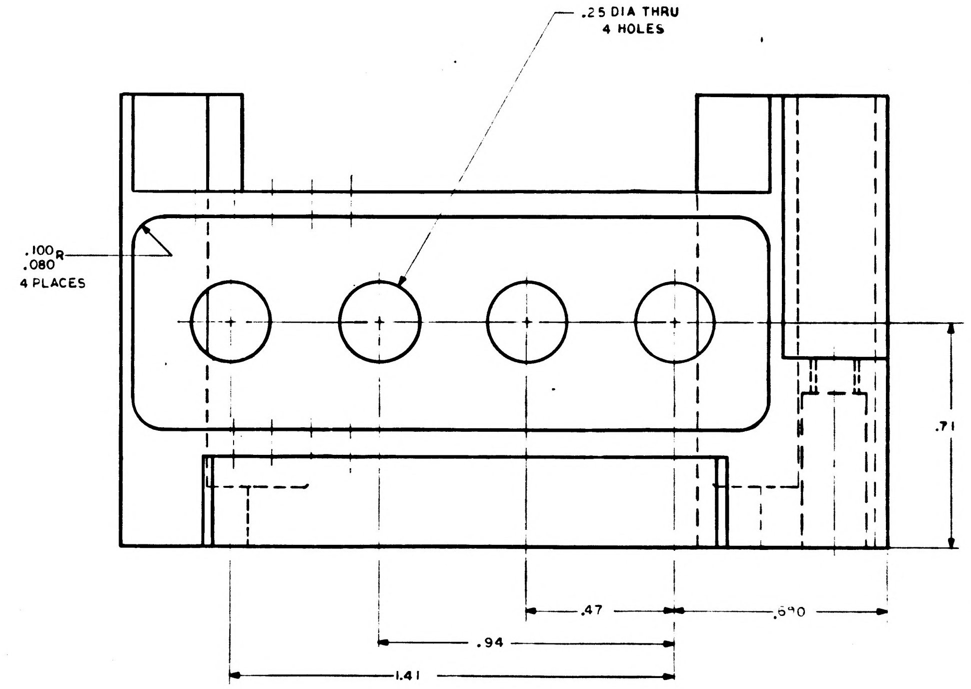
.115
.094
2 PLACES
.213
.217 DIA
2 PLACES
B .005

PARTIAL SECTION A-A


.200
2 PLACES

PARTIAL SECTION B-B


.200
2 PLACES
A
A
.040
.040
.200
2 PLACES
45°
2 PLACES
.165 R
2 PLACES
.215
.195
2 PLACES
.100
2 PLACES
.069
.073 DIA THRU CSK 60°
TO .089
.104 DIA 15 HOL
A .005
B
B
.040
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7

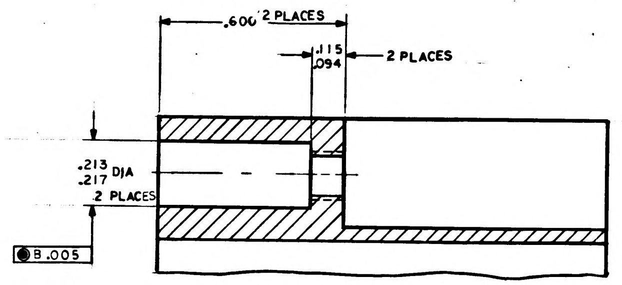

.25 DIA THRU
4 HOLES
.100
.080 R
4 PLACES
.71
.47
.640
.94
1.41

NOTES:

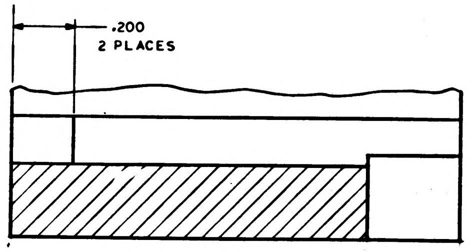
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND 1002019

2008528	REV A	SH 1

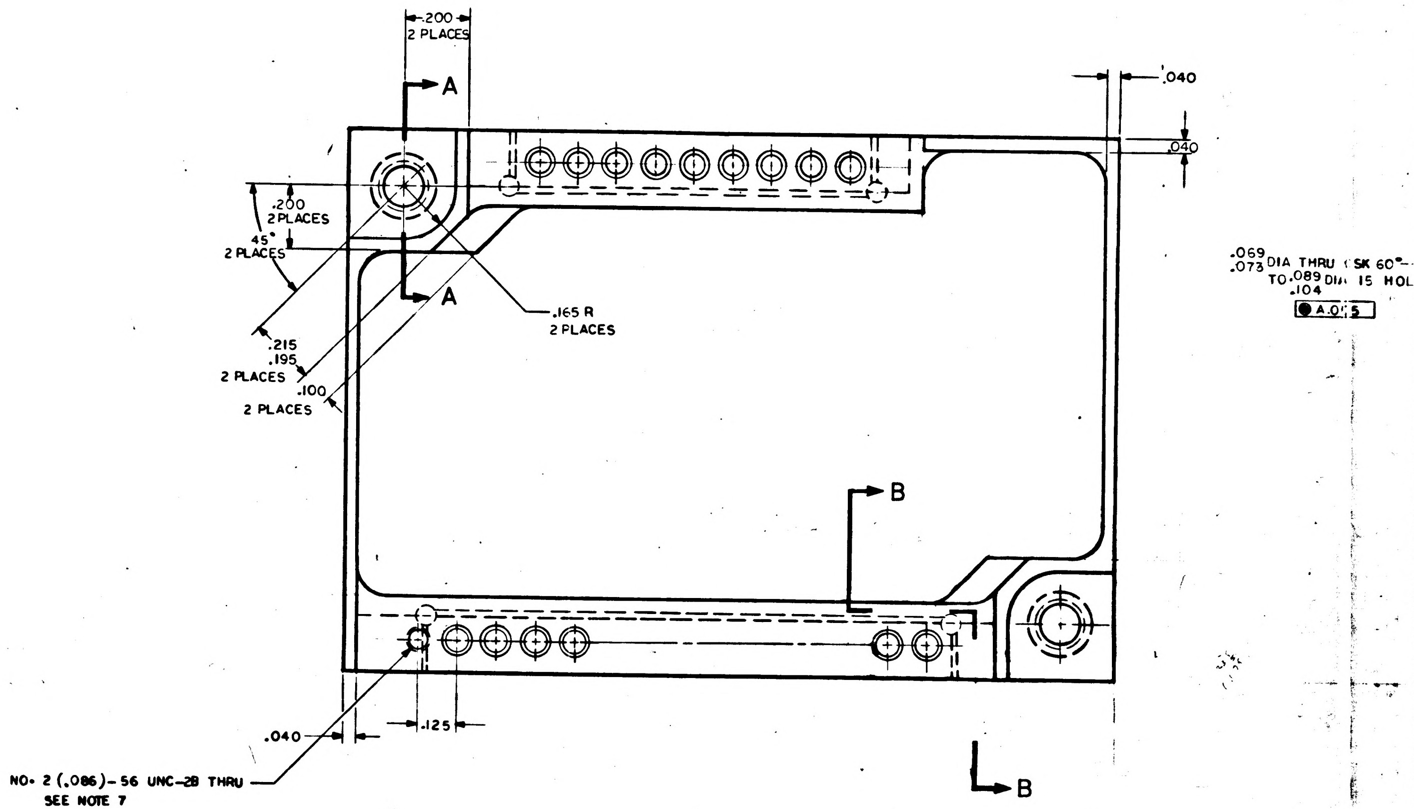
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

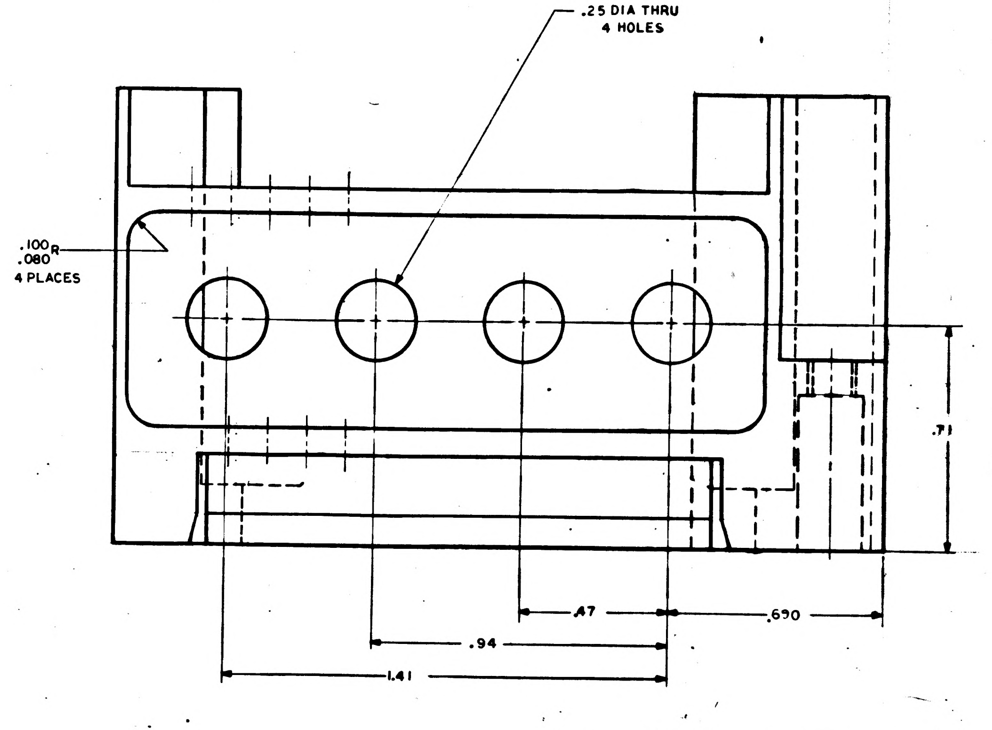

.600 2 PLACES
.115
.094
2 PLACES
.213
.217 DIA
2 PLACES
B .005

PARTIAL SECTION A-A


.200
2 PLACES

PARTIAL SECTION B-B


.200
2 PLACES
A
A
.040
.040
.200
2 PLACES
45°
2 PLACES
.165 R
2 PLACES
.215
.195
2 PLACES
.100
2 PLACES
.069
.073 DIA THRU CSK 60°
TO .089
.104 DIA 15 HOL
A .0 5
B
B
.040
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7


.25 DIA THRU
4 HOLES
.100
.080 R
4 PLACES
.71
.47
.690
.94
1.41

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005/.015
5. UNLESS OTHERWISE SPECIFIED 125√ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND 1002019

2008528	REV LTR B	SH 1

REVISIONS 28510

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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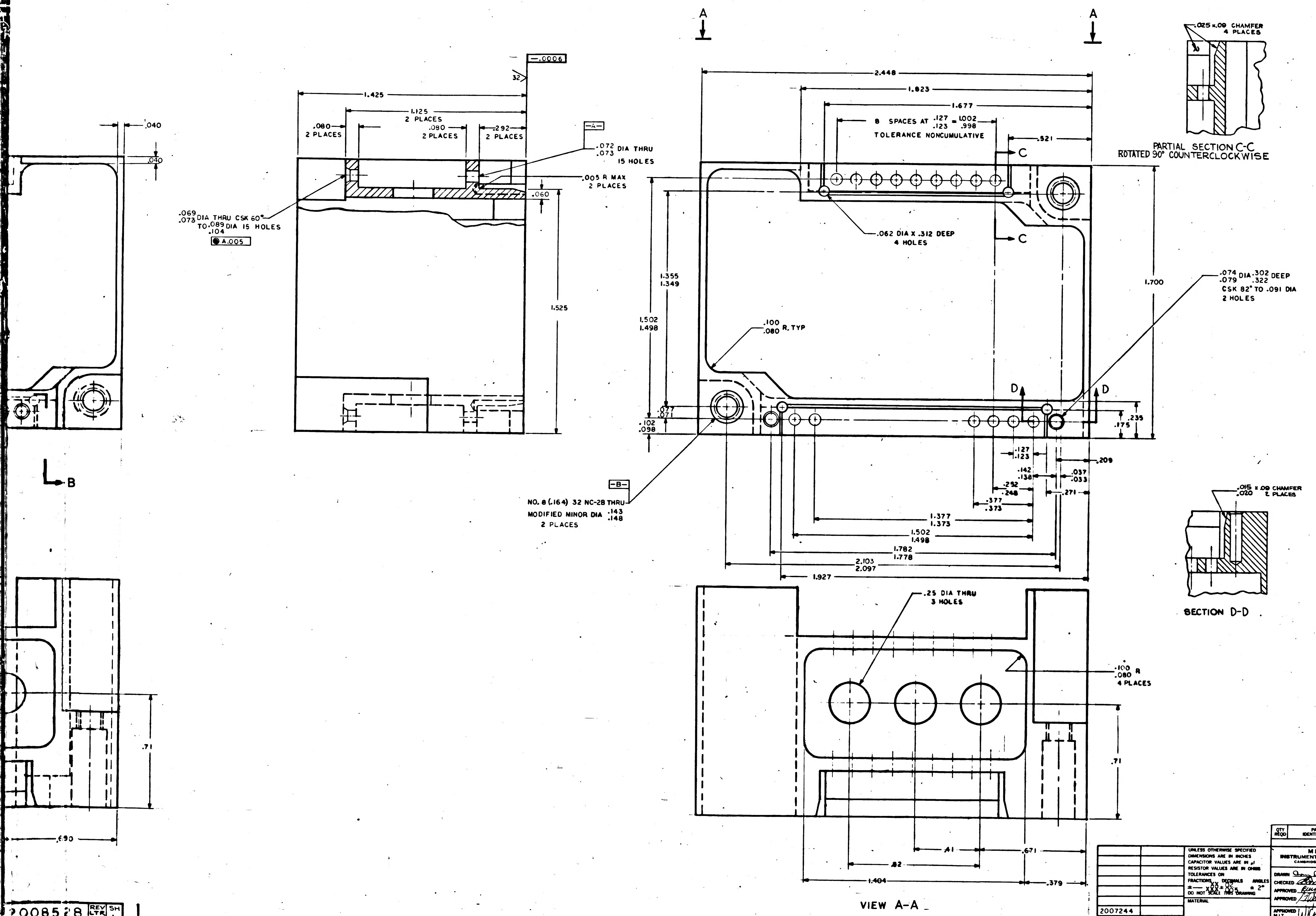
B		REVISED PER TDRR 32433	REP		10 JAN 67	



A
A
.0006
32
1.425
1.125 2 PLACES
.080 2 PLACES
.080 2 PLACES
.292 2 PLACES
-A-
.072 .073 DIA THRU 15 HOLES
.005 R MAX 2 PLACES
.060
.069 .072 DIA THRU CSK 60° TO .089 .104 DIA 15 HOLES
A .005
1.525
.040
.040
2.448
1.823
1.677
8 SPACES AT .127 .123 = 1.002 .998
TOLERANCE NONCUMULATIVE
.521
C
C
.062 DIA X .312 DEEP 4 HOLES
1.355 1.349
1.502 1.498
1.700
.100 .080 R. TYP
.074 .079 DIA .302 .322 DEEP
CSK 82° TO .091 DIA 2 HOLES
D
D
.235
.175
.077 .071
.102 .098
-B-
NO. 8 (.164) 32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 PLACES
.127 .123
.142 .138
.252 .248
.377 .373
.209
.037 .033
.271
1.377 1.373
1.502 1.498
1.782 1.778
2.103 2.097
1.927
B
.025 x .09 CHAMFER 4 PLACES
PARTIAL SECTION C-C
ROTATED 90° COUNTERCLOCKWISE
.015 .020 x .09 CHAMFER 2 PLACES
SECTION D-D
.25 DIA THRU 3 HOLES
.100 .080 R 4 PLACES
.71
.71
.41
.671
.82
1.404
.379
.690
VIEW A-A

2008528 REV LTR B SH 1

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007244	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS XX ± .02 XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

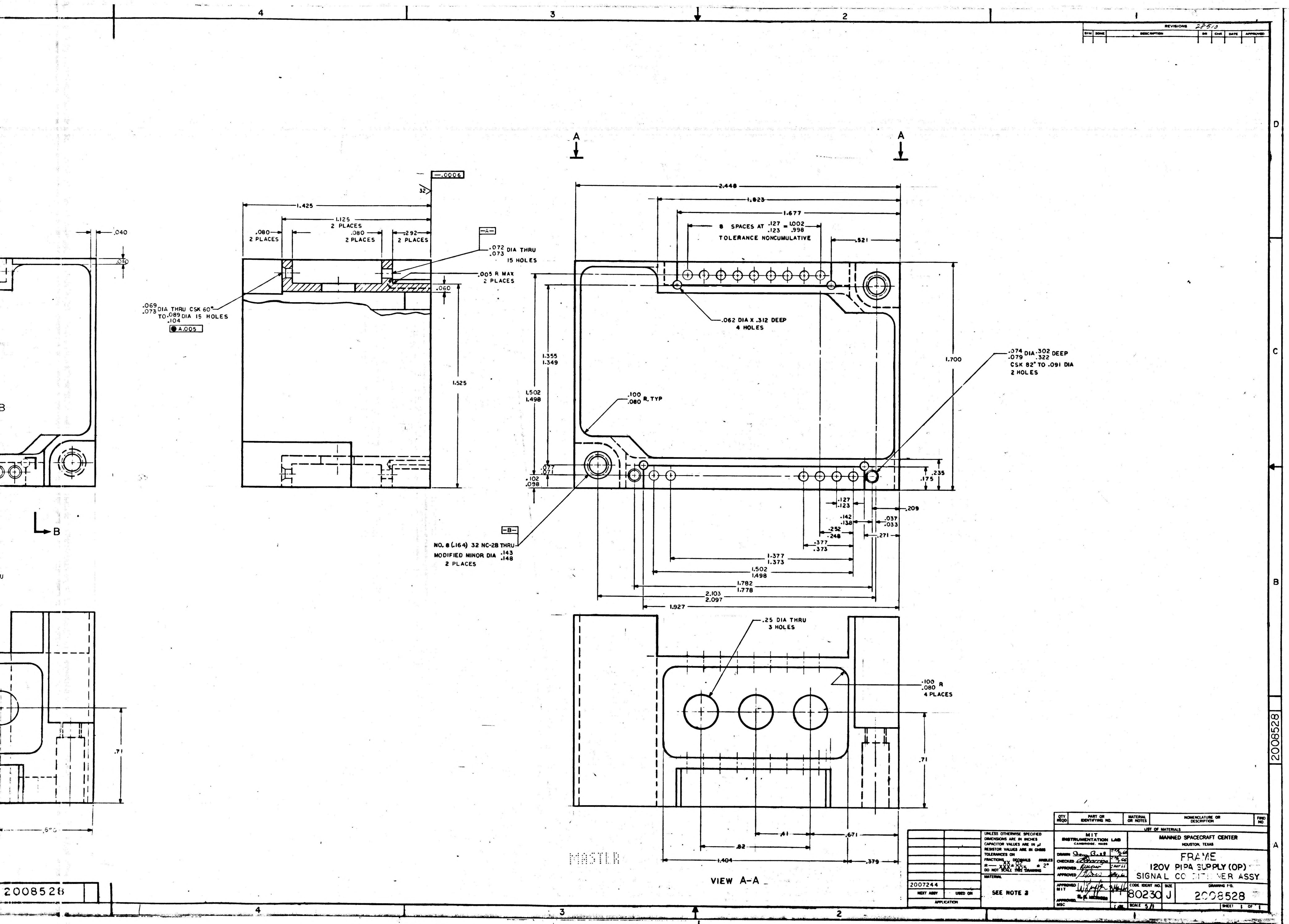
DRAWN Gary B. Bell 25 Apr 66
CHECKED Bonarrigo 27 Apr 66
APPROVED Kupfer 2 MAY 66
APPROVED 2 May 66
APPROVED MIT W. Kupfer 3 Aug 66
APPROVED MSC E. G. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FRAME
120V PIPA SUPPLY (OP)
SIGNAL CONDITIONER ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008528
SCALE 5/1
SHEET 1 OF 1

2/2008528


4
3
2
1
D
C
B
A
REVISIONS
SYM
ZONE
DESCRIPTION
BY
CHK
DATE
APPROVED
—.0006
32
1.425
1.125
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
-A-
.072
.073 DIA THRU
15 HOLES
.005 R MAX
2 PLACES
.060
.040
.040
.069
.073 DIA THRU CSK 60°
TO .089
.104 DIA 15 HOLES
● A.005
1.525
B
B
A
A
2.448
1.823
1.677
8 SPACES AT .127
.123 = 1.002
.998
TOLERANCE NONCUMULATIVE
.521
.062 DIA X .312 DEEP
4 HOLES
1.355
1.349
1.502
1.498
.100
.080 R. TYP
1.700
.074
.079 DIA .302
.322 DEEP
CSK 82° TO .091 DIA
2 HOLES
.077
.071
.102
.098
.235
.175
.127
.123
.209
.142
.138
.037
.033
.252
.248
.271
.377
.373
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
-B-
NO. 8 (.164) 32 NC-2B THRU
MODIFIED MINOR DIA .143
.148
2 PLACES
.25 DIA THRU
3 HOLES
.100
.080 R
4 PLACES
.71
.71
.41
.671
.82
1.404
.379
VIEW A-A
MASTER
2008528
2008528
3H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

2007244	
NEXT ASSY	USED ON
APPLICATION	

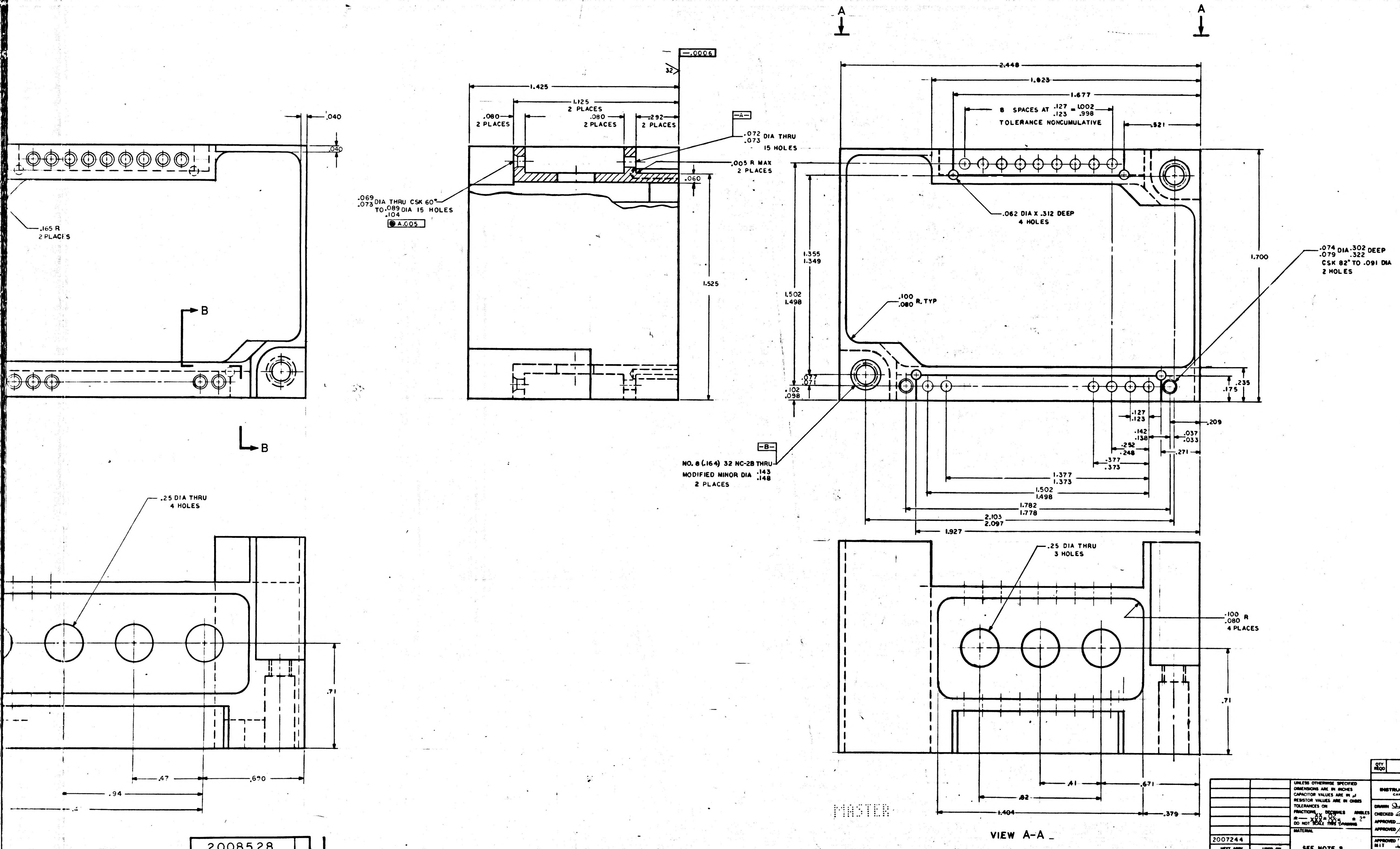
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED 2 MAY 66
APPROVED
APPROVED MIT
APPROVED MSC

FRAME
120V PIPA SUPPLY (OP)
SIGNAL CONDITIONER ASSY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2008528
SCALE 5/1
SHEET 1 OF 1



A
A
—.0006
32
1.425
1.125
2 PLACES
.080
2 PLACES
.080
2 PLACES
.292
2 PLACES
—A—
.072 .073 DIA THRU
15 HOLES
.005 R MAX
2 PLACES
.060
.069 .073 DIA THRU CSK 60° TO .089 .104 DIA 15 HOLES
● A.005
1.525
.040
.040
.165 R
2 PLACES
B
B
2.448
1.823
1.677
8 SPACES AT .127 .123 = 1.002 .998
TOLERANCE NONCUMULATIVE
.521
.062 DIA X .312 DEEP
4 HOLES
1.700
.074 .079 DIA .302 .322 DEEP
CSK 82° TO .091 DIA
2 HOLES
1.355
1.349
1.502
1.498
.100 .080 R. TYP
.077
.071
.102
.098
.175
.235
.127
.123
.209
.142
.138
.037
.033
.252
.248
.271
.377
.373
1.377
1.373
1.502
1.498
1.782
1.778
2.103
2.097
1.927
—B—
NO. 8 (.164) 32 NC-2B THRU
MODIFIED MINOR DIA .143 .148
2 PLACES
.25 DIA THRU
4 HOLES
.71
.47
.690
.94
.25 DIA THRU
3 HOLES
.100 .080 R
4 PLACES
.71
.41
.671
.82
1.404
.379
MASTER

VIEW A-A

2008528

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

2007244	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS .XX ± .02 .XXX ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

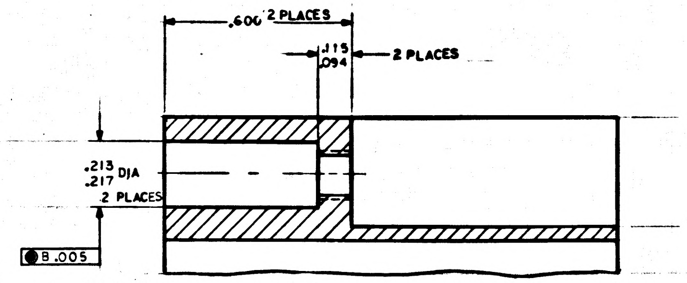
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
E. E. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

120V
SIGNAL

CODE IDENT NO. 80230
SIZE J
SCALE 5/1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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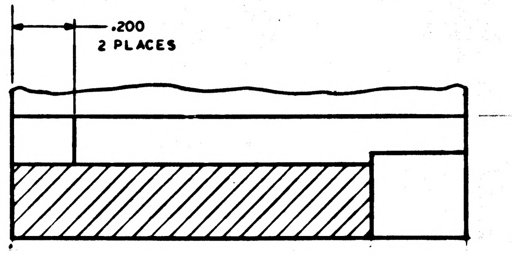
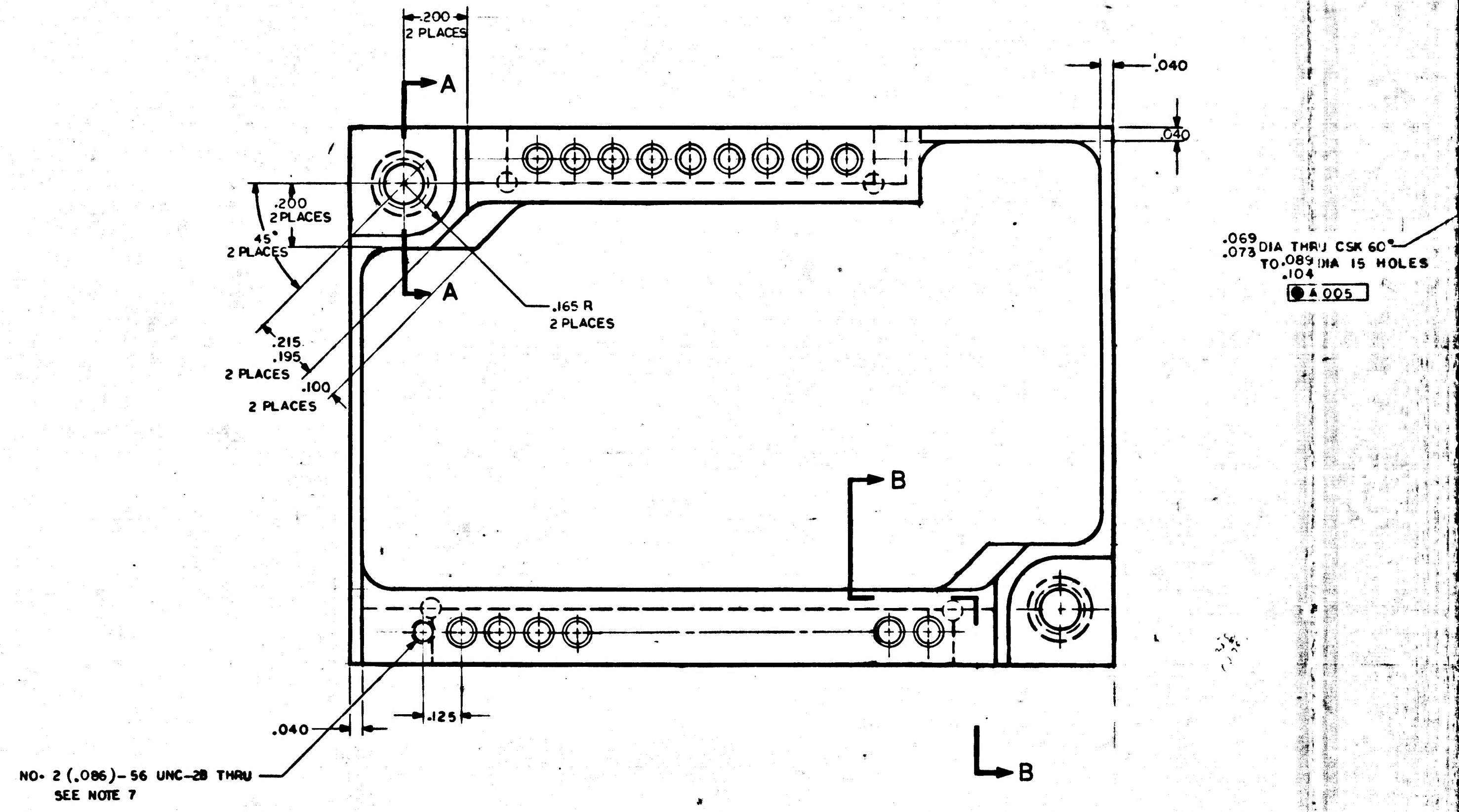
.115
.094
2 PLACES
.213
.217 DIA
2 PLACES
B .005

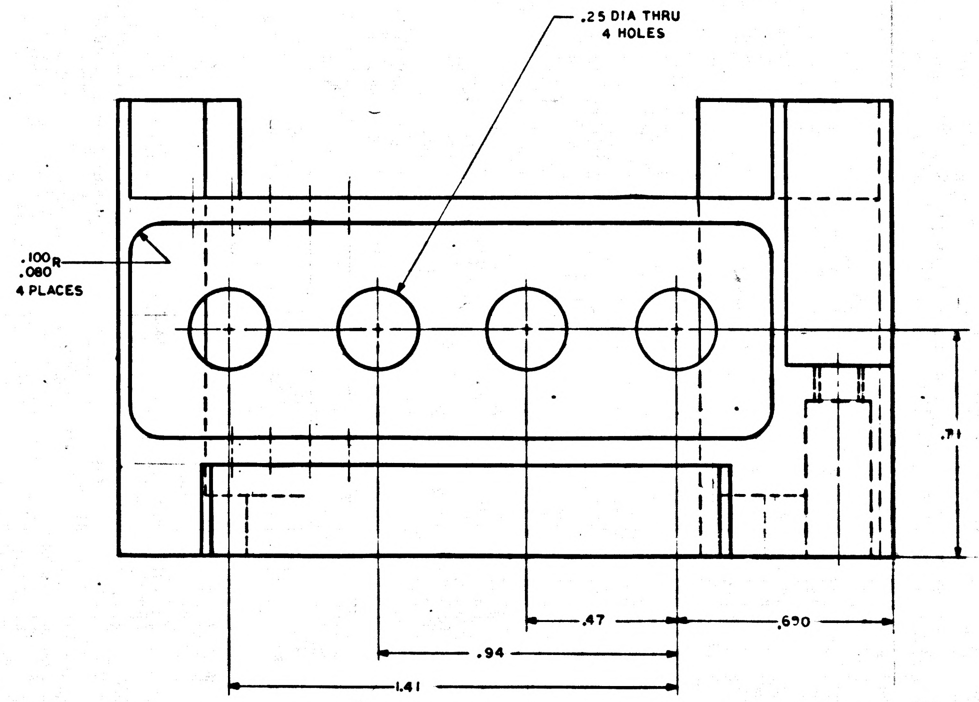
PARTIAL SECTION A-A


.200
2 PLACES

PARTIAL SECTION B-B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM ZK60A-T5 PER QQ-M-31, TEMP 5
3. UNLESS OTHERWISE SPECIFIED, ALL FILLETS AND RADII TO BE .010 MAX
4. REMOVE BURRS AND SHARP EDGES .005 /.015
5. UNLESS OTHERWISE SPECIFIED 125/ ALL OVER
6. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
7. TAP HOLE AFTER ANODIZE. COAT PER ND 1002040, DO NOT EPOXY COAT
8. IDENTIFY WITH PART NO. PER ND 1002019

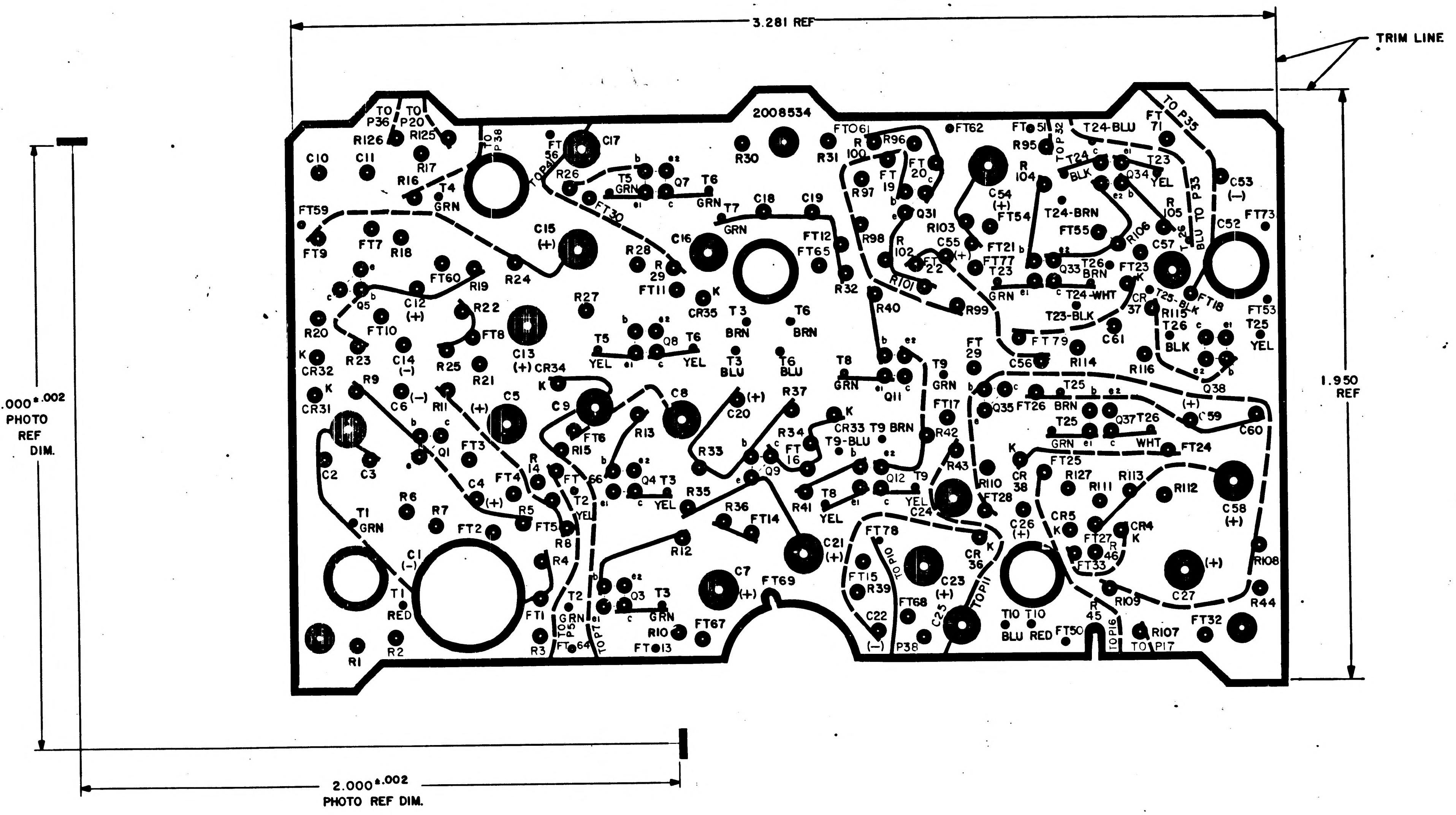

.200
2 PLACES
A
A
.040
.040
.069
.073 DIA THRU CSK 60°
TO .089
.104 DIA 15 HOLES
A .005
.200
2 PLACES
45°
2 PLACES
.165 R
2 PLACES
.215
.195
2 PLACES
.100
2 PLACES
B
B
.040
.125
NO. 2 (.086)-56 UNC-2B THRU
SEE NOTE 7


.25 DIA THRU
4 HOLES
.100
.080 R
4 PLACES
.71
.47
.690
.94
1.41

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30281			27 Aug 66	



NOTES:
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2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Adams Jr. 4 May 66
CHECKED Bonarrigo 2 May 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER WIRING BOARD A
TORQUE MOTOR AND 1 X SINE GIMBAL RESOLVER

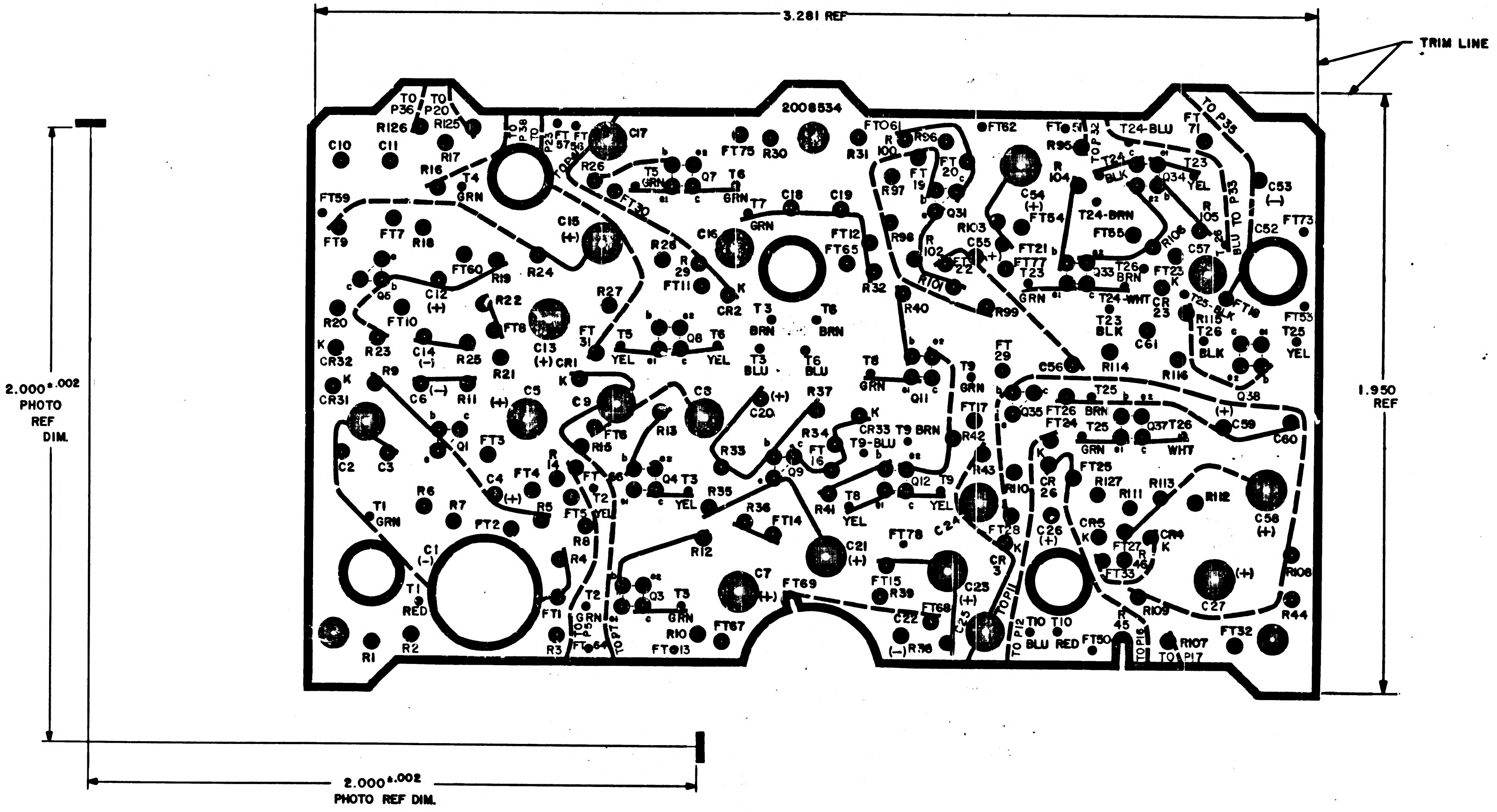
CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008530
SCALE 5/1
SHEET 1 OF 1

2008530 A

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.281 REF
TRIM LINE
1.950 REF
2.000±.002 PHOTO REF DIM.
2.000±.002 PHOTO REF DIM.
2008534
TO P36
TO P20
TO P35
TO P33
TO P11
TO P12
TO P16
TO P17
TO P7
C1 C2 C3 C5 C7 C9 C10 C11 C13 C15 C16 C17 C18 C19 C21 C23 C27 C52 C53 C57 C58 C59 C60
T1 GRN RED
T2 GRN
T3 BRN BLU YEL GRN
T4 GRN
T5 GRN YEL
T6 BRN BLU YEL GRN
T7 GRN
T8 GRN YEL
T9 GRN BRN BLU YEL
T10 BLU RED
T23 BLK YEL
T24-BLU T24-BRN T24-WHT
T25 YEL BRN GRN
T26 BLK BRN WHT

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Jablonski Jr. 4 May 66
CHECKED Bouarrigo 23 May 66
APPROVED Rumor May 25/66
APPROVED S. Lieb LGE 5/25/66
APPROVED MIT MG Murley 6-1-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
TORQUE MOTOR AND I X SINE
GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008530
SCALE 5/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 25256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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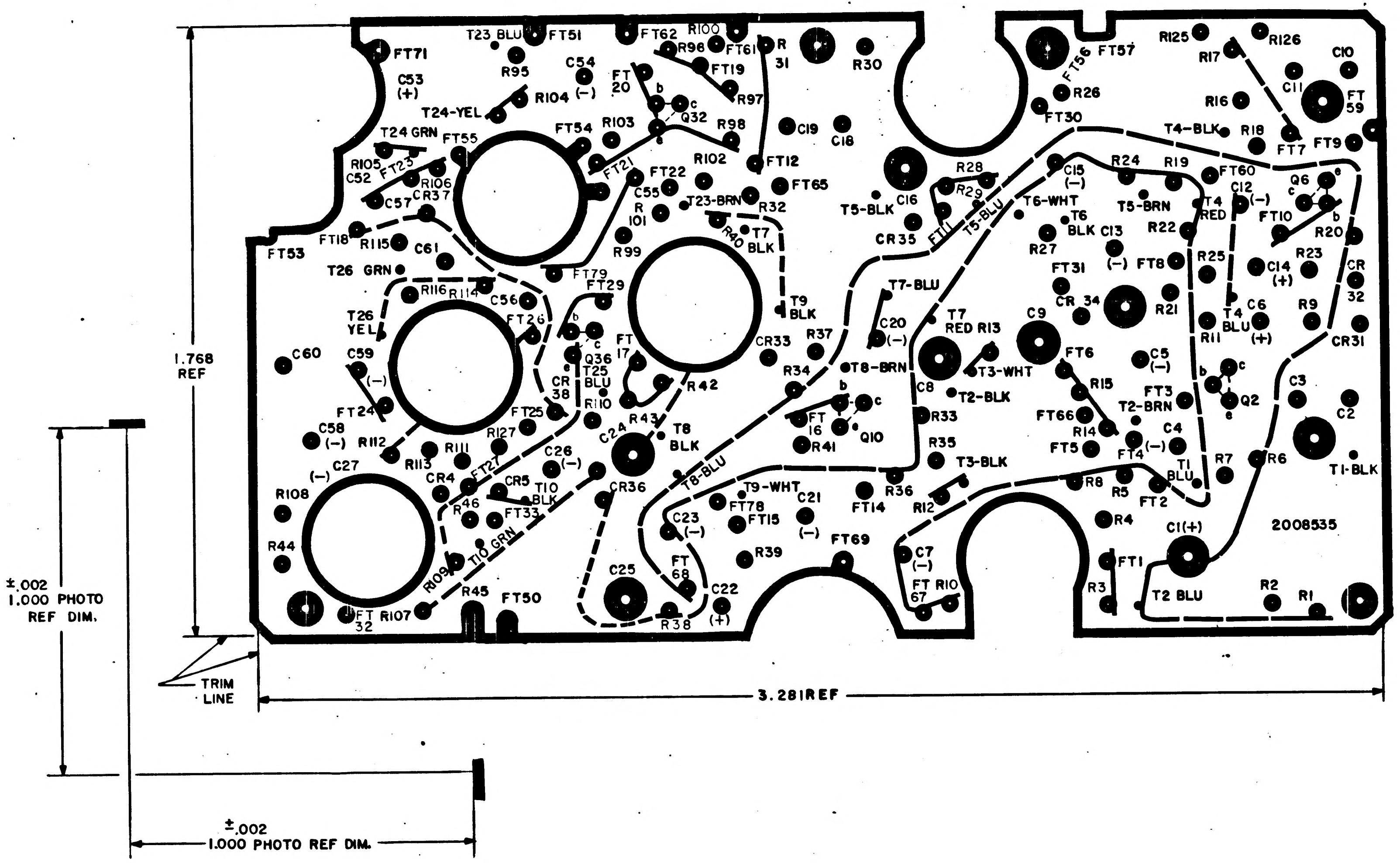
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FT51
FT62
R100
R96
FT61
R 31
R30
C53 (+)
R95
C54 (−)
FT 20
FT19
R97
T24-YEL
R104
Q32
R98
C19
C18
T24 GRN
FT55
FT54
R103
FT12
R105
C52
FT23
R106
CR37
FT21
FT22
C55
R 101
R102
T23-BRN
R32
FT65
C16
T5-BLK
CR35
C57
R40
T7 BLK
FT18
R115
C61
FT53
T26 GRN
FT79
FT29
R99
T9 BLK
R116
R114
C56
FT26
T26 YEL
CR33
R37
C60
C59 (−)
FT 17
Q36
CR 38
T25 BLU
R110
R42
R34
FT24
C58 (−)
R112
R111
R127
FT25
C26 (−)
C24
R43
T8 BLK
C27 (−)
R113
CR4
FT27
CR5
T10 BLK
CR36
R108
R46
FT33
T8-BLU
T9-WHT
C21 (−)
R36
FT14
R44
R109
T10 GRN
C23 (−)
FT78
FT15
R39
FT69
FT 68
C25
C22 (+)
R45
FT50
FT 32
R107
R38
FT56
FT57
R125
R17
R126
C10
C11
FT 59
R16
R26
FT30
T4-BLK
R18
FT7
FT9
R28
R29
C15 (−)
R24
R19
FT60
C12 (−)
Q6
FT11
T5-BLU
T6-WHT
T6 BLK
C13 (−)
T5-BRN
T4 RED
FT10
R20
R22
R27
FT31
FT8
R25
C14 (+)
R23
CR 32
T7-BLU
CR 34
R21
C6
R9
C20 (−)
T7 RED
R13
C9
T4 BLU (+)
R11
CR31
T8-BRN
T3-WHT
FT6
C5 (−)
C3
C8
T2-BLK
R15
FT3
T2-BRN
Q2
C2
FT 16
Q10
R41
R33
FT66
R14
C4 (−)
R35
FT5
FT4
T1 BLU
R7
R6
T1-BLK
T3-BLK
R8
R5
FT2
R12
R4
C1(+)
2008535
C7 (−)
FT1
FT R10 67
R3
T2 BLU
R2
R1
1.768 REF
±.002 1.000 PHOTO REF DIM.
TRIM LINE
3.281 REF
±.002 1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 27 Mar 66
CHECKED Bonarrigo 25 May 66
APPROVED MAY 27/66
APPROVED
APPROVED MIT 6/1/66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

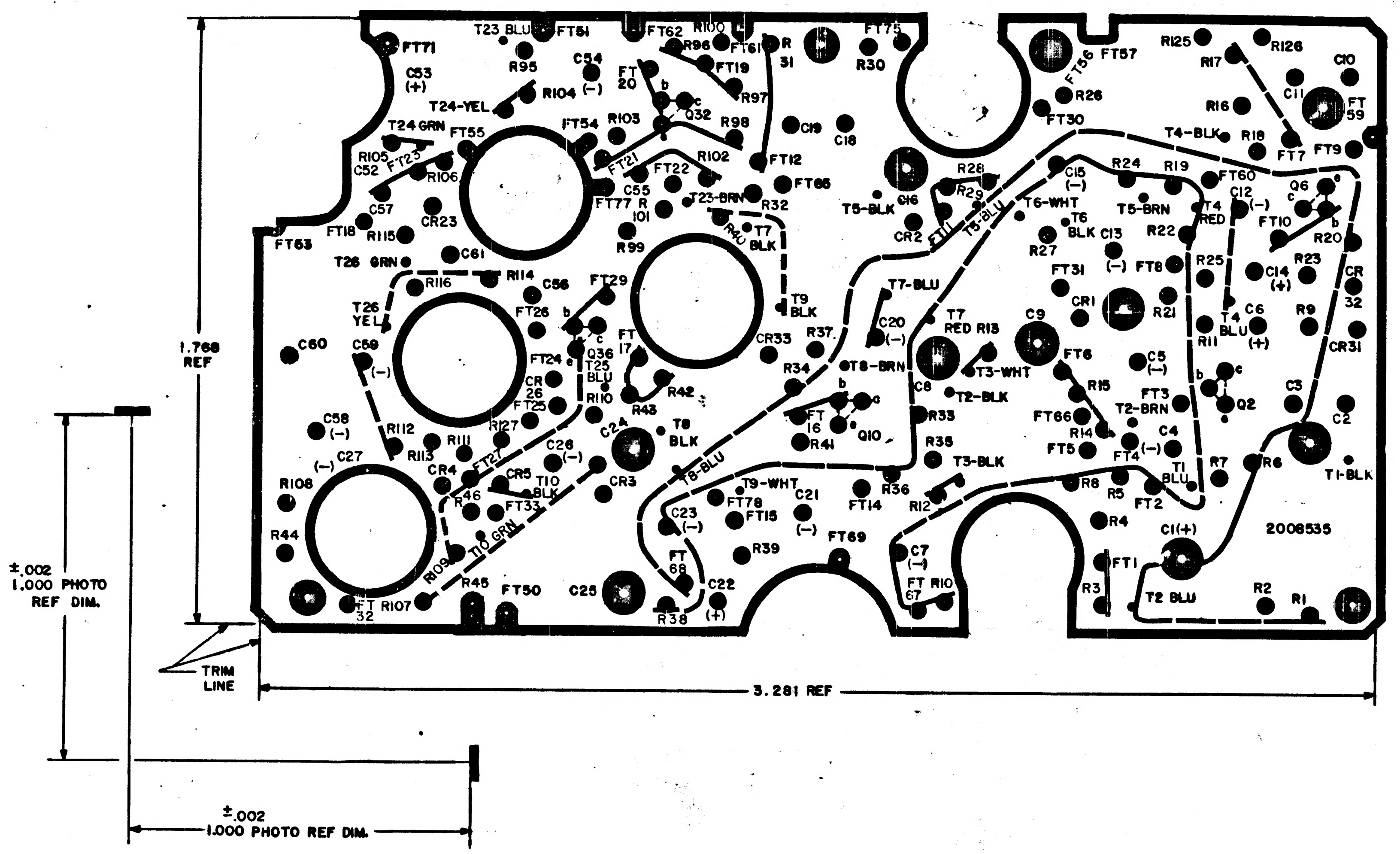
PHOTOGRAPHIC MASTER
WIRING BOARD B
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER

CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008531
SCALE 5/1
SHEET 1 OF 1

2008531 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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R
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FT71
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(–)
FT
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R96
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C53
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R104
b
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Q32
T24-YEL
R103
R98
C19
C18
T24 GRN
FT55
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C52
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FT21
FT22
R102
FT12
FT66
C57
C55
FT77
R
101
T23-BRN
R32
R40
T7
BLK
T5-BLK
C16
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FT63
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R116
R114
C56
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FT26
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C60
C59
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FT24
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FT
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R113
R127
R111
C26
(–)
C24
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BLK
C27
(–)
CR4
FT27
CR5
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BLK
CR3
T8-BLU
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FT33
T9-WHT
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(–)
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(–)
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C22
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R45
FT50
C25
R38
FT
32
R107
FT
16
R41
b
c
e
Q10
R28
R29
FT11
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T6-WHT
T6
BLK
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R19
FT60
T5-BRN
T4
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C12
(–)
Q6
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b
FT10
R20
R27
C13
(–)
FT8
R22
R25
C14
(+)
R23
CR
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FT31
CR1
R21
T7-BLU
C20
(–)
T7
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R13
C9
T4
BLU
C6
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R9
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FT6
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(–)
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(–)
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FT1
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T2 BLU
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R1
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FT57
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FT
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FT30
T4-BLK
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FT7
FT9
1.768
REF
±.002
1.000 PHOTO
REF DIM.
TRIM
LINE
3.281 REF
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIMLINE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Lewis A Lane 27 May 66
CHECKED Bonarrigo 27 May 66
APPROVED Rummer MAY 25/66
APPROVED Arthur 5/25/66
APPROVED MIT Mulvey 6-1-66
A.C.
APPROVED MSC
DATE

PHOTOGRAPHIC MASTER WIRING BOARD B
TORQUE MOTOR AND IX SINE GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008531
SCALE 8/1
SHEET 1 OF 1

2008531

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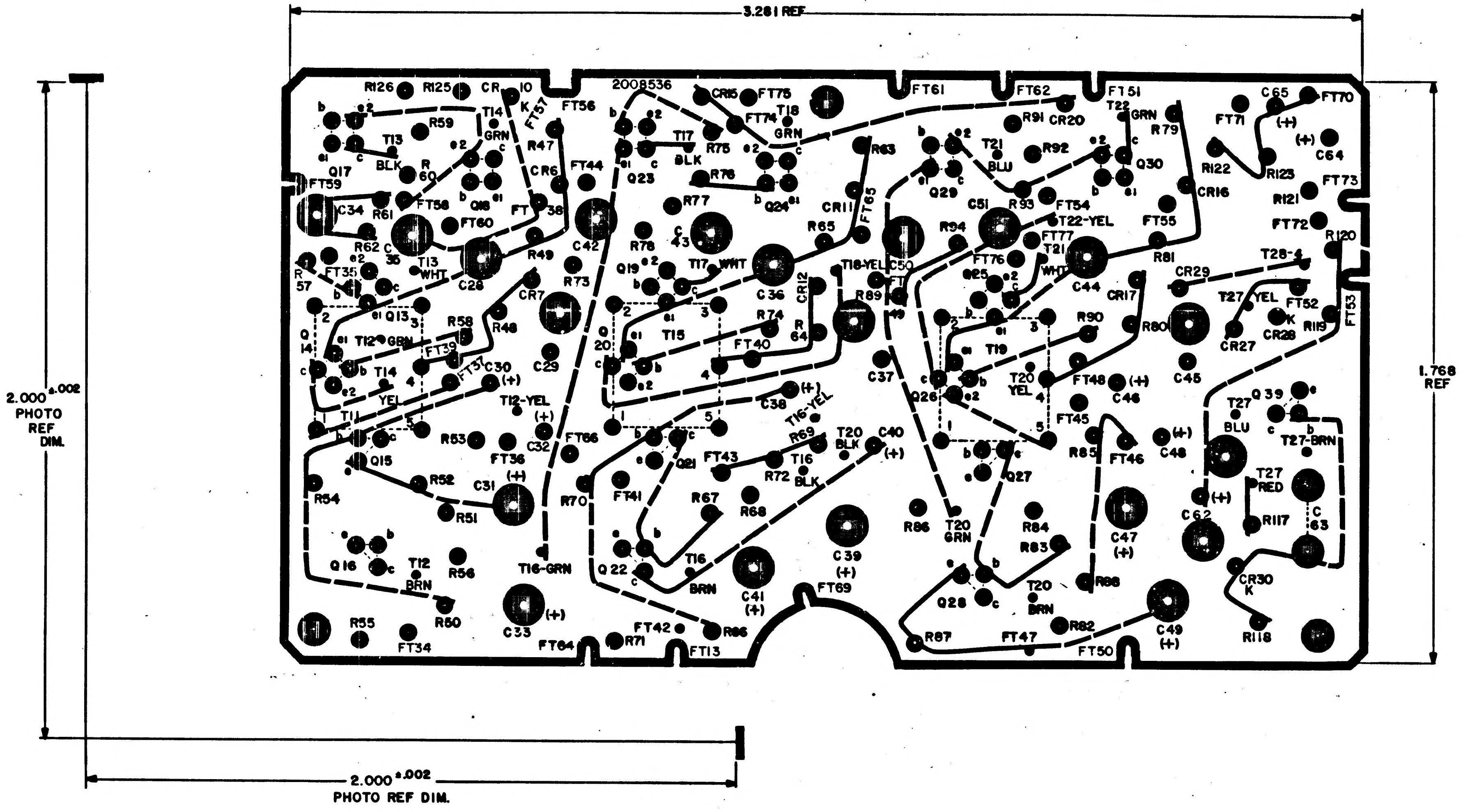
REVISIONS 29256						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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1.768 REF
2.000 ±.002 PHOTO REF DIM.
2.000 ±.002 PHOTO REF DIM.
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R125
CR 10 K
FT57
FT56
T14 GRN
R59
T13 BLK
Q17
R60
FT59
C34
R61
FT58
Q18
FT60
FT 38
R47
CR6
FT44
C42
R62
C 35
T13 WHT
C28
R49
R 57
FT35
Q13
Q 14
T12 GRN
R58
R48
CR7
R73
FT39
T14 YEL
FT37
C30 (+)
C29
T12-YEL
(+)
T11
Q15
R53
FT36
C32
FT66
R52
C31 (+)
R54
R51
R70
Q16
T12 BRN
R56
T16-GRN
R50
R55
FT34
C33 (+)
FT64
R71
FT42
R86
FT13
CR15
FT75
FT74
T18 GRN
T17 BLK
R75
Q23
R76
Q24
R77
C 43
R78
CR11
FT65
R65
R63
Q19
T17 WHT
C36
CR12
T18-YEL
R89
Q 20
T15
R74
R 64
FT40
C38 (+)
T16-YEL
R69
T20 BLK
C40 (+)
Q21
FT43
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R72
FT41
R67
R68
Q 22
T16 BRN
C41 (+)
C39 (+)
FT69
FT61
FT62
FT51
T22 GRN
R91
CR20
T21 BLU
R92
Q29
Q30
R79
C51
R93
FT54
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R94
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FT76
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FT55
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R122
R123
CR16
R121
FT73
FT72
R120
T28-4
CR29
T27 YEL
FT52
CR28 K
R119
FT53
CR27
Q39
T27 BLU
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T27 RED
C62 (+)
R117
C 63
CR30 K
R118

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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MASTER

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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

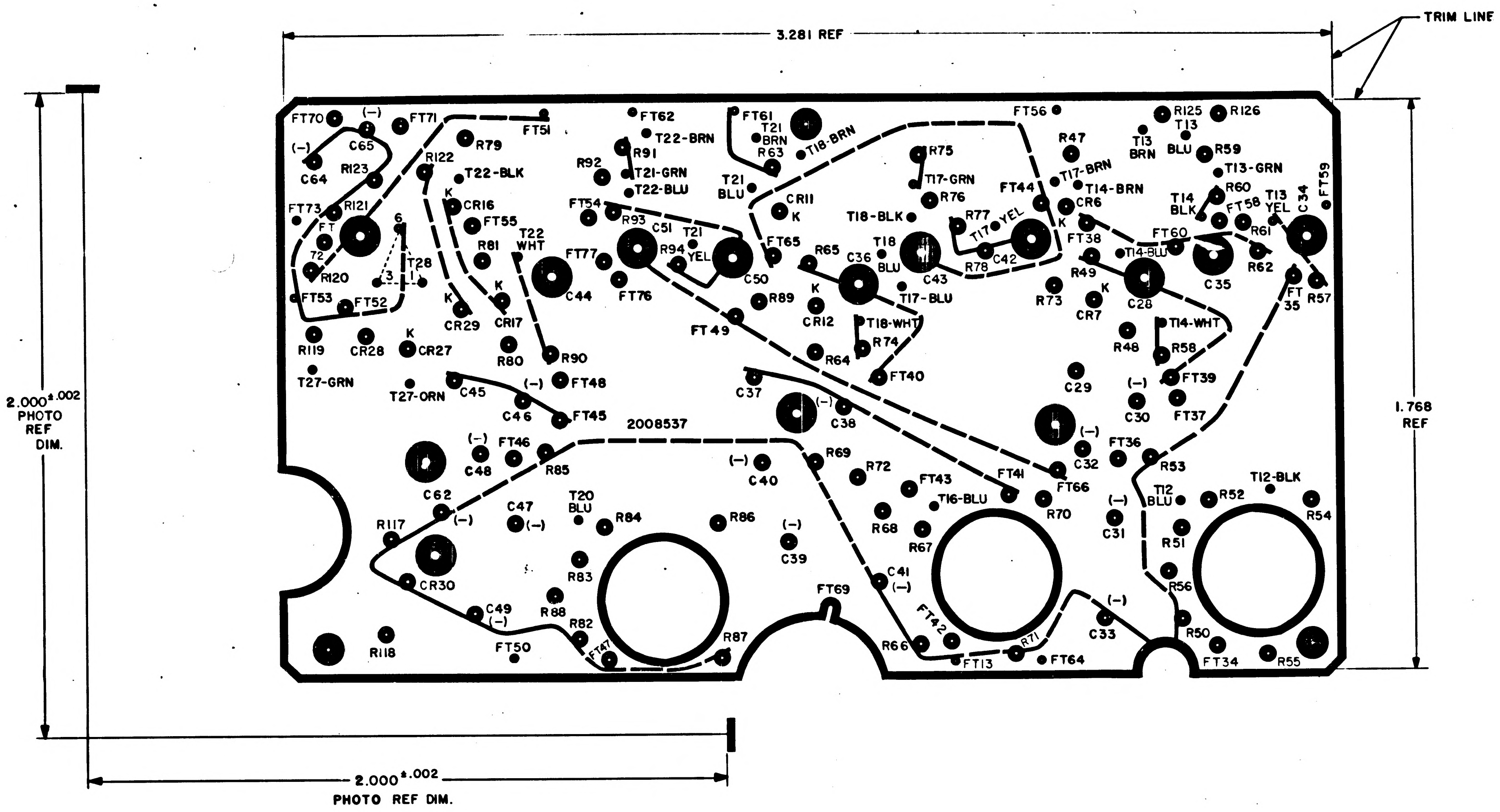
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	A. Addario Jr.	23 May 66
CHECKED	Bonarrigo	
APPROVED	Reuzer	MAY 25/66
APPROVED	A. Ches LTB	5/26/66
APPROVED MIT	MG Mundy	6-1-66
APPROVED MSC	A. C. METZGER	DATE

PHOTOGRAPHIC MASTER WIRING BOARD C
TORQUE MOTOR AND 1X SINE GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008532
SCALE 5/1		SHEET 1 OF 1

REVISIONS 272-6						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30281			27 AUG 66	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1.768 REF
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2.000±.002 PHOTO REF DIM.
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FT70
(−)
C65
FT71
FT51
(−)
C64
R123
R122
R79
T22-BLK
FT73
R121
K
CR16
FT55
FT
72
6
T28
3
1
R81
T22 WHT
R120
FT53
FT52
K
CR29
K
CR17
C44
FT77
FT76
R119
CR28
K
CR27
R80
R90
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T27-ORN
C45
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FT48
C46
FT45
FT62
T22-BRN
R92
R91
T21-GRN
T22-BLU
FT54
R93
C51
T21
R94
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C50
FT61
T21 BRN
R63
T18-BRN
T21 BLU
CR11
K
FT65
R65
C36
T18 BLU
C43
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CR12
R89
FT49
R64
R75
T17-GRN
R76
T18-BLK
R77
T17 YEL
C42
R78
T17-BLU
T18-WHT
R74
FT40
FT44
FT56
R47
T17-BRN
T14-BRN
CR6
K
FT38
R49
R73
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CR7
C28
T14-BLU
R125
R126
T13
T13 BRN
BLU
R59
T13-GRN
R60
T14 BLK
FT58
T13 YEL
C34
FT59
FT60
R61
C35
R62
FT 35
R57
T14-WHT
R48
R58
FT39
C29
(−)
C30
FT37
C37
(−)
C38
(−)
C48
FT46
R85
C62
(−)
R117
C47
(−)
T20 BLU
R84
R86
(−)
C40
(−)
C39
CR30
R83
C49
(−)
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R82
FT47
R87
R118
FT50
FT69
R69
R72
FT43
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R67
C41
(−)
FT42
R66
FT13
R71
FT64
FT41
FT66
R70
(−)
C32
FT36
R53
(−)
C31
T12 BLU
R52
T12-BLK
R54
R51
R56
(−)
C33
R50
FT34
R55

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Addario Jr. 23 May 66
CHECKED Bonafrigo 23 May 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD D
TORQUE MOTOR AND IX SINE
GIMBAL RESOLVER

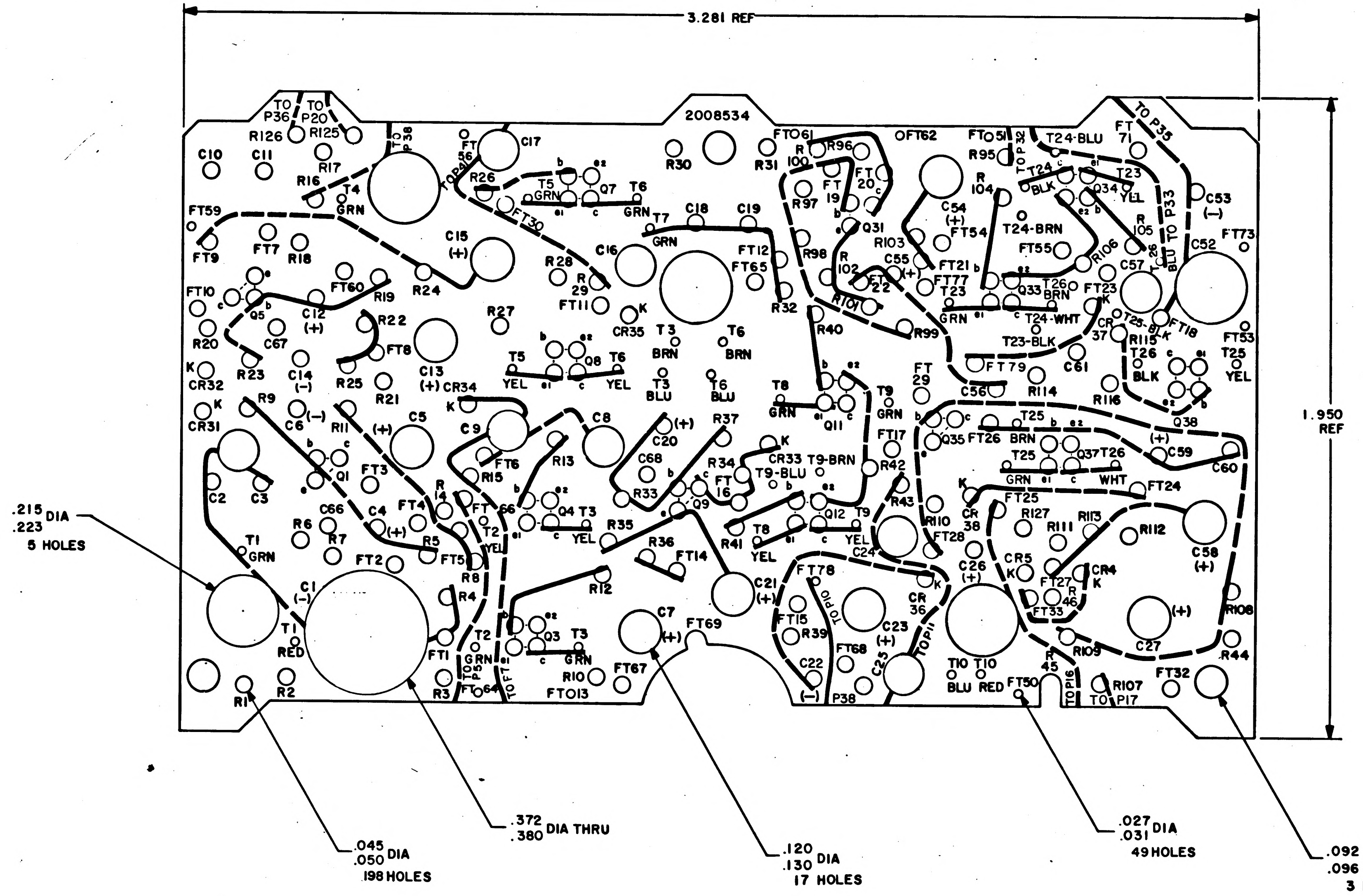
CODE IDENT NO 80230
SIZE D
DRAWING NO 2008533
SCALE 5/1
SHEET 1 OF 1

2008533 A

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 292?C

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30281		Wm	27 Aug 66	
B		REVISED PER TDRR 31976	WSM	cw	6 DEC 66	



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.223
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.045 DIA
.050
198 HOLES
.372 DIA THRU
.380
.120 DIA
.130
17 HOLES
.027 DIA
.031
49 HOLES
.092 DIA
.096
3 HOLES
TO P36
TO P20
R126
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T4
GRN
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FT 56
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T5 GRN
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T6 GRN
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OFT62
FT051
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T24-BLU
FT 71
TO P35
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FT9
FT7
R18
C15 (+)
FT30
T7 GRN
C18
C19
FT12
FT65
R97
FT 19
FT 20
Q31
R103
C54 (+)
FT54
T24-BRN
T23 YEL
Q34
R105
C53 (–)
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Q5
FT60
R19
R24
R28
R 29
FT11
C16
R98
R 102
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FT77
FT55
R106
C57
FT23
TO P33
BLU
C12 (+)
R22
FT8
C13 (+)
CR34
R27
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CR35
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T6 BRN
R32
R40
R101
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T23 GRN
Q33
T26 BRN
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T23-BLK
CR 37
R115
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FT53
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R20
C67
CR32
R23
C14 (–)
R25
R21
T5 YEL
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T6 YEL
T3 BLU
T6 BLU
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C61
FT 29
C56
R114
R116
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CR31
R9
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(+)
C5
C9
C8
C20 (+)
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T9 GRN
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Q4
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R36
R41
T8 YEL
Q12
T9 YEL
C24
R110
FT28
CR 38
R127
R111
R113
R112
C58 (+)
T1 GRN
FT2
R5
FT5
T2 YEL
FT14
R12
C21 (+)
FT78
C26 (+)
CR5
CR4
FT27
R 46
R108
C1 (–)
R8
R4
T1 RED
FT1
T2
Q3
T3 GRN
R10
C7 (+)
FT69
FT15
R39
TO P10
C23 (+)
CR 36
TO P11
FT33
C27
(+)
R109
R44
R1
R2
R3
TO P5
FT64
FT013
FT67
C22 (–)
P38
FT68
C25
T10 BLU
T10 RED
FT50
R 45
TO P16
R107
TO P17
FT32

REF:
DRAWING NO. 2008530 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

2007239	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.

DRAWN A. Addario Jr. 4 Mar 66
CHECKED Bonarrigo 23 Mar 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A

TORQUE MOTOR AND 1X SINE
GIMBAL RESOLVER

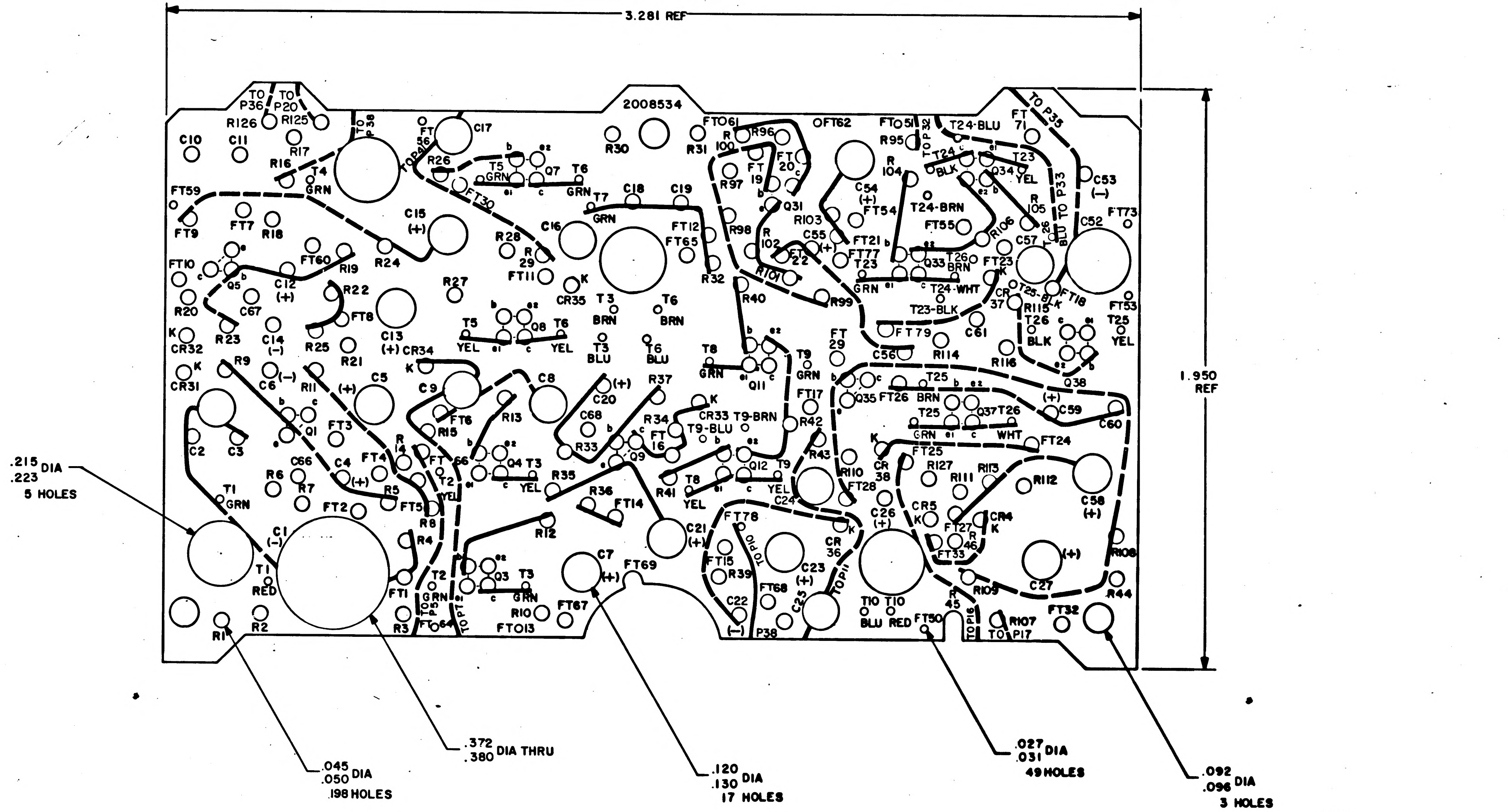
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008534
SCALE 5/1
SHEET 1 OF 1

2008534 B

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30281			27 Aug 66	
B		REVISED PER TDRR 31976	WSM	CW	6 DEC 66	


3.281 REF
1.950 REF
2008534
.215 / .223 DIA
5 HOLES
.045 / .050 DIA
198 HOLES
.372 / .380 DIA THRU
.120 / .130 DIA
17 HOLES
.027 / .031 DIA
49 HOLES
.092 / .096 DIA
3 HOLES
TO P36
TO P20
TO P35
TO P38
TO P17
TO P33
T1 GRN
T1 RED
T24-BLU
T24-BRN
T23-BLK
T24-WHT
T9-BRN
T9-BLU
FT13
FT69
FT50
FT32

REF:
DRAWING NO. 2008530 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007239	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Addario Jr. 4 Mar 66
CHECKED Bonarrigo 23 Mar 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A

TORQUE MOTOR AND 1X SINE GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008534

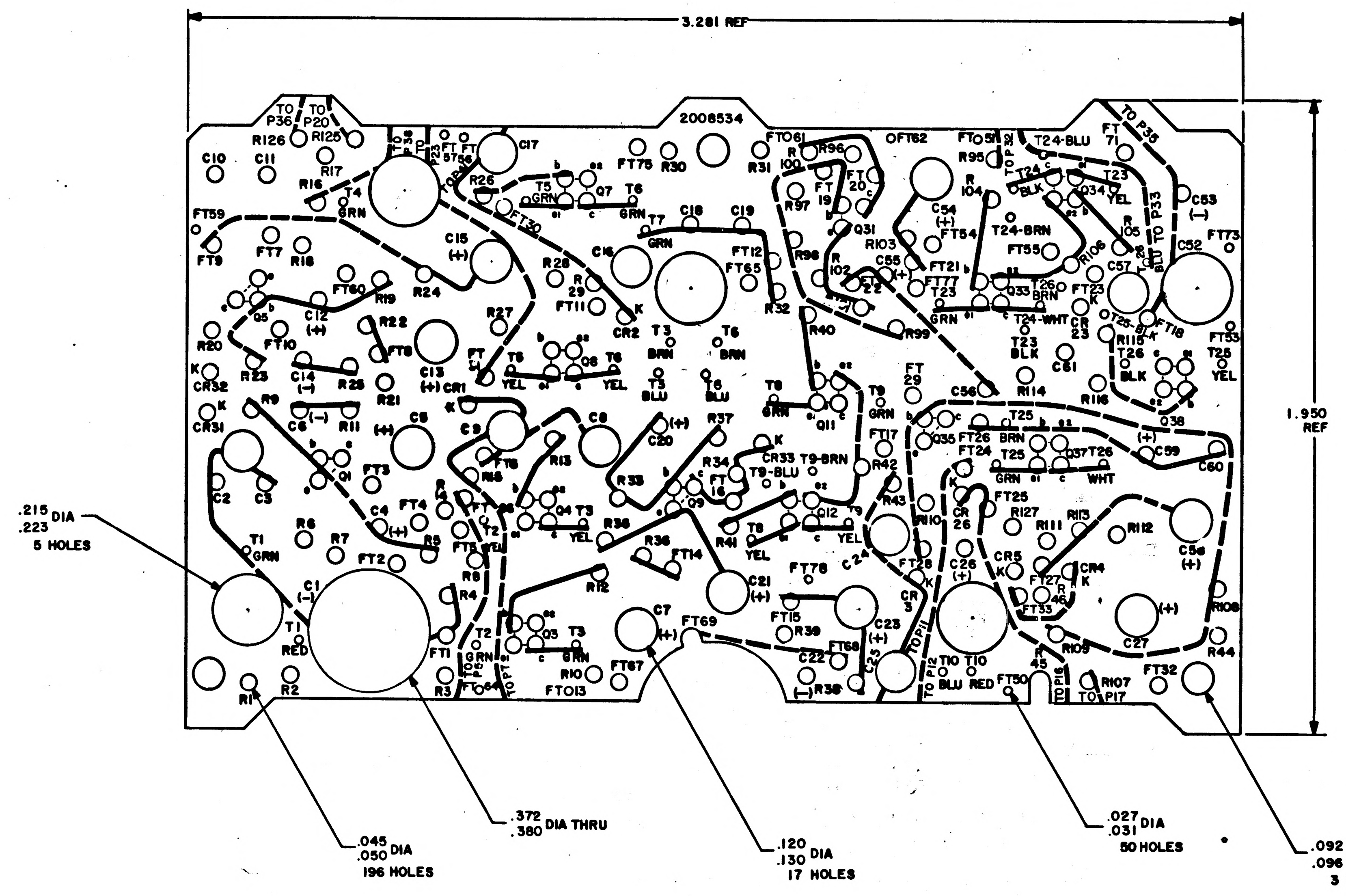
SCALE 5/1 SHEET 1 OF 1

2008534 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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1.950 REF
2008534
.215 DIA
.223
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.045 DIA
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196 HOLES
.372 DIA THRU
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17 HOLES
.027 DIA
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50 HOLES
.092 DIA
.096
3 HOLES
TO P36
TO P20
TO P35
TO P33
TO P17
TO P12
TO P11
TO PT
T24-BLU
T24-BRN
T24-WHT
T9-BRN
T9-BLU
CR33
GRN
YEL
BLU
BRN
BLK
RED
WHT

REF:
DRAWING NO. 2008530 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007239	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Gdarris Jr 4 Mar 66
CHECKED Bonarrigo 23 May 66
APPROVED Russo May 25/66
APPROVED LBB 5/25/66
APPROVED MIT M6 Wesley 6-1-66
A. C. METZGER
APPROVED MSC
DATE

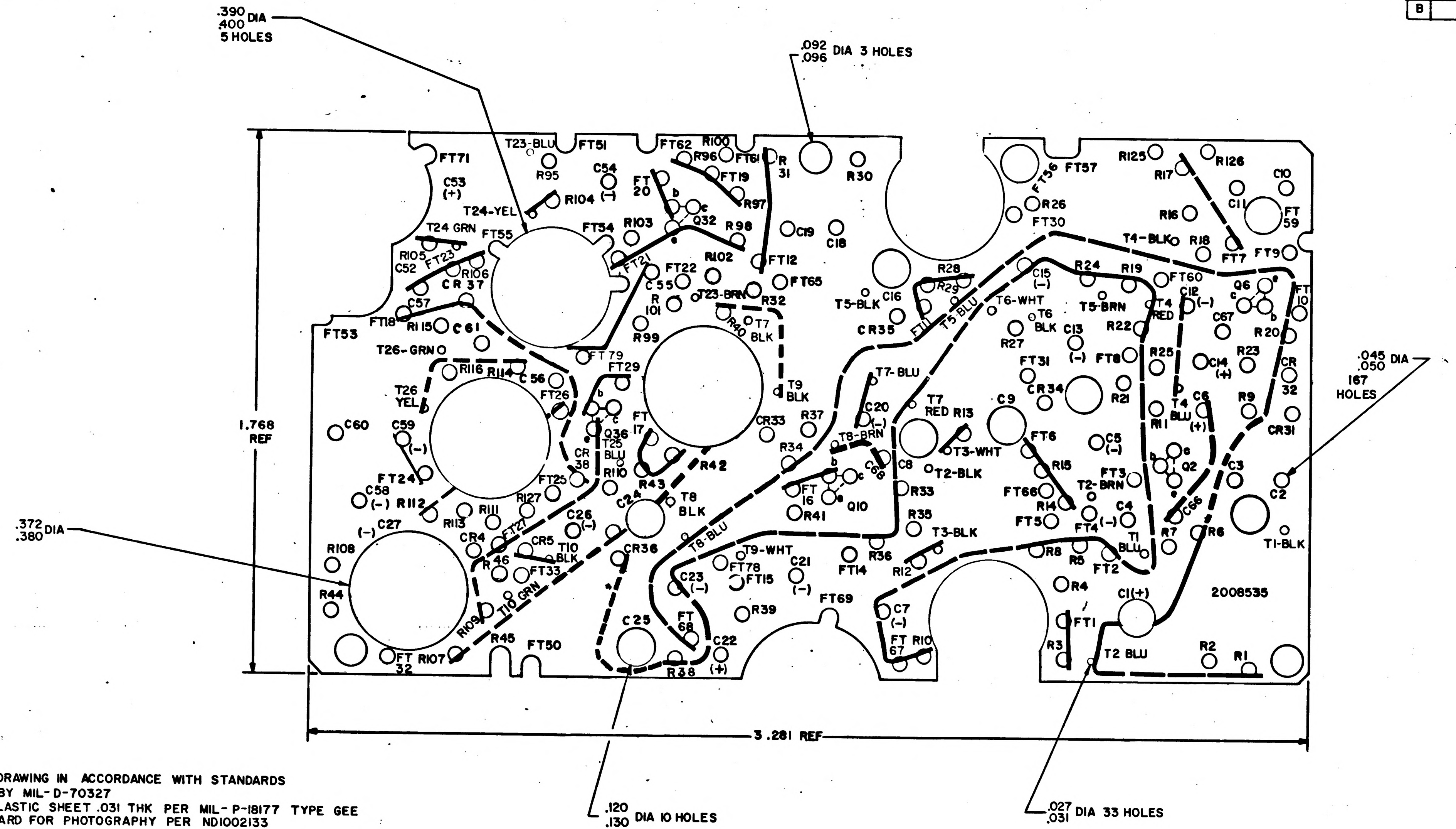
WIRING BOARD A
TORQUE MOTOR AND I X SINE GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008534
SCALE 5/1
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30281	R		30 AUG 66	
B		REVISED PER TDRR 31976	WSM	CWS	6 DEC 66	



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5 HOLES
.092
.096 DIA 3 HOLES
.045
.050 DIA
167
HOLES
.372
.380 DIA
1.768
REF
3.281 REF
.120
.130 DIA 10 HOLES
.027
.031 DIA 33 HOLES
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FT71
T23-BLU
FT51
FT62
R100
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FT61
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R125
R126
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FT36
C53 (+)
R95
C54
FT 20
FT19
R97
R17
C10
T24-YEL
R104 (-)
Q32
R26
FT30
C11
FT 59
R16
T24 GRN
FT55
FT34
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C19
C18
T4-BLK
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R105
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FT23
R106
FT21
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FT12
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FT7
FT9
CR 37
C55
FT22
FT65
C15 (-)
R24
R19
FT60
C57
R 101
T23-BRN
R32
C16
T5-BLK
T6-WHT
T6 BLK
T5 BRN
T4 RED
C12 (-)
Q6
FT 10
FT18
R115
C61
R140
T7 BLK
T5 BLU
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C67
FT53
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FT11
CR35
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C13 (-)
FT8
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R20
R116
R114
C56
FT 79
FT29
T9 BLK
T7-BLU
FT31
R25
C14 (+)
CR 32
T26 YEL
FT26
FT 17
C20 (-)
T7 RED
R13
C9
CR34
R21
T4 BLU (+)
R9
C60
C59 (-)
Q36
CR33
R37
T8-BRN
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CR31
T25 BLU
CR 38
R34
C5 (-)
FT24
R110
R42
C8
T3-WHT
T2-BLK
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C58
R112
FT25
R43
C24
T8 BLK
FT 16
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R33
FT66
R14
T2-BRN
C4 (-)
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C2
R111
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C26 (-)
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C27
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T1-BLK
R108
R46
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C21 (-)
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C23 (-)
FT78
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FT14
R12
R44
T10 GRN
FT69
C7 (-)
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C1(+)
R109
R39
FT1
C25
FT 68
FT R10 67
R3
R45
FT50
C22 (+)
T2 BLU
R2
R1
FT 32
R107
R38

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

REF:
DRAWING NO. 2008531
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007239	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Lantz H. Lane 27 May 66
CHECKED Bonarrigo 25 May 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
TORQUE MOTOR AND IX SINE GIMBAL RESOLVER

CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008535
SCALE 5/1
SHEET 1 OF 1

2008535 B

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

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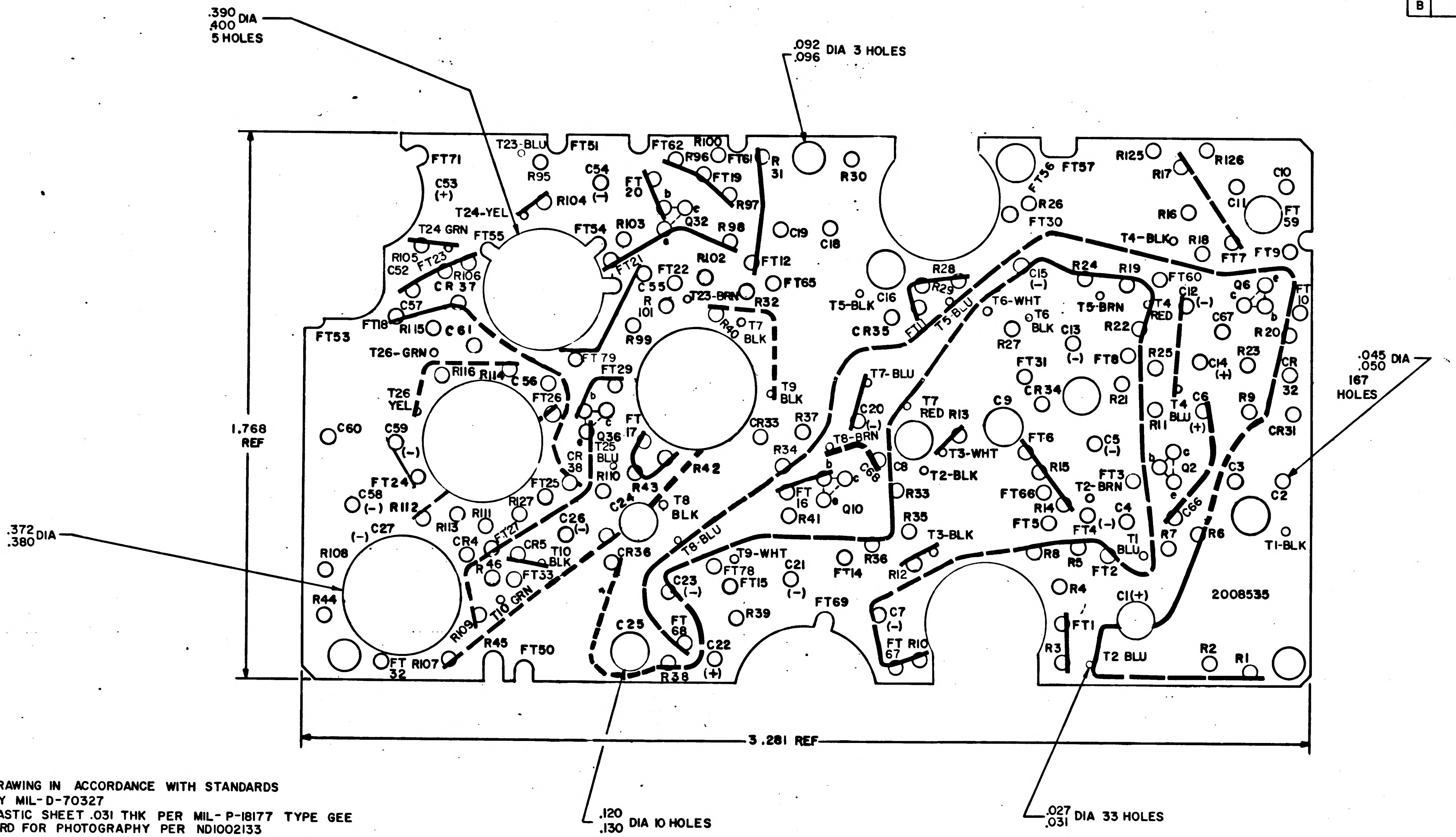
A		REVISED PER TDRR 30281	R		30 AUG 66	
B		REVISED PER TDRR 31976		CWS	6 DEC 66	


.390
.400 DIA
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.092
.096 DIA 3 HOLES
.045
.050 DIA
167
HOLES
.372
.380 DIA
1.768
REF
3.281 REF
.120
.130 DIA 10 HOLES
.027
.031 DIA 33 HOLES
2008535
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T4
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BLU
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R37
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CR31
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T2-BRN
C2
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R113
CR4
FT27
C26
(-)
C68
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R108
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BLK
T8-BLU
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T1
BLU
R7
R6
T1-BLK
R46
CR5
CR36
T9-WHT
T3-BLK
R36
R12
R8
R5
FT2
R44
FT33
FT78
C21
(-)
FT14
R4
C1(+)
C23
(-)
FT15
R109
T10 GRN
FT69
R39
C7
(-)
FT1
C25
FT
68
FT R10
67
R3
T2 BLU
R2
R1
FT R107
32
R45
FT50
C22
(+)
R38

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

REF:
DRAWING NO. 2008531
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007239	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 27 May 66
CHECKED Bonarrigo 25 May 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
TORQUE MOTOR AND 1X SINE GIMBAL RESOLVER

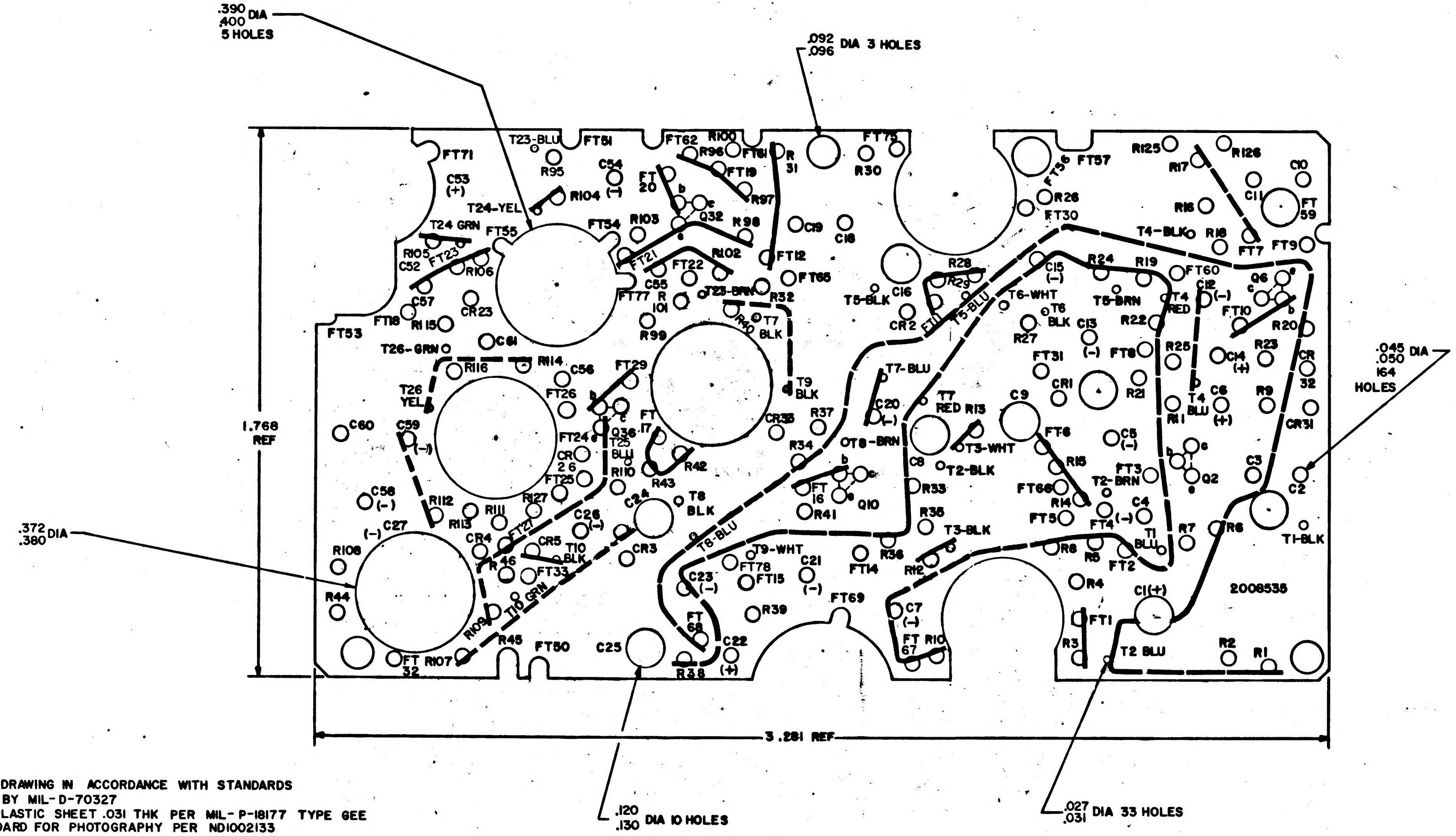
CODE IDENT NO 80230
SIZE D
DRAWING NO. 2008535
SCALE 5/1
SHEET 1 OF 1

2008535 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



.390
.400 DIA
5 HOLES
.092
.096 DIA 3 HOLES
.045
.050 DIA
164 HOLES
.372
.380 DIA
1.768 REF
3.281 REF
.120
.130 DIA 10 HOLES
.027
.031 DIA 33 HOLES
2008535
FT71
T23-BLU
FT51
FT62
R100
FT61
R31
FT75
R30
FT57
R125
R17
R126
C10
C53 (+)
R95
C54 (-)
FT20
R96
FT19
R97
C11
FT59
T24-YEL
R104
Q32
R98
R26
FT30
R16
T4-BLK
R18
FT7
FT9
T24 GRN
FT55
FT54
R103
R102
C19
C18
R105
C52
FT23
R106
FT21
FT22
FT12
FT65
R28
R29
C15 (-)
R24
R19
FT60
C12 (-)
Q6
C57
C55
R101
T23-BRN
R32
T5-BLK
C16
T6-WHT
T6-BRN
T4 RED
FT10
R20
FT18
R115
CR23
FT77
T7 BLK
CR2
T6 BLK
C13 (-)
R22
FT53
T26-GRN
C61
R99
R27
FT8
R25
C14 (+)
R23
CR32
R116
R114
C56
FT29
T9 BLK
T7-BLU
FT31
CR1
R21
T4 BLU
C6 (+)
R9
T26 YEL
FT26
C20 (-)
T7 RED
R13
C9
R11
CR31
C60
C59 (-)
FT24
Q36
FT17
CR33
R37
FT6
C5 (-)
CR26
T25 BLU
R34
T8-BRN
T3-WHT
R15
C3
FT3
Q2
C2
R110
R42
C8
T2-BLK
FT66
T2-BRN
C58 (-)
R112
R127
R43
FT16
Q10
R33
R14
C4 (-)
C27 (-)
R113
R111
FT25
C26 (-)
C24
T8 BLK
R41
R35
FT5
FT4
T1 BLU
R7
R6
T1-BLK
R108
CR4
CR5
T10 BLK
CR3
T8-BLU
T9-WHT
T3-BLK
R46
FT33
FT78
FT15
C21 (-)
R36
FT14
R8
R5
FT2
R44
R109
T10 GRN
C23 (-)
R12
R4
C1 (+)
FT68
R39
FT69
C7 (-)
FT1
R45
FT50
C25
C22 (+)
FT R10 67
R3
T2 BLU
R2
R1
FT 32
R107
R38

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019

REF:
DRAWING NO. 2008531
PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007239	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Lane	27 May 66
CHECKED	Bonarrigo	25 May 66
APPROVED	Rlunser	MAY 25/66
APPROVED	A. Hay	5/25/66
APPROVED MIT	M. C. Mulley	6-1-66
APPROVED MSC	C. METZGER	DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
TORQUE MOTOR AND IX SINE GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008535
SCALE 5/1		SHEET 1 OF 1

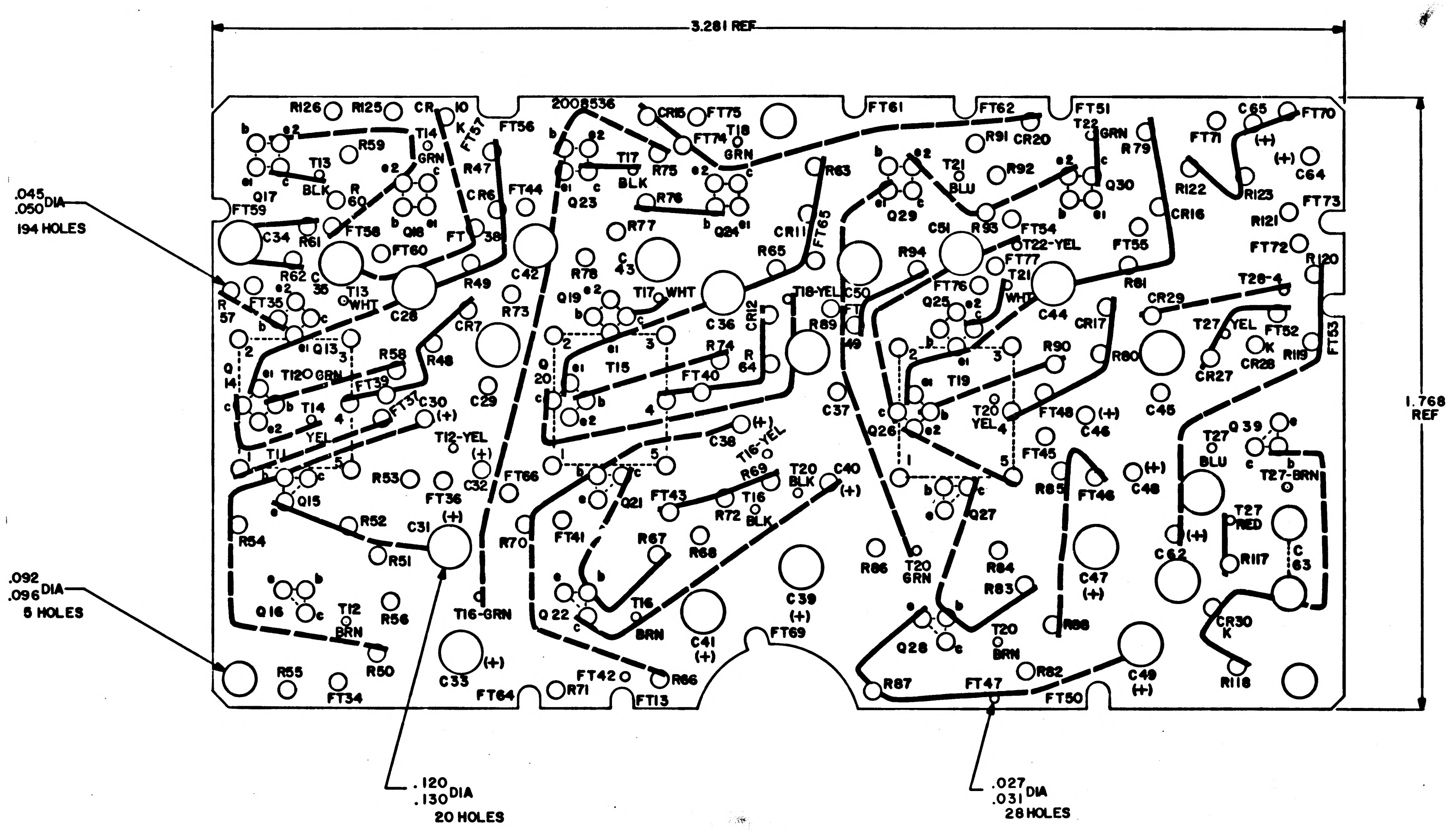
MASTER

2008535

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29256

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3.281 REF
1.768 REF
2008536
.045
.050 DIA
194 HOLES
.092
.096 DIA
5 HOLES
.120
.130 DIA
20 HOLES
.027
.031 DIA
28 HOLES
R126
R125
CR10
FT57
FT56
CR15
FT75
FT74
T18 GRN
FT61
FT62
FT51
T22 GRN
C65
FT70
FT71
(+)
C64
FT73
Q17
T13 BLK
R59
T14 GRN
R47
CR6
FT44
Q23
T17 BLK
R75
R76
R63
Q29
T21 BLU
R91
CR20
R92
Q30
R79
R122
R123
CR16
R121
FT59
C34
R61
FT58
Q18
R60
FT38
C42
R77
Q24
CR11
FT65
C51
R93
FT54
T22-YEL
FT55
FT72
R120
R62
C35
T13 WHT
FT60
C28
R49
R78
C43
R65
R94
FT77
T21 WHT
FT76
R81
CR29
T26-4
R57
FT35
Q13
R73
Q19
T17 WHT
C36
CR12
T18-YEL
C50
R89
Q25
C44
CR17
T27 YEL
FT52
FT53
Q14
T12 GRN
FT39
R58
R48
CR7
Q20
T15
R74
R64
FT40
T19
R90
R80
CR27
CR28
R119
C30 (+)
C29
T14 YEL
FT31
T11
T12-YEL
(+)
C37
C38
T16-YEL
Q26
T20 YEL
FT48
(+)
C46
C45
Q39
T27 BLU
T27-BRN
R53
C32
FT66
FT45
Q15
R52
FT36
C31 (+)
Q21
FT43
R69
T20 BLK
C40 (+)
T16 BLK
R72
R85
FT46
C48
Q27
T27 RED
R54
R51
FT41
R67
R68
R70
R86
T20 GRN
R84
R83
C47 (+)
C62
R117
C63
Q16
T12 BRN
R56
T16-GRN
Q22
T16 BRN
C41 (+)
C39 (+)
FT69
Q28
T20 BRN
R88
CR30
R55
R50
C33 (+)
FT34
FT64
FT42
R71
R66
FT13
R87
FT47
R82
FT50
C49 (+)
R118

REF:
DRAWING NO. 2008532 FOR
PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2007239	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ±— DECIMALS ±— ANGLES ±—
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Addario Jr 19 May 66
CHECKED Bonarrigo 23 May 66
APPROVED Rheinger May 25/66
APPROVED G. Hug 5/25/66
APPROVED MIT M G Murphy 6-1-66
APPROVED MSC A. G. MERCER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C

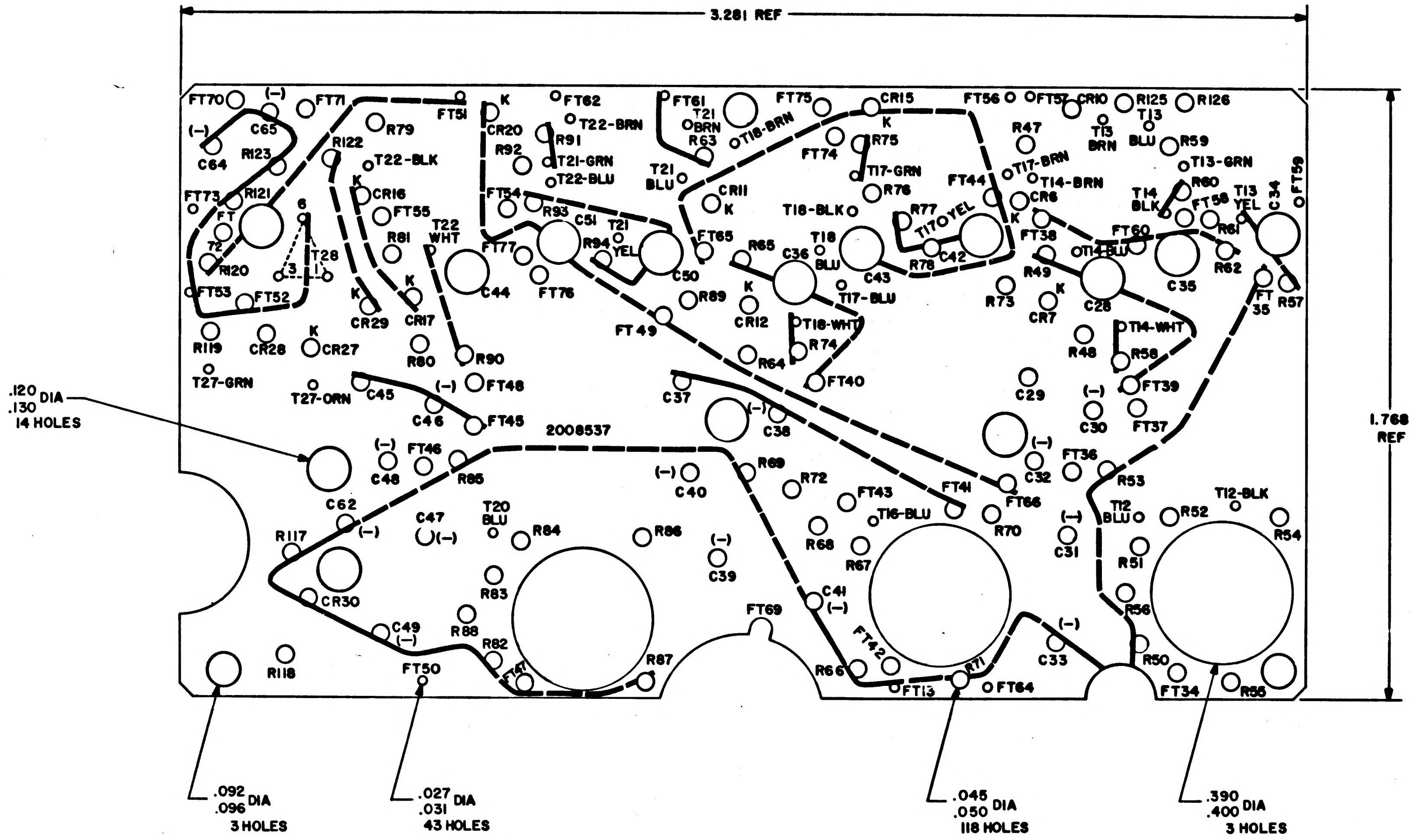
TORQUE MOTOR AND 1X SINE GIMBAL RESOLVER

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008536
SCALE 5/1
SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISIONS 29256				



REF:
DRAWING NO. 2008533 FOR
PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2007239	
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Addario Jr. 23 May 66
CHECKED Banarriga 23 May 66
APPROVED May 25/66
APPROVED 5/25/66
APPROVED MIT M G Whaley 6-1-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

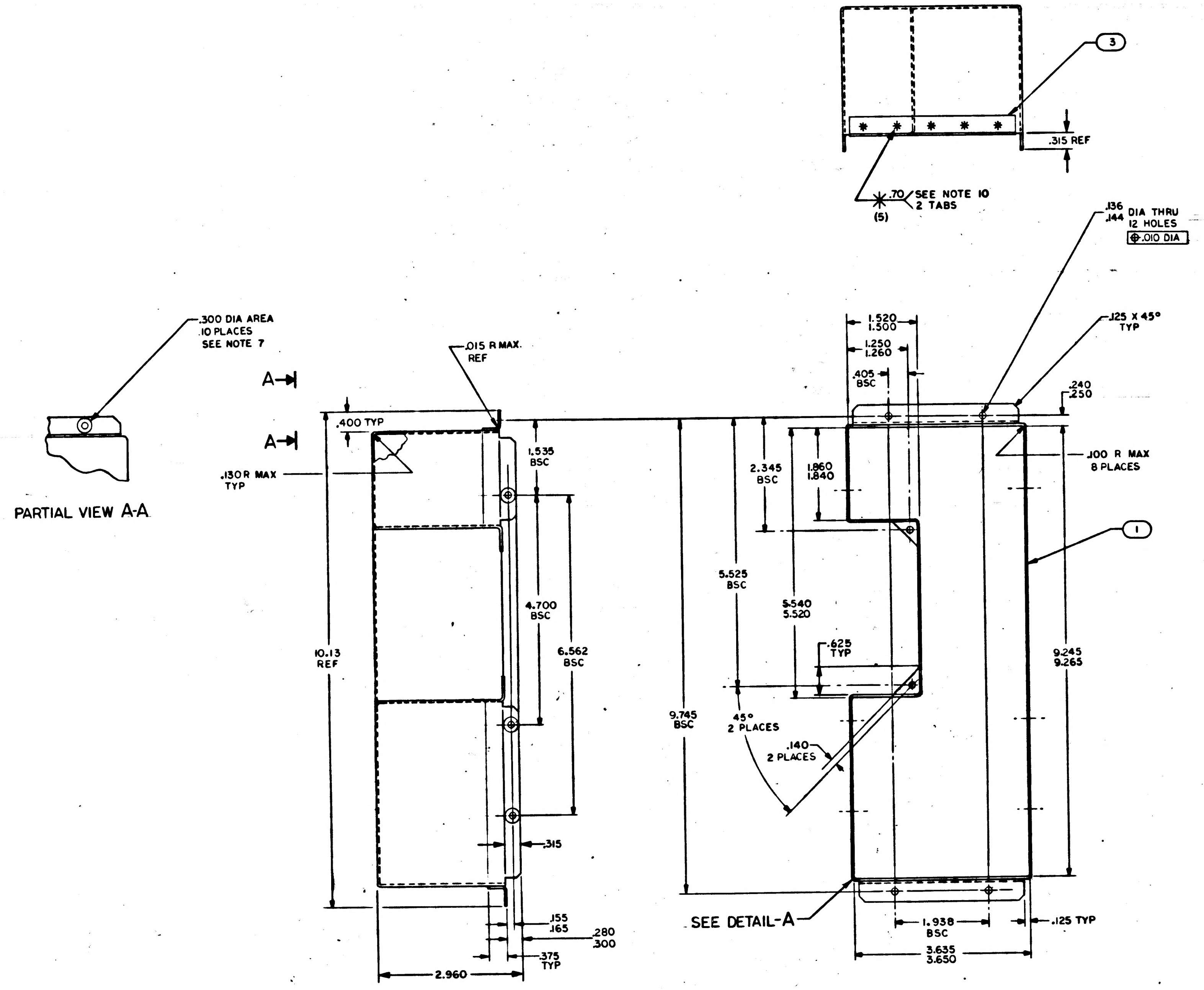
WIRING BOARD D
TORQUE MOTOR AND IX SINE GIMBAL RESOLVER

CODE IDENT NO.	SIZE	DRAWING NO.
80230	D	2008537
SCALE 5/1		SHEET OF

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

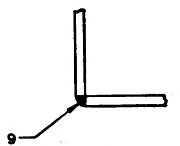
		REVISIONS 29349				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 31456	ME	lm	3 OCT 66	



3
.315 REF
.70 SEE NOTE 10
2 TABS
(5)
.136
.144 DIA THRU
12 HOLES
⊕ .010 DIA
.300 DIA AREA
10 PLACES
SEE NOTE 7
A
A
PARTIAL VIEW A-A
.015 R MAX.
REF
.400 TYP
.130 R MAX
TYP
1.535
BSC
4.700
BSC
6.562
BSC
10.13
REF
.315
.155
.165
.280
.300
.375
TYP
2.960
1.520
1.500
1.250
1.260
.405
BSC
.125 X 45°
TYP
.240
.250
.100 R MAX
8 PLACES
2.345
BSC
1.860
1.840
1
5.525
BSC
5.540
5.520
.625
TYP
9.245
9.265
9.745
BSC
45°
2 PLACES
.140
2 PLACES
SEE DETAIL-A
1.938
BSC
.125 TYP
3.635
3.650

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM 5052-H32 PER QQ-A-250/8, .040 THICK SHEET.
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .015 MAX
4. REMOVE BURRS AND SHARP EDGES .005 TO .015 MAX.
5. ALL SURFACES 125✓ UNLESS OTHERWISE SPECIFIED.
6. FINISH: UNLESS OTHERWISE SPECIFIED ANODIZE PER MIL-A-8625 TYPE I CLEAR. APPLY PAINT PER ND1002291 USING 1012543-003.
7. INDICATED AREAS SHALL BE FREE OF ANODIZE AND PAINT. COAT AREAS SHOWN PER ND1002040. DO NOT EPOXY COAT.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. WELDING PERMITTED. WELD PER MIL-W-8604.
10. SPOT WELD PER MIL-W-6858, CLASS B.



DETAIL-A
SCALE 4/1
OPTIONAL CORNER CONFIGURATION

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008538-3	TAB, END	3
~~2~~	~~2008538-2~~	~~TAB, CORNER~~	~~2~~
1	2008538-1	COVER	1

LIST OF MATERIALS

2007234	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.015 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L. Dorney	9 May 66
CHECKED	L. Hood	27 May 66
APPROVED	Z. G. Zagorin	31 May 66
APPROVED	D. Hoag	2 Jun 66
APPROVED MIT	M. S. Murley	6-3-66
APPROVED MSC	A. C. METZGER	
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

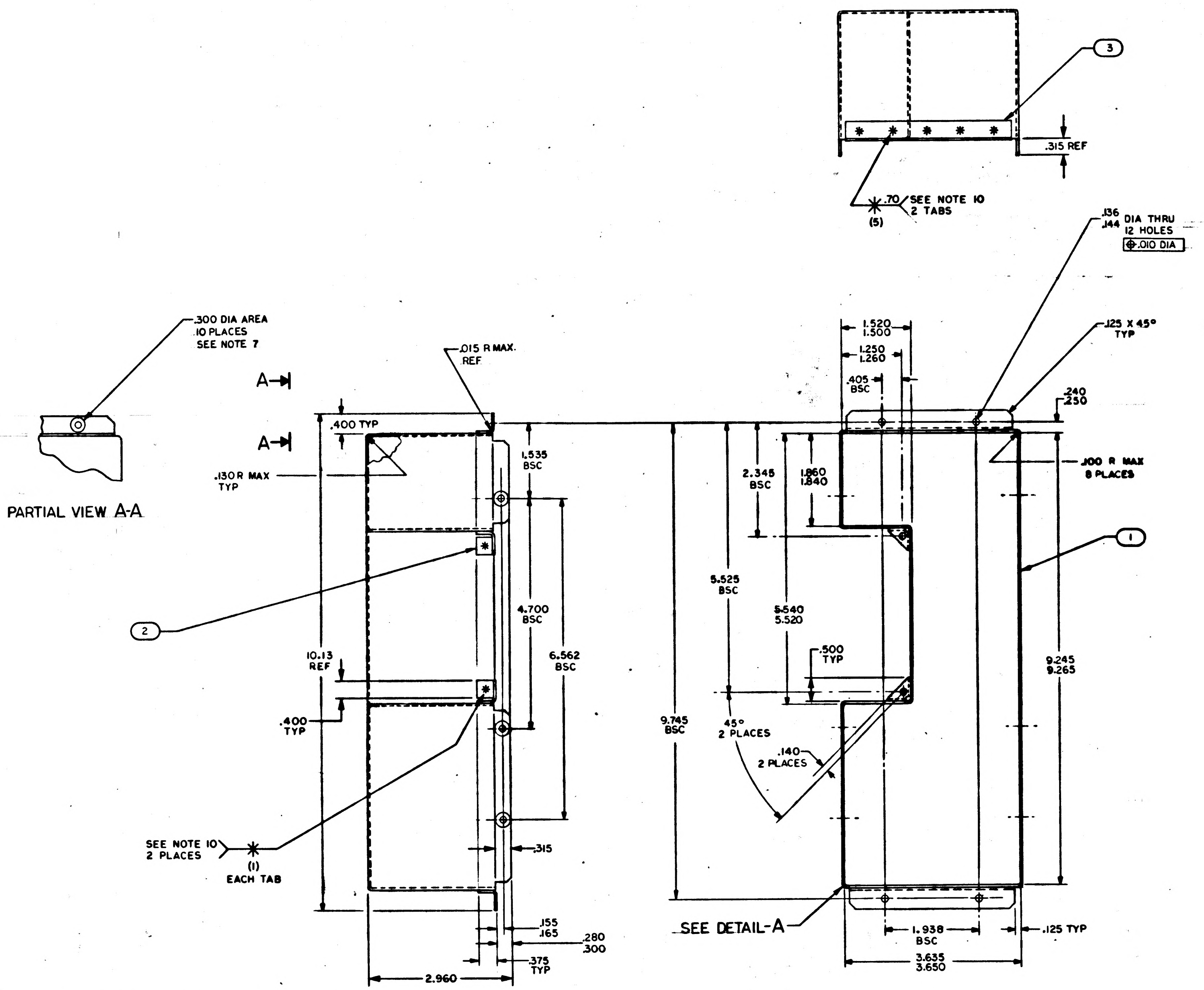
COVER
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2008538
SCALE 1:1		SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29349

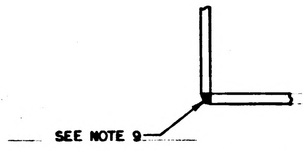
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



3
.315 REF
.70 SEE NOTE 10
2 TABS
(5)
.136
.144 DIA THRU
12 HOLES
⌖ .010 DIA
.300 DIA AREA
10 PLACES
SEE NOTE 7
PARTIAL VIEW A-A
A
A
.015 R MAX.
REF
.400 TYP
.130 R MAX
TYP
1.535
BSC
4.700
BSC
6.562
BSC
2
10.13
REF
.400
TYP
SEE NOTE 10
2 PLACES
(1)
EACH TAB
.315
.155
.165
.280
.300
.375
TYP
2.960
1.520
1.500
1.250
1.260
.405
BSC
.125 X 45°
TYP
.240
.250
.100 R MAX
8 PLACES
2.348
BSC
1.860
1.840
1
5.525
BSC
5.540
5.520
.500
TYP
9.745
BSC
45°
2 PLACES
.140
2 PLACES
9.245
9.265
SEE DETAIL-A
1.938
BSC
.125 TYP
3.635
3.650

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM 5052-H32 PER QQ-A-250/8, .040 THICK SHEET.
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .015 MAX
4. REMOVE BURRS AND SHARP EDGES .005 TO .015 MAX.
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED.
6. FINISH: UNLESS OTHERWISE SPECIFIED ANODIZE PER MIL-A-8625 TYPE I CLEAR. APPLY PAINT PER ND1002291 USING 1012543-003.
7. INDICATED AREAS SHALL BE FREE OF ANODIZE AND PAINT. COAT AREAS SHOWN PER ND1002040. DO NOT EPOXY COAT.
8. IDENTIFY WITH PART NO. PER ND1002019.
9. WELDING PERMITTED. WELD PER MIL-W-8604.
10. SPOT WELD PER MIL-W-6858, CLASS B.



DETAIL-A
SCALE 4/1
OPTIONAL CORNER CONFIGURATION

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008538-3	TAB, END	3
2	2008538-2	TAB, CORNER	2
1	2008538-1	COVER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007234	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.015 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN L. Bo[illegible]
CHECKED L. Wood
APPROVED U.G. [illegible]
APPROVED [illegible]
APPROVED MIT W.G. Mu[illegible] 6-3-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

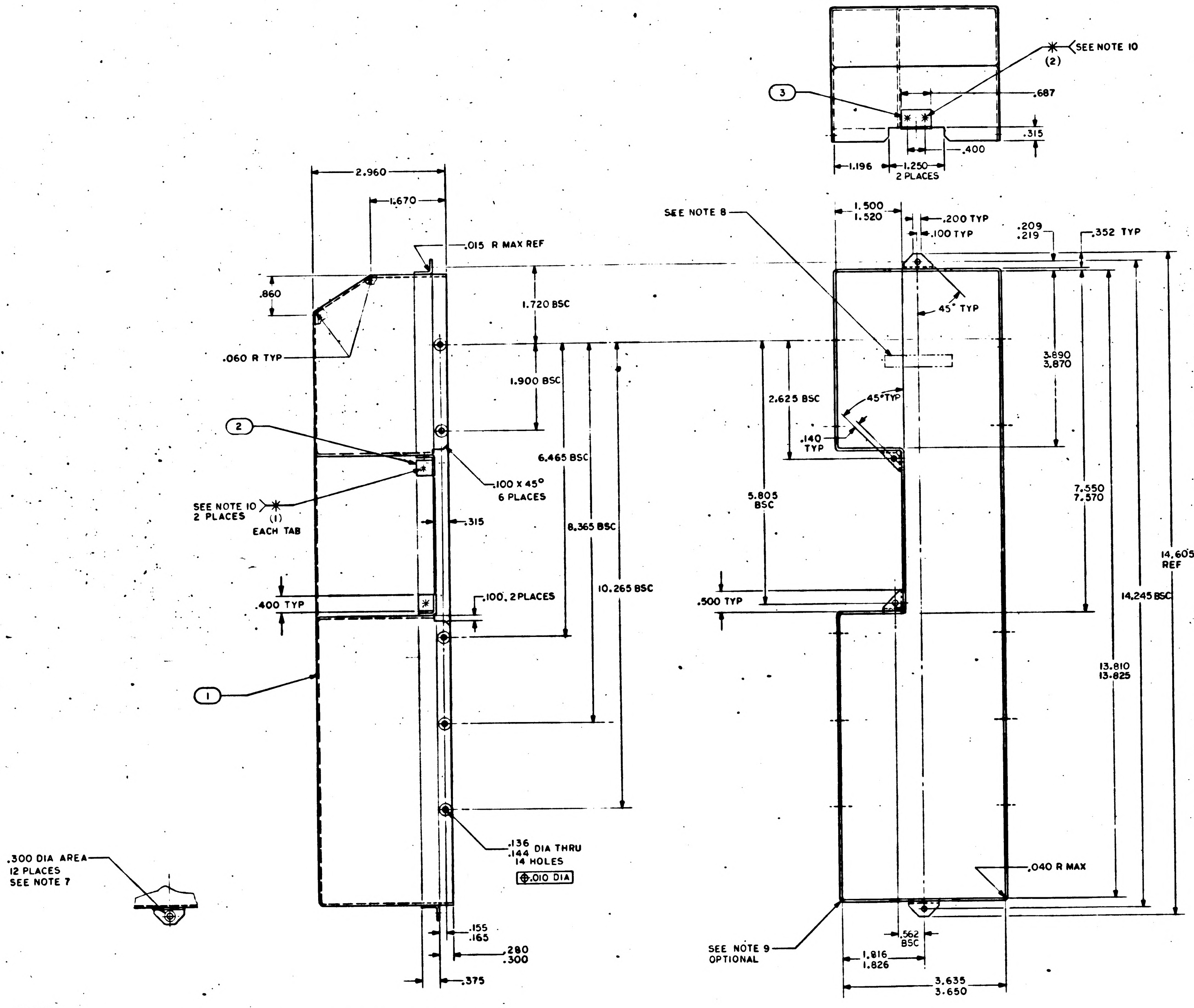
COVER
SIGNAL CONDITIONER
C/M OPERATIONAL

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2008538
SCALE 1:1
SHEET 1 OF 1

2008538

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 27389			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 31224	4 OCT '66	T.D. N.W.



SEE NOTE 10
(2)
3
.687
.315
.400
1.196
1.250
2 PLACES
2.960
1.670
.015 R MAX REF
.860
1.720 BSC
.060 R TYP
1.900 BSC
2
6.465 BSC
.100 X 45°
6 PLACES
SEE NOTE 10
2 PLACES
(1)
EACH TAB
.315
8.365 BSC
10.265 BSC
.400 TYP
.100, 2 PLACES
1
.300 DIA AREA
12 PLACES
SEE NOTE 7
.136
.144
DIA THRU
14 HOLES
⊕.010 DIA
.155
.165
.280
.300
.375
SEE NOTE 8
1.500
1.520
.200 TYP
.100 TYP
.209
.219
.352 TYP
45° TYP
3.890
3.870
2.625 BSC
45° TYP
.140
TYP
5.805
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7.550
7.370
14.605
REF
14.245 BSC
.500 TYP
13.810
13.825
.040 R MAX
SEE NOTE 9
OPTIONAL
.562
BSC
1.816
1.826
3.635
3.650

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM .040 THICK 5052-H32 PER QQ-A-250/8
3. UNLESS OTHERWISE SPECIFIED ALL FILLETS AND RADII TO BE .015 MAX
4. REMOVE ALL BURRS AND SHARP EDGES .005/.015
5. ALL SURFACES 125√ UNLESS OTHERWISE SPECIFIED
6. FINISH: UNLESS OTHERWISE SPECIFIED ANODIZE PER MIL-A-8625 TYPE I, CLEAR. APPLY PAINT PER ND1002291 USING 1012543-003
7. INDICATED AREAS SHALL BE FREE OF ANODIZE AND PAINT. COAT AREAS SHOWN PER ND1002040. DO NOT EPOXY COAT.
8. IDENTIFY WITH PART NO. PER ND1002019
9. WELDING PERMITTED, WELD PER MIL-W-8604
10. SPOT WELD PER MIL-W-6858, CLASS B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008539-3	TAB, END	3
2	2008539-2	TAB, CORNER	2
1	2008539-1	COVER	1

LIST OF MATERIALS

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.015 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 6

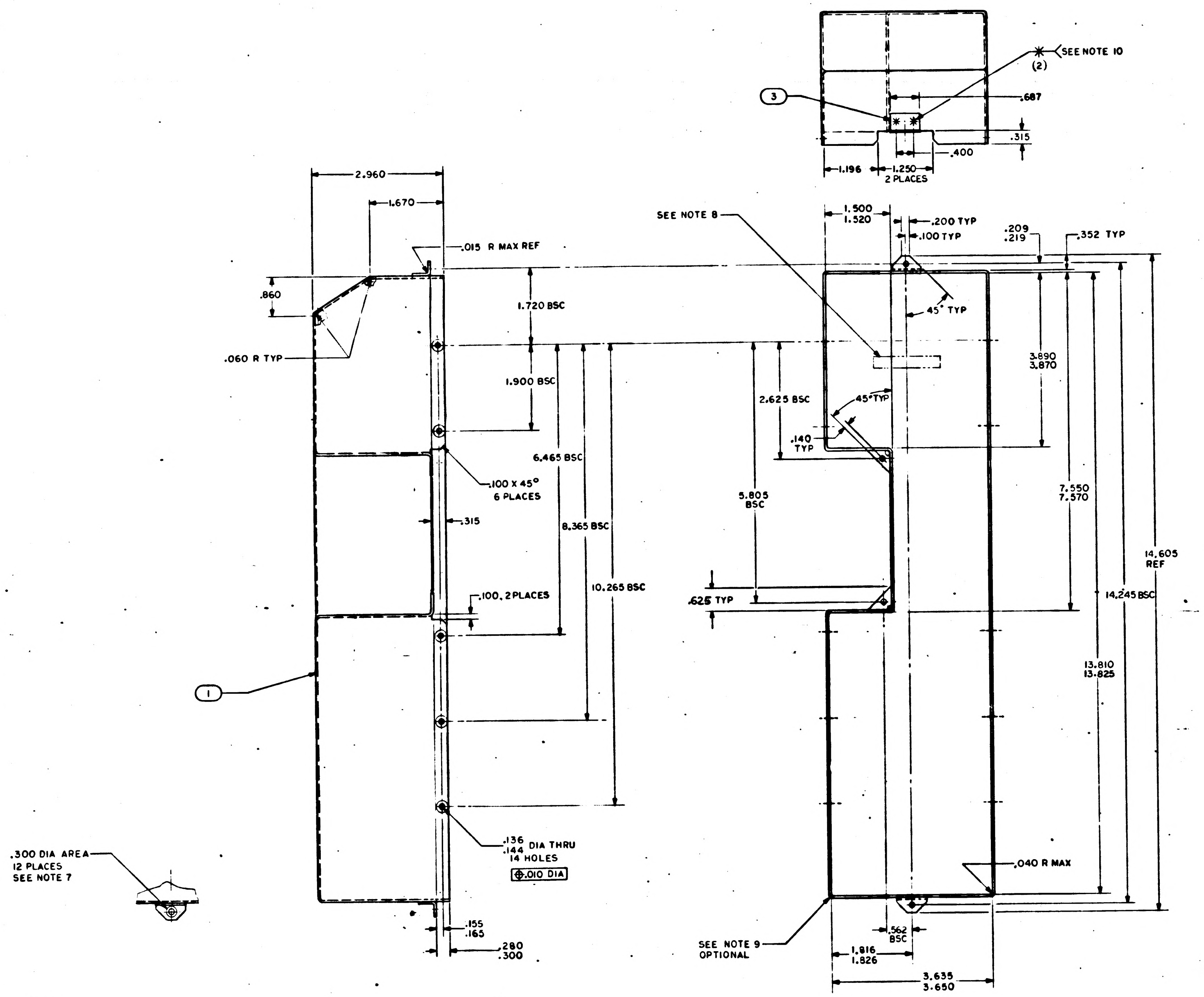
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN D. Horgan DATE 6 MAY 66
CHECKED 27 May 66
APPROVAL 31 MAY 66
APPROVAL 2 June 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL 6-7-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2008539
SCALE 1/1	WT	SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 31224	4 OCT '66	T.D. N.W.
B	REVISED PER TDRR 31457	14 OCT 66	JJB Rla



SEE NOTE 10
(2)
3
.687
.315
.400
1.196
1.250
2 PLACES
2.960
1.670
.015 R MAX REF
.860
1.720 BSC
.060 R TYP
1.900 BSC
6.465 BSC
.100 X 45°
6 PLACES
.315
8.365 BSC
.100, 2 PLACES
10.265 BSC
1
.136
.144 DIA THRU
14 HOLES
⊕ .010 DIA
.300 DIA AREA
12 PLACES
SEE NOTE 7
.155
.165
.280
.300
SEE NOTE 8
1.500
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.209
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45° TYP
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TYP
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BSC
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7.570
14.605
REF
14.245 BSC
13.810
13.825
.040 R MAX
SEE NOTE 9
OPTIONAL
.562
BSC
1.816
1.826
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NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
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10. SPOT WELD PER MIL-W-6858, CLASS B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008539-3	TAB, END	3
~~2~~	~~2008539-2~~	~~TAB, CORNER~~	2
1	2008539-1	COVER	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2007235	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.015 ANGLES ±2°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

HEAT TREATMENT
—

FINAL FINISH
SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN D. Horgan DATE 6 MAY 66
CHECKED [illegible] 27 May 66
APPROVAL V. G. Kopaczewski 31 MAY 66
APPROVAL [illegible] 2 June 66
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 6-3-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2008539

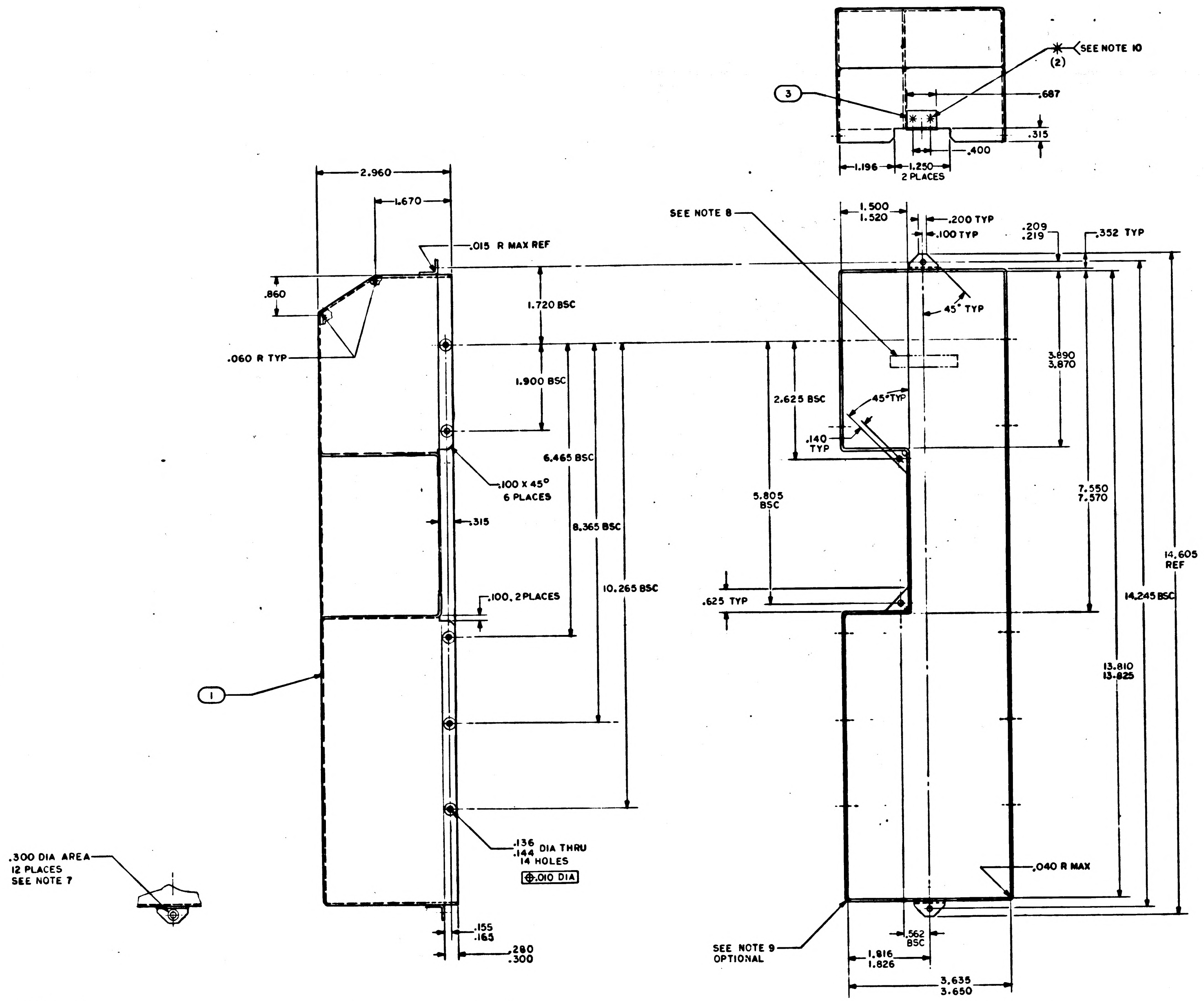
SCALE 1/1 WT SHEET 1 OF 1

2008539 B

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29349

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 31224	4 OCT '66	T.D. U.W.
B	REVISED PER TDRR 31457	14 OCT 66	JJB
C	REVISED PER TDRR 31487	14 OCT 66	JJB



SEE NOTE 10
(2)
3
.687
.315
.400
1.196
1.250
2 PLACES
2.960
1.670
.015 R MAX REF
.860
.060 R TYP
1.720 BSC
1.900 BSC
6.465 BSC
8.365 BSC
10.265 BSC
.100 X 45°
6 PLACES
.315
.100, 2 PLACES
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.136
.144 DIA THRU
14 HOLES
⊕ .010 DIA
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12 PLACES
SEE NOTE 7
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SEE NOTE 8
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.140
TYP
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BSC
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14.605
REF
14.245 BSC
.625 TYP
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13.825
.040 R MAX
SEE NOTE 9
OPTIONAL
.562
BSC
1.816
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NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM .040 THICK 5052-H32 PER QQ-A-250/8
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8. IDENTIFY WITH PART NO. PER ND1002019
9. WELDING PERMITTED, WELD PER MIL-W-8604
10. SPOT WELD PER MIL-W-6858, CLASS B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008539-3	TAB, END	3
~~2~~	~~2008539-2~~	~~TAB, CORNER~~	2
1	2008539-1	COVER	1

LIST OF MATERIALS

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ±— DECIMALS ±.015 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Horgan DATE 6 May 66
CHECKED 27 May 66
APPROVAL 31 May 66
APPROVAL 2 June 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL 6-3-66

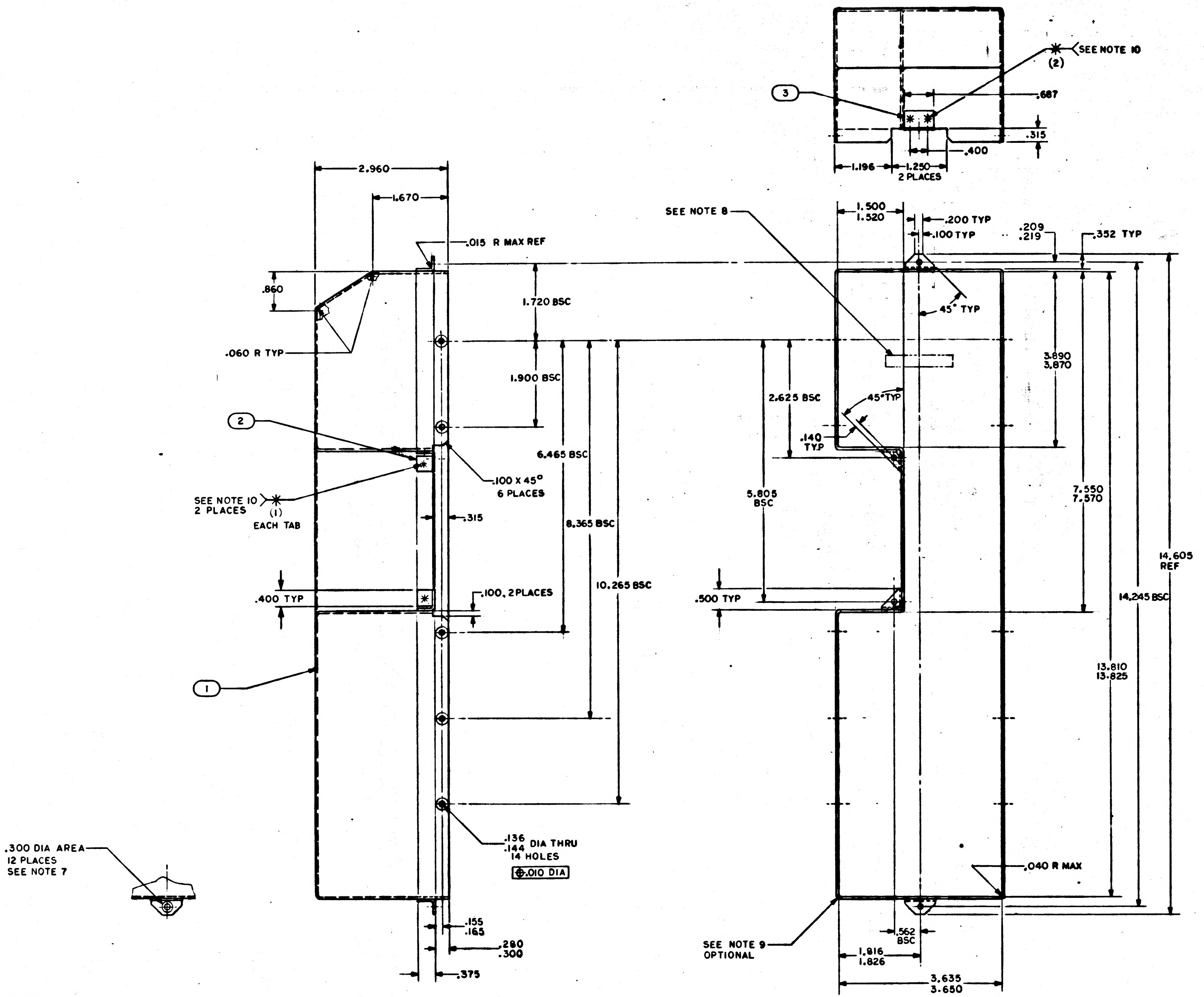
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
SIGNAL CONDITIONER C/M FLIGHT QUAL

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. - 2008539
SCALE 1/1
WT
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29349			
SYM	DESCRIPTION	DATE	APPROVAL



SEE NOTE 10
(2)
3
.687
.315
.400
1.196
1.250
2 PLACES
2.960
1.670
.015 R MAX REF
.860
1.720 BSC
.060 R TYP
1.900 BSC
2
SEE NOTE 10
2 PLACES
(1)
EACH TAB
.100 X 45°
6 PLACES
6.465 BSC
.315
8.365 BSC
.400 TYP
.100, 2 PLACES
10.265 BSC
1
.300 DIA AREA
12 PLACES
SEE NOTE 7
.136
.144 DIA THRU
14 HOLES
⊕ .010 DIA
.155
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SEE NOTE 8
1.500
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.219
.352 TYP
45° TYP
3.890
3.870
2.625 BSC
45° TYP
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TYP
5.805
BSC
7.550
7.570
14.605
REF
14.245 BSC
.500 TYP
13.810
13.825
.040 R MAX
.562
BSC
SEE NOTE 9
OPTIONAL
1.816
1.826
3.635
3.650

NOTES
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9. WELDING PERMITTED, WELD PER MIL-W-8604
10. SPOT WELD PER MIL-W-6858, CLASS B

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
2	2008539-3	TAB, END	3
2	2008539-2	TAB, CORNER	2
1	2008539-1	COVER	1

LIST OF MATERIALS

2007235	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.015 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
HEAT TREATMENT —
FINAL FINISH SEE NOTE 6

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Horgan DATE 6 May 66
CHECKED [illegible] 27 May 66
APPROVAL W. G. [illegible] 31 May 66
APPROVAL [illegible] 2 June 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL [illegible] 6-3-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
SIGNAL CONDITIONER
C/M FLIGHT QUAL

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2008539
SCALE 1/1
WT
SHEET 1 OF 1

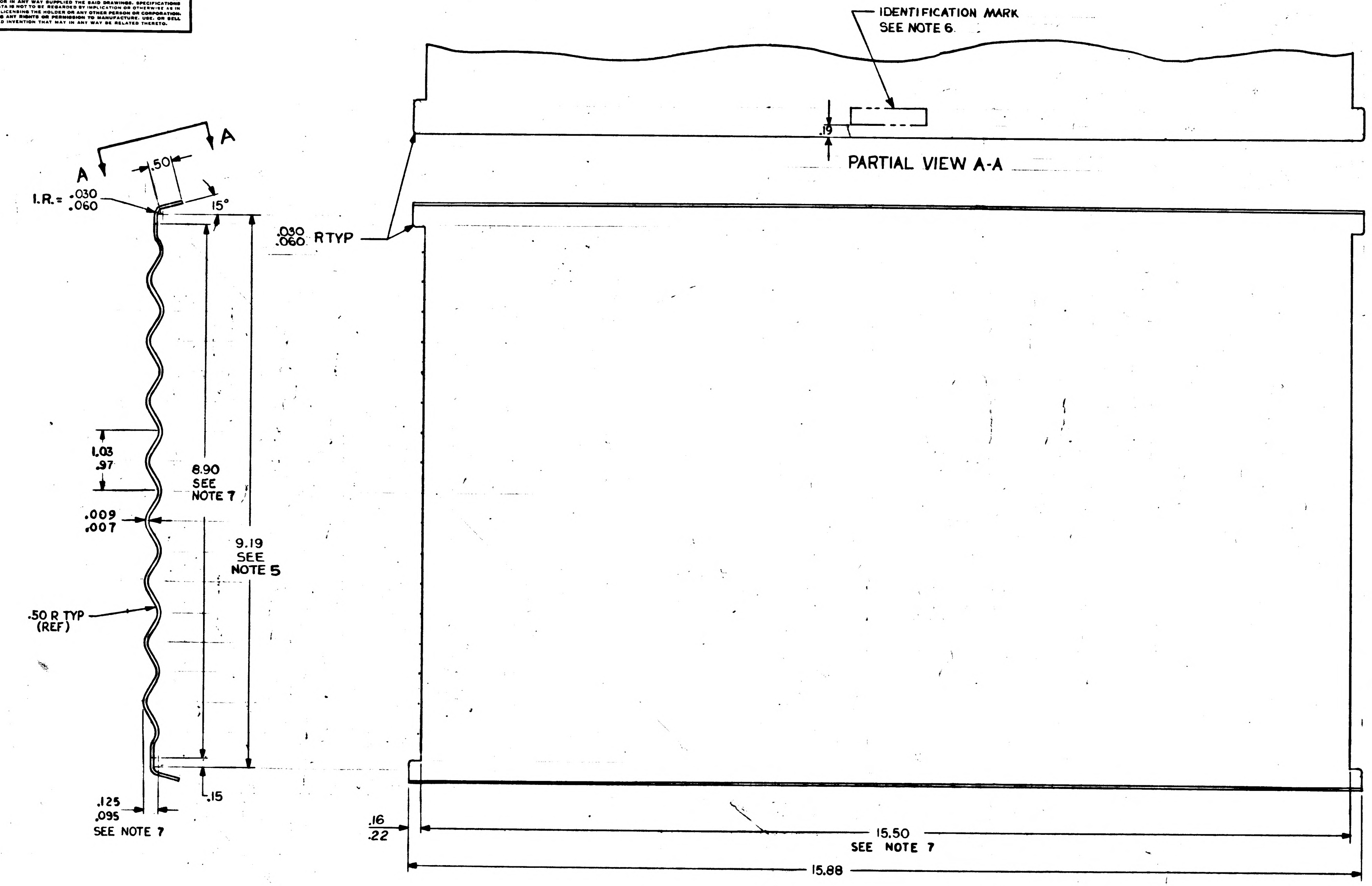
MASTER

2008539

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER DO 62743			16 DEC 66	
B		INITIAL RELEASE TDRR 32958			9 FEB 67	
C		REVISED PER TDRR 32959	JLB		16 FEB 67	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED IN MIL-D-70327.
2. MATERIAL: CRES STEEL PER MIL-S-5059, TYPE 301, FULL HARD
3. PASSIVATE PER MIL-F-14072, E 300, TYPE I.
4. REMOVE ALL BURRS AND SHARP EDGES TO .005/.015 R OR CHAMFER.
5. FORMED SECTION TO BE AN APPROXIMATE SINUSOIDAL WAVE SHAPE OF AMPLITUDE .125/.095 AND PITCH 1.03/.97 WITH THE WAVES CENTERED WITHIN .25 OF THE 9.19 DIMENSION. THE AMPLITUDE TO BE MEASURED AT POINTS WITHIN ONE INCH FROM A 10 POUND LOAD DISTRIBUTED OVER AN 18 TO 27 SQUARE INCH AREA AND RESTING ON TOP OF THE WAVES.
6. IDENTIFY USING PART NO. PER ND1002019 AND CENTRALIZE.
7. THE HEIGHT OF THE SINUSOIDAL WAVE SHALL BE AS SPECIFIED AFTER COMPRESSING THE DAMPER PLATE FIVE TIMES WITH A 3000 ± 50 POUND LOAD DISTRIBUTED OVER THE DESIGNATED AREA.
8. APPLY .005 TO .008 THICK COAT OF 1012509 PER ND 1002236 TO ALL SURFACES. COATING COMPOUND TO BE THINNED TO SPRAY CONSISTENCY WITH TOLUENE PER TT-T-548. CURE COATING TO 70 MIN. SHORE A HARDNESS.
9. ALL REQUIREMENTS AND DIMENSIONS APPLY BEFORE ADDITION OF COATING.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± .02 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN F. Byrne 9/6/66
CHECKED 10/7/66
APPROVED 10/7/66
APPROVED
APPROVED CCB 2/8/67
APPROVED MSC 10/11/66
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, DAMPER
CDU

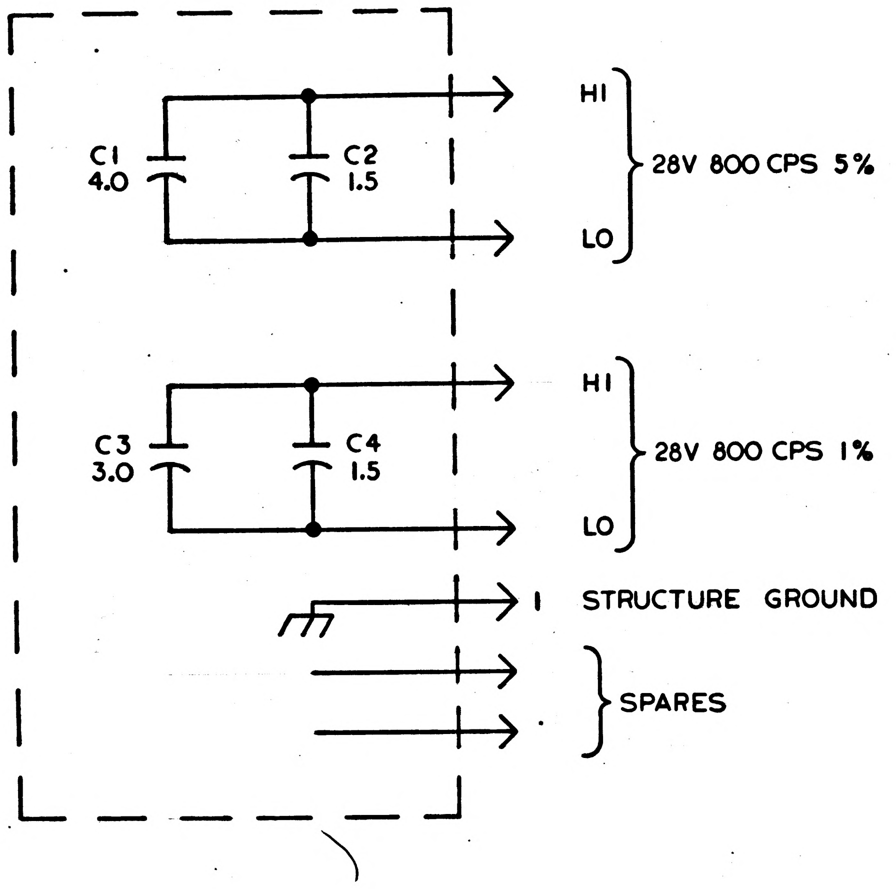
CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2008541
SCALE NONE
SHEET 1 OF 1

2008541 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16270

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1010264-41	CAPACITOR	4.0	± 5 %	200 V
C2	1010264-38	CAPACITOR	1.5	± 5 %	200 V
C3	1010264-40	CAPACITOR	3.0	± 5 %	200 V
C4	1010264-38	CAPACITOR	1.5	± 5 %	200 V

REF DWG
OPTICS LOAD COMPENSATION ASSY
DWG NO. 2007120

NOTE
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN	Wunderlich	1-FEB-65
CHECKED	R.W. Drozewski	1-FEB-65
APPROVED	DA Koso	1-Feb-65
APPROVED		
APPROVED MIT	W Kupfer	9 Feb 65
APPROVED MSC	W J Rhine	2-9-65
		DATE

SCHEMATIC
OPTICS LOAD COMPENSATION

CODE IDENT NO.
SIZE C
DRAWING NO. 2010001
SCALE —
SHEET 1 OF 1

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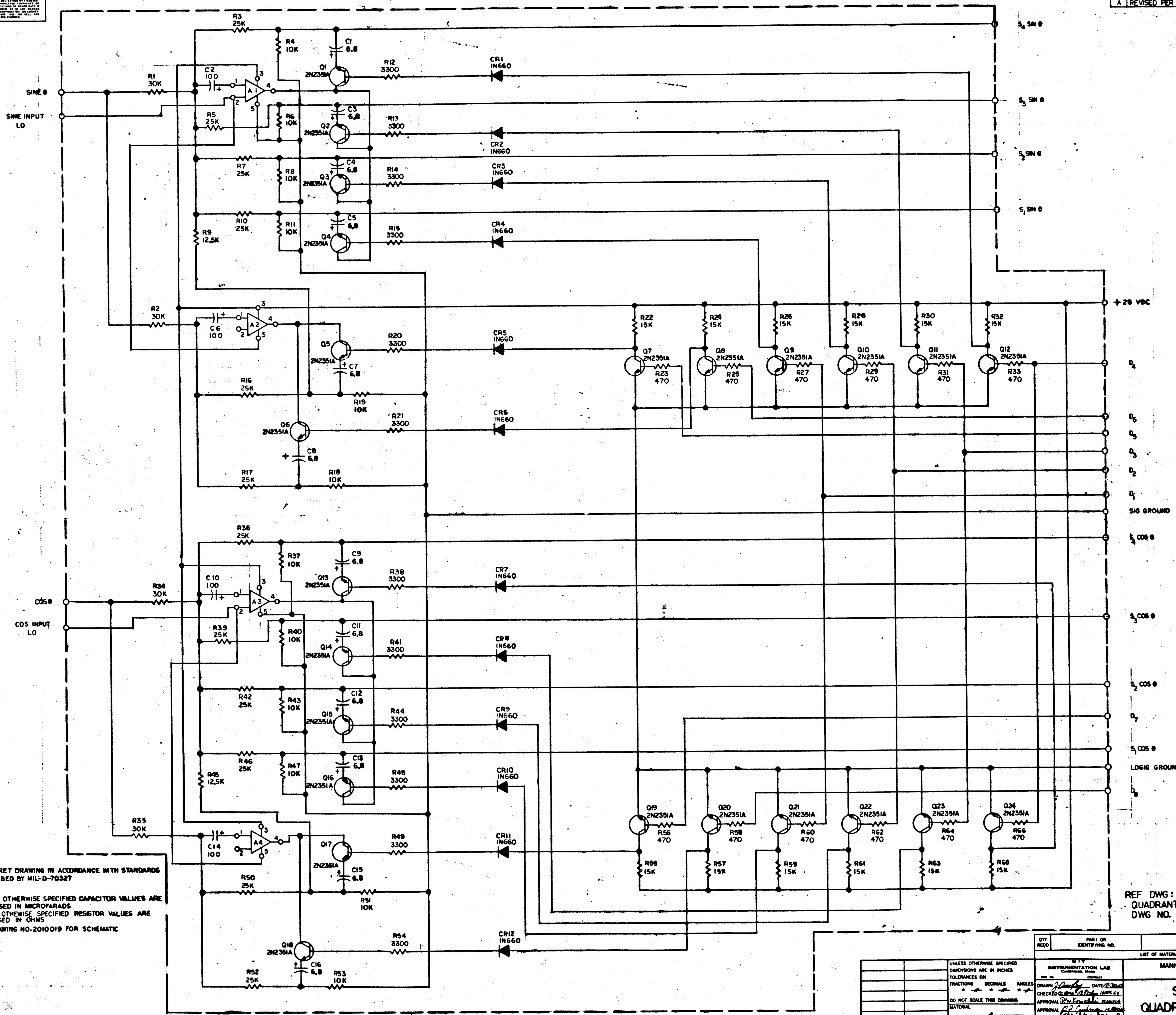
REVISIONS 88491			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 10160	6/16/64	



SINE θ
SINE INPUT LO
R1 30K
C2 100
A1
R3 25K
R4 10K
C1 6.8
Q1 2N2351A
R12 3300
CR1 1N660
S4 SIN θ
R5 25K
R6 10K
C3 6.8
Q2 2N2351A
R13 3300
CR2 1N660
S3 SIN θ
R7 25K
R8 10K
C4 6.8
Q3 2N2351A
R14 3300
CR3 1N660
S2 SIN θ
R10 25K
R11 10K
C5 6.8
Q4 2N2351A
R15 3300
CR4 1N660
S1 SIN θ
R9 12.5K
R2 30K
C6 100
A2
Q5 2N2351A
C7 6.8
R20 3300
CR5 1N660
R16 25K
R19 10K
Q6 2N2351A
C8 6.8
R21 3300
CR6 1N660
R17 25K
R18 10K
+28 VDC
R22 15K
R24 15K
R26 15K
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R23 470
R25 470
R27 470
R29 470
R31 470
R33 470
D4
D6
D5
D3
D2
D1
SIG GROUND
S4 COS θ
COS θ
COS INPUT LO
R34 30K
C10 100
A3
R36 25K
R37 10K
C9 6.8
Q13 2N2351A
R38 3300
CR7 1N660
R39 25K
R40 10K
C11 6.8
Q14 2N2351A
R41 3300
CR8 1N660
S3 COS θ
R42 25K
R43 10K
C12 6.8
Q15 2N2351A
R44 3300
CR9 1N660
S2 COS θ
D7
R46 25K
R47 10K
C13 6.8
Q16 2N2351A
R48 3300
CR10 1N660
S1 COS θ
LOGIC GROUND
D8
R45 12.5K
R35 30K
C14 100
A4
Q17 2N2351A
C15 6.8
R49 3300
CR11 1N660
R50 25K
R51 10K
Q18 2N2351A
C16 6.8
R54 3300
CR12 1N660
R52 25K
R53 10K
Q19 2N2351A
Q20 2N2351A
Q21 2N2351A
Q22 2N2351A
Q23 2N2351A
Q24 2N2351A
R56 470
R58 470
R60 470
R62 470
R64 470
R66 470
R55 15K
R57 15K
R59 15K
R61 15K
R63 15K
R65 15K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
3. UNLESS OTHEWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC

REF DWG:
QUADRANT SELECTOR ASSEMBLY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Camfry DATE 5-30-64
CHECKED D. Dolan 14 APR 64
APPROVAL R.M. Kowalski 18 APR 64
APPROVAL R.J. Cushman 15 May 64
S Millus 18 May 64
NASA APPROVAL 5/19/64
MIT APPROVAL 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, QUADRANT SELECTOR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010002
SCALE NONE
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08497

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 10160	6/4/64	RB LW

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377-309	RESISTOR	30K	±.01 %	1/10W
R2	1010377-309		30K	±.01 %	1/10W
R3	1010377-307		25K	±.01 %	1/10W
R4	1006750-56		10K	±2 %	1/4W
R5	1010377-307		25K	±.01 %	1/10W
R6	1006750-56		10K	±2 %	1/4 W
R7	1010377-307		25K	±.01 %	1/10W
R8	1006750-56		10K	±2 %	1/4 W
R9	1010377-306		12.5K	±.01 %	1/10W
R10	1010377-307		25K	±.01 %	1/10W
R11	1006750-56		10K	±2 %	1/4 W
R12	1006750-44		3300		
R13	1006750-44		3300		
R14	1006750-44		3300		
R15	1006750-44		3300		
R16	1010377-307		25K	±.01 %	1/10W
R17	1010733-12		25K	±0.1 %	1/10W
R18	1006750-56		10K	±2 %	1/4 W
R19	-56		10K		
R20	-44		3300		
R21	-44		3300		
R22	-60		15K		
R23	-24		470		
R24	-60		15K		
R25	-24		470		
R26	-60		15K		
R27	-24		470		
R28	-60		15K		
R29	-24		470		
R30	-60		15K		
R31	-24		470		
R32	-60		15K		
R33	1006750-24		470	±2 %	1/4 W
R34	1010377-309		30K	±.01 %	1/10W
R35	1010377-309		30K	±.01 %	1/10W
R36	1010377-307		25K	±.01 %	1/10W
R37	1006750-56		10K	±2 %	1/4 W
R38	1006750-44		3300	±2 %	1/4 W
R39	1010377-307		25K	±.01 %	1/10W
R40	1006750-56		10K	±2 %	1/4 W
R41	1006750-44		3300	±2 %	1/4 W
R42	1010377-307		25K	±.01 %	1/10W
R43	1006750-56		10K	±2 %	1/4 W
R44	1006750-44		3300	±2 %	1/4 W
R45	1010377-306		12.5K	±.01 %	1/10W
R46	1010377-307		25K	±.01 %	1/10W
R47	1006750-56		10K	±2 %	1/4 W
R48	1006750-44		3300	±2 %	1/4 W
R49	1006750-44		3300	±2 %	1/4 W
R50	1010377-307		25K	±.01 %	1/10W
R51	1006750-56		10K	±2 %	1/4 W
R52	1010733-12		25K	±0.1 %	1/10W
R53	1006750-56		10K	±2 %	1/4 W
R54	-44		3300		
R55	-60		15K		
R56	-24		470		
R57	-60		15K		
R58	-24		470		
R59	-60		15K		
R60	-24		470		
R61	-60		15K		
R62	-24		470		
R63	-60		15K		
R64	-24		470		
R65	-60		15K		
R66	1006750-24		470	±2 %	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-79	CAPACITOR	6.8	±10 %	35 VDC
C2	-14		100		10 VDC
C3	-79		6.8		35 VDC
C4	-79		6.8		35 VDC
C5	-79		6.8		35 VDC
C6	-14		100		10 VDC
C7	-79		6.8		35 VDC
C8	-79		6.8		35 VDC
C9	-79		6.8		35 VDC
C10	-14		100		10 VDC
C11	-79		6.8		35 VDC
C12	-79		6.8		35 VDC
C13	-79		6.8		35 VDC
C14	-14		100		10 VDC
C15	-79		6.8		35 VDC
C16	1006755-79		6.8	± 10 %	35 VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12	1010385				
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2					
Q3					
Q4					
Q5					
Q6					
Q7					
Q8					
Q9					
Q10					
Q11					
Q12					
Q13					
Q14					
Q15					
Q16					
Q17					
Q18					
Q19					
Q20					
Q21					
Q22					
Q23					
Q24	1010343-3				
A1		AMPLIFIER	SEE NOTE 4		
A2					
A3					
A4					

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN J. Conley DATE 23 Oct
CHECKED
APPROVAL R. J. Kowalski
APPROVAL D. J. Cushman 15 May 64
NASA APPROVAL
MIT APPROVAL

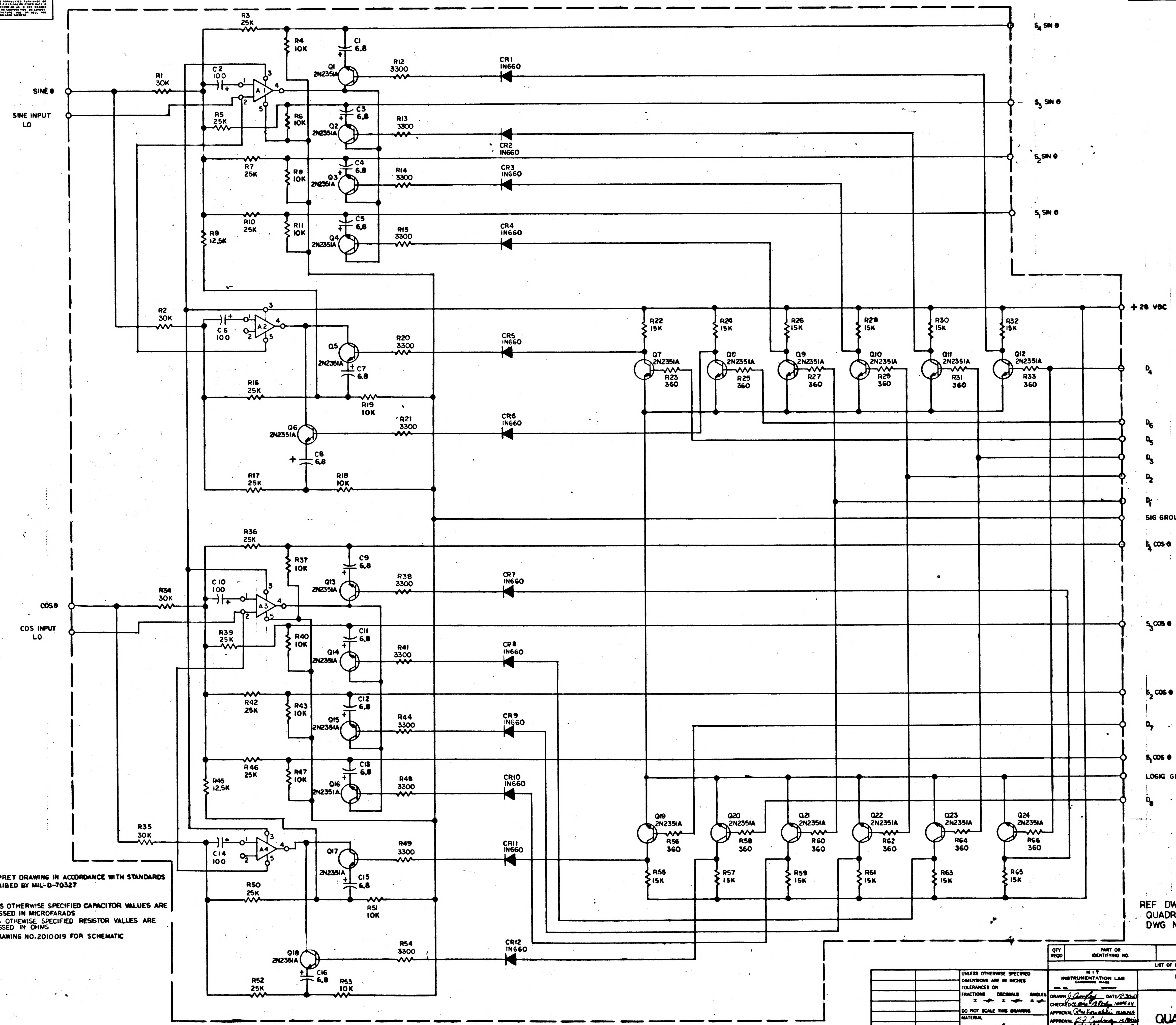
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, QUADRANT SELECTOR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010002
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 08491			
SYM	DESCRIPTION	DATE	APPROVAL


S4 SIN θ
S3 SIN θ
S2 SIN θ
S1 SIN θ
SINE θ
SINE INPUT LO
R1 30K
R2 30K
R3 25K
R4 10K
C1 6.8
C2 100
A1
Q1 2N2351A
R12 3300
CR1 1N660
R5 25K
R6 10K
C3 6.8
Q2 2N2351A
R13 3300
CR2 1N660
R7 25K
R8 10K
C4 6.8
Q3 2N2351A
R14 3300
CR3 1N660
R9 12.5K
R10 25K
R11 10K
C5 6.8
Q4 2N2351A
R15 3300
CR4 1N660
C6 100
A2
Q5 2N2351A
C7 6.8
R20 3300
CR5 1N660
R16 25K
R19 10K
Q6 2N2351A
R21 3300
CR6 1N660
C8 6.8
R17 25K
R18 10K
+28 VDC
R22 15K
R24 15K
R26 15K
R28 15K
R30 15K
R32 15K
Q7 2N2351A
Q8 2N2351A
Q9 2N2351A
Q10 2N2351A
Q11 2N2351A
Q12 2N2351A
R23 360
R25 360
R27 360
R29 360
R31 360
R33 360
D4
D6
D5
D3
D2
D1
SIG GROUND
S4 COS θ
S3 COS θ
S2 COS θ
D7
S1 COS θ
LOGIC GROUND
D8
COS θ
COS INPUT LO
R34 30K
R35 30K
R36 25K
R37 10K
C9 6.8
C10 100
A3
Q13 2N2351A
R38 3300
CR7 1N660
R39 25K
R40 10K
C11 6.8
Q14 2N2351A
R41 3300
CR8 1N660
R42 25K
R43 10K
C12 6.8
Q15 2N2351A
R44 3300
CR9 1N660
R45 12.5K
R46 25K
R47 10K
C13 6.8
Q16 2N2351A
R48 3300
CR10 1N660
C14 100
A4
Q17 2N2351A
C15 6.8
R49 3300
CR11 1N660
R50 25K
R51 10K
Q18 2N2351A
C16 6.8
R54 3300
CR12 1N660
R52 25K
R53 10K
Q19 2N2351A
Q20 2N2351A
Q21 2N2351A
Q22 2N2351A
Q23 2N2351A
Q24 2N2351A
R56 360
R58 360
R60 360
R62 360
R64 360
R66 360
R55 15K
R57 15K
R59 15K
R61 15K
R63 15K
R65 15K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC

REF DWG:
QUADRANT SELECTOR ASSEMBLY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. [illegible] DATE 12-30-63
CHECKED [illegible] 14 Mar 64
APPROVAL R M Kowalski [illegible]
APPROVAL [illegible] 15 Mar 64
S Miller 8 May 64
NASA APPROVAL [illegible] 5/19/64
MIT APPROVAL W Kupfer 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, QUADRANT SELECTOR

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	E	2010002

SCALE NONE WT — SHEET 1 OF 2

2010002

MASTER

INCHES 0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 08491			
SYM	DESCRIPTION	DATE	APPROVAL

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377-309	RESISTOR	30K	±.01%	1/10W
R2	1010377-309		30K	±.01%	1/10W
R3	1010377-307		25K	±.01%	1/10W
R4	1006750-56		10K	±2%	1/4W
R5	1010377-307		25K	±.01%	1/10W
R6	1006750-56		10K	±2%	1/4W
R7	1010377-307		25K	±.01%	1/10W
R8	1006750-56		10K	±2%	1/4W
R9	1010377-306		12.5K	±.01%	1/10W
R10	1010377-307		25K	±.01%	1/10W
R11	1006750-56		10K	±2%	1/4W
R12	1006750-44		3300		
R13	1006750-44		3300		
R14	1006750-44		3300		
R15	1006750-44		3300	↓	↓
R16	1010377-307		25K	±.01%	1/10W
R17	1010733-12		25K	±0.1%	1/10W
R18	1006750-56		10K	±2%	1/4W
R19	-56		10K		
R20	-44		3300		
R21	-44		3300		
R22	-60		15K		
R23	-21		360		
R24	-60		15K		
R25	-21		360		
R26	-60		15K		
R27	-21		360		
R28	-60		15K		
R29	-21		360		
R30	-60		15K		
R31	-21		360		
R32	↓ -60		15K	↓	↓
R33	1006750-21		360	±2%	1/4W
R34	1010377-309		30K	±.01%	1/10W
R35	1010377-309		30K	±.01%	1/10W
R36	1010377-307		25K	±.01%	1/10W
R37	1006750-56		10K	±2%	1/4W
R38	1006750-44		3300	±2%	1/4W
R39	1010377-307		25K	±.01%	1/10W
R40	1006750-56		10K	±2%	1/4W
R41	1006750-44		3300	±2%	1/4W
R42	1010377-307		25K	±.01%	1/10W
R43	1006750-56		10K	±2%	1/4W
R44	1006750-44		3300	±2%	1/4W
R45	1010377-306		12.5K	±.01%	1/10W
R46	1010377-307		25K	±.01%	1/10W
R47	1006750-56		10K	±2%	1/4W
R48	1006750-44		3300	±2%	1/4W
R49	1006750-44		3300	±2%	1/4W
R50	1010377-307		25K	±.01%	1/10W
R51	1006750-56		10K	±2%	1/4W
R52	1010733-12		25K	±0.1%	1/10W
R53	1006750-56		10K	±2%	1/4W
R54	-44		3300		
R55	-60		15K		
R56	-21		360		
R57	-60		15K		
R58	-21		360		
R59	-60		15K		
R60	-21		360		
R61	-60		15K		
R62	-21		360		
R63	-60		15K		
R64	-21		360		
R65	↓ -60		15K	↓	↓
R66	1006750-21	↓	360	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-79	CAPACITOR	6.8	±10%	35 VDC
C2	-14		100		10 VDC
C3	-79		6.8		35 VDC
C4	-79		6.8		35 VDC
C5	-79		6.8		35 VDC
C6	-14		100		10 VDC
C7	-79		6.8		35 VDC
C8	-79		6.8		35 VDC
C9	-79		6.8		35 VDC
C10	-14		100		10 VDC
C11	-79		6.8		35 VDC
C12	-79		6.8		35 VDC
C13	-79		6.8		35 VDC
C14	-14		100		10 VDC
C15	↓ -79		6.8	↓	35 VDC
C16	1006755-79	↓	6.8	±10%	35 VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11	↓				
CR12	1010385	↓	↓		
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2					
Q3					
Q4					
Q5					
Q6					
Q7					
Q8					
Q9					
Q10					
Q11					
Q12					
Q13					
Q14					
Q15					
Q16					
Q17					
Q18					
Q19					
Q20					
Q21					
Q22					
Q23	↓				
Q24	1010343-3	↓	↓		
A1		AMPLIFIER	SEE NOTE 4		
A2					
A3					
A4	↓	↓	↓		

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J. Crowley DATE 2-30-63
CHECKED
APPROVAL R.J. Kowalski
APPROVAL D.J. Cushman 15 May 64
NASA APPROVAL 5/15/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, QUADRANT SELECTOR

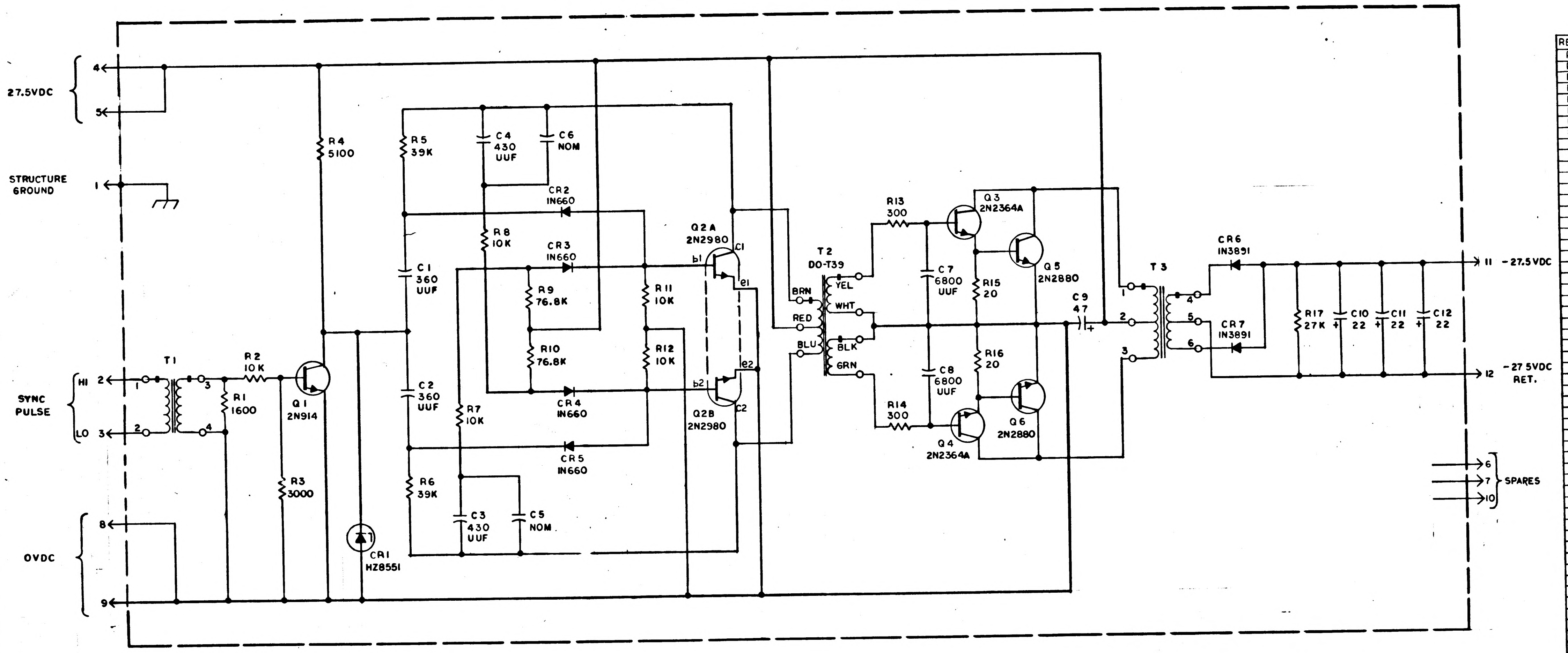
CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	E	2010002

SCALE — WT — SHEET 2 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16028

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17968			5 Mar 65	



27.5VDC
4
5
STRUCTURE GROUND
1
SYNC PULSE
HI 2
LO 3
OVDC
8
9
T1
R2 10K
R1 1600
Q1 2N914
R3 3000
R4 5100
CR1 HZ8551
R5 39K
R6 39K
C4 430 UUF
C6 NOM
CR2 IN660
C1 360 UUF
C2 360 UUF
R8 10K
CR3 IN660
R9 76.8K
R10 76.8K
CR4 IN660
R7 10K
CR5 IN660
C3 430 UUF
C5 NOM
R11 10K
R12 10K
Q2A 2N2980
Q2B 2N2980
b1
c1
e1
e2
b2
c2
T2 DO-T39
BRN
RED
BLU
YEL
WHT
BLK
GRN
R13 300
R14 300
C7 6800 UUF
C8 6800 UUF
Q3 2N2364A
Q4 2N2364A
R15 20
R16 20
Q5 2N2880
Q6 2N2880
C9 47
T3
1
2
3
4
5
6
CR6 IN3891
CR7 IN3891
R17 27K
C10 22
C11 22
C12 22
11 -27.5VDC
12 -27.5VDC RET.
6
7
10
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-37	RESISTOR	1600	±2%	1/4 W
R2	-56		10 K		
R3	-43		3000		
R4	-49		5100		
R5	-70		39K		
R6	1006750-70		39K	+2%	1/4 W
R7	1010364-443		10 K	+1%	1/8 W
R8	1010364-443		10 K	±1%	1/8 W
R9	1010363-613		76.8K	±1%	1/4 W
R10	1010363-613		76.8K	±1%	
R11	1006750-56		10 K	±2%	
R12	1006750-56		10 K	±2%	
R13	1006750-19		300	±2%	
R14	1006750-19		300	±2%	1/4 W
R15	1010369-148		20	±5%	1/8 W
R16	1010369-148		20	±5%	1/8 W
R17	1006750-66	RESISTOR	27 K	±2%	1/4 W
C1	1010410-6	CAPACITOR	360UUF	±2%	500VDC
C2	1010410-6		360UUF	±2%	500
C3	1010410-20		430UUF	±1%	500
C4	1010410-20		430UUF	±1%	500
C5	SEE NOTE 4		NOM	±2%	500
C6	SEE NOTE 4		NOM	±2%	500
C7	1006777-30		6800UUF	±10%	100
C8	1006777-30		6800UUF		100
C9	1006789-002		47		50
C10	1010393-045		22		50
C11	1010393-045		22		50
C12	1010393-045	CAPACITOR	22	±10%	50 VDC
CR1	1010372-22	DIODE	HZ8551		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010777-2		IN3891		
CR7	1010777-2	DIODE	IN3891		
Q1	1006752	TRANSISTOR	2N914		
Q2	1010652-4		2N2980		
Q3	1010343-2		2N2364A		
Q4	1010343-2		2N2364A		
Q5	1010843-2		2N2880		
Q6		TRANSISTOR	2N2880		
T1	1006319	TRANSFORMER			
T2	1010315-2	TRANSFORMER	DO-T39		
T3	1010889	TRANSFORMER			

C5, C6			
PART NO.	VALUE	TOL	RATING
1010409-1	10 UUF	0.25UUF	500VDC
-2	11	0.25UUF	
-3	12	0.25UUF	
-4	13	±2%	
-5	15		
-6	16		
-7	18		
-8	20		
-9	22		
-10	24		
-11	27		
1010409-12	30 UUF	±2%	500VDC

REF DWG:
POWER SUPPLY -28VDC ASSY
DWG NO. 2007107

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED. CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT C5 & C6 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 27 JAN 65
CHECKED Louis H. Martin 29 Jan
APPROVED Manuel Kramer 29 Jan 65
APPROVED E. Kilrolak
APPROVED MIT W. Kupfer 9 Feb 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

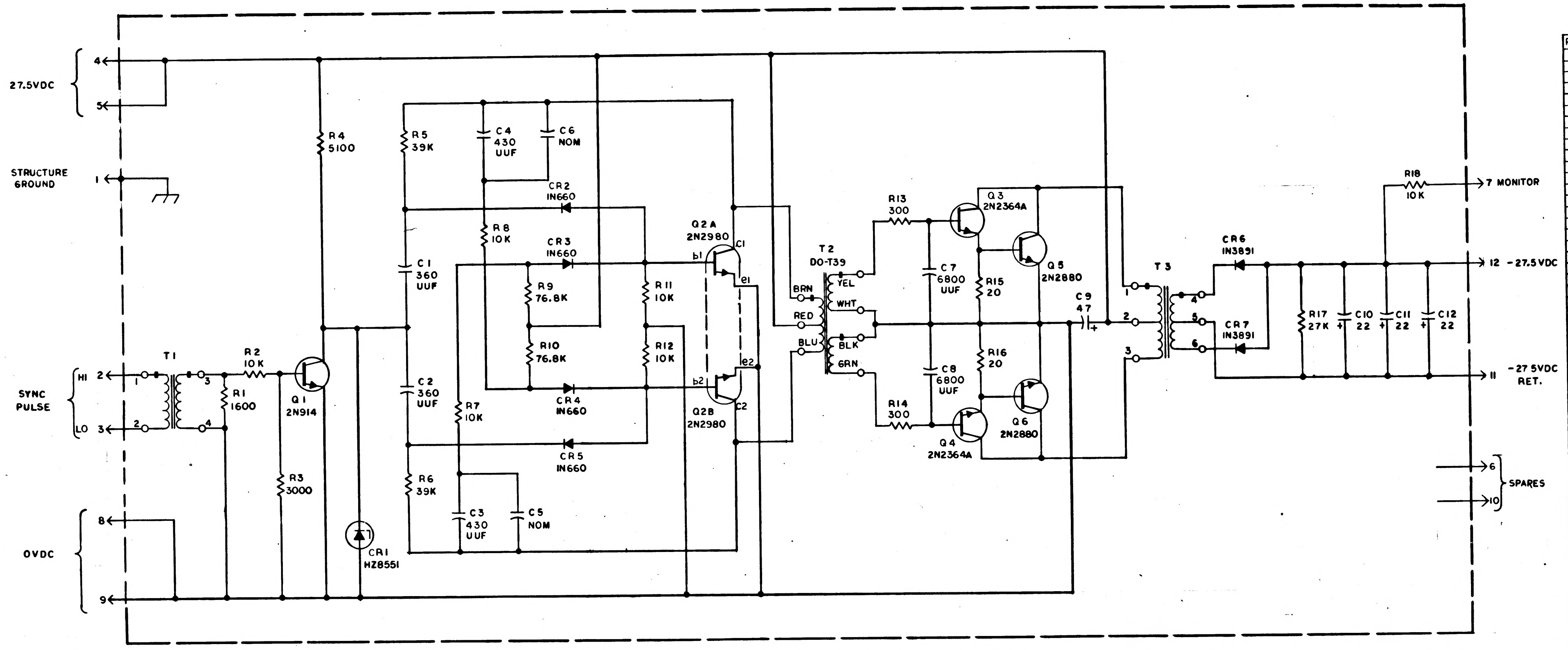
SCHEMATIC,
POWER SUPPLY -28VDC

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010003
SCALE —
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16028

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17968				WR
B		REVISED PEP TDRR 19813			9 June 65	


27.5VDC
4
5
STRUCTURE GROUND
1
SYNC PULSE
HI
LO
2
3
OVDC
8
9
T1
1
2
3
4
R2
10K
R1
1600
Q1
2N914
R3
3000
R4
5100
CR1
HZ8551
R5
39K
R6
39K
C4
430 UUF
C6
NOM
CR2
IN660
R8
10K
CR3
IN660
C1
360 UUF
R9
76.8K
R10
76.8K
R11
10K
R12
10K
CR4
IN660
C2
360 UUF
R7
10K
CR5
IN660
C3
430 UUF
C5
NOM
Q2A
2N2980
Q2B
2N2980
b1
C1
e1
b2
C2
e2
T2
DO-T39
BRN
RED
BLU
YEL
WHT
BLK
GRN
R13
300
R14
300
C7
6800 UUF
C8
6800 UUF
R15
20
R16
20
Q3
2N2364A
Q4
2N2364A
Q5
2N2880
Q6
2N2880
C9
47
T3
1
2
3
4
5
6
CR6
IN3891
CR7
IN3891
R17
27K
C10
22
C11
22
C12
22
R18
10K
7 MONITOR
12 -27.5VDC
11 -27.5VDC RET.
6
10
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-37	RESISTOR	1600	±2%	1/4 W
R2	-56		10K		
R3	-43		3000		
R4	-49		5100		
R5	-70		39K		
R6	1006750-70		39K	+2%	1/4 W
R7	1010364-443		10 K	+1%	1/8 W
R8	1010364-443		10 K	±1%	1/8 W
R9	1010363-613		76.8K	±1%	1/4 W
R10	1010363-613		76.8K	±1%	
R11	1006750-56		10 K	±2%	
R12	1006750-56		10 K	±2%	
R13	1006750-19		300	±2%	
R14	1006750-19		300	±2%	1/4 W
R15	1010369-148		20	±5%	1/8 W
R16	1010369-148		20	±5%	1/8 W
R17	1006750-66	RESISTOR	27 K	±2%	1/4 W
R18	1010364-443	RESISTOR	10 K	±1%	1/8 W
C1	1010410-6	CAPACITOR	360UUF	±2%	500VDC
C2	1010410-6		360UUF	±2%	500
C3	1010410-20		430UUF	±1%	500
C4	1010410-20		430UUF	±1%	500
C5	SEE NOTE 4		NOM	±2%	500
C6	SEE NOTE 4		NOM	±2%	500
C7	1006777-30		6800UUF	±10%	100
C8	1006777-30		6800UUF		100
C9	1006789-002		47		50
C10	1010393-045		22		50
C11	1010393-045		22		50
C12	1010393-045	CAPACITOR	22	±10%	50 VDC
CR1	1010372-22	DIODE	HZ8551		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010777-2		IN3891		
CR7	1010777-2	DIODE	IN3891		
Q1	1006752	TRANSISTOR	2N914		
Q2	1010652-4		2N2980		
Q3	1010343-2		2N2364A		
Q4	1010343-2		2N2364A		
Q5	1010843-2		2N2880		
Q6		TRANSISTOR	2N2880		
T1	1006319	TRANSFORMER			
T2	1010315-2	TRANSFORMER	DO-T39		
T3	1010889	TRANSFORMER			

C5, C6			
PART NO.	VALUE	TOL	RATING
1010409-1	10 UUF	0.25UUF	500VDC
-2	11	0.25UUF	
-3	12	0.25UUF	
-4	13	±2%	
-5	15		
-6	16		
-7	18		
-8	20		
-9	22		
-10	24		
-11	27		
1010409-12	30 UUF	±2%	500VDC

REF DWG:
POWER SUPPLY -28VDC ASSY
DWG NO. 2007107

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED, CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT C5 & C6 PER ATP FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN a. D. Leo 27 JAN 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
POWER SUPPLY -28VDC

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010003

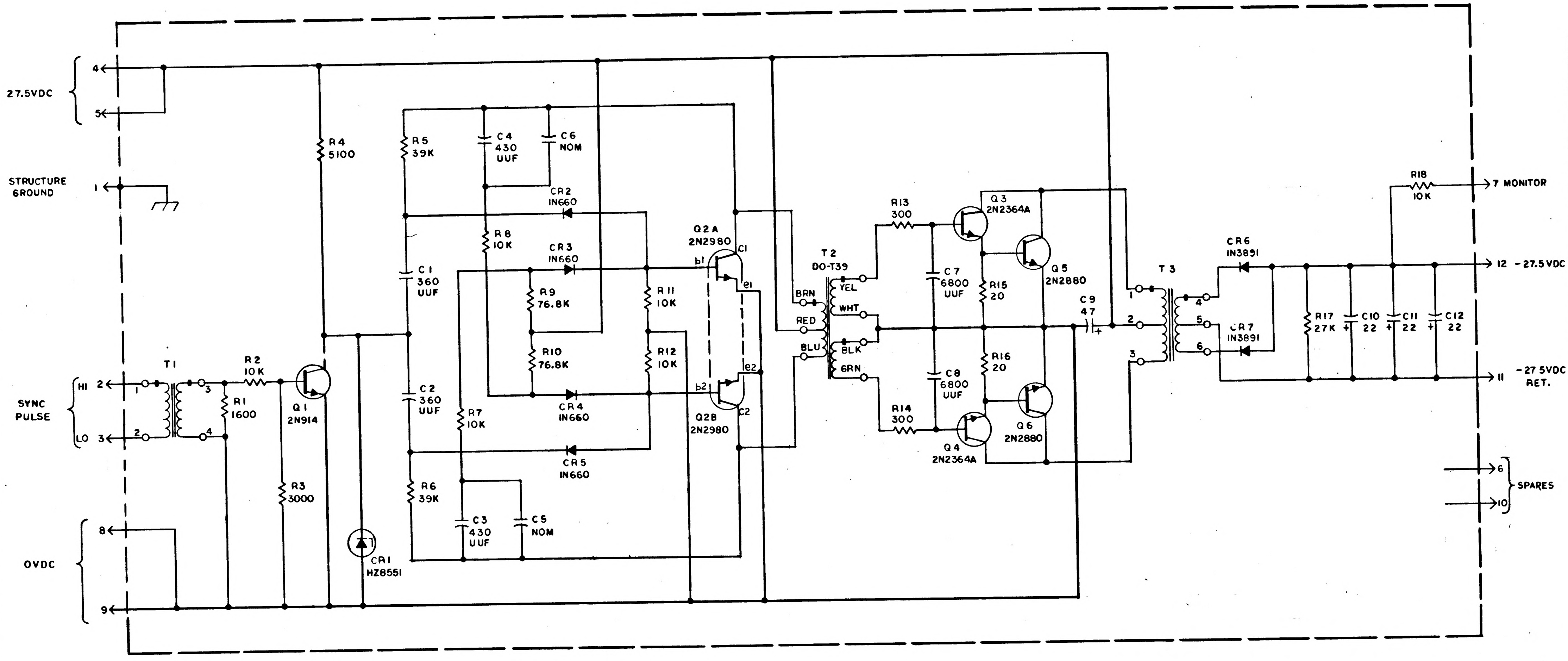
SCALE — SHEET 1 OF 1

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16028

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17968	R.N.R		5 Apr 65	WK
B		REVISED PEP TDRR 19813			8 Jun 65	
C		REVISED PER TDRR 21280	KCH		29 Jul 65	WK


27.5VDC
4
5
STRUCTURE GROUND
1
SYNC PULSE
HI 2
LO 3
OVDC
8
9
T1
1
2
3
4
R2 10K
R1 1600
R3 3000
Q1 2N914
R4 5100
CR1 HZ8551
R5 39K
C4 430 UUF
C6 NOM
CR2 IN660
R8 10K
CR3 IN660
C1 360 UUF
R9 76.8K
R10 76.8K
R11 10K
R12 10K
C2 360 UUF
R7 10K
CR4 IN660
CR5 IN660
R6 39K
C3 430 UUF
C5 NOM
Q2A 2N2980
Q2B 2N2980
b1
c1
e1
b2
e2
c2
T2 DO-T39
BRN
RED
BLU
YEL
WHT
BLK
GRN
R13 300
R14 300
C7 6800 UUF
C8 6800 UUF
R15 20
R16 20
Q3 2N2364A
Q4 2N2364A
Q5 2N2880
Q6 2N2880
C9 47
T3
CR6 IN3891
CR7 IN3891
R17 27K
C10 22
C11 22
C12 22
R18 10K
7 MONITOR
12 -27.5VDC
11 -27 5VDC RET.
6
10
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-37	RESISTOR	1600	±2%	1/4 W
R2	-56		10K		
R3	-43		3000		
R4	-49		5100		
R5	-70		39K		
R6	1006750-70		39K	+2%	1/4 W
R7	1010364-443		10K	+1%	1/8 W
R8	1010364-443		10K	±1%	1/8 W
R9	1010363-613		76.8K	±1%	1/4 W
R10	1010363-613		76.8K	±1%	
R11	1006750-56		10K	±2%	
R12	1006750-56		10K	±2%	
R13	1006750-19		300	±2%	
R14	1006750-19		300	±2%	1/4 W
R15	1010369-148		20	±5%	1/8 W
R16	1010369-148		20	±5%	1/8 W
R17	1006750-66	RESISTOR	27K	±2%	1/4 W
R18	1010364-443	RESISTOR	10K	±1%	1/8 W
C1	1010410-6	CAPACITOR	360UUF	±2%	500VDC
C2	1010410-6		360UUF	±2%	500
C3	1010410-20		430UUF	±1%	500
C4	1010410-20		430UUF	±1%	500
C5	SEE NOTE 4		NOM	±2%	500
C6	SEE NOTE 4		NOM	±2%	500
C7	1006777-30		6800UUF	±10%	100
C8	1006777-30		6800UUF		100
C9	1006789-002		47		50
C10	1010393-045		22		50
C11	1010393-045		22		50
C12	1010393-045	CAPACITOR	22	±10%	50 VDC
CR1	1010372-22	DIODE	HZ8551		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010777-2		IN3891		
CR7	1010777-2	DIODE	IN3891		
Q1	1010966-1	TRANSISTOR	2N914		
Q2	1010652-4		2N2980		
Q3	1010343-2		2N2364A		
Q4	1010343-2		2N2364A		
Q5	1010843-2		2N2880		
Q6		TRANSISTOR	2N2880		
T1	1006319	TRANSFORMER			
T2	1010315-2	TRANSFORMER	DO-T39		
T3	1010889	TRANSFORMER			

C5, C6			
PART NO.	VALUE	TOL	RATING
1010409-1	10 UUF	0.25UUF	500VDC
-2	11	0.25UUF	
-3	12	0.25UUF	
-4	13	±2%	
-5	15		
-6	16		
-7	18		
-8	20		
-9	22		
-10	24		
-11	27		
1010409-12	30 UUF	±2%	500VDC

REF DWG:
POWER SUPPLY -28VDC ASSY
DWG NO. 2007107

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED, CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT C5 & C6 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R. Di Leo 27 JAN 65
CHECKED Louis H. Martinez 27 Jan
APPROVED Manuel Kramer 29 Jan 65
APPROVED
APPROVED MIT W Kupfer 9 Feb 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY -28VDC

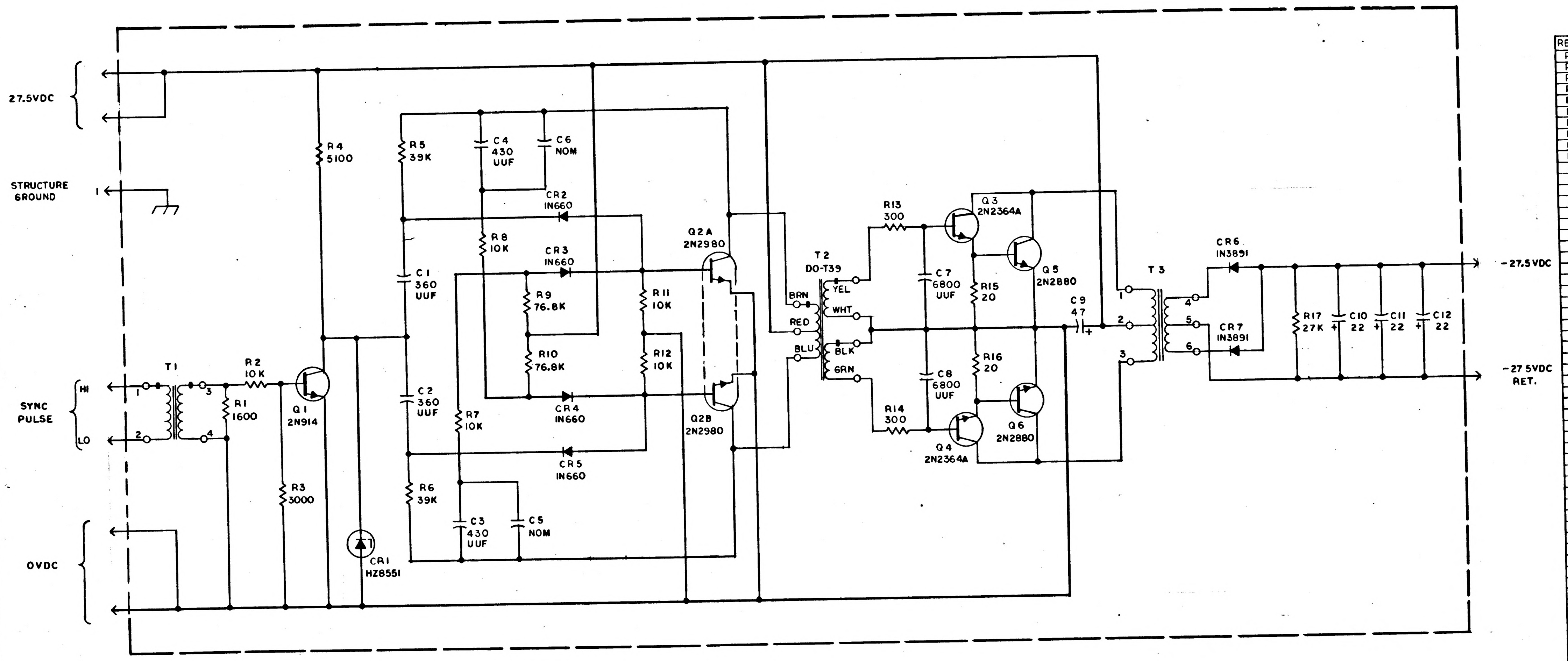
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010003
SCALE —
SHEET 1 OF 1

2010003 C

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16028

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


27.5VDC
STRUCTURE GROUND
1
SYNC PULSE
HI
LO
OVDC
T1
1
2
3
4
R2 10K
R1 1600
Q1 2N914
R4 5100
R3 3000
CR1 HZ8551
R5 39K
C4 430 UUF
C6 NOM
CR2 IN660
R8 10K
C1 360 UUF
CR3 IN660
R9 76.8K
R10 76.8K
R11 10K
R12 10K
CR4 IN660
C2 360 UUF
R7 10K
CR5 IN660
R6 39K
C3 430 UUF
C5 NOM
Q2A 2N2980
Q2B 2N2980
T2 DO-T39
BRN
YEL
RED
WHT
BLU
BLK
GRN
R13 300
R14 300
C7 6800 UUF
C8 6800 UUF
R15 20
R16 20
Q3 2N2364A
Q4 2N2364A
Q5 2N2880
Q6 2N2880
C9 47
T3
1
2
3
4
5
6
CR6 IN3891
CR7 IN3891
R17 27K
C10 22
C11 22
C12 22
-27.5VDC
-27.5VDC RET.

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-37	RESISTOR	1600	±2%	1/4 W
R2	-56		10 K		
R3	-43		3000		
R4	-49		5100		
R5	-70		39K		
R6	1006750-70		39K	+2%	1/4 W
R7	1010364-443		10 K	+1%	1/8 W
R8	1010364-443		10 K	±1%	1/8 W
R9	1010363-613		76.8K	±1%	1/4 W
R10	1010363-613		76.8K	±1%	
R11	1006750-56		10 K	±2%	
R12	1006750-56		10 K	±2%	
R13	1006750-19		300	±2%	
R14	1006750-19		300	±2%	1/4 W
R15	1010369-148		20	±5%	1/8 W
R16	1010369-148		20	±5%	1/8 W
R17	1006750-66	RESISTOR	27 K	±2%	1/4 W
C1	1010410-6	CAPACITOR	360UUF	±2%	500VDC
C2	1010410-6		360UUF	±2%	500
C3	1010410-20		430UUF	±1%	500
C4	1010410-20		430UUF	±1%	500
C5	SEE NOTE 4		NOM	±2%	500
C6	SEE NOTE 4		NOM	±2%	500
C7	1006777-30		6800UUF	±10%	100
C8	1006777-30		6800UUF		100
C9	1006789-002		47		50
C10	1010393-045		22		50
C11	1010393-045		22		50
C12	1010393-045	CAPACITOR	22	±10%	50 VDC
CR1	1010372-22	DIODE	HZ8551		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010777-2		IN3891		
CR7	1010777-2	DIODE	IN3891		
Q1	1006752	TRANSISTOR	2N914		
Q2	1010652-4		2N2980		
Q3	1010343-2		2N2364A		
Q4	1010343-2		2N2364A		
Q5	1010843-2		2N2880		
Q6		TRANSISTOR	2N2880		
T1	1006319	TRANSFORMER			
T2	1010315-2	TRANSFORMER	DO-T39		
T3	1010889	TRANSFORMER			

C5, C6			
PART NO.	VALUE	TOL	RATING
1010409-1	10 UUF	0.25UUF	500VDC
-2	11	0.25UUF	
-3	12	0.25UUF	
-4	13	±2%	
-5	15		
-6	16		
-7	18		
-8	20		
-9	22		
-10	24		
-11	27		
1010409-12	30 UUF	±2%	500VDC

REF DWG:
POWER SUPPLY -28VDC ASSY
DWG NO. 2007107

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHEPWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED, CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT C5 & C6 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. D. Leo 27 JAN 65
CHECKED Louis H. Martinez 29 Jan
APPROVED 29 Jan 65
APPROVED
APPROVED MIT W Kupfer 2 Feb 65
APPROVED MSC
DATE

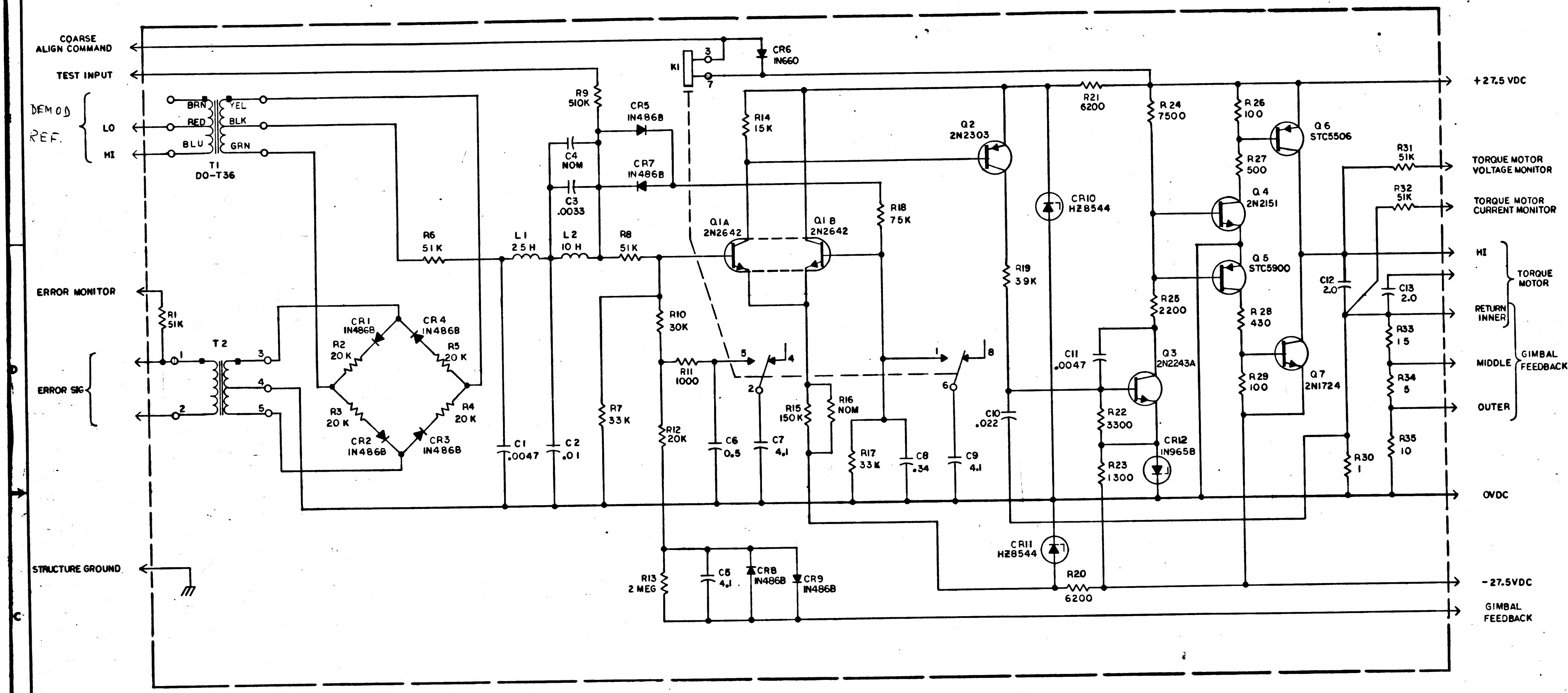
SCHEMATIC,
POWER SUPPLY -28VDC

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010003
SCALE —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189	TAS	[illegible]	12 MAR 65	WR


COARSE ALIGN COMMAND
TEST INPUT
DEMOD REF.
LO
HI
BRN
RED
BLU
YEL
BLK
GRN
T1
DO-T36
ERROR MONITOR
R1
51K
ERROR SIG
1
2
T2
3
4
5
CR1
IN486B
CR4
IN486B
R2
20 K
R5
20 K
R3
20 K
R4
20 K
CR2
IN486B
CR3
IN486B
STRUCTURE GROUND
R6
51 K
L1
25 H
L2
10 H
R8
51 K
R9
510K
C4
NOM
C3
.0033
CR5
IN486B
CR7
IN486B
K1
3
7
CR6
IN660
C1
.0047
C2
.01
R7
33 K
R10
30K
R11
1000
R12
20K
C6
0.5
C7
4.1
R13
2 MEG
C5
4.1
CR8
IN486B
CR9
IN486B
Q1A
2N2642
Q1B
2N2642
R14
15K
R18
75K
R15
150K
R16
NOM
R17
33K
C8
.34
C9
4.1
5
4
2
1
8
6
Q2
2N2303
R21
6200
CR10
HZ8544
R19
39K
C10
.022
C11
.0047
R22
3300
R23
1300
Q3
2N2243A
CR12
IN965B
CR11
HZ8544
R20
6200
R24
7500
R25
2200
R26
100
R27
500
Q4
2N2151
Q5
STC5900
R28
430
R29
100
Q6
STC5506
Q7
2N1724
R30
1
C12
2.0
C13
2.0
R31
51K
R32
51K
R33
15
R34
5
R35
10
+27.5 VDC
TORQUE MOTOR VOLTAGE MONITOR
TORQUE MOTOR CURRENT MONITOR
HI
TORQUE MOTOR
RETURN INNER
MIDDLE
GIMBAL FEEDBACK
OUTER
OVDC
-27.5VDC
GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-73	RESISTOR	51K	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-60		15K	±2%	1/4W
R15	1010369-85		150K	±5%	1/8W
R16	SEE NOTE 2		NOMINAL	±5%	1/8W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-70		39K		
R20	-51		6200		
R21	-51		6200		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5W
R28	1010389-47		430	±1%	3W
R29	1010278-39		100	±5%	1/2W
R30	1010389-94		1	±1%	3W
R31	1006750-73		51K	±2%	1/4W
R32	1006750-73		51K	±2%	1/4W
R33	1006802-4		15	±4%	1/4W
R34	1006802-3		5	±4%	1/4W
R35	1006802-1	RESISTOR	10	±4%	1/4W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1010372-15		HZ8544		
CR11	1010372-15		HZ8544		
CR12	1010830-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1010633-1		2N2303		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16

PART NO.	VALUE
1010369-85	150K
-87	180K
-88	200K
-89	220K
-90	240K
-91	270K
-92	300K
-93	330K
-94	360K
-95	390K
-96	430K
-97	470K
-98	510K
-100	620K
-102	750K
1010369-105	1MEG

C4

PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 4 DEC 64
CHECKED P. Kingston 15 Feb 65
APPROVED [illegible] 15 Feb 65
APPROVED

APPROVED MIT W Kyler 17 Feb 65
APPROVED MSC [illegible] 2/17/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

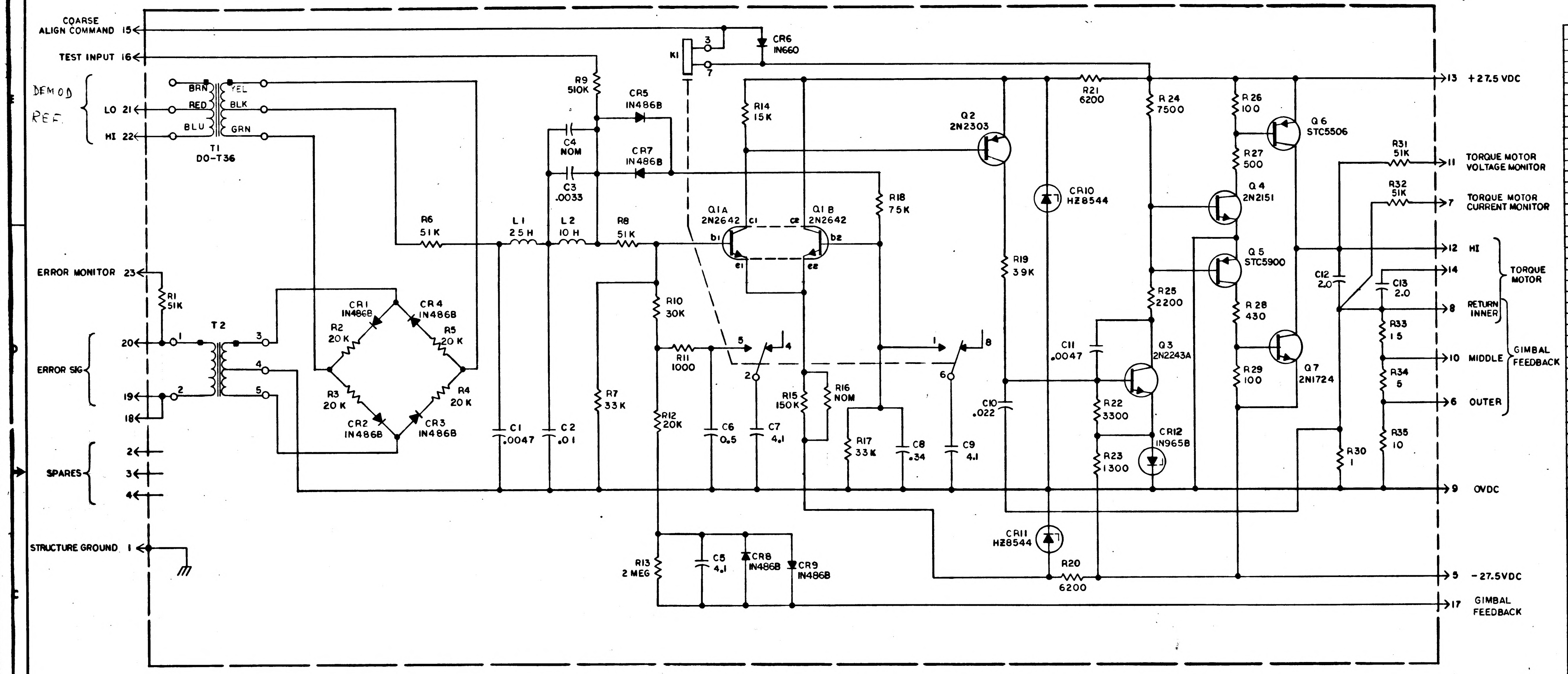
SCHEMATIC,
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189			12 MAR 65	
B		REVISED PER TDRR 19816	DP		3 Jun 65	


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF.
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1 DO-T36
ERROR MONITOR 23
R1 51K
ERROR SIG
20
19
18
T2
1
2
3
4
5
CR1 IN486B
CR4 IN486B
R2 20K
R5 20K
R3 20K
R4 20K
CR2 IN486B
CR3 IN486B
SPARES
2
3
4
STRUCTURE GROUND 1
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
K1
3
7
CR6 IN660
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
C6 0.5
C7 4.1
Q1A 2N2642
Q1B 2N2642
b1
c1
e1
b2
c2
e2
R14 15K
R15 150K
R16 NOM
R17 33K
C8 .34
C9 4.1
R18 75K
5
4
2
1
8
6
Q2 2N2303
R19 39K
CR10 HZ8544
R21 6200
C10 .022
C11 .0047
Q3 2N2243A
R22 3300
R23 1300
CR12 IN965B
CR11 HZ8544
R20 6200
R24 7500
R25 2200
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
C12 2.0
C13 2.0
R30 1
R31 51K
R32 51K
R33 15
R34 5
R35 10
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-73	RESISTOR	51K	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-60		15K	±2%	1/4W
R15	1010369-85		150K	±5%	1/8W
R16	SEE NOTE 2		NOMINAL	±5%	1/8W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-70		39K		
R20	-51		6200		
R21	-51		6200		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5W
R28	1010389-47		430	±1%	3W
R29	1010278-39		100	±5%	1/2W
R30	1010389-94		1	±1%	3W
R31	1006750-73		51K	±2%	1/4W
R32	1006750-73		51K	±2%	1/4W
R33	1006802-4		15	±1%	1/2W
R34	1006802-3		5	±1%	1/2W
R35	1006802-1	RESISTOR	10	±1%	1/2W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1010372-15		HZ8544		
CR11	1010372-15		HZ8544		
CR12	1010830-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1010633-1		2N2303		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16	
PART NO.	VALUE
1010369 - 85	150K
- 87	180K
- 88	200K
- 89	220K
- 90	240K
- 91	270K
- 92	300K
- 93	330K
- 94	360K
- 95	390K
- 96	430K
- 97	470K
- 98	510K
- 100	620K
- 102	750K
1010369 - 105	1MEG

C4			
PART NO.	VALUE	TOL	RATING
1010409 - 12	30 UUF	±2%	500 VDC
1010409 - 18	51 UUF		500 VDC
1010409 - 25	100 UUF		500 VDC
1010409 - 32	200 UUF		300 VDC
1010410 - 5	330 UUF		500 VDC
- 8	430 UUF		500 VDC
- 10	510 UUF		500 VDC
- 12	620 UUF		300 VDC
- 14	750 UUF		300 VDC
- 15	820 UUF		300 VDC
- 16	910 UUF		300 VDC
1010410 - 17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER ATP FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 4 DEC 64
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kupfer
APPROVED MSC 2/17/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
GIMBAL SERVO AMPLIFIER

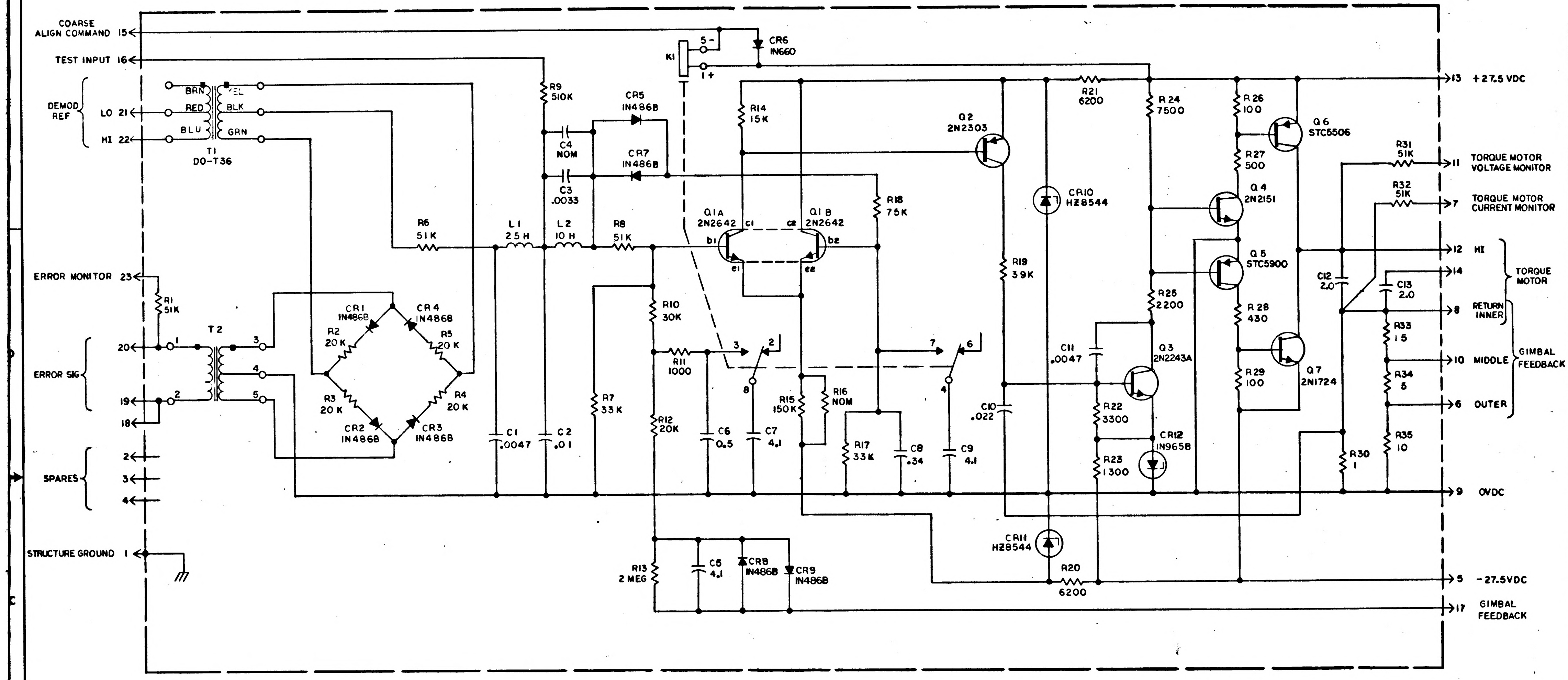
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF 1

MASTER

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189			12 MAR 65	
B		REVISED PER TDRR 19816			8 June 65	
C		REVISED PER TDRR 22192			3 SEPT 65	


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1
DO-T36
ERROR MONITOR 23
R1 51K
ERROR SIG
20
19
18
T2
1
2
3
4
5
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 IN486B
CR4 IN486B
R2 20K
R5 20K
R3 20K
R4 20K
CR2 IN486B
CR3 IN486B
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
K1
5 -
1 +
CR6 IN660
R14 15K
Q1A 2N2642
Q1B 2N2642
c1
c2
b1
b2
e1
e2
C6 0.5
C7 4.1
R15 150K
R16 NOM
R17 33K
C8 .34
C9 4.1
R18 75K
Q2 2N2303
R19 39K
C10 .022
CR10 HZ8544
CR11 HZ8544
R20 6200
R21 6200
C11 .0047
R22 3300
R23 1300
Q3 2N2243A
CR12 IN965B
R24 7500
R25 2200
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
R30 1
R31 51K
R32 51K
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-73	RESISTOR	51K	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-60		15K	±2%	1/4W
R15	1010369-85		150K	±5%	1/8W
R16	SEE NOTE 2		NOMINAL	±5%	1/8W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-70		39K		
R20	-51		6200		
R21	-51		6200		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5W
R28	1010389-47		430	±1%	3W
R29	1010278-39		100	±5%	1/2W
R30	1010389-94		1	±1%	3W
R31	1006750-73		51K	±2%	1/4W
R32	1006750-73		51K	±2%	1/4W
R33	1006802-4		15	±1%	1/2W
R34	1006802-3		5	±1%	1/2W
R35	1006802-1	RESISTOR	10	±1%	1/2W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1010372-15		HZ8544		
CR11	1010372-15		HZ8544		
CR12	1010830-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1010633-1		2N2303		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16	
PART NO.	VALUE
1010369-85	150K
-87	180K
-88	200K
-89	220K
-90	240K
-91	270K
-92	300K
-93	330K
-94	360K
-95	390K
-96	430K
-97	470K
-98	510K
-100	620K
-102	750K
1010369-105	1MEG

C4			
PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

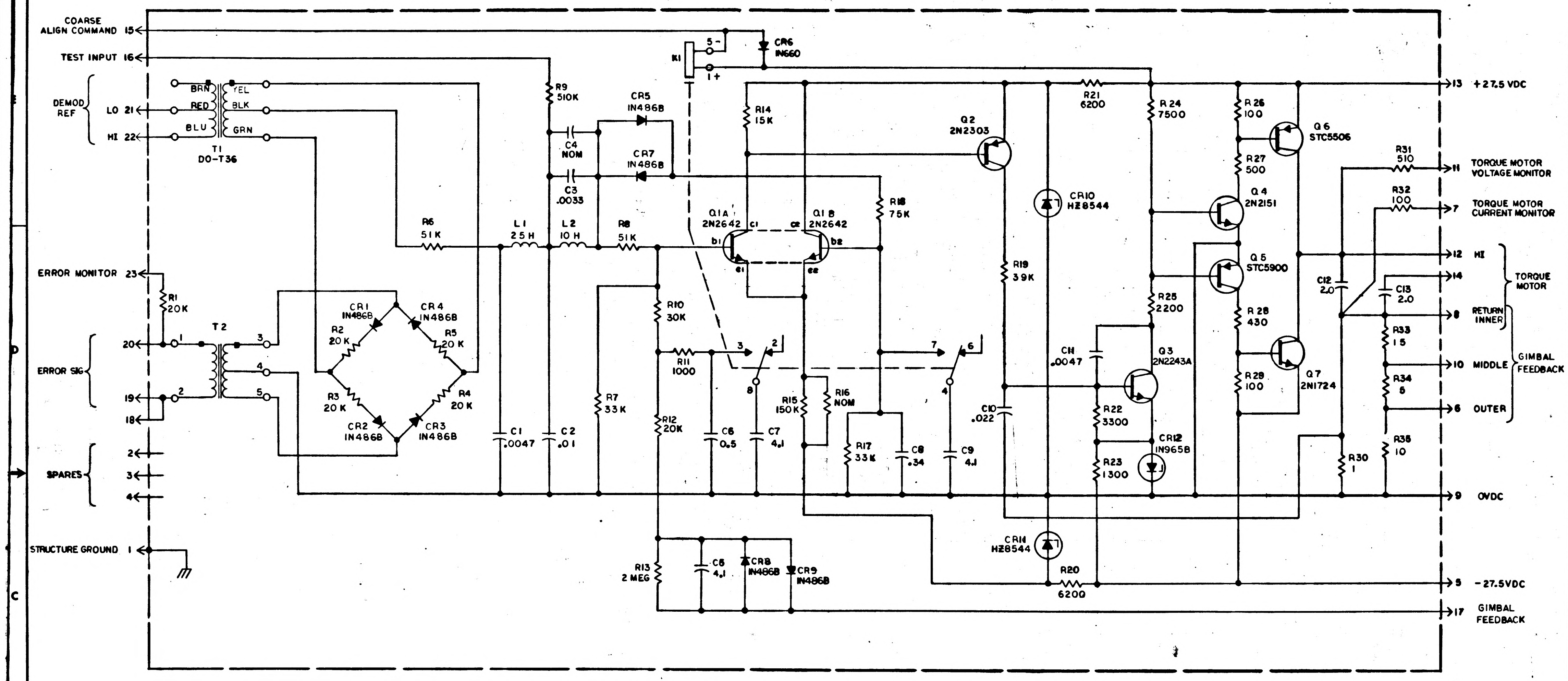
DRAWN A. Di Leo 4 DEC 64
CHECKED 15 FEB 65
APPROVED 15 Feb 65
APPROVED
APPROVED MIT 17 Feb 65
APPROVED MSC 2/17/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISIONS 16615				
A		REVISED PER TDRR 17169				WP
B		REVISED PER TDRR 19816				
C		REVISED PER TDRR 22192			3 Sept 65	
D		REVISED PER TDRR 23026				


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1 DO-T36
ERROR MONITOR 23
R1 20K
ERROR SIG
20
19
18
T2
1
2
3
4
5
CR1 IN486B
CR4 IN486B
R2 20K
R5 20K
R3 20K
R4 20K
CR2 IN486B
CR3 IN486B
SPARES
2
3
4
STRUCTURE GROUND 1
R6 51K
L1 25H
L2 10H
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
R8 51K
C1 .0047
C2 .01
K1
5 -
1 +
CR6 IN660
R14 15K
Q1A 2N2642
Q1B 2N2642
c1
c2
b1
b2
e1
e2
R18 75K
R10 30K
R11 1000
R7 33K
R12 20K
R15 150K
R16 NOM
R17 33K
C6 0.5
C7 4.1
C8 .34
C9 4.1
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
Q2 2N2303
CR10 HZ8544
R19 39K
C10 .022
R21 6200
R24 7500
R25 2200
C11 .0047
Q3 2N2243A
R22 3300
R23 1300
CR12 IN965B
CR11 HZ8544
R20 6200
R26 100
R27 500
Q6 STC5506
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q7 2N1724
C12 2.0
C13 2.0
R30 1
R31 510
R32 100
R33 15
R34 5
R35 10
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20K	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-60		15K	±2%	1/4W
R15	1010369-85		150K	±5%	1/8W
R16	SEE NOTE 2		NOMINAL	±5%	1/8W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-70		39K		
R20	-51		6200		
R21	-51		6200		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5W
R28	1010389-47		430	±1%	3W
R29	1010278-39		100	±5%	1/2W
R30	1010389-94		1	±1%	3W
R31	1006750-25		510	±2%	1/4W
R32	1006750-8		100	±2%	1/4W
R33	1006802-4		15	±1%	1/2W
R34	1006802-3		5	±1%	1/2W
R35	1006802-1	RESISTOR	10	±1%	1/2W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1010372-15		HZ8544		
CR11	1010372-15		HZ8544		
CR12	1010830-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1010633-1		2N2303		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16	
PART NO.	VALUE
1010369-85	150K
-87	180K
-88	200K
-89	220K
-90	240K
-91	270K
-92	300K
-93	330K
-94	360K
-95	390K
-96	430K
-97	470K
-98	510K
-100	620K
-102	750K
1010369-105	1MEG

C4			
PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER APPLICABLE P.S. FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC 2/12/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF 1

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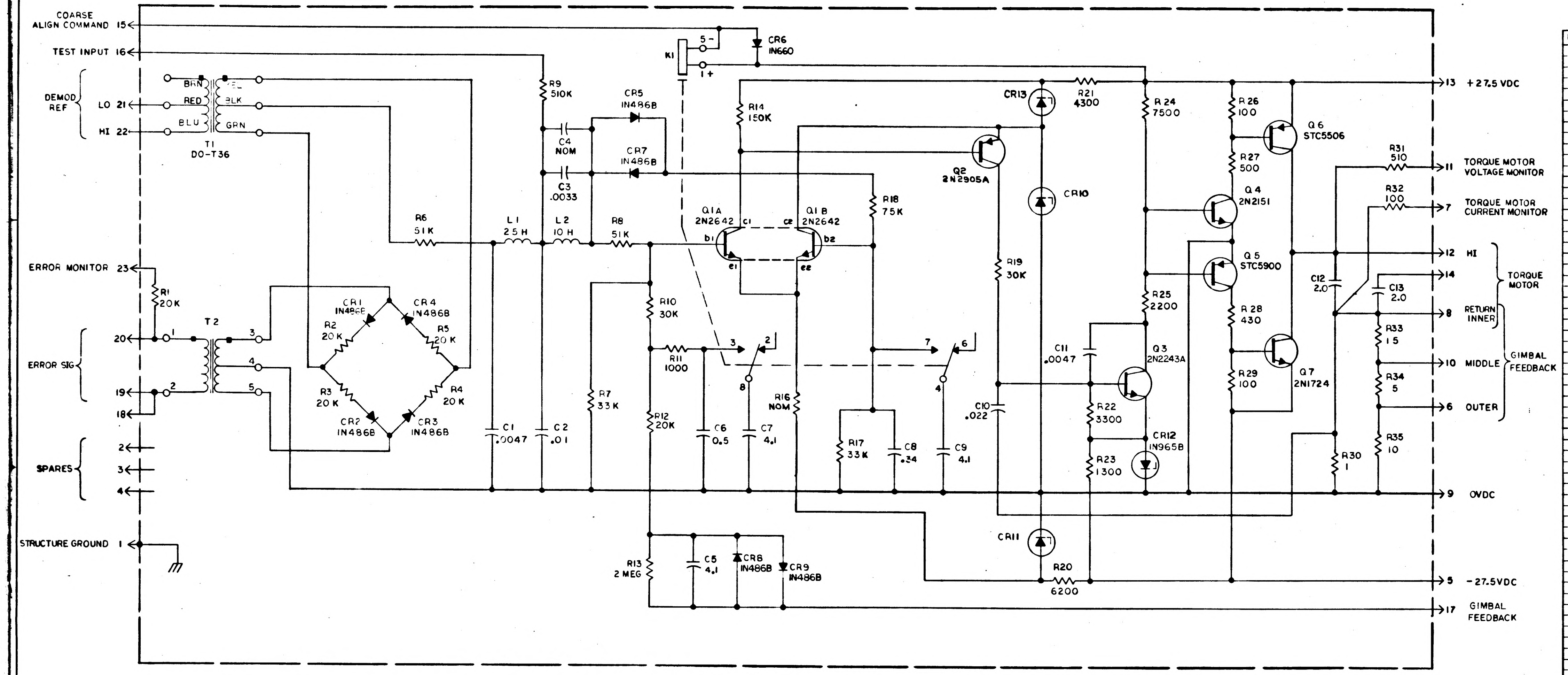
REVISIONS 14615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189	TAG	[illegible]	12 MAR 65	WP
B		REVISED PER TDRR 19816	[illegible]	[illegible]	23 Jun 65	[illegible]
C		REVISED PER TDRR 22192	NEH	[illegible]	3 SEPT 65	[illegible]
D		REVISED PER TDRR 23026	[illegible]	[illegible]	[illegible]	[illegible]
E		REVISED PER TDRR 26C--E	[illegible]	[illegible]	21 FEB 66	



COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1
DO-T36
ERROR MONITOR 23
R1 20K
ERROR SIG
20
19
18
1
2
3
4
5
T2
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 IN486B
CR4 IN486B
R2 20K
R5 20K
R3 20K
R4 20K
CR2 IN486B
CR3 IN486B
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
C6 0.5
C7 4.1
K1
5 -
1 +
CR6 IN660
R14 150K
Q1A 2N2642
Q1B 2N2642
b1
c1
e1
b2
c2
e2
R16 NOM
R17 33K
C8 .34
R18 75K
C9 4.1
3
2
8
7
6
4
Q2 2N2905A
R19 30K
CR13
CR10
CR11
R21 4300
R20 6200
C10 .022
C11 .0047
R22 3300
R23 1300
Q3 2N2243A
CR12 IN965B
R24 7500
R25 2200
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
R30 1
R31 510
R32 100
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20K	± 2%	1/4 W
R2	1010364-501		20K	± 1%	1/8 W
R3	1010364-501		20K	± 1%	1/8 W
R4	1010364-501		20K	± 1%	1/8 W
R5	1010364-501		20K	± 1%	1/8 W
R6	1006750-73		51K	± 2%	1/4 W
R7	1006750-68		33K	± 2%	1/4 W
R8	1006750-73		51K	± 2%	1/4 W
R9	1010369-98		510K	± 5%	1/8 W
R10	1006750-67		30K	± 2%	1/4 W
R11	1006750-32		1000	± 2%	1/4 W
R12	1006750-63		20K	± 2%	1/4 W
R13	1010369-112		2 MEG	± 5%	1/8 W
R14	1006750-84		150K	± 2%	1/4 W
R15	~~1010369-85~~		~~150K~~	~~± 5%~~	~~1/8W~~
R16	SEE NOTE 2		NOMINAL	± 2%	1/4 W
R17	1006750-68		33K	± 2%	1/4 W
R18	-77		75K		
R19	-67		30K		
R20	-51		6200		
R21	↓ -47		4.3K		↓
R22	1006750-44		3300		1/4 W
R23	1006760-35		1300		1/2 W
R24	1006750-53		7500	↓	1/4 W
R25	1006750-40		2200	± 2%	1/4 W
R26	1010278-39		100	± 5%	1/2 W
R27	1010399-31		500	± 5%	5 W
R28	1010389-47		430	± 1%	3 W
R29	1010278-39		100	± 5%	1/2 W
R30	1010389-94		1	± 1%	3 W
R31	1006750-25		510	± 2%	1/4 W
R32	1006750-8		100	± 2%	1/4 W
R33	1006802-4		15	± 1%	1/2 W
R34	1006802-3	↓	5	± 1%	1/2 W
R35	1006802-1	RESISTOR	10	± 1%	1/2 W
C1	1010264-9	CAPACITOR	.0047	± 5%	200V
C2	1010264-13		.01	± 5%	200V
C3	1010264-7		.0033	± 5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	± 10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	↓ -106		.34	↓	↓
C9	1010279-119		4.1	± 10%	15V
C10	1010264-17		.022	± 5%	200V
C11	1010264-9		.0047	± 5%	200V
C12	1010279-252	↓	2.0	± 10%	50V
C13	1010279-252	CAPACITOR	2.0	± 10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4	↓		↓		
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1010830-1		6.8 vdc		
CR11	1010372-13	↓	6.2 vdc		
CR12	1010830-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1010633-1		2N2303		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271	↓	STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
CR13	1010372-13	DIODE	6.2vdc		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16

PART NO.	VALUE	PART NO.	VALUE
1006750-67	30.0K	1006750-157	53.5K
-151	31.5K	-74	56.0K
-68	33.0K	-158	59.0K
-152	34.5K	-75	62.0K
-69	36.0K	-159	65.0K
-153	37.5K	-76	68.0K
-70	39.0K	-160	71.5K
-154	41.0K	-77	75.0K
-71	43.0K	-161	78.5K
-155	45.0K	-78	82.0K
-72	47.0K	-162	86.5K
↓ -156	49.0K	1006750-79	91.0K
1006750-73	51.0K		

C4

PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
↓ -16	910 UUF	↓	300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER PS 2007114 FROM APPROPRIATE CHART.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	A. Di Leo	4 DEC 64
CHECKED	[illegible]	15 Feb 65
APPROVED	[illegible]	15 Feb 65
APPROVED		
APPROVED MIT	W Kupfer	17 Feb 65
APPROVED MSC	[illegible]	2/17/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
GIMBAL SERVO AMPLIFIER

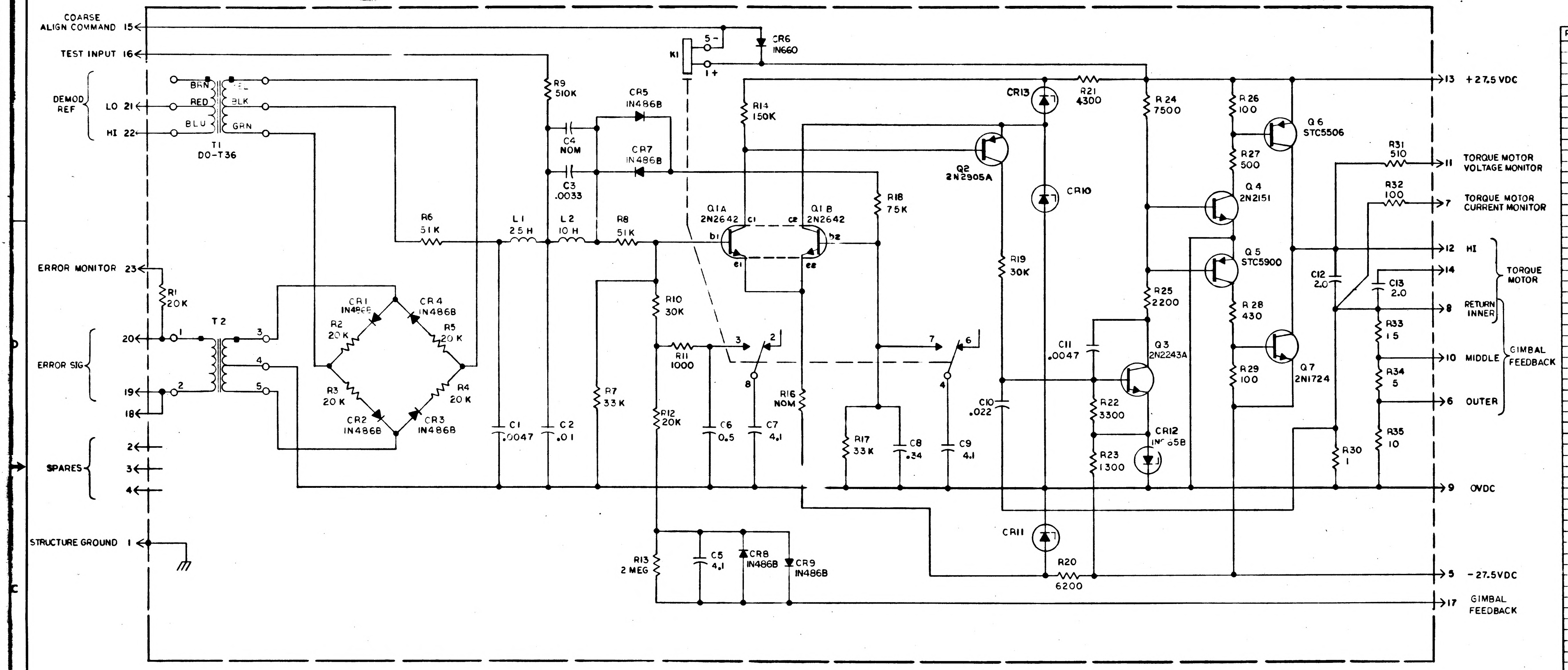
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010004

SCALE —
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189	TAG		2 MAR 65	W
B		REVISED PER TDRR 19816			2 June 65	
C		REVISED PER TDRR 22192	WEN		3 SEPT 65	
D		REVISED PER TDRR 23026		AL		
Ⓜ E		REVISED PER TDRR 26045		CF	21 FEB 66	
F		REVISED PER TDRR 27493		JAC	4 APR 66	


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
BLK
GRN
T1 DO-T36
ERROR MONITOR 23
R1 20K
ERROR SIG
20
19
18
T2
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 1N486B
CR2 1N486B
CR3 1N486B
CR4 1N486B
R2 20K
R3 20K
R4 20K
R5 20K
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
CR5 1N486B
CR7 1N486B
C4 NOM
C3 .0033
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
R13 2 MEG
C5 4.1
CR8 1N486B
CR9 1N486B
C6 0.5
C7 4.1
K1
5
1
CR6 1N660
R14 150K
Q1A 2N2642
Q1B 2N2642
b1 c1 e1
b2 c2 e2
R16 NOM
R17 33K
C8 .34
C9 4.1
R18 75K
Q2 2N2905A
CR13
R21 4300
CR10
R19 30K
C10 .022
C11 .0047
R22 3300
R23 1300
CR12 1N965B
CR11
R20 6200
R24 7500
R25 2200
Q3 2N2243A
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
R31 510
R32 100
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
R30 1
13 +27.5VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 0VDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20K	±2%	1/4 W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-84		150K	±2%	1/4 W
~~R15~~	~~1010369-86~~		~~150K~~	~~±5%~~	~~1/8W~~
R16	SEE NOTE 2		NOMINAL	±2%	1/4W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-67		30K		
R20	-51		6200		
R21	-47		4.3K		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4 W
R25	1006750-40		2200	±2%	1/4 W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5 W
R28	1010389-47		430	±1%	3 W
R29	1010278-39		100	±5%	1/2 W
R30	1010389-94		1	±1%	3 W
R31	1006750-25		510	±2%	1/4W
R32	1006750-8		100	±2%	1/4 W
R33	1006802-4		15	±1%	1/2 W
R34	1006802-3		5	±1%	1/2 W
R35	1006802-1	RESISTOR	10	±1%	1/2 W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	1N486B		
CR2					
CR3					
CR4					
CR5	1010392-1		1N486B		
CR6	1010385		1N660		
CR7	1010392-1		1N486B		
CR8	1010392-1		1N486B		
CR9	1010392-1		1N486B		
CR10	1010830-1		6.8 vdc		
CR11	1010372-13		6.2 vdc		
CR12	1010830-9	DIODE	1N965B		
Q1	1010262-1	TRANSISTOR	2N2642		
Q2	1008812-1		2N2905A		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
CR13	1010372-13	DIODE	6.2vdc		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16

PART NO.	VALUE	PART NO.	VALUE
1006750-67	30.0K	1006750-157	53.5K
-151	31.5K	-74	56.0K
-68	33.0K	-158	59.0K
-152	34.5K	-75	62.0K
-69	36.0K	-159	65.0K
-153	37.5K	-76	68.0K
-70	39.0K	-160	71.5K
-154	41.0K	-77	75.0K
-71	43.0K	-161	78.5K
-155	45.0K	-78	82.0K
-72	47.0K	-162	86.5K
-156	49.0K	1006750-79	91.0K
1006750-73	51.0K		

C4

PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER PS 2007114 FROM APPROPRIATE CHART.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 4 DEC 64
CHECKED 15 Feb 65
APPROVED 15 Feb 65
APPROVED
APPROVED MIT W Kyfer
APPROVED MSC 2/17/6
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

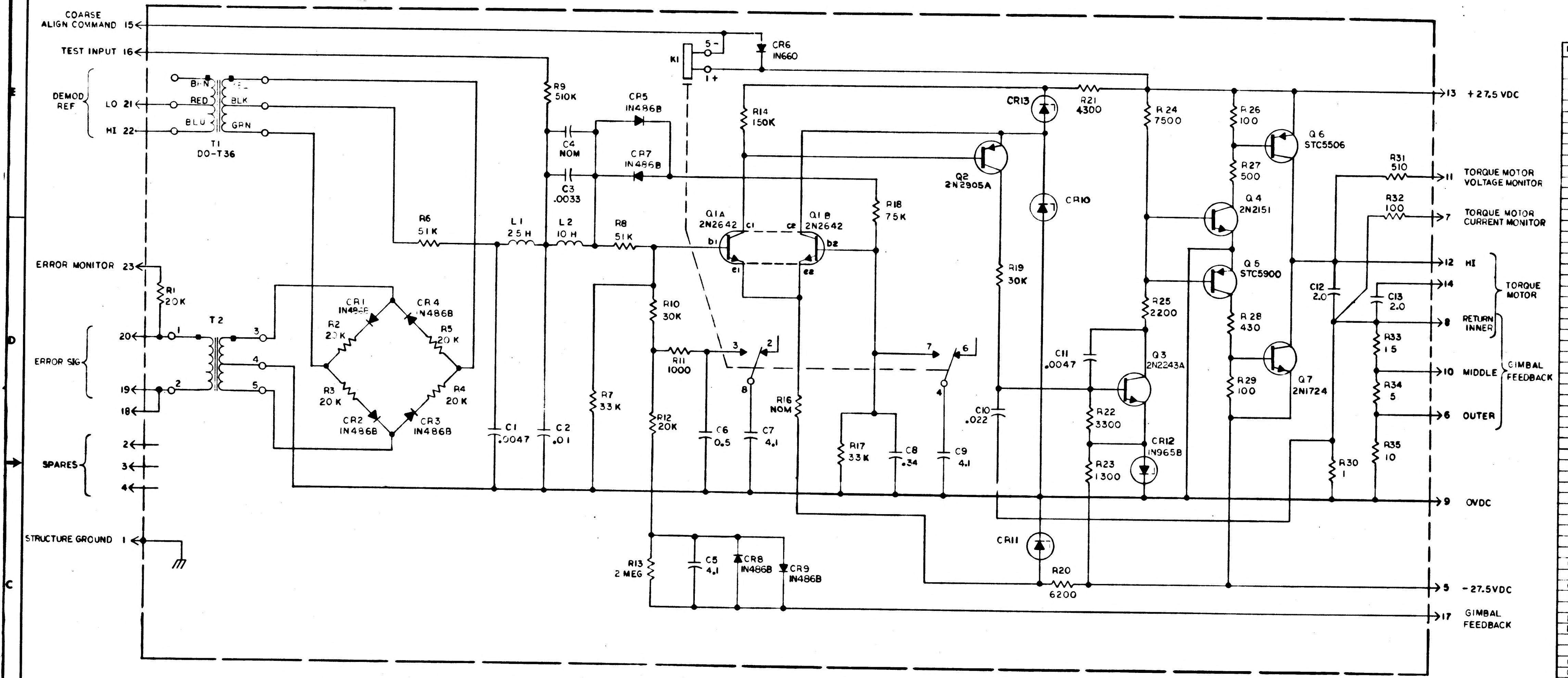
SCHEMATIC, GIMBAL SERVO AMPLIFIER

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189	TAO		12 MAR 65	W
B		REVISED PER TDRR 19816			Jun 65	
C		REVISED PER TDRR 22192			3 SEPT 65	
D		REVISED PER TDRR 23026				
E		REVISED PER TDRR 26045		F	21 FEB 66	
F		REVISED PER TDRR 27493		JAC	4 APR 66	
G		REVISED PER TDRR 27980	R.M.T.		8 JAN	


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1
DO-T36
ERROR MONITOR 23
R1 20K
ERROR SIG
20
19
18
T2
1
2
3
4
5
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 IN486B
CR4 IN486B
R2 20K
R5 20K
R3 20K
R4 20K
CR2 IN486B
CR3 IN486B
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
C6 0.5
C7 4.1
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
K1
5-
1+
CR6 IN660
Q1A 2N2642
Q1B 2N2642
c1
c2
b1
b2
e1
e2
R14 150K
R16 NOM
R17 33K
C8 .34
R18 75K
C9 4.1
7
6
8
4
Q2 2N2905A
R19 30K
CR13
CR10
CR11
R20 6200
R21 4300
C10 .022
C11 .0047
Q3 2N2243A
R22 3300
R23 1300
CR12 IN965B
R24 7500
R25 2200
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
C12 2.0
C13 2.0
R30 1
R31 510
R32 100
R33 15
R34 5
R35 10
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
GIMBAL FEEDBACK
6 OUTER
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/ W
R14	1006750-84		150K	±2%	1/4W
R15	~~1010369-85~~		~~150K~~	~~±5%~~	~~1/8W~~
R16	SEE NOTE 2		NOMINAL	±2%	1/4W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-67		30K		
R20	-51		6200		
R21	-47		4.3K		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/4W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/4W
R27	1010399-31		500	±5%	W
R28	1010389-47		430	±1%	W
R29	1010278-39		100	±5%	1/ W
R30	1010389-94		1	±1%	3 W
R31	1006750-25		510	±2%	1/4W
R32	1006750-8		100	±2%	1/4W
R33	1006802-4		15	±1%	1/2W
R34	1006802-3		5	±1%	1/2W
R35	1006802-1	RESISTOR	10	±1%	1/2W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1008815-1		6.8 vdc		
CR11	1010372-13		6.2 vdc		
CR12	1008815-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1008812-1		2N2905A		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
CR13	1010372-13	DIODE	6.2vdc		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

2010004 G

R16

PART NO.	VALUE	PART NO.	VALUE
1006750-67	30.0K	1006750-157	53.5K
-151	31.5K	-74	56.0K
-68	33.0K	-158	59.0K
-152	34.5K	-75	62.0K
-69	36.0K	-159	65.0K
-153	37.5K	-76	68.0K
-70	39.0K	-160	71.5K
-154	41.0K	-77	75.0K
-71	43.0K	-161	78.5K
-155	45.0K	-78	82.0K
-72	47.0K	-162	86.5K
-156	49.0K	1006750-79	91.0K
1006750-73	51.0K		

C4

PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER PS 2007114 FROM APPROPRIATE CHART.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Di Leo 4 DEC 64
CHECKED 15 Feb 65
APPROVED 15 Feb 65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
GIMBAL SERVO AMPLIFIER

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF

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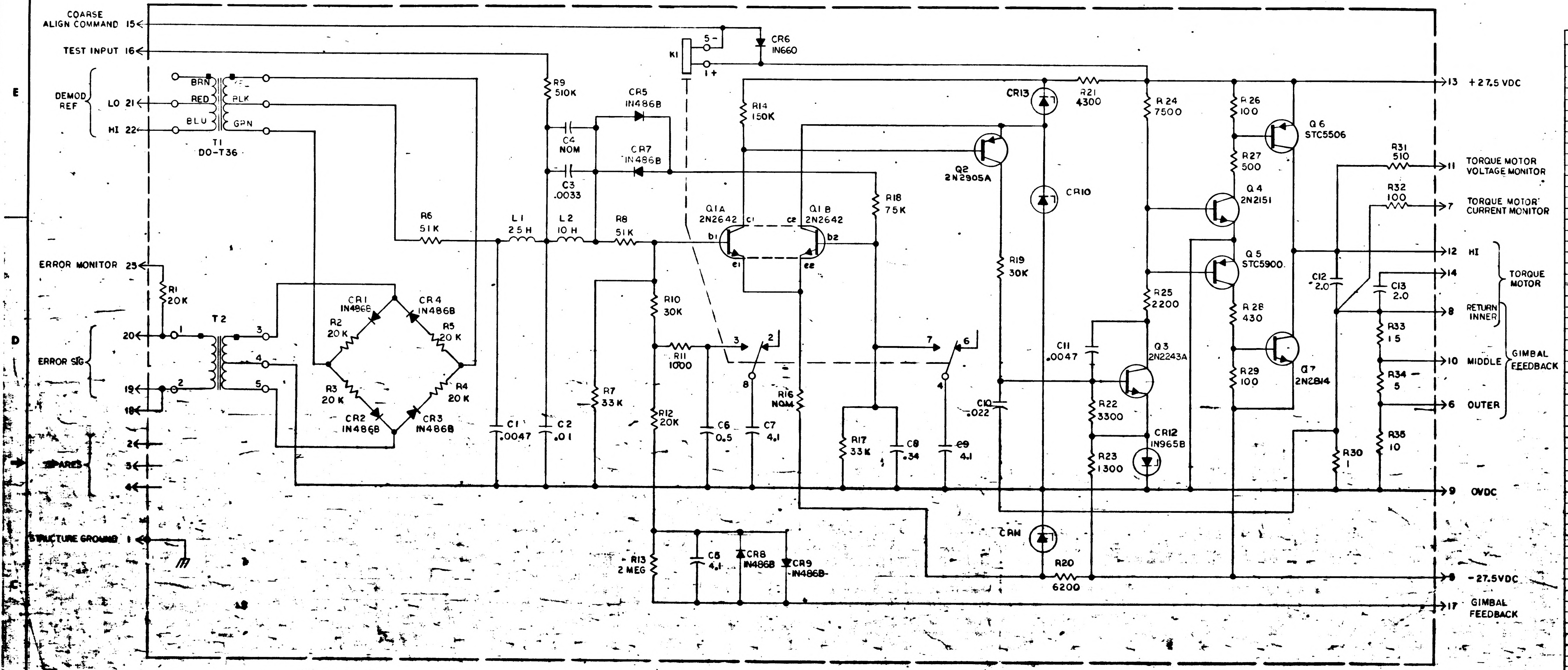
REVISIONS 14615

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 17189	TAG	A.W.L.	12 MAR 65	WF
B		REVISED PER TDRR 19816	[illegible]	[illegible]	23 Jun 65	[illegible]
C		REVISED PER TDRR 22192	JEH	[illegible]	3 SEPT 65	[illegible]
D		REVISED PER TDRR 23026	JCL	MK	[illegible]	WGM
E		REVISED PER TDRR 26045	J.J.	CF	21 FEB 66	
F		REVISED PER TDRR 27493	[illegible]	JAC	4 APR 66	
G		REVISED PER TDRR 27980	R.W.T	[illegible]	18 APR 66	
H		REVISED PER TDRR 32401	REP	[illegible]	13 JAN 67	



COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1 DO-T36
ERROR MONITOR 25
R1 20K
ERROR SIG
20
19
18
T2
1
2
3
4
5
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 IN486B
CR2 IN486B
CR3 IN486B
CR4 IN486B
R2 20K
R3 20K
R4 20K
R5 20K
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
C6 0.5
C7 4.1
K1
5-
1+
CR6 IN660
R14 150K
Q1A 2N2642
Q1B 2N2642
c1
c2
b1
b2
e1
e2
R16 NOM
R17 33K
C8 .34
C9 4.1
R18 75K
Q2 2N2905A
R19 30K
CR13
CR10
CR11
R20 6200
R21 4300
C10 .022
C11 .0047
Q3 2N2243A
R22 3300
R23 1300
CR12 IN965B
R24 7500
R25 2200
R26 100
R27 500
R28 430
R29 100
Q4 2N2151
Q5 STC5900
Q6 STC5506
Q7 2N2814
R30 1
R31 510
R32 100
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
8 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20K	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-84		150K	±2%	1/4W
R15	~~1010369-85~~		~~150K~~	~~±5%~~	~~1/8W~~
R16	SEE NOTE 2		NOMINAL	±2%	1/4W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-67		30K		
R20	-51		6200		
R21	-47		4.3K		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5W
R28	1010389-47		430	±1%	3W
R29	1010278-39		100	±5%	1/2W
R30	1010389-94		1	±1%	3W
R31	1006750-25		510	±2%	1/4W
R32	1006750-8		100	±2%	1/4W
R33	1006802-4		15	±1%	1/2W
R34	1006802-3		5	±1%	1/2W
R35	1006802-1	RESISTOR	10	±1%	1/2W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL	-	
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1008815-1		6.8 vdc		
CR11	1010372-13		6.2 vdc		
CR12	1008815-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1008812-1		2N2905A		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1008922-1	TRANSISTOR	2N2814		
CR13	1010372-13	DIODE	6.2vdc		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16

PART NO.	VALUE	PART NO.	VALUE
1006750-67	30.0K	1006750-157	53.5K
-151	31.5K	-74	56.0K
-68	33.0K	-158	59.0K
-152	34.5K	-75	62.0K
-69	36.0K	-159	65.0K
-153	37.5K	-76	68.0K
-70	39.0K	-160	71.5K
-154	41.0K	-77	75.0K
-71	43.0K	-161	78.5K
-155	45.0K	-78	82.0K
-72	47.0K	-162	86.5K
-156	49.0K	1006750-79	91.0K
1006750-73	51.0K		

C4

PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER PS 2007114 FROM APPROPRIATE CHART.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 4 DEC 64
CHECKED [illegible] 15 Feb 65
APPROVED [illegible] 15 Feb 65
APPROVED

APPROVED MIT W Kupfer 17 Feb 65
APPROVED MSC [illegible] 2/17/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

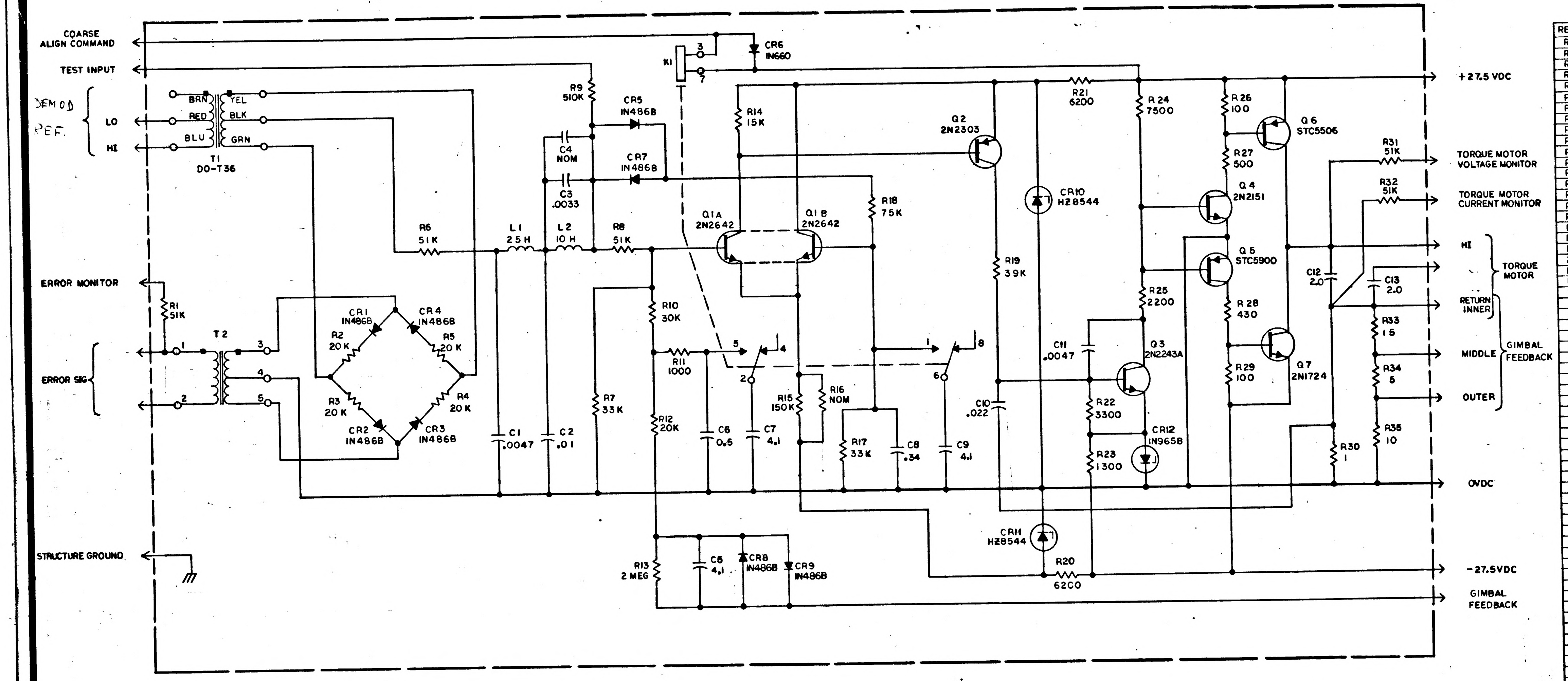
SCHEMATIC
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010004
SCALE
SHEET 1 OF 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS [illegible]

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


COARSE ALIGN COMMAND
TEST INPUT
DEMOD REF.
LO
HI
BRN
RED
BLU
YEL
BLK
GRN
T1
DO-T36
ERROR MONITOR
R1 51K
ERROR SIG
T2
1
2
3
4
5
CR1 IN486B
CR4 IN486B
R2 20 K
R5 20 K
R3 20 K
R4 20 K
CR2 IN486B
CR3 IN486B
STRUCTURE GROUND
R6 51 K
L1 25 H
L2 10 H
R8 51 K
C1 .0047
C2 .01
R9 510K
C4 NOM
C3 .0033
CR5 IN486B
CR7 IN486B
K1
3
7
CR6 IN660
R7 33 K
R10 30K
R11 1000
R12 20K
R13 2 MEG
C5 4.1
CR8 IN486B
CR9 IN486B
C6 0.5
C7 4.1
Q1A 2N2642
Q1B 2N2642
R14 15K
R18 75K
5
4
2
1
8
6
R15 150K
R16 NOM
R17 33K
C8 .34
C9 4.1
Q2 2N2303
CR10 HZ8544
R19 39K
R21 6200
C10 .022
C11 .0047
R22 3300
R23 1300
CR11 HZ8544
R20 6200
Q3 2N2243A
CR12 IN965B
R24 7500
R25 2200
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
R31 51K
R32 51K
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
R30 1
+27.5 VDC
TORQUE MOTOR VOLTAGE MONITOR
TORQUE MOTOR CURRENT MONITOR
HI
RETURN INNER
TORQUE MOTOR
MIDDLE
GIMBAL FEEDBACK
OUTER
OVDC
-27.5VDC
GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-73	RESISTOR	51K	±2%	1/4 W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-60		15K	±2%	1/4 W
R15	1010369-85		150K	±5%	1/8W
R16	SEE NOTE 2		NOMINAL	±5%	1/8W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-70		39K		
R20	-51		6200		
R21	-51		6200		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5 W
R28	1010389-47		430	±1%	3 W
R29	1010278-39		100	±5%	1/2 W
R30	1010389-94		1	±1%	3 W
R31	1006750-73		51K	±2%	1/4W
R32	1006750-73		51K	±2%	1/4 W
R33	1006802-4		15	±4%	1/4 W
R34	1006802-3		5	±4%	1/4 W
R35	1006802-1	RESISTOR	10	±4%	1/4 W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	IN486B		
CR2					
CR3					
CR4					
CR5	1010392-1		IN486B		
CR6	1010385		IN660		
CR7	1010392-1		IN486B		
CR8	1010392-1		IN486B		
CR9	1010392-1		IN486B		
CR10	1010372-15		HZ8544		
CR11	1010372-15		HZ8544		
CR12	1010830-9	DIODE	IN965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1010633-1		2N2303		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010790-3	RELAY			

R16	
PART NO.	VALUE
1010369-85	150K
-87	180K
-88	200K
-89	220K
-90	240K
-91	270K
-92	300K
-93	330K
-94	360K
-95	390K
-96	430K
-97	470K
-98	510K
-100	620K
-102	750K
1010369-105	1MEG

C4			
PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

REF DWG:
GIMBAL SERVO AMPLIFIER
DWG NO 2007114

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 4 DEC 64
CHECKED [illegible] 15 Feb 65
APPROVED [illegible] 15 Feb 65
APPROVED
APPROVED MIT [illegible] 17 Feb 65
APPROVED MSC [illegible] 2/17/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

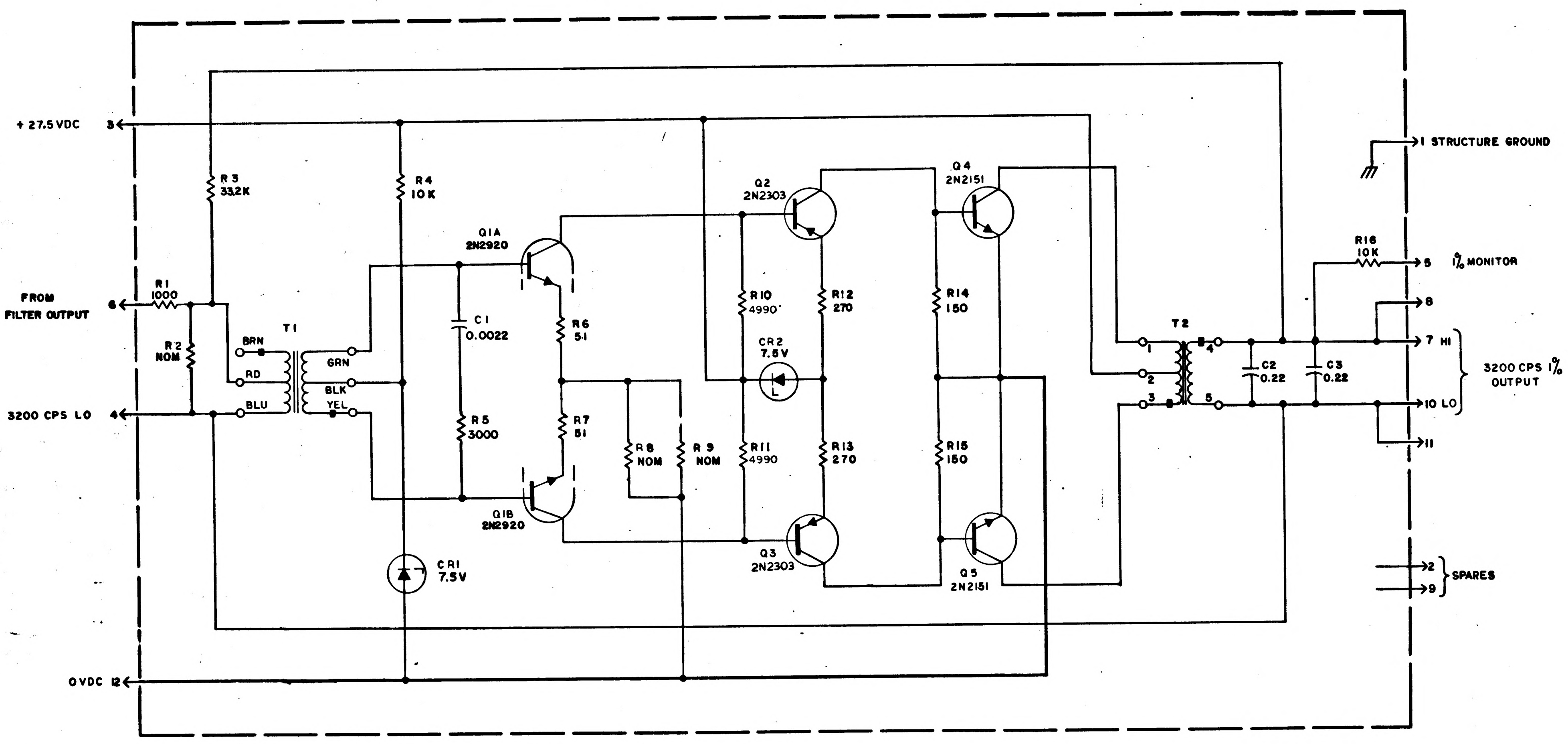
SCHEMATIC,
GIMBAL SERVO AMPLIFIER

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010004
SCALE —
SHEET 1 OF

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

15145

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16274	2/9/65	W.L.


+27.5 VDC 3
FROM FILTER OUTPUT 6
3200 CPS LO 4
OVDC 12
R1 1000
R2 NOM
R3 33.2K
R4 10K
T1
BRN
RD
BLU
GRN
BLK
YEL
Q1A 2N2920
Q1B 2N2920
C1 0.0022
R5 3000
R6 51
R7 51
CR1 7.5V
R8 NOM
R9 NOM
Q2 2N2303
Q3 2N2303
R10 4990
R11 4990
CR2 7.5V
R12 270
R13 270
Q4 2N2151
Q5 2N2151
R14 150
R15 150
T2
1
2
3
4
5
6
C2 0.22
C3 0.22
1 STRUCTURE GROUND
R16 10K
5 1% MONITOR
8
7 HI
10 LO
11
3200 CPS 1% OUTPUT
2
9
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-251	RESISTOR	1000	±1%	1/8W
R2	SEE NOTE 4		NOM	±2%	1/4W
R3	1010364-543		33.2 K	±1%	1/8W
R4	1006750-56		10 K	±2%	1/4W
R5	1006750-43		3000	±2%	1/4W
R6	1006750-1		51	±2%	1/4W
R7	1006750-1		51	±2%	1/4W
R8	SEE NOTE 4		NOM	±1%	1/8W
R9	SEE NOTE 4		NOM	±1%	1/8W
R10	1010364-385		4990	±1%	1/8W
R11	1010364-385		4990	±1%	1/8W
R12	1006750-18		270	±2%	1/4W
R13	-18		270		
R14	-12		150		
R15	-12		150		
R16	1006750-56	RESISTOR	10 K	±2%	1/4W
C1	1010264-5	CAPACITOR	0.0022	±5%	200VDC
C2	1010264-29	CAPACITOR	0.22	±5%	200VDC
C3	1010264-29	CAPACITOR	0.22	±5%	200VDC
CR1	1010372-18	DIODE	7.5 V	±5%	250MW
CR2	1010829-2	DIODE	7.5 V	±5%	1W
Q1	1010431	TRANSISTOR	2N2920		
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010269-2		2N2151		
Q5		TRANSISTOR	2N2151		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010887	TRANSFORMER			

R2		R8		R9	
PART NO	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-88	71.5	1010364-287	1540	1010364-515	23.7K
-90	86.5	-291	1620	-525	26.7K
-92	105	-295	1690	-533	29.4K
-94	125	299	1780	-545	34 K
-12	150	-303	1870	-557	39.2K
-14	180	-307	1960	-573	47.5K
-16	220	-311	2050	-591	59 K
-18	270	-315	2150	-615	78.7K
-104	345	-319	2260	-649	118 K
-107	450	1010364-323	2370	1010364-707	237K
-110	590				
-30	820				
-34	1200				
-39	2000				
-130	4100				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R8 & R9 PER APPLICABLE P.S. FROM APPROPRIATE CHART

REF DWG:
3200 CPS 1% AMPLIFIER ASSY
DWG NO. 2007108

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN A. Di Lea DATE [illegible]
CHECKED [illegible]
APPROVAL Louis Martinez [illegible]
APPROVAL M. Kramer 8 Feb 65
NASA APPROVAL [illegible] 2-29-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, 3200 CPS 1% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010006
SCALE — WT — SHEET 1 OF 1

2010006

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15145

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
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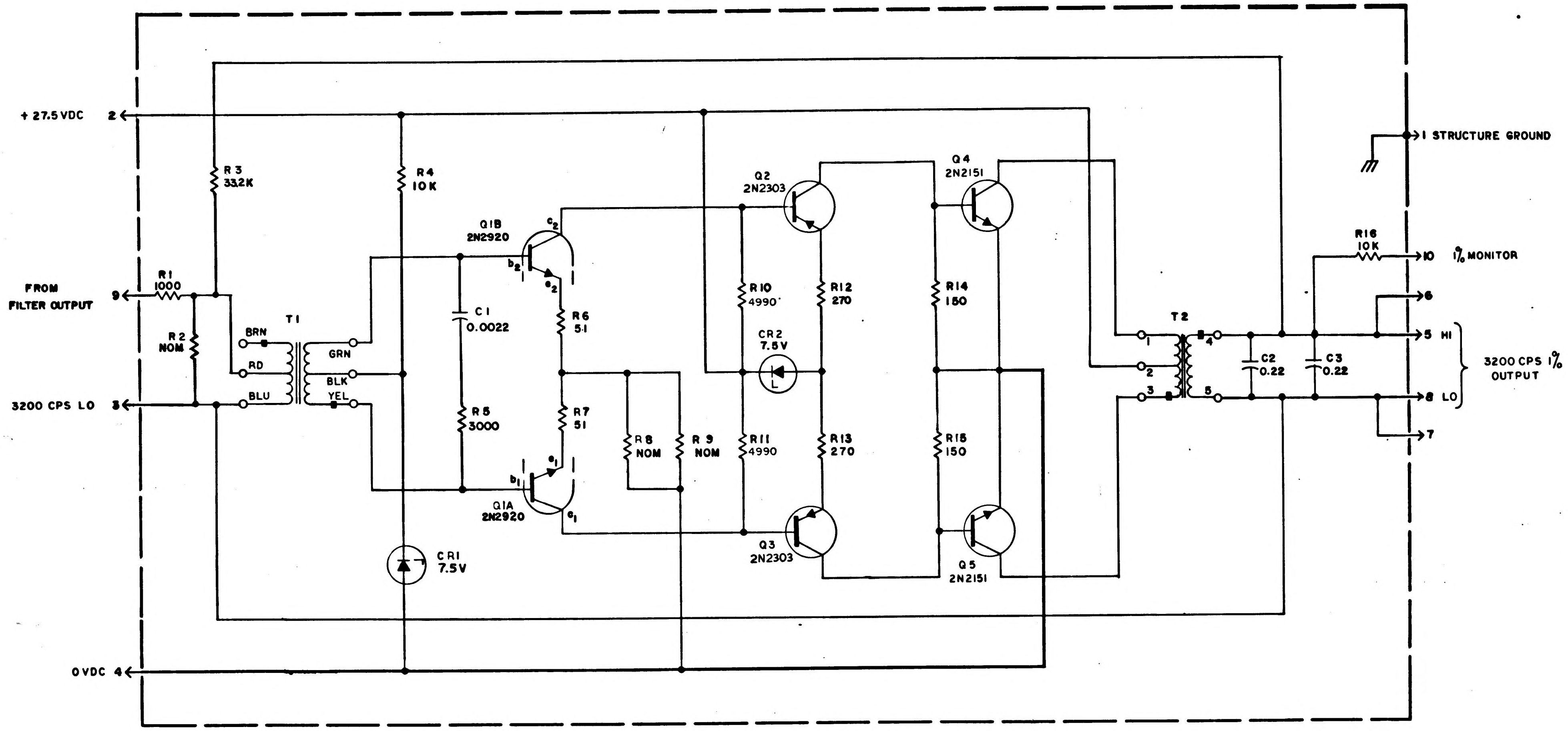
B	REVISED PER TDRR 17967	3/4/65	JFW WK


+27.5 VDC 2
FROM FILTER OUTPUT 9
3200 CPS LO 3
OVDC 4
R1 1000
R2 NOM
R3 33.2K
T1
BRN
RD
BLU
GRN
BLK
YEL
R4 10K
CR1 7.5V
Q1B 2N2920
Q1A 2N2920
b_2
c_2
e_2
b_1
e_1
c_1
C1 0.0022
R5 3000
R6 51
R7 51
R8 NOM
R9 NOM
Q2 2N2303
Q3 2N2303
R10 4990
R11 4990
CR2 7.5V
R12 270
R13 270
Q4 2N2151
Q5 2N2151
R14 150
R15 150
T2
1
2
3
4
5
C2 0.22
C3 0.22
R16 10K
1 STRUCTURE GROUND
10 1% MONITOR
6
5 HI
8 LO
7
3200 CPS 1% OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-251	RESISTOR	1000	±1 %	1/8 W
R2	SEE NOTE 4		NOM	±2 %	1/4 W
R3	1010364-543		33.2 K	±1 %	1/8 W
R4	1006750-56		10 K	±2 %	1/4 W
R5	1006750-43		3000	±2 %	1/4 W
R6	1006750-1		51	±2 %	1/4 W
R7	1006750-1		51	±2 %	1/4 W
R8	SEE NOTE 4		NOM	±1 %	1/8 W
R9	SEE NOTE 4		NOM	±1 %	1/8 W
R10	1010364-385		4990	±1 %	1/8 W
R11	1010364-385		4990	±1 %	1/8 W
R12	1006750-18		270	±2 %	1/4 W
R13	-18		270		
R14	-12		150		
R15	-12		150		
R16	1006750-56	RESISTOR	10 K	±2 %	1/4 W
C1	1010264-5	CAPACITOR	0.0022	±5 %	200VDC
C2	1010264-29	CAPACITOR	0.22	±5 %	200VDC
C3	1010264-29	CAPACITOR	0.22	±5 %	200VDC
CR1	1010372-15	DIODE	7.5 V	±5 %	250MW
CR2	1010829-2	DIODE	7.5 V	±5 %	1W
Q1	1010431-000	TRANSISTOR	2N2920		
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010269-2		2N2151		
Q5		TRANSISTOR	2N2151		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010887	TRANSFORMER			

R2		R8		R9	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-88	71.5	1010364-287	1540	1010364-515	23.7 K
-90	86.5	-291	1620	-525	26.7 K
-92	105	-295	1690	-533	29.4 K
-94	125	299	1780	-545	34 K
-12	150	-303	1870	-557	39.2 K
-14	180	-307	1960	-573	47.5 K
-16	220	-311	2050	-591	59 K
-18	270	-315	2150	-615	78.7 K
-104	345	-319	2260	-649	118 K
-107	450	1010364-323	2370	1010364-707	237 K
-110	590				
-30	820				
-34	1200				
-39	2000				
-130	4100				
1006750-84	150 K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R8 & R9 PER APPLICABLE P.S. FROM APPROPRIATE CHART

REF DWG:
3200 CPS 1% AMPLIFIER ASSY
DWG NO. 2007108

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO CONTRACT
DRAWN A. Di Leo DATE
CHECKED
APPROVAL
APPROVAL M. Kramer
NASA APPROVAL 9-29-64
MIT APPROVAL

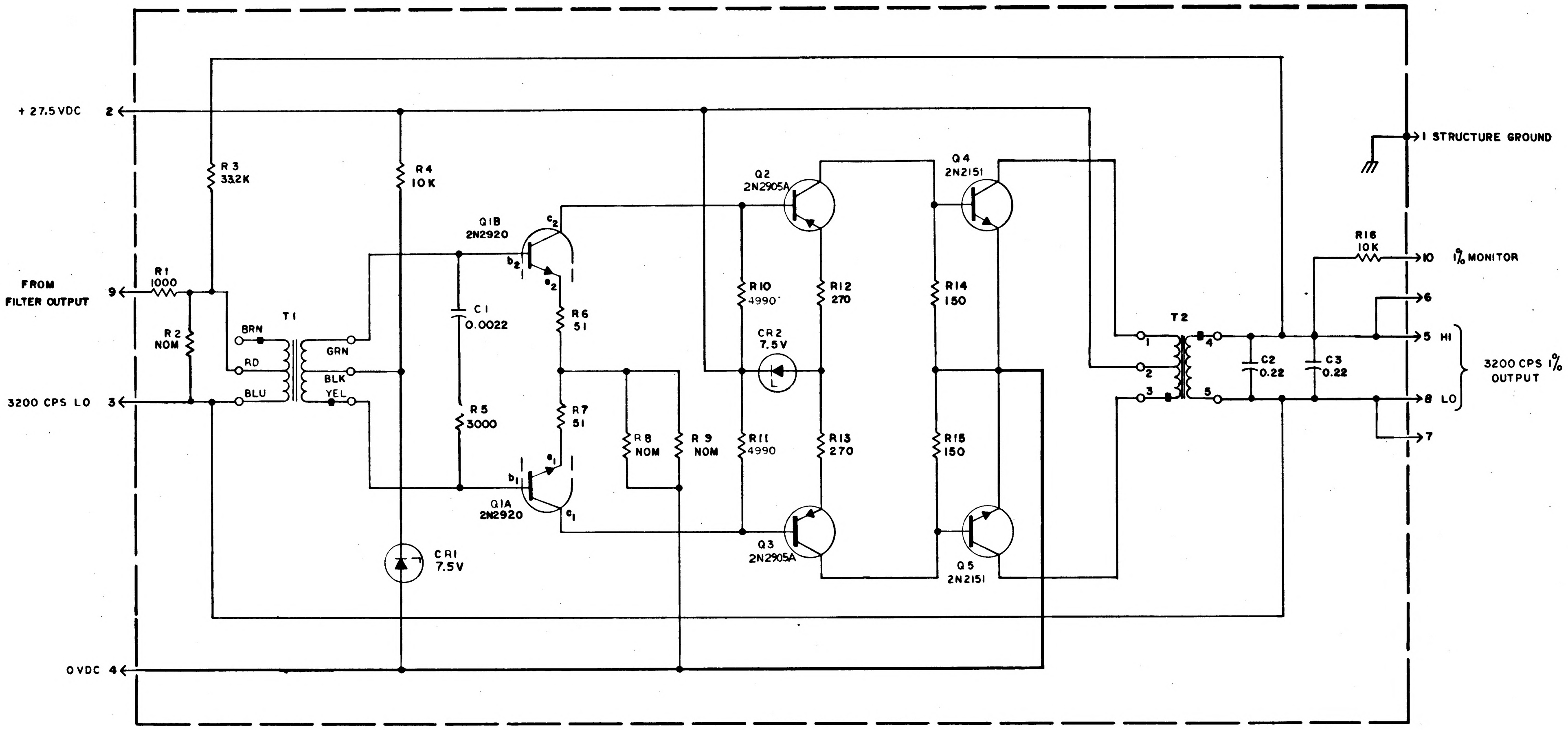
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
3200 CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010006
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16274	3/9/65	
B	REVISED PER TDRR 17967	5 Apr 65	
C	REVISED PER TDRR 27493	4 APR 66	JPC


+27.5 VDC
2
FROM FILTER OUTPUT
9
3200 CPS LO
3
OVDC
4
R1
1000
R2
NOM
R3
33.2K
R4
10K
T1
BRN
RD
BLU
GRN
BLK
YEL
Q1B
2N2920
b2
c2
e2
C1
0.0022
R5
3000
R6
51
R7
51
Q1A
2N2920
b1
e1
c1
CR1
7.5V
R8
NOM
R9
NOM
Q2
2N2905A
R10
4990
R11
4990
CR2
7.5 V
R12
270
R13
270
Q3
2N2905A
Q4
2N2151
R14
150
R15
150
Q5
2N2151
T2
1
2
3
4
5
C2
0.22
C3
0.22
1 STRUCTURE GROUND
R16
10K
10 1% MONITOR
6
5 HI
8 LO
7
3200 CPS 1% OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-251	RESISTOR	1000	±1%	1/8W
R2	SEE NOTE 4		NOM	±2%	1/4W
R3	1010364-543		33.2 K	±1%	1/8W
R4	1006750-56		10 K	±2%	1/4W
R5	1006750-43		3000	±2%	1/4W
R6	1006750-1		51	±2%	1/4W
R7	1006750-1		51	±2%	1/4W
R8	SEE NOTE 4		NOM	±1%	1/8W
R9	SEE NOTE 4		NOM	±1%	1/8W
R10	1010364-385		4990	±1%	1/8W
R11	1010364-385		4990	±1%	1/8W
R12	1006750-18		270	±2%	1/4W
R13	-18		270		
R14	-12		150		
R15	-12		150		
R16	1006750-56	RESISTOR	10 K	±2%	1/4W
C1	1010264-5	CAPACITOR	0.0022	±5%	200VDC
C2	1010264-29	CAPACITOR	0.22	±5%	200VDC
C3	1010264-29	CAPACITOR	0.22	±5%	200VDC
CR1	1010372-15	DIODE	7.5 V	±5%	250MW
CR2	1010829-2	DIODE	7.5 V	±5%	1W
Q1	1010431-000	TRANSISTOR	2N2920		
Q2	1008813-3		2N2905A		
Q3			2N2905A		
Q4	1010269-2		2N2151		
Q5		TRANSISTOR	2N2151		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010887	TRANSFORMER			

R2		R8		R9	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-88	71.5	1010364-287	1540	1010364-515	23.7K
-90	86.5	-291	1620	-525	26.7K
-92	105	-295	1690	-533	29.4K
-94	125	299	1780	-545	34 K
-12	150	-303	1870	-557	39.2K
-14	180	-307	1960	-573	47.5K
-16	220	-311	2050	-591	59 K
-18	270	-315	2150	-615	78.7 K
-104	345	-319	2260	-649	118 K
-107	450	1010364-323	2370	1010364-707	237K
-110	590				
-30	820				
-34	1200				
-39	2000				
-130	4100				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R8 & R9 PER APPLICABLE P.S. FROM APPROPRIATE CHART

REF DWG:
3200 CPS 1% AMPLIFIER ASSY
DWG NO. 2007108

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. DiLeo DATE 2 MAR 64
CHECKED
APPROVAL
APPROVAL M. Kramer 2 Feb 64
NASA APPROVAL
MIT APPROVAL

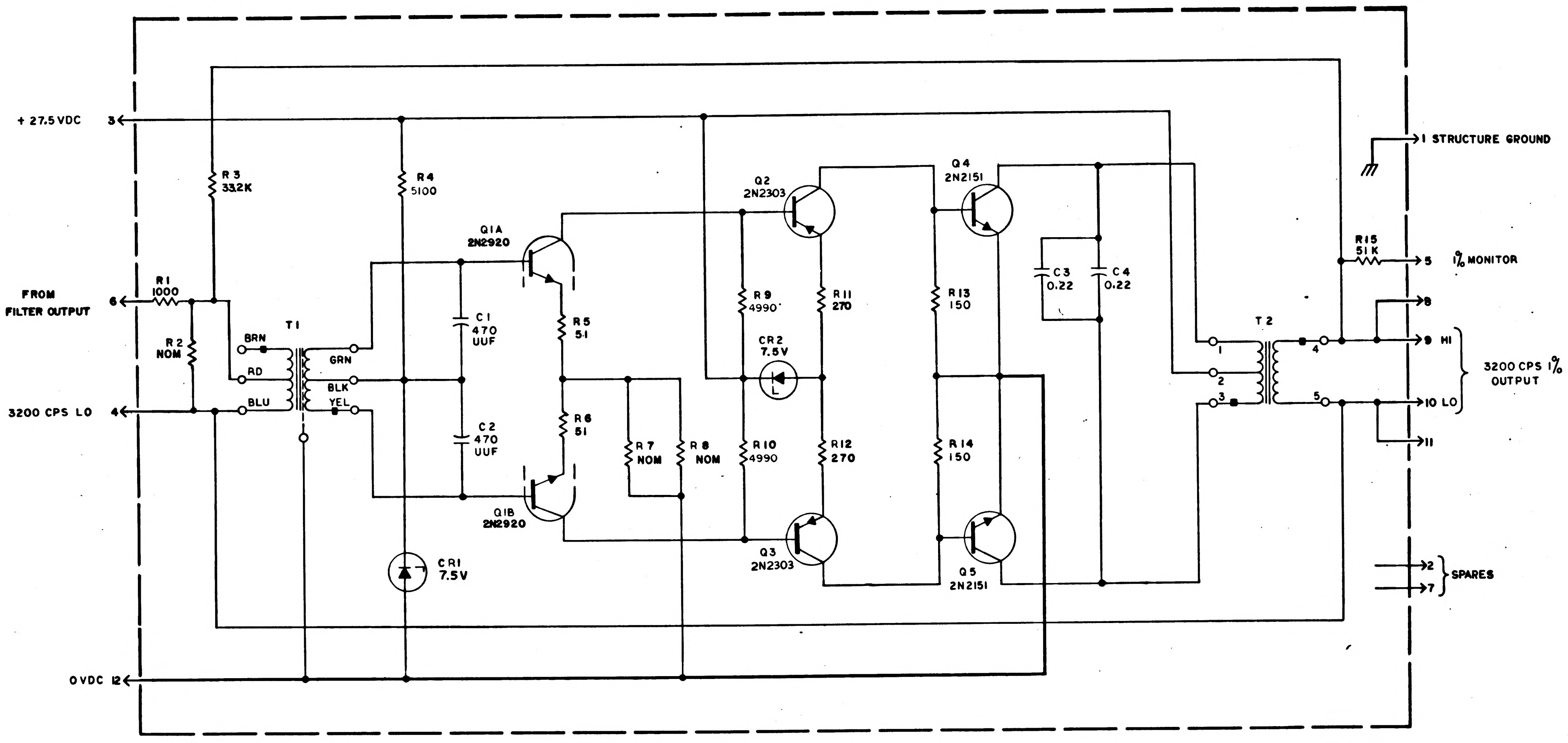
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
3200 CPS 1% AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010006
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


+ 27.5 VDC
3
FROM
FILTER OUTPUT
6
3200 CPS LO
4
0 VDC
12
R1
1000
R2
NOM
R3
33.2K
R4
5100
T1
BRN
RD
BLU
GRN
BLK
YEL
C1
470
UUF
C2
470
UUF
Q1A
2N2920
Q1B
2N2920
R5
5.1
R6
51
CR1
7.5V
R7
NOM
R8
NOM
Q2
2N2303
Q3
2N2303
R9
4990
R10
4990
CR2
7.5V
R11
270
R12
270
Q4
2N2151
Q5
2N2151
R13
150
R14
150
C3
0.22
C4
0.22
T2
1
2
3
4
5
R15
51 K
1 STRUCTURE GROUND
5 1% MONITOR
8
9 HI
10 LO
11
3200 CPS 1%
OUTPUT
2
7
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-251	RESISTOR	1000	±1 %	1/8 W
R2	SEE NOTE 4		NOM	±2 %	1/4 W
R3	1010364-543		33.2 K	±1 %	1/8 W
R4	1006750-49		5100	±2 %	1/4 W
R5	1006750-1		51	±2 %	1/4 W
R6	1006750-1		51	±2 %	1/4 W
R7	SEE NOTE 4		NOM	±1 %	1/8 W
R8	SEE NOTE 4		NOM	±1 %	1/8 W
R9	1010364-385		4990	±1 %	1/8 W
R10	1010364-385		4990	±1 %	1/8 W
R11	1006750-18		270	±2 %	1/4 W
R12	-18		270		
R13	-12		150		
R14	-12		150		
R15	1006750-73	RESISTOR	51 K	±2 %	1/4 W
C1	1010410-9	CAPACITOR	470 UUF	±2 %	500VDC
C2	1010410-9	CAPACITOR	470 UUF	±2 %	500VDC
C3	1010264-29	CAPACITOR	0.22	±5 %	200VDC
C4	1010264-29	CAPACITOR	0.22	±5 %	200VDC
CR1	1010372-15	DIODE	7.5 V	±5 %	250MW
CR2	1010829-2	DIODE	7.5 V	±5 %	1W
Q1	1010431	TRANSISTOR	2N2920		
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010269-2		2N2151		
Q5		TRANSISTOR	2N2151		
T1	1010880	TRANSFORMER	DO-T47		
T2		TRANSFORMER			

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 15145 **DATE**

R7		R8		R2	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010364-		1010364-		1006750-	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2,R7 & R8 PER ATP FROM APPROPRIATE CHART

REF DWG:
3200 CPS 1% AMPLIFIER ASSEMBLY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN A. Di Leo DATE
CHECKED
APPROVAL Louis Martinage
APPROVAL
NASA APPROVAL 2-29-64
MIT APPROVAL W Kupfer 29 Feb

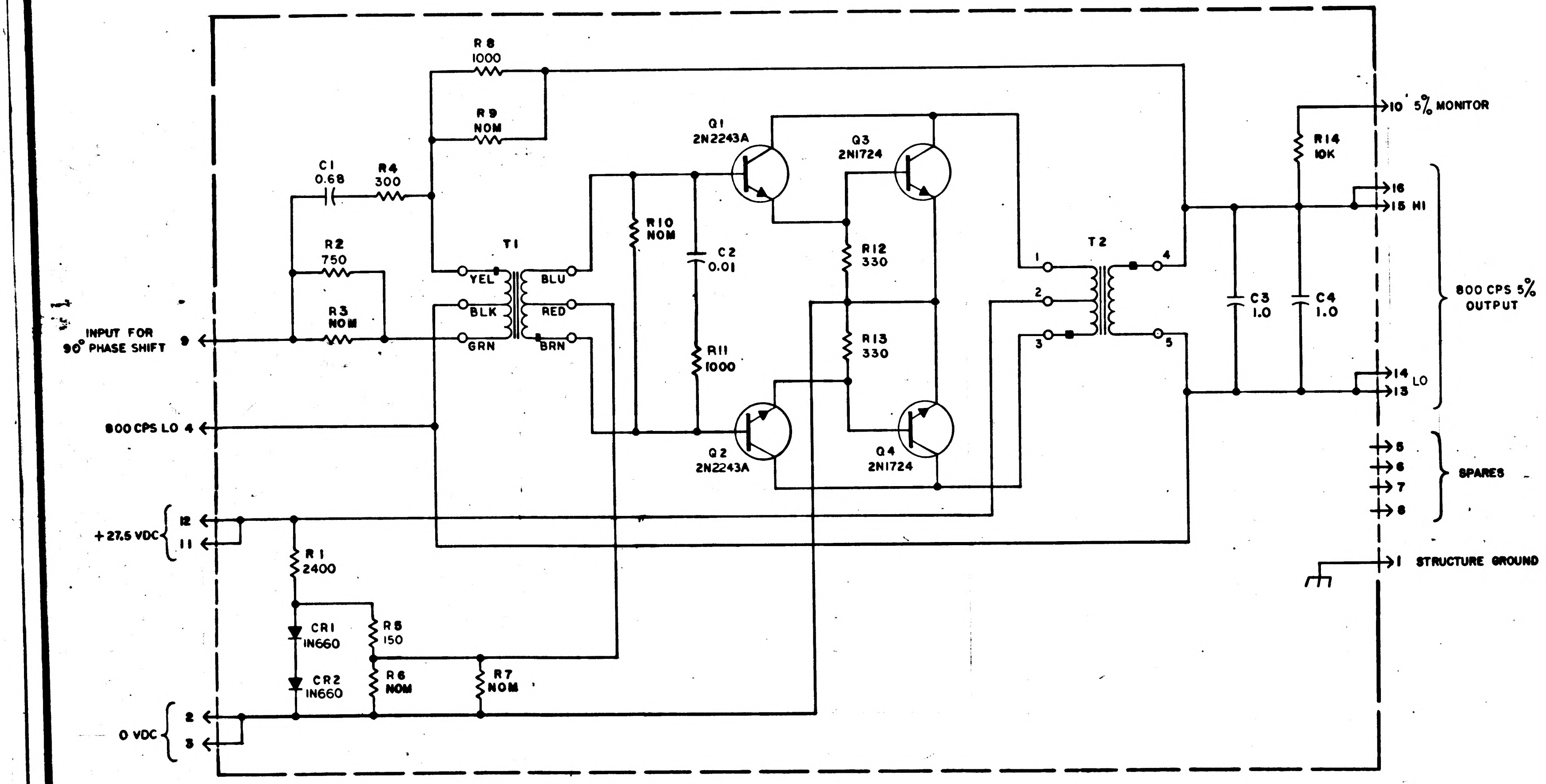
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
3200CPS 1% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010006
SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15:45			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED & UPGRADED TO CLASS A PER TDRR 16272	3/9/65	


R8
1000
R9
NOM
C1
0.68
R4
300
R2
750
R3
NOM
INPUT FOR
90° PHASE SHIFT
9
T1
YEL
BLK
GRN
BLU
RED
BRN
Q1
2N2243A
Q2
2N2243A
Q3
2N1724
Q4
2N1724
R10
NOM
C2
0.01
R11
1000
R12
330
R13
330
T2
1
2
3
4
5
C3
1.0
C4
1.0
R14
10K
10 5% MONITOR
16
15 HI
14
13 LO
800 CPS 5%
OUTPUT
5
6
7
8
SPARES
1 STRUCTURE GROUND
800 CPS LO 4
+27.5 VDC
12
11
R1
2400
CR1
1N660
CR2
1N660
R5
150
R6
NOM
R7
NOM
0 VDC
2
3

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-65	RESISTOR	2400	±1%	3 W
R2	1010389-53		750	±1%	3 W
R3	SEE NOTE 4		NOM	±1%	3 W
R4	1010389-43		300	±1%	3 W
R5	1006750-12		150	±2%	1/4W
R6	SEE NOTE 4		NOM	±1%	1/8W
R7	SEE NOTE 4		NOM	±1%	1/8W
R8	1010389-56		1000	±1%	3 W
R9	SEE NOTE 4		NOM	±1%	3 W
R10	SEE NOTE 4		NOM	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-20		330	±2%	1/4W
R13	1006750-20		330	±2%	1/4W
R14	1006750-56	RESISTOR	10 K	2%	1/4 W
C1	1010264-35	CAPACITOR	0.68	±5%	200VDC
C2	1010264-13		0.01	±5%	200VDC
C3	1010264-37		1.0	±5%	200VDC
C4	1010264-37	CAPACITOR	1.0	±5%	200VDC
CR1	1010385	DIODE	1N660		
CR2	1010385	DIODE	1N660		
Q1	1010398-4	TRANSISTOR	2N2243A		
Q2		TRANSISTOR	2N2243A		
Q3	1010273-2	TRANSISTOR	2N1724		
Q4		TRANSISTOR	2N1724		
T1	1010407	TRANSFORMER	DO-T25		
T2	1010886	TRANSFORMER			

R3		R9		R7		R10		R6	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010389-96	2800	1010389-60	1500	1010364-385	4990	1006750-28	680	1010364-157	324
-67	3000	-61	1600	-397	5760	-30	820	-161	340
-68	3300	-62	1800	-409	6650	-32	1000	-165	357
-69	3600	-63	2000	-425	8060	-118	1250	-171	383
-70	3900	-64	2200	-443	10K	-37	1600	-175	402
-97	4100	-107	2300	-467	13.3K	-123	2100	-179	422
-71	4300	-65	2400	-501	20 K	-126	2850	-183	442
-98	4500	-95	2600	1010364-559	40.2K	-130	4100	-187	464
-110	4900	-96	2800	-		-135	6500	-189	475
-73	5100	-67	3000	-		-59	13 K	-193	499
-99	5300	-108	3100	-		1006750-84	150K	-197	523
-74	5600	-68	3300					-199	536
-100	5800	-109	3500					-203	562
-101	6100	-69	3600					-205	576
-102	6300	-70	3900					1010364-209	604
-103	6600	-97	4100						
-104	6900	-71	4300						
-105	7200	1010389-98	4500						
1010389-77	7500								

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R3, R9, R7 R10 & R6 PER ATP [illegible] PRIATE FROM APPROPRIATE CHART

REF DWG:
800 CPS 5% AMPLIFIER ASSY
DWG NO.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 12-29-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

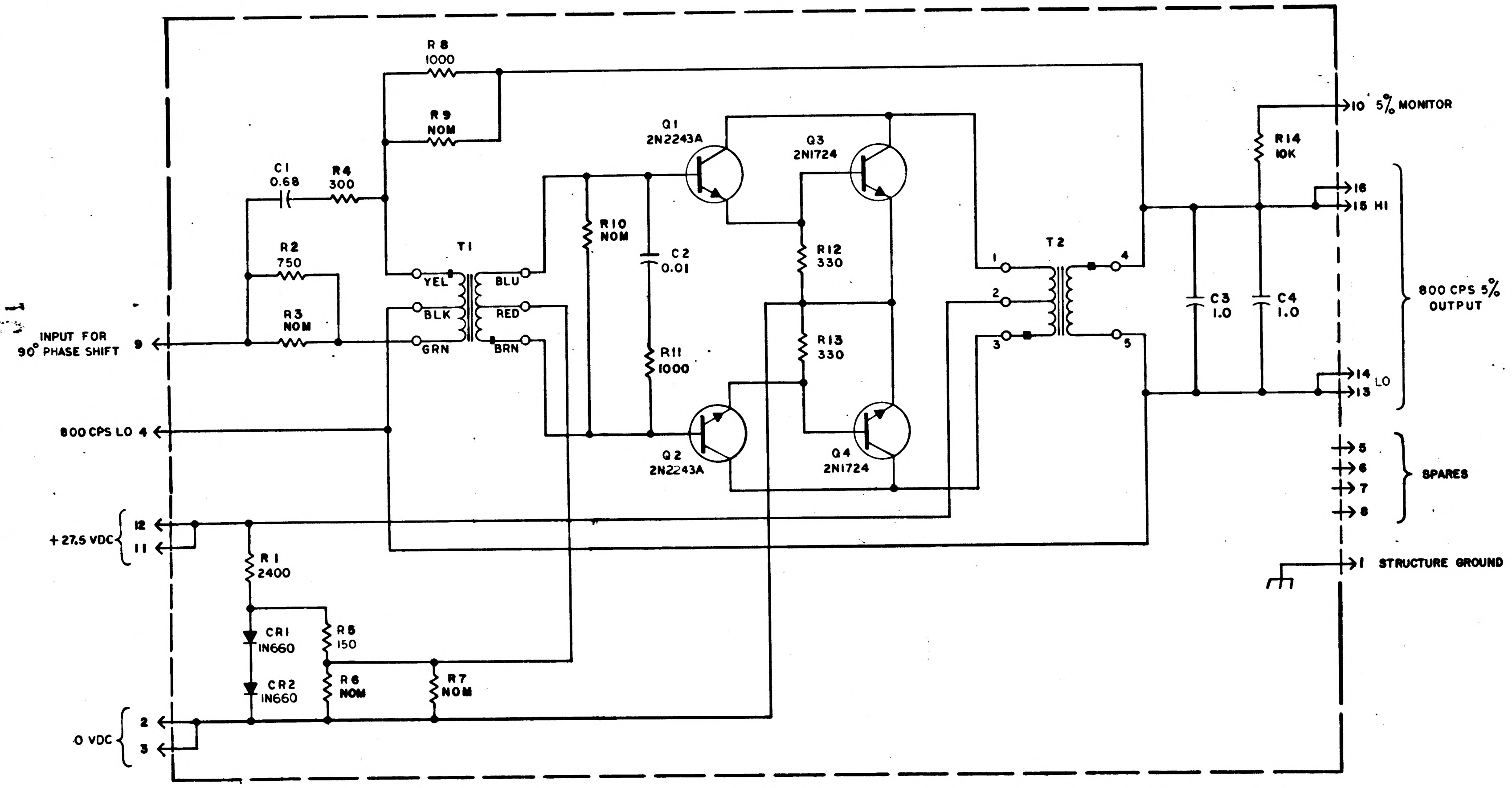
SCHEMATIC,
800 CPS 5% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010007
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15145

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED & UPGRADED TO CLASS A PER TDRR 16272	2/9/65	
B	REVISED PER TDRR 20308	23 Jun 65	


R8
1000
R9
NOM
C1
0.68
R4
300
R2
750
R3
NOM
T1
YEL
BLK
GRN
BLU
RED
BRN
R10
NOM
C2
0.01
R11
1000
Q1
2N2243A
Q2
2N2243A
Q3
2N1724
Q4
2N1724
R12
330
R13
330
T2
1
2
3
4
5
C3
1.0
C4
1.0
R14
10K
INPUT FOR 90° PHASE SHIFT 9
800 CPS LO 4
+27.5 VDC
12
11
R1
2400
CR1
1N660
CR2
1N660
R5
150
R6
NOM
R7
NOM
0 VDC
2
3
10 5% MONITOR
16
15 HI
14
13 LO
800 CPS 5% OUTPUT
5
6
7
8
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-65	RESISTOR	2400	±1%	3 W
R2	1010389-53		750	±1%	3 W
R3	SEE NOTE 4		NOM	±1%	3 W
R4	1010389-43		300	±1%	3 W
R5	1006750-12		150	±2%	1/4 W
R6	SEE NOTE 4		NOM	±1%	1/8 W
R7	SEE NOTE 4		NOM	±1%	1/8 W
R8	1010389-56		1000	±1%	3 W
R9	SEE NOTE 4		NOM	±1%	3 W
R10	SEE NOTE 4		NOM	±2%	1/4 W
R11	1006750-32		1000	±2%	1/4 W
R12	1006750-20		330	±2%	1/4 W
R13	1006750-20		330	±2%	1/4 W
R14	1006750-56	RESISTOR	10 K	2%	1/4 W
C1	1010264-35	CAPACITOR	0.68	±5%	200VDC
C2	1010264-13		0.01	±5%	200VDC
C3	1010264-37		1.0	±5%	200VDC
C4	1010264-37	CAPACITOR	1.0	±5%	200VDC
CR1	1010385	DIODE	1N660		
CR2	1010385	DIODE	1N660		
Q1	1010398-4	TRANSISTOR	2N2243A		
Q2		TRANSISTOR	2N2243A		
Q3	1010273-3	TRANSISTOR	2N1724		
Q4		TRANSISTOR	2N1724		
T1	1010407	TRANSFORMER	DO-T25		
T2	1010886	TRANSFORMER			

R3		R9		R7		R10		R6	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010389-96	2800	1010389-60	1500	1010364-385	4990	1006750-28	680	1010364-157	324
-67	3000	-61	1600	-397	5760	-30	820	-161	340
-68	3300	-62	1800	-409	6650	-32	1000	-165	357
-69	3600	-63	2000	-425	8060	-118	1250	-171	383
-70	3900	-64	2200	-443	10K	-37	1600	-175	402
-97	4100	-107	2300	-467	13.3K	-123	2100	-179	422
-71	4300	-65	2400	-501	20K	-126	2850	-183	442
-98	4500	-95	2600	1010364-559	40.2K	-130	4100	-187	464
-110	4900	-96	2800	-		-135	6500	-189	475
-73	5100	-67	3000	-		-59	13K	-193	499
-99	5300	-108	3100	-		1006750-84	150K	-197	523
-74	5600	-68	3300					-199	536
-100	5800	-109	3500					-203	562
-101	6100	-69	3600					-205	576
-102	6300	-70	3900					1010364-209	604
-103	6600	-97	4100						
-104	6900	-71	4300						
-105	7200	1010389-98	4500						
1010389-77	7500								

REF DWG:
800 CPS 5% AMPLIFIER ASSY
DWG NO.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R3, R9, R7 R10 & R6 PER ATP FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT

DRAWN DATE
CHECKED
APPROVAL
APPROVAL M. Kramer
NASA APPROVAL 12-29-64
MIT APPROVAL

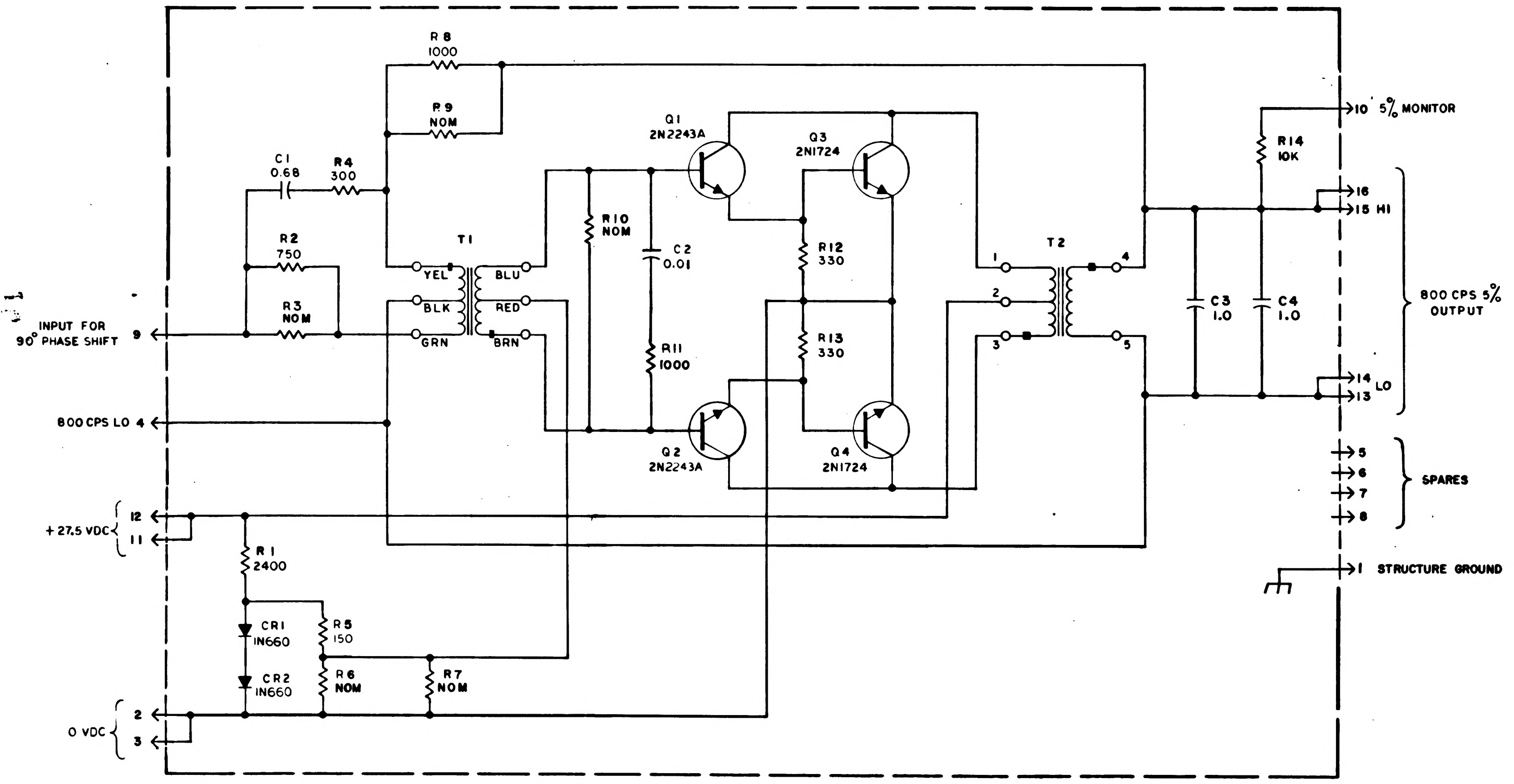
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800 CPS 5% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010007
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED & UPGRADED TO CLASS A PER TDRR 16272	2/9/65	
B	REVISED PER TDRR 20308	23 Aug 65	
C	REVISED PER TDRR 25052	11 JAN 66	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-65	RESISTOR	2400	±1%	3 W
R2	1010389-53		750	±1%	3 W
R3	SEE NOTE 4		NOM	±1%	3 W
R4	1010389-43		300	±1%	3 W
R5	1006750-12		150	±2%	1/4 W
R6	SEE NOTE 4		NOM	±1%	1/8 W
R7	SEE NOTE 4		NOM	±1%	1/8 W
R8	1010389-56		1000	±1%	3 W
R9	SEE NOTE 4		NOM	±1%	3 W
R10	SEE NOTE 4		NOM	±2%	1/4 W
R11	1006750-32		1000	±2%	1/4 W
R12	1006750-20		330	±2%	1/4 W
R13	1006750-20		330	±2%	1/4 W
R14	1006750-56	RESISTOR	10 K	2%	1/4 W
C1	1010264-35	CAPACITOR	0.68	±5%	200VDC
C2	1010264-13		0.01	±5%	200VDC
C3	1010264-37		1.0	±5%	200VDC
C4	1010264-37	CAPACITOR	1.0	±5%	200VDC
CR1	1010385	DIODE	IN660		
CR2	1010385	DIODE	IN660		
Q1	1010398-4	TRANSISTOR	2N2243A		
Q2		TRANSISTOR	2N2243A		
Q3	1010273-3	TRANSISTOR	2N1724		
Q4		TRANSISTOR	2N1724		
T1	1010407	TRANSFORMER	DO-T25		
T2	1010886	TRANSFORMER			

R3		R9		R7		R10		R6	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010389-96	2800	1010389-60	1500	1010364-385	4990	1006750-28	680	1010364-157	324
-67	3000	-61	1600	-397	5760	-30	820	-161	340
-68	3300	-62	1800	-409	6650	-32	1000	-165	357
-69	3600	-63	2000	-425	8060	-11[illegible]	1250	-171	383
-70	3900	-64	2200	-443	10K	-37	1600	-175	402
-97	4100	-107	2300	-467	13.3K	-123	2100	-179	422
-71	4300	-65	2400	-501	20K	-126	2850	-183	442
-98	4500	-95	2600	-559	40.2K	-130	4100	-187	464
-110	4900	-96	2800	-375	4420	-135	6500	-189	475
-73	5100	-67	3000	-367	4020	-59	13K	-193	499
-99	5300	-108	3100	-359	3650	1006750-84	150K	-197	523
-74	5600	-68	3300	-251	3320			-199	536
-100	5800	-109	3500	-345	3090			-203	562
-101	6100	-69	3600	1010364-339	2870			-205	576
-102	6300	-70	3900					-209	604
-103	6600	-97	4100					-153	309
-104	6900	-71	4300					-149	294
-105	7200	1010389-98	4500					1010364-145	280
1010389-77	7500								

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R3, R9, R7 R10 & R6 PER ATP FROM APPROPRIATE CHART

REF DWG:
800 CPS 5% AMPLIFIER ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL M. Kramer
NASA APPROVAL 12-24-64
MIT APPROVAL

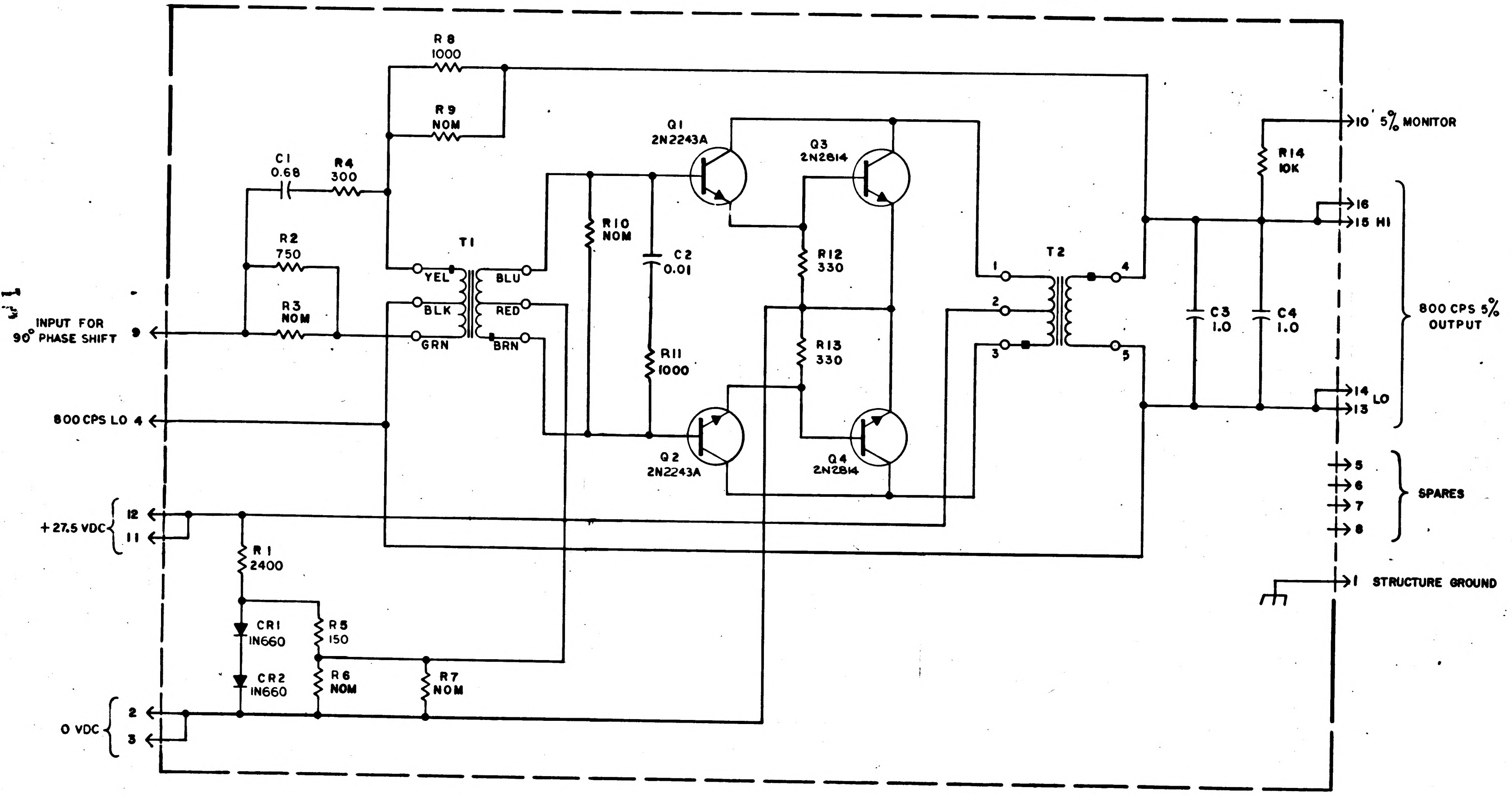
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800 CPS 5% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010007
SCALE #
WT #
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15.45			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED & UPGRADED TO CLASS A PER TDRR 16272	2/9/65	WK
B	REVISED PER TDRR 20308	23 Jun 65	WK
C	REVISED PER TDRR ..052	11 JAN 66	BLP / MEM
D	REVISED PER TDRR ..401	13 JAN 67	REP



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-65	RESISTOR	2400	± 1%	3 W
R2	1010389-53		750	± 1%	3 W
R3	SEE NOTE 4		NOM	± 1%	3 W
R4	1010389-43		300	± 1%	3 W
R5	1006750-12		150	± 2%	1/4 W
R6	SEE NOTE 4		NOM	± 1%	1/8 W
R7	SEE NOTE 4		NOM	± 1%	1/8 W
R8	1010389-56		1000	± 1%	3 W
R9	SEE NOTE 4		NOM	± 1%	3 W
R10	SEE NOTE 4		NOM	± 2%	1/4 W
R11	1006750-32		1000	± 2%	1/4 W
R12	1006750-20		330	± 2%	1/4 W
R13	1006750-20		330	± 2%	1/4 W
R14	1006750-56	RESISTOR	10 K	2%	1/4 W
C1	1010264-35	CAPACITOR	0.68	± 5%	200VDC
C2	1010264-13		0.01	± 5%	200VDC
C3	1010264-37		1.0	± 5%	200VDC
C4	1010264-37	CAPACITOR	1.0	± 5%	200VDC
CR1	1010385	DIODE	IN660		
CR2	1010385	DIODE	IN660		
Q1	1010398-4	TRANSISTOR	2N2243A		
Q2		TRANSISTOR	2N2243A		
Q3	1008922-2	TRANSISTOR	2N2814		
Q4		TRANSISTOR	2N2814		
T1	1010407	TRANSFORMER	DO-T25		
T2	1010886	TRANSFORMER			

R3		R9		R7		R10		R6	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010389-96	2800	1010389-60	1500	1010364-385	4990	1006750-28	680	1010364-157	324
-67	3000	-61	1600	-397	5760	-30	820	-161	340
-68	3300	-62	1800	-409	6650	-32	1000	-165	357
-69	3600	-63	2000	-425	8060	-113	1250	-171	383
-70	3900	-64	2200	-443	10K	-37	1600	-175	402
-97	4100	-107	2300	-467	13.3K	-123	2100	-179	422
-71	4300	-65	2400	-501	20 K	-126	2850	-183	442
-98	4500	-95	2600	-559	40.2K	-130	4100	-187	464
-110	4900	-96	2800	-375	4420	-135	6500	-189	475
-73	5100	-67	3000	-367	4020	-59	13 K	-193	499
-99	5300	-108	3100	-359	3650	1006750-84	150K	-197	523
-74	5600	-68	3300	-351	3820			-199	536
-100	5800	-109	3500	-345	3090			-203	562
-101	6100	-69	3600	1010364-339	2870			-205	576
-102	6300	-70	3900					-209	604
-103	6600	-97	4100					-153	309
-104	6900	-71	4300					-149	294
-105	7200	1010389-98	4500					1010364-145	280
1010389-77	7500								

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R3, R9, R7 R10 & R6 PER ATP FROM APPROPRIATE CHART

REF DWG:
800 CPS 5% AMPLIFIER ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN G. Di Leo DATE
CHECKED
APPROVAL E. H. Martineau
APPROVAL M. Kramer
E. F. Sisolak
NASA APPROVAL 12-29-64
MIT APPROVAL 29 Dec

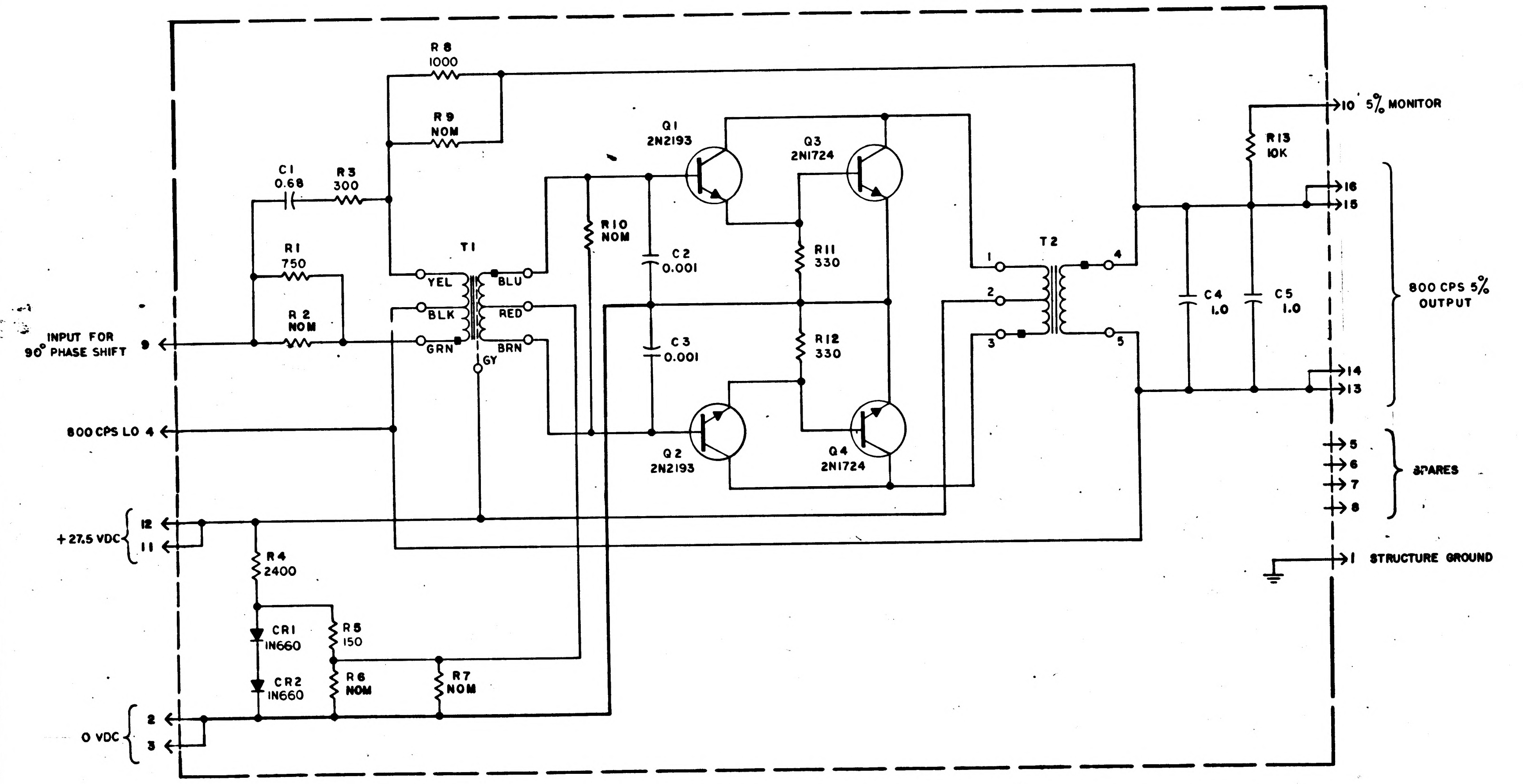
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800 CPS 5% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010007
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


R8
1000
R9
NOM
C1
0.68
R3
300
R1
750
R2
NOM
T1
YEL
BLK
GRN
BLU
RED
BRN
GY
R10
NOM
C2
0.001
C3
0.001
Q1
2N2193
Q2
2N2193
Q3
2N1724
Q4
2N1724
R11
330
R12
330
T2
1
2
3
4
5
C4
1.0
C5
1.0
R13
10K
INPUT FOR 90° PHASE SHIFT 9
800 CPS LO 4
+27.5 VDC 12 11
R4
2400
CR1
IN660
CR2
IN660
R5
150
R6
NOM
R7
NOM
0 VDC 2 3
10 5% MONITOR
16
15
800 CPS 5% OUTPUT
14
13
5
6
7
8
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-53	RESISTOR	750	±1%	3 W
R2	SEE NOTE 4		NOM	±1%	3 W
R3	1010389-43		300	±1%	3 W
R4	1010389-65		2400	±1%	3 W
R5	1006750-12		150	±2%	3 W
R6	SEE NOTE 4		NOM	±1%	1/8W
R7	SEE NOTE 4		NOM	±1%	1/8W
R8	1010389-56		1000	±1%	3 W
R9	SEE NOTE 4		NOM	±1%	3 W
R10	SEE NOTE 4		NOM	±2%	1/4W
R11	1006750-20		330	±2%	1/4W
R12	1006750-20		330	±2%	1/4W
R13	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-35	CAPACITOR	0.68	±5%	200VDC
C2	1010264-1		0.001	±5%	200VDC
C3	1010264-1		0.001	±5%	200VDC
C4	1010264-37		1.0 UF	±5%	200VDC
C5	1010264-37	CAPACITOR	1.0 UF	±5%	200VDC
CR1	1010385	DIODE	IN660		
CR2	1010385	DIODE	IN660		
Q1	1010398-4	TRANSISTOR	2N2243A		
Q2		TRANSISTOR	2N2243A		
Q3	1010273-2	TRANSISTOR	2N1724		
Q4		TRANSISTOR	2N1724		
T1	1010881	TRANSFORMER	DOT48		
T2	1010307	TRANSFORMER			

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 15145 DATE

R2		R9		R7		R10		R6	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010389-96	2800	1010389-60	1500	1010364-195	511	1006750			
-67	3000	-61	1600	-203	562				
-68	3300	-62	1800	-211	619				
-69	3600	-63	2000	-219	681				
-70	3900	-64	2200	-227	750				
-97	4100	-107	2300	-235	825				
-71	4300	-65	2400	-243	909				
-98	4500	-95	2600	-251	1000				
-110	4900	-96	2800	-259	1100				
-73	5100	-67	3000	-267	1210				
-99	5300	-108	3100	-273	1300				
-74	5600	-68	3300	-279	1400				
-100	5800	-109	3500	1010364-285	1500				
-101	6100	-69	3600						
-102	6300	-70	3900						
-103	6600	-97	4100						
-104	6900	-71	4300						
-105	7200	1010389-98	4500						
1010389-77	7500								

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R9, R7 R10 & R6 PER ATP FROM APPROPRIATE CHART

REF DWG:
800 CPS 5% AMPLIFIER ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 2-28-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800 CPS 5% AMPLIFIER

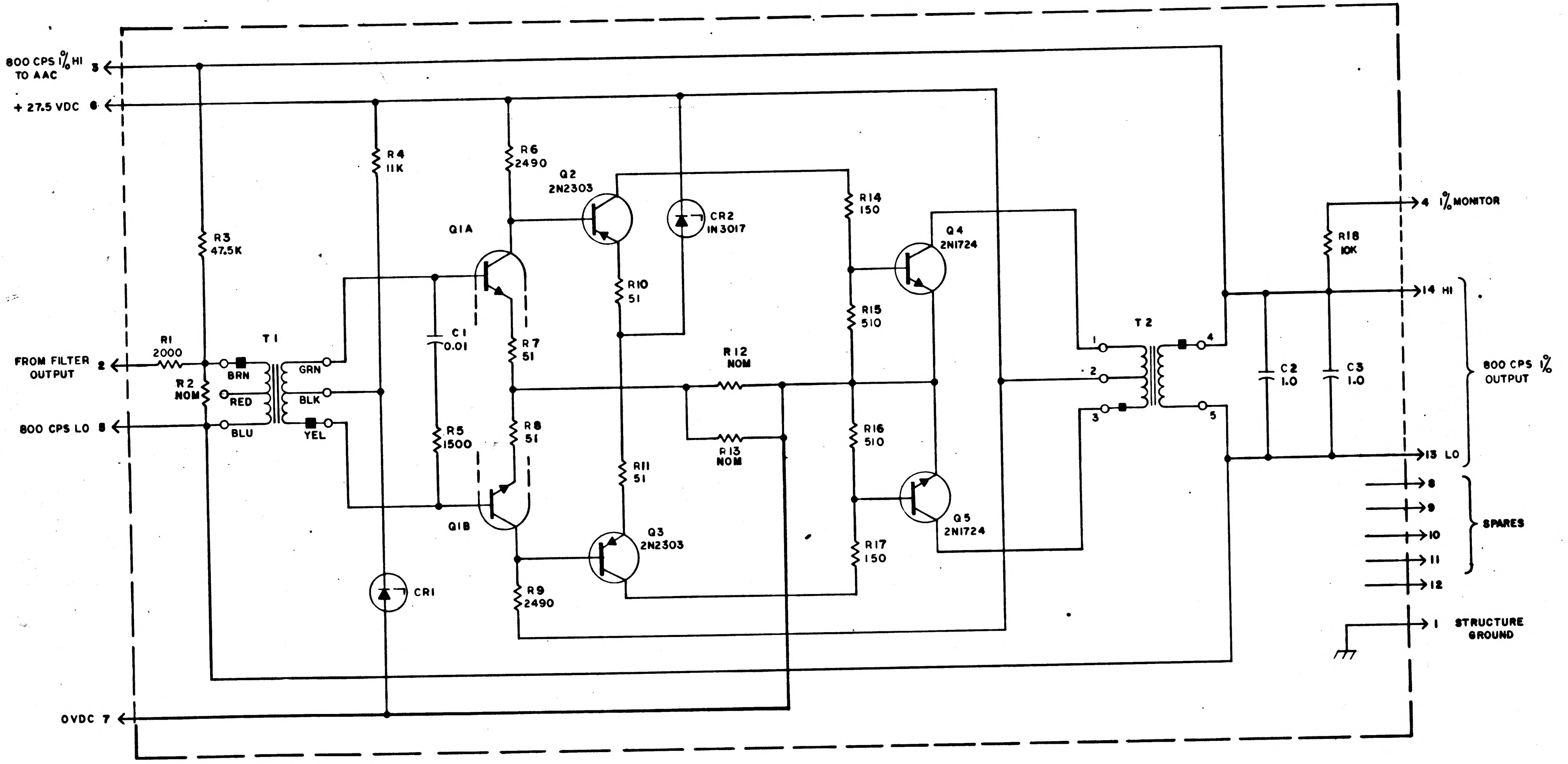
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010007
SCALE —
WT —
SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16030	4/2/65	WK


800 CPS 1% HI TO AAC 3
+ 27.5 VDC 6
FROM FILTER OUTPUT 2
800 CPS LO 5
0VDC 7
R1 2000
R2 NOM
R3 47.5K
R4 11K
T1
BRN
RED
BLU
GRN
BLK
YEL
C1 0.01
R5 1500
Q1A
Q1B
R6 2490
R7 51
R8 51
R9 2490
Q2 2N2303
Q3 2N2303
CR1
CR2 IN3017
R10 51
R11 51
R12 NOM
R13 NOM
R14 150
R15 510
R16 510
R17 150
Q4 2N1724
Q5 2N1724
T2
1
2
3
4
5
C2 1.0
C3 1.0
R18 10K
4 1% MONITOR
14 HI
13 LO
800 CPS 1% OUTPUT
8
9
10
11
12
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	±1%	1/8 W
R2	SEE NOTE 4		NOM	±2%	1/4 W
R3	1010364-573		47.5K	±1%	1/8 W
R4	1006750-57		11K	±2%	1/4 W
R5	1006750-36		1500	±2%	1/4W
R6	1010364-327		2490	±1%	1/8W
R7	1006750-1		51	±2%	1/4 W
R8	1006750-1		51	±2%	1/4 W
R9	1010364-327		2490	±1%	1/8 W
R10	1006750-1		51	±2%	1/4 W
R11	1006750-1		51	±2%	1/4 W
R12	SEE NOTE 4		NOM	±1%	1/8 W
R13	SEE NOTE 4		.0M	±1%	1/8W
R14	1006750-12		150	±2%	1/4W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-13	CAPACITOR	0.01	± 5%	200VDC
C2	1010264-37	CAPACITOR	1.0	± 5%	200VDC
C3	1010264-37	CAPACITOR	1.0	± 5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431	TRANSISTOR			
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010273-2		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010886	TRANSFORMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

R 2		R 12		R 13	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-16	220	1010364-251	1000	1010364-467	13.3K
-18	270	-255	1050	-479	15.4K
-20	330	-259	1100	-489	17.4K
-22	390	-263	1150	-501	20 K
-23	430	-267	1210	-517	24.3K
-25	510	-271	1270	-535	30.1K
-27	620	-275	1330	-553	40.2K
-29	750	-277	1370	-595	61.9K
-30	820	-281	1430	1010364-651	121 K
-32	1000	1010364-285	1500		
-34	1200				
-36	1500				
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12 & R13 PER ATP FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT

DRAWN R. Di Leo DATE [illegible]
CHECKED [illegible]
APPROVAL F. H. Martens 22 Dec 64
APPROVAL [illegible] 29 [illegible]
NASA APPROVAL [illegible] 12-23-64
MIT APPROVAL [illegible] 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800CPS 1% AMPLIFIER

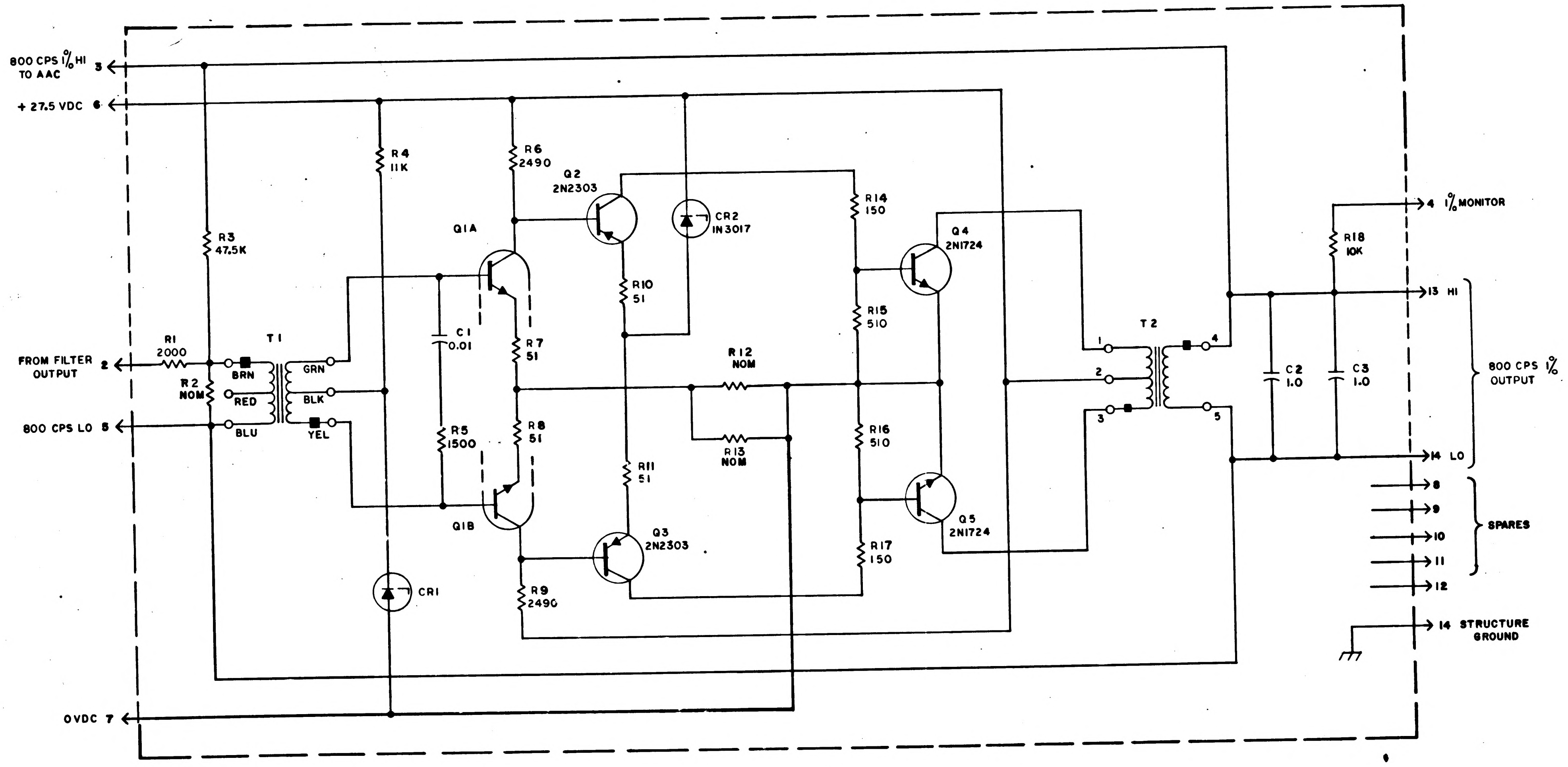
CODE IDENT NO.	SIZE	NASA DRAWING NO
—	E	2010008

SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16030	[illegible]	[illegible]
B	REVISED PER TDRR 16622	[illegible]	[illegible]



800 CPS 1% HI TO AAC 3
+ 27.5 VDC 6
FROM FILTER OUTPUT 2
800 CPS LO 5
OVDC 7
R1 2000
R2 NOM
R3 47.5K
R4 11K
R5 1500
R6 2490
R7 51
R8 51
R9 2490
R10 51
R11 51
R12 NOM
R13 NOM
R14 150
R15 510
R16 510
R17 150
R18 10K
C1 0.01
C2 1.0
C3 1.0
CR1
CR2 1N3017
Q1A
Q1B
Q2 2N2303
Q3 2N2303
Q4 2N1724
Q5 2N1724
T1
BRN
RED
BLU
GRN
BLK
YEL
T2
1
2
3
4
5
4 1% MONITOR
13 HI
14 LO
800 CPS 1% OUTPUT
8
9
10
11
12
SPARES
14 STRUCTURE GROUND

R2 PART NO.	R2 VALUE	R12 PART NO.	R12 VALUE	R13 PART NO.	R13 VALUE
1006750-16	220	1010364-251	1000	1010364-467	13.3K
-18	270	-255	1050	-479	15.4K
-20	330	-259	1100	-489	17.4K
-22	390	-263	1150	-501	20K
-23	430	-267	1210	-517	24.3K
-25	510	-271	1270	-535	30.1K
-27	620	-275	1330	-559	40.2K
-29	750	-277	1370	-595	61.9K
-30	820	-281	1430	1010364-651	121 K
-32	1000	1010364-285	1500		
-34	1200				
-36	1500				
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12 & R13 PER ATP FROM APPROPRIATE CHART

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	±1%	1/8 W
R2	SEE NOTE 4		NOM	±2%	1/4 W
R3	1010364-573		47.5K	±1%	1/8 W
R4	1006750-57		11K	±2%	1/4 W
R5	1006750-36		1500	±2%	1/4W
R6	1010364-327		2490	±1%	1/8W
R7	1006750-1		51	±2%	1/4 W
R8	1006750-1		51	±2%	1/4 W
R9	1010364-327		2490	±1%	1/8 W
R10	1006750-1		51	±2%	1/4 W
R11	1006750-1		51	±2%	1/4 W
R12	SEE NOTE 4		NOM	±1%	1/8 W
R13	SEE NOTE 4		NOM	±1%	1/8W
R14	1006750-12		150	±2%	1/4 W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-13	CAPACITOR	0.01	± 5%	200VDC
C2	1010264-37	CAPACITOR	1.0	± 5%	200VDC
C3	1010264-37	CAPACITOR	1.0	± 5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431	TRANSISTOR			
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010273-2		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010886	TRANSFORMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN R. Di Leo DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible] 12-23-64
MIT APPROVAL [illegible] 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

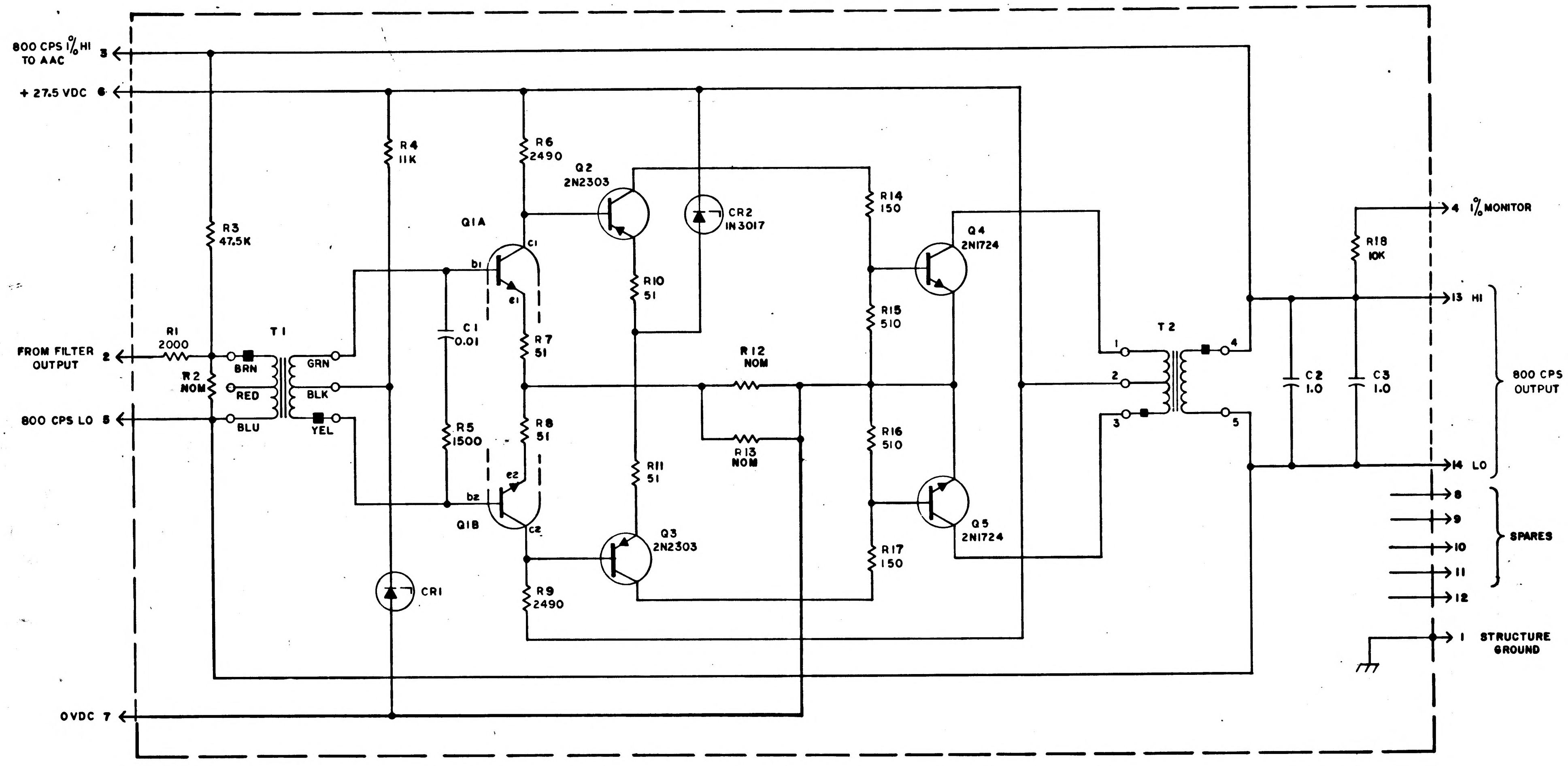
SCHEMATIC,
800CPS 1% AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010008
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16030	2/2/65	WK
B	REVISED PER TDRR 16622	2/23/65	WK
C	REVISED PER TDRR 18123	4/12/65	WK


800 CPS 1% HI TO AAC 3
+ 27.5 VDC 6
FROM FILTER OUTPUT 2
800 CPS LO 5
OVDC 7
R1 2000
R2 NOM
R3 47.5K
R4 11K
R5 1500
R6 2490
R7 51
R8 51
R9 2490
R10 51
R11 51
R12 NOM
R13 NOM
R14 150
R15 510
R16 510
R17 150
R18 10K
T1
BRN
RED
BLU
GRN
BLK
YEL
C1 0.01
Q1A
Q1B
b1
c1
e1
b2
c2
e2
Q2 2N2303
Q3 2N2303
CR1
CR2 1N3017
Q4 2N1724
Q5 2N1724
T2
1
2
3
4
5
C2 1.0
C3 1.0
4 1% MONITOR
13 HI
14 LO
800 CPS 1% OUTPUT
8
9
10
11
12
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	± 1%	1/8 W
R2	SEE NOTE 4		NOM	± 2%	1/4 W
R3	1010364-573		47.5K	± 1%	1/8 W
R4	1006750-57		11K	± 2%	1/4 W
R5	1006750-36		1500	± 2%	1/4W
R6	1010364-327		2490	± 1%	1/8W
R7	1006750-1		51	± 2%	1/4 W
R8	1006750-1		51	± 2%	1/4 W
R9	1010364-327		2490	± 1%	1/8 W
R10	1006750-1		51	± 2%	1/4 W
R11	1006750-1		51	± 2%	1/4 W
R12	SEE NOTE 4		NOM	± 1%	1/8 W
R13	SEE NOTE 4		NOM	± 1%	1/8W
R14	1006750-12		150	± 2%	1/4 W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	± 2%	1/4W
C1	1010264-13	CAPACITOR	0.01	± 5%	200VDC
C2	1010264-37	CAPACITOR	1.0	± 5%	200VDC
C3	1010264-37	CAPACITOR	1.0	± 5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431-000	TRANSISTOR			
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010273-2		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010886	TRANSFORMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

R 2		R 12		R13	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-16	220	1010364-251	1000	1010364-467	13.3K
-18	270	-255	1050	-479	15.4K
-20	330	-259	1100	-489	17.4K
-22	390	-263	1150	-501	20 K
-23	430	-267	1210	-517	24.3K
-25	510	-271	1270	-535	30.1K
-27	620	-275	1330	-559	40.2K
-29	750	-277	1370	-595	61.9K
-30	820	-281	1430	1010364-651	121 K
-32	1000	1010364-285	1500		
-34	1200				
-36	1500				
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12 & R13 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO.
CONTRACT
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 12-23-64
MIT APPROVAL 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800CPS 1% AMPLIFIER

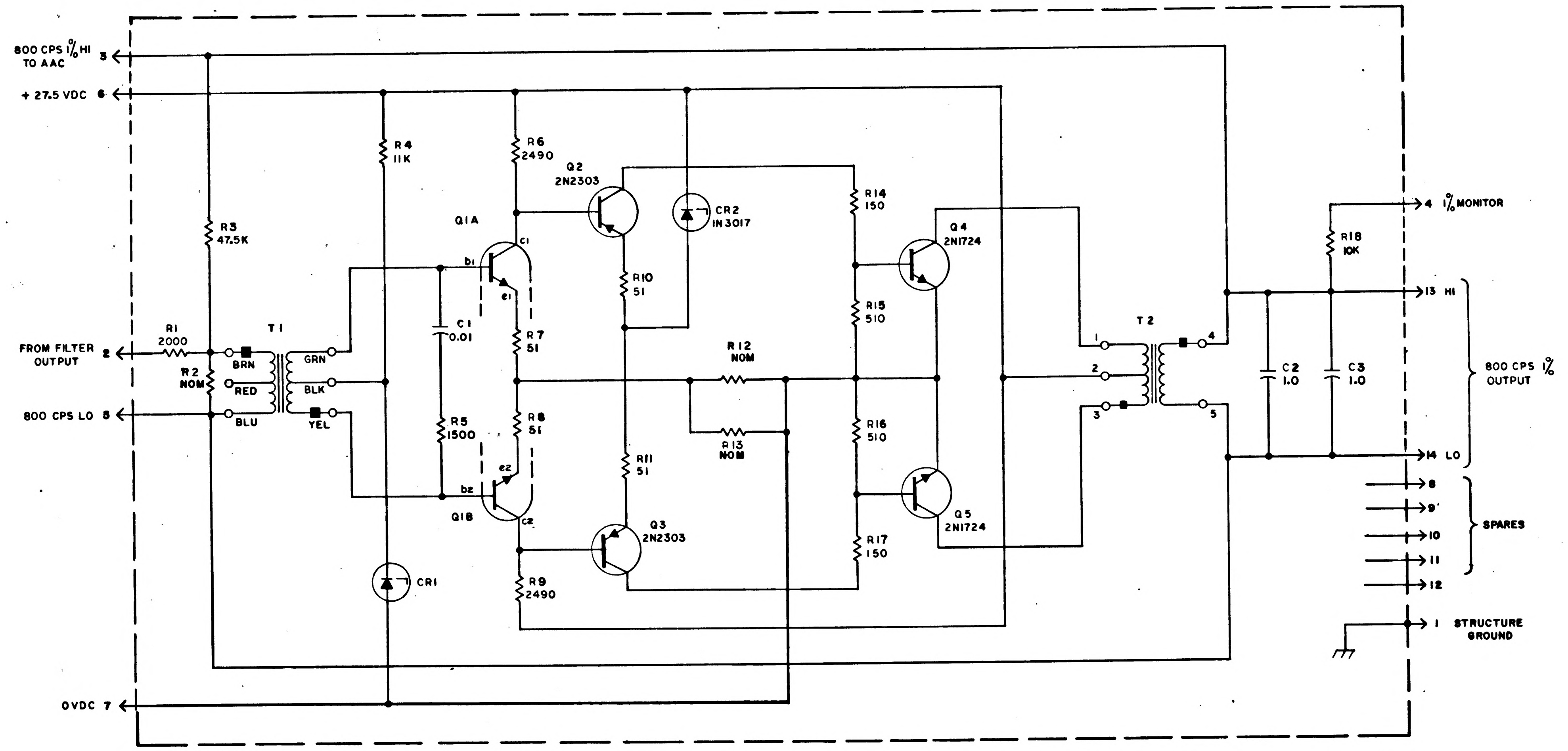
CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010008
SCALE —
WT —
SHEET 1 OF 1

2010008 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15105

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR [illegible]	[illegible]	[illegible]
B	REVISED PER TDRR 1[illegible]22		
C	REVISED PER TDRR 18123	4/12/65	
D	REVISED PER TDRR 18961		


800 CPS 1% HI TO AAC 3
+ 27.5 VDC 6
FROM FILTER OUTPUT 2
800 CPS LO 5
0VDC 7
R1 2000
R2 NOM
R3 47.5K
R4 11K
R5 1500
R6 2490
R7 51
R8 51
R9 2490
R10 51
R11 51
R12 NOM
R13 NOM
R14 150
R15 510
R16 510
R17 150
R18 10K
C1 0.01
C2 1.0
C3 1.0
CR1
CR2 1N3017
T1
BRN
RED
BLU
GRN
BLK
YEL
Q1A
Q1B
b1
c1
e1
b2
c2
e2
Q2 2N2303
Q3 2N2303
Q4 2N1724
Q5 2N1724
T2
1
2
3
4
5
4 1% MONITOR
13 HI
14 LO
800 CPS 1% OUTPUT
8
9
10
11
12
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	±1%	1/8 W
R2	SEE NOTE 4		NOM	±2%	1/4 W
R3	1010364-573		47.5K	±1%	1/8 W
R4	1006750-57		11K	±2%	1/4 W
R5	1006750-36		1500	±2%	1/4W
R6	1010364-327		2490	±1%	1/8W
R7	1006750-1		51	±2%	1/4 W
R8	1006750-1		51	±2%	1/4 W
R9	1010364-327		2490	±1%	1/8 W
R10	1006750-1		51	±2%	1/4 W
R11	1006750-1		51	±2%	1/4 W
R12	SEE NOTE 4		NOM	±1%	1/8 W
R13	SEE NOTE 4		NOM	±1%	1/8W
R14	1006750-12		150	±2%	1/4 W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-13	CAPACITOR	0.01	±5%	200VDC
C2	1010264-37	CAPACITOR	1.0	±5%	200VDC
C3	1010264-37	CAPACITOR	1.0	±5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431-000	TRANSISTOR			
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010273-2		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010886	TRANSFOFMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

R 2 PART NO.	R 2 VALUE	R 12 PART NO.	R 12 VALUE	R 13 PART NO.	R 13 VALUE
1006750-16	220	1010364-231	787	1010364-473	14.3K
-18	270	-235	825	-481	15.8K
-20	330	-239	866	-489	17.4K
-22	390	-243	909	-499	19.6K
-23	430	-247	953	-509	22.1K
-25	510	-251	1000	-521	25.5K
-27	620	-255	1050	-535	30.1K
-29	750	-259	1100	-553	37.4K
-30	820	-263	1150	-575	48.7K
-32	1000	-267	1210	-605	69.8K
-34	1200	-271	1270	-651	121K
-36	1500	1010364-275	1330	1010364 -767	487K
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12 & R13 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN R. Di Leo DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 12-23-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

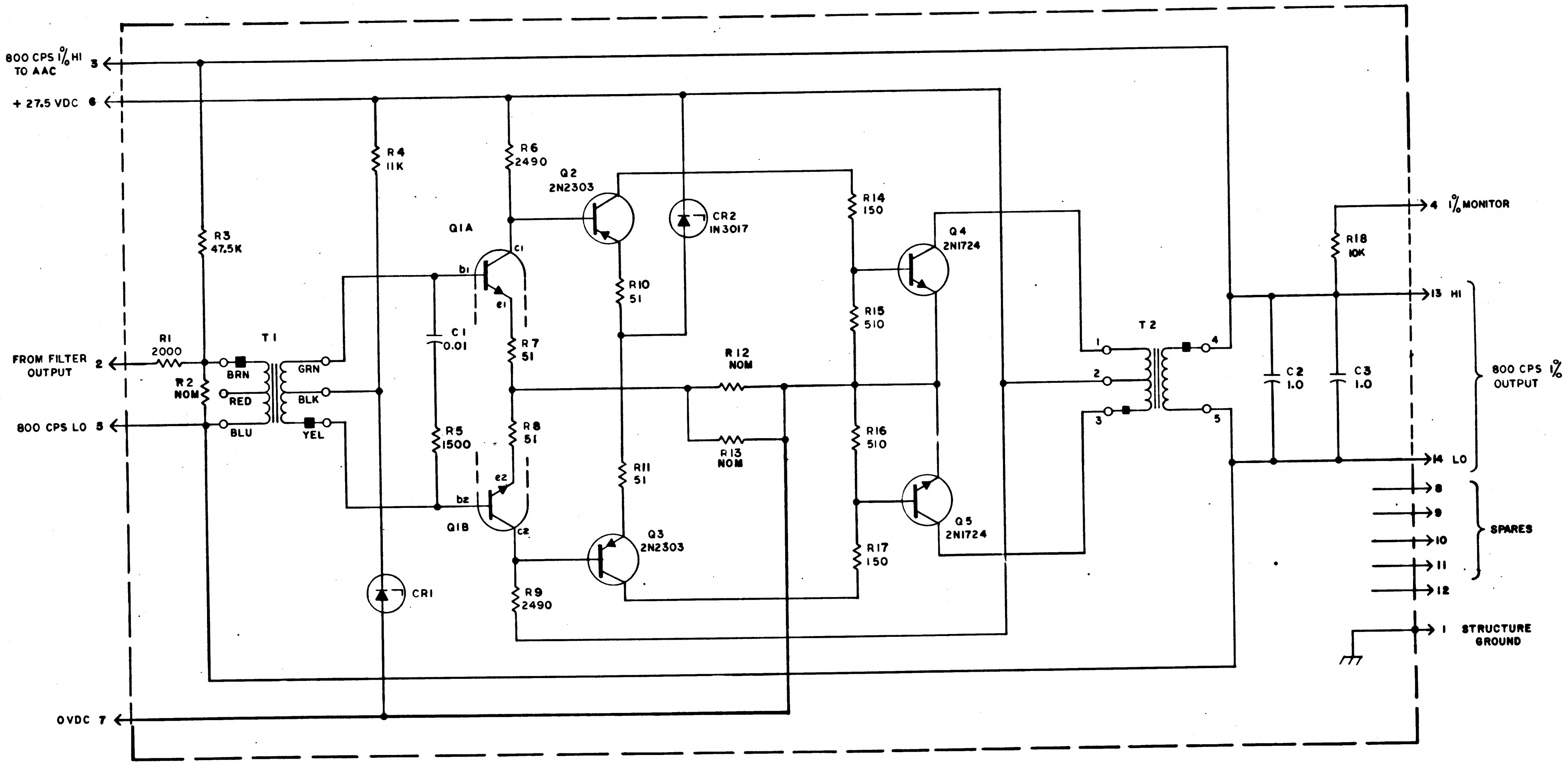
SCHEMATIC, 800CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010008
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16030	4/2/65	wk
B	REVISED PER TDRR 16622		
C	REVISED PER TDRR 18123	4/12/65	
D	REVISED PER TDRR 18961		
E	REVISED PER TDRR 20310	23 June 65	


800 CPS 1% HI TO AAC 3
+ 27.5 VDC 6
FROM FILTER OUTPUT 2
800 CPS LO 5
OVDC 7
R1 2000
R2 NOM
R3 47.5K
R4 11K
R5 1500
R6 2490
R7 51
R8 51
R9 2490
R10 51
R11 51
R12 NOM
R13 NOM
R14 150
R15 510
R16 510
R17 150
R18 10K
C1 0.01
C2 1.0
C3 1.0
CR1
CR2 1N3017
T1
BRN
RED
BLU
GRN
BLK
YEL
Q1A
Q1B
b1
c1
e1
b2
c2
e2
Q2 2N2303
Q3 2N2303
Q4 2N1724
Q5 2N1724
T2
1
2
3
4
5
4 1% MONITOR
13 HI
14 LO
800 CPS 1% OUTPUT
8
9
10
11
12
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	±1%	1/8 W
R2	SEE NOTE 4		NOM	±2%	1/4 W
R3	1010364-573		47.5K	±1%	1/8 W
R4	1006750-57		11K	±2%	1/4 W
R5	1006750-36		1500	±2%	1/4W
R6	1010364-327		2490	±1%	1/8W
R7	1006750-1		51	±2%	1/4 W
R8	1006750-1		51	±2%	1/4 W
R9	1010364-327		2490	±1%	1/8 W
R10	1006750-1		51	±2%	1/4 W
R11	1006750-1		51	±2%	1/4 W
R12	SEE NOTE 4		NOM	±1%	1/8 W
R13	SEE NOTE 4		NOM	±1%	1/8W
R14	1006750-12		150	±2%	1/4 W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-13	CAPACITOR	0.01	± 5%	200VDC
C2	1010264-37	CAPACITOR	1.0	± 5%	200VDC
C3	1010264-37	CAPACITOR	1.0	± 5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431-000	TRANSISTOR			
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010273-3		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010886	TRANSFORMER			

R 2		R 12		R 13	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-16	220	1010364-231	787	1010364-473	14.3K
-18	270	-235	825	-481	15.8K
-20	330	-239	866	-489	17.4K
-22	390	-243	909	-499	19.6K
-23	430	-247	953	-509	22.1K
-25	510	-251	1000	-521	25.5K
-27	620	-255	1050	-535	30.1K
-29	750	-259	1100	-553	37.4K
-30	820	-263	1150	-575	48.7K
-32	1000	-267	1210	-605	69.8K
-34	1200	-271	1270	-651	121K
-36	1500	1010364-275	1330	1010364 - 767	487K
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12 & R13 PER APPLICABLE PS FROM APPROPRIATE CHART

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

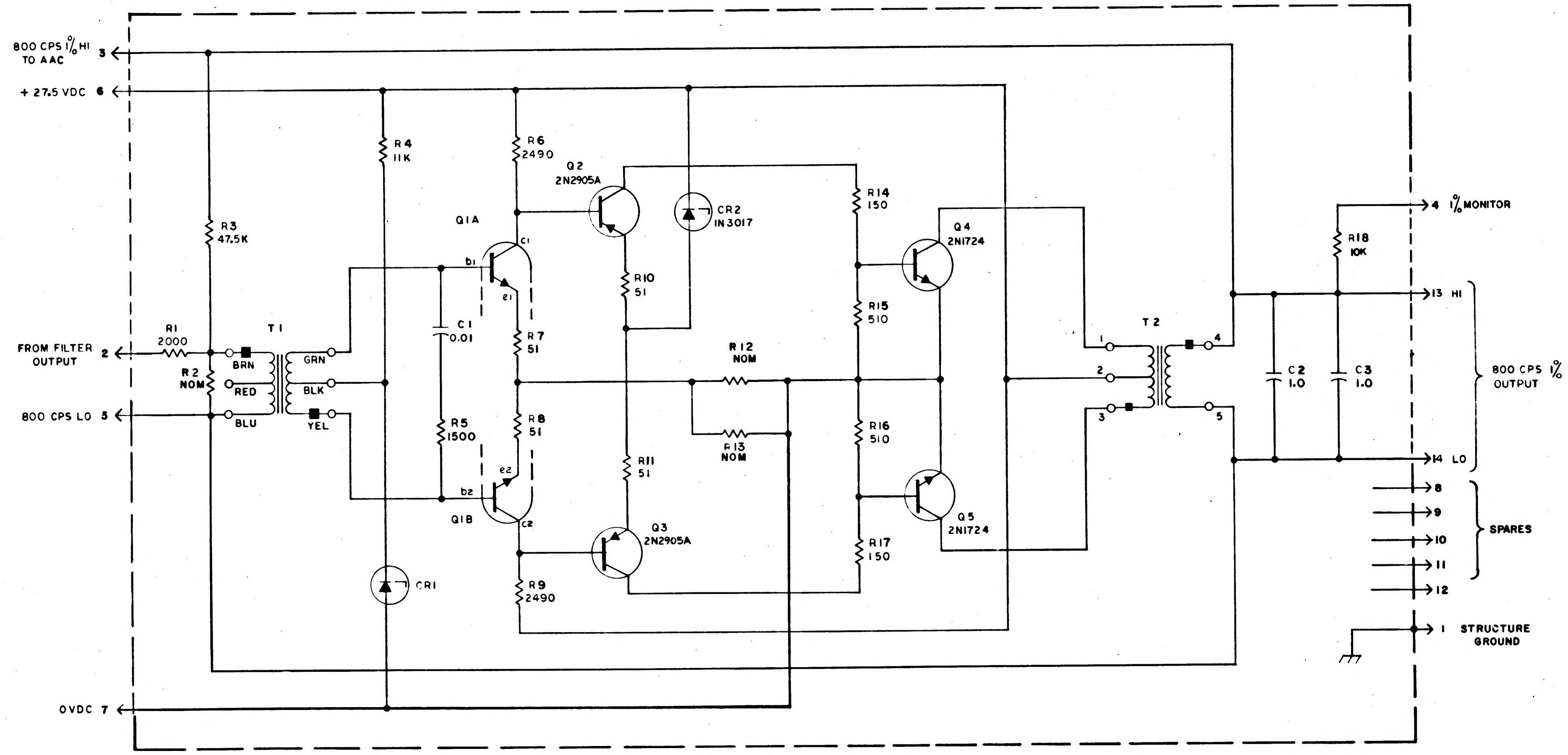
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010008
SCALE — WT — SHEET 1 OF 1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16030	2/4/65	
B	REVISED PER TDRR 16622	2/23/65	
C	REVISED PER TDRR 18123	4/12/65	
D	REVISED PER TDRR 18961		
E	REVISED PER TDRR 20310	23 June 65	
F	REVISED PER TDRR 27493		


800 CPS 1% HI
TO AAC
3
+ 27.5 VDC
6
FROM FILTER
OUTPUT
2
800 CPS LO
5
0VDC
7
R1
2000
R2
NOM
R3
47.5K
R4
11K
R5
1500
R6
2490
R7
51
R8
51
R9
2490
R10
51
R11
51
R12
NOM
R13
NOM
R14
150
R15
510
R16
510
R17
150
R18
10K
T1
BRN
RED
BLU
GRN
BLK
YEL
C1
0.01
Q1A
Q1B
b1
c1
e1
b2
c2
e2
Q2
2N2905A
Q3
2N2905A
Q4
2N1724
Q5
2N1724
CR1
CR2
1N3017
T2
1
2
3
4
5
C2
1.0
C3
1.0
4
1% MONITOR
13
HI
800 CPS 1%
OUTPUT
14
LO
8
9
10
11
12
SPARES
1
STRUCTURE
GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	±1%	1/8 W
R2	SEE NOTE 4		NOM	±2%	1/4 W
R3	1010364-573		47.5K	±1%	1/8 W
R4	1006750-57		11K	±2%	1/4 W
R5	1006750-36		1500	±2%	1/4W
R6	1010364-327		2490	±1%	1/8W
R7	1006750-1		51	±2%	1/4 W
R8	1006750-1		51	±2%	1/4 W
R9	1010364-327		2490	±1%	1/8 W
R10	1006750-1		51	±2%	1/4 W
R11	1006750-1		51	±2%	1/4 W
R12	SEE NOTE 4		NOM	±1%	1/8 W
R13	SEE NOTE 4		NOM	±1%	1/8W
R14	1006750-12		150	±2%	1/4W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-13	CAPACITOR	0.01	±5%	200VDC
C2	1010264-37	CAPACITOR	1.0	±5%	200VDC
C3	1010264-37	CAPACITOR	1.0	±5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431-000	TRANSISTOR			
Q2	1008813-3		2N2905A		
Q3			2N2905A		
Q4	1010273-3		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010856	TRANSFORMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

R 2		R 12		R 13	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-16	220	1010364-231	787	1010364-473	14.3K
-18	270	-235	825	-481	15.8K
-20	330	-239	866	-489	17.4K
-22	390	-243	909	-499	19.6K
-23	430	-247	953	-509	22.1K
-25	510	-251	1000	-521	25.5K
-27	620	-255	1050	-535	30.1K
-29	750	-259	1100	-553	37.4K
-30	820	-263	1150	-575	48.7K
-32	1000	-267	1210	-605	69.8K
-34	1200	-271	1270	-651	121K
-36	1500	1010364-275	1330	1010364-767	487K
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12 & R13 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN R. D. Lee DATE 11 MAR
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

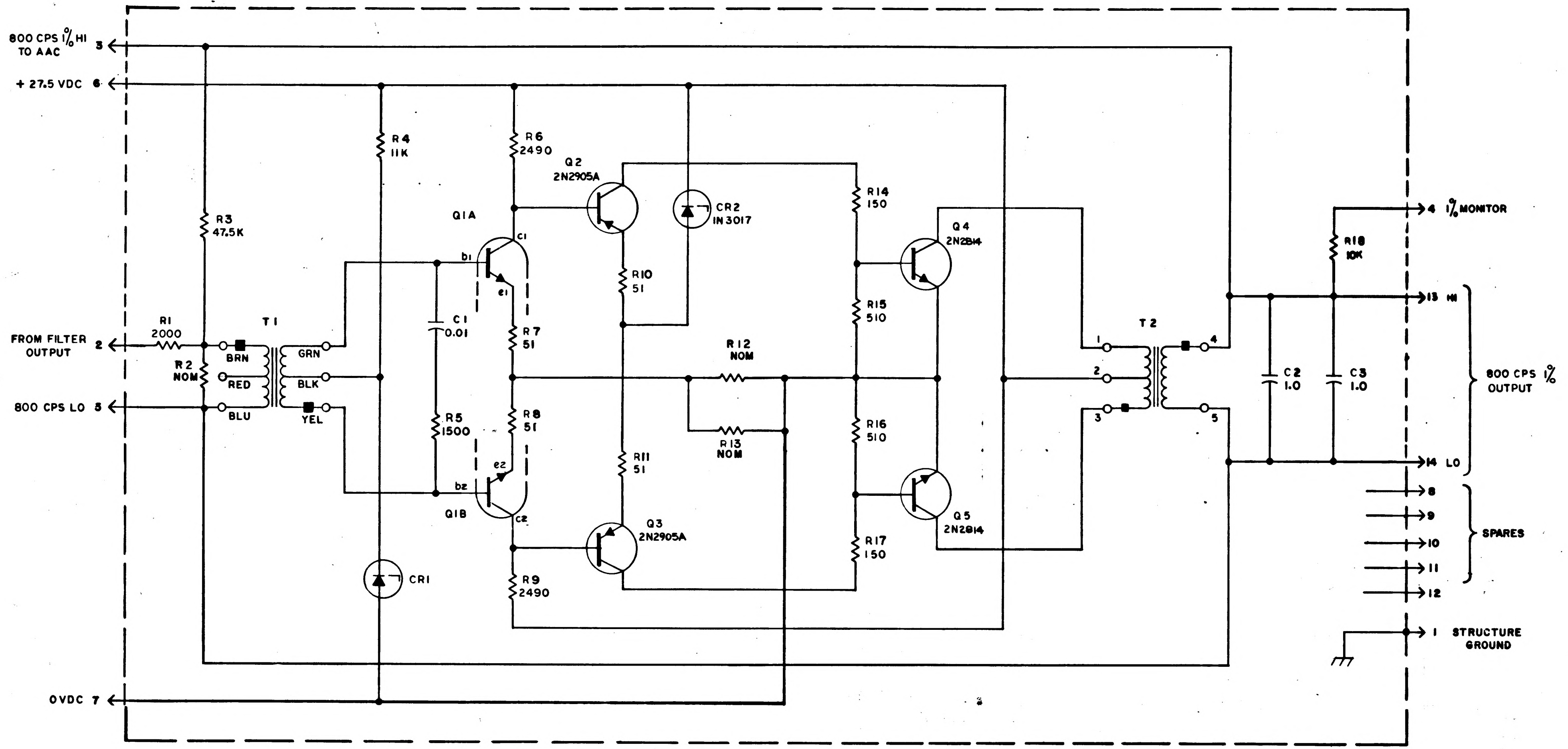
SCHEMATIC,
800CPS 1% AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010008
SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16030	2/2/65	wk
B	REVISED PER TDRR 16622	7/65	wk
C	REVISED PER TDRR 18123	4/12/65	wk
D	REVISED PER TDRR 18961		wk
E	REVISED PER TDRR 20310	23 June 65	wk
F	REVISED PER TDRR 27493		JFC
G	REVISED PER TDRR 32401	B.AN	


800 CPS 1% HI TO AAC 3
+ 27.5 VDC 6
FROM FILTER OUTPUT 2
800 CPS LO 5
0VDC 7
R1 2000
R2 NOM
R3 47.5K
R4 11K
R5 1500
R6 2490
R7 51
R8 51
R9 2490
R10 51
R11 51
R12 NOM
R13 NOM
R14 150
R15 510
R16 510
R17 150
R18 10K
C1 0.01
C2 1.0
C3 1.0
CR1
CR2 IN3017
T1
BRN
RED
BLU
GRN
BLK
YEL
Q1A
Q1B
b1
c1
e1
b2
c2
e2
Q2 2N2905A
Q3 2N2905A
Q4 2N2814
Q5 2N2814
T2
1
2
3
4
5
4 1% MONITOR
13 HI
14 LO
800 CPS 1% OUTPUT
8
9
10
11
12
SPARES
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALJE	TOL	RATING
R1	1010364-309	RESISTOR	2000	±1%	1/8W
R2	SEE NOTE 4		NOM	±2%	1/4W
R3	1010364-573		47.5K	±1%	1/8W
R4	1006750-57		11K	±2%	1/4W
R5	1006750-36		1500	±2%	1/4W
R6	1010364-327		2490	±1%	1/8W
R7	1006750-1		51	±2%	1/4W
R8	1006750-1		51	±2%	1/4W
R9	1010364-327		2490	±1%	1/8W
R10	1006750-1		51	±2%	1/4W
R11	1006750-1		51	±2%	1/4W
R12	SEE NOTE 4		NOM	±1%	1/8W
R13	SEE NOTE 4		NOM	±1%	1/8W
R14	1006750-12		150	±2%	1/4W
R15	-25		510		
R16	-25		510		
R17	-12		150		
R18	1006750-56	RESISTOR	10K	±2%	1/4W
C1	1010264-13	CAPACITOR	0.01	±5%	200VDC
C2	1010264-37	CAPACITOR	1.0	±5%	200VDC
C3	1010264-37	CAPACITOR	1.0	±5%	200VDC
CR1	1010372-15	DIODE	7.5 V		200MW
CR2	1010829-2	DIODE	7.5 V		1WATT
Q1	1010431-000	TRANSISTOR			
Q2	1008813-3		2N2905A		
Q3			2N2905A		
Q4	1008922-2		2N2814		
Q5		TRANSISTOR	2N2814		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010886	TRANSFORMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO. 2007110

R 2		R 12		R13	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1006750-16	220	1010364-231	787	1010364-473	14.3K
-18	270	-235	825	-481	15.8K
-20	330	-239	866	-489	17.4K
-22	390	-243	909	-499	19.6K
-23	430	-247	953	-509	22.1K
-25	510	-251	1000	-521	25.5K
-27	620	-255	1050	-535	30.1K
-29	750	-259	1100	-553	37.4K
-30	820	-263	1150	-575	48.7K
-32	1000	-267	1210	-605	69.8K
-34	1200	-271	1270	-651	121K
-36	1500	1010364-275	1330	1010364 -767	487K
-38	1800				
-41	2400				
-44	3300				
-49	5100				
-56	10K				
1006750-84	150K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R2, R12&R13 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN A. Di Leo DATE
CHECKED
APPROVAL F. G. Martinez 22 Feb 64
APPROVAL 29 Jan
NASA APPROVAL 2-23-64
MIT APPROVAL 23 Dec 64

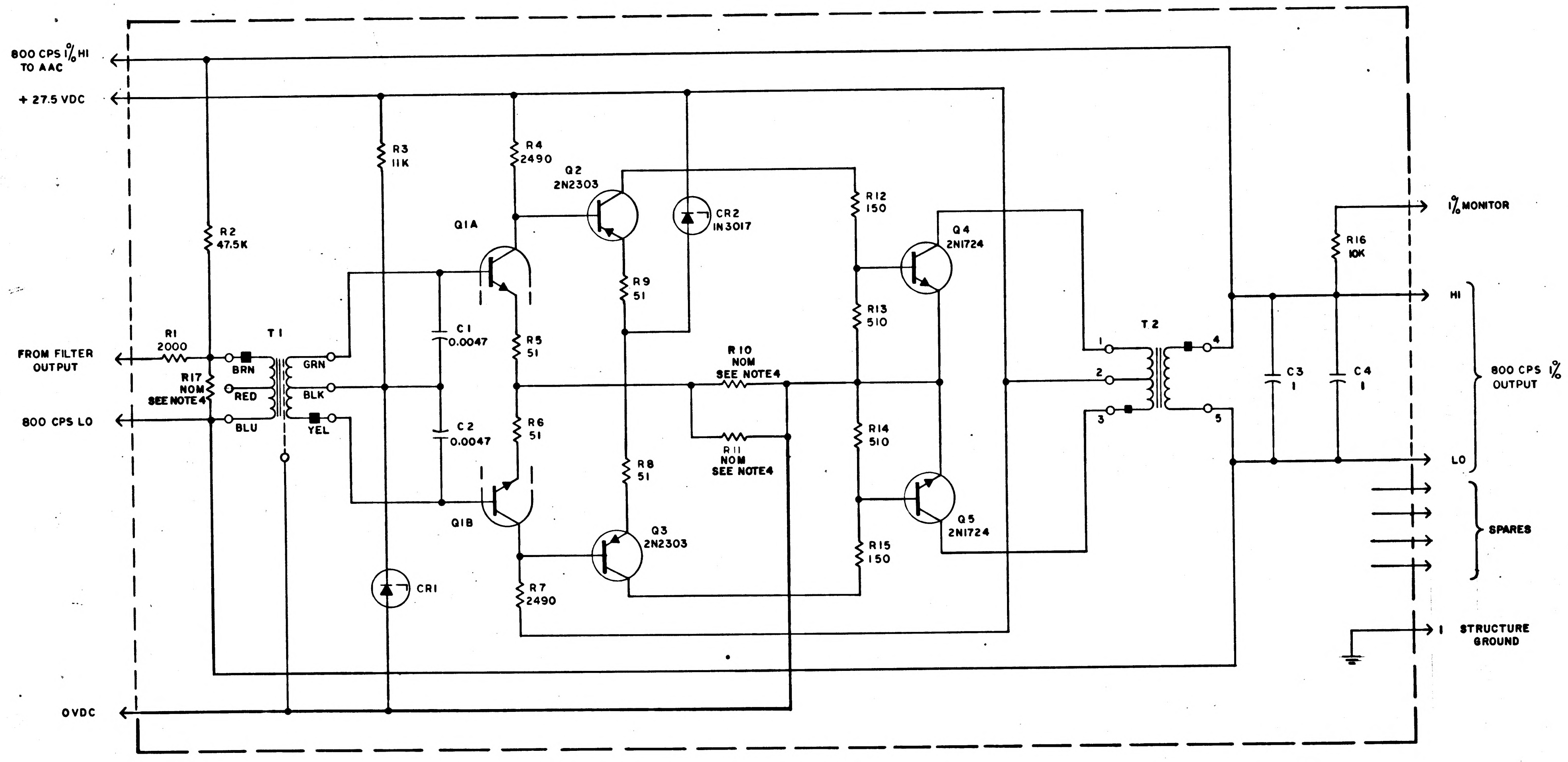
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800CPS 1% AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010008
SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


800 CPS 1% HI
TO AAC
+ 27.5 VDC
FROM FILTER OUTPUT
800 CPS LO
OVDC
R1
2000
R17
NOM
SEE NOTE 4
R2
47.5K
R3
11K
T1
BRN
RED
BLU
GRN
BLK
YEL
Q1A
Q1B
C1
0.0047
C2
0.0047
R4
2490
R5
51
R6
51
R7
2490
Q2
2N2303
Q3
2N2303
R8
51
R9
51
CR1
CR2
1N3017
R10
NOM
SEE NOTE4
R11
NOM
SEE NOTE4
R12
150
R13
510
R14
510
R15
150
Q4
2N1724
Q5
2N1724
T2
1
2
3
4
5
C3
1
C4
1
R16
10K
1% MONITOR
HI
LO
800 CPS 1%
OUTPUT
SPARES
1
STRUCTURE
GROUND

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 15108 DATE

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-309	RESISTOR	2000	± 1%	1/8 W
R2	1010364-573		47.5K	± 1%	1/8 W
R3	1006750-57		11 K	± 2%	1/4 W
R4	1010364-327		2490	± 1%	1/8 W
R5	1006750-1		51	± 2%	1/4W
R6	1006750-1		51	± 2%	1/4W
R7	1010364-327		2490	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	SEE NOTE 4			± 1%	1/8 W
R11	SEE NOTE 4			± 1%	1/8 W
R12	1006750-12		150	± 2%	1/4 W
R13	-25		510		
R14	-25		510		
R15	-12		150		
R16	1006750-56		10K		
R17	SEE NOTE 4	RESISTOR		± 2%	1/4W
C1	1010264-9	CAPACITOR	0.0047	± 5 %	200VDC
C2	1010264-9	CAPACITOR	0.0047	± 5	200VDC
C3	1010264-37	CAPACITOR	1	± 5	200VDC
C4	1010264-37	CAPACITOR	1	± 5	200VDC
CR1	1010372-15	DIODE			200MW
CR2	1010265-2	DIODE	1N3017		1WATT
Q1	1010431	TRANSISTOR			
Q2	1010345-2		2N2303		
Q3			2N2303		
Q4	1010273-2		2N1724		
Q5		TRANSISTOR	2N1724		
T1	1010880	TRANSFORMER	DOT 47		
T2	1010307	TRANSFORMER			

REF DWG:
800 CPS 1% AMPLIFIER ASSY
DWG NO.

R10		R11		R17	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010364-		1010364-325	2430	1006750	
		-329	2550		
		-337	2800		
		-343	3010		
		-351	3320		
		-355	3480		
		-361	3740		
		-367	4020		
		-371	4220		
		-375	4420		
		-377	4530		
		-381	4750		
		-385	4990		
		-387	5110		
		-391	5360		
		-395	5620		
		-399	5900		
		-403	6190		
		-405	6340		
		1010364-409	6650		

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. SELECT R10, R11 & R17 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT

DRAWN Q. Di Leo DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 12-23-69
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
800CPS 1% AMPLIFIER

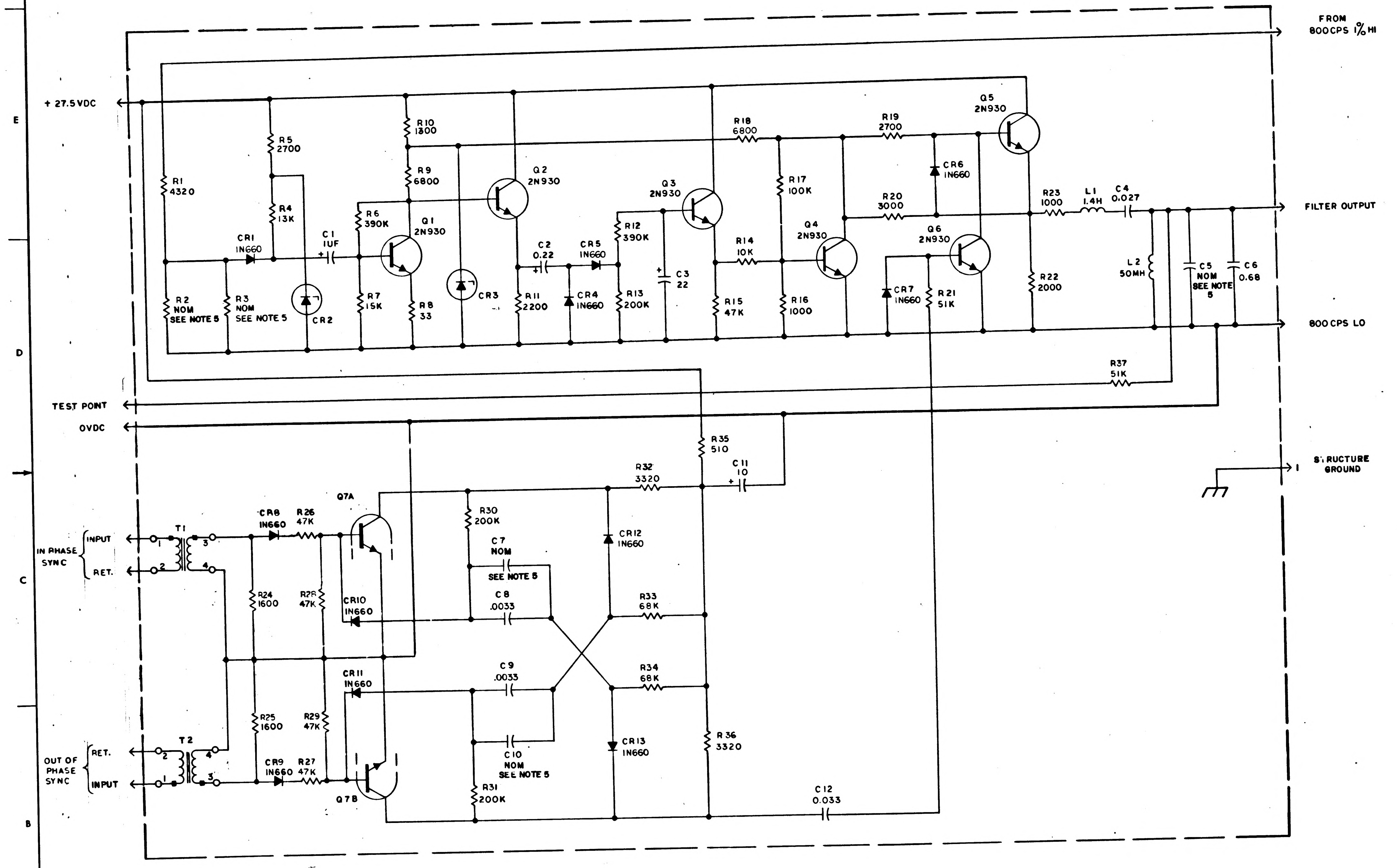
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010008
SCALE — WT — SHEET 1 OF 1

2010008

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

W

REVISIONS 15108			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16029	2/2/65	wk


FROM 800CPS 1% HI
+ 27.5VDC
R1 4320
R2 NOM SEE NOTE 5
R3 NOM SEE NOTE 5
CR1 1N660
R5 2700
R4 13K
CR2
C1 1UF
R6 390K
R7 15K
Q1 2N930
R8 33
R10 1300
R9 6800
CR3
Q2 2N930
C2 0.22
R11 2200
CR5 1N660
CR4 1N660
R12 390K
R13 200K
C3 22
Q3 2N930
R14 10K
R15 47K
R18 6800
R17 100K
R16 1000
Q4 2N930
R19 2700
R20 3000
CR6 1N660
Q5 2N930
Q6 2N930
CR7 1N660
R21 51K
R22 2000
R23 1000
L1 1.4H
C4 0.027
L2 50MH
C5 NOM SEE NOTE 5
C6 0.68
FILTER OUTPUT
800 CPS LO
R37 51K
TEST POINT
OVDC
R35 510
R32 3320
C11 10
STRUCTURE GROUND
IN PHASE SYNC
INPUT
RET.
T1
1 2 3 4
CR8 1N660
R26 47K
Q7A
R30 200K
C7 NOM SEE NOTE 5
C8 .0033
CR12 1N660
R24 1600
R28 47K
CR10 1N660
R33 68K
C9 .0033
CR11 1N660
R34 68K
R25 1600
R29 47K
CR13 1N660
R36 3320
OUT OF PHASE SYNC
RET.
INPUT
T2
CR9 1N660
R27 47K
C10 NOM SEE NOTE 5
R31 200K
Q7B
C12 0.033

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363-373	RESISTOR	4320	±1%	1/4 W
R2	SEE NOTE 5		NOM	±1%	1/8 W
R3	SEE NOTE 5		NOM	±1%	1/8 W
R4	1010364-465		13K	±1%	1/8 W
R5	1006750-42		2700	±2%	1/4 W
R6	1010369-95		390K	±5%	1/8 W
R7	1006750-60		15K	±2%	1/4 W
R8	1010369-140		33	±5%	1/8 W
R9	1006750-52		6800	±2%	1/4 W
R10	1006760-35		1300	±2	1/2 W
R11	1006750-40		2200	±2	1/4 W
R12	1010369-95		390K	±5%	1/8W
R13	1010369-88		200K	±5%	1/8W
R14	1006750-56		10K	±2%	1/4W
R15	-72		47K		
R16	-32		1000		
R17	-80		100K		
R18	-52		6800		
R19	-42		2700		
R20	-43		3000		
R21	-73		51K		
R22	-39		2000		
R23	-32		1000		
R24	-37		1600		
R25	-37		1600		
R26	-72		47K		
R27	-72		47K		
R28	↓ -72		47K	↓	↓
R29	1006750-72		47K	±2%	1/4W
R30	1010364-693		200K	±1%	1/8W
R31	1010364-693		200K	±1%	1/8W
R32	1010364-351		3320	±1%	1/8W
R33	1006750-76		68K	±2%	1/4W
R34	1006750-76		68K	±2%	1/4W
R35	1010389-49		510	±1%	3W
R36	1010364-351	↓	3320	±1%	1/8W
R37	1006750-73	RESISTOR	51K	±2%	1/4W
C1	1006755-69	CAPACITOR	1.0	±10%	35V
C2	1006755-61		0.22	±10%	35V
C3	1006755-85		22	±10%	35V
C4	1010375-18		0.027	±10%	50V
C5	SEE NOTE 5		NOM	± 5%	200V
C6	1010264-35		0.68		200VDC
C7	SEE NOTE 5		NOM		200V
C8	1010264-7		0.0033		200V
C9	1010264-7		0.0033	↓	200V
C10	SEE NOTE 5		NOM	± 5%	200V
C11	1006755-81	↓	10	±10%	35V
C12	1010375-19	CAPACITOR	0.033	±10%	50V
CR1	1010385	DIODE	1N660		
CR2	1010346-1		17V		250MW
CR3	1010829-11		18V		1W
CR4	1010385		1N660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12	↓	↓	↓		
CR13	1010385	DIODE	1N660		
Q1	1010397-1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5	↓		↓		
Q6	1010397-1	↓	2N930		
Q7	1010431	TRANSISTOR	2N2920		
T1	1006319	TRANSFORMER			
T2	1006319	TRANSFORMER			
L1	1010277-004	REACTOR	1.4H		
L2	1010427	REACTOR, FIL	50MH		

REF DWG:
AAC FILTER & MULTIVIBRATOR 800 CPS ASSY
DWG NO. 2007112

R2		R3		C5		C7, C10	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010364-309	2000	1010364-577	49.9K	1010264-20	.039	1010264-1	.001
-327	2490	-585	54.9K	-21	.047	-2	.0012
-343	3010	-595	61.9K	-22	.056	-3	.0015
-355	3480	-607	71.5K	-23	.068	-4	.0018
-367	4020	-619	82.5K	-24	.082	-5	.0022
-377	4530	-653	124K	-25	.100	-6	.0027
-385	4990	-679	169K	↓ -26	.120	-7	.0033
-393	5490	↓ -711	249K	1010264-27	.150	↓ -8	.0039
-399	5900	1010364-769	499K			1010264-9	.0047
-407	6490						
-413	6980						
↓ -419	7500						
1010364-425	8060						

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. CONNECT 800 CPS LO TO OVDC AT ONE POINT ONLY AS SHOWN
5. SELECT R2, R3, C5, C7 & C10 PER ATP FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN G. D. Lee DATE [illegible] 64
CHECKED [illegible]
APPROVAL [illegible] 22 Dec 64
APPROVAL [illegible]
NASA APPROVAL [illegible] 12-23-64
MIT APPROVAL [illegible] 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
AAC, FILTER &
MULTIVIBRATOR 800 CPS

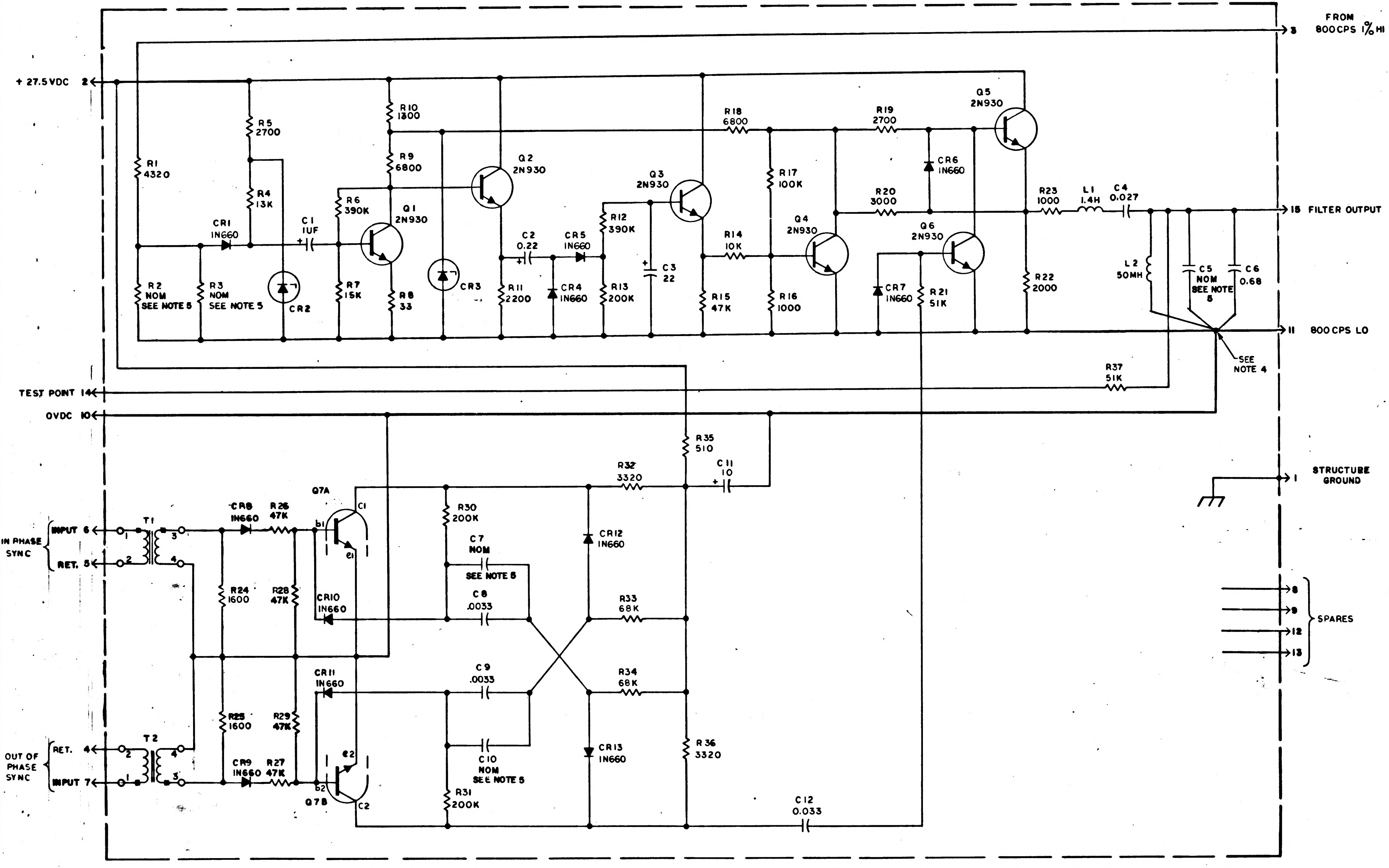
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010009
SCALE —
WT —
SHEET 1 OF 1

2010009 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

W

REVISIONS 15108			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16029	7/12/65	WK
B	REVISED PER TDRR 18088		WK


+ 27.5 VDC 2
FROM 800 CPS 1% HI 3
R1 4320
R2 NOM SEE NOTE 5
R3 NOM SEE NOTE 5
R5 2700
R4 13K
CR1 1N660
CR2
C1 1UF
R6 390K
R7 15K
Q1 2N930
R8 33
R10 1300
R9 6800
Q2 2N930
CR3
C2 0.22
CR5 1N660
CR4 1N660
R11 2200
R12 390K
R13 200K
C3 22
Q3 2N930
R14 10K
R15 47K
R18 6800
R17 100K
R16 1000
Q4 2N930
R19 2700
CR6 1N660
R20 3000
Q5 2N930
Q6 2N930
CR7 1N660
R21 51K
R22 2000
R23 1000
L1 1.4H
C4 0.027
15 FILTER OUTPUT
L2 50MH
C5 NOM SEE NOTE 5
C6 0.68
11 800 CPS LO
SEE NOTE 4
R37 51K
TEST POINT 14
0VDC 10
R35 510
C11 10
R32 3320
STRUCTURE GROUND 1
IN PHASE SYNC
INPUT 6
RET. 5
T1
CR8 1N660
R26 47K
Q7A
b1
c1
e1
R24 1600
R28 47K
CR10 1N660
R30 200K
C7 NOM SEE NOTE 5
C8 .0033
CR12 1N660
R33 68K
SPARES 8 9 12 13
CR11 1N660
C9 .0033
R34 68K
R25 1600
R29 47K
CR13 1N660
R36 3320
OUT OF PHASE SYNC
RET. 4
INPUT 7
T2
CR9 1N660
R27 47K
b2
e2
c2
Q7B
C10 NOM SEE NOTE 5
R31 200K
C12 0.033

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363-373	RESISTOR	4320	±1%	1/4 W
R2	SEE NOTE 5		NOM	±1%	1/8 W
R3	SEE NOTE 5		NOM	±1%	1/8 W
R4	1010364-465		13K	±1%	1/8 W
R5	1006750-42		2700	±2%	1/4 W
R6	1010369-95		390K	±5%	1/8 W
R7	1006750-60		15K	±2%	1/4 W
R8	1010369-140		33	±5%	1/8 W
R9	1006750-52		6800	±2%	1/4 W
R10	1006760-35		1300	±2	1/2 W
R11	1006750-40		2200	±2	1/4 W
R12	1010369-95		390K	±5%	1/8 W
R13	1010369-88		200K	±5%	1/8 W
R14	1006750-56		10K	±2%	1/4 W
R15	-72		47K		
R16	-32		1000		
R17	-80		100K		
R18	-52		6800		
R19	-42		2700		
R20	-43		3000		
R21	-73		51K		
R22	-39		2000		
R23	-32		1000		
R24	-37		1600		
R25	-37		1600		
R26	-72		47K		
R27	-72		47K		
R28	-72		47K		
R29	1006750-72		47K	±2%	1/4W
R30	1010364-693		200K	±1%	1/8W
R31	1010364-693		200K	±1%	1/8W
R32	1010364-351		3320	±1%	1/8W
R33	1006750-76		68K	±2%	1/4W
R34	1006750-76		68K	±2%	1/4W
R35	1010389-49		510	±1%	3W
R36	1010364-351		3320	±1%	1/8W
R37	1006750-73	RESISTOR	51K	±2%	1/4W
C1	1006755-69	CAPACITOR	1.0	±10%	35V
C2	1006755-61		0.22	±10%	35V
C3	1006755-85		22	±10%	35V
C4	1010375-18		0.027	±10%	50V
C5	SEE NOTE 5		NOM	± 5%	200V
C6	1010264-35		0.68		200VDC
C7	SEE NOTE 5		NOM		200V
C8	1010264-7		0.0033		200V
C9	1010264-7		0.0033		200V
C10	SEE NOTE 5		NOM	± 5%	200V
C11	1006755-81		10	±10%	35V
C12	1010375-19	CAPACITOR	0.033	±10%	50V
CR1	1010385	DIODE	1N660		
CR2	1010346-1		17V		250MW
CR3	1010829-11		18V		1W
CR4	1010385		1N660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385	DIODE	1N660		
Q1	1010397-1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397-1		2N930		
Q7	1010431-000	TRANSISTOR	2N2920		
T1	1006319	TRANSFORMER			
T2	1006319	TRANSFORMER			
L1	1010277-4	REACTOR	1.4H		
L2	1010427	REACTOR, FIL	50MH		

REF DWG:
AAC FILTER & MULTIVIBRATOR 800 CPS ASSY
DWG NO. 2007112

R2		R3		C5		C7, C10	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010364-309	2000	1010364-577	49.9K	1010264-20	.039	1010264-1	.001
-327	2490	-585	54.9K	-21	.047	-2	.0012
-343	3010	-595	61.9K	-22	.056	-3	.0015
-355	3480	-607	71.5K	-23	.068	-4	.0018
-367	4020	-619	82.5K	-24	.082	-5	.0022
-377	4530	-653	124K	-25	.100	-6	.0027
-385	4990	-679	169K	-26	.120	-7	.0033
-393	5490	-711	249K	1010264-27	.150	-8	.0039
-399	5900	1010364-769	499K			1010264-9	.0047
-407	6490						
-413	6980						
-419	7500						
1010364-425	8060						

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. CONNECT 800 CPS LO TO 0VDC AT ONE POINT ONLY AS SHOWN
5. SELECT R2, R3, C5, C7 & C10 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN DATE
CHECKED
APPROVAL 22 Dec.
APPROVAL
NASA APPROVAL 12-23-64
MIT APPROVAL 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

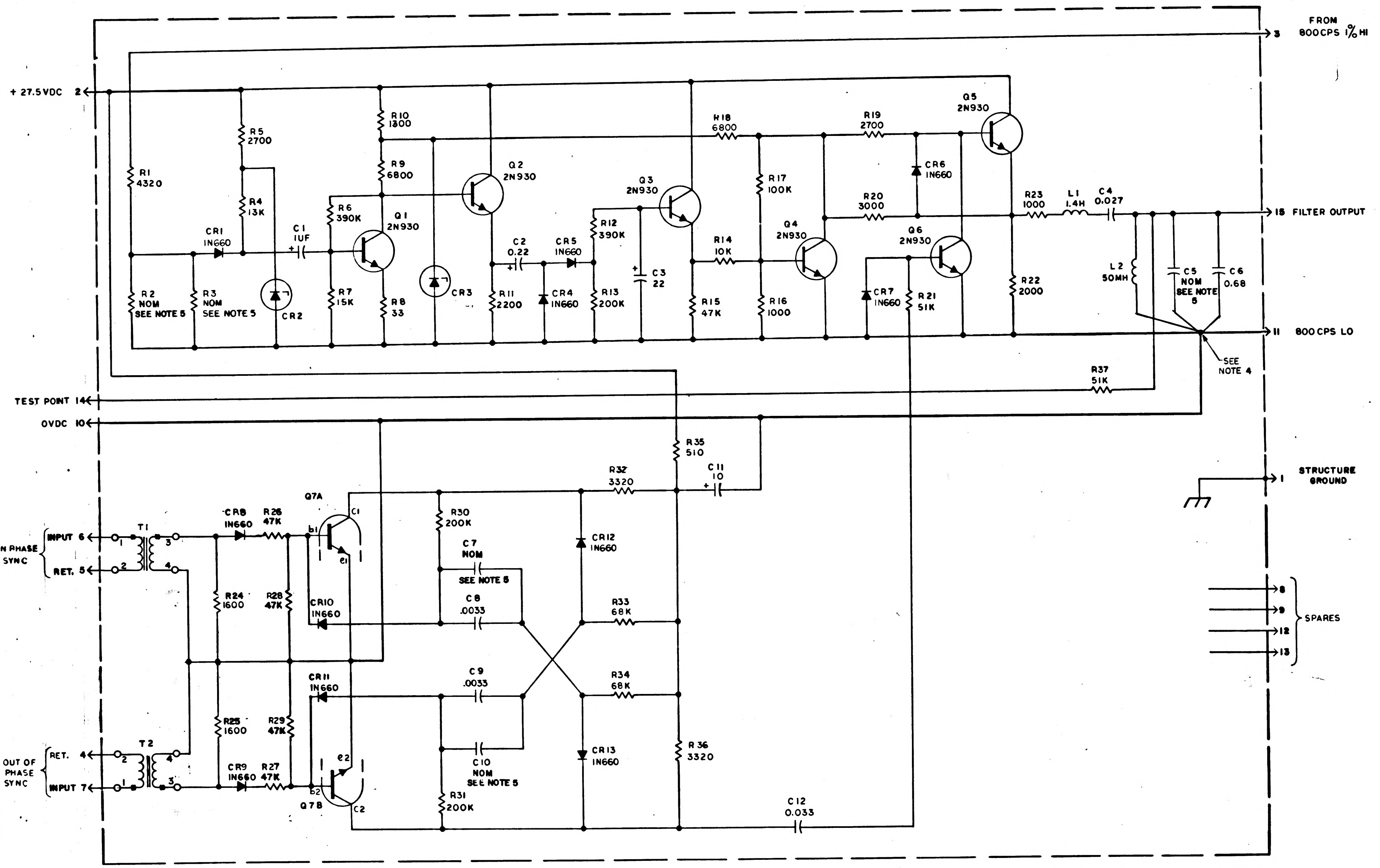
SCHEMATIC, AAC, FILTER & MULTIVIBRATOR 800 CPS

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010009
SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16029	7/2/65	wk
B	REVISED PER TDRR 18088		WK
C	REVISED PER TDRR 19817	4 JUN 65	


+ 27.5VDC 2
FROM 800CPS 1% HI 3
15 FILTER OUTPUT
11 800CPS LO
SEE NOTE 4
TEST POINT 14
0VDC 10
STRUCTURE GROUND 1
SPARES 8 9 12 13
IN PHASE SYNC
INPUT 6
RET. 5
OUT OF PHASE SYNC
RET. 4
INPUT 7
T1
T2
R1 4320
R2 NOM SEE NOTE 5
R3 NOM SEE NOTE 5
R4 13K
R5 2700
CR1 1N660
CR2
C1 1UF
R6 390K
R7 15K
Q1 2N930
R8 33
R9 6800
R10 1300
Q2 2N930
CR3
R11 2200
C2 0.22
CR4 1N660
CR5 1N660
R12 390K
R13 200K
C3 22
Q3 2N930
R14 10K
R15 47K
R16 1000
R17 100K
R18 6800
Q4 2N930
R19 2700
R20 3000
CR6 1N660
CR7 1N660
R21 51K
Q6 2N930
Q5 2N930
R22 2000
R23 1000
L1 1.4H
C4 0.027
L2 50MH
C5 NOM SEE NOTE 5
C6 0.68
R37 51K
R35 510
C11 10
R32 3320
Q7A
b1 c1 e1
CR8 1N660
R26 47K
R24 1600
R28 47K
CR10 1N660
R30 200K
C7 NOM SEE NOTE 5
C8 .0033
CR12 1N660
R33 68K
C9 .0033
CR11 1N660
R34 68K
CR13 1N660
R25 1600
R29 47K
CR9 1N660
R27 47K
Q7B
b2 c2 e2
C10 NOM SEE NOTE 5
R31 200K
R36 3320
C12 0.033

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363-373	RESISTOR	4320	±1%	1/4 W
R2	SEE NOTE 5		NOM	±1%	1/8 W
R3	SEE NOTE 5		NOM	±1%	1/8 W
R4	1010364-465		13K	±1%	1/8W
R5	1006750-42		2700	±2%	1/4 W
R6	1010369-95		390K	±5%	1/8 W
R7	1006750-60		15K	±2%	1/4 W
R8	1010369-140		33	±5%	1/8 W
R9	1006750-52		6800	±2%	1/4 W
R10	1006760-35		1300	±2	1/2 W
R11	1006750-40		2200	±2	1/4W
R12	1010369-95		390K	±5%	1/8W
R13	1010369-88		200K	±5%	1/8W
R14	1006750-56		10K	±2%	1/4W
R15	-72		47K		
R16	-32		1000		
R17	-80		100K		
R18	-52		6800		
R19	-42		2700		
R20	-43		3000		
R21	-73		51K		
R22	-39		2000		
R23	-32		1000		
R24	-37		1600		
R25	-37		1600		
R26	-72		47K		
R27	-72		47K		
R28	-72		47K		
R29	1006750-72		47K	±2%	1/4W
R30	1010364-693		200K	±1%	1/8W
R31	1010364-693		200K	±1%	1/8W
R32	1010364-351		3320	±1%	1/8W
R33	1006750-76		68K	±2%	1/4W
R34	1006750-76		68K	±2%	1/4W
R35	1010389-49		510	±1%	3W
R36	1010364-351		3320	±1%	1/8W
R37	1006750-73	RESISTOR	51K	±2%	1/4W
C1	1006755-69	CAPACITOR	1.0	±10%	35V
C2	1006755-61		0.22	±10%	35V
C3	1006755-85		22	±10%	35V
C4	1010375-18		0.027	±10%	50V
C5	SEE NOTE 5		NOM	± 5%	200V
C6	1010264-35		0.68		200VDC
C7	SEE NOTE 5		NOM		200V
C8	1010264-7		0.0033		200V
C9	1010264-7		0.0033		200V
C10	SEE NOTE 5		NOM	± 5%	200V
C11	1006755-81		10	±10%	35V
C12	1010375-19	CAPACITOR	0.033	±10%	50V
CR1	1010385	DIODE	1N660		
CR2	1010346-1		17V		250MW
CR3	1010829-11		18V		1W
CR4	1010385		1N660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385	DIODE	1N660		
Q1	1010397-1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397-1		2N930		
Q7	1010431-000	TRANSISTOR	2N2920		
T1	1006319	TRANSFORMER			
T2	1006319	TRANSFORMER			
L1	1010277-4	REACTOR	1.4H		
L2	1010427	REACTOR, FIL	50MH		

REF DWG:
AAC FILTER & MULTIVIBRATOR 800 CPS ASSY
DWG NO. 2007112

R2		R3		C5		C7, C10	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010364-333	2670	1010364-565	[illegible]	1010264-20	.039	1010264-1	.001
-335	2740	-569	45.3K	-21	.047	-2	.0012
-337	2800	-575	48.7K	-22	.056	-3	.0015
-339	2870	-581	52.3K	-23	.068	-4	.0018
-341	2940	-587	56.2K	-24	.082	-5	.0022
-343	3010	-593	60.4K	-25	.100	-6	.0027
-345	3090	-59[illegible]	64.9K	-26	.120	-7	.0033
-347	3160	-607	71.5K	1010264-27	.150	-8	.0039
-349	3240	-615	78.7K			1010264-9	.0047
-351	3320	-625	88.7K				
-353	3400	-635	100K				
-355	3480	-647	115K				
-357	3570	-661	137K				
-359	3650	-679	169K				
-361	3740	-699	215K				
-363	3830	-727	301K				
1010364-365	3920	1010364-769	499K				

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. CONNECT 800 CPS LO TO 0VDC AT ONE POINT ONLY AS SHOWN
5. SELECT R2, R3, C5, C7 & C10 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT

DRAWN A. D. Lee DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, AAC, FILTER & MULTIVIBRATOR 800 CPS

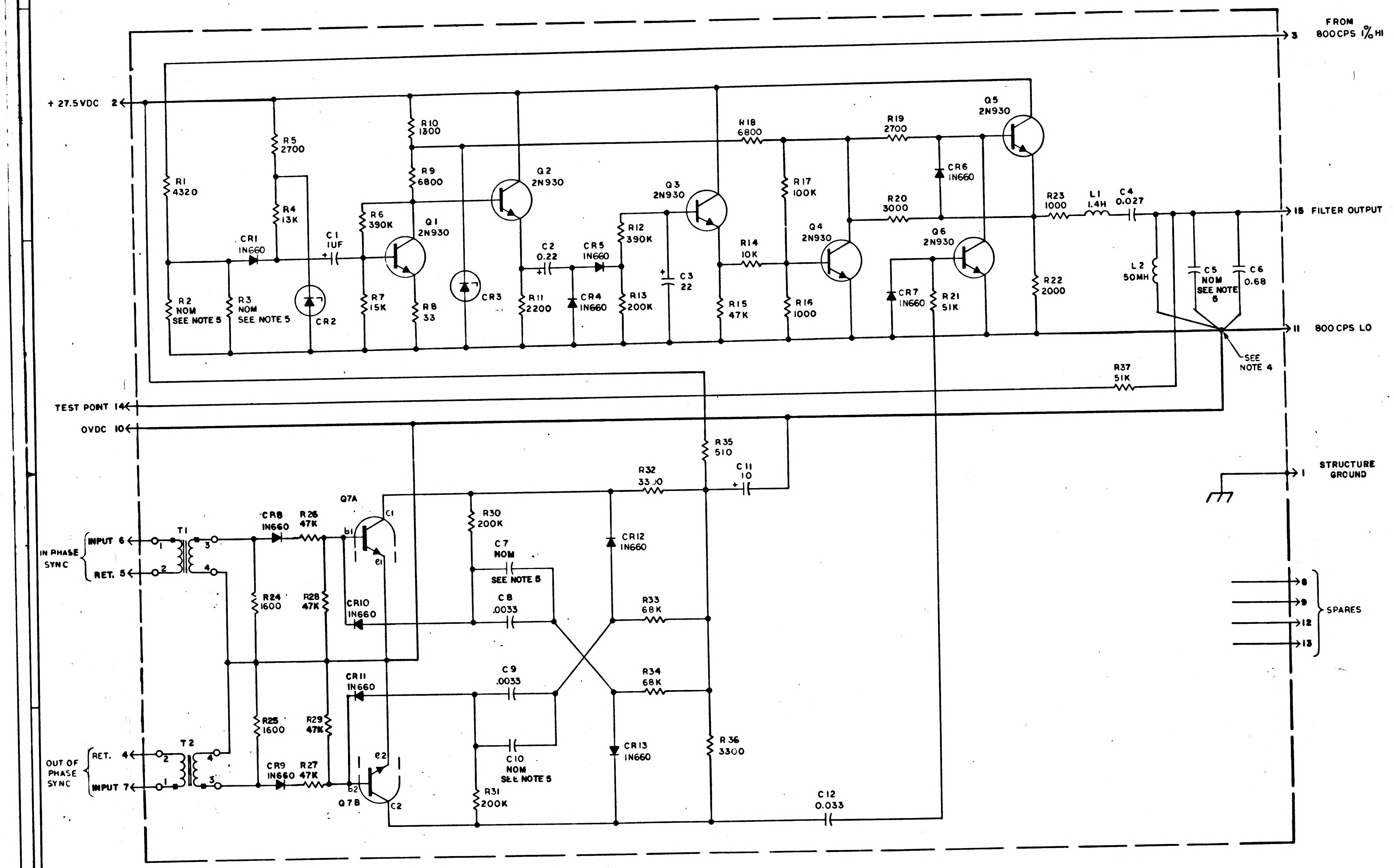
CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2010009

SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 1510

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16029		
B	REVISED PER TDRR 18088		
C	REVISED PER TDRR 19817	4 JUN 65	
D	REVISED PER TDRR 20671	18 JUN 65	


FROM 800CPS 1% HI
3
+27.5 VDC 2
R1 4320
R5 2700
R4 13K
CR1 1N660
C1 1UF
R2 NOM SEE NOTE 5
R3 NOM SEE NOTE 5
CR2
R10 1300
R9 6800
R6 390K
Q1 2N930
R7 15K
R8 33
Q2 2N930
CR3
C2 0.22
CR5 1N660
CR4 1N660
R11 2200
R12 390K
R13 200K
C3 22
Q3 2N930
R18 6800
R14 10K
R15 47K
R17 100K
R16 1000
Q4 2N930
R19 2700
R20 3000
CR6 1N660
Q5 2N930
Q6 2N930
CR7 1N660
R21 51K
R22 2000
R23 1000
L1 1.4H
C4 0.027
L2 50MH
C5 NOM SEE NOTE 5
C6 0.68
15 FILTER OUTPUT
11 800 CPS LO
SEE NOTE 4
R37 51K
TEST POINT 14
OVDC 10
R35 510
R32 3300
C11 10
1 STRUCTURE GROUND
IN PHASE SYNC
INPUT 6
RET. 5
T1
CR8 1N660
R26 47K
Q7A
b1 c1 e1
R30 200K
C7 NOM SEE NOTE 5
C8 .0033
CR12 1N660
R33 68K
R24 1600
R28 47K
CR10 1N660
CR11 1N660
C9 .0033
R34 68K
R25 1600
R29 47K
C10 NOM SEE NOTE 5
CR13 1N660
R36 3300
OUT OF PHASE SYNC
RET. 4
INPUT 7
T2
CR9 1N660
R27 47K
Q7B
b2 e2 c2
R31 200K
C12 0.033
8
9
12
13
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363-373	RESISTOR	4320	±1%	1/4 W
R2	SEE NOTE 5		NOM	±1%	1/8 W
R3	SEE NOTE 5		NOM	±1%	1/8 W
R4	1010364-465		13K	±1%	1/8 W
R5	1006750-42		2700	±2%	1/4 W
R6	1010369-95		390K	±5%	1/8 W
R7	1006750-60		15K	±2%	1/4 W
R8	1010369-140		33	±5%	1/8 W
R9	1006750-52		6800	±2%	1/4 W
R10	1006760-35		1300	±2	1/2 W
R11	1006750-40		2200	±2	1/4 W
R12	1010369-95		390K	±5%	1/8 W
R13	1010369-88		200K	±5%	1/8 W
R14	1006750-56		10K	±2%	1/4 W
R15	-72		47K		
R16	-32		1000		
R17	-80		100K		
R18	-52		6800		
R19	-42		2700		
R20	-43		3000		
R21	-73		51K		
R22	-39		2000		
R23	-32		1000		
R24	-37		1600		
R25	-37		1600		
R26	-72		47K		
R27	-72		47K		
R28	-72		47K		
R29	1006750-72		47K	±2%	1/4W
R30	1010364-693		200K	±1%	1/8W
R31	1010364-693		200K	±1%	1/8W
R32	1010604-38		3300	±1%	1 W
R33	1006750-76		68K	±2%	1/4W
R34	1006750-76		68K	±2%	1/4W
R35	1006760-25		510	±2%	1/2W
R36	1010604-38		3300	±1%	1 W
R37	1006750-73	RESISTOR	51K	±2%	1/4W
C1	1006755-69	CAPACITOR	1.0	±10%	35V
C2	1006755-61		0.22	±10%	35V
C3	1006755-85		22	±10%	35V
C4	1010375-18		0.027	±10%	50V
C5	SEE NOTE 5		NOM	± 5%	200V
C6	1010264-35		0.68		200VDC
C7	SEE NOTE 5		NOM		200V
C8	1010264-7		0.0033		200V
C9	1010264-7		0.0033		200V
C10	SEE NOTE 5		NOM	± 5%	200V
C11	1006755-81		10	±10%	35V
C12	1010375-19	CAPACITOR	0.033	±10%	50V
CR1	1010385	DIODE	1N660		
CR2	1010346-1		17V		250MW
CR3	1010829-11		18V		1W
CR4	1010385		1N660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385	DIODE	1N660		
Q1	1010397-1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397-1		2N930		
Q7	1010431-000	TRANSISTOR	2N2920		
T1	1006319	TRANSFORMER			
T2	1006319	TRANSFORMER			
L1	1010277-4	REACTOR	1.4H		
L2	1010427	REACTOR, FIL	50MH		

REF DWG:
AAC FILTER & MULTIVIBRATOR 800 CPS ASSY
DWG NO. 2007112

C7, C10		R2		R3		C5	
PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010264-1	.001	1010364-333	2670	1010364-565	43.2K	1010264-20	.039
-123	.0011	-335	2740	-569	45.3K	-21	.047
-2	.0012	-337	2800	-575	48.7K	-22	.056
-124	.0013	-339	2870	-581	52.3K	-23	.068
-3	.0015	-341	2940	-587	56.2K	-24	.082
-125	.0016	-343	3010	-593	60.4K	-25	.100
-4	.0018	-345	3090	-599	64.9K	-26	.120
-126	.0020	-347	3160	-607	71.5K	1010264-27	.150
-5	.0022	-349	3240	-615	78.7K		
-127	.0024	-351	3320	-625	88.7K		
-6	.0027	-353	3400	-635	100K		
-128	.0030	-355	3480	-647	115K		
-7	.0033	-357	3570	-661	137K		
-129	.0036	-359	3650	-679	169K		
-8	.0039	-361	3740	-699	215K		
-130	.0043	-363	3830	-727	301K		
1010264-9	.0047	1010364-365	3920	1010364-769	499K		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. CONNECT 800 CPS LO TO OVDC AT ONE POINT ONLY AS SHOWN
5. SELECT R2, R3, C5, C7 & C10 PER APPLICABLE PS FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, AAC, FILTER & MULTIVIBRATOR 800 CPS

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010009
SCALE —
WT —
SHEET 1 OF 1

2010009 D

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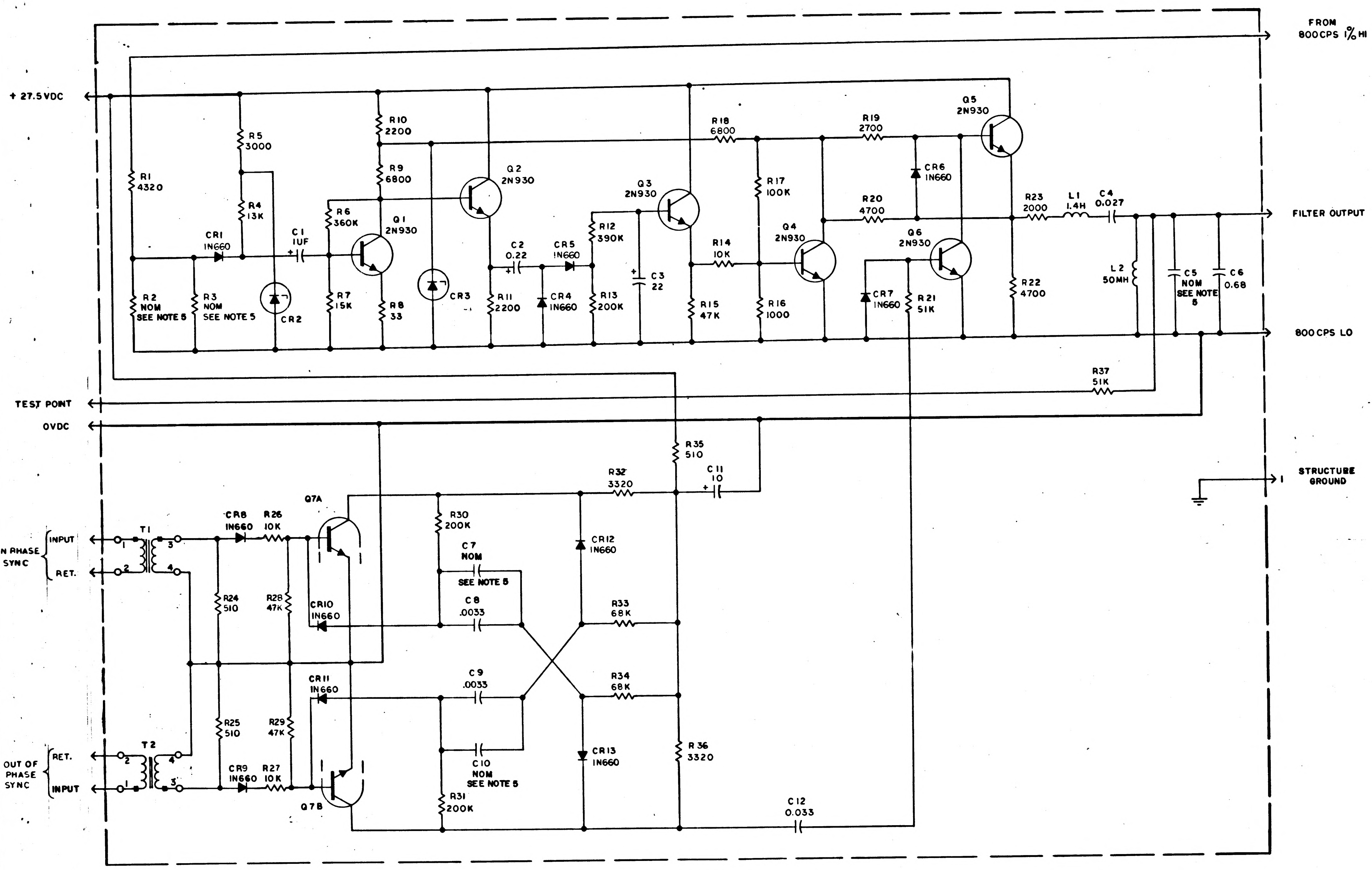
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


FROM 800CPS 1% HI
+ 27.5VDC
R1 4320
R5 3000
R4 13K
CR1 1N660
C1 1UF
R2 NOM SEE NOTE 5
R3 NOM SEE NOTE 5
CR2
R10 2200
R9 6800
R6 360K
Q1 2N930
R7 15K
R8 33
Q2 2N930
CR3
R11 2200
C2 0.22
CR5 1N660
CR4 1N660
R12 390K
R13 200K
C3 22
Q3 2N930
R18 6800
R17 100K
R14 10K
R15 47K
R16 1000
Q4 2N930
R19 2700
CR6 1N660
R20 4700
Q5 2N930
Q6 2N930
CR7 1N660
R21 51K
R23 2000
L1 1.4H
C4 0.027
R22 4700
L2 50MH
C5 NOM SEE NOTE 5
C6 0.68
FILTER OUTPUT
800 CPS LO
R37 51K
TEST POINT
OVDC
R35 510
R32 3320
C11 10
STRUCTURE GROUND
IN PHASE SYNC
INPUT
RET.
T1
CR8 1N660
R26 10K
Q7A
R24 510
R28 47K
CR10 1N660
R30 200K
C7 NOM SEE NOTE 5
C8 .0033
CR12 1N660
R33 68K
CR11 1N660
C9 .0033
R34 68K
R25 510
R29 47K
OUT OF PHASE SYNC
RET.
INPUT
T2
CR9 1N660
R27 10K
Q7B
C10 NOM SEE NOTE 5
R31 200K
CR13 1N660
R36 3320
C12 0.033

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363-373	RESISTOR	4320	±1%	1/4 W
R2	SEE NOTE 5		NOM	±1%	1/8 W
R3	SEE NOTE 5		NOM	±1%	1/8 W
R4	1010364-465		13K	±1%	1/8W
R5	1006750-43		3000	±2%	1/4 W
R6	1010369-94		360K	±5%	1/8 W
R7	1006750-60		15K	±2%	1/4 W
R8	1010369-140		33	±5%	1/8 W
R9	1006750-52		6800	±2%	1/4 W
R10	1006750-40		2200	±2	1/4W
R11	1006750-40		2200	±2	1/4W
R12	1010369-95		390K	±5%	1/8W
R13	1010369-88		200K	±5%	1/8W
R14	1006750-56		10K	±2%	1/4W
R15	-72		47K		
R16	-32		1000		
R17	-80		100K		
R18	-52		6800		
R19	-42		2700		
R20	-48		4700		
R21	-73		51K		
R22	-48		4700		
R23	-39		2000		
R24	-25		510		
R25	-25		510		
R26	-56		10K		
R27	-56		10K		
R28	-72		47K		
R29	1006750-72		47K	±2%	1/4W
R30	1010364-693		200K	±1%	1/8W
R31	1010364-693		200K	±1%	1/9W
R32	1010364-351		3320	±1%	1/8W
R33	1006750-76		68K	±2%	1/4W
R34	1006750-76		68K	±2%	1/4W
R35	1010389-49		510	±1%	3W
R36	1010364-351		3320	±1%	1/8W
R37	1006750-73	RESISTOR	51K	±2%	1/4W
C1	1006755-89	CAPACITOR	1.0	±10%	35V
C2	1006755-61		0.22	±10%	35V
C3	1006755-85		22	±10%	35V
C4	1010375-18		0.027	±10%	50V
C5	SEE NOTE 5		NOM	± 5%	200V
C6	1010264-35		0.68		200VDC
C7	SEE NOTE 5		NOM		200V
C8	1010264-7		0.0033		200V
C9	1010264-7		0.0033		200V
C10	SEE NOTE 5		NOM	± 5%	200V
C11	1006755-81		10	±10%	35V
C12	1010375-19	CAPACITOR	0.033	±10%	50V
CR1	1010385	DIODE	1N660		
CR2	1010346-1				250MW
CR3	1010829-9				1W
CR4	1010385		1N660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385	DIODE	1N660		
Q1	1010397-1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397-1		2N930		
Q7	1010431	TRANSISTOR			
T1	1006762-	TRANSFORMER			
T2	1006762-	TRANSFORMER			
L1	1010277-004	REACTOR	1.4H		
L2	1010427	REACTOR, FIL	50MH		

REF DWG:
AAC FILTER & MULTIVIBRATOR 800 CPS ASSY
DWG NO.

R3		R2		C5		C7, C10	
		PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
		1010364-401	6040	1010264-20	.039	1010264-1	.001
		-407	6490	-21	.047	-2	.0012
		-413	6980	-22	.056	-3	.0015
		-419	7500	-23	.068	-4	.0018
		-425	8060	-24	.082	-5	.0022
		-429	8450	-25	.100	-6	.0027
		-435	9090	-26	.120	-7	.0033
		-439	9530	1010264-27	.150	-8	.0039
		-443	10K			1010264-9	.0047
		-447	10.5K				
		-451	11K				
		-455	11.5K				
		-459	12.1K				
		-463	12.7K				
		-465	13K				
		-469	13.7K				
		1010364-471	14K				

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTORS ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITORS ARE IN MICROFARADS
4. CONNECT 800 CPS LO TO OVDC AT ONE POINT ONLY AS SHOWN
5. SELECT R2, R3, C5, C7 & C10 PER ATP FROM APPROPRIATE CHART

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 15108 DATE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN A. P. Kao DATE
CHECKED 13 Dec 64
APPROVAL 22 Dec 64
APPROVAL
NASA APPROVAL 12-23-64
MIT APPROVAL 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

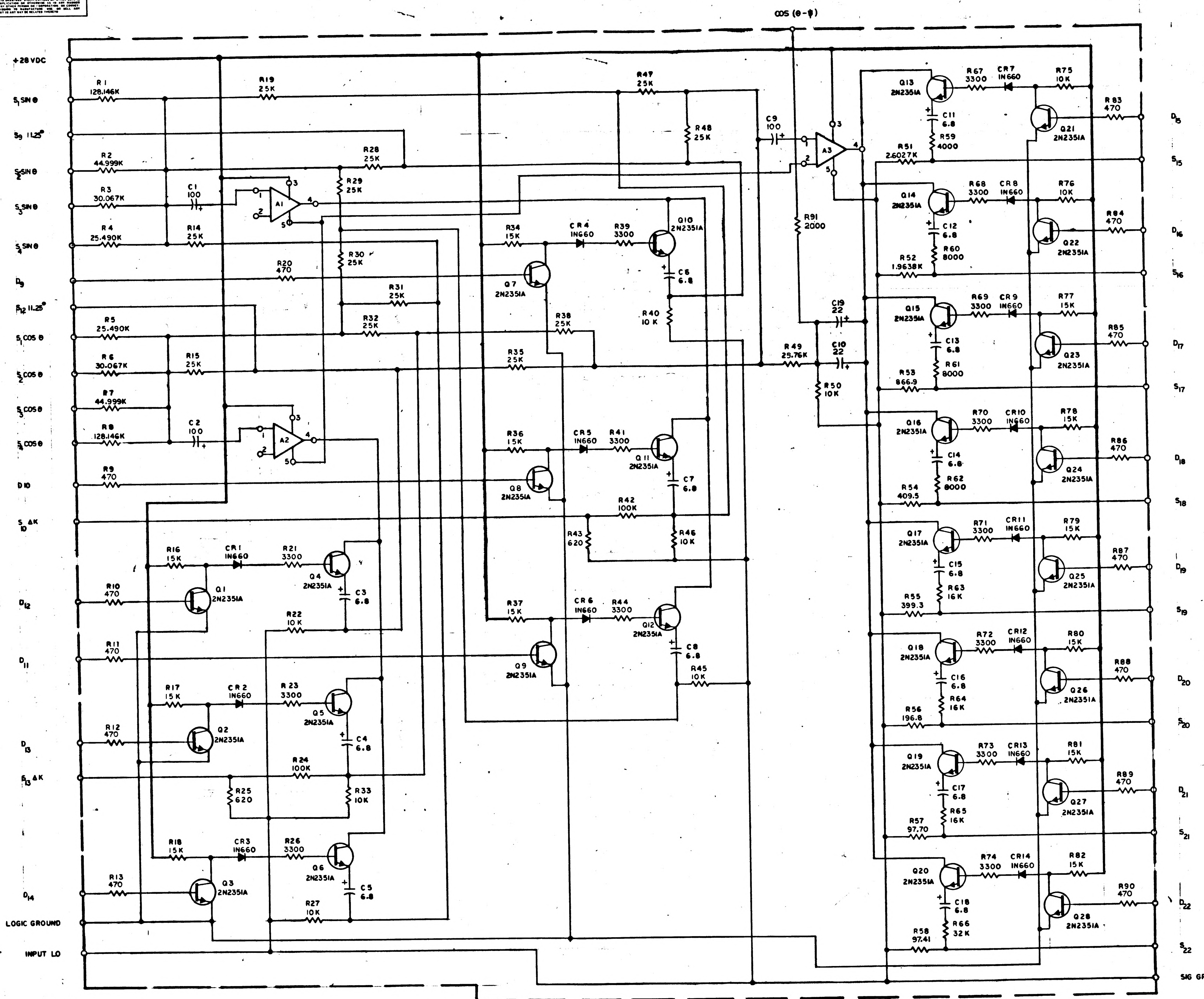
SCHEMATIC,
AAC, FILTER &
MULTIVIBRATOR 800 CPS

CODE IDENT NO. —
SIZE E
NASA DRAWING NO 2010009
SCALE — WT — SHEET 1 OF 1

2010009

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 10161	4/16/64	

REVISIONS 07491



COS (θ-Ψ)
+28 VDC
S1 SIN θ
S9 11.25°
S2 SIN θ
S3 SIN θ
S4 SIN θ
D9
S12 11.25°
S1 COS θ
S2 COS θ
S3 COS θ
S4 COS θ
D10
S10 ΔK
D12
D11
D13
S13 ΔK
D14
LOGIC GROUND
INPUT LO
R1 128.146K
R2 44.999K
R3 30.067K
R4 25.490K
R5 25.490K
R6 30.067K
R7 44.999K
R8 128.146K
R9 470
R10 470
R11 470
R12 470
R13 470
R14 25K
R15 25K
R16 15K
R17 15K
R18 15K
R19 25K
R20 470
R21 3300
R22 10K
R23 3300
R24 100K
R25 620
R26 3300
R27 10K
R28 25K
R29 25K
R30 25K
R31 25K
R32 25K
R33 10K
R34 15K
R35 25K
R36 15K
R37 15K
R38 25K
R39 3300
R40 10K
R41 3300
R42 100K
R43 620
R44 3300
R45 10K
R46 10K
R47 25K
R48 25K
R49 25.76K
R50 10K
R51 2.6027K
R52 1.9638K
R53 866.9
R54 409.5
R55 399.3
R56 196.8
R57 97.70
R58 97.41
R59 4000
R60 8000
R61 8000
R62 8000
R63 16K
R64 16K
R65 16K
R66 32K
R67 3300
R68 3300
R69 3300
R70 3300
R71 3300
R72 3300
R73 3300
R74 3300
R75 10K
R76 10K
R77 15K
R78 15K
R79 15K
R80 15K
R81 15K
R82 15K
R83 470
R84 470
R85 470
R86 470
R87 470
R88 470
R89 470
R90 470
R91 2000
C1 100
C2 100
C3 6.8
C4 6.8
C5 6.8
C6 6.8
C7 6.8
C8 6.8
C9 100
C10 22
C11 6.8
C12 6.8
C13 6.8
C14 6.8
C15 6.8
C16 6.8
C17 6.8
C18 6.8
C19 22
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9 IN660
CR10 IN660
CR11 IN660
CR12 IN660
CR13 IN660
CR14 IN660
Q1 2N2351A
Q2 2N2351A
Q3 2N2351A
Q4 2N2351A
Q5 2N2351A
Q6 2N2351A
Q7 2N2351A
Q8 2N2351A
Q9 2N2351A
Q10 2N2351A
Q11 2N2351A
Q12 2N2351A
Q13 2N2351A
Q14 2N2351A
Q15 2N2351A
Q16 2N2351A
Q17 2N2351A
Q18 2N2351A
Q19 2N2351A
Q20 2N2351A
Q21 2N2351A
Q22 2N2351A
Q23 2N2351A
Q24 2N2351A
Q25 2N2351A
Q26 2N2351A
Q27 2N2351A
Q28 2N2351A
A1
A2
A3
D15
S15
D16
S16
D17
S17
D18
S18
D19
S19
D20
S20
D21
S21
D22
S22
SIG GROUND

REF DWG:
COS (θ-Ψ) GENERATOR ASSY
DWG NO.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Di Leo DATE 26 MAR 64
CHECKED L. P. Krug 10 Mar 64
APPROVAL R. M. Kowalski 13 MAY 64
APPROVAL R. J. Cushman 15 May 64
NASA APPROVAL 5/15/64
MIT APPROVAL 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COS (θ-Ψ) GENERATOR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010010
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 03491

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 10161	6/16/69	WK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377 - 313	RESISTOR	128.146K	±.01%	1/10W
R2	- 311		44.999K		
R3	- 310		30.067K		
R4	- 308		25.490K		
R5	- 308		25.490K		
R6	- 310		30.067K		
R7	- 311		44.999K		
R8	- 313		128.146 K		
R9	1006750 - 24		470	± 2 %	1/4 W
R10	- 24		470		
R11	- 24		470		
R12	- 24		470		
R13	- 24		470		
R14	1010377 - 307		25 K	±.01 %	1/10 W
R15	1010377 - 307		25 K	±.01 %	1/10 W
R16	1006750 - 60		15 K	± 2 %	1/4 W
R17	- 60		15 K		
R18	- 60		15 K		
R19	1010377 - 307		25 K	±.01 %	1/10 W
R20	1006750 - 24		470	± 2 %	1/4 W
R21	- 44		3300		
R22	- 56		10 K		
R23	- 44		3300		
R24	- 80		100K		
R25	- 27		620		
R26	- 44		3300		
R27	- 56		10 K		
R28	1010377 - 307		25 K	±.01 %	1/10 W
R29	- 307		25 K		
R30	- 307		25 K		
R31	- 307		25 K		
R32	- 307		25 K		
R33	1006750 - 56		10 K	± 2 %	1/4 W
R34	1006750 - 60		15 K	± 2 %	1/4 W
R35	1010377 - 307		25 K	±.01 %	1/10 W
R36	1006750 - 60		15 K	± 2 %	1/4 W
R37	1006750 - 60		15 K	± 2 %	1/4 W
R38	1010377 - 307		25 K	±.01 %	1/10 W
R39	1006750 - 44		3300	± 2 %	1/4 W
R40	- 56		10 K		
R41	- 44		3300		
R42	- 80		100K		
R43	- 27		620		
R44	- 44		3300		
R45	- 56		10 K		
R46	- 56		10 K		
R47	1010377 - 307		25 K	±.01 %	1/10 W
R48	- 307		25 K		
R49	- 315		25.76 K		
R50	1006750 - 56		10 K	± 2 %	1/4 W
R51	1010377 - 303		2.6027K	±.01 %	1/10 W
R52	1010377 - 302		1.9638K	±.01 %	
R53	1010733 - 16		866.9	±.1 %	
R54	- 5		409.5		
R55	- 4		399.3		
R56	- 3		196.8		
R57	- 2		97.70		
R58	- 1		97.41		
R59	1010377 - 304		4000	±.01 %	
R60	1010377 - 305		8000		
R61	1010733 - 6		8000	±.1 %	
R62	- 6		8000		
R63	- 7		16 K		
R64	- 7		16 K		
R65	- 7		16 K		
R66	- 9		32 K		
R67	1006750 - 44		3300	± 2 %	1/4 W
R68	- 44		3300		
R69	- 44		3300		
R70	- 44		3300		
R71	- 44		3300		
R72	- 44		3300		
R73	- 44		3300		
R74	- 44		3300		
R75	- 56		10K		
R76	- 56		10K		
R77	- 60		15K		
R78	- 60		15K		
R79	- 60		15K		
R80	- 60		15K		
R81	- 60		15K		
R82	- 60		15K		
R83	- 24		470		
R84	- 24		470		
R85	- 24		470		
R86	- 24		470		
R87	- 24		470		
R88	- 24		470		
R89	- 24		470		
R90	- 24		470		
R91	- 39		2000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 - 14	CAPACITOR	100 UF	± 10 %	10VDC
C2	- 14		100		10VDC
C3	- 79		6.8		35VDC
C4	- 79		6.8		
C5	- 79		6.8		
C6	- 79		6.8		
C7	- 79		6.8		
C8	- 79		6.8		
C9	- 14		100		10V DC
C10	- 85		22		35V DC
C11	- 79		6.8		
C12	- 79		6.8		
C13	- 79		6.8		
C14	- 79		6.8		
C15	- 79		6.8		
C16	- 79		6.8		
C17	- 79		6.8		
C18	- 79		6.8		
C19	- 85		22		
CR1	1010385	DIODE	1N660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2					
Q3					
Q4					
Q5					
Q6					
Q7					
Q8					
Q9					
Q10					
Q11					
Q12					
Q13					
Q14					
Q15					
Q16					
Q17					
Q18					
Q19					
Q20					
Q21					
Q22					
Q23					
Q24					
Q25					
Q26					
Q27					
Q28					
A1		AMPLIFIER	SEE NOTE 4		
A2					
A3					

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN A. D. Lee DATE 8 MAR 69
CHECKED R. P. [illegible] 10 Mar 69
APPROVAL [illegible] 13 MAY 69
APPROVAL R. J. Cushman 15 May 69
[illegible] 15 May 69
NASA APPROVAL [illegible] 5/15/69
MIT APPROVAL W. Kupfer 19 May 69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

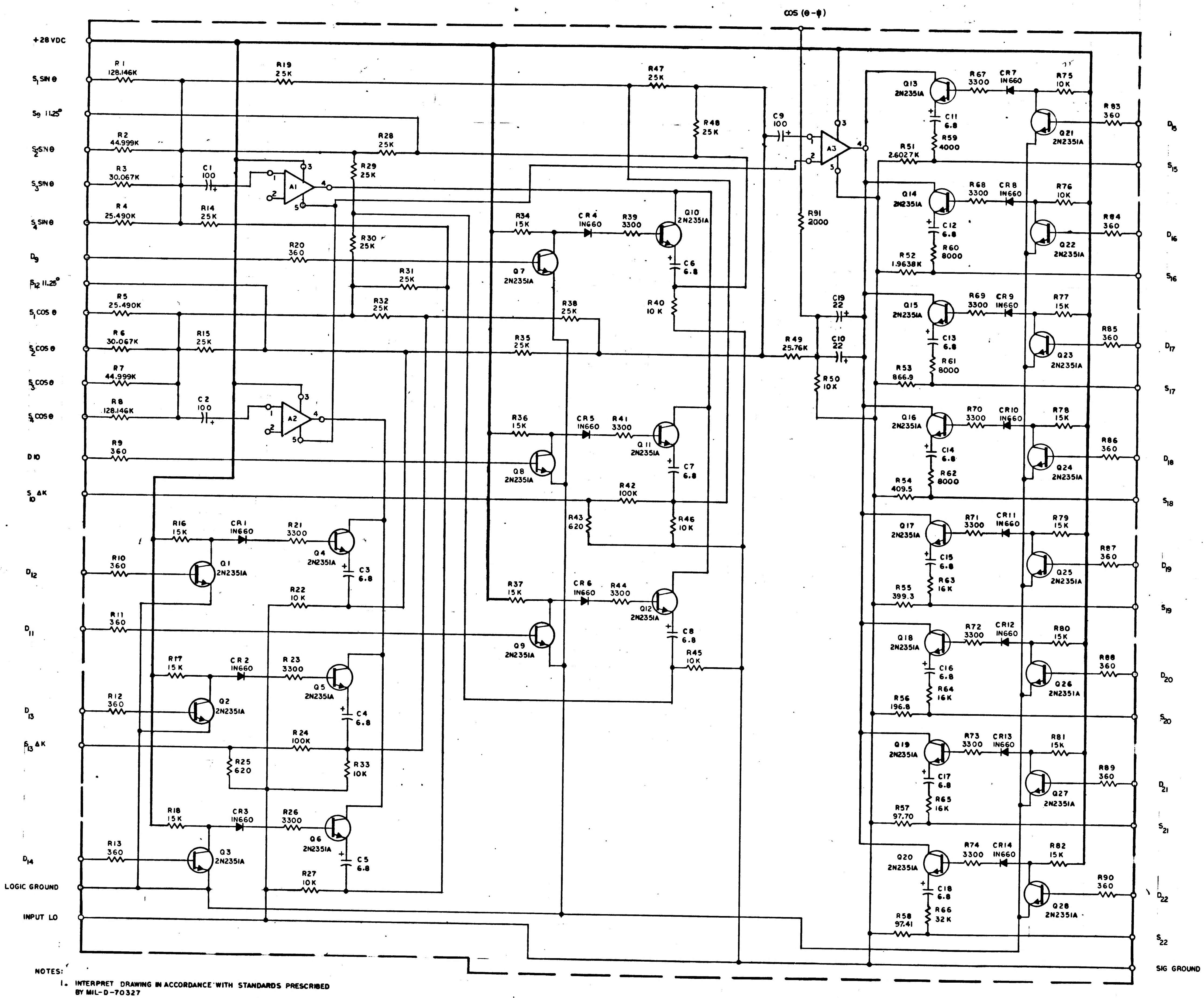
SCHEMATIC,
COS (Θ - Ψ) GENERATOR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010010
SCALE —
WT —
SHEET 2 OF 2

2010010 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 0P491			
SYM	DESCRIPTION	DATE	APPROVAL


COS (θ-ψ)
+28 VDC
S_1 SIN θ
S_9 11.25°
S_2 SIN θ
S_3 SIN θ
S_4 SIN θ
D_9
S_{12} 11.25°
S_1 COS θ
S_2 COS θ
S_3 COS θ
S_4 COS θ
D10
S_{10} ΔK
D_{12}
D_{11}
D_{13}
S_{13} ΔK
D_{14}
LOGIC GROUND
INPUT LO
R1 128.146K
R2 44.999K
R3 30.067K
R4 25.490K
R5 25.490K
R6 30.067K
R7 44.999K
R8 128.146K
R9 360
R10 360
R11 360
R12 360
R13 360
R14 25K
R15 25K
R16 15K
R17 15K
R18 15K
R19 25K
R20 360
R21 3300
R22 10K
R23 3300
R24 100K
R25 620
R26 3300
R27 10K
R28 25K
R29 25K
R30 25K
R31 25K
R32 25K
R33 10K
R34 15K
R35 25K
R36 15K
R37 15K
R38 25K
R39 3300
R40 10K
R41 3300
R42 100K
R43 620
R44 3300
R45 10K
R46 10K
R47 25K
R48 25K
R49 25.76K
R50 10K
R51 2.6027K
R52 1.9638K
R53 866.9
R54 409.5
R55 399.3
R56 196.8
R57 97.70
R58 97.41
R59 4000
R60 8000
R61 8000
R62 8000
R63 16K
R64 16K
R65 16K
R66 32K
R67 3300
R68 3300
R69 3300
R70 3300
R71 3300
R72 3300
R73 3300
R74 3300
R75 10K
R76 10K
R77 15K
R78 15K
R79 15K
R80 15K
R81 15K
R82 15K
R83 360
R84 360
R85 360
R86 360
R87 360
R88 360
R89 360
R90 360
R91 2000
C1 100
C2 100
C3 6.8
C4 6.8
C5 6.8
C6 6.8
C7 6.8
C8 6.8
C9 100
C10 22
C11 6.8
C12 6.8
C13 6.8
C14 6.8
C15 6.8
C16 6.8
C17 6.8
C18 6.8
C19 22
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9 IN660
CR10 IN660
CR11 IN660
CR12 IN660
CR13 IN660
CR14 IN660
A1
A2
A3
Q1 2N2351A
Q2 2N2351A
Q3 2N2351A
Q4 2N2351A
Q5 2N2351A
Q6 2N2351A
Q7 2N2351A
Q8 2N2351A
Q9 2N2351A
Q10 2N2351A
Q11 2N2351A
Q12 2N2351A
Q13 2N2351A
Q14 2N2351A
Q15 2N2351A
Q16 2N2351A
Q17 2N2351A
Q18 2N2351A
Q19 2N2351A
Q20 2N2351A
Q21 2N2351A
Q22 2N2351A
Q23 2N2351A
Q24 2N2351A
Q25 2N2351A
Q26 2N2351A
Q27 2N2351A
Q28 2N2351A
D_{15}
S_{15}
D_{16}
S_{16}
D_{17}
S_{17}
D_{18}
S_{18}
D_{19}
S_{19}
D_{20}
S_{20}
D_{21}
S_{21}
D_{22}
S_{22}
SIG GROUND

REF DWG:
COS (θ-ψ) GENERATOR ASSY
DWG NO.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. Di Leo DATE 26 MAR 64
CHECKED R.P. Kerezelman 10 Apr 64
APPROVAL R.M. Kowalski 13 MAY 64
APPROVAL R.J. Cushman 15 May 64
APPROVAL 15 May 64
NASA APPROVAL 5/15/64
MIT APPROVAL 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COS (θ - ψ) GENERATOR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010010
SCALE —
WT —
SHEET 1 OF 2

2010010

INCHES

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 08491			
SYM	DESCRIPTION	DATE	APPROVAL

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377-313	RESISTOR	128.146K	±.01%	1/10W
R2	-311		44.999K		
R3	-310		30.067K		
R4	-308		25.490K		
R5	-308		25.490K		
R6	-310		30.067K		
R7	-311		44.999K		
R8	↓ -313		128.146 K	↓	↓
R9	1006750-21		360	± 2%	1/4 W
R10	-21		360		
R11	-21		360		
R12	-21		360		
R13	↓ -21		360	↓	↓
R14	1010377 -307		25 K	±.01%	1/10 W
R15	1010377 -307		25 K	±.01%	1/10 W
R16	1006750-60		15 K	± 2%	1/4 W
R17	-60		15 K		
R18	↓ -60		15 K	↓	↓
R19	1010377 -307		25 K	±.01%	1/10 W
R20	1006750-21		360	± 2%	1/4 W
R21	-44		3300		
R22	-56		10 K		
R23	-44		3300		
R24	-80		100K		
R25	-27		620		
R26	-44		3300		
R27	↓ -56		10 K	↓	↓
R28	1010377-307		25 K	±.01%	1/10 W
R29	-307		25 K		
R30	-307		25 K		
R31	-307		25 K		
R32	↓ -307		25 K	↓	↓
R33	1006750-56		10 K	± 2%	1/4 W
R34	1006750-60		15 K	± 2%	1/4 W
R35	1010377 -307		25 K	±.01%	1/10 W
R36	1006750-60		15 K	± 2%	1/4 W
R37	1006750-60		15K	± 2%	1/4 W
R38	1010377-307		25K	±.01%	1/10 W
R39	1006750-44		3300	± 2%	1/4 W
R40	-56		10 K		
R41	-44		3300		
R42	-80		100K		
R43	-27		620		
R44	-44		3300		
R45	-56		10 K		
R46	↓ -56		10 K	↓	↓
R47	1010377-307		25 K	±.01%	1/10 W
R48	-307		25 K		
R49	↓ -315		25.76 K	↓	↓
R50	1006750-56		10 K	± 2%	1/4 W
R51	1010377-303		2.6027K	±.01%	1/10 W
R52	1010377-302		1.9638K	±.01%	
R53	1010733-16		866.9	±.1%	
R54	-5		409.5		
R55	-4		399.3		
R56	-3		196.8		
R57	-2		97.70		
R58	↓ -1		97.41	↓	
R59	1010377-304		4000	±.01%	
R60	1010377-305		8000	↓	
R61	1010733-6		8000	±.1%	
R62	-6		8000		
R63	-7		16 K		
R64	-7		16 K		
R65	-7		16 K		
R66	↓ -9		32 K	↓	↓
R67	1006750-44		3300	± 2%	1/4 W
R68	-44		3300		
R69	-44		3300		
R70	-44		3300		
R71	-44		3300		
R72	-44		3300		
R73	-44		3300		
R74	-44		3300		
R75	-56		10K		
R76	-56		10K		
R77	-60		15K		
R78	-60		15K		
R79	-60		15K		
R80	-60		15K		
R81	-60		15K		
R82	-60		15K		
R83	-21		360		
R84	-21		360		
R85	-21		360		
R86	-21		360		
R87	-21		360		
R88	-21		360		
R89	-21		360		
R90	-21		360		
R91	↓ -39	↓	2000	↓	↓

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-14	CAPACITOR	100 UF	± 10%	10VDC
C2	-14		100		10VDC
C3	-79		6.8		35VDC
C4	-79		6.8		
C5	-79		6.8		
C6	-79		6.8		
C7	-79		6.8		
C8	-79		6.8		↓
C9	-14		100		10V DC
C10	-85		22		35V DC
C11	-79		6.8		
C12	-79		6.8		
C13	-79		6.8		
C14	-79		6.8		
C15	-79		6.8		
C16	-79		6.8		
C17	-79		6.8		
C18	-79		6.8		
C19	↓ -85	↓	22 ↓	↓	↓
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14	↓	↓	↓		
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2					
Q3					
Q4					
Q5					
Q6					
Q7					
Q8					
Q9					
Q10					
Q11					
Q12					
Q13					
Q14					
Q15					
Q16					
Q17					
Q18					
Q19					
Q20					
Q21					
Q22					
Q23					
Q24					
Q25					
Q26					
Q27					
Q28	↓	↓	↓		
A1		AMPLIFIER	SEE NOTE 4		
A2					
A3	↓	↓	↓		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN A. D. Leo DATE 25 MAR 64
CHECKED R. P. Kirkham 10 APR 64
APPROVAL R. M. Kondelchuk 13 MAY 64
APPROVAL E. J. Cushman 15 May 64
14 May 64
NASA APPROVAL 5/15/64
MIT APPROVAL 15 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

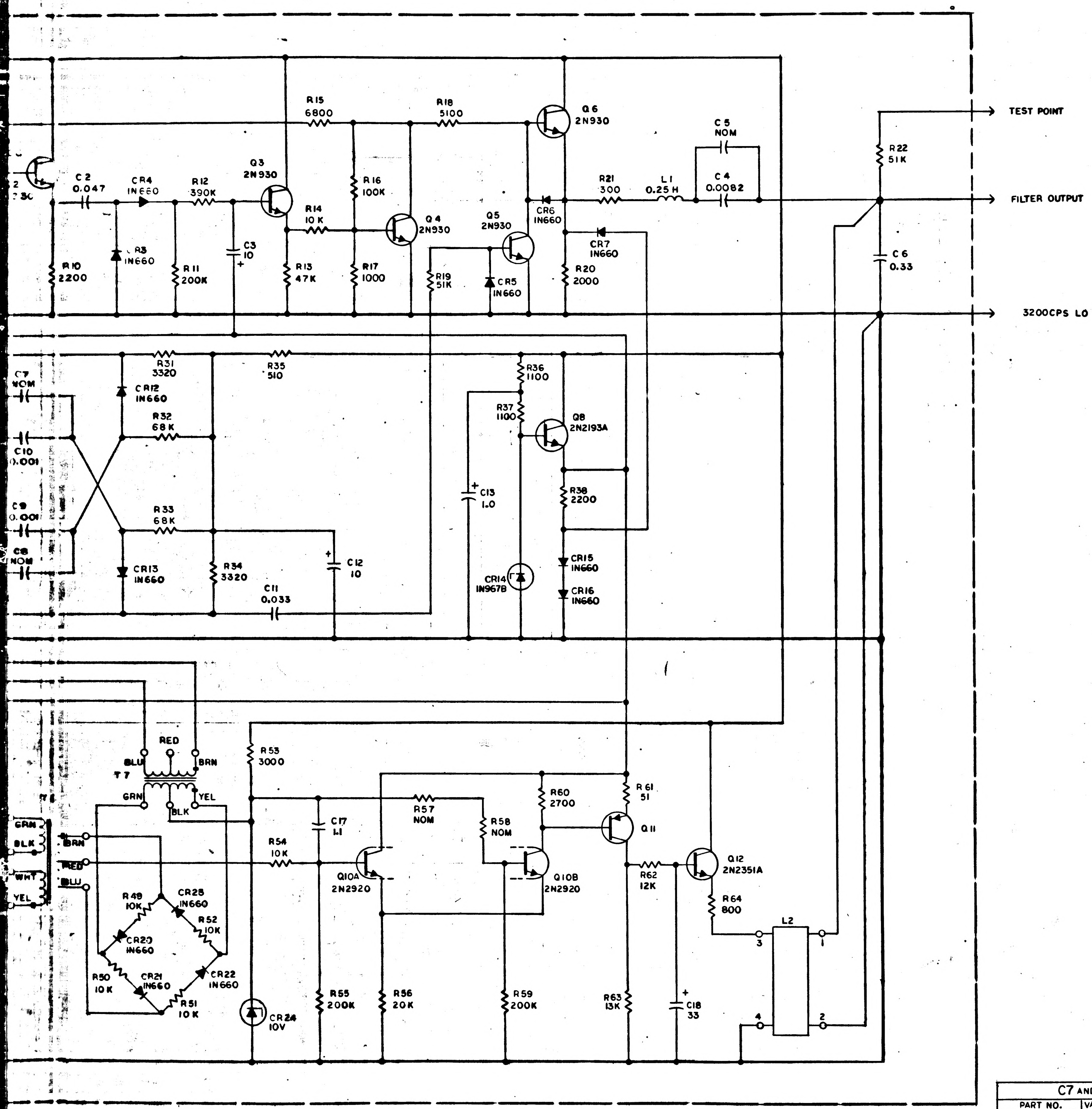
SCHEMATIC,
COS (θ - ψ) GENERATOR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010010
SCALE —
WT —
SHEET 2 OF 2

2010010

15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16271	2/9/68	W.H.


TEST POINT
FILTER OUTPUT
3200CPS LO
R15 6800
R18 5100
Q6 2N930
C5 NOM
R22 51K
C2 0.047
CR4 IN660
R12 390K
Q3 2N930
R16 100K
R14 10K
Q4 2N930
Q5 2N930
CR6 IN660
R21 300
L1 0.25H
C4 0.0082
CR7 IN660
C6 0.33
R10 2200
CR3 IN660
R11 200K
C3 10
R13 47K
R17 1000
R19 51K
CR5 IN660
R20 2000
C7 NOM
R31 3320
R35 510
CR12 IN660
R32 68K
R36 1100
R37 1100
Q8 2N2193A
C10 0.001
C9 0.001
C8 NOM
R33 68K
C13 1.0
R38 2200
CR13 IN660
R34 3320
C12 10
C11 0.033
CR14 IN967B
CR15 IN660
CR16 IN660
RED
BLU
BRN
T7
GRN
YEL
BLK
GRN
BLK
WHT
YEL
BRN
RED
BLU
R53 3000
R49 10K
CR23 IN660
R52 10K
CR20 IN660
R50 10K
CR21 IN660
R51 10K
CR22 IN660
CR24 10V
R54 10K
C17 1.1
R57 NOM
R58 NOM
Q10A 2N2920
Q10B 2N2920
R60 2700
R61 51
Q11
R62 12K
Q12 2N2351A
R64 800
R55 200K
R56 20K
R59 200K
R63 13K
C18 33
L2
1
2
3
4

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363 -373	RESISTOR	4320	± 1%	1/4 W
R2	SEE NOTE 4		NOM	± 1%	1/8 W
R3	SEE NOTE 4		NOM	± 1%	1/8 W
R4	1006750 -42		2700	± 2%	1/4 W
R5	1006750 -59		13K	± 2%	1/4 W
R6	1010369 -95		390K	± 5%	1/8 W
R7	1006750 -60		15K	± 2%	1/4 W
R8	1010369 -140		33	± 5%	1/8 W
R9	1006750 -52		6800	± 2%	1/4 W
R10	1006750 -40		2200	± 2%	1/4 W
R11	1010369 -88		200K	± 5%	1/8 W
R12	1010369 -95		390K	± 5%	1/8 W
R13	1006750 -72		47K	± 2%	1/4 W
R14	-56		10K		
R15	-52		6800		
R16	-80		100K		
R17	-32		1000		
R18	-49		5100		
R19	-73		51K		
R20	-39		2000		
R21	-19		300		
R22	-73		51K		
R23	-30		820		
R24	-30		820		
R25	-72		47K		
R26	-72		47K		
R27	-72		47K		
R28	1006750 -72		47K	± 2%	1/4 W
R29	1010364 -693		200K	± 1%	1/8 W
R30	1010364 -693		200K	± 1%	1/8 W
R31	1010363 -351		3320	± 1%	1/4 W
R32	1006750 -76		68K	± 2%	1/4 W
R33	1006750 -76		68K	± 2%	1/4 W
R34	1010363 -351		3320	± 1%	1/4 W
R35	1010278 -56		510	± 5%	1/2 W
R36	1006750 -33		1100	± 2%	1/4 W
R37	1006750 -33		1100		1/4 W
R38	1006760 -40		2200		1/2 W
R39	1006750 -30		820		1/4 W
R40	-58		12K		
R41	-30		820		
R42	-58		12K		
R43	-80		100K		
R44	-60		15K		
R45	-56		10K		
R46	-80		100K		
R47	-60		15K		
R48	1006750 -56		10K	± 2%	1/4 W
R49	1010364 -443		10K	± 1%	1/8 W
R50	1010364 -443		10K	± 1%	1/8 W
R51	1010364 -443		10K	± 1%	1/8 W
R52	1010364 -443		10K	± 1%	1/8 W
R53	1006760 -43		3000	± 2%	1/2 W
R54	1010364 -443		10K	± 1%	1/8 W
R55	1010364 -693		200K	± 1%	1/8 W
R56	1006750 -63		20K	± 2%	1/4 W
R57	SEE NOTE 4		NOM	± 1%	1/8 W
R58	SEE NOTE 4		NOM	± 1%	1/8 W
R59	1010364 -693		200K	± 1%	1/8 W
R60	1006750 -42		2700	± 2%	1/4 W
R61	1006750 -1		51	± 2%	1/4 W
R62	1006750 -58		12K	± 2%	1/4 W
R63	1006750 -59		13K	± 2%	1/4 W
R64	1010604 -21	RESISTOR	800	± 1%	1W
C1	1006755 -69	CAPACITOR	1.0	± 10%	35VDC
C2	1010264 -21		0.047	± 5%	200
C3	1006755 -81		10.0	± 10%	35
C4	1010264 -12		0.0082	± 5%	200
C5	SEE NOTE 4		NOM	± 5%	200
C6	1010264 -31		0.33	± 5%	
C7	SEE NOTE 4		NOM	± 2%	
C8	SEE NOTE 4		NOM	± 2%	
C9	1006793 -007		0.001	± 2%	500
C10	1006793 -007		0.001	± 2%	500
C11	1010375 -19		0.033	± 10%	50
C12	1006755 -130		10.0	± 10%	50
C13	1006755 -118		1.0	± 10%	50
C14	1010409 -14		36UUF	± 2%	500
C15	1010409 -14		36UUF	± 2%	500
C16	1006755 -69		1.0	± 10%	35
C17	1010279 -249		1.1	± 10%	20
C18	1006755 -87	CAPACITOR	33.0	± 10%	35
L1	1010277-1	INDUCTOR	0.25H		
L2	1010890	INDUCTOR			
T1	1010924	TRANSFORMER	DO-T51		
T2	1006319				
T3	1006319				
T4	1006319				
T5	1006319				
T6	1010895		DO-T37		
T7	1010328	TRANSFORMER	DO-T23		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010346		PS1584		
CR3	1010385		IN660		
CR4	1010385				
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385		IN660		
CR14	1010830-11		IN967B	±5%	400MW
CR15	1010385		IN660		
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010385		IN660		
CR24	1010372-18	DIODE	10V	±5%	250MW
Q1	1010397	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397		2N930		
Q7	1010431		2N2920		
Q8	1010398-1		2N2193A		
Q9	1010376-4				
Q10	1010431		2N2920		
Q11	1010633-3				
Q12	1010343-1	TRANSISTOR	2N2351A		

R58			
PART NO.	VALUE	PART NO.	VALUE
1010364 - 1	49.9	1010364 - 213	634
-61	102	-217	665
-93	150	-221	698
-117	200	-225	732
-135	249	-229	768
-149	294	1010364 - 233	806
-161	340		
-171	383		
-179	422		
-187	464		
-193	499		
-199	536		
-205	576		
1010364 - 209	604		

C5	
PART NO.	VALUE UF
1010264 - 1	0.0010
- 2	0.0012
- 3	0.0015
- 4	0.0018
- 5	0.0022
1010264 - 6	0.0027

C7 AND C8		
PART NO.	VALUE UUF	RATING VDC
1010410 - 2	240	500
- 3	270	
- 4	300	
- 5	330	
- 6	360	
- 7	390	
- 8	430	
- 9	470	
- 10	510	500
- 11	560	300
- 12	620	
- 13	680	
- 14	750	
- 15	820	
- 16	910	
1010410 - 17	1000	300

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo DATE 17 OCT 67
CHECKED 21 Dec 67
APPROVAL E.H. Martinage 22 Dec 67
APPROVAL M. Kramer 8 Feb 68
NASA APPROVAL 1-23-68
MIT APPROVAL 23 Dec 67

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
3200 CPS PHASE AND AMPLITUDE CONTROL

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010012
SCALE — WT — SHEET 1 OF 1

2010012	A

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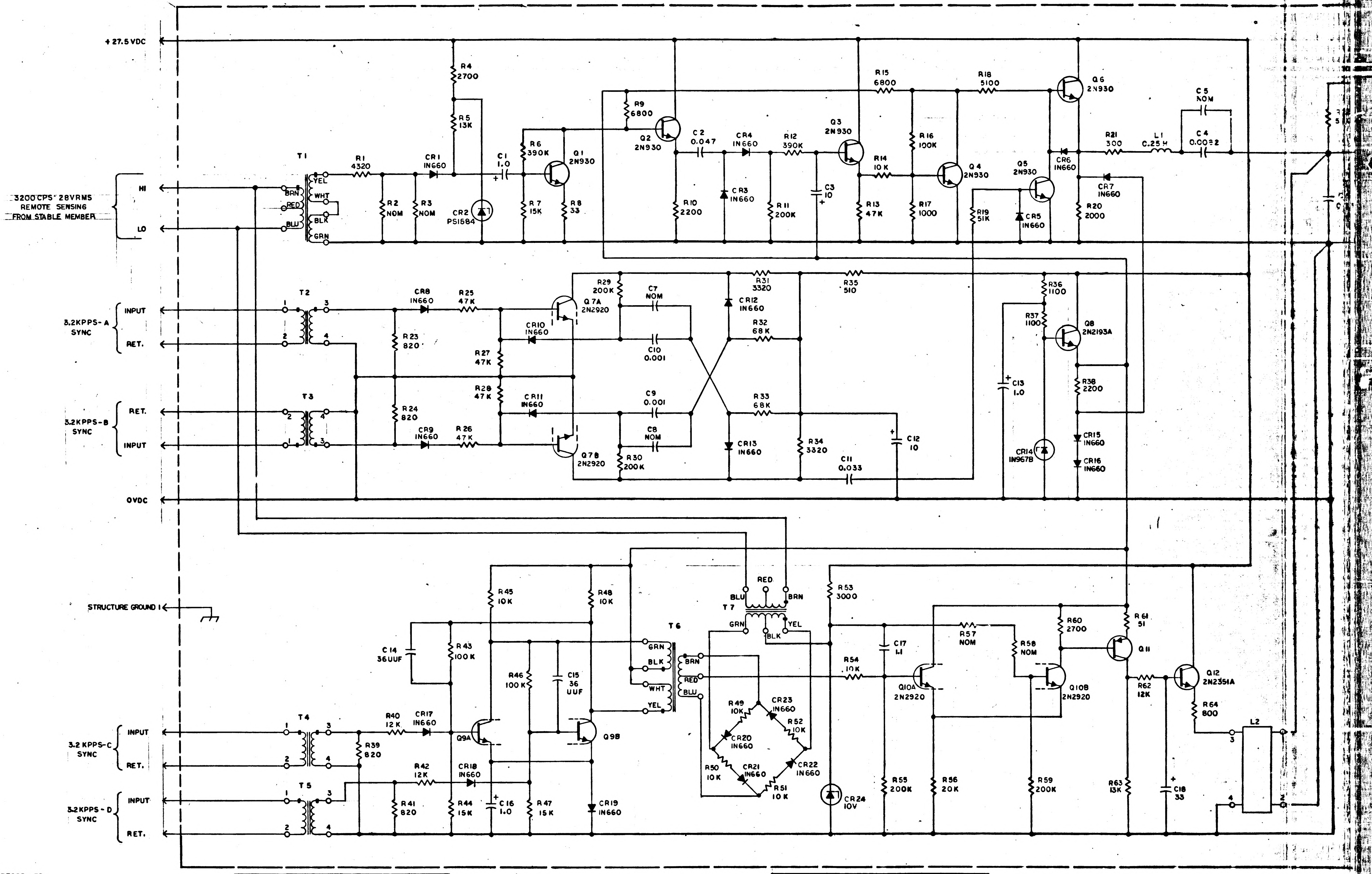

+27.5 VDC
3200 CPS 28VRMS
REMOTE SENSING
FROM STABLE MEMBER
HI
LO
T1
BRN
RED
BLU
YEL
WHT
BLK
GRN
R1 4320
R2 NOM
R3 NOM
CR1 IN660
R4 2700
R5 13K
C1 1.0
CR2 PS1584
R6 390K
R7 15K
R8 33
Q1 2N930
R9 6800
Q2 2N930
C2 0.047
CR4 IN660
CR3 IN660
R10 2200
R11 200K
R12 390K
C3 10
Q3 2N930
R13 47K
R14 10K
R15 6800
R16 100K
R17 1000
Q4 2N930
R18 5100
R19 51K
Q5 2N930
CR5 IN660
Q6 2N930
CR6 IN660
CR7 IN660
R20 2000
R21 300
L1 0.25 H
C4 0.0082
C5 NOM
3.2KPPS-A SYNC
INPUT
RET.
T2
CR8 IN660
R25 47K
R23 820
CR10 IN660
R27 47K
R28 47K
CR11 IN660
R24 820
CR9 IN660
R26 47K
3.2KPPS-B SYNC
T3
Q7A 2N2920
Q7B 2N2920
R29 200K
R30 200K
C7 NOM
C10 0.001
C9 0.001
C8 NOM
R31 3320
CR12 IN660
R32 68K
R33 68K
CR13 IN660
R34 3320
C11 0.033
C12 10
R35 510
R36 1100
R37 1100
Q8 2N2193A
C13 1.0
R38 2200
CR14 IN967B
CR15 IN660
CR16 IN660
OVDC
STRUCTURE GROUND 1
C14 36UUF
R43 100K
R45 10K
R46 100K
C15 36 UUF
R48 10K
T4
3.2 KPPS-C SYNC
R39 820
R40 12K
CR17 IN660
Q9A
Q9B
R42 12K
CR18 IN660
T5
3.2KPPS-D SYNC
R41 820
R44 15K
C16 1.0
R47 15K
CR19 IN660
T6
T7
R49 10K
CR23 IN660
R52 10K
CR20 IN660
CR21 IN660
CR22 IN660
R50 10K
R51 10K
R53 3000
CR24 10V
C17 1.1
R54 10K
Q10A 2N2920
R57 NOM
R58 NOM
Q10B 2N2920
R55 200K
R56 20K
R59 200K
R60 2700
R61 51
Q11
R62 12K
R63 13K
Q12 2N2351A
R64 800
C18 33
L2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R3, R57, R58, C5, C7 AND C8 PER APPLICABLE P.S. FROM APPROPRIATE CHART

R2	
PART NO.	VALUE
1010364-309	2000
-327	2490
-343	3010
-355	3480
-367	4020
-377	4530
-385	4990
-393	5490
-399	5900
-407	6490
-413	6980
-419	7500
1010364-425	8060

R3	
PART NO.	VALUE
1010364-577	49.9K
-585	54.9K
-595	61.9K
-607	71.5K
-619	82.5K
-653	124K
-679	169K
-711	249K
1010364-769	499K

R 57	
PART NO.	VALUE
1010364-451	11 K
-455	11.5K
-459	12.1K
-463	12.7K
-465	13 K
-467	13.3K
-469	13.7K
-471	14 K
-473	14.3 K
-475	14.7 K
-477	15 K
1010364-479	15.4K

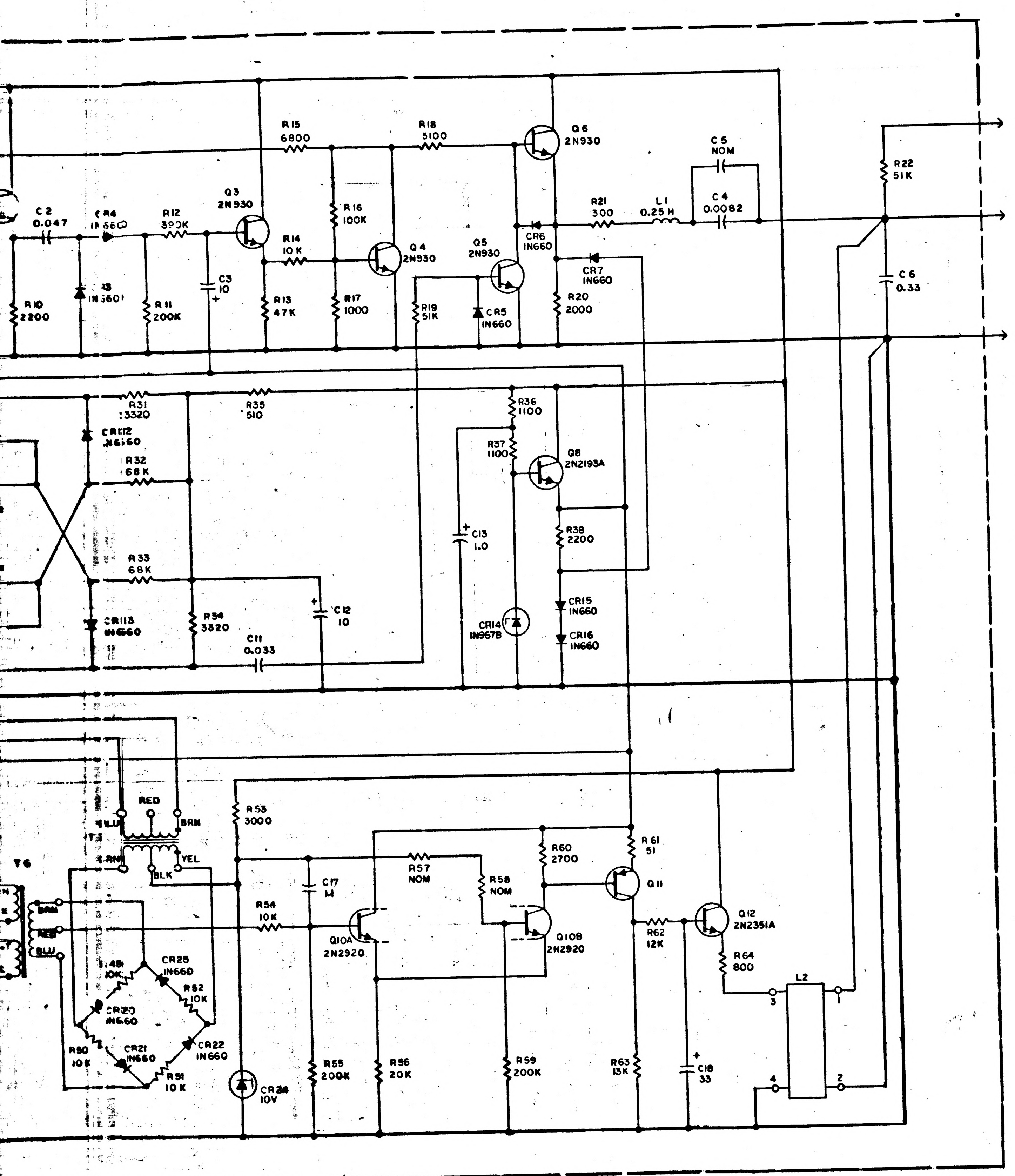
R 58			
PART NO.	VALUE	PART NO.	VALUE
1010364-1	49.9	1010364-213	634
-61	102	-217	665
-93	150	-221	698
-117	200	-225	732
-135	249	-229	768
-149	294	1010364-233	806
-161	340		
-171	383		
-179	422		
-187	464		
-193	499		
-199	536		
-205	576		
1010364-209	604		

C5	
PART NO.	VALUE
101026-1	0.00
-2	0.0
-3	0.0
-4	0.0
-5	0.
101026-6	0.

2010012 A

15108

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16271	5/2/68	WK.
B	REVISED PER TDRR 17007	5 MAR 69	



TEST POINT
FILTER OUTPUT
3200CPS LO
R15 6800
R18 5100
Q6 2N930
C5 NOM
R22 51K
Q3 2N930
R14 10K
R16 100K
Q4 2N930
Q5 2N930
CR6 IN660
R21 300
L1 0.25 H
C4 0.0082
C2 0.047
CR4 IN660
R12 390K
C3 10
CR7 IN660
C6 0.33
R10 2200
CR3 IN5601
R11 200K
R13 47K
R17 1000
R19 51K
CR5 IN660
R20 2000
R31 3320
R35 510
R36 1100
CR12 IN660
R32 68K
R37 1100
Q8 2N2193A
C13 1.0
R38 2200
R33 68K
C12 10
CR15 IN660
CR14 IN967B
R34 3320
C11 0.033
CR16 IN660
CR113 IN660
RED
BRN
BLK
YEL
BLU
T6
R53 3000
R57 NOM
R58 NOM
R60 2700
R61 51
C17 1.1
Q11
R54 10K
Q10A 2N2920
Q10B 2N2920
R62 12K
Q12 2N2351A
R64 800
R48 10K
CR25 IN660
R52 10K
CR20 IN660
L2
CR21 IN660
CR22 IN660
R50 10K
R51 10K
CR24 10V
R55 200K
R56 20K
R59 200K
R63 13K
C18 33

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363 -373	RESISTOR	4320	± 1%	1/4 W
R2	SEE NOTE 4		NOM	± 1%	1/8 W
R3	SEE NOTE 4		NOM	± 1%	1/8 W
R4	1006750 -42		2700	± 2%	1/4 W
R5	1006750 -59		13K	± 2%	1/4 W
R6	1010369 -95		390 K	± 5%	1/8 W
R7	1006750 -60		15K	± 2%	1/4 W
R8	1010369 -140		33	± 5%	1/8 W
R9	1006750 -52		6800	± 2%	1/4 W
R10	1006750 -40		2200	± 2%	1/4 W
R11	1010369 -88		200K	± 5%	1/8 W
R12	1010369 -95		390K	± 5 %	1/8 W
R13	1006750 -72		47K	± 2 %	1/4 W
R14	-56		10K		
R15	-52		6800		
R16	-80		100K		
R17	-32		1000		
R18	-49		5100		
R19	-73		51K		
R20	-39		2000		
R21	-19		300		
R22	-73		51K		
R23	-30		820		
R24	-30		820		
R25	-72		47 K		
R26	-72		47 K		
R27	-72		47K		
R28	1006750 -72		47K	± 2 %	1/4 W
R29	1010364 -693		200K	± 1 %	1/8 W
R30	1010364 -693		200K	± 1 %	1/8 W
R31	1010363 -351		3320	± 1%	1/4 W
R32	1006750 -76		68K	± 2%	1/4 W
R33	1006750 -76		68K	± 2%	1/4 W
R34	1010363 -351		3320	± 1 %	1/4 W
R35	1010278 -56		510	± 5%	1/2 W
R36	1006750 -33		1100	± 2%	1/4 W
R37	1006750 -33		1100		1/4 W
R38	1006760 -40		2200		1/2 W
R39	1006750 -30		820		1/4 W
R40	-58		12K		
R41	-30		820		
R42	-58		12K		
R43	-80		100K		
R44	-60		15K		
R45	-56		10K		
R46	-80		100K		
R47	-60		15K		
R48	1006750 -56		10 K	± 2%	1/4 W
R49	1010364 -443		10 K	± 1%	1/8 W
R50	1010364 -443		10 K	± 1%	1/8 W
R51	1010364 -443		10 K	± 1%	1/8 W
R52	1010364 -443		10 K	± 1%	1/8 W
R53	1006760 -43		3000	± 2%	1/2 W
R54	1010364 -443		10K	± 1%	1/8 W
R55	1010364 -693		200K	± 1%	1/8 W
R56	1006750 -63		20K	± 2%	1/4 W
R57	SEE NOTE 4		NOM	± 1%	1/8 W
R58	SEE NOTE 4		NOM	± 1%	1/8 W
R59	1010364 -693		200K	± 1%	1/8 W
R60	1006750 -42		2700	± 2%	1/4 W
R61	1006750 -1		51	± 2%	1/4 W
R62	1006750 -58		12K	± 2%	1/4 W
R63	1006750 -59		13K	± 2%	1/4 W
R64	1010604 -21	RESISTOR	800	± 1%	1W
C1	1006755 -69	CAPACITOR	1.0	± 10 %	35 VDC
C2	1010264 -21		0.047	± 5 %	200
C3	1006755 -81		10.0	± 10%	35
C4	1010264 -12		0.0082	± 5 %	200
C5	SEE NOTE 4		NOM	± 5%	200
C6	1010264 -31		0.33	± 5%	
C7	SEE NOTE 4		NOM	± 2%	
C8	SEE NOTE 4		NOM	± 2%	
C9	1006793 -007		0.001	± 2%	500
C10	1006793 -007		0.001	± 2 %	500
C11	1010375 -19		0.033	± 10%	50
C12	1006755 -130		10.0	± 10 %	50
C13	1006755 -118		1.0	± 10 %	50
C14	1010409 -14		36UUF	± 2%	500
C15	1010409 -14		36UUF	± 2%	500
C16	1006755 -69		1.0	± 10%	35
C17	1010279 -249		1.1	± 10%	20
C18	1006755 -87	CAPACITOR	33.0	± 10%	35
L1	1010277-1	INDUCTOR	0.25H		
L2	1010890	INDUCTOR			
T1	1010924	TRANSFORMER	DO-T51		
T2	1006319				
T3	1006319				
T4	1006319				
T5	1006319				
T6	1010895		DO-T37		
T7	1010328	TRANSFORMER	DO-T23		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010346		PS1584		
CR3	1010385		IN660		
CR4	1010385				
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385		IN660		
CR14	1010830-11		IN967B	± 5 %	400MW
CR15	1010385		IN660		
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010385		IN660		
CR24	1010372-18	DIODE	10V	± 5 %	250MW
Q1	1010397	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397		2N930		
Q7	1010431		2N2920		
Q8	1010398-1		2N2193A		
Q9	1010376-4				
Q10	1010431		2N2920		
Q11	1010633-1				
Q12	1010343-1	TRANSISTOR	2N2351A		

R 58

PART NO.	VALUE	PART NO.	VALUE
1010364 - 1	49.9	1010364-213	634
-61	102	-217	665
-93	150	-221	698
-117	200	-225	732
-135	249	-229	768
-149	294	1010364-233	806
-161	340		
-171	383		
-179	422		
-187	464		
-193	499		
-199	536		
-205	576		
1010364 - 209	604		

C 5

PART NO.	VALUE UF
1010264 - 1	0.0010
- 2	0.0012
- 3	0.0015
- 4	0.0018
- 5	0.0022
1010264 - 6	0.0027

C7 AND C8

PART NO.	VALUE UUF	RATING VDC
1010410 - 2	240	500
- 3	270	
- 4	300	
- 5	330	
- 6	360	
- 7	390	
- 8	430	
- 9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
1010410 -17	1000	300

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. Di Leo DATE
CHECKED 21 Dec '64
APPROVAL L.H. Mackinnon 22 Dec '64
APPROVAL M. Kramer
NASA APPROVAL
MIT APPROVAL 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
3200 CPS PHASE AND
AMPLITUDE CONTROL

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010012
SCALE —
WT —
SHEET 1 OF 1

2010012 B

F-2

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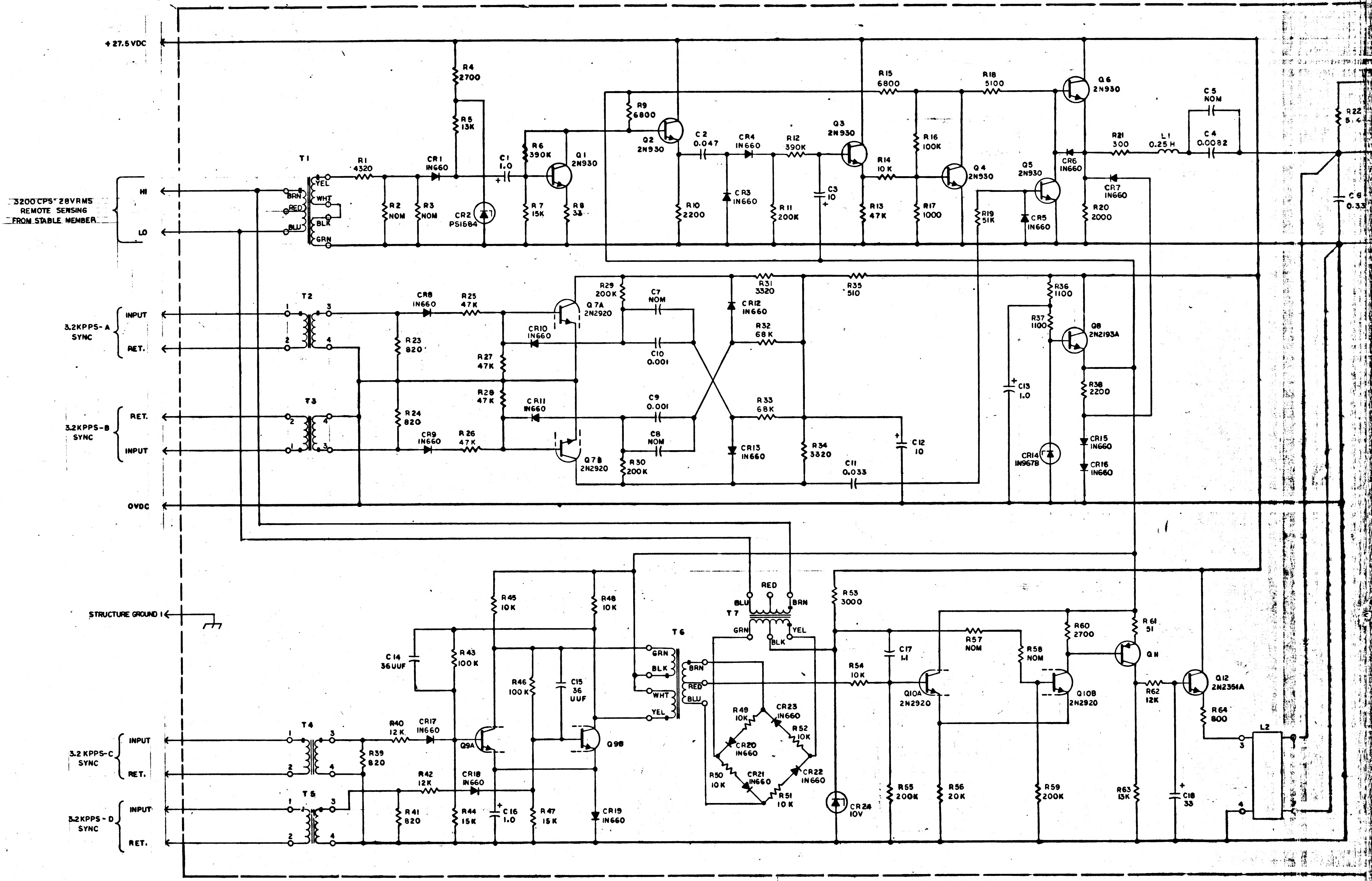


+27.5 VDC
3200 CPS 28VRMS REMOTE SENSING FROM STABLE MEMBER
HI
LO
T1
YEL
BRN
WHT
RED
BLK
BLU
GRN
R1 4320
CR1 IN660
R2 NOM
R3 NOM
R4 2700
R5 13K
CR2 PS1684
C1 1.0
R6 390K
R7 15K
Q1 2N930
R8 33
R9 6800
Q2 2N930
C2 0.047
CR4 IN660
CR3 IN660
R10 2200
R11 200K
R12 390K
C3 10
Q3 2N930
R13 47K
R14 10K
R15 6800
R16 100K
R17 1000
Q4 2N930
R18 5100
Q5 2N930
R19 51K
CR5 IN660
Q6 2N930
CR6 IN660
CR7 IN660
R20 2000
R21 300
L1 0.25 H
C4 0.0082
C5 NOM
R22
C6
3.2KPPS-A SYNC
INPUT
RET.
T2
CR8 IN660
R25 47K
R23 820
CR10 IN660
Q7A 2N2920
R29 200K
C7 NOM
C10 0.001
R27 47K
R28 47K
R31 3320
CR12 IN660
R32 68K
R35 510
R36 1100
R37 1100
Q8 2N2193A
C13 1.0
R38 2200
3.2KPPS-B SYNC
T3
R24 820
CR9 IN660
R26 47K
CR11 IN660
C9 0.001
C8 NOM
Q7B 2N2920
R30 200K
CR13 IN660
R33 68K
R34 3320
C11 0.033
C12 10
CR14 IN967B
CR15 IN660
CR16 IN660
OVDC
STRUCTURE GROUND
T7
RED
BLU
BRN
GRN
YEL
BLK
T6
R45 10K
R48 10K
C14 36UUF
R43 100K
R46 100K
C15 36 UUF
3.2KPPS-C SYNC
T4
R39 820
R40 12K
CR17 IN660
Q9A
Q9B
3.2KPPS-D SYNC
T5
R41 820
R42 12K
CR18 IN660
R44 15K
C16 1.0
R47 15K
CR19 IN660
R49 10K
CR23 IN660
R52 10K
CR20 IN660
CR21 IN660
CR22 IN660
R50 10K
R51 10K
R53 3000
CR24 10V
C17 1.1
R54 10K
Q10A 2N2920
R57 NOM
R58 NOM
Q10B 2N2920
R55 200K
R56 20K
R59 200K
R60 2700
R61 51
Q11
R62 12K
Q12 2N2351A
R64 800
R63 13K
C18 33
L2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R3, R57, R58, C5, C7 AND C8 PER APPLICABLE P.S. FROM APPROPRIATE CHART

R 2	
PART NO.	VALUE
1010364-309	2000
-327	2490
-343	3010
-355	3480
-367	4020
-377	4530
-385	4990
-393	5490
-399	5900
-407	6490
-413	6980
-419	7500
1010364-425	8060

R 3	
PART NO.	VALUE
1010364-577	49.9K
-585	54.9K
-595	61.9K
-607	71.5K
-619	82.5K
-653	124K
-679	169K
-711	249K
1010364-769	499K

R 57	
PART NO.	VALUE
1010364-451	11 K
-455	11.5K
-459	12.1K
-463	12.7K
-465	13 K
-467	13.3K
-469	13.7K
-471	14 K
-473	14.3K
-475	14.7K
-477	15 K
1010364-479	15.4K

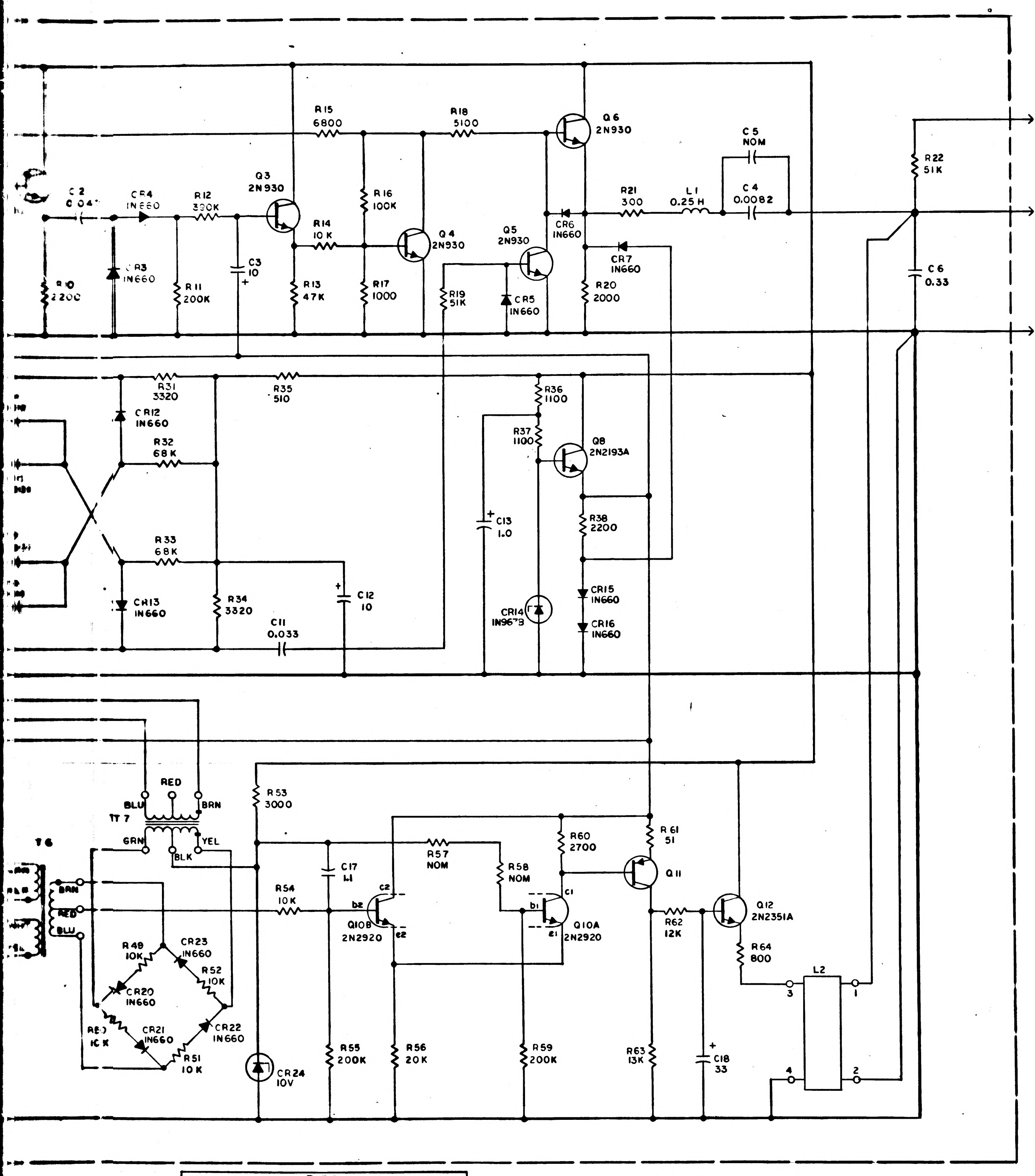
R 58			
PART NO.	VALUE	PART NO.	VALUE
1010364-1	49.9	1010364-213	634
-61	102	-217	665
-93	150	-221	698
-117	200	-225	732
-135	249	-229	768
-149	294	1010364-233	806
-161	340		
-171	383		
-179	422		
-187	464		
-193	499		
-199	536		
-205	576		
1010364-209	604		

C 5	
PART NO.	VALUE
101026-1	0.001
-2	0.0012
-3	0.001
-4	0.00
-5	0.002
101026-6	0.0

2010012 B

15108

SYM	DESCRIPTION	DATE	APPROVED
A	REVISED AND UPGRADED TO CLASS A PER TDRR 16271	3/9/65	WK.
B	REVISED PER TDRR 17007	5 MAR 65	WK.
C	REVISED PER TDRR 19812	3 JUNE 1965	



7 TEST POINT
2 FILTER OUTPUT
3 3200CPS LO
R15 6800
R18 5100
Q6 2N930
C5 NOM
R22 51K
C2 0.047
CR4 IN660
R12 330K
Q3 2N930
R16 100K
R14 10K
Q4 2N930
Q5 2N930
R21 300
L1 0.25H
C4 0.0082
CR6 IN660
CR7 IN660
C6 0.33
CR3 IN660
R10 2200
R11 200K
C3 10
R13 47K
R17 1000
R19 51K
CR5 IN660
R20 2000
R31 3320
R35 510
R36 1100
CR12 IN660
R32 68K
R37 1100
Q8 2N2193A
R33 68K
C13 1.0
R38 2200
CR15 IN660
CR13 IN660
R34 3320
C12 10
CR14 IN967B
CR16 IN660
C11 0.033
T6
T7
RED
BLU
BRN
GRN
YEL
BLK
R53 3000
R57 NOM
R58 NOM
C17 1.1
R60 2700
R61 51
Q11
R54 10K
Q10B 2N2920
Q10A 2N2920
R62 12K
Q12 2N2351A
R64 800
L2
R49 10K
CR23 IN660
R52 10K
CR20 IN660
CR21 IN660
CR22 IN660
R51 10K
CR24 10V
R55 200K
R56 20K
R59 200K
R63 13K
C18 33

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363 -373	RESISTOR	4320	± 1%	1/4 W
R2	SEE NOTE 4		NOM	± 1%	1/8 W
R3	SEE NOTE 4		NOM	± 1%	1/8 W
R4	1006750-42		2700	± 2%	1/4 W
R5	1006750-59		13K	± 2%	1/4 W
R6	1010369-95		390K	± 5%	1/8 W
R7	1006750-60		15K	± 2%	1/4 W
R8	1010369 -140		33	± 5%	1/8 W
R9	1006750 -52		6800	± 2%	1/4 W
R10	1006750 -40		2200	± 2%	1/4 W
R11	1010369 -88		200K	± 5%	1/8 W
R12	1010369 -95		390K	± 5%	1/8 W
R13	1006750 -72		47K	± 2%	1/4 W
R14	-56		10K		
R15	-52		6800		
R16	-80		100K		
R17	-32		1000		
R18	-49		5100		
R19	-73		51K		
R20	-39		2000		
R21	-19		300		
R22	-73		51K		
R23	-30		820		
R24	-30		820		
R25	-72		47K		
R26	-72		47K		
R27	-72		47K		
R28	1006750 - 72		47K	± 2%	1/4 W
R29	1010364 -693		200K	± 1%	1/8 W
R30	1010364 -693		200K	± 1%	1/8 W
R31	1010363 -351		3320	± 1%	1/4 W
R32	1006750 - 76		68K	± 2%	1/4 W
R33	1006750 - 76		68K	± 2%	1/4 W
R34	1010363 -351		3320	± 1%	1/4 W
R35	1010278 - 56		510	± 5%	1/2 W
R36	1006750 - 33		1100	± 2%	1/4 W
R37	1006750 - 33		1100		1/4 W
R38	1006760 - 40		2200		1/2 W
R39	1006750 - 30		820		1/4 W
R40	-58		12K		
R41	-30		820		
R42	-58		12K		
R43	-80		100K		
R44	-60		15K		
R45	-56		10K		
R46	-80		100K		
R47	-60		15K		
R48	1006750 -56		10K	± 2%	1/4 W
R49	1010364 -443		10K	± 1%	1/8 W
R50	1010364 -443		10K	± 1%	1/8 W
R51	1010364 -443		10K	± 1%	1/8 W
R52	1010364 -443		10K	± 1%	1/8 W
R53	1006760 -43		3000	± 2%	1/2 W
R54	1010364 -443		10K	± 1%	1/8 W
R55	1010364 - 693		200K	± 1%	1/8 W
R56	1006750 -63		20K	± 2%	1/4 W
R57	SEE NOTE 4		NOM	± 1%	1/8 W
R58	SEE NOTE 4		NOM	± 1%	1/8 W
R59	1010364 -693		200K	± 1%	1/8 W
R60	1006750 - 42		2700	± 2%	1/4 W
R61	1006750 - 1		51	± 2%	1/4 W
R62	1006750 - 58		12K	± 2%	1/4 W
R63	1006750 - 59		13K	± 2%	1/4 W
R64	1010604 - 21	RESISTOR	800	± 1%	1 W
C1	1006755 - 69	CAPACITOR	1.0	± 10%	35 VDC
C2	1010264 - 21		0.047	± 5%	200
C3	1006755 - 81		10.0	± 10%	35
C4	1010264 - 12		0.0082	± 5%	200
C5	SEE NOTE 4		NOM	± 5%	200
C6	1010264 - 31		0.33	± 5%	
C7	SEE NOTE 4		NOM	± 2%	
C8	SEE NOTE 4		NOM	± 2%	
C9	1006793 -7		0.001	± 2%	500
C10	1006793 -7		0.001	± 2%	500
C11	1010375 -19		0.033	± 10%	50
C12	1006755 -130		10.0	± 10%	50
C13	1006755 -118		1.0	± 10%	50
C14	1010409 -14		36UUF	± 2%	500
C15	1010409 -14		36UUF	± 2%	500
C16	1006755 -69		1.0	± 10%	35
C17	1010279 -249		1.1	± 10%	20
C18	1006755 -87	CAPACITOR	33.0	± 10%	35
L1	1010277-1	INDUCTOR	0.25H		
L2	1010890	INDUCTOR			
T1	1010924	TRANSFORMER	DO-T51		
T2	1006319				
T3	1006319				
T4	1006319				
T5	1006319				
T6	1010895		DO-T37		
T7	1010328	TRANSFORMER	DO-T23		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010346-1		PS1584		
CR3	1010385		IN660		
CR4	1010385				
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385		IN660		
CR14	1010830-11		IN967B	± 5%	400MW
CR15	1010385		IN660		
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010385		IN660		
CR24	1010372-18	DIODE	10V	± 5%	250MW
Q1	1010397-1	TRANSISTOR	2N930		
Q2	-1				
Q3	-1				
Q4	-1				
Q5	-1				
Q6	1010397 - 1		2N930		
Q7	1010431 -000		2N2920		
Q8	1010398-1		2N2193A		
Q9	1010376-4				
Q10	1010431-000		2N2920		
Q11	1010633-1				
Q12	1010343-1	TRANSISTOR	2N2351A		

R 58

PART NO.	VALUE	PART NO.	VALUE
1010364 - 1	49.9	1010364-213	634
-61	102	-217	665
-93	150	-221	698
-117	200	-225	732
-135	249	-229	768
-149	294	1010364-233	806
-161	340		
-171	383		
-179	422		
-187	464		
-193	499		
-199	536		
-205	576		
1010364 - 209	604		

C 5

PART NO.	VALUE UF
1010264 - 1	0.0010
- 2	0.0012
- 3	0.0015
- 4	0.0018
- 5	0.0022
1010264 - 6	0.0027

C7 AND C8

PART NO.	VALUE UUF	RATING VDC
1010410 - 2	240	500
- 3	270	
- 4	300	
- 5	330	
- 6	360	
- 7	390	
- 8	430	
- 9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
1010410 -17	1000	300

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Di Leo DATE 15 Oct 64
CHECKED 21 Dec '64
APPROVAL 22 Dec '64
APPROVAL M. Kramer 8 Feb '65
NASA APPROVAL 12-23-64
MIT APPROVAL 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, 3200 CPS PHASE AND AMPLITUDE CONTROL

CODE IDENT NO. 80230 | SIZE J | NASA DRAWING NO. 2010012
SCALE — — | WT — | SHEET 1 OF 1

2010012 C

2010012 | C

2#

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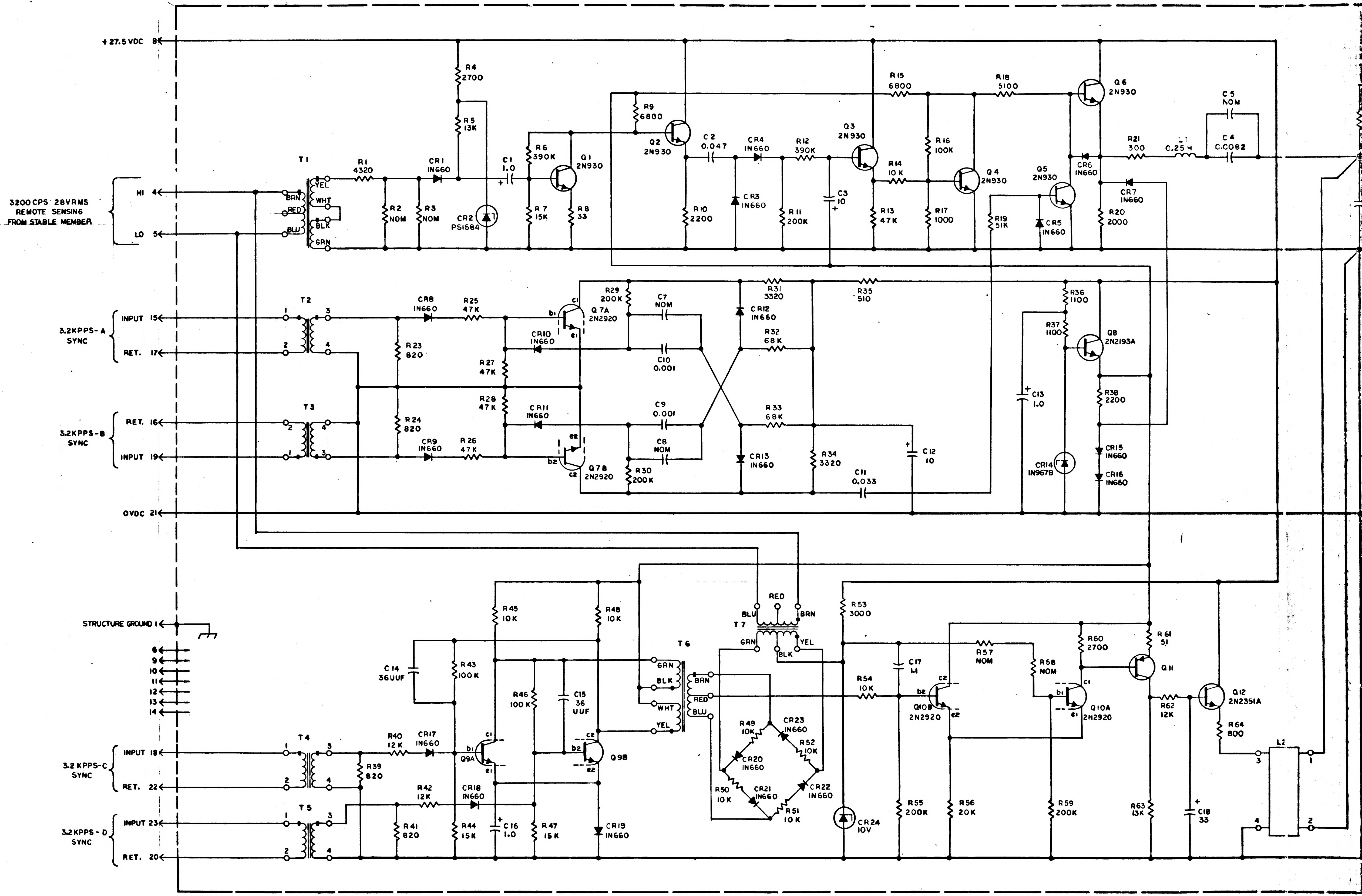

+27.5 VDC 8
3200 CPS 28 VRMS REMOTE SENSING FROM STABLE MEMBER
HI 4
LO 5
T1
YEL
BRN
WHT
RED
BLK
BLU
GRN
R1 4320
R2 NOM
R3 NOM
R4 2700
R5 13K
CR1 IN660
CR2 PS1684
C1 1.0
R6 390K
R7 15K
R8 33
Q1 2N930
R9 6800
Q2 2N930
R10 2200
C2 0.047
CR3 IN660
CR4 IN660
R11 200K
R12 390K
C3 10
Q3 2N930
R13 47K
R14 10K
R15 6800
R16 100K
R17 1000
Q4 2N930
R18 5100
Q5 2N930
CR5 IN660
R19 51K
Q6 2N930
CR6 IN660
CR7 IN660
R20 2000
R21 300
L1 0.25 H
C4 0.0082
C5 NOM
3.2KPPS-A SYNC
INPUT 15
RET. 17
T2
CR8 IN660
R25 47K
R23 820
R27 47K
CR10 IN660
Q7A 2N2920
R29 200K
C7 NOM
C10 0.001
R31 3320
CR12 IN660
R32 68K
R35 510
R36 1100
R37 1100
Q8 2N2193A
C13 1.0
R38 2200
CR14 IN967B
CR15 IN660
CR16 IN660
3.2KPPS-B SYNC
RET. 16
INPUT 19
T3
R24 820
R28 47K
CR11 IN660
CR9 IN660
R26 47K
C9 0.001
C8 NOM
R30 200K
Q7B 2N2920
R33 68K
CR13 IN660
R34 3320
C11 0.033
C12 10
0VDC 21
STRUCTURE GROUND 1
6 9 10 11 12 13 14
C14 36UUF
R43 100K
R45 10K
R46 100K
C15 36 UUF
R48 10K
Q9A
Q9B
T6
T7
R49 10K
R50 10K
R51 10K
R52 10K
CR20 IN660
CR21 IN660
CR22 IN660
CR23 IN660
R53 3000
CR24 10V
R54 10K
C17 1.1
Q10B 2N2920
R55 200K
R56 20K
R57 NOM
R58 NOM
Q10A 2N2920
R59 200K
R60 2700
R61 51
Q11
R62 12K
R63 13K
C18 33
Q12 2N2351A
R64 800
L2
3.2 KPPS-C SYNC
INPUT 18
RET. 22
T4
R39 820
R40 12K
CR17 IN660
R42 12K
CR18 IN660
3.2KPPS-D SYNC
INPUT 23
RET. 20
T5
R41 820
R44 15K
C16 1.0
R47 15K
CR19 IN660

R2	
PART NO.	VALUE
1010364-565	43.2 K
-569	45.3 K
-575	48.7 K
-581	52.3 K
-587	56.2 K
-593	60.4 K
-599	64.9 K
-607	71.5 K
-615	78.7 K
-625	88.7 K
-635	100 K
-647	115 K
-661	137 K
-679	169 K
-699	215 K
-727	301 K
1010364-769	499 K

R3	
PART NO.	VALUE
1010364-337	2800
-339	2870
-341	2940
-343	3010
-345	3090
-347	3160
-349	3240
-351	3320
-353	3400
-355	3480
-357	3570
-359	3650
-361	3740
-363	3830
-365	3920
-369	4120
-3[illegible]3	4320
-377	4530
1010364-381	4750

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R3, R57, R58, C5, C7 AND C8 PER APPLICABLE P.S. FROM APPROPRIATE CHART

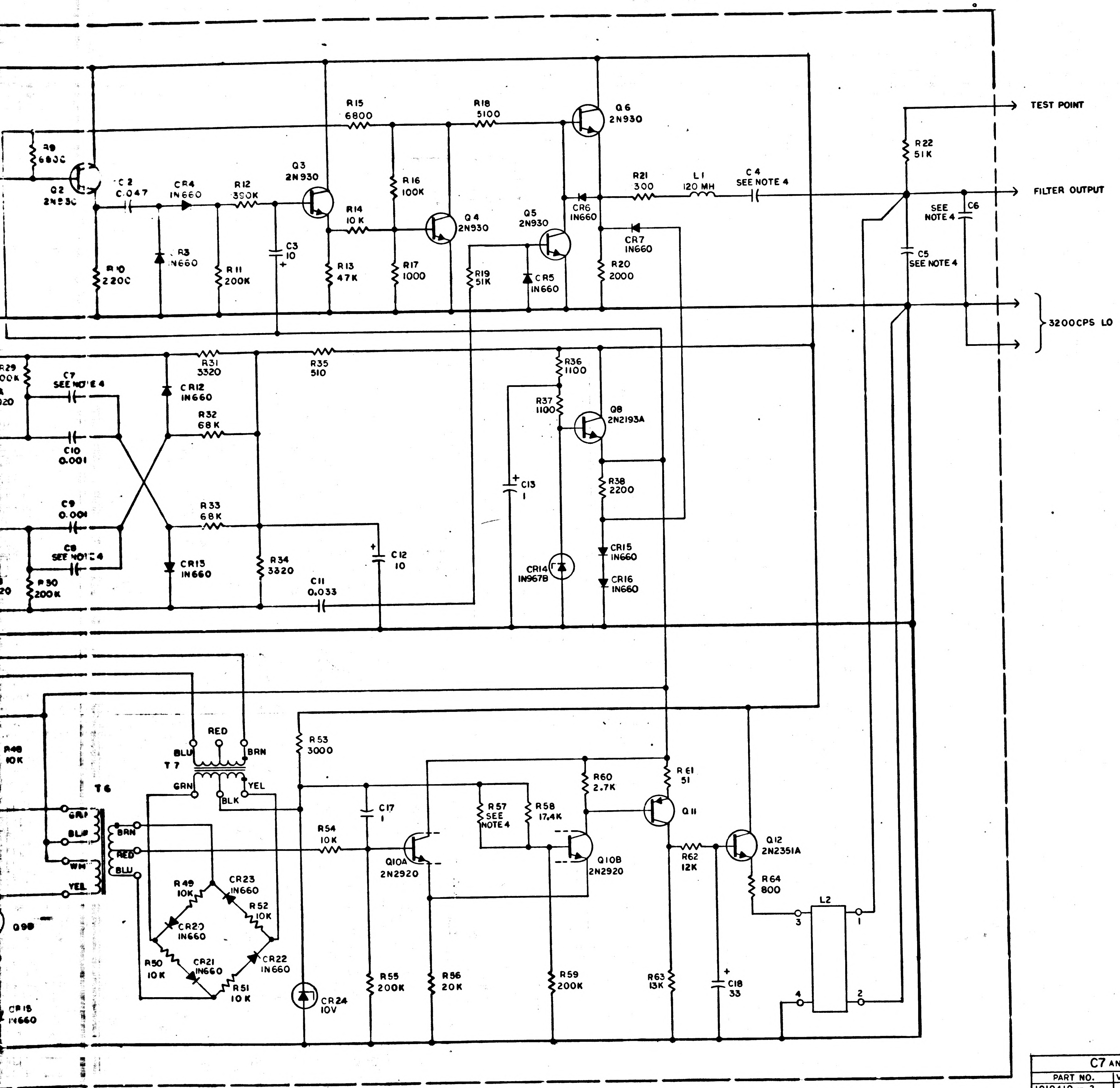
R 57	
PART NO.	VALUE
1010364-451	11 K
-455	11.5K
-459	12.1 K
-463	12.7K
-465	13 K
-467	13.3K
-469	13.7K
-471	14 K
-473	14.3 K
-475	14.7 K
-477	15 K
1010364-479	15.4K

R 58			
PART NO.	VALUE	PART NO.	VALUE
1010364-1	49.9	1010364-213	634
-61	102	-217	665
-93	150	-221	698
-117	200	-225	732
-135	249	-229	768
-149	294	1010364-233	806
-161	340		
-171	383		
-179	422		
-187	464		
-193	499		
-199	536		
-205	576		
1010364-209	604		

C5
PART NO.
010264 -
-
-
-
-
010264 -

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS


TEST POINT
FILTER OUTPUT
3200CPS LO
R9 6800
Q2 2N930
C2 0.047
CR4 IN660
R12 390K
R10 2200
R3 IN660
R11 200K
C3 10
R15 6800
Q3 2N930
R14 10K
R13 47K
R16 100K
R17 1000
Q4 2N930
R18 5100
Q6 2N930
Q5 2N930
R19 51K
CR5 IN660
CR6 IN660
CR7 IN660
R20 2000
R21 300
L1 120 MH
C4 SEE NOTE 4
R22 51K
SEE NOTE 4
C6
C5 SEE NOTE 4
R31 3320
R35 510
C7 SEE NOTE 4
C10 0.001
CR12 IN660
R32 68K
C9 0.001
C8 SEE NOTE 4
R30 200K
R33 68K
CR13 IN660
R34 3320
C11 0.033
C12 10
R36 1100
R37 1100
Q8 2N2193A
C13 1
R38 2200
CR14 IN9678
CR15 IN660
CR16 IN660
R48 10K
T7
RED
BLU
BRN
GRN
YEL
BLK
T6
GRN
BLU
WH
YEL
BRN
RED
BLU
R49 10K
CR23 IN660
R52 10K
CR20 IN660
R50 10K
CR21 IN660
CR22 IN660
R51 10K
CR18 IN660
Q9B
CR24 10V
R53 3000
R54 10K
C17 1
Q10A 2N2920
R57 SEE NOTE 4
R58 17.4K
Q10B 2N2920
R60 2.7K
R61 51
Q11
R62 12K
Q12 2N2351A
R64 800
L2
R55 200K
R56 20K
R59 200K
R63 13K
C18 33

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010363 -373	RESISTOR	4320	± 1%	1/4 W
R2	1010364 -		SEE NOTE 4	± 1%	1/8 W
R3	1010364 -		SEE NOTE 4	± 1%	1/8 W
R4	1006750 -42		2700	± 2%	1/4 W
R5	1006750 -59		13K	± 2%	1/4 W
R6	1010369 -95		390K	± 5%	1/8 W
R7	1006750 -60		15K	± 2%	1/4 W
R8	1010369 -140		33	± 5%	1/8 W
R9	1006750 -52		6800	± 2%	1/4 W
R10	1006750 -40		2200	± 2%	1/4 W
R11	1010369 -88		200K	± 5%	1/8 W
R12	1010369 -95		390K	± 5%	1/8 W
R13	1006750 -72		47K	± 2%	1/4 W
R14	-56		10K		
R15	-52		6800		
R16	-80		100K		
R17	-32		1000		
R18	-49		5100		
R19	-73		51K		
R20	-39		2000		
R21	-19		300		
R22	-73		51K		
R23	-				
R24	-				
R25	-56		10K		
R26	-56		10K		
R27	-72		47K		
R28	1006750 -72		47K	± 2%	1/4 W
R29	1010364 -693		200K	± 1%	1/8 W
R30	1010364 -693		200K	± 1%	1/8 W
R31	1010363 -351		3320	± 1%	1/4 W
R32	1006750 -76		68K	± 2%	1/4 W
R33	1006750 -76		68K	± 2%	1/4 W
R34	1010363 -351		3320	± 1%	1/4 W
R35	1010278 -56		510	± 5%	1/2 W
R36	1006750 -33		1100	± 2%	1/4 W
R37	1006750 -33		1100		1/4 W
R38	1006760 -40		2200		1/2 W
R39	1006750 -26		560		1/4 W
R40	-49		5100		
R41	-26		560		
R42	-49		5100		
R43	-80		100K		
R44	-60		15K		
R45	-56		10K		
R46	-80		100K		
R47	-60		15K		
R48	1006750 -56		10K	± 2%	1/4 W
R49	1010364 -443		10K	± 1%	1/8 W
R50	1010364 -443		10K	± 1%	1/8 W
R51	1010364 -443		10K	± 1%	1/8 W
R52	1010364 -443		10K	± 1%	1/8 W
R53	1006760 -43		3000	± 2%	1/2 W
R54	1010364 -443		10K	± 1%	1/8 W
R55	1010364 -693		200K	± 1%	1/8 W
R56	1006750 -63		20K	± 2%	1/4 W
R57	1010364 -		SEE NOTE 4	± 1%	1/8 W
R58	1010364 -489		17.4K	± 1%	1/8 W
R59	1010364 -693		200K	± 1%	1/8 W
R60	1006750 -42		2.7K	± 2%	1/4 W
R61	1006750 -1		51	± 2%	1/4 W
R62	1006750 -58		12K	± 2%	1/4 W
R63	1006750 -59		13K	± 2%	1/4 W
R64	1010604 -21	RESISTOR	800	± 1%	1W
C1	1006755 -69	CAPACITOR	1.0	± 10%	35 VDC
C2	1010264 -21		0.047	± 5%	200
C3	1006755 -81		10.0	± 10%	35
C4	1010264 -		SEE NOTE 4	± 5%	200
C5	1010264 -		SEE NOTE 4	± 5%	200
C6	1010264 -		SEE NOTE 4	± 5%	
C7	1010410 -		SEE NOTE 4	± 2%	
C8	1010410 -		SEE NOTE 4	± 2%	
C9	1006793 -007		0.001	± 2%	500
C10	1006793 -007		0.001	± 2%	500
C11	1010375 -19		0.033	± 10%	50
C12	1006755 -130		10.0	± 10%	50
C13	1006755 -118		1.0	± 10%	50
C14	1010409 -14		36UUF	± 2%	500
C15	1010409 -14		36UUF	± 2%	500
C16	1006755 -69		1.0	± 10%	35
C17	1010279 -249		1.0	± 10%	20
C18	1006755 -87	CAPACITOR	33.0	± 10%	35
L1	1010309 -8	INDUCTOR	120 MH		
L2		INDUCTOR			
T1		TRANSFORMER			
T2	1006762				
T3	1006762				
T4	1006762				
T5	1006762				
T6					
T7	1010328	TRANSFORMER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010346		PS1584		
CR3	1010385		IN660		
CR4	1010385				
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13	1010385		IN660		
CR14	1010380-11		IN9678	±5%	400MW
CR15	1010385		IN660		
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010385		IN660		
CR24	1010372-18	DIODE	10V	±5%	250MW
Q1	1010397	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5					
Q6	1010397		2N930		
Q7	1010431		2N2920		
Q8	1010398-1		2N2193A		
Q9	1010376-4				
Q10	1010431		2N2920		
Q11	1010633-				
Q12	1010343-1	TRANSISTOR	2N2351A		

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 15108 DATE

R3

PART NO.	VALUE
1010364 -	
-	
-	
-	
-	
-	
-	
-	
-	
-	
1010364 -	

R57

PART NO.	VALUE	PART NO.	VALUE
1010364 -		1010364 -	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		1010364 -	
-			
-			
1010364 -			

C4

PART NO.	VALUE UF
1010264-16	.018
1010264-17	.022

C5

PART NO.	VALUE UF
1010264-28	.180
1010264-29	.220
1010264-30	.270
1010264-31	.330

C6

PART NO	VALUE UF	RATING VDC
1010264 -52	.027	400
-21	.047	200
-22	.056	
-23	.068	
-24	.082	
-25	.100	
-26	.120	
1010264 -27	.150	200

C7 AND C8

PART NO.	VALUE UUF	RATING VDC
1010410 - 2	240	500
- 3	270	
- 4	300	
- 5	330	
- 6	360	
- 7	390	
- 8	430	
- 9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
1010410 -17	1000	300

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

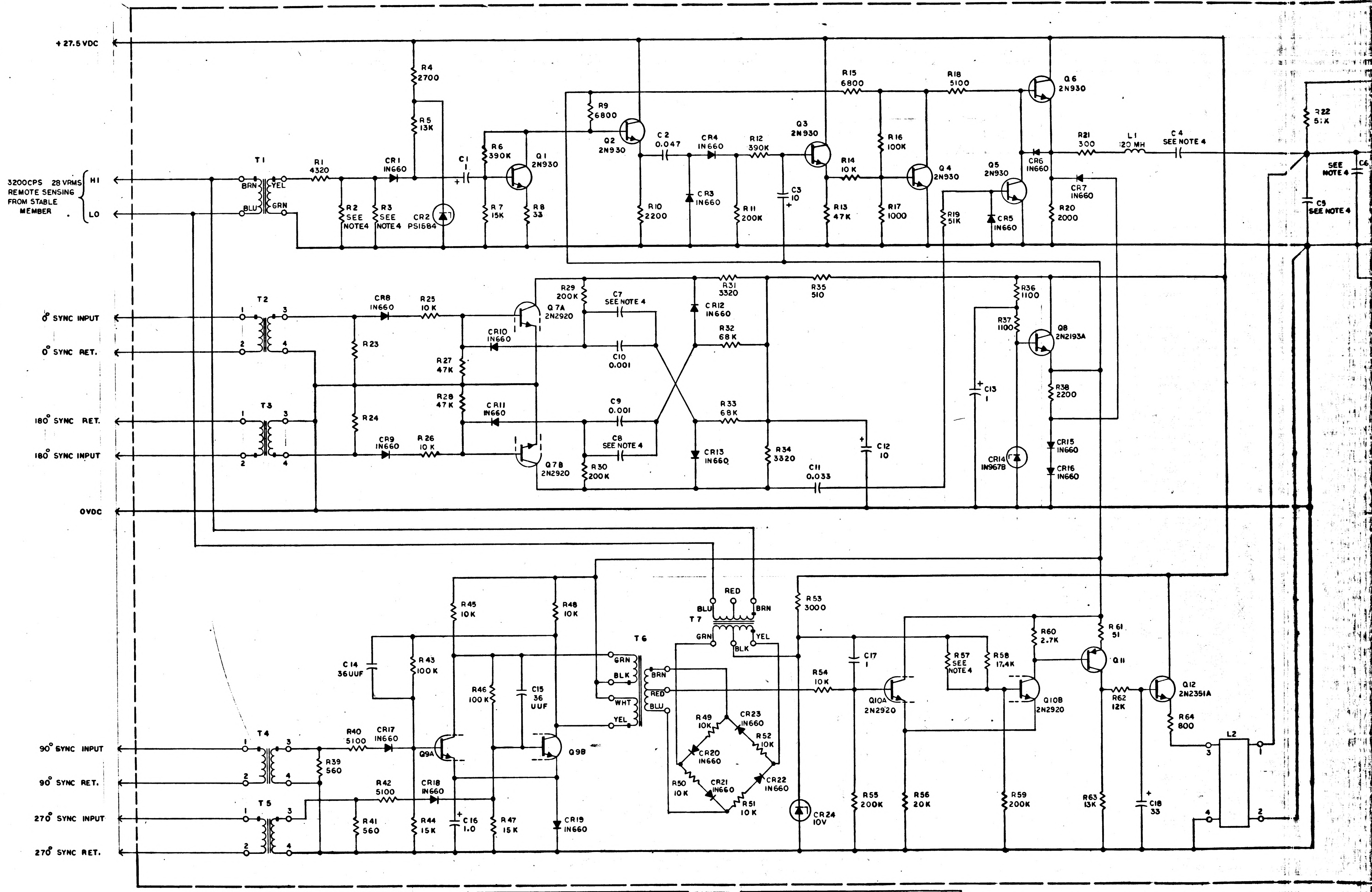
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT
DRAWN A. D. Leo DATE
CHECKED 21 Dec 64
APPROVAL L.H. Martinage 22 Dec 64
APPROVAL
NASA APPROVAL
MIT APPROVAL 23 Dec 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, 3200 CPS PHASE AND AMPLITUDE CONTROL

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010012
SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


+27.5 VDC
3200CPS 28 VRMS
REMOTE SENSING
FROM STABLE
MEMBER
HI
LO
T1
BRN
YEL
BLU
GRN
R1 4320
R2 SEE NOTE4
R3 SEE NOTE4
CR1 IN660
CR2 PS1684
R4 2700
R5 13K
C1 1
R6 390K
R7 15K
R8 33
Q1 2N930
R9 6800
Q2 2N930
R10 2200
C2 0.047
CR4 IN660
CR3 IN660
R11 200K
R12 390K
C3 10
Q3 2N930
R13 47K
R14 10K
R15 6800
R16 100K
R17 1000
Q4 2N930
R18 5100
R19 51K
Q5 2N930
CR5 IN660
Q6 2N930
CR6 IN660
CR7 IN660
R20 2000
R21 300
L1 120 MH
C4 SEE NOTE 4
R22 51K
SEE NOTE 4
C5 SEE NOTE 4
C6
0° SYNC INPUT
0° SYNC RET.
180° SYNC RET.
180° SYNC INPUT
T2
T3
CR8 IN660
R25 10K
R23
R24
CR9 IN660
R26 10K
CR10 IN660
CR11 IN660
R27 47K
R28 47K
Q7A 2N2920
Q7B 2N2920
R29 200K
R30 200K
C7 SEE NOTE 4
C8 SEE NOTE 4
C10 0.001
C9 0.001
R31 3320
CR12 IN660
R32 68K
R33 68K
CR13 IN660
R34 3320
C11 0.033
C12 10
R35 510
R36 1100
R37 1100
Q8 2N2193A
R38 2200
C13 1
CR14 IN967B
CR15 IN660
CR16 IN660
OVDC
90° SYNC INPUT
90° SYNC RET.
270° SYNC INPUT
270° SYNC RET.
T4
T5
R39 560
R40 5100
CR17 IN660
R41 560
R42 5100
CR18 IN660
R43 100K
R44 15K
C14 36UUF
R45 10K
R46 100K
C15 36 UUF
C16 1.0
R47 15K
R48 10K
Q9A
Q9B
CR19 IN660
T6
GRN
BLK
WHT
YEL
BRN
RED
BLU
T7
RED
BLU
BRN
GRN
BLK
YEL
R49 10K
CR23 IN660
R52 10K
CR20 IN660
R50 10K
CR21 IN660
CR22 IN660
R51 10K
R53 3000
CR24 10V
C17 1
R54 10K
Q10A 2N2920
R55 200K
R56 20K
R57 SEE NOTE 4
R58 17.4K
Q10B 2N2920
R59 200K
R60 2.7K
R61 51
Q11
R62 12K
R63 13K
C18 33
Q12 2N2351A
R64 800
L2
1
2
3
4
7
6
5
4
3
A
B
C
D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R2, R3, R57, C4, C5, C6, C7 AND C8 PER ATP FROM APPROPRIATE CHART

R2			
PART NO.	VALUE	PART NO.	VALUE
1010364 -		1010364 -	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		1010364 -	
-			
-			
1010364 -			

R3			
PART NO.	VALUE	PART NO.	VALUE
1010364 -		1010364 -	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		1010364 -	
-			
-			
1010364 -			

R57			
PART NO.	VALUE	PART NO.	VALUE
1010364 -		1010364 -	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		-	
-		1010364 -	
-			
-			
1010364 -			

C4	
PART NO.	VALUE UF
1010264 - 16	.018
1010264 - 17	.022

C5	
PART NO.	VALUE UF
1010264 - 28	.180
1010264 - 29	.220
1010264 - 30	.270
1010264 - 31	.330

C6		
PART NO	VALUE UF	PAT
1010264 - 5	.027	4
- 2	.047	2
- 2	.056	
- 2	.068	
- 2	.082	
- 2	.100	
- 2	.120	
1010264 - 2	.150	20

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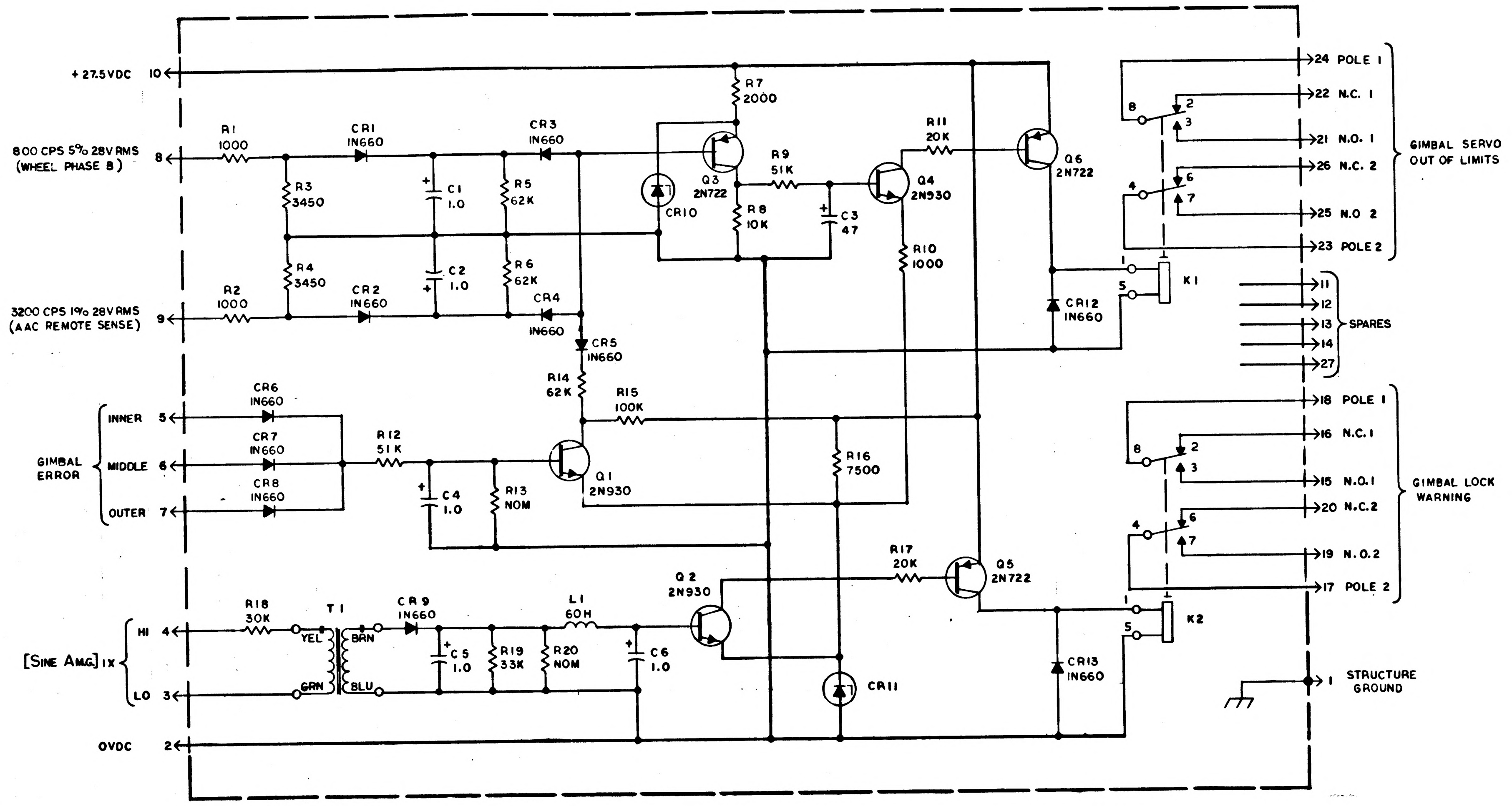
REVISIONS 16028

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 18516			31 APR 65	



+27.5VDC 10
800 CPS 5% 28V RMS (WHEEL PHASE B) 8
3200 CPS 1% 28V RMS (AAC REMOTE SENSE) 9
GIMBAL ERROR
INNER 5
MIDDLE 6
OUTER 7
[SINE AMG] 1X
HI 4
LO 3
OVDC 2
R1 1000
R2 1000
R3 3450
R4 3450
R5 62K
R6 62K
R7 2000
R8 10K
R9 51K
R10 1000
R11 20K
R12 51K
R13 NOM
R14 62K
R15 100K
R16 7500
R17 20K
R18 30K
R19 33K
R20 NOM
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9 IN660
CR10
CR11
CR12 IN660
CR13 IN660
C1 1.0
C2 1.0
C3 47
C4 1.0
C5 1.0
C6 1.0
L1 60H
T1
YEL
GRN
BRN
BLU
Q1 2N930
Q2 2N930
Q3 2N722
Q4 2N930
Q5 2N722
Q6 2N722
K1
K2
1
5
8
2
3
4
6
7
24 POLE 1
22 N.C. 1
21 N.O. 1
26 N.C. 2
25 N.O 2
23 POLE 2
GIMBAL SERVO OUT OF LIMITS
11
12
13
14
27
SPARES
18 POLE 1
16 N.C. 1
15 N.O. 1
20 N.C. 2
19 N.O. 2
17 POLE 2
GIMBAL LOCK WARNING
1 STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-32	RESISTOR	1000	± 2%	1/4 W
R 2	-32		1000		
R 3	-128		3450		
R 4	-128		3450		
R 5	-75		62K		
R 6	1006750-75		62K		1/4 W
R 7	1006760-39		2000		1/2 W
R 8	1006750-56		10 K		1/4 W
R 9	-73		51 K		
R10	-32		1000		
R11	-63		20K		
R12	1006750-73		51K	± 2%	1/4 W
R13	SEE NOTE 4		NOM	± 5%	1/8 W
R14	1006750-75		62 K	± 2%	1/4 W
R15	-80		100K		
R16	-53		7500		
R17	-63		20 K		
R18	-67		30 K		
R19	1006750-68		33 K	± 2%	1/4 W
R20	SEE NOTE 4	RESISTOR	NOM	± 1%	1/8 W
C 1	1006755-118	CAPACITOR	1.0	±10%	50VDC
C 2	-118		1.0		50
C 3	-89		47.0		35
C 4	-118		1.0		50
C 5	-118		1.0		50
C 6	1006755-118	CAPACITOR	1.0	±10%	50VDC
L 1	1010277-10	REACTOR	60 H		
CR1	1010385	DIODE	IN660		250MW
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9	1010385		IN660		250MW
CR10	1010830-9		15 V	5%	400MW
CR11	1010372-11		5.1 V	5%	250MW
CR12	1010385		IN 660		250MW
CR13	1010385	DIODE	IN 660		250MW
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1		2N930		
Q 3	1010285		2N722		
Q 4	1010397-1		2N 930		
Q 5	1010285		2N722		
Q 6	1010285	TRANSISTOR	2N722		
K 1	1010353-4	RELAY			
K 2	1010353-4	RELAY			
T 1	1010324	TRANSFORMER	DO-T36		

R13		R 20	
PART NO.	VALUE	PART NO.	VALUE
1010369-93	330 K	1010364-565	43.2 K
-94	360 K	-569	45.3 K
-95	390 K	-573	47.5 K
-96	430 K	-577	49.9 K
-97	470 K	-581	52.3 K
-98	510 K	-585	54.9 K
-99	560 K	-589	57.6 K
-100	620 K	-593	60.4 K
-101	680 K	-597	63.4 K
-102	750 K	-603	68.1 K
-103	820 K	-609	73.2 K
-104	910 K	-615	78.7 K
-105	1 MEG	-621	84.4 K
1010369-106	1.1 MEG	-627	90.9 K
		1010364-633	97.6 K

REF DWG:
GIMBAL SERVO OUT OF LIMITS &
GIMBAL LOCK WARNING INDICATOR ASSY
DWG NO. 2007117

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED, CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R13 & R20 PER ATP FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 21 NOV 65
CHECKED
APPROVED Louis Martinez 28 Jan 65
APPROVED 29 Jan 65
APPROVED MIT W Kupfer 9 Feb 65
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
GIMBAL SERVO OUT OF LIMITS &
GIMBAL LOCK WARNING INDICATOR

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010013
SCALE —
SHEET 1 OF

MASTER

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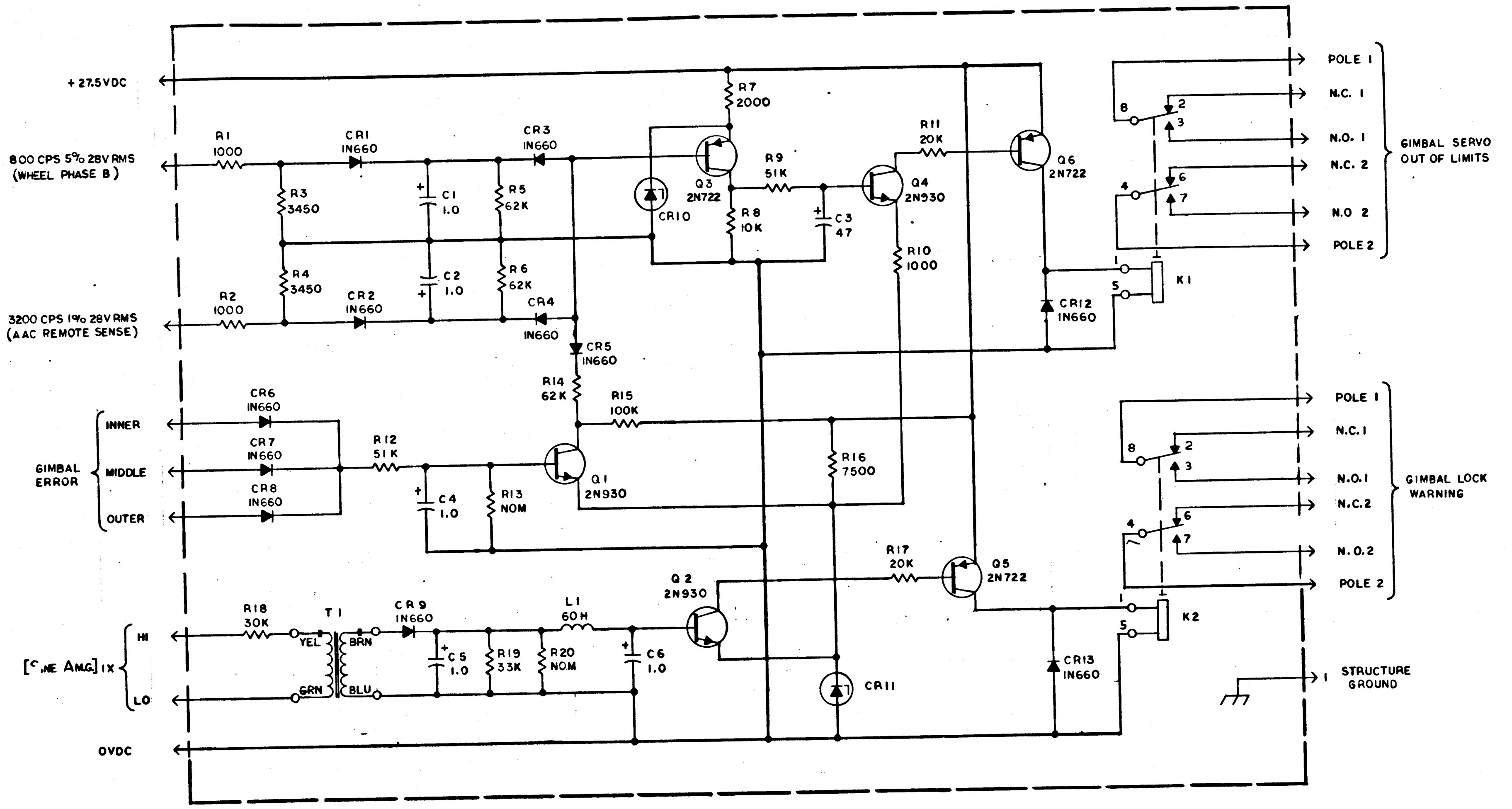
REVISIONS 16028

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


+27.5VDC
800 CPS 5% 28V RMS
(WHEEL PHASE B)
3200 CPS 1% 28V RMS
(AAC REMOTE SENSE)
GIMBAL ERROR
INNER
MIDDLE
OUTER
[SINE AMG] IX
HI
LO
OVDC
R1 1000
R2 1000
R3 3450
R4 3450
R5 62K
R6 62K
R7 2000
R8 10K
R9 51K
R10 1000
R11 20K
R12 51K
R13 NOM
R14 62K
R15 100K
R16 7500
R17 20K
R18 30K
R19 33K
R20 NOM
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9 IN660
CR10
CR11
CR12 IN660
CR13 IN660
C1 1.0
C2 1.0
C3 47
C4 1.0
C5 1.0
C6 1.0
L1 60H
T1
YEL
BRN
GRN
BLU
Q1 2N930
Q2 2N930
Q3 2N722
Q4 2N930
Q5 2N722
Q6 2N722
K1
K2
POLE 1
N.C. 1
N.O. 1
N.C. 2
N.O 2
POLE 2
GIMBAL SERVO OUT OF LIMITS
GIMBAL LOCK WARNING
STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-32	RESISTOR	1000	± 2%	1/4 W
R2	-32		1000		
R3	-128		3450		
R4	-128		3450		
R5	-75		62K		
R6	1006750-75		62K		1/4 W
R7	1006760-39		2000		1/2 W
R8	1006750-56		10K		1/4 W
R9	-73		51K		
R10	-32		1000		
R11	-63		20K		
R12	1006750-73		51K	± 2%	1/4 W
R13	SEE NOTE 4		NOM	± 5%	1/8 W
R14	1006750-75		62K	± 2%	1/4 W
R15	-80		100K		
R16	-53		7500		
R17	-63		20K		
R18	-67		30K		
R19	1006750-68		33K	± 2%	1/4 W
R20	SEE NOTE 4	RESISTOR	NOM	± 1%	1/8 W
C1	1006755-118	CAPACITOR	1.0	±10%	50VDC
C2	-118		1.0		50
C3	-89		47		35
C4	-118		1.0		50
C5	-118		1.0		50
C6	1006755-118	CAPACITOR	1.0	±10%	50VDC
L1	1010277-10	INDUCTOR	60 H		
CR1	1010385	DIODE	IN660		250MW
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9	1010385		IN660		250MW
CR10	1010286-9		15 V	5%	400MW
CR11	1010372-11		5.1 V	5%	250MW
CR12	1010385		IN660		250MW
CR13	1010385	DIODE	IN 660		250MW
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010285		2N722		
Q4	1010397-1		2N930		
Q5	1010285		2N722		
Q6	1010285	TRANSISTOR	2N722		
K1	1010353-4	RELAY			
K2	1010353-4	RELAY			
T1	1010324	TRANSFORMER	DO-T36		

R13		R20	
PART NO.	VALUE	PART NO.	VALUE
1010369-93	330 K	1010364-565	43.2 K
-94	360 K	-569	45.3 K
-95	390 K	-573	47.5 K
-96	430 K	-577	49.9 K
-97	470 K	-581	52.3 K
-98	510 K	-585	54.9 K
-99	560 K	-589	57.6 K
-100	620 K	-593	60.4 K
-101	680 K	-597	63.4 K
-102	750 K	-603	68.1 K
-103	820 K	-609	73.2 K
-104	910 K	-615	78.7 K
-105	1 MEG	-621	84.4 K
1010369-106	1.1 MEG	-627	90.9 K
		1010364-633	97.6 K

REF DWG:
GIMBAL SERVO OUT OF LIMITS &
GIMBAL LOCK WARNING INDICATOR ASSY
DWG NO. 2007117

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED, CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R13 & R20 PER ATP FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Q. Di Leo	21 JAN 65
CHECKED		
APPROVED	Louis Martingage	28 Jan 65
APPROVED	Manuel Braun E. Grindal	29 Jan 65
APPROVED MIT	W Kupfer	9 Feb 65
APPROVED MSC		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

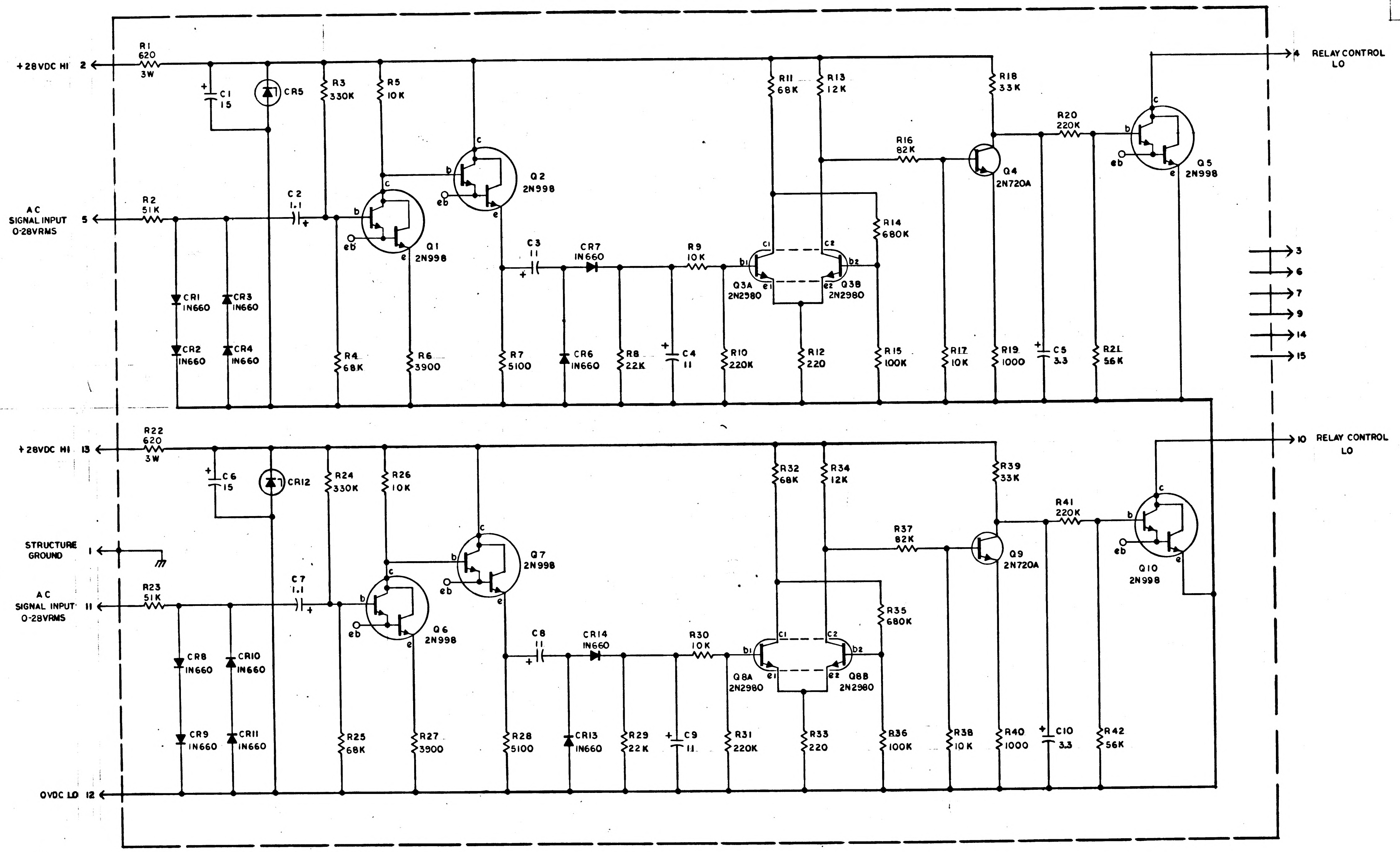
SCHEMATIC,
GIMBAL SERVO OUT OF LIMITS &
GIMBAL LOCK WARNING INDICATOR

CODE IDENT NO.	SIZE	DRAWING NO.
—	E	2010013
SCALE —		SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19825

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21451	KCH			WK


+28VDC HI 2
R1 620 3W
C1 15
CR5
R3 330K
R5 10K
Q2 2N998
AC SIGNAL INPUT 0-28VRMS 5
R2 51K
C2 1.1
Q1 2N998
CR1 1N660
CR3 1N660
CR2 1N660
CR4 1N660
R4 68K
R6 3900
R7 5100
C3 11
CR7 1N660
CR6 1N660
R8 22K
C4 11
R9 10K
R10 220K
R11 68K
R13 12K
R14 680K
Q3A 2N2980
Q3B 2N2980
R12 220
R15 100K
R16 82K
Q4 2N720A
R17 10K
R18 33K
R19 1000
C5 3.3
R20 220K
R21 56K
Q5 2N998
4 RELAY CONTROL LO
3
6
7
9
14
15
+28VDC HI 13
R22 620 3W
C6 15
CR12
R24 330K
R26 10K
Q7 2N998
STRUCTURE GROUND 1
AC SIGNAL INPUT 11 0-28VRMS
R23 51K
C7 1.1
Q6 2N998
CR8 1N660
CR10 1N660
CR9 1N660
CR11 1N660
R25 68K
R27 3900
R28 5100
C8 11
CR14 1N660
CR13 1N660
R29 22K
C9 11
R30 10K
R31 220K
R32 68K
R34 12K
R35 680K
Q8A 2N2980
Q8B 2N2980
R33 220
R36 100K
R37 82K
Q9 2N720A
R38 10K
R39 33K
R40 1000
C10 3.3
R41 220K
R42 56K
Q10 2N998
10 RELAY CONTROL LO
0VDC LO 12

REF DWG:
ANTI-CREEP ASSY
DWG NO. 2007124

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 21 MAY 65
CHECKED 27 May 65
APPROVED 1 Jun '65
APPROVED
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
ANTI-CREEP

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010014
SCALE ——
SHEET 1 OF 2

2010014 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19825

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21451	KCH		65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-51	RESISTOR	620	± 1%	3 W
R2	1006750-73		51 K	± 2%	1/4 W
R3	1010369-94		330K	± 5%	1/8 W
R4	1006750-76		68 K	± 2%	1/4 W
R5	-56		10 K		
R6	-46		3900		
R7	-49		5100		
R8	-64		22 K		
R9	1006750-56		10 K	± 2%	1/4 W
R10	1010369-89		220K	± 5%	1/8 W
R11	1006750-76		68 K	± 2%	1/4 W
R12	1006750-16		220	± 2%	1/4 W
R13	1006750-58		12 K	± 2%	1/4 W
R14	1010369-101		680K	± 5%	1/8 W
R15	1006750-80		100 K	± 2%	1/4 W
R16	1006750-78		82 K	± 2%	1/4 W
R17	1006750-56		10 K	± 2%	1/4 W
R18	1006750-68		33 K	± 2%	1/4 W
R19	1010969-126		1000	± 1%	1/4 W
R20	1010369-89		220 K	± 5%	1/8 W
R21	1006750-74		56 K	± 2%	1/4 W
R22	1010389-51		620	± 1%	3 W
R23	1006750-73		51 K	± 2%	1/4 W
R24	1010369-94		330K	± 5%	1/8 W
R25	1006750-76		68 K	± 2%	1/4 W
R26	-56		10 K		
R27	-46		3900		
R28	-49		5100		
R29	-64		22K		
R30	1006750-56		10 K	± 2%	1/4 W
R31	1010369-89		220K	± 5%	1/8 W
R32	1006750-76		68 K	± 2%	1/4 W
R33	1006750-16		220	± 2%	1/4 W
R34	1006750-58		12 K	± 2%	1/4 W
R35	1010369-101		680 K	± 5%	1/8 W
R36	1006750-80		100 K	± 2%	1/4 W
R37	1006750-78		82 K	± 2%	1/4 W
R38	1006750-56		10 K	± 2%	1/4 W
R39	1006750-68		33 K	± 2%	1/4 W
R40	1010969-126		1000	± 1%	1/4 W
R41	1010369-89		220K	± 5%	1/8 W
R42	1006750-74	RESISTOR	56 K	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-33	CAPACITOR	15	± 10%	20 VDC
C2	1010279-13		1.1		6
C3	1010279-124		11		15
C4	1010279-124		11		15
C5	1006755-75		3.3		35
C6	1006755-33		15		20
C7	1010279-13		1.1		6
C8	1010279-124		11		15
C9	1010279-124		11		15
C10	1006755-75	CAPACITOR	3.3	± 10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010830-7	ZENER	IN963B		
CR6	1010385		IN660		
CR7					
CR8					
CR9					
CR10					
CR11	1010385		IN660		
CR12	1010830-7	ZENER	IN963B		
CR13	1010385		IN660		
CR14	1010385	DIODE	IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010342		2N998		
Q3	1010652-1		2N2980		
Q4	1010357-1		2N720A		
Q5	1010342		2N998		
Q6	1010342		2N998		
Q7	1010342		2N998		
Q8	1010652-1		2N2980		
Q9	1010357-1		2N720A		
Q10	1010342	TRANSISTOR	2N998		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MASTER

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 21 MAY 65
CHECKED Bonarrigo
APPROVED
APPROVED —
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

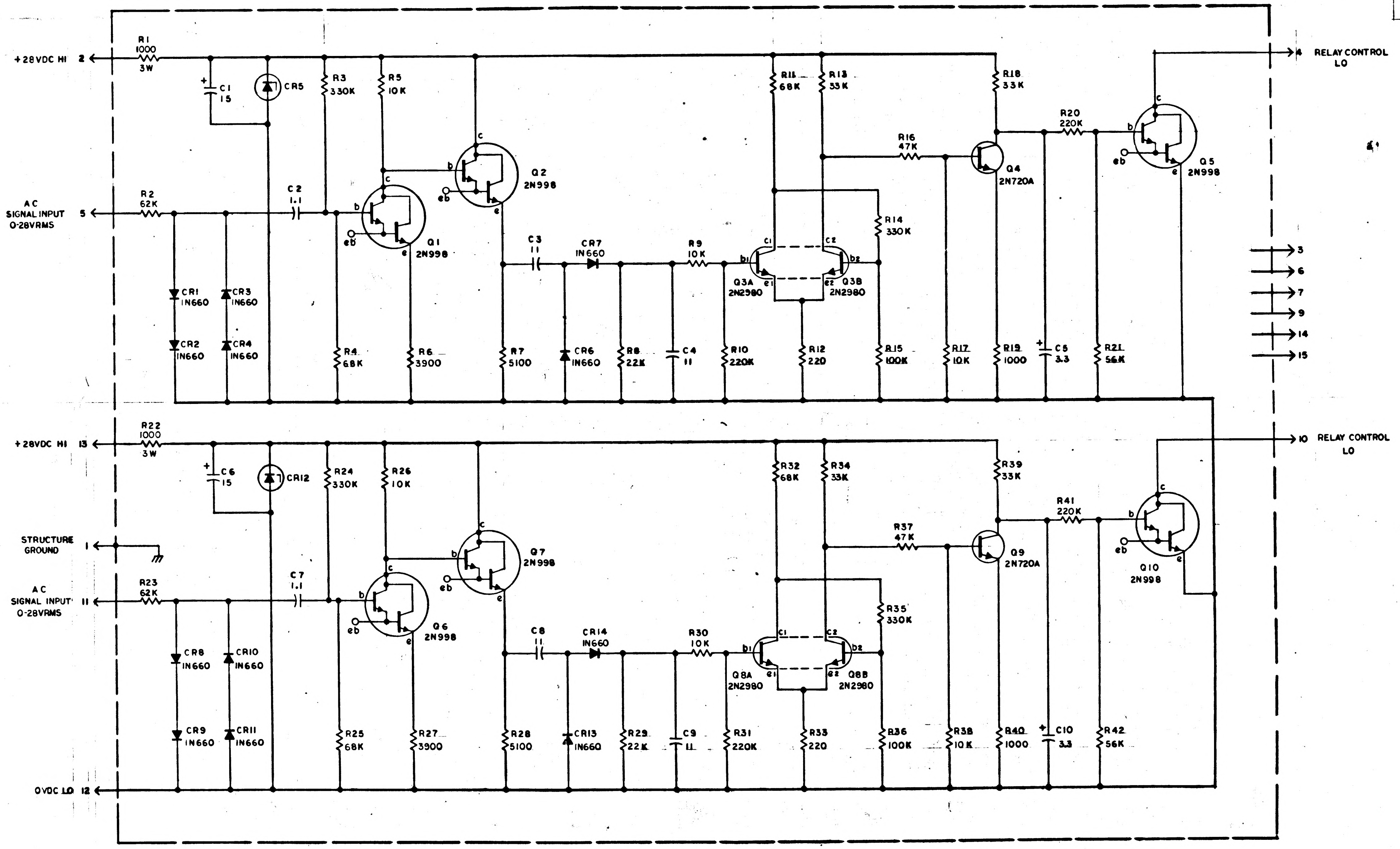
SCHEMATIC,
ANTI-CREEP

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010014
SCALE —
SHEET 2 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19825

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21451	KCH			WK
B		REVISED PER TDRR 23904				WK


+28VDC HI 2
R1 1000 3W
C1 15
CR5
R3 330K
R5 10K
Q2 2N998
AC SIGNAL INPUT 0-28VRMS 5
R2 62K
C2 1.1
Q1 2N998
C3 11
CR7 1N660
R9 10K
Q3A 2N2980
Q3B 2N2980
R11 68K
R13 33K
R14 330K
R16 47K
R18 33K
Q4 2N720A
R20 220K
Q5 2N998
4 RELAY CONTROL LO
CR1 1N660
CR2 1N660
CR3 1N660
CR4 1N660
R4 68K
R6 3900
R7 5100
CR6 1N660
R8 22K
C4 11
R10 220K
R12 220
R15 100K
R17 10K
R19 1000
C5 3.3
R21 56K
3
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7
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14
15
+28VDC HI 13
R22 1000 3W
C6 15
CR12
R24 330K
R26 10K
Q7 2N998
STRUCTURE GROUND 1
AC SIGNAL INPUT 0-28VRMS 11
R23 62K
C7 1.1
Q6 2N998
C8 11
CR14 1N660
R30 10K
Q8A 2N2980
Q8B 2N2980
R32 68K
R34 33K
R35 330K
R37 47K
R39 33K
Q9 2N720A
R41 220K
Q10 2N998
10 RELAY CONTROL LO
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
R25 68K
R27 3900
R28 5100
CR13 1N660
R29 22K
C9 11
R31 220K
R33 220
R36 100K
R38 10K
R40 1000
C10 3.3
R42 56K
0VDC LO 12
b
c
e
eb
b1
b2
c1
c2
e1
e2

REF DWG:
ANTI-CREEP ASSY
DWG NO. 2007124

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	A. D. Leo	21 MAY 65
CHECKED		27 65
APPROVED		1 June 65
APPROVED		
APPROVED MIT	W Kupfer	
APPROVED MSC		
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
ANTI-CREEP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010014

SCALE —— SHEET 1 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19825

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 21451	KCH			WR
B		REVISED PER TDRR 23904				WR

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-56	RESISTOR	1000	± 1%	3 W
R2	1006750-75		62 K	± 2%	1/4 W
R3	1010369-93		330K	± 5%	1/8 W
R4	1006750-76		68 K	± 2%	1/4 W
R5	-56		10 K		
R6	-46		3900		
R7	-49		5100		
R8	-64		22 K		
R9	1006750-56		10 K	± 2%	1/4 W
R10	1010369-89		220K	± 5%	1/8 W
R11	1006750-76		68K	± 2%	1/4 W
R12	1006750-16		220	± 2%	1/4 W
R13	1006750-68		33K	± 2%	1/4 W
R14	1010369-93		330K	± 5%	1/8 W
R15	1006750-80		100K	± 2%	1/4 W
R16	1006750-72		47 K	± 2%	1/4 W
R17	1006750-56		10K	± 2%	1/4 W
R18	1006750-68		33K	± 2%	1/4 W
R19	1010969-126		1000	± 1%	1/4 W
R20	1010369-89		220K	± 5%	1/8 W
R21	1006750-74		56 K	± 2%	1/4 W
R22	1010389-56		1000	± 1%	3 W
R23	1006750-75		62 K	± 2%	1/4 W
R24	1010369-93		330K	± 5%	1/8 W
R25	1006750-76		68 K	± 2%	1/4 W
R26	-56		10 K		
R27	-46		3900		
R28	-49		5100		
R29	-64		22K		
R30	1006750-56		10K	± 2%	1/4 W
R31	1010369-89		220K	± 5%	1/8 W
R32	1006750-76		68 K	± 2%	1/4 W
R33	1006750-16		220	± 2%	1/4 W
R34	1006750-68		33K	± 2%	1/4 W
R35	1010369-93		330K	± 5%	1/8 W
R36	1006750-80		100K	± 2%	1/4 W
R37	1006750-72		47 K	± 2%	1/4 W
R38	1006750-56		10K	± 2%	1/4 W
R39	1006750-68		33K	± 2%	1/4 W
R40	1010969-126		1000	± 1%	1/4 W
R41	1010369-89		220K	± 5%	1/8 W
R42	1006750-74	RESISTOR	56K	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-33	CAPACITOR	15	± 10%	20 VDC
C2	1010279-13		1.1		6
C3	1010279-124		11		15
C4	1010279-124		11		15
C5	1006755-75		3.3		35
C6	1006755-33		15		20
C7	1010279-13		1.1		6
C8	1010279-124		11		15
C9	1010279-124		11		15
C10	1006755-75	CAPACITOR	3.3	± 10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010830-7	ZENER	IN963B		
CR6	1010385		IN660		
CR7					
CR8					
CR9					
CR10					
CR11	1010385		IN660		
CR12	1010830-7	ZENER	IN963B		
CR13	1010385		IN660		
CR14	1010385	DIODE	IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010342		2N998		
Q3	1010652-1		2N2980		
Q4	1010357-1		2N720A		
Q5	1010342		2N998		
Q6	1010342		2N998		
Q7	1010342		2N998		
Q8	1010652-1		2N2980		
Q9	1010357-1		2N720A		
Q10	1010342	TRANSISTOR	2N998		

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

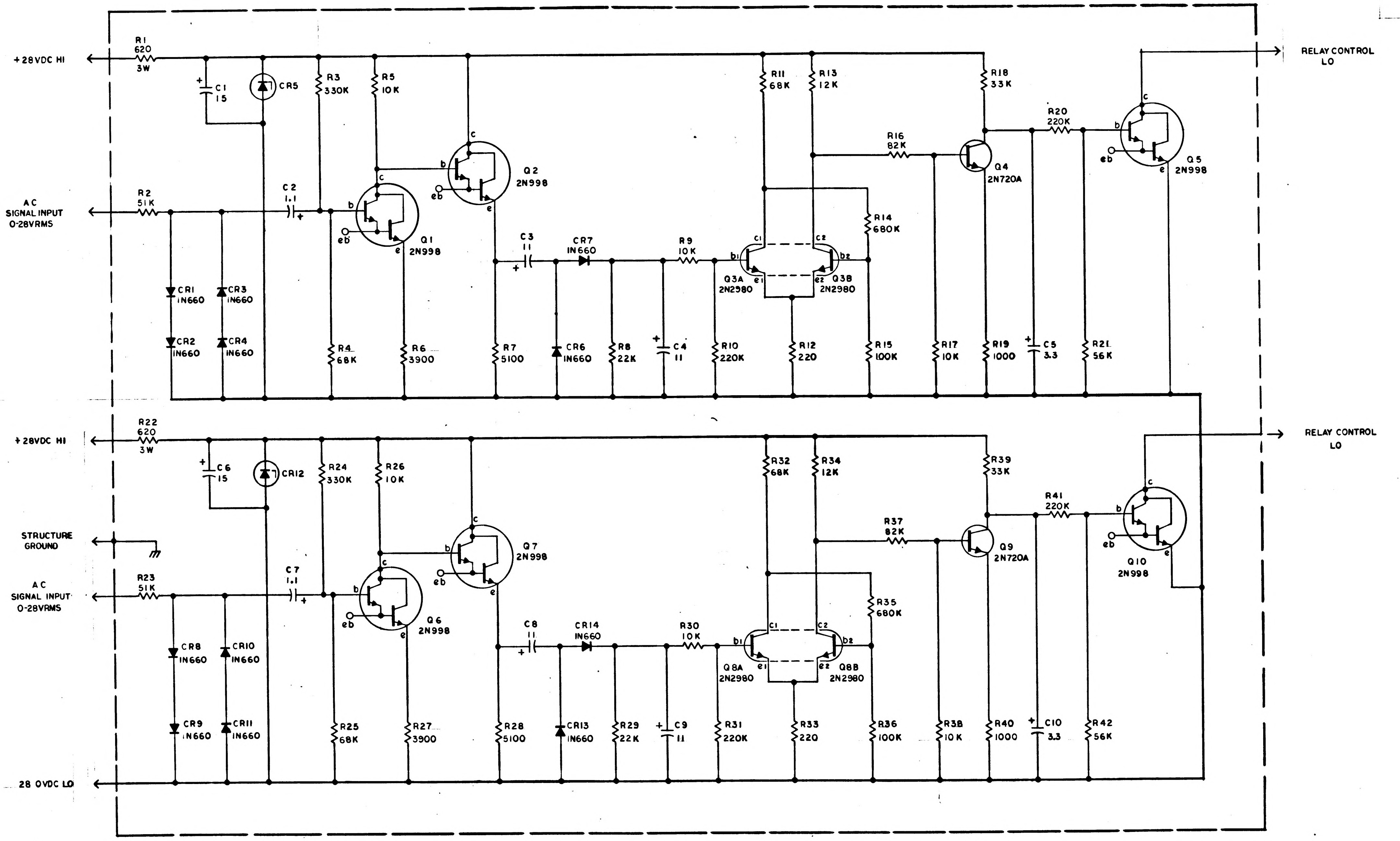
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
ANTI-CREEP

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010014
SCALE ——
SHEET 2 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19825						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


+28VDC HI
R1
620
3W
C1
15
CR5
R3
330K
R5
10K
Q2
2N998
AC
SIGNAL INPUT
0-28VRMS
R2
51K
C2
1.1
Q1
2N998
CR1
1N660
CR3
1N660
CR2
1N660
CR4
1N660
R4
68K
R6
3900
R7
5100
C3
11
CR7
1N660
CR6
1N660
R8
22K
C4
11
R9
10K
R10
220K
R11
68K
R13
12K
R14
680K
Q3A
2N2980
Q3B
2N2980
R12
220
R15
100K
R16
82K
R17
10K
R18
33K
Q4
2N720A
R19
1000
R20
220K
C5
3.3
R21
56K
Q5
2N998
RELAY CONTROL
LO
+28VDC HI
R22
620
3W
C6
15
CR12
R24
330K
R26
10K
Q7
2N998
STRUCTURE
GROUND
AC
SIGNAL INPUT
0-28VRMS
R23
51K
C7
1.1
Q6
2N998
CR8
1N660
CR10
1N660
CR9
1N660
CR11
1N660
R25
68K
R27
3900
R28
5100
C8
11
CR14
1N660
CR13
1N660
R29
22K
C9
11
R30
10K
R31
220K
R32
68K
R34
12K
R35
680K
Q8A
2N2980
Q8B
2N2980
R33
220
R36
100K
R37
82K
R38
10K
R39
33K
Q9
2N720A
R40
1000
R41
220K
C10
3.3
R42
56K
Q10
2N998
RELAY CONTROL
LO
28 0VDC LO

REF DWG:
ANTI CREEP ELECTRONICS ASSY
DWG NO.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	A. D. Leo	21 MAY 65
CHECKED		27 1/65
APPROVED	A. Cushman	1 Jun '65
APPROVED		
APPROVED MIT	W Kupfer	
APPROVED MSC		

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, ANTI-CREEP ELECTRONICS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010014

SCALE — SHEET 1 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010389-51	RESISTOR	620	± 1%	3 W
R2	1006750-73		51 K	± 2%	1/4 W
R3	1010369-94		330K	± 5%	1/8 W
R4	1006750-76		68 K	± 2%	1/4 W
R5	-56		10 K		
R6	-46		3900		
R7	-49		5100		
R8	-64		22 K		
R9	1006750-56		10 K	± 2%	1/4 W
R10	1010369-89		220K	± 5%	1/8 W
R11	1006750-76		68K	± 2%	1/4 W
R12	1006750-16		220	± 2%	1/4 W
R13	1006750-58		12 K	± 2%	1/4 W
R14	1010369-101		680K	± 5%	1/8 W
R15	1006750-80		100 K	± 2%	1/4 W
R16	1006750-78		82 K	± 2%	1/4 W
R17	1006750-56		10 K	± 2%	1/4 W
R18	1006750-68		33 K	± 2%	1/4 W
R19	1010321-126		1000	± 1%	1/4 W
R20	1010369-89		220 K	± 5%	1/8 W
R21	1006750-74		56 K	± 2%	1/4 W
R22	1010389-51		620	± 1%	3 W
R23	1006750-73		51 K	± 2%	1/4 W
R24	1010369-94		330K	± 5%	1/8 W
R25	1006750-76		68 K	± 2%	1/4 W
R26	-56		10 K		
R27	-46		3900		
R28	-49		5100		
R29	-64		22K		
R30	1006750-56		10K	± 2%	1/4 W
R31	1010369-89		220K	± 5%	1/8 W
R32	1006750-76		68 K	± 2%	1/4 W
R33	1006750-16		220	± 2%	1/4 W
R34	1006750-58		12 K	± 2%	1/4 W
R35	1010369-101		680K	± 5%	1/8 W
R36	1006750-80		100 K	± 2%	1/4 W
R37	1006750-78		82 K	± 2%	1/4 W
R38	1006750-56		10 K	± 2%	1/4 W
R39	1006750-68		33 K	± 2%	1/4 W
R40	1010321-126		1000	± 1%	1/4 W
R41	1010369-89		220K	± 5%	1/8 W
R42	1006750-74	RESISTOR	56 K	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-33	CAPACITOR	15	± 10%	20 VDC
C2	1010279-13		1.1		6
C3	1010279-124		11		15
C4	1010279-124		11		15
C5	1006755-75		3.3		35
C6	1006755-33		15		20
C7	1010279-13		1.1		6
C8	1010279-124		11		15
C9	1010279-124		11		15
C10	1006755-75	CAPACITOR	3.3	± 10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010385		IN660		
CR5	1010830-7	ZENER	IN963B		
CR6	1010385		IN660		
CR7					
CR8					
CR9					
CR10					
CR11	1010385		IN660		
CR12	1010830-7	ZENER	IN963B		
CR13	1010385		IN660		
CR14	1010385	DIODE	IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010342		2N998		
Q3	1010652-1		2N2980		
Q4	1010357-1		2N720A		
Q5	1010342		2N998		
Q6	1010342		2N998		
Q7	1010342		2N998		
Q8	1010652-1		2N2980		
Q9	1010357-1		2N720A		
Q10	1010342	TRANSISTOR	2N998		

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
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MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo 21 MAY 65
CHECKED Bonarrigo 27 May 65
APPROVED A Cushman 1 Jun '65
APPROVED
APPROVED MIT W Kupfer 2 Jun 65
APPROVED MSC 1/2/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
ANTI-CREEP ELECTRONICS

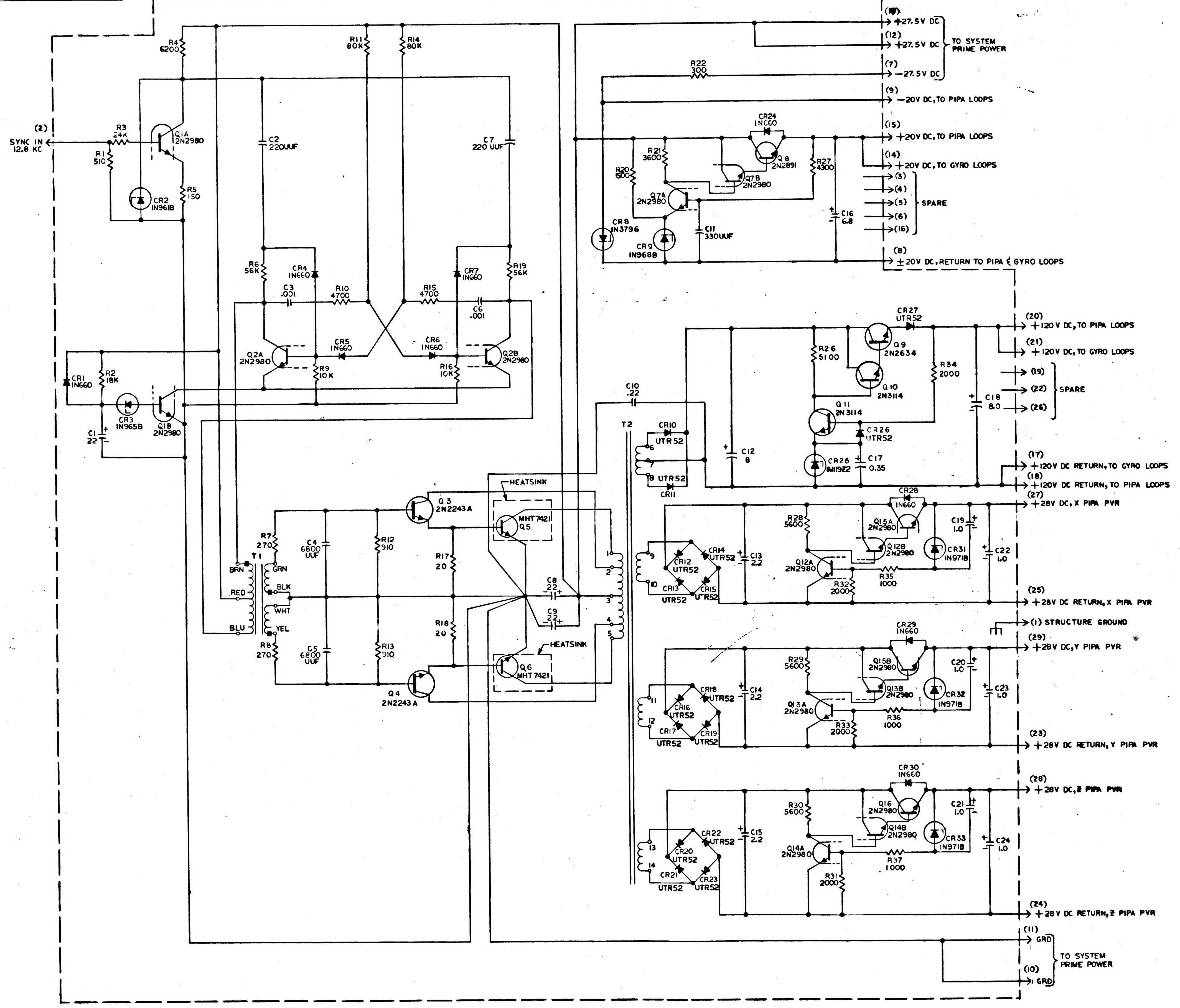
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010014
SCALE
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

(r)

REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL
A	R_VISED PER TDRR 15163	29 Dec 64	


(2) SYNC IN 12.8 KC
R3 24K
R1 510
Q1A 2N2980
R4 6200
R5 150
CR2 IN961B
R11 80K
R14 80K
C2 220UUF
C7 220 UUF
R6 56K
CR4 IN660
C3 .001
R10 4700
R15 4700
CR7 IN660
R19 56K
C6 .001
Q2A 2N2980
CR5 IN660
R9 10K
CR6 IN660
R16 10K
Q2B 2N2980
CR1 IN660
R2 18K
CR3 IN965B
Q1B 2N2980
C1 22
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
R7 270
R8 270
C4 6800 UUF
C5 6800 UUF
R12 910
R13 910
Q3 2N2243A
Q4 2N2243A
R17 20
R18 20
HEATSINK
MHT 7421 Q5
Q6 MHT 7421
C8 22
C9 22
C10 .22
T2
CR10 UTR52
CR11 UTR52
R22 300
CR24 IN660
R21 3600
R20 1500
Q8 2N2891
Q7B 2N2980
Q7A 2N2980
R27 4300
C16 6.8
CR8 IN3796
CR9 IN968B
C11 330UUF
(16) +27.5V DC
(12) +27.5V DC
TO SYSTEM PRIME POWER
(7) −27.5V DC
(9) −20V DC, TO PIPA LOOPS
(15) +20V DC, TO PIPA LOOPS
(14) +20V DC, TO GYRO LOOPS
(3) (4) (5) (6) (16) SPARE
(8) ±20V DC, RETURN TO PIPA & GYRO LOOPS
CR27 UTR52
Q9 2N2634
R26 5100
Q10 2N3114
R34 2000
Q11 2N3114
CR26 UTR52
CR25 IN1922
C17 0.35
C12 8
C18 8.0
(20) +120V DC, TO PIPA LOOPS
(21) +120V DC, TO GYRO LOOPS
(19) (22) (26) SPARE
(17) +120V DC RETURN, TO GYRO LOOPS
(18) +120V DC RETURN, TO PIPA LOOPS
CR28 IN660
R28 5600
Q15A 2N2980
Q12B 2N2980
Q12A 2N2980
CR31 IN971B
C19 1.0
C22 1.0
R35 1000
R32 2000
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
C13 2.2
(27) +28V DC, X PIPA PVR
(25) +28V DC RETURN, X PIPA PVR
(1) STRUCTURE GROUND
CR29 IN660
R29 5600
Q15B 2N2980
Q13B 2N2980
Q13A 2N2980
CR32 IN971B
C20 1.0
C23 1.0
R36 1000
R33 2000
CR16 UTR52
CR17 UTR52
CR18 UTR52
CR19 UTR52
C14 2.2
(29) +28V DC, Y PIPA PVR
(23) +28V DC RETURN, Y PIPA PVR
CR30 IN660
R30 5600
Q16 2N2980
Q14B 2N2980
Q14A 2N2980
CR33 IN971B
C21 1.0
C24 1.0
R37 1000
R31 2000
CR20 UTR52
CR21 UTR52
CR22 UTR52
CR23 UTR52
C15 2.2
(28) +28V DC, Z PIPA PVR
(24) +28V DC RETURN, Z PIPA PVR
(11) GRD
(10) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
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DO NOT SCALE THIS DRAWING
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DWG NO. CONTRACT
DRAWN J.F. Walsh DATE 5/29/64
CHECKED
APPROVAL
APPROVAL 11/2/64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
PULSE TORQUE
POWER SUPPLY

CODE IDENT NO. —
SIZE E
NASA DRAWING NO 2010015
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	2 Dec '64	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	± 2%	1/4 W
R2	↑ – 62	↑	18 K	↑	↑
R3	– 65		24 K		
R4	– 51		6200		
R5	– 12		150		
R6	– 74		56 K		
R7	– 18		270		
R8	↓ – 18		270	↓	↓
R9	1006750 – 56		10K	± 2%	1/4 W
R10	1010377 – 110		4700	± 1%	1/10 W
R11	1010377 – 314		80K	± 1%	1/10 W
R12	1006750 – 31		910	± 2%	1/4 W
R13	1006750 – 31		910	± 2%	1/4 W
R14	1010377 – 314		80K	± 1%	1/10 W
R15	1010377 – 110		4700	± 1%	1/10W
R16	1006750 – 56		10K	± 2%	1/4 W
R17	1006802 – 2		20	± 1%	1/2 W
R18	1006802 – 2		20	± 1%	1/2 W
R19	1006750 – 74		56 K	± 2%	1/4 W
R20	1006750 – 36		1500	± 2%	1/4 W
R21	1006750 – 45		3600	± 2%	1/4 W
R22	1010604 – 37		300	± 1%	1 W
R26	1010389 – 73		5100	± 1%	3 W
R27	1006750 – 47		4300	± 2%	1/4 W
R28	↑ – 50		5600	↑	↑
R29	– 50		5600		
R30	– 50		5600		
R31	– 39		2000		
R32	– 39		2000		
R33	– 39		2000		
R34	– 39		2000		
R35	– 32		1000		
R36	↓ – 32		1000	↓	↓
R37	1006750 – 32	↓	1000	± 2%	1/4 W
C1	1006755 – 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 – 16	↑	220 UUF	± 10%	100V DC
C3	1010316 – 1		.001	± 1%	↑
C4	1006777 – 30		6800 UUF	± 10%	
C5	1006777 – 30		6800 UUF	± 10%	
C6	1010316 – 1		.001	± 1%	↓
C7	1006777 – 16		220 UUF	± 10%	100V DC
C8	1006755 – 134		22	± 10%	50V DC
C9	1006755 – 134		22	± 10%	50V DC
C10	1010264 – 29		0.22	± 5%	200V DC
C11	1006777 – 18		330 UUF	± 10%	100V DC
C12	1010769 – 001		8.0	-15/+50%	270VDC
C13	1006755 – 122		2.2	± 10%	50V DC
C14	1006755 – 122		2.2	± 10%	50V DC
C15	1006755 – 122		2.2	± 10%	50V DC
C16	1006755 – 79		6.8	± 10%	35 V DC
C17	1010438 – 103		.35	± 20%	150V DC
C18	1010769 – 001		8.0	-15/+50%	270V DC
C19	1006755 – 69		1.0	± 10%	35V DC
C20	1006755 – 69		1.0	± 10%	35V DC
C21	1006755 – 69		1.0	± 10%	35 V DC
C22	1006755 – 118		1.0	± 10%	50V DC
C23	1006755 – 118	↓	1.0	± 10%	50V DC
C24	1006755 – 118	CAPACITOR	1.0	± 10%	50V DC

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 – 5	ZENER DIODE	IN961B	± 5%	10 VDC
CR3	1010830 – 9	ZENER DIODE	IN965B	± 5%	15 VDC
CR4	1010385	↑	IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385	↓	IN660		
CR8	1010831 – 1	ZENER DIODE	IN3796	± 5%	20 VDC
CR9	1010830 – 12	ZENER DIODE	IN968B	± 5%	20 VDC
CR10	1010497	↑	UTR 52		
CR11	↑				
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22	↓		↓		
CR23	1010497		UTR 52		
CR24	1010385	↓	IN660		
CR25	1010265 - 26	ZENER DIODE	IM119 Z2	± 2%	119 VDC
CR26	1010497	↑	UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385	↓	IN660		
CR31	1010830 – 15	ZENER DIODE	IN971B	± 5%	27 VDC
CR32	1010830 – 15	ZENER DIODE	IN971B	± 5%	27 VDC
CR33	1010830 – 15	ZENER DIODE	IN971B	± 5%	27 VDC
Q1	1010652 – 1	TRANSISTOR	2N2980		
Q2	1010652 – 1	↑	2N2980		
Q3	1010398 – 3		2N2243		
Q4	1010398 – 3		2N2243		
Q5	1010806 – 001		MHT 7421		
Q6	1010806 – 001		MHT 7421		
Q7	1010652 – 1		2N2980		
Q8	1010713 – 1		2N2891		
Q9	1010499 – 1		2N2634		
Q10	1010747 – 1		2N3114		
Q11	1010747 – 1		2N3114		
Q12	1010652 – 1		2N2980		
Q13	↑ – 1		↑		
Q14	– 1				
Q15	↓ – 1	↓	↓		
Q16	1010652 – 1	TRANSISTOR	2N2980		
T1	1010315 – 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DWG. NO. CONTRACT
DRAWN J. F. DATE 5/19/64
CHECKED
APPROVAL
APPROVAL J. Stromsa 11/2/64
NASA APPROVAL 9-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

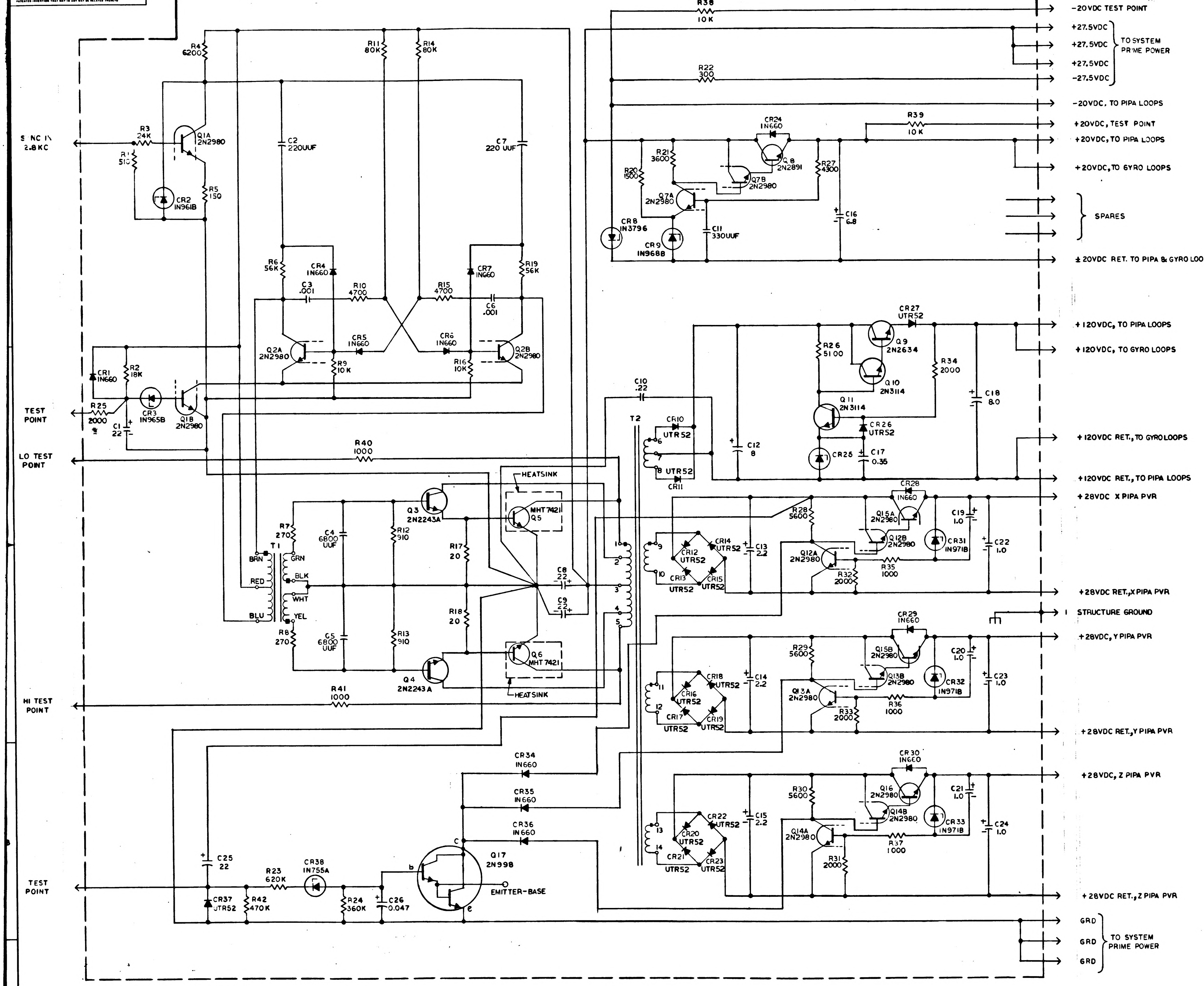
SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010015
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	Dec 64	
B	REVISED PER TDRR 18962	Jan 65	


SYNC IN
2.8KC
R3 24K
R1 510
Q1A 2N2980
R4 6200
R5 150
CR2 1N961B
R11 80K
R14 80K
C2 220UUF
C7 220 UUF
R6 56K
CR4 1N660
R10 4700
R15 4700
CR7 1N660
R19 56K
C3 .001
C6 .001
Q2A 2N2980
CR5 1N660
CR6 1N660
Q2B 2N2980
R9 10K
R16 10K
CR1 1N660
R2 18K
TEST POINT
R25 2000
C1 22
CR3 1N965B
Q1B 2N2980
LO TEST POINT
R40 1000
HEATSINK
Q3 2N2243A
MHT 7421 Q5
R7 270
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
R8 270
C4 6800 UUF
C5 6800 UUF
R12 910
R13 910
R17 20
R18 20
C8 .22
C9 .22
Q4 2N2243A
Q6 MHT 7421
HI TEST POINT
R41 1000
CR34 1N660
CR35 1N660
CR36 1N660
Q17 2N998
EMITTER-BASE
C25 22
R23 620K
CR38 1N755A
R24 360K
C26 0.047
CR37 UTR52
R42 470K
R38 10K
-20VDC TEST POINT
+27.5VDC
+27.5VDC
+27.5VDC
-27.5VDC
TO SYSTEM PRIME POWER
R22 300
-20VDC, TO PIPA LOOPS
CR24 1N660
R39 10K
+20VDC, TEST POINT
+20VDC, TO PIPA LOOPS
R21 3600
R20 1500
Q8 2N2891
Q7B 2N2980
Q7A 2N2980
R27 4300
+20VDC, TO GYRO LOOPS
C16 6.8
SPARES
CR8 1N3796
C11 330UUF
CR9 1N968B
± 20VDC RET. TO PIPA & GYRO LOOPS
CR27 UTR52
+120VDC, TO PIPA LOOPS
+120VDC, TO GYRO LOOPS
R26 5100
Q9 2N2634
Q10 2N3114
R34 2000
C10 .22
C18 8.0
Q11 2N3114
T2
CR10 UTR52
CR26 UTR52
C12 8
CR25
C17 0.35
UTR52 CR11
+120VDC RET., TO GYRO LOOPS
+120VDC RET., TO PIPA LOOPS
+28VDC X PIPA PVR
CR28 1N660
R28 5600
Q15A 2N2980
Q12B 2N2980
C19 1.0
CR31 1N971B
C22 1.0
CR12 UTR52
CR14 UTR52
CR13 UTR52
CR15 UTR52
C13 2.2
Q12A 2N2980
R32 2000
R35 1000
+28VDC RET., X PIPA PVR
STRUCTURE GROUND
CR29 1N660
+28VDC, Y PIPA PVR
R29 5600
Q15B 2N2980
Q13B 2N2980
C20 1.0
CR32 1N971B
C23 1.0
CR16 UTR52
CR18 UTR52
CR17 UTR52
CR19 UTR52
C14 2.2
Q13A 2N2980
R33 2000
R36 1000
+28VDC RET., Y PIPA PVR
CR30 1N660
+28VDC, Z PIPA PVR
R30 5600
Q16 2N2980
Q14B 2N2980
C21 1.0
CR33 1N971B
C24 1.0
CR20 UTR52
CR22 UTR52
CR21 UTR52
CR23 UTR52
C15 2.2
Q14A 2N2980
R31 2000
R37 1000
+28VDC RET., Z PIPA PVR
GRD
GRD
GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN J.F. Walsh DATE 5/19/64
CHECKED
APPROVAL
APPROVAL J. S. 11/2/64
NASA APPROVAL W. J. 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010015
SCALE
WT
SHEET 1 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	24 Dec '64	
B	REVISED PER TDRR 18962	3MAY65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 62		18K		
R3	- 65		24K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 2		20	± 1%	1/2 W
R18	1006802 - 2		20	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4 W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10K		
R39	- 56		10K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 97	RESISTOR	470K	± 5%	1/8 W
C1	1006755 - 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 30		6800UUF	± 10%	
C5	1006777 - 30		6800UUF	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C10	1010264 - 29		0.22	± 5%	200V DC
C11	1006777 - 18		330 UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 134		22	± 10%	50VDC
C26	1006755 - 53	CAPACITOR	0.047	± 10%	35VDC

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 - 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 - 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 - 1	ZENER	IN3796	± 5%	20 VDC
CR9	1010830 - 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 - 15	ZENER	IN 971B	± 5%	27 VDC
CR32	1010830 - 15	ZENER	IN971B	± 5%	27 VDC
CR33	1010830 - 15	ZENER	IN971B	± 5%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN 755A		
Q1	1010652 - 1	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243		
Q4	1010398 - 3		2N2243		
Q5	1010806 - 001		MHT 7421		
Q6	1010806 - 001		MHT 7421		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010499 - 1		2N2634		
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	- 1				
Q14	- 1				
Q15	- 1				
Q16	1010652 - 1		2N2980		
Q17	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN DATE 5/19/64
CHECKED
APPROVAL
APPROVAL J Stromer 11/2/64
NASA APPROVAL 9-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010015
SCALE —
WT —
SHEET 2 OF 2

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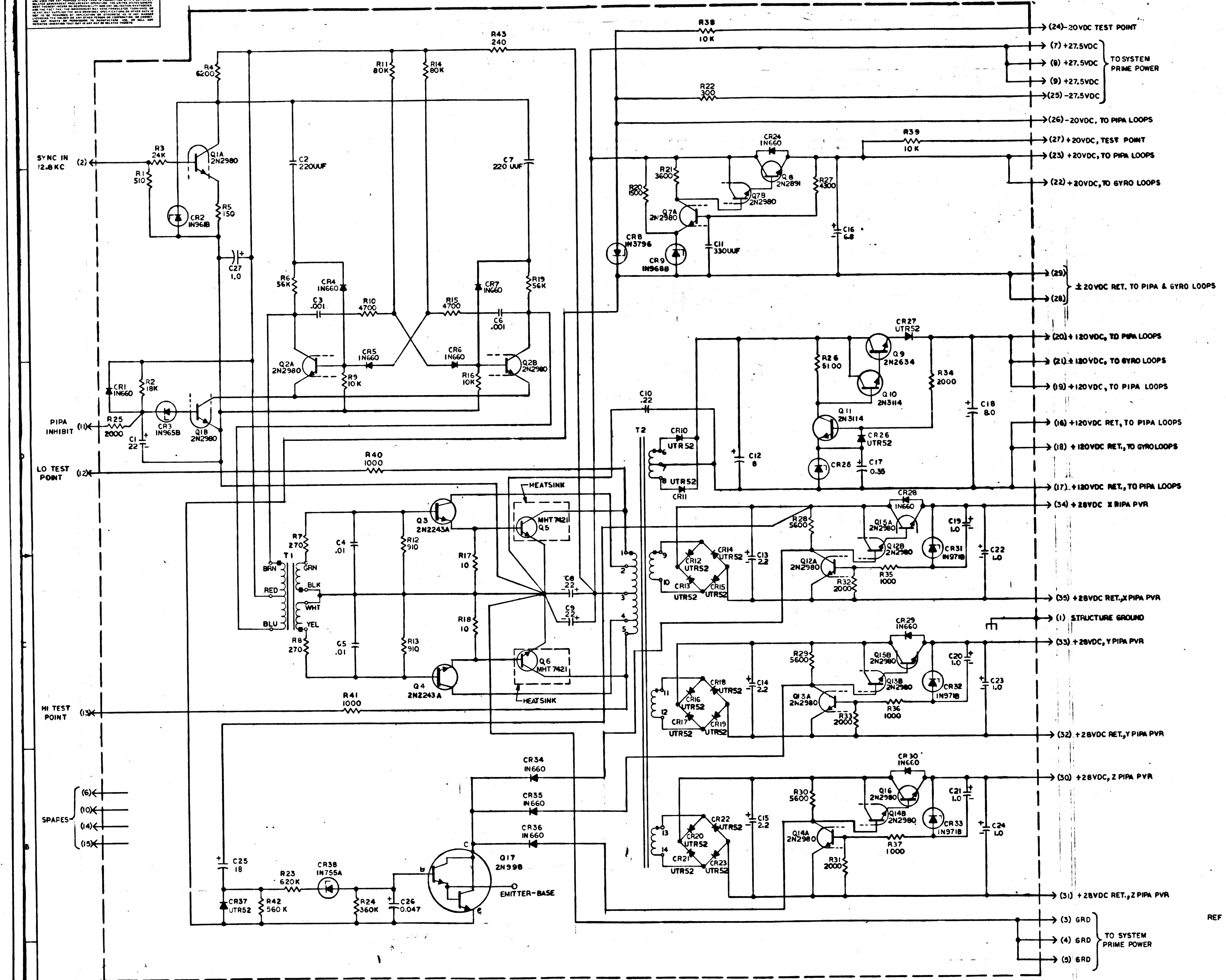
REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	3 Dec 64	WR
B	REVISED PER TDRR 18962	13 Jan 65	WR
C	REVISED PER TDRR 22511	15 Sep 65	MGH



SYNC IN 12.8KC (2)
PIPA INHIBIT (11)
LO TEST POINT (12)
HI TEST POINT (13)
SPARES (6) (10) (14) (15)
R1 510
R2 18K
R3 24K
R4 6200
R5 150
R6 56K
R7 270
R8 270
R9 10K
R10 4700
R11 80K
R12 910
R13 910
R14 80K
R15 4700
R16 10K
R17 10
R18 10
R19 56K
R20 1500
R21 3600
R22 300
R23 620K
R24 360K
R25 2000
R26 5100
R27 4300
R28 5600
R29 5600
R30 5600
R31 2000
R32 2000
R33 2000
R34 2000
R35 1000
R36 1000
R37 1000
R38 10K
R39 10K
R40 1000
R41 1000
R42 560K
R43 240
C1 22
C2 220UUF
C3 .001
C4 .01
C5 .01
C6 .001
C7 220 UUF
C8 .22
C9 .22
C10 .22
C11 330UUF
C12 8
C13 2.2
C14 2.2
C15 2.2
C16 6.8
C17 0.35
C18 8.0
C19 1.0
C20 1.0
C21 1.0
C22 1.0
C23 1.0
C24 1.0
C25 18
C26 0.047
C27 1.0
CR1 1N660
CR2 1N961B
CR3 1N965B
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N3796
CR9 1N968B
CR10 UTR52
CR11 UTR52
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
CR16 UTR52
CR17 UTR52
CR18 UTR52
CR19 UTR52
CR20 UTR52
CR21 UTR52
CR22 UTR52
CR23 UTR52
CR24 1N660
CR25
CR26 UTR52
CR27 UTR52
CR28 1N660
CR29 1N660
CR30 1N660
CR31 1N971B
CR32 1N971B
CR33 1N971B
CR34 1N660
CR35 1N660
CR36 1N660
CR37 UTR52
CR38 1N755A
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
Q3 2N2243A
Q4 2N2243A
Q5 MHT 7421
Q6 MHT 7421
Q7A 2N2980
Q7B 2N2980
Q8 2N2891
Q9 2N2634
Q10 2N3114
Q11 2N3114
Q12A 2N2980
Q12B 2N2980
Q13A 2N2980
Q13B 2N2980
Q14A 2N2980
Q14B 2N2980
Q15A 2N2980
Q15B 2N2980
Q16 2N2980
Q17 2N998
HEATSINK
EMITTER-BASE
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
T2
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
(34) +28VDC X PIPA PVR
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
(33) +28VDC, Y PIPA PVR
(32) +28VDC RET., Y PIPA PVR
(30) +28VDC, Z PIPA PVR
(31) +28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4 UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN J.E. Webb DATE 5/19/64
CHECKED
APPROVAL
APPROVAL J. S. 11/2/64
NASA APPROVAL W.J. Rhine 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010015
SCALE —
WT —
SHEET 1 OF 2

2010015 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	29 Dec '64	
B	REVISED PER TDRR 18962	30Mar65	
C	REVISED PER TDRR 22511	25 Sept 65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 62		18 K		
R3	- 65		24 K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10 K		
R39	- 56		10 K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560 K	± 5%	1/8 W
C1	1006755 - 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C10	1010264 - 29		0,22	± 5%	200V DC
C11	1006777 - 18		330 UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69	CAPACITOR	1.0	± 10%	35VDC
R43	1006750-17	RESISTOR	240	± 2%	1/4 W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 - 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 - 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 - 1	ZENER	IN3796	± 5%	20 VDC
CR9	1010830 - 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 - 15	ZENER	IN 971B	± 5%	27 VDC
CR32	1010830 - 15	ZENER	IN971B	± 5%	27 VDC
CR33	1010830 - 15	ZENER	IN971B	± 5%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN 755A		
Q1	1010652 - 1	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243		
Q4	1010398 - 3		2N2243		
Q5	1010806 -001		MHT 7421		
Q6	1010806 -001		MHT 7421		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010499 - 1		2N2634		
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	- 1				
Q14	- 1				
Q15	- 1				
Q16	1010652 - 1		2N2980		
Q17	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN J.F. DATE 5/12/64
CHECKED
APPROVAL
APPROVAL 11/4/64
NASA APPROVAL 9-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

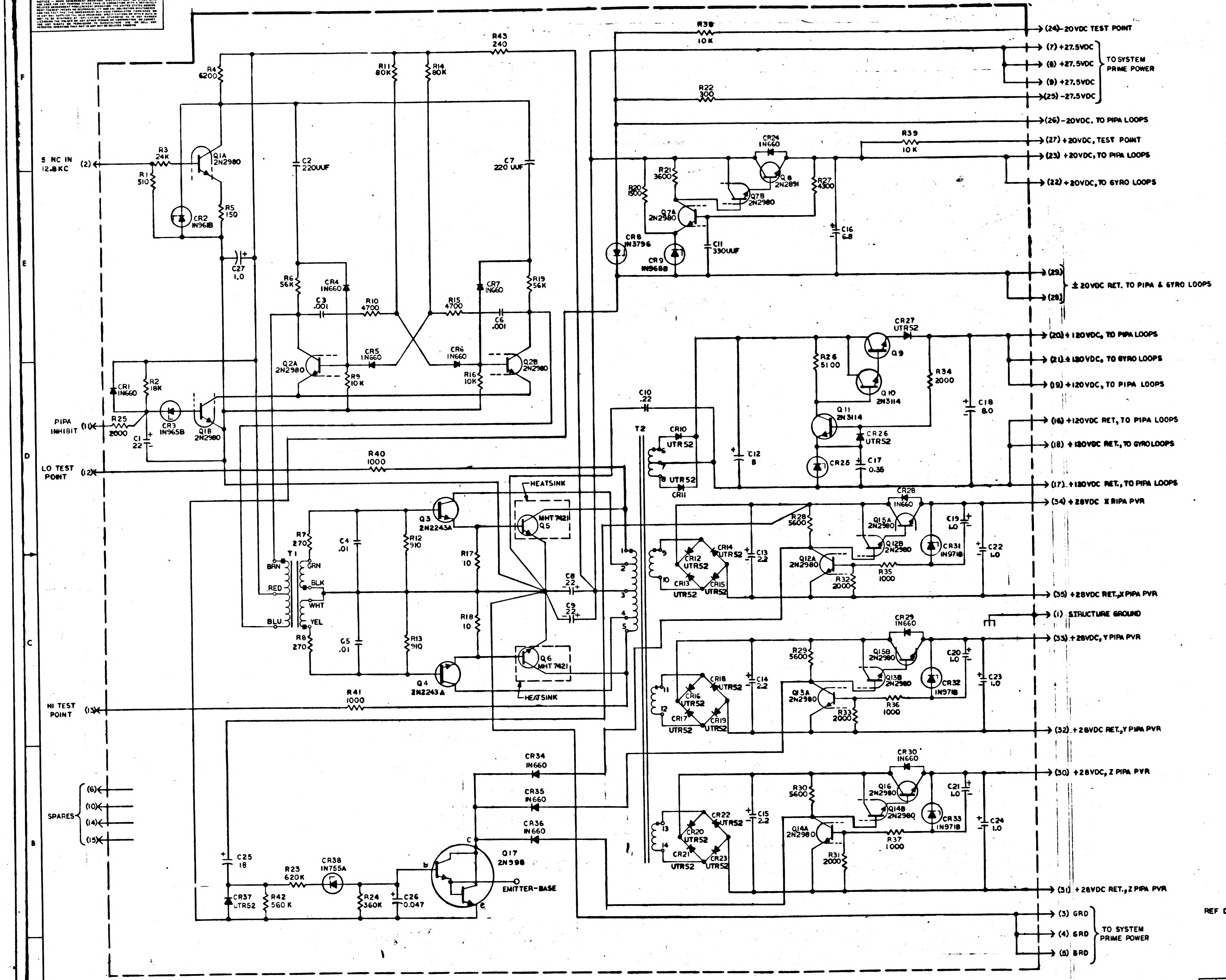
SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010015
SCALE — WT —
SHEET 2 OF 2

2010015 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14327			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	29 Jan 64	WK
B	REVISED PER TDRR 18962	Jan 65	WK
C	REVISED PER TDRR 22511	Sep 65	
D	REVISED PER TDRR 23946	65	WK



R43 240
R4 6200
R11 80K
R14 80K
R38 10K
R22 300
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
R39 10K
CR24 1N660
Q8 2N2891
Q7B 2N2980
Q7A 2N2980
R21 3600
R20 1500
R27 4300
C16 6.8
C11 330UUF
CR8 1N3796
CR9 1N968B
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
SYNC IN 12.8KC (2)
R3 24K
R1 510
Q1A 2N2980
R5 150
CR2 1N961B
C2 220UUF
C7 220 UUF
C27 1.0
R6 56K
CR4 1N660
C3 .001
R10 4700
R15 4700
CR7 1N660
R19 56K
C6 .001
Q2A 2N2980
CR5 1N660
CR6 1N660
Q2B 2N2980
R9 10K
R16 10K
CR1 1N660
R2 18K
CR3 1N965B
Q18 2N2980
PIPA INHIBIT (11)
R25 2000
C1 22
LO TEST POINT (12)
R40 1000
HI TEST POINT (13)
R41 1000
C10 .22
T2
CR10 UTR52
CR11 UTR52
C12 8
R26 5100
Q9
Q10 2N3114
Q11 2N3114
CR27 UTR52
R34 2000
C18 8.0
CR26 UTR52
CR25
C17 0.36
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
HEATSINK
Q3 2N2243A
MHT 7421 Q5
R12 910
R17 10
R18 10
C4 .01
C5 .01
R7 270
R8 270
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
C8 22
C9 22
R13 910
Q4 2N2243A
Q6 MHT 7421
CR28 1N660
R28 5600
Q15A 2N2980
Q12B 2N2980
Q12A 2N2980
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
C13 2.2
R32 2000
R35 1000
C19 1.0
CR31 1N971B
C22 1.0
(34) +28VDC X PIPA PVR
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
CR29 1N660
(33) +28VDC, Y PIPA PVR
R29 5600
Q15B 2N2980
Q13B 2N2980
Q13A 2N2980
CR16 UTR52
CR17 UTR52
CR18 UTR52
CR19 UTR52
C14 2.2
R33 2000
R36 1000
C20 1.0
CR32 1N971B
C23 1.0
(32) +28VDC RET., Y PIPA PVR
CR30 1N660
(30) +28VDC, Z PIPA PVR
R30 5600
Q16 2N2980
Q14B 2N2980
Q14A 2N2980
CR20 UTR52
CR21 UTR52
CR22 UTR52
CR23 UTR52
C15 2.2
R31 2000
R37 1000
C21 1.0
CR33 1N971B
C24 1.0
(31) +28VDC RET., Z PIPA PVR
CR34 1N660
CR35 1N660
CR36 1N660
SPARES (6) (10) (14) (15)
C25 18
CR37 UTR52
R42 560K
R23 620K
CR38 1N755A
R24 360K
C26 0.047
Q17 2N998
EMITTER-BASE
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J.F. Webb DATE 5/19/64
CHECKED
APPROVAL
APPROVAL J. S. 11/5/64
NASA APPROVAL 12-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
PULSE TORQUE
POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010015
SCALE
WT
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 19327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	Jan '64	
B	REVISED PER TDRR 18962		
C	REVISED PER TDRR 22511		
D	REVISED PER TDRR 23946	65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 62		18 K		
R3	- 65		24 K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56 K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56 K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10 K		
R39	- 56		10 K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560 K	± 5%	1/8 W
C1	1006755 - 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C10	1010264 - 29		0,22	± 5%	200V DC
C11	1006777 - 18		330 UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69	CAPACITOR	1,0	± 10%	35VDC
R43	1006750-17	RESISTOR	240	± 2%	1/4 W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 - 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 - 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 - 1	ZENER	IN3796	± 5%	20 VDC
CR9	1010830 - 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 - 15	ZENER	IN 971B	± 5%	27 VDC
CR32	1010830 - 15	ZENER	IN971B	± 5%	27 VDC
CR33	1010830 - 15	ZENER	IN971B	± 5%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN 755A		
Q1	1010652 - 1	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243		
Q4	1010398 - 3		2N2243		
Q5	1010806 -001		MHT 7421		
Q6	1010806 -001		MHT 7421		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010273 - 1				
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	- 1				
Q14	- 1				
Q15	- 1				
Q16	1010652 - 1		2N2980		
Q17	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

MASTER

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FINAL FINISH —

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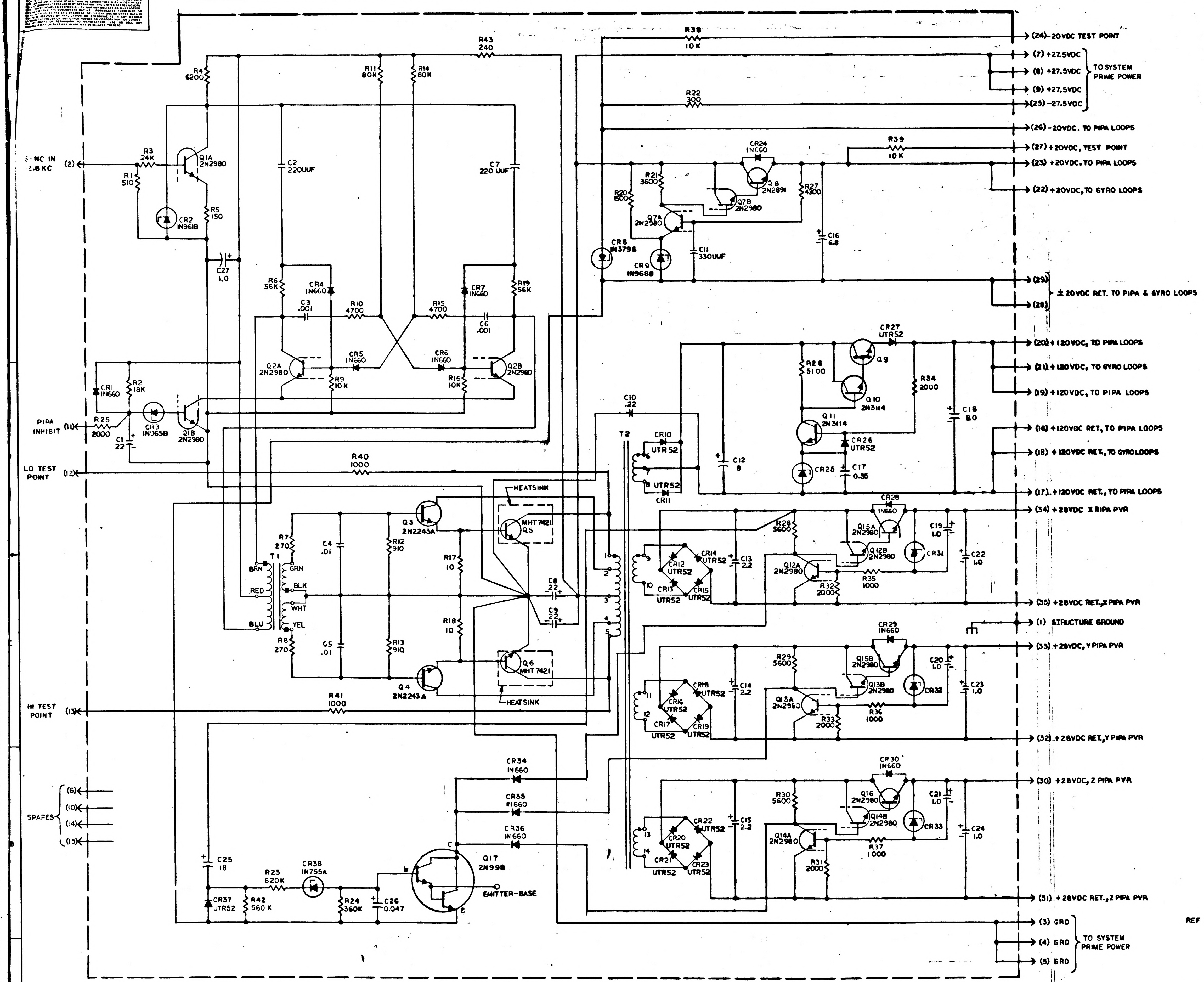
DWG. NO. CONTRACT
DRAWN J.E. DATE
CHECKED
APPROVAL
APPROVAL 11/2/64
NASA APPROVAL 12-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010015
SCALE —
WT —
SHEET 2 OF 2

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	[illegible] 64	[illegible]
B	REVISED PER TDRR 18962	[illegible] 65	[illegible]
C	REVISED PER TDRR 22511	[illegible] 65	[illegible]
D	REVISED PER TDRR 23946	[illegible] 65	[illegible]
E	REVISED PER TDRR 24541	[illegible] Dec 65	[illegible]


SYNC IN
12.8KC
(2)
R3 24K
Q1A 2N2980
R1 510
CR2 IN961B
R4 6200
R5 150
C27 1.0
C2 220UUF
R11 80K
R14 80K
R43 240
C7 220 UUF
R6 56K
CR4 IN660
C3 .001
R10 4700
R15 4700
CR7 IN660
R19 56K
C6 .001
Q2A 2N2980
CR5 IN660
R9 10K
CR6 IN660
R16 10K
Q2B 2N2980
CR1 IN660
R2 18K
PIPA INHIBIT (11)
R25 2000
C1 22
CR3 IN965B
Q1B 2N2980
LO TEST POINT (12)
R40 1000
HEATSINK
Q3 2N2243A
MHT 7421 Q5
R7 270
T1
BRN
GRN
RED
BLK
WHT
YEL
BLU
C4 .01
R12 910
R17 10
C8 22
C9 22
R18 10
R8 270
C5 .01
R13 910
Q4 2N2243A
Q6 MHT 7421
HI TEST POINT (13)
R41 1000
SPARES
(6)
(10)
(14)
(15)
CR34 IN660
CR35 IN660
CR36 IN660
Q17 2N998
C25 18
R23 620K
CR38 IN755A
CR37 UTR52
R42 560 K
R24 360K
C26 0.047
EMITTER-BASE
b
c
e
R38 10 K
R22 300
CR24 IN660
R39 10 K
R21 3600
R20 1500
Q7A 2N2980
Q7B 2N2980
Q8 2N2891
R27 4300
C16 6.8
C11 330UUF
CR8 IN3796
CR9 IN968B
C10 .22
T2
CR10 UTR52
CR11 UTR52
C12 8
R26 5100
Q9
Q10 2N3114
Q11 2N3114
CR26 UTR52
CR25
C17 0.35
CR27 UTR52
R34 2000
C18 8.0
CR28 IN660
R28 5600
Q15A 2N2980
Q12B 2N2980
C19 1.0
CR31
C22 1.0
CR12 UTR52
CR14 UTR52
C13 2.2
Q12A 2N2980
R35 1000
R32 2000
CR13 UTR52
CR15 UTR52
CR29 IN660
R29 5600
Q15B 2N2980
Q13B 2N2980
C20 1.0
CR32
C23 1.0
CR16 UTR52
CR18 UTR52
C14 2.2
Q13A 2N2980
R36 1000
R33 2000
CR17 UTR52
CR19 UTR52
CR30 IN660
R30 5600
Q16 2N2980
Q14B 2N2980
C21 1.0
CR33
C24 1.0
CR20 UTR52
CR22 UTR52
C15 2.2
Q14A 2N2980
R37 1000
R31 2000
CR21 UTR52
CR23 UTR52
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET., TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
(34) +28VDC X PIPA PVR
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
(33) +28VDC, Y PIPA PVR
(32) +28VDC RET., Y PIPA PVR
(30) +28VDC, Z PIPA PVR
(31) +28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
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4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

MASTER

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LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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CHECKED [illegible]
APPROVAL
APPROVAL J. S[illegible] 11/2/64
NASA APPROVAL [illegible] 11-17-64
MIT APPROVAL [illegible] 17 [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010015
SCALE
WT
SHEET 1 OF 2

2010015 E

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REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	29 Jan '64	
B	REVISED PER TDRR 18962	[illegible] 65	
C	REVISED PER TDRR 22511	[illegible] 65	
D	REVISED PER TDRR 23946	[illegible] 65	
E	REVISED PER TDRR 24541	9 Dec 65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 62		18 K		
R3	- 65		24 K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10 K		
R39	- 56		10 K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560 K	± 5%	1/8 W
C1	1006755 - 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 - 16		220 UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220 UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C10	1010264 - 29		0.22	± 5%	200V DC
C11	1006777 - 18		330 UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69	CAPACITOR	1.0	± 10%	35VDC
R43	1006750-17	RESISTOR	240	± 2%	1/4 W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 - 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 - 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 - 1	ZENER	IN3796	± 5%	20 VDC
CR9	1010830 - 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 -28	ZENER		± 2%	27 VDC
CR32	1010830 -28	ZENER		± 2%	27 VDC
CR33	1010830 -28	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN 755A		
Q1	1010652 - 1	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243		
Q4	1010398 - 3		2N2243		
Q5	1010806 -001		MHT 7421		
Q6	1010806 -001		MHT 7421		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010273 - 1				
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	- 1				
Q14	- 1				
Q15	- 1				
Q16	1010652 - 1		2N2980		
Q17	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

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CHECKED [illegible]
APPROVAL
APPROVAL [illegible] 11/[illegible]
NASA APPROVAL [illegible] 4-17-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010015
SCALE —
WT —
SHEET 2 OF 2

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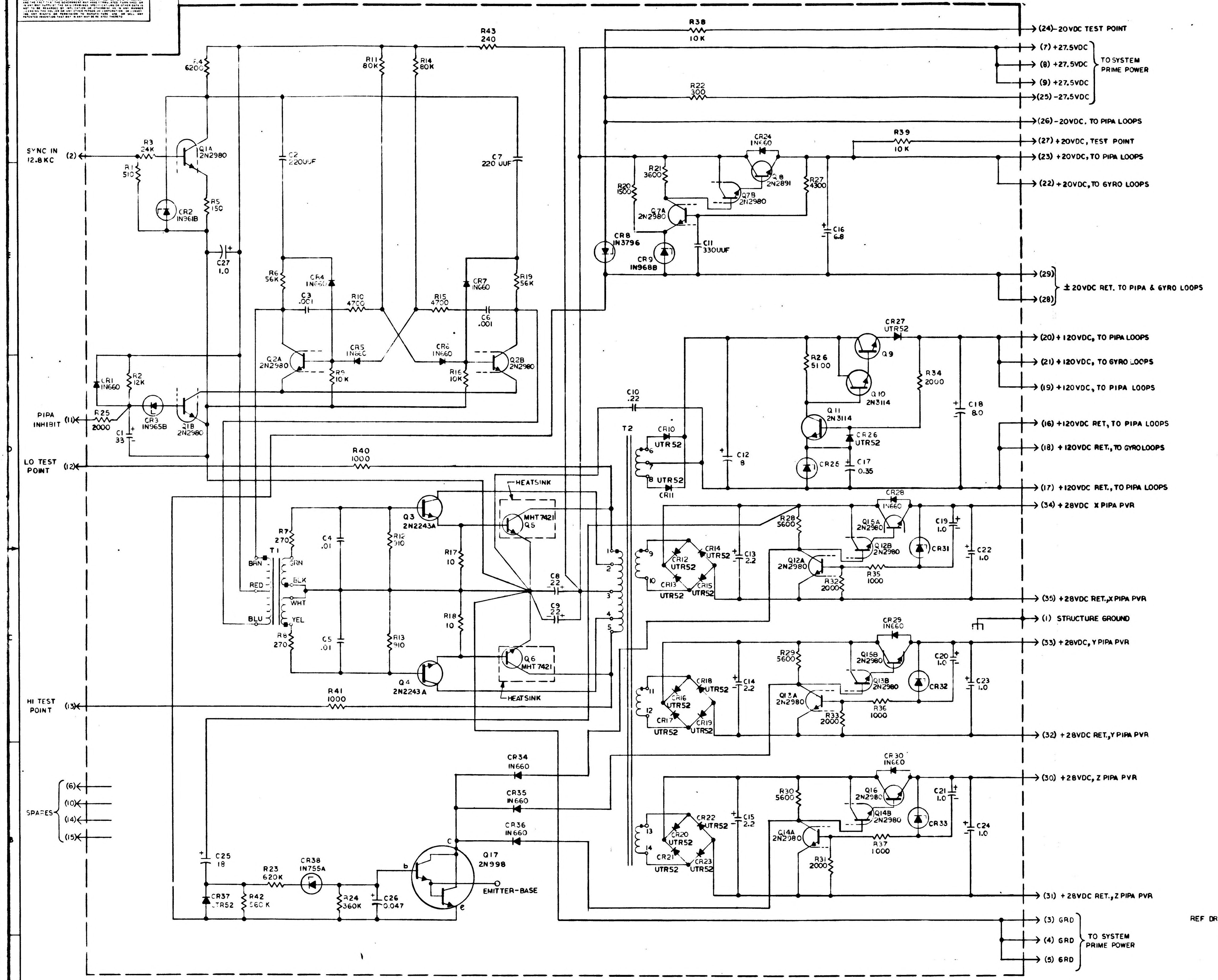
REVISIONS 76377			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	29 Dec 64	WK
B	REVISED PER TDRR 18962		WK
C	REVISED PER TDRR 22511	15 Sept 65	
D	REVISED PER TDRR 23946		WK
E	REVISED PER TDRR 24541	9 Dec 65	WK
F	REVISED PER TDRR 30142	66	


SYNC IN 12.8 KC (2)
R3 24K
R1 510
Q1A 2N2980
CR2 1N3618
R4 6200
R5 150
C27 1.0
C2 220UUF
R11 80K
R14 80K
R43 240
C7 220 UUF
R6 56K
CR4 1N660
C3 .001
R10 4700
R15 4700
CR7 1N660
C6 .001
R19 56K
Q2A 2N2980
CR5 1N660
CR6 1N660
Q2B 2N2980
R9 10K
R16 10K
CR1 1N660
R2 12K
CR3 1N965B
Q1B 2N2980
PIPA INHIBIT (11)
R25 2000
C1 33
LO TEST POINT (12)
R40 1000
HI TEST POINT (13)
R41 1000
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
R7 270
R8 270
C4 .01
C5 .01
R12 910
R13 910
Q3 2N2243A
Q4 2N2243 A
R17 10
R18 10
HEATSINK
MHT 7421 Q5
Q6 MHT 7421
HEATSINK
C8 22
C9 22
C10 .22
T2
CR10 UTR52
CR11 UTR52
C12 8
R38 10K
R22 300
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC. TO PIPA LOOPS
R39 10K
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
CR24 1N660
R21 3600
R20 1500
Q8 2N2891
Q7B 2N2980
Q7A 2N2980
R27 4300
C16 6.8
C11 330UUF
CR8 1N3796
CR9 1N968B
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
CR27 UTR52
R26 5100
Q9
Q10 2N3114
Q11 2N3114
R34 2000
C18 8.0
CR26 UTR52
C17 0.35
CR25
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
CR28 1N660
R28 5600
Q15A 2N2980
Q12B 2N2980
C19 1.0
CR31
C22 1.0
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
C13 2.2
Q12A 2N2980
R32 2000
R35 1000
(34) +28VDC X PIPA PVR
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
CR29 1N660
R29 5600
Q15B 2N2980
Q13B 2N2980
C20 1.0
CR32
C23 1.0
CR16 UTR52
CR17 UTR52
CR18 UTR52
CR19 UTR52
C14 2.2
Q13A 2N2980
R33 2000
R36 1000
(33) +28VDC, Y PIPA PVR
(32) +28VDC RET., Y PIPA PVR
CR30 1N660
R30 5600
Q16 2N2980
Q14B 2N2980
C21 1.0
CR33
C24 1.0
CR20 UTR52
CR21 UTR52
CR22 UTR52
CR23 UTR52
C15 2.2
Q14A 2N2980
R31 2000
R37 1000
(30) +28VDC, Z PIPA PVR
(31) +28VDC RET., Z PIPA PVR
CR34 1N660
CR35 1N660
CR36 1N660
SPARES (6) (10) (14) (15)
C25 18
CR37 UTR52
R42 560K
R23 620K
CR38 1N755A
R24 360K
C26 0.047
Q17 2N998
c b e
EMITTER-BASE
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
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NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010015
SCALE
WT
SHEET 1 OF 2

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REVISIONS 14337

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15163	29 Jan '64	
B	REVISED PER TDRR 18962	13 MAY 65	
C	REVISED PER TDRR 22511	25 Sep 65	
D	REVISED PER TDRR 23946	14 NOV 65	
E	REVISED PER TDRR 24541	9 Dec 65	
F	REVISED PER TDRR 30142	18 JUL 66	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 58		12 K		
R3	- 65		24 K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56 K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4 W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10 K		
R39	- 56		10 K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560 K	± 5%	1/8 W
C1	1006755 - 34	CAPACITOR	33	± 10%	20 V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C10	1010264 - 29		0.22	± 5%	200V DC
C11	1006777 - 18		330 UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69	CAPACITOR	1.0	± 10%	35VDC
R43	1006750-17	RESISTOR	240	± 2%	1/4 W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 - 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 - 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 - 1	ZENER	IN3796	± 5%	20 VDC
CR9	1010830 - 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 - 28	ZENER		± 2%	27 VDC
CR32	1010830 - 28	ZENER		± 2%	27 VDC
CR33	1010830 - 28	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN 755A		
Q1	1010652 - 3	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243		
Q4	1010398 - 3		2N2243		
Q5	1010806 - 001		MHT 7421		
Q6	1010806 - 001		MHT 7421		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010273 - 1				
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	- 1				
Q14	- 1				
Q15	- 1				
Q16	1010652 - 1		2N2980		
Q17	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

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INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN J.E. [illegible] DATE 5/19/64
CHECKED
APPROVAL
APPROVAL J. Stone 11/2/64
NASA APPROVAL 4-17-64
MIT APPROVAL

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HOUSTON, TEXAS

SCHEMATIC,
PULSE TORQUE
POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010015
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SHEET 2 OF 2

2010015 F

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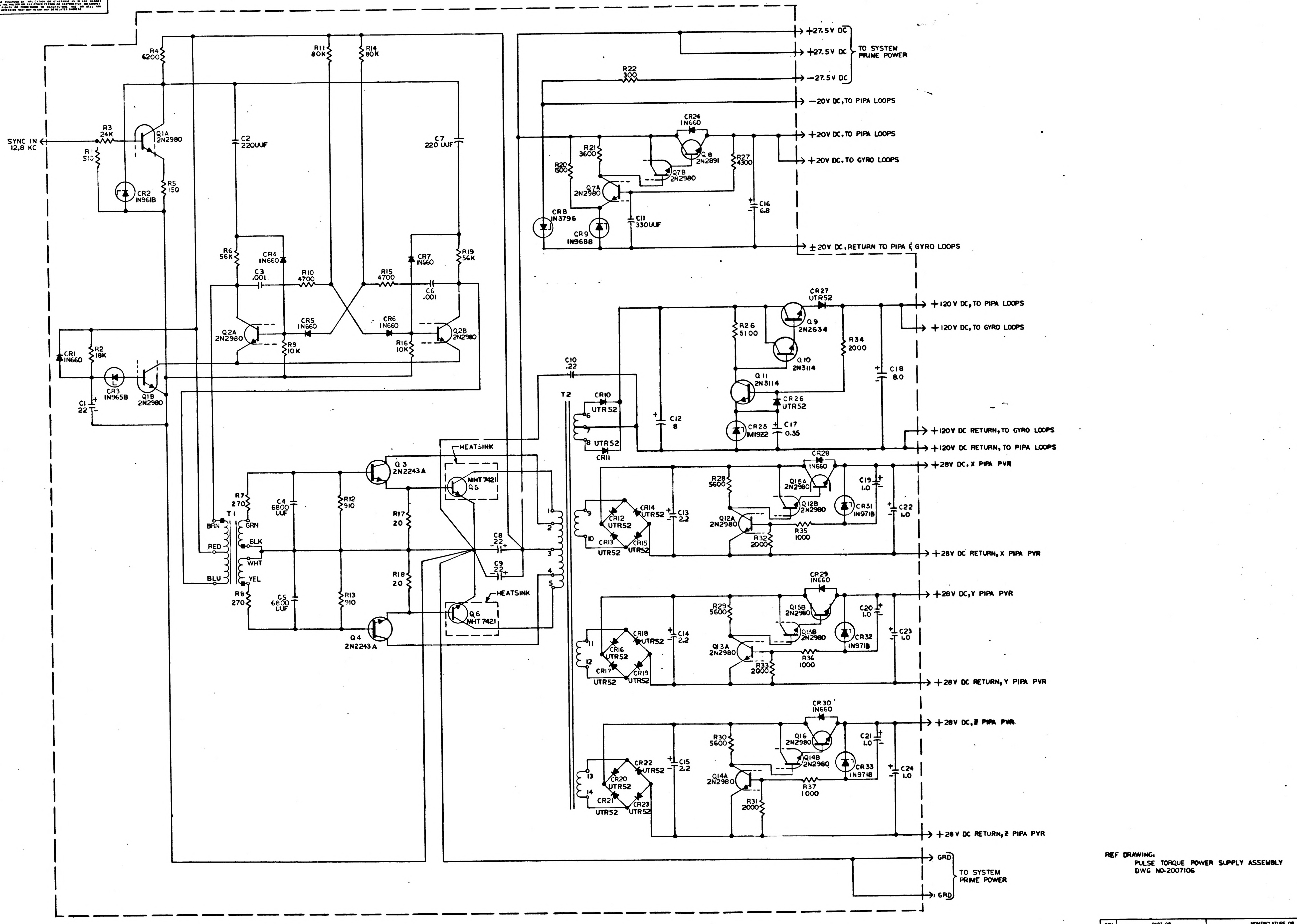
REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL


SYNC IN
12.8 KC
R1
510
R3
24K
R4
6200
Q1A
2N2980
R5
150
CR2
1N961B
R11
80K
R14
80K
C2
220UUF
C7
220 UUF
R6
56K
CR4
1N660
C3
.001
R10
4700
R15
4700
CR7
1N660
C6
.001
R19
56K
Q2A
2N2980
CR5
1N660
R9
10K
CR6
1N660
R16
10K
Q2B
2N2980
CR1
1N660
R2
18K
CR3
1N965B
Q1B
2N2980
C1
22
HEATSINK
Q3
2N2243A
MHT7421
Q5
R7
270
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
R8
270
C4
6800
UUF
C5
6800
UUF
R12
910
R13
910
R17
20
R18
20
C8
22
C9
22
Q6
MHT 7421
Q4
2N2243A
+27.5V DC
+27.5V DC
TO SYSTEM
PRIME POWER
R22
300
−27.5V DC
−20V DC, TO PIPA LOOPS
CR24
1N660
+20V DC, TO PIPA LOOPS
+20V DC, TO GYRO LOOPS
R21
3600
R20
1500
Q8
2N2891
Q7B
2N2980
Q7A
2N2980
R27
4300
C16
6.8
CR8
1N3796
CR9
1N968B
C11
330UUF
± 20V DC, RETURN TO PIPA & GYRO LOOPS
CR27
UTR52
+120V DC, TO PIPA LOOPS
+120V DC, TO GYRO LOOPS
R26
5100
Q9
2N2634
Q10
2N3114
R34
2000
C18
8.0
C10
.22
T2
CR10
UTR52
UTR52
CR11
Q11
2N3114
CR26
UTR52
CR25
1M11922
C17
0.35
C12
8
+120V DC RETURN, TO GYRO LOOPS
+120V DC RETURN, TO PIPA LOOPS
CR28
1N660
+28V DC, X PIPA PVR
R28
5600
Q15A
2N2980
Q12B
2N2980
C19
1.0
CR31
1N971B
C22
1.0
CR12
UTR52
CR14
UTR52
C13
2.2
CR13
UTR52
CR15
UTR52
Q12A
2N2980
R32
2000
R35
1000
+28V DC RETURN, X PIPA PVR
CR29
1N660
+28V DC, Y PIPA PVR
R29
5600
Q15B
2N2980
Q13B
2N2980
C20
1.0
CR32
1N971B
C23
1.0
CR16
UTR52
CR18
UTR52
C14
2.2
CR17
UTR52
CR19
UTR52
Q13A
2N2980
R33
2000
R36
1000
+28V DC RETURN, Y PIPA PVR
CR30
1N660
+28V DC, Z PIPA PVR
R30
5600
Q16
2N2980
Q14B
2N2980
C21
1.0
CR33
1N971B
C24
1.0
CR20
UTR52
CR22
UTR52
C15
2.2
CR21
UTR52
CR23
UTR52
Q14A
2N2980
R31
2000
R37
1000
+28V DC RETURN, Z PIPA PVR
GRD
GRD
TO SYSTEM
PRIME POWER
1
2
3
4
5
6
7
8
9
10
11
12
13
14

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO-2007106

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4 UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN J.F. Walsh DATE 5/19/64
CHECKED [illegible]
APPROVAL
APPROVAL J. S[illegible] 11/2/64
NASA APPROVAL W. J. Rhine 11-17-64
MIT APPROVAL [illegible] 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010015
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 1432			
SYM	DESCRIPTION	DATE	APPROVAL

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	± 2%	1/4 W
R2	↑ – 62	↑	18 K	↑	↑
R3	– 65		24 K		
R4	– 51		6200		
R5	– 12		150		
R6	– 74		56K		
R7	– 18		270		
R8	↓ – 18		270	↓	↓
R9	1006750 – 56		10K	± 2%	1/4 W
R10	1010377 – 110		4700	± 1%	1/10 W
R11	1010377 – 314		80K	± 1%	1/10 W
R12	1006750 – 31		910	± 2%	1/4 W
R13	1006750 – 31		910	± 2%	1/4 W
R14	1010377 – 314		80K	± 1%	1/10 W
R15	1010377 – 110		4700	± 1%	1/10W
R16	1006750 – 56		10K	± 2%	1/4 W
R17	1006802 – 2		20	± 1%	1/2 W
R18	1006802 – 2		20	± 1%	1/2 W
R19	1006750 – 74		56K	± 2%	1/4 W
R20	1006750 – 36		1500	± 2%	1/4 W
R21	1006750 – 45		3600	± 2%	1/4 W
R22	1010604 – 37		300	± 1%	1 W
R26	1010389 – 73		5100	± 1%	3 W
R27	1006750 – 47		4300	± 2%	1/4 W
R28	↑ – 50		5600	↑	↑
R29	– 50		5600		
R30	– 50		5600		
R31	– 39		2000		
R32	– 39		2000		
R33	– 39		2000		
R34	– 39		2000		
R35	– 32		1000		
R36	↓ – 32		1000	↓	↓
R37	1006750 – 32	↓	1000	± 2%	1/4 W
C1	1006755 – 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 – 16	↑	220UUF	± 10%	100V DC
C3	1010316 – 1		.001	± 1%	↑
C4	1006777 – 30		6800UUF	± 10%	
C5	1006777 – 30		6800UUF	± 10%	
C6	1010316 – 1		.001	± 1%	↓
C7	1006777 – 16		220UUF	± 10%	100V DC
C8	1006755 – 134		22	± 10%	50V DC
C9	1006755 – 134		22	± 10%	50V DC
C10	1010264 – 29		0,22	± 5%	200V DC
C11	1006777 – 18		330 UUF	± 10%	100V DC
C12	1010769 – 001		8.0	-15/+50%	270VDC
C13	1006755 – 122		2.2	± 10%	50V DC
C14	1006755 – 122		2.2	± 10%	50V DC
C15	1006755 – 122		2.2	± 10%	50V DC
C16	1006755 – 79		6.8	± 10%	35 V DC
C17	1010438 – 103		.35	± 20%	150V DC
C18	1010769 – 001		8.0	-15/+50%	270V DC
C19	1006755 – 69		1.0	± 10%	35V DC
C20	1006755 – 69		1.0	± 10%	35V DC
C21	1006755 – 69		1.0	± 10%	35V DC
C22	1006755 – 118		1.0	± 10%	50V DC
C23	1006755 – 118	↓	1.0	± 10%	50V DC
C24	1006755 – 118	CAPACITOR	1.0	± 10%	50V DC

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 – 5	Zener ↑	IN961B	± 5%	10 VDC
CR3	1010830 – 9	Zener	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 – 1	Zener	IN3796	± 5%	20 VDC
CR9	1010830 – 12	Zener	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11	↑				
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22	↓		↓		
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010265 - 26	Zener	IM119Z2	± 2%	119 VDC
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 – 15	Zener	IN971B	± 5%	27 VDC
CR32	1010830 – 15	Zener ↓	IN971B	± 5%	27 VDC
CR33	1010830 – 15	Zener DIODE	IN971B	± 5%	27 VDC
Q1	1010652 – 1	TRANSISTOR	2N2980		
Q2	1010652 – 1	↑	2N2980		
Q3	1010398 – 3		2N2243		
Q4	1010398 – 3		2N2243		
Q5	1010806 – 001		MHT 7421		
Q6	1010806 – 001		MHT 7421		
Q7	1010652 – 1		2N2980		
Q8	1010713 – 1		2N2891		
Q9	1010499 – 1		2N2634		
Q10	1010747 – 1		2N3114		
Q11	1010747 – 1		2N3114		
Q12	1010652 – 1		2N2980		
Q13	↑ – 1		↑		
Q14	– 1				
Q15	↓ – 1	↓	↓		
Q16	1010652 – 1	TRANSISTOR	2N2980		
T1	1010315 – 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ———
HEAT TREATMENT ———
FINAL FINISH ———

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO. CONTRACT
DRAWN J.F. DATE 5/ /64
CHECKED
APPROVAL
APPROVAL J Stone 11/2/64
NASA APPROVAL 9-17-64
MIT APPROVAL

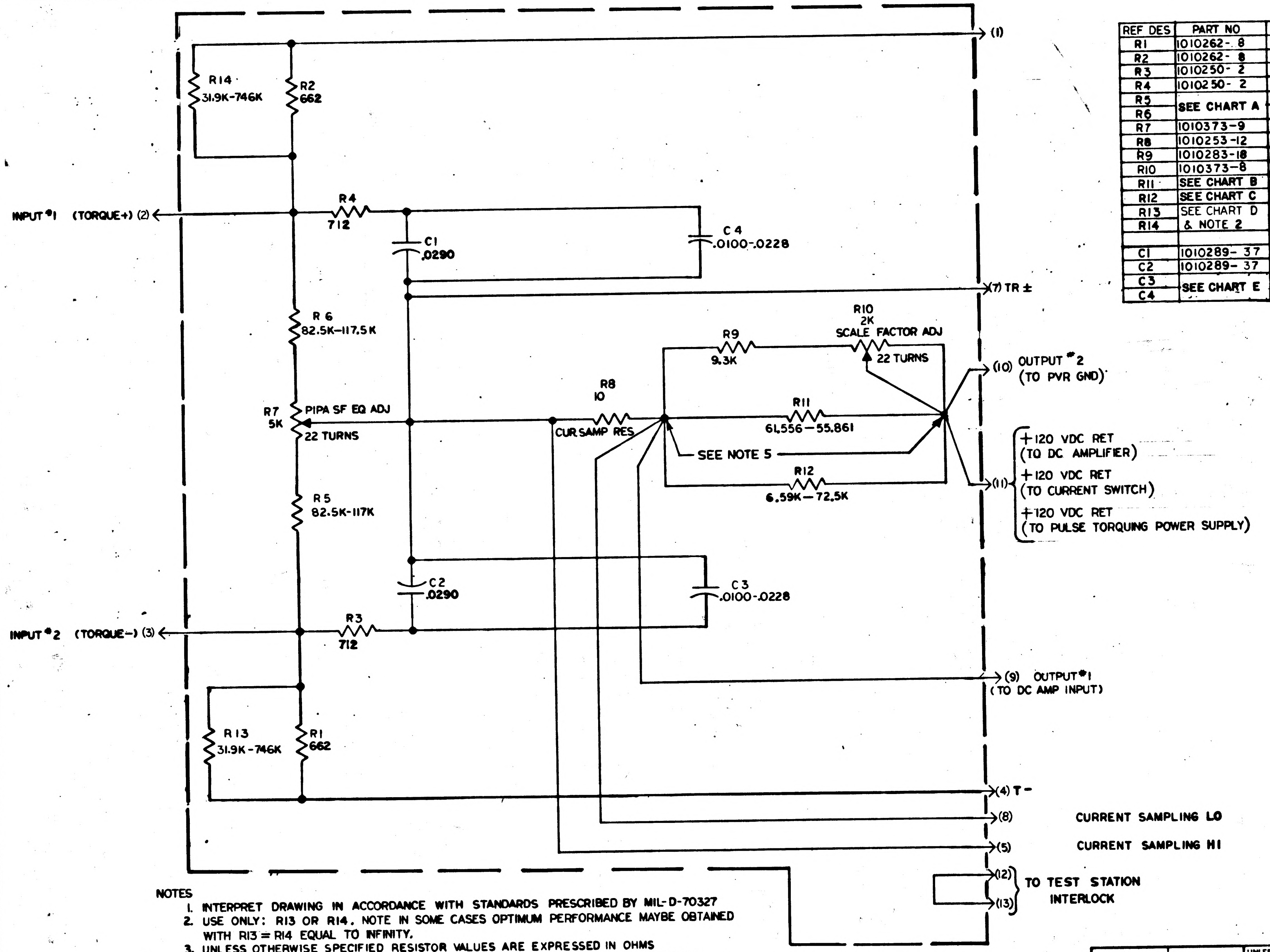
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
PULSE TORQUE
POWER SUPPLY

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	E	2010015
SCALE —	WT —	SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 1036V			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13OCT64	


R14
31.9K-746K
R2
662
(1)
INPUT #1 (TORQUE+) (2)
R4
712
C1
.0290
C4
.0100-.0228
(7) TR ±
R6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
22 TURNS
R9
9.3K
(10) OUTPUT #2
(TO PVR GND)
R8
10
CUR SAMP RES
R7
5K
PIPA SF EQ ADJ
22 TURNS
R11
61.556-55.861
SEE NOTE 5
R12
6.59K-72.5K
+120 VDC RET
(TO DC AMPLIFIER)
(11)
+120 VDC RET
(TO CURRENT SWITCH)
+120 VDC RET
(TO PULSE TORQUING POWER SUPPLY)
R5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE-) (3)
R3
712
(9) OUTPUT #1
(TO DC AMP INPUT)
R13
31.9K-746K
R1
662
(4) T-
(8)
CURRENT SAMPLING LO
(5)
CURRENT SAMPLING HI
(12)
(13)
TO TEST STATION
INTERLOCK

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262- 8	RESISTOR	662	±1%	10W
R2	1010262- 8		662	±1%	10W
R3	1010250- 2		712	±1%	0.7W
R4	1010250- 2		712	±1%	0.7W
R5	SEE CHART A			±1%	1/10W
R6				±.01%	1/10W
R7	1010373-9		5K	±5%	1W
R8	1010253-12		10	±.01%	1W
R9	1010283-18		9.3K	±.1%	1/10W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D & NOTE 2			±1%	1/4W
R14				±1%	1/4W
C1	1010289- 37	CAPACITOR	.0290	±0.5%	200V
C2	1010289- 37		.0290	±0.5%	200V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V

REF DWG.
PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO. 1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200 K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN A Di Lag DATE 2 MAR 64
CHECKED C.C.
APPROVAL J.L. 6/16/64
APPROVAL 6/24/69
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
PIPA CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 1 OF 2

2010016

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13 Jul 64	

CHART A

R5, R6 1/10 W ± 0.1%

PART NO	VALUE
1010377 -337	82,500
-338	83,750
-339	85,000
-344	86,250
-2	87,500
-3	88,750
-4	90,000
-5	91,250
-6	92,500
-7	93,750
-8	95,000
-9	96,250
-10	97,500
-11	98,750
-12	100,000
-13	101,250
-14	102,500
-15	103,750
-16	105,000
-17	106,250
-18	107,500
-19	108,750
-20	110,000
-21	111,250
-22	112,500
-340	113,750
-341	115,000
-342	116,250
1010377 -343	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010253 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010253 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06K
-9	8.05K
-10	7.25K
1010283 -11	6.59K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9K
-2	36.0 K
-3	41.2 K
-4	48.2 K
-5	58.01K
-6	72.6 K
-7	97.1 K
-8	146.0K
-9	292.4K
-10	33.4K
-11	35.0K
-12	38.8K
-13	38.6K
-14	41.0K
-15	43.4K
-16	46.2K
-17	49.3K
-18	52.9K
-19	57.0K
-20	61.8K
-21	67.4K
-22	74.2 K
-23	82.6 K
-24	92.9 K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ± 0.5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

2010016 A

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis S Alcove DATE 21 Apr 64
CHECKED [illegible] 21 Apr 64
APPROVAL J. L. S[illegible] 6/18/64
APPROVAL [illegible] 6/29/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 23 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PIPA CALIBRATION

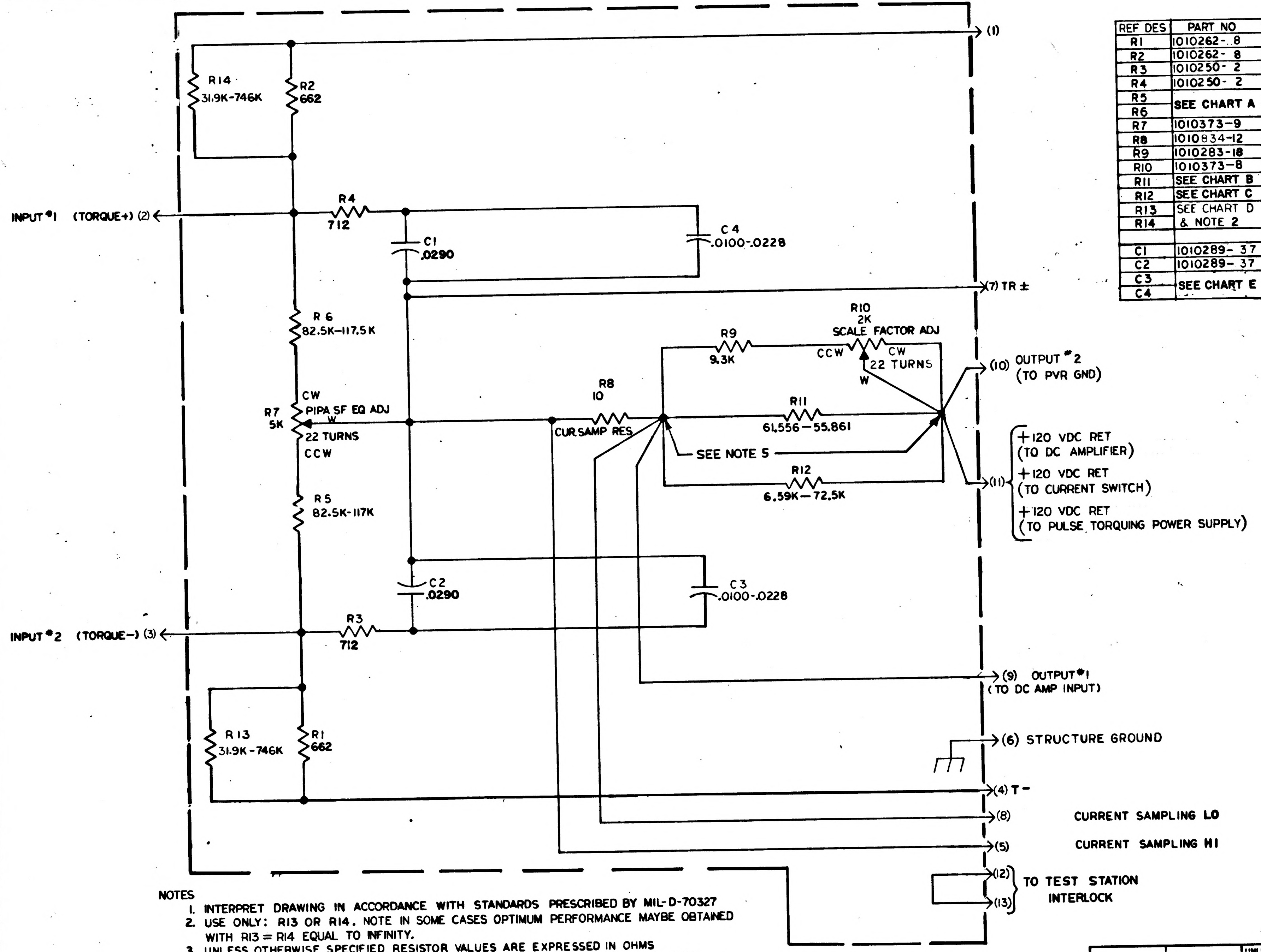
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 2 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15231	13 OCT 64	
B	REVISED PER TDRR 14800	17 DEC	


R14
31.9K-746K
R2
662
INPUT #1 (TORQUE+) (2)
R4
712
C1
.0290
C4
.0100-.0228
(1)
(7) TR ±
R 6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
R9
9.3K
CCW
CW
22 TURNS
W
(10) OUTPUT #2
(TO PVR GND)
R8
10
CUR SAMP RES
R7
5K
CW
PIPA SF EQ ADJ
W
22 TURNS
CCW
R11
61,556—55.861
SEE NOTE 5
R12
6.59K—72.5K
(11)
+120 VDC RET
(TO DC AMPLIFIER)
+120 VDC RET
(TO CURRENT SWITCH)
+120 VDC RET
(TO PULSE TORQUING POWER SUPPLY)
R 5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE–) (3)
R3
712
(9) OUTPUT #1
(TO DC AMP INPUT)
R 13
31.9K-746K
R1
662
(6) STRUCTURE GROUND
(4) T–
(8)
(5)
(12)
(13)

CURRENT SAMPLING LO

CURRENT SAMPLING HI

TO TEST STATION INTERLOCK

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262- 8	RESISTOR	662	±1%	10W
R2	1010262- 8		662	±1%	10W
R3	1010250- 2		712	±1%	0.7W
R4	1010250- 2		712	±1%	0.7W
R5	SEE CHART A			±0.1%	1/10W
R6				±0.1%	1/10W
R7	1010373-9		5K	±5%	1W
R8	1010834-12		10	±.01%	1W
R9	1010283-18		9.3K	±.1%	1/10 W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D			±1%	1/4 W
R14	& NOTE 2			±1%	1/4 W
C1	1010289- 37	CAPACITOR	.0290	±0.5%	200V
C2	1010289- 37		.0290	±0.5%	200V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V

REF DWG.
PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO. 1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN A. Di Leo DATE 21 JUNE 64
CHECKED C.C. Kingsbury
APPROVAL J L Stanton 6/24/64
APPROVAL R E Miller 6/24/69
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PIPA CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13 OCT 64	[illegible]
B	REVISED PER TDRR 14800	17 DEC 64	[illegible]

CHART A

R5, R6 1/10 W ± 0.1%

PART NO	VALUE
1010377 -337	82,500
-338	83,750
-339	85,000
-344	86,250
-2	87,500
-3	88,750
-4	90,000
-5	91,250
-6	92,500
-7	93,750
-8	95,000
-9	96,250
-10	97,500
-11	98,750
-12	100,000
-13	101,250
-14	102,500
-15	103,750
-16	105,000
-17	106,250
-18	107,500
-19	108,750
-20	110,000
-21	111,250
-22	112,500
-340	113,750
-341	115,000
-342	116,250
1010377 -343	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010834 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010834 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06 K
-9	8.05 K
-10	7.25 K
1010283 -11	6.59 K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9 K
-2	36.0 K
-3	41.2 K
-4	48.2 K
-5	58.01 K
-6	72.6 K
-7	97.1 K
-8	146.0 K
-9	292.4 K
-10	33.4 K
-11	35.0 K
-12	36.8 K
-13	38.8 K
-14	41.0 K
-15	43.4 K
-16	46.2 K
-17	49.3 K
-18	52.9 K
-19	57.0 K
-20	61.8 K
-21	67.4 K
-22	74.2 K
-23	82.6 K
-24	92.9 K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ± 0.5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis S Alowe DATE 21 APR 64
CHECKED [illegible] 21 APR 64
APPROVAL J. L. S[illegible] 6/18/64
APPROVAL [illegible] 6/29/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 23 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PIPA CALIBRATION

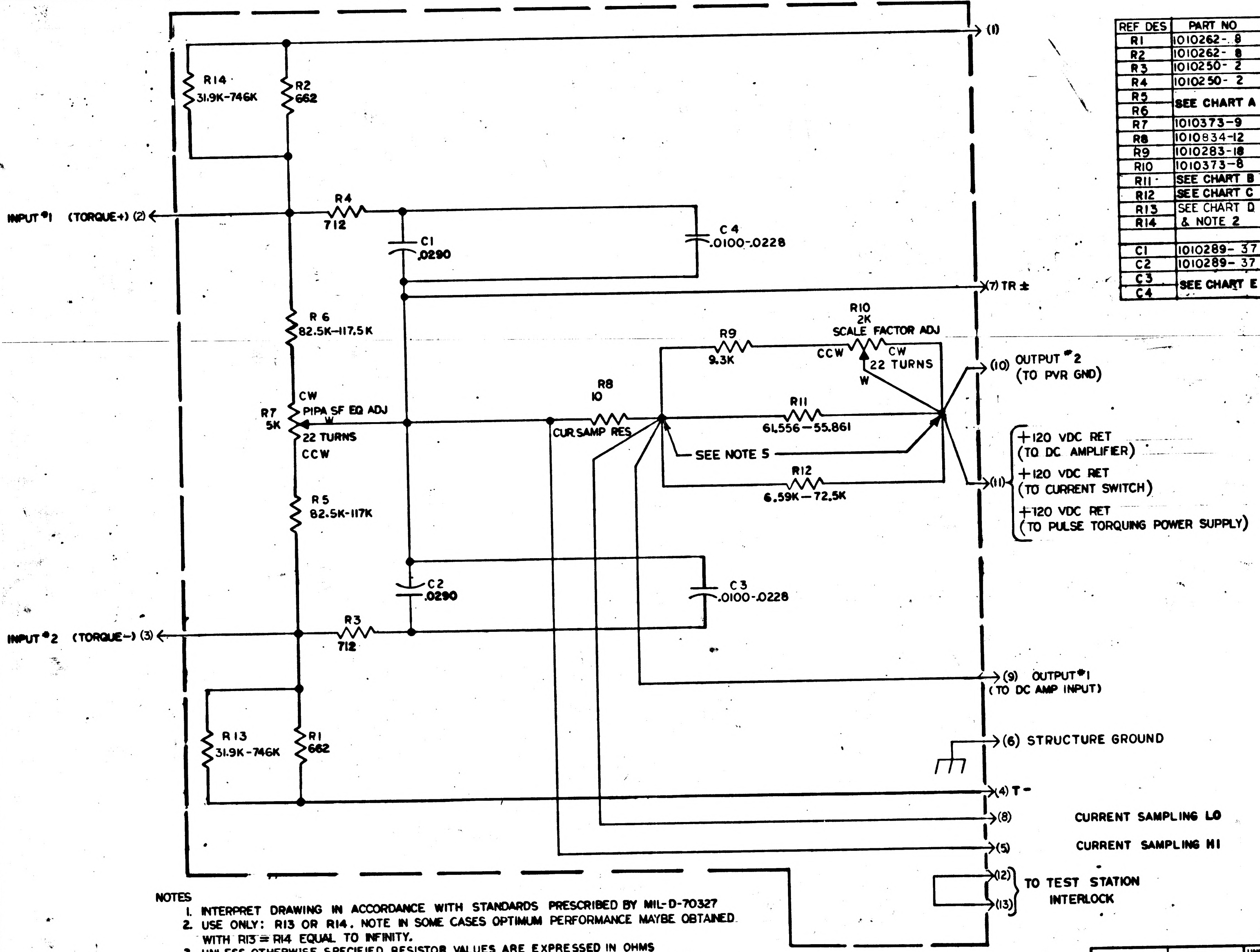
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13 OCT 64	
B	REVISED PER TDRR 14800	17 DEC	
C	REVISED PER TDRR 16269	16 FEB 65	WR

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262- 8	RESISTOR	662	±1%	10W
R2	1010262- 8		662	±1%	10W
R3	1010250- 2		712	±1%	0.7W
R4	1010250- 2		712	±1%	0.7W
R5	SEE CHART A			±0.1%	1/10W
R6				±0.1%	1/10W
R7	1010373-9		5K	±5%	1W
R8	1010834-12		10	±.01%	1W
R9	1010283-18		9,3K	±.1%	1/10 W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D			±1%	1/4 W
R14	& NOTE 2			±1%	1/4 W
C1	1010289- 37	CAPACITOR	.0290	±0.5%	200V
C2	1010289- 37		.0290	±0.5%	200 V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V


(1)
R14
31.9K-746K
R2
662
INPUT #1 (TORQUE+) (2)
R4
712
C1
.0290
C4
.0100-.0228
(7) TR ±
R6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
R9
9.3K
CCW
CW
22 TURNS
W
(10) OUTPUT #2
(TO PVR GND)
R8
10
CW
PIPA SF EQ ADJ
R7
5K
W
22 TURNS
CCW
CUR SAMP RES
R11
61,556—55.861
SEE NOTE 5
R12
6.59K—72.5K
(11)
+120 VDC RET
(TO DC AMPLIFIER)
+120 VDC RET
(TO CURRENT SWITCH)
+120 VDC RET
(TO PULSE TORQUING POWER SUPPLY)
R5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE-) (3)
R3
712
(9) OUTPUT #1
(TO DC AMP INPUT)
(6) STRUCTURE GROUND
R13
31.9K-746K
R1
662
(4) T-
(8) CURRENT SAMPLING LO
(5) CURRENT SAMPLING HI
(12)
(13)
TO TEST STATION
INTERLOCK

REF DWG.
C/M PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO. 1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200 K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL ——
HEAT TREATMENT ——
FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN A. Di Leo DATE
CHECKED
APPROVAL J. L. Stouffer 6/18/6?
APPROVAL J. E. Miller 6/24/69
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
C/M PIPA CALIBRATION

CODE IDENT NO. —— SIZE D NASA DRAWING NO. 2010016
SCALE — WT — SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13 Oct 64	
B	REVISED PER TDRR 14800	17 Dec 64	W
C	REVISED PER TDRR 16269	16 FEB 65	WR

CHART A

R5, R6 1/10 W ± 0.1%

PART NO	VALUE
1010377 -337	82,500
-338	83,750
-339	85,000
-344	86,250
-2	87,500
-3	88,750
-4	90,000
-5	91,250
-6	92,500
-7	93,750
-8	95,000
-9	96,250
-10	97,500
-11	98,750
-12	100,000
-13	101,250
-14	102,500
-15	103,750
-16	105,000
-17	106,250
-18	107,500
-19	108,750
-20	110,000
-21	111,250
-22	112,500
-340	113,750
-341	115,000
-342	116,250
1010377 -343	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010834 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010834 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06K
-9	8.05K
-10	7.25K
1010283 -11	6.59K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9K
-2	36.0 K
-3	41.2 K
-4	48.2 K
-5	58.01K
-6	72.6 K
-7	97.1 K
-8	146.0K
-9	292.4K
-10	33.4K
-11	35.0K
-12	36.8K
-13	38.8K
-14	41.0K
-15	43.4K
-16	46.2K
-17	49.3K
-18	52.9K
-19	57.0K
-20	61.8K
-21	67.4K
-22	74.2 K
-23	82.6 K
-24	92.9K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ± 0.5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
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HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis S Klowe DATE 21 April
CHECKED 21 April
APPROVAL J L Stadler 6/18/64
APPROVAL 6/29/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
C/M PIPA CALIBRATION

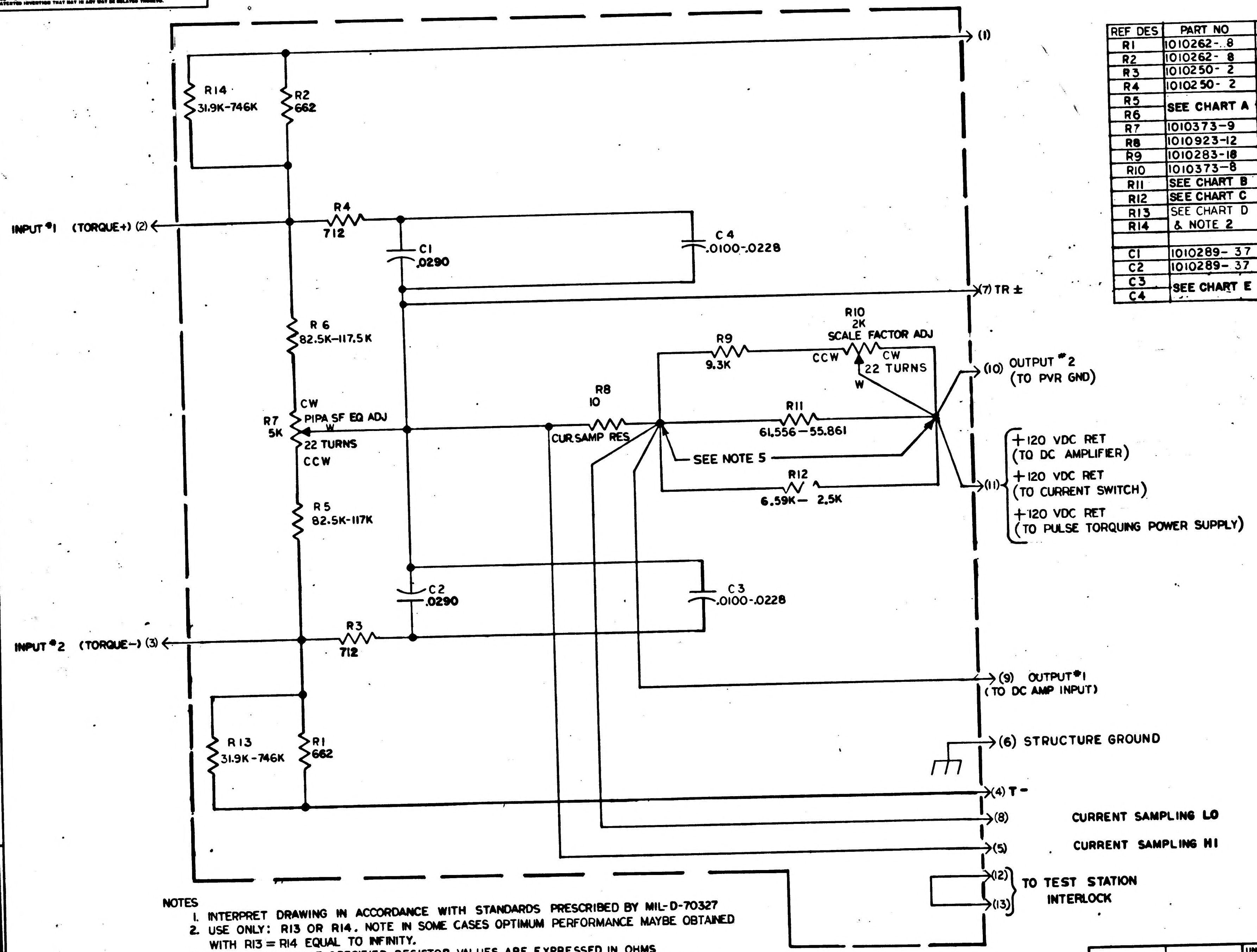
CODE IDENT NO. — SIZE D NASA DRAWING NO. 2010016
SCALE — WT — SHEET 2 OF 2

2010016 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 19231	13 Oct 64	
B	REVISED PER TDRR 14800	17 DEC	Will
C	REVISED PER TDRR 16269	16 FEB 65	
D	REVISED PER TDRR 16846		Will


(1)
R14
31.9K-746K
R2
662
INPUT #1 (TORQUE+) (2)
R4
712
C1
.0290
C4
.0100-.0228
(7) TR ±
R6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
R9
9.3K
CCW
CW
22 TURNS
W
(10) OUTPUT #2
(TO PVR GND)
R8
10
CW
R7
5K
PIPA SF EQ ADJ
W
22 TURNS
CCW
CUR SAMP RES
R11
61,556-55.861
SEE NOTE 5
R12
6.59K- 2.5K
(11)
+120 VDC RET
(TO DC AMPLIFIER)
+120 VDC RET
(TO CURRENT SWITCH)
+120 VDC RET
(TO PULSE TORQUING POWER SUPPLY)
R5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE-) (3)
R3
712
(9) OUTPUT #1
(TO DC AMP INPUT)
R13
31.9K-746K
R1
662
(6) STRUCTURE GROUND
(4) T-
(8)
CURRENT SAMPLING LO
(5)
CURRENT SAMPLING HI
(12)
(13)
TO TEST STATION
INTERLOCK

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262-8	RESISTOR	662	±1%	10W
R2	1010262-8		662	±1%	10W
R3	1010250-2		712	±1%	0.7W
R4	1010250-2		712	±1%	0.7W
R5	SEE CHART A			±0.1%	1/10W
R6				±0.1%	1/10W
R7	1010373-9		5K	±5%	1W
R8	1010923-12		10	±.01%	1W
R9	1010283-18		9.3K	±.1%	1/10 W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D & NOTE 2			±1%	1/4 W
R14				±1%	1/4 W
C1	1010289-37	CAPACITOR	.0290	±0.5%	200V
C2	1010289-37		.0290	±0.5%	200 V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V

REF DWG.
C/M PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO. 1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL ———
HEAT TREATMENT ———
FINAL FINISH ———

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN A. DiLeo DATE
CHECKED
APPROVAL J. L.
APPROVAL 6/24/69
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, C/M PIPA CALIBRATION

CODE IDENT NO. ——
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13 OCT 64	
B	REVISED PER TDRR 14800	17 DEC 64	
C	REVISED PER TDRR 16269	16 FEB 65	WR
D	REVISED PER TDRR 16846		

CHART A

R5, R6 1/10 W ± 0.1%

PART NO	VALUE
1010377 -337	82,500
-338	83,750
-339	85,000
-344	86,250
-2	87,500
-3	88,750
-4	90,000
-5	91,250
-6	92,500
-7	93,750
-8	95,000
-9	96,250
-10	97,500
-11	98,750
-12	100,000
-13	101,250
-14	102,500
-15	103,750
-16	105,000
-17	106,250
-18	107,500
-19	108,750
-20	110,000
-21	111,250
-22	112,500
-340	113,750
-341	115,000
-342	116,250
1010377 -343	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010923 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010923 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06K
-9	8.05K
-10	7.25K
1010283 -11	6.59K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9K
-2	36.0 K
-3	41.2 K
-4	48.2 K
-5	58.01K
-6	72.6 K
-7	97.1 K
-8	146.0K
-9	292.4K
-10	33.4K
-11	35.0K
-12	36.8K
-13	38.8K
-14	41.0K
-15	43.4K
-16	46.2K
-17	49.3K
-18	52.9K
-19	57.0K
-20	61.8K
-21	67.4K
-22	74.2 K
-23	82.6 K
-24	92.9K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ± 0.5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

MASTER

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis Blow DATE 21 Apr 64
CHECKED 21 Apr 64
APPROVAL J L Stalker 6/18/64
APPROVAL 6/29/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

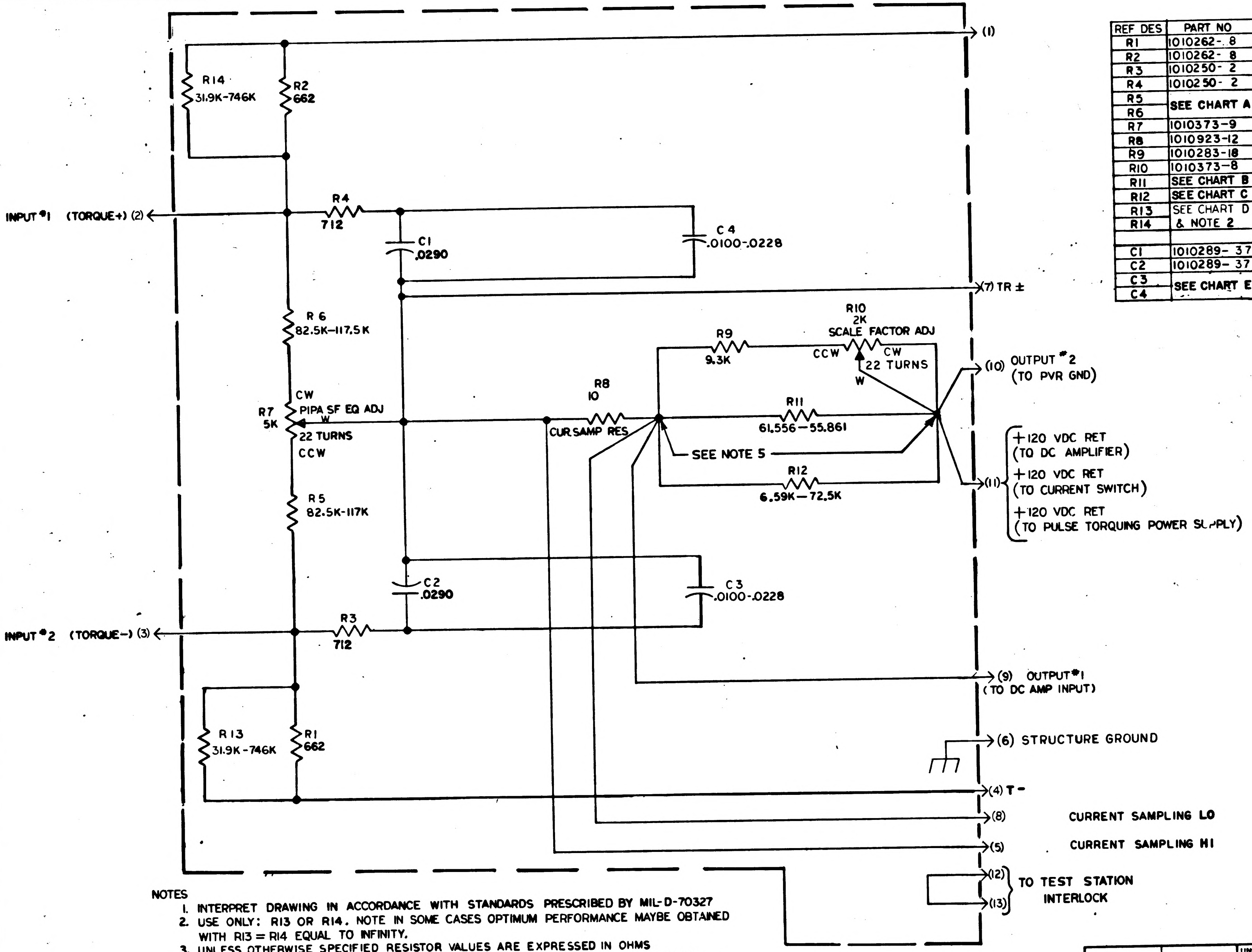
SCHEMATIC
C/M PIPA CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 19231	13 Oct 64	
B	REVISED PER TDRR 14800		WH
C	REVISED PER TDRR 16269	16 FEB 65	
D	REVISED PER TDRR 16846	2 MAR 65	
E	REVISED PER TDRR 18511	22 APR 65	KCH

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262- 8	RESISTOR	662	±1%	10W
R2	1010262- 8		662	±1%	10W
R3	1010250- 2		712	±1%	0.7W
R4	1010250- 2		712	±1%	0.7W
R5	SEE CHART A			±0.1%	1/10W
R6				±0.1%	1/10W
R7	1010373-9		5K	±5%	1W
R8	1010923-12		10	±.01%	1W
R9	1010283-18		9.3K	±.1%	1/10 W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D			±1%	1/4 W
R14	& NOTE 2			±1%	1/4 W
C1	1010289- 37	CAPACITOR	.0290	±0.5%	200V
C2	1010289- 37		.0290	±0.5%	200 V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V


(1)
R14
31.9K-746K
R2
662
INPUT #1 (TORQUE+) (2)
R4
712
C1
.0290
C4
.0100-.0228
(7) TR ±
R6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
R9
9.3K
CCW
CW
22 TURNS
W
(10) OUTPUT #2
(TO PVR GND)
R8
10
CW
PIPA SF EQ ADJ
W
R7
5K
22 TURNS
CCW
CUR.SAMP RES
R11
61.556—55.861
SEE NOTE 5
+120 VDC RET
(TO DC AMPLIFIER)
+120 VDC RET
(TO CURRENT SWITCH)
+120 VDC RET
(TO PULSE TORQUING POWER SUPPLY)
(11)
R12
6.59K—72.5K
R5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE−) (3)
R3
712
(9) OUTPUT #1
(TO DC AMP INPUT)
R13
31.9K-746K
R1
662
(6) STRUCTURE GROUND
(4) T−
(8) CURRENT SAMPLING LO
(5) CURRENT SAMPLING HI
(12)
(13)
TO TEST STATION
INTERLOCK

REF DWG.
C/M PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO. 1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL ______
HEAT TREATMENT ______
FINAL FINISH ______

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN A. DiLeo DATE 2 MAR 64
CHECKED CC P. Kingsbury 9 Mar 64
APPROVAL J. C. Stanton 6/16/64
APPROVAL R. E. Miller 6/24/69
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, C/M PIPA CALIBRATION

CODE IDENT NO. ——
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13231	13 JUL 64	
B	REVISED PER TDRR 14800	17 DEC 64	WR
C	REVISED PER TDRR 16269	16 FEB 65	WR
D	REVISED PER TDRR 16846		WR
E	REVISED PER TDRR 18511	22 APR 65	

CHART A

R5, R6 1/10 W ± 0.1%

PART NO	VALUE
1010377 -337	82,500
-338	83,750
-339	85,000
-344	86,250
-2	87,500
-3	88,750
-4	90,000
-5	91,250
-6	92,500
-7	93,750
-8	95,000
-9	96,250
-10	97,500
-11	98,750
-12	100,000
-13	101,250
-14	102,500
-15	103,750
-16	105,000
-17	106,250
-18	107,500
-19	108,750
-20	110,000
-21	111,250
-22	112,500
-340	113,750
-341	115,000
-342	116,250
1010377 -343	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010923 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010923 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06K
-9	8.05K
-10	7.25K
-11	6.59K
-31	145K
-32	48.3K
-33	29K
-34	20.7K
-35	16.1K
-36	13.2K
-37	11.2K
-38	9.68K
-39	8.53K
-40	7.63K
-41	6.90K
1010283 -42	6.30K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9K
-2	36.0 K
-3	41.2 K
-4	48.2 K
-5	58.01K
-6	72.6 K
-7	97.1 K
-8	146.0K
-9	292.4K
-10	33.4K
-11	35.0K
-12	36.8K
-13	38.8K
-14	41.0K
-15	43.4K
-16	46.2K
-17	49.3K
-18	52.9K
-19	57.0K
-20	61.8K
-21	67.4K
-22	74.2 K
-23	82.6K
-24	92.9K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ± 0.5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN Louis Alowe DATE 21 APR 64
CHECKED 21 APR 64
APPROVAL J. L. S 6/18/64
APPROVAL 6/29/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

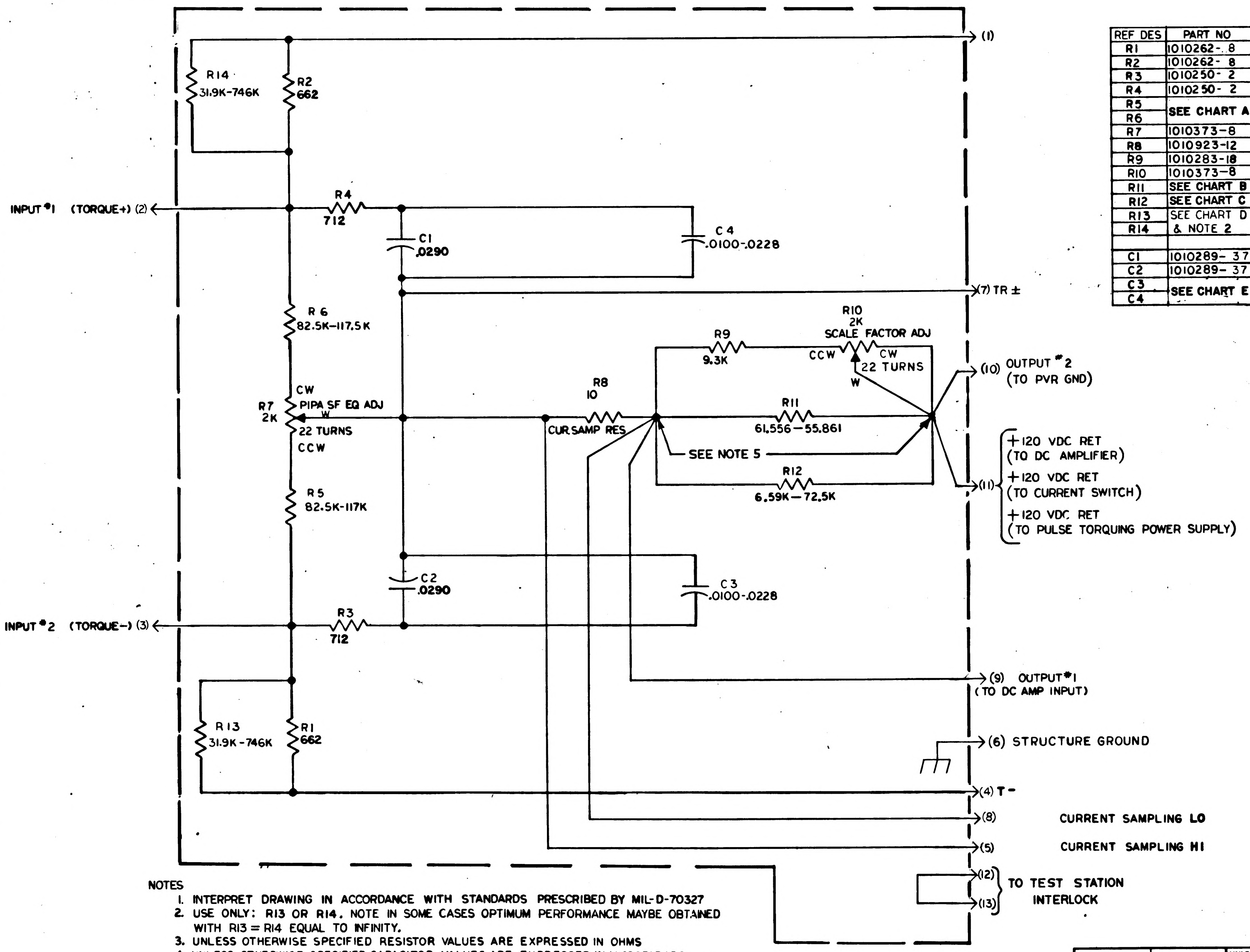
SCHEMATIC
C/M PIPA CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10363			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 19231	13 OCT 64	
B	REVISED PER TDRR 14800	17 DEC	
C	REVISED PER TDRR 16269	16 FEB 65	
D	REVISED PER TDRR 16846	2 MAR 65	
E	REVISED PER TDRR 18511	22 APR 65	KCH
F	REVISED PER TDRR 21777	30 AUG 65	KCH

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262- 8	RESISTOR	662	±1%	10W
R2	1010262- 8		662	±1%	10W
R3	1010250- 2		712	±1%	0.7W
R4	1010250- 2		712	±1%	0.7W
R5	SEE CHART A			±0.1%	1/10W
R6				±0.1%	1/10W
R7	1010373-8		2K	±5%	1W
R8	1010923-12		10	±.01%	1W
R9	1010283-18		9.3K	±.1%	1/10 W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D & NOTE 2			±1%	1/4 W
R14				±1%	1/4 W
C1	1010289- 37	CAPACITOR	.0290	±0.5%	200V
C2	1010289- 37		.0290	±0.5%	200 V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V


(1)
R14
31.9K-746K
R2
662
INPUT #1 (TORQUE+) (2)
R4
712
C1
.0290
C4
.0100-.0228
(7) TR ±
R6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
R9
9.3K
CCW
CW
22 TURNS
W
(10) OUTPUT #2
(TO PVR GND)
R7
2K
CW
PIPA SF EQ ADJ
W
22 TURNS
CCW
R8
10
CUR SAMP RES
R11
61.556—55.861
SEE NOTE 5
R12
6.59K—72.5K
+120 VDC RET
(TO DC AMPLIFIER)
(11)
+120 VDC RET
(TO CURRENT SWITCH)
+120 VDC RET
(TO PULSE TORQUING POWER SUPPLY)
R5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE-) (3)
R3
712
(9) OUTPUT #1
(TO DC AMP INPUT)
R13
31.9K-746K
R1
662
(6) STRUCTURE GROUND
(4) T-
(8) CURRENT SAMPLING LO
(5) CURRENT SAMPLING HI
(12)
(13)
TO TEST STATION
INTERLOCK

REF DWG.
C/M PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
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2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
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4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO.1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200 K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. CONTRACT
DRAWN A. DiLeo DATE 2 MAR 64
CHECKED
APPROVAL
APPROVAL J.E. Miller 6/24/64
NASA APPROVAL
MIT APPROVAL 13 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
C/M PIPA CALIBRATION

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 13271	13 OCT 64	[illegible]
B	REVISED PER TDRR 14800	17 DEC 64	WR
C	REVISED PER TDRR 16269	16 FEB 65	WR
D	REVISED PER TDRR 16846		WR
E	REVISED PER TDRR 18511	22 APR 65	KCH
F	REVISED PER TDRR 21777	30 AUG 65	KCH WR

CHART A

R5, R6 1/10 W ± 0.1%

PART NO	VALUE
1010377 -337	82,500
-338	83,750
-339	85,000
-344	86,250
-2	87,500
-3	88,750
-4	90,000
-5	91,250
-6	92,500
-7	93,750
-8	95,000
-9	96,250
-10	97,500
-11	98,750
-12	100,000
-13	101,250
-14	102,500
-15	103,750
-16	105,000
-17	106,250
-18	107,500
-19	108,750
-20	110,000
-21	111,250
-22	112,500
-340	113,750
-341	115,000
-342	116,250
1010377 -343	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010923 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010923 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06K
-9	8.05K
-10	7.25K
-11	6.59K
-31	145K
-32	48.3K
-33	29K
-34	20.7K
-35	16.1K
-36	13.2K
-37	11.2K
-38	9.68K
-39	8.53K
-40	7.63K
-41	6.90K
1010283 -42	6.30K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9K
-2	36.0 K
-3	41.2 K
-4	48.2 K
-5	58.01K
-6	72.6 K
-7	97.1 K
-8	146.0K
-9	292.4K
-10	33.4K
-11	35.0K
-12	36.8K
-13	38.8K
-14	41.0K
-15	43.4K
-16	46.2K
-17	49.3K
-18	52.9K
-19	57.0K
-20	61.8K
-21	67.4K
-22	74.2 K
-23	82.6 K
-24	92.9K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ± 0.5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Louis A Lowe DATE 21 APR 64
CHECKED C C Kingsbury 21 APR 64
APPROVAL J. L. Stalter 6/18/64
APPROVAL E. Miller 6/29/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

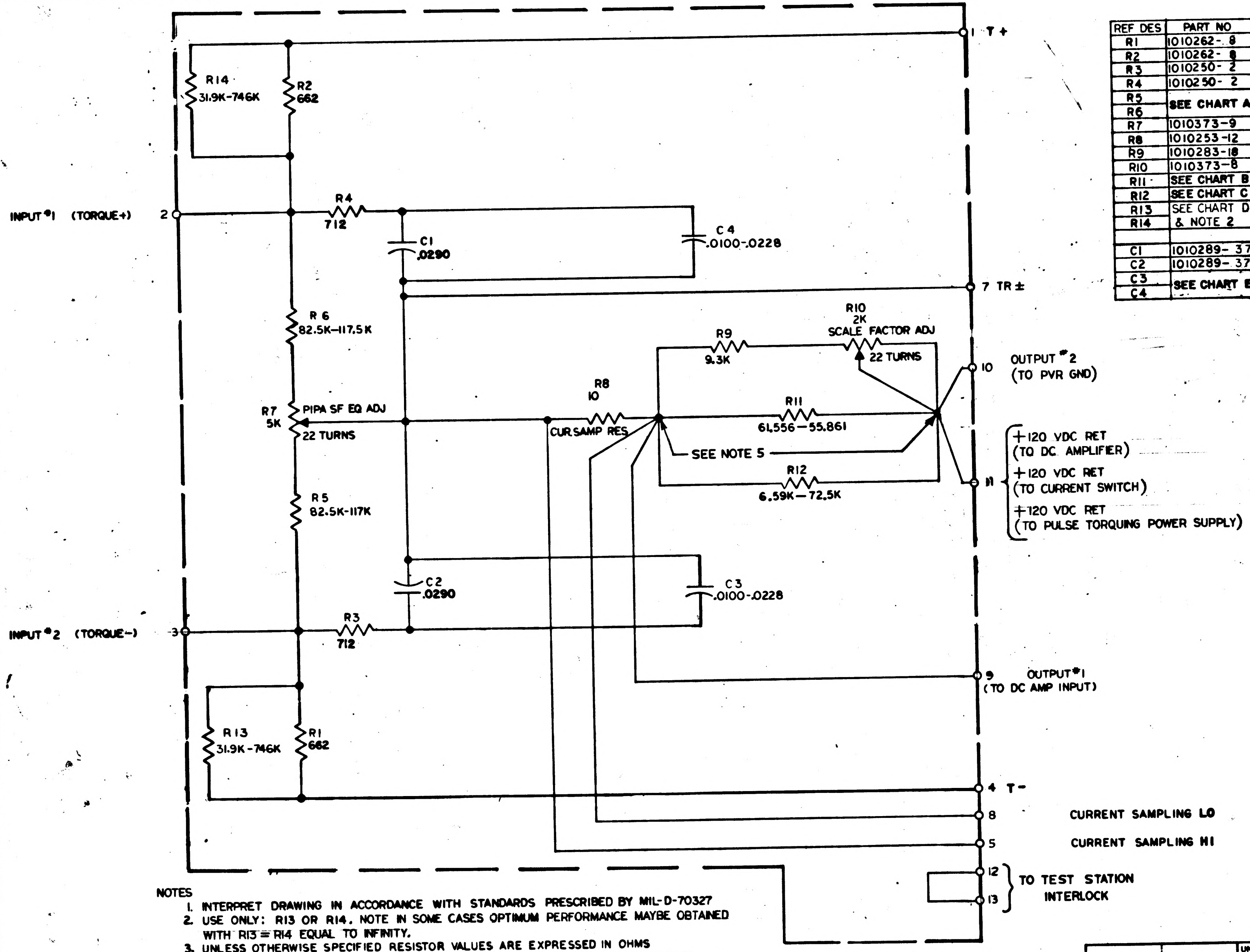
SCHEMATIC
C/M PIPA CALIBRATION

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 2 OF 2

2010016 F

MASTER

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 10362			



R14
31.9K-746K
R2
662
1 T+
INPUT #1 (TORQUE+) 2
R4
712
C1
.0290
C4
.0100-.0228
7 TR±
R6
82.5K-117.5K
R10
2K
SCALE FACTOR ADJ
22 TURNS
R9
9.3K
10 OUTPUT #2 (TO PVR GND)
R8
10
CUR SAMP RES
R7
5K
PIPA SF EQ ADJ
22 TURNS
R11
61,556-55,861
SEE NOTE 5
R12
6,59K-72,5K
11
+120 VDC RET (TO DC AMPLIFIER)
+120 VDC RET (TO CURRENT SWITCH)
+120 VDC RET (TO PULSE TORQUING POWER SUPPLY)
R5
82.5K-117K
C2
.0290
C3
.0100-.0228
INPUT #2 (TORQUE-) 3
R3
712
9 OUTPUT #1 (TO DC AMP INPUT)
R13
31.9K-746K
R1
662
4 T-
8 CURRENT SAMPLING LO
5 CURRENT SAMPLING HI
12
13
TO TEST STATION INTERLOCK

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010262- 8	RESISTOR	662	±1%	10W
R2	1010262- 8		662	±1%	10W
R3	1010250- 2		712	±1%	0.7W
R4	1010250- 2		712	±1%	0.7W
R5	SEE CHART A			±1%	1/10W
R6				±1%	1/10W
R7	1010373-9		5K	±5%	1W
R8	1010253-12		10	±.01%	1W
R9	1010283-18		9,3K	±.1%	1/10 W
R10	1010373-8		2K	±5%	1W
R11	SEE CHART B			±.01%	1W
R12	SEE CHART C			±0.1%	1/10W
R13	SEE CHART D			±1%	1/4 W
R14	& NOTE 2			±1%	1/4 W
C1	1010289- 37	CAPACITOR	.0290	±0.5%	200V
C2	1010289- 37		.0290	±0.5%	200V
C3	SEE CHART E			±0.5%	200V
C4				±0.5%	200V

REF DWG.
PIPA CALIBRATION ASSY
DWG NO. 2007105

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. USE ONLY: R13 OR R14. NOTE IN SOME CASES OPTIMUM PERFORMANCE MAYBE OBTAINED WITH R13 = R14 EQUAL TO INFINITY.
3. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
4. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
5. WIRING TO BE TO A SINGLE POINT AS SHOWN
6. LEADS TO TERMINAL (9) OUTPUT NO. 1 & TERMINAL (10) PVR GND MUST BE CONNECTED TO R11
7. THE SUM OF R5 & R6 MUST EQUAL 200K. REFER TO SHEET 2, THIS DWG. FOR PERMISSIBLE VALUES.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN A. Di Leo
CHECKED
APPROVAL
APPROVAL 6/24/69
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PIPA CALIBRATION

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010016
SCALE —
WT —
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2010016

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362			
SYM	DESCRIPTION	DATE	APPROVAL

CHART A

R5, R6 1/10W ±1%

PART NO	VALUE
1010377 -76	82,500
-77	83,750
-78	85,000
-79	86,250
-80	87,500
-81	88,750
-82	90,000
-83	91,250
-84	92,500
-85	93,750
-86	95,000
-87	96,250
-88	97,500
-89	98,750
-90	100,000
-91	101,250
-92	102,500
-93	103,750
-94	105,000
-95	106,250
-96	107,500
-97	108,750
-98	110,000
-99	111,250
-100	112,500
-101	113,750
-102	115,000
-103	116,250
1010377 -104	117,500

CHART B

R11 1W ±.01%

PART NO	VALUE
1010253 -1	61.556
-2	60.934
-3	60.326
-4	59.729
-5	59.144
-6	58.570
-7	58.008
-8	57.456
-9	56.914
-10	56.383
1010253 -11	55.861

CHART C

R 12 1/10W ± 0.1%

PART NO	VALUE
1010283 -1	72.5 K
-2	36.2 K
-3	24.2 K
-4	18.1 K
-5	14.5 K
-6	12.1 K
-7	10.4 K
-8	9.06K
-9	8.05K
-10	7.25K
1010283 -11	6.59K

CHART D

R13 OR R14 1/4W ±1%

PART NO.	VALUE
1010251 -1	31.9K
-2	36.0 K
-3	41.2K
-4	48.2K
-5	58.01K
-6	72.6K
-7	97.1 K
-8	146.0K
-9	292.4K
-10	33.4K
-11	35.0K
-12	38.8K
-13	38.6K
-14	41.0K
-15	43.4K
-16	46.2K
-17	49.3K
-18	52.9K
-19	57.0K
-20	61.8K
-21	67.4K
-22	74.2 K
-23	82.6K
-24	92.9K
-25	106 K
-26	124 K
-27	149 K
-28	187 K
-29	249 K
-30	373 K
1010251 -31	746 K

CHART E

C3, C4 200V ±5%

PART NO.	VALUE
1010289-1	0.0100
-2	0.0108
-3	0.0116
-4	0.0124
-5	0.0132
-6	0.0140
-7	0.0148
-8	0.0156
-9	0.0164
-10	0.0172
-11	0.0180
-12	0.0188
-13	0.0196
-14	0.0204
-15	0.0212
-16	0.0220
1010289-17	0.0228

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN DATE 21 Apr 64
CHECKED 21 Apr 64
APPROVAL J. L. S 6/18/64
APPROVAL 6/29/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PIPA CALIBRATION

CODE IDENT NO. — | SIZE D | NASA DRAWING NO. 2010016

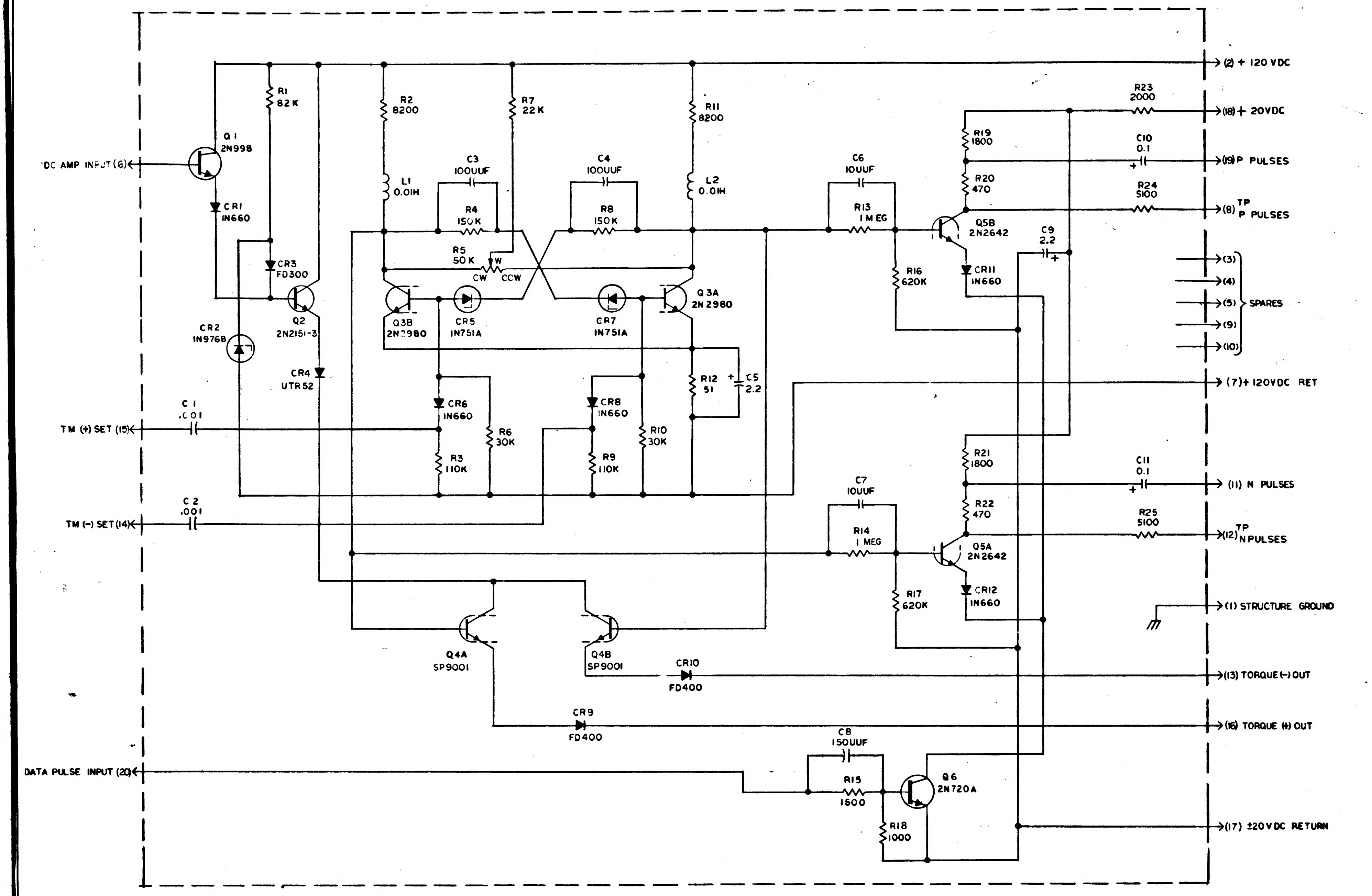
SCALE — | WT — | SHEET 2 OF 2

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

ⓡ

REVISIONS 14327			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14799	17 Dec 64	[illegible]



R1
82K
Q1
2N998
DC AMP INPUT (6)
CR1
IN660
CR3
FD300
Q2
2N2151-3
CR2
IN976B
CR4
UTR52
C1
.001
TM (+) SET (15)
C2
.001
TM (-) SET (14)
R2
8200
L1
0.01H
C3
100UUF
R4
150K
R5
50K
W
CW
CCW
Q3B
2N2980
CR5
IN751A
CR6
IN660
R3
110K
R6
30K
R7
22K
C4
100UUF
R8
150K
CR7
IN751A
CR8
IN660
R9
110K
R10
30K
R11
8200
L2
0.01H
Q3A
2N2980
R12
51
C5
2.2
Q4A
SP9001
Q4B
SP9001
CR10
FD400
CR9
FD400
C6
10UUF
R13
1 MEG
R16
620K
C7
10UUF
R14
1 MEG
R17
620K
C8
150UUF
R15
1500
R18
1000
Q6
2N720A
DATA PULSE INPUT (20)
R19
1800
R20
470
Q5B
2N2642
CR11
IN660
C9
2.2
R21
1800
R22
470
Q5A
2N2642
CR12
IN660
R23
2000
C10
0.1
R24
5100
C11
0.1
R25
5100
(2) + 120 VDC
(18) + 20VDC
(19) P PULSES
(8) TP P PULSES
(3)
(4)
(5)
(9)
(10)
SPARES
(7) + 120VDC RET
(11) N PULSES
(12) TP N PULSES
(1) STRUCTURE GROUND
(13) TORQUE (-) OUT
(16) TORQUE (+) OUT
(17) ±20VDC RETURN

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-78	RESISTOR	82K	2%	1/4W
R2	1010389-78		8200	1%	3W
R3	1006750-81		110K	2%	1/4W
R4	1006750-84		150K	2%	1/4W
R5	1010373-12		50K	5%	1 W
R6	1006750-67		30K	2%	1/4 W
R7	1010389-88		22K	1%	3W
R8	1006750-84		150K	2%	1/4 W
R9	1006750-81		110K		
R10	1006750-67		30K	↓	↓
R11	1010389-78		8200	1%	3W
R12	1006750-1		51	2%	1/4W
R13	1010369-105		1MEG	5%	1/8W
R14	1010369-105		1MEG	5%	1/8W
R15	1006750-36		1500	2%	1/4W
R16	1010369-100		620K	5%	1/8W
R17	1010369-100		620K	5%	1/8W
R18	1006750-32		1000	2%	1/4W
R19	1006750-38		1800		
R20	1006750-24		470		
R21	1006750-38		1800		
R22	1006750-24		470		
R23	1006750-39		2000		
R24	1006750-49		5100		
R25	1006750-49	↓	5100	↓	↓
C1	1006777-24	CAPACITOR	.001	10%	100VDC
C2	1006777-24		.001		100 VDC
C3	1006777-13		100 UUF		100 VDC
C4	1006777-13		100 UUF		100 VDC
C5	1006755-73		2.2		35 VDC
C6	1006777-1		10 UUF		100 VDC
C7	1006777-1		10 UUF		100 VDC
C8	1006777-15		150UUF		100VDC
C9	1006755-73		2.2		35 VDC
C10	1006755-57		0.1		35 VDC
C11	1006755-57	↓	0.1	↓	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010830-20	ZENER	IN976B	5%	43VDC
CR3	1010775-1		FD300		
CR4	1010497		UTR52		
CR5	1010833-1	ZENER	IN751A	5%	5.1VDC
CR6	1010385		IN660		
CR7	1010833-1	ZENER	IN751A	5%	5.1VDC
CR8	1010385		IN660		
CR9	1010394		FD400		
CR10	1010394		FD400		
CR11	1010385		IN660		
CR12	1010385	↓	IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010269-3		2N2151-3		
Q3	1010652-2		2N2980		
Q4	1010715-1		SP9001		
Q5	1010252-1		2N2642		
Q6	1010357-1	↓	2N720A		
L1	1010388-39	INDUCTOR			
L2	↓	↓			

REF DWG:
BINARY CURRENT SWITCH ASSY
DWG NO. 2007103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN S. Bonamis DATE 12/26/63
CHECKED [illegible] MAR 64
APPROVAL
APPROVAL J Stromer 11/3/64
NASA APPROVAL [illegible] 11-12-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

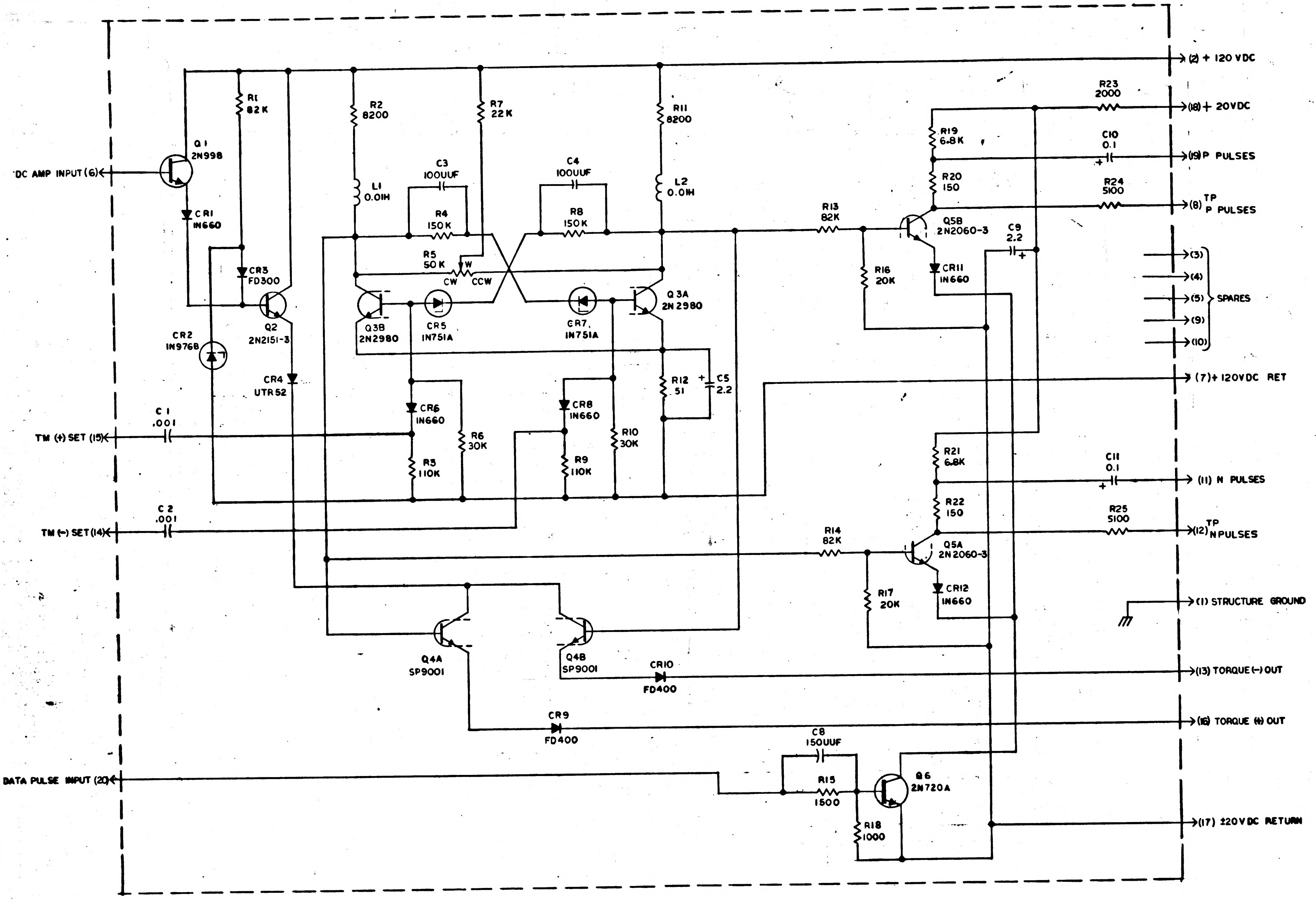
SCHEMATIC,
BINARY CURRENT SWITCH

CODE IDENT NO —
SIZE E
NASA DRAWING NO 2010017
SCALE —
WT —
SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 14327			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14799	17 Dec 64	
B	REVISED PER TDRR 17619	22 MAR 65	


DC AMP INPUT (6)
Q1 2N998
R1 82K
CR1 IN660
CR3 FD300
Q2 2N2151-3
CR2 IN976B
CR4 UTR52
R2 8200
L1 0.01H
C3 100UUF
R4 150K
R5 50K
W
CW
CCW
R7 22K
Q3B 2N2980
CR5 IN751A
C4 100UUF
R8 150K
CR7 IN751A
R11 8200
L2 0.01H
Q3A 2N2980
R12 51
C5 2.2
CR6 IN660
R3 110K
R6 30K
CR8 IN660
R9 110K
R10 30K
C1 .001
TM (+) SET (15)
C2 .001
TM (−) SET (14)
Q4A SP9001
Q4B SP9001
CR10 FD400
CR9 FD400
C8 150UUF
R15 1500
Q6 2N720A
R18 1000
DATA PULSE INPUT (20)
R13 82K
R16 20K
Q5B 2N2060-3
CR11 IN660
C9 2.2
R19 6.8K
R20 150
R23 2000
C10 0.1
R24 5100
R14 82K
R17 20K
Q5A 2N2060-3
CR12 IN660
R21 6.8K
R22 150
C11 0.1
R25 5100
(2) + 120 VDC
(18) + 20VDC
(19) P PULSES
(8) TP P PULSES
(3)
(4)
(5)
(9)
(10)
SPARES
(7) + 120VDC RET
(11) N PULSES
(12) TP N PULSES
(1) STRUCTURE GROUND
(13) TORQUE (−) OUT
(16) TORQUE (+) OUT
(17) ±20VDC RETURN

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-78	RESISTOR	82K	2%	1/4W
R2	1010389-78		8200	1%	3W
R3	1006750-81		110K	2%	1/4W
R4	1006750-84		150K	2%	1/4W
R5	1010373-12		50K	5%	1 W
R6	1006750-67		30K	2%	1/4 W
R7	1010389-88		22K	1%	3W
R8	1006750-84		150K	2%	1/4 W
R9	1006750-81		110K		
R10	1006750-67		30K		
R11	1010389-78		8200	1%	3W
R12	1006750-1		51	2%	1/4W
R13	1006750-78		82K	2%	1/4W
R14	1006750-78		82K	2%	1/4W
R15	1006750-36		1500	2%	1/4W
R16	1006750-63		20K	2%	1/4W
R17	1006750-63		20K	2%	1/4W
R18	1006750-32		1000	2%	1/4W
R19	1006750-52		6.8K		
R20	1006750-12		150		
R21	1006750-52		6.8K		
R22	1006750-12		150		
R23	1006750-39		2000		
R24	1006750-49		5100		
R25	1006750-49		5100		
C1	1006777-24	CAPACITOR	.001	10%	100VDC
C2	1006777-24		.001		100VDC
C3	1006777-13		100 UUF		100VDC
C4	1006777-13		100 UUF		100VDC
C5	1006755-73		2.2		35 VDC
C8	1006777-15		150UUF		100VDC
C9	1006755-73		2.2		35 VDC
C10	1006755-57		0.1		35 VDC
C11	1006755-57		0.1		35VDC
CR1	1010385	DIODE	IN660		
CR2	1010830-20	ZENER	IN976B	5%	43VDC
CR3	1010775-1		FD300		
CR4	1010497		UTR52		
CR5	1010833-1	ZENER	IN751A	5%	5.1VDC
CR6	1010385		IN660		
CR7	1010833-1	ZENER	IN751A	5%	5.1VDC
CR8	1010385		IN660		
CR9	1010394		FD400		
CR10	1010394		FD400		
CR11	1010385		IN660		
CR12	1010385		IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010269-3		2N2151-3		
Q3	1010652-2		2N2980		
Q4	1010715-1		SP9001		
Q5	1010376-3		2N2060-3		
Q6	1010357-1		2N720A		
L1	1010388-39	INDUCTOR			
L2					

REF DWG:
BINARY CURRENT SWITCH ASSY
DWG NO. 2007103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN DATE 12/26/63
CHECKED 14 MAR 64
APPROVAL
APPROVAL 11/3/64
NASA APPROVAL 11-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
BINARY CURRENT SWITCH

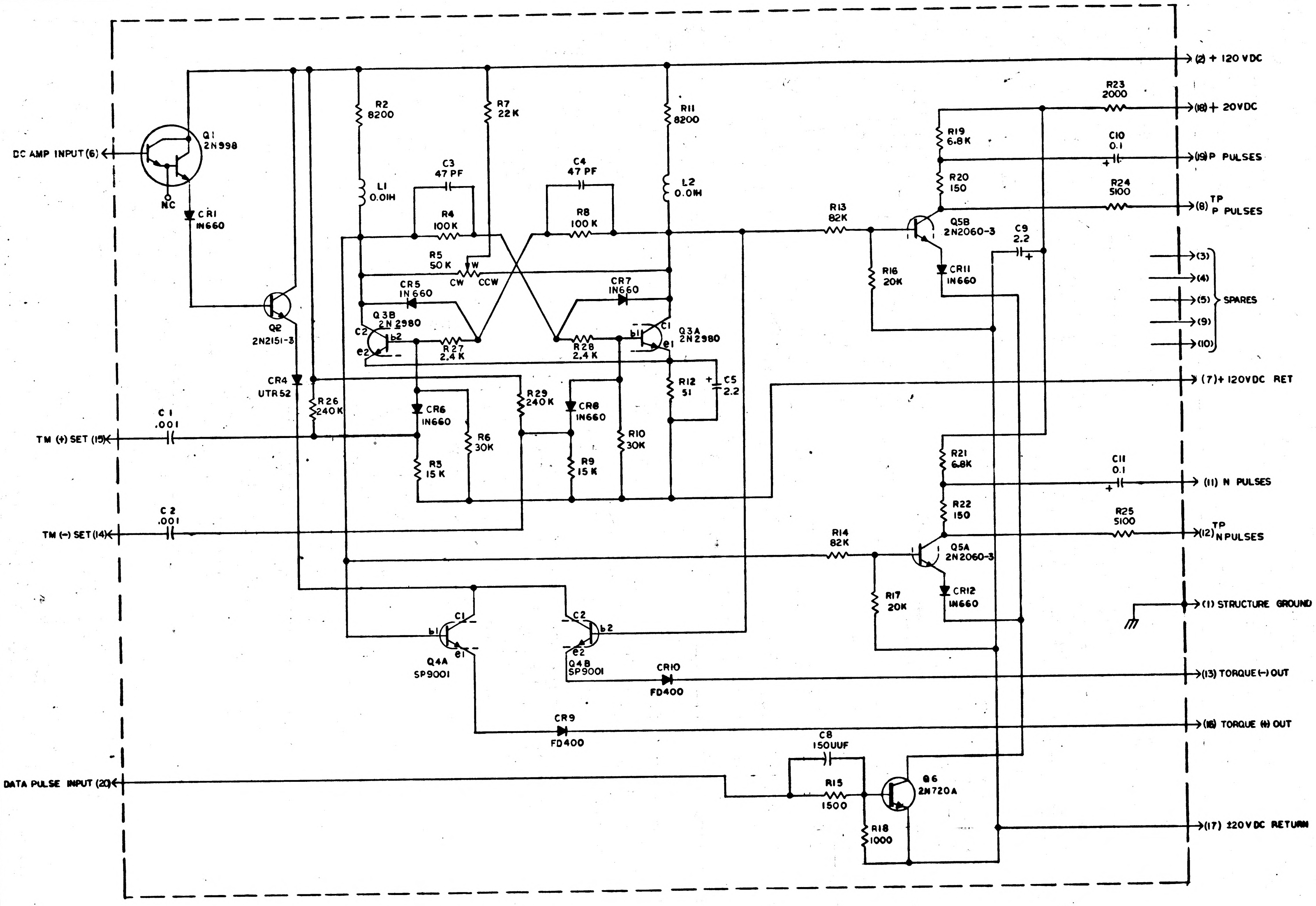
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010017
SCALE —
WT —
SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14799	17 Dec 64	WK
B	REVISED PER TDRR 17619	22 MAR 65	WK
C	REVISED PER TDRR 19166	19 MAY 1965	
D	REVISED PER TDRR 19778		


DC AMP INPUT (6)
Q1
2N998
NC
CR1
1N660
Q2
2N2151-3
CR4
UTR52
R26
240K
C1
.001
TM (+) SET (15)
C2
.001
TM (−) SET (14)
R2
8200
L1
0.01H
C3
47 PF
R4
100K
R5
50K
W
CW
CCW
CR5
1N660
Q3B
2N2980
c2
b2
e2
R27
2.4K
CR6
1N660
R5
15K
R6
30K
R7
22K
C4
47 PF
R8
100K
CR7
1N660
R28
2.4K
b1
c1
e1
Q3A
2N2980
R29
240K
CR8
1N660
R9
15K
R10
30K
R11
8200
L2
0.01H
R12
51
C5
2.2
Q4A
SP9001
Q4B
SP9001
CR10
FD400
CR9
FD400
C8
150UUF
R15
1500
R18
1000
Q6
2N720A
DATA PULSE INPUT (2)
R13
82K
R16
20K
Q5B
2N2060-3
CR11
1N660
C9
2.2
R19
6.8K
R20
150
R23
2000
C10
0.1
R24
5100
R14
82K
R17
20K
Q5A
2N2060-3
CR12
1N660
R21
6.8K
R22
150
C11
0.1
R25
5100
(2) + 120 VDC
(18) + 20VDC
(19) P PULSES
(8) TP P PULSES
(3)
(4)
(5)
(9)
(10)
SPARES
(7) + 120VDC RET
(11) N PULSES
(12) TP N PULSES
(1) STRUCTURE GROUND
(13) TORQUE (−) OUT
(16) TORQUE (+) OUT
(17) ±20VDC RETURN

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R2	1010389-78	RESISTOR	8200	1%	3W
R3	1006750-60		15K	2%	1/4W
R4	1006750-80		100K	2%	1/4W
R5	1010373-12		50K	5%	1 W
R6	1006750-67		30K	2%	1/4 W
R7	1010389-88		22K	1%	3W
R8	1006750-80		100K	2%	1/4 W
R9	1006750-60		15K		
R10	1006750-67		30K		
R11	1010389-78		8200	1%	3W
R12	1006750-1		51	2%	1/4W
R13	1006750-78		82K	2%	1/4W
R14	1006750-78		82K	2%	1/4W
R15	1006750-36		1500	2%	1/4W
R16	1006750-63		20K	2%	1/4W
R17	1006750-63		20K	2%	1/4W
R18	1006750-32		1000	2%	1/4W
R19	1006750-52		6.8K		
R20	1006750-12		150		
R21	1006750-52		6.8K		
R22	1006750-12		150		
R23	1006750-39		2000		
R24	1006750-49		5100		
R25	1006750-49		5100		
R26	1010369-90		240K	5%	1/8W
R27	1006750-41		2.4K	2%	1/4W
R28	1006750-41		2.4K	2%	1/4W
R29	1010369-90	RESISTOR	240K	5%	1/8W
C1	1006777-24	CAPACITOR	.001	10%	100VDC
C2	1006777-24		.001		100VDC
C3	1006777-7		47PF		100VDC
C4	1006777-7		47PF		100VDC
C5	1006755-73		2.2		35 VDC
C8	1006777-15		150UUF		100VDC
C9	1006755-73		2.2		35 VDC
C10	1006755-57		0.1		35 VDC
C11	1006755-57		0.1		35VDC
CR1	1010385	DIODE	IN660		
CR4	1010497		UTR52		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010385		IN660		
CR9	1010394		FD400		
CR10	1010394		FD400		
CR11	1010385		IN660		
CR12	1010385		IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010269-3		2N2151-3		
Q3	1010652-2		2N2980		
Q4	1010715-2		SP9001		
Q5	1010376-3		2N2060-3		
Q6	1010357-1		2N720A		
L1	1010388-39	INDUCTOR			
L2					

REF DWG:
BINARY CURRENT SWITCH ASSY
DWG NO. 2007103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN DATE 4/26/63
CHECKED MAR 64
APPROVAL
APPROVAL
NASA APPROVAL 11-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

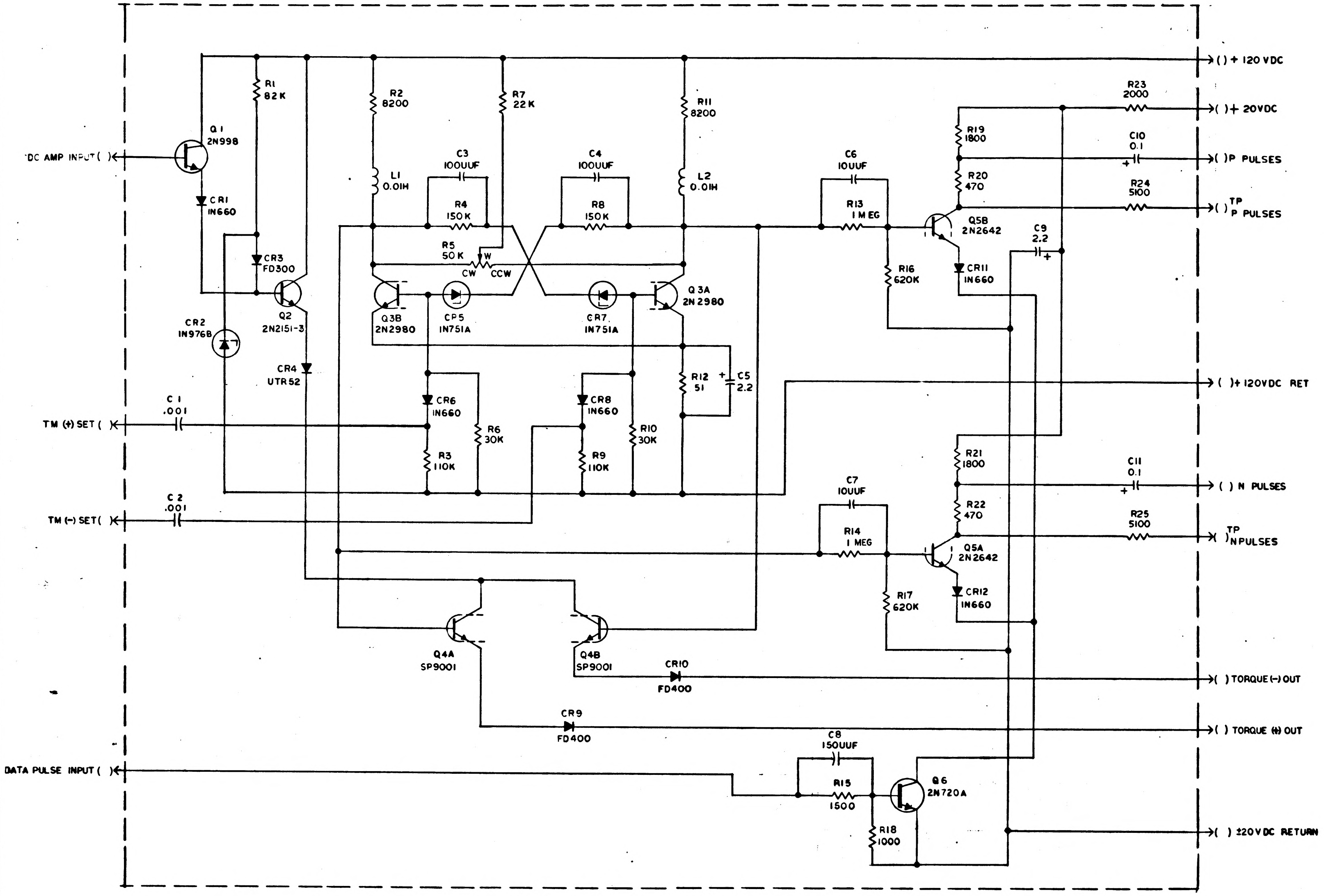
SCHEMATIC,
BINARY CURRENT SWITCH

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010017
SCALE
WT
SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 14327			
SYM	DESCRIPTION	DATE	APPROVAL


( ) + 120 VDC
R23 2000
( ) + 20VDC
C10 0.1
( ) P PULSES
R24 5100
( ) TP P PULSES
DC AMP INPUT ( )
Q1 2N998
R1 82K
CR1 IN660
CR3 FD300
Q2 2N2151-3
CR2 IN976B
CR4 UTR52
R2 8200
L1 0.01H
C3 100UUF
R4 150K
R5 50K
CW
CCW
R7 22K
C4 100UUF
R8 150K
R11 8200
L2 0.01H
Q3B 2N2980
CR5 IN751A
CR7 IN751A
Q3A 2N2980
R12 51
C5 2.2
C6 10UUF
R13 1 MEG
R16 620K
Q5B 2N2642
R19 1800
R20 470
C9 2.2
CR11 IN660
( )+ 120VDC RET
C 1 .001
TM (+) SET ( )
CR6 IN660
R3 110K
R6 30K
CR8 IN660
R9 110K
R10 30K
C 2 .001
TM (−) SET ( )
C7 10UUF
R14 1 MEG
R17 620K
R21 1800
R22 470
Q5A 2N2642
CR12 IN660
C11 0.1
( ) N PULSES
R25 5100
TP N PULSES
Q4A SP9001
Q4B SP9001
CR10 FD400
( ) TORQUE (−) OUT
CR9 FD400
( ) TORQUE (+) OUT
DATA PULSE INPUT ( )
C8 150UUF
R15 1500
Q6 2N720A
R18 1000
( ) ±20VDC RETURN

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-78	RESISTOR	82K	2%	1/4W
R2	1010389-78		8200	1%	3W
R3	1006750-81		110K	2%	1/4W
R4	1006750-84		150K	2%	1/4W
R5	1010373-12		50K	5%	1 W
R6	1006750-67		30K	2%	1/4 W
R7	1010389-88		22K	1%	3W
R8	1006750-84		150K	2%	1/4 W
R9	1006750-81		110K		
R10	1006750-67		30K		
R11	1010389-78		8200	1%	3W
R12	1006750-1		51	2%	1/4W
R13	1010369-105		1MEG	5%	1/8W
R14	1010369-105		1MEG	5%	1/8W
R15	1006750-36		1500	2%	1/4W
R16	1010369-100		620K	5%	1/8W
R17	1010369-100		620K	5%	1/8W
R18	1006750-32		1000	2%	1/4W
R19	1006750-38		1800		
R20	1006750-24		470		
R21	1006750-38		1800		
R22	1006750-24		470		
R23	1006750-39		2000		
R24	1006750-49		5100		
R25	1006750-49		5100		
C1	1006777-24	CAPACITOR	.001	10%	100VDC
C2	1006777-24		.001		100VDC
C3	1006777-13		100 UUF		100VDC
C4	1006777-13		100 UUF		100VDC
C5	1006755-73		2.2		35 VDC
C6	1006777-1		10 UUF		100VDC
C7	1006777-1		10 UUF		100VDC
C8	1006777-15		150UUF		100VDC
C9	1006755-73		2.2		35 VDC
C10	1006755-57		0.1		35 VDC
C11	1006755-57		0.1		35VDC
CR1	1010385	DIODE	IN660		
CR2	1010830-20	ZENER	IN976B	5%	43VDC
CR3	1010775-1		FD300		
CR4	1010497		UTR52		
CR5	1010833-1	ZENER	IN751A	5%	5.1VDC
CR6	1010385		IN660		
CR7	1010833-1	ZENER	IN751A	5%	5.1VDC
CR8	1010385		IN660		
CR9	1010394		FD400		
CR10	1010394		FD400		
CR11	1010385		IN660		
CR12	1010385		IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010269-3		2N2151-3		
Q3	1010652-2		2N2980		
Q4	1010715-1		SP9001		
Q5	1010252-1		2N2642		
Q6	1010357-1		2N720A		
L1	1010388-39	INDUCTOR			
L2					

REF DWG:
BINARY CURRENT SWITCH ASSY
DWG NO. 2007103

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN S Bonomi DATE 12/26/63
CHECKED CC ZAE 2 MAR 64
APPROVAL
APPROVAL J Stormer 11/3/64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC,
BINARY CURRENT SWITCH

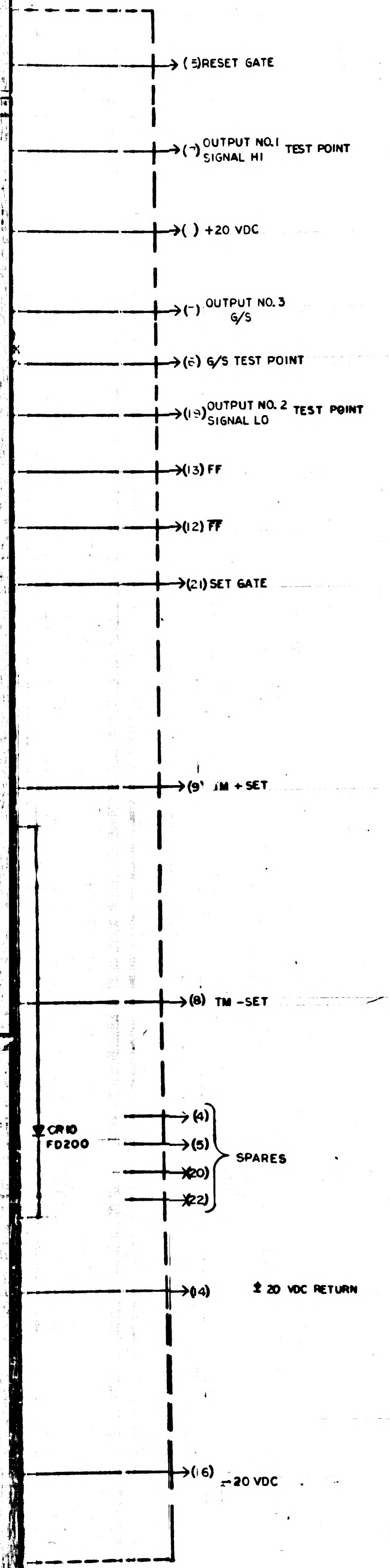
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010017
SCALE — WT — SHEET 1 OF 1

MASTER

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15164		

REVISIONS 14327

2010018 A



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4 W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65	CAPACITOR	0.47	10%	35VDC
C2	1006755-65		0.47		35VDC
C3	1006755-69		1.0		35VDC
C4	1006755-65		0.47		35VDC
C5	1006777-16		220 UUF		100VDC
C6	1006755-65		0.47		35VDC
C7	1006777-34		.033		100VDC
C8	1006755-79		6.8		35VDC
C9	1006755-57		0.1		35VDC
C10	1006755-69		1.0		35VDC
C11	1006777-27		3300 UUF		100VDC
C12	1006755-65		0.47		35VDC
C13	-65		0.47		
C14	-69		1.0		
C15	-79		6.8		
C16	-55		.068		
C17	1006755-55		.068		35VDC
C18	1006777-27		3300 UUF		100VDC
C19	-27		3300 UUF		
C20	-1		10 UUF		
C21	-1		10 UUF		
C22	-24		1000 UUF		
C23	1006777-24		1000 UUF		100VDC
C24	1006755-51		.033		35VDC
C25	1006755-51		.033		35VDC
C26	1006777-12		82 UUF		100VDC
C27	-8		50 UUF		
C29	-21		560 UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	-13		100 UUF		
C34	1006777-24	CAPACITOR	1000 UUF	10%	100VDC
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3		2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675		2N2369A		
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4M13Z2		
CR7	1010385		IN660		
CR8	1010385		IN660		
CR9	1010384		FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	EH-060		

REF DWG
AC DIFFERENTIAL AMPLIFIER AND
INTERROGATOR ASSY
DWG NO: 2007104

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Ed Powers DATE 10-7-63
CHECKED 9 APR 64
APPROVAL
APPROVAL J. Sitomer 11-2-64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

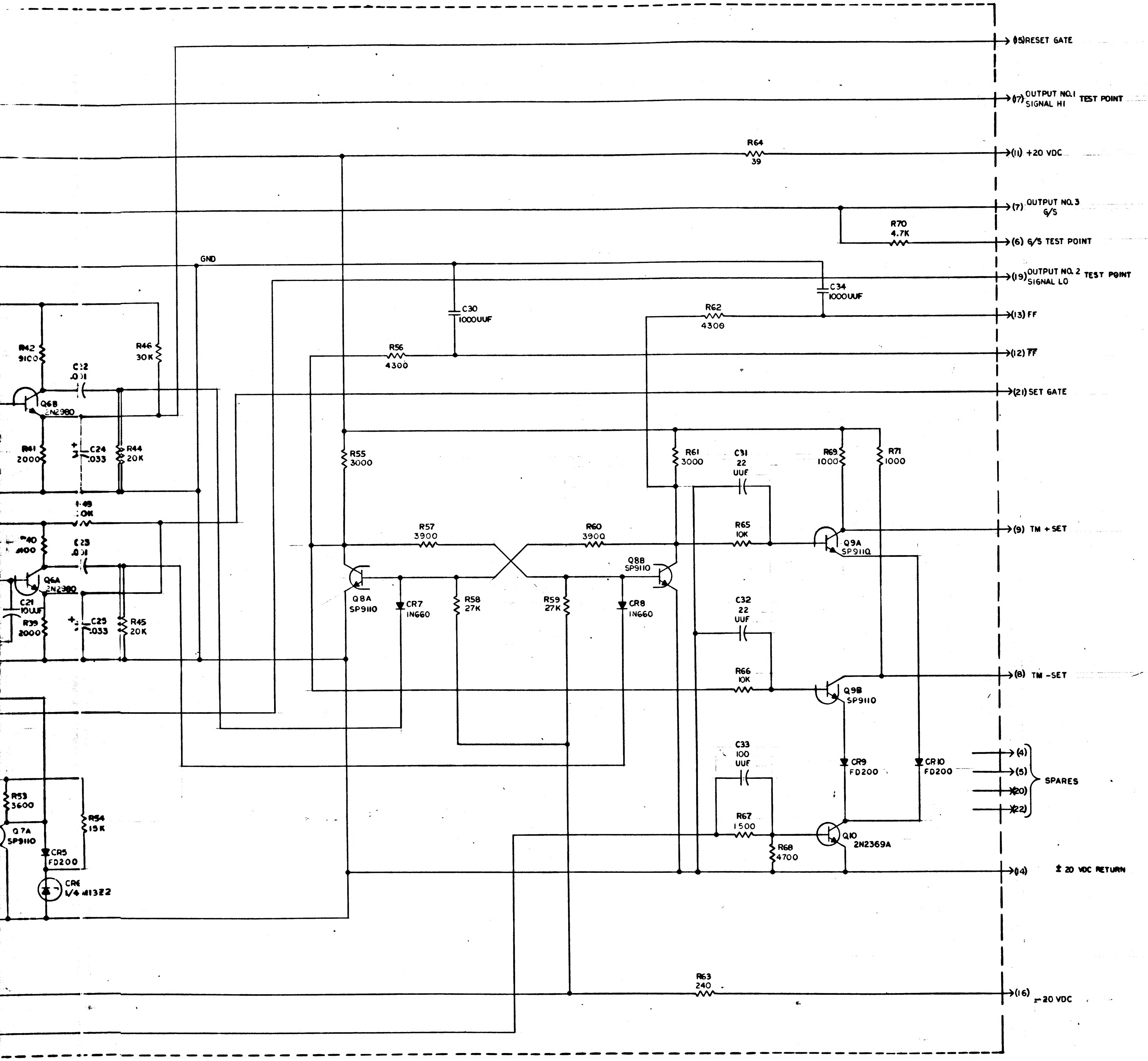
SCHEMATIC,
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 2010018
SCALE
WT
SHEET 1 OF 1

2010018 A

MASTER

F3


(15) RESET GATE
(7) OUTPUT NO. 1 SIGNAL HI
TEST POINT
R64
39
(11) +20 VDC
(7) OUTPUT NO. 3 G/S
R70
4.7K
(6) G/S TEST POINT
GND
C34
1000UUF
(19) OUTPUT NO. 2 SIGNAL LO
TEST POINT
C30
1000UUF
R62
4300
(13) FF
R56
4300
(12) FF
(21) SET GATE
R42
9100
R46
30K
C22
.001
Q6B
2N2980
R41
2000
C24
.033
R44
20K
R55
3000
R61
3000
C31
22 UUF
R69
1000
R71
1000
R49
10K
R40
9100
C23
.001
R57
3900
R60
3900
R65
10K
Q9A
SP9110
(9) TM + SET
Q8B
SP9110
Q6A
2N2980
C21
10UUF
R39
2000
C25
.033
R45
20K
Q8A
SP9110
CR7
1N660
R58
27K
R59
27K
CR8
1N660
C32
22 UUF
R66
10K
Q9B
SP9110
(8) TM - SET
C33
100 UUF
CR9
FD200
CR10
FD200
(4)
(5)
(20)
(22)
SPARES
R53
3600
R54
15K
Q7A
SP9110
CR5
FD200
CR6
1/4 M1322
R67
1500
R68
4700
Q10
2N2369A
(14)
± 20 VDC RETURN
R63
240
(16)
-20 VDC

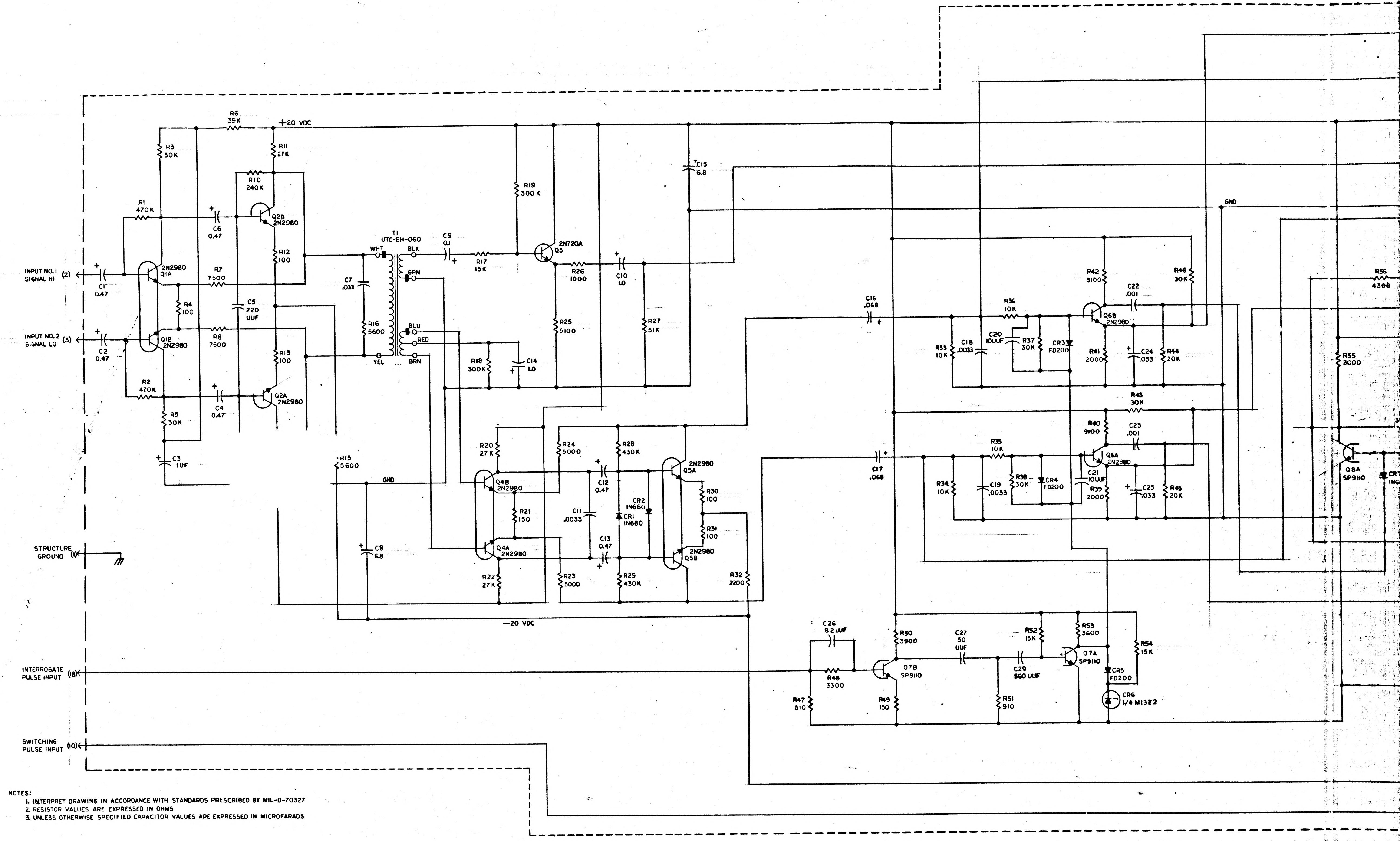
REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-[illegible]		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4 W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATI
C1	1006755-65	CAPACITOR	0.47	10%	35V
C2	1006755-65		0.47		35V
C3	1006755-69		1.0		35V
C4	1006755-65		0.47		35V
C5	1006777-16		22 UUF		100V
C6	1006755-65		0.47		35V
C7	1006777-34		.033		100V
C8	1006755-79		6.8		35V
C9	1006755-57		.01		35V
C10	1006755-69		1.0		35V
C11	1006777-27		3300 UUF		100V
C12	1006755-65		0.47		35V
C13	-65		0.47		
C14	-69		1.0		
C15	-79		6.8		
C16	-55		.068		
C17	1006755-55		.068		35V
C18	1006777-27		3300 UUF		100V
C19	-27		3300 UUF		
C20	-1		10 UUF		
C21	-1		10 UUF		
C22	-24		1000 UUF		
C23	1006777-24		1000 UUF		100V
C24	1006755-51		.033		35V
C25	1006755-51		.033		35V
C26	1006777-12		82 UUF		100V
C27	-8		51 UUF		
C29	-21		560 UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	-13		100 UUF		
C34	1006777-24	CAPACITOR	1000 UUF	10%	100V
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3		2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675		2N2369A		
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4 M1322		
CR7	1010385		1N660		
CR8	1010385		1N660		
CR9	1010384		FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	E[illegible]-060		

2010018 A

F2

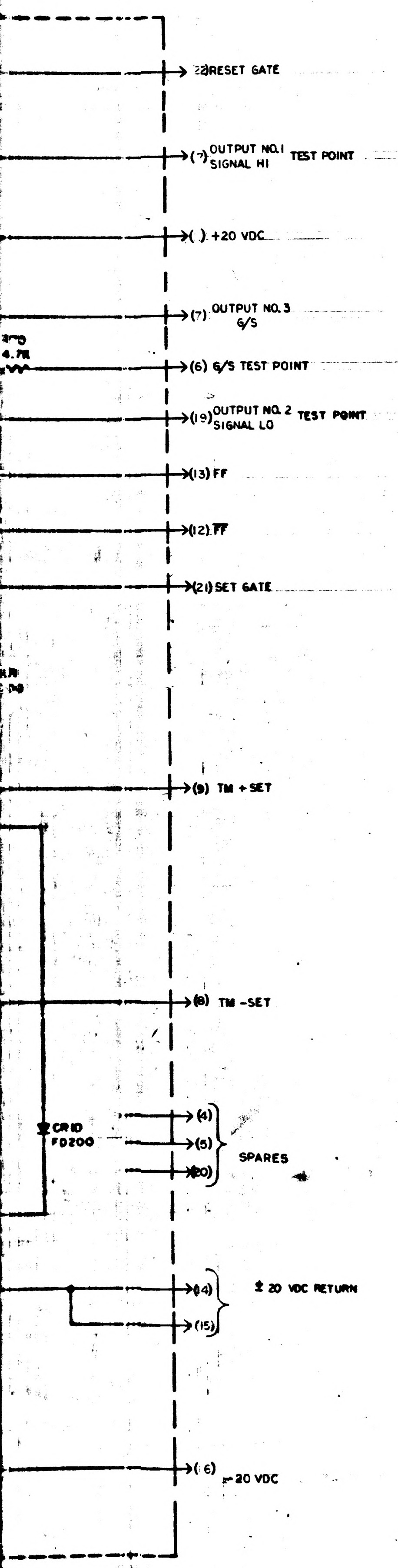
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



INPUT NO. 1 SIGNAL HI (2)
INPUT NO. 2 SIGNAL LO (3)
STRUCTURE GROUND (1)
INTERROGATE PULSE INPUT (18)
SWITCHING PULSE INPUT (10)
+20 VDC
-20 VDC
GND
R6 39K
R3 30K
R11 27K
R10 240K
R1 470K
C6 0.47
Q2B 2N2980
R12 100
Q1A 2N2980
C1 0.47
R7 7500
R4 100
C5 220 UUF
Q1B 2N2980
C2 0.47
R8 7500
R13 100
R2 470K
C4 0.47
Q2A 2N2980
R5 30K
C3 1UF
T1 UTC-EH-060
WHT
BLK
GRN
BLU
RED
BRN
YEL
C7 .033
R16 5600
R15 5600
C8 6.8
C9 0.1
R17 15K
R19 300K
2N720A Q3
R26 1000
R25 5100
C10 1.0
R27 51K
C15 6.8
R18 300K
C14 1.0
R20 27K
Q4B 2N2980
R21 150
Q4A 2N2980
R22 27K
R24 5000
R23 5000
C12 0.47
C11 .0033
C13 0.47
R28 430K
R29 430K
CR2 1N660
CR1 1N660
2N2980 Q5A
R30 100
R31 100
2N2980 Q5B
R32 2200
C16 .068
C17 .068
R36 10K
R33 10K
C18 .0033
C20 10UUF
R37 30K
CR3 FD200
R42 9100
Q6B 2N2980
C22 .001
R46 30K
R41 2000
C24 .033
R44 20K
R43 30K
R40 9100
C23 .001
R35 10K
R34 10K
C19 .0033
R38 30K
CR4 FD200
C21 10UUF
Q6A 2N2980
R39 2000
C25 .033
R45 20K
R56 4300
R55 3000
Q8A SP9110
CR7
C26 8.2 UUF
R48 3300
R47 510
Q7B SP9110
R50 3900
R49 150
C27 50 UUF
C29 560 UUF
R51 910
R52 15K
Q7A SP9110
R53 3600
R54 15K
CR5 FD200
CR6 1/4 M13Z2
10
9
8
7

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

REVISIONS 14327			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15164	Dec '64	Oct 64
B	REVISED PER TDRR 18795	6 Nov 65	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65	CAPACITOR	0.47	10%	35VDC
C2	1006755-65		0.47		35VDC
C3	1006755-69		1.0		35VDC
C4	1006755-65		0.47		35VDC
C5	1006777-16		220 UUF		100VDC
C6	1006755-65		0.47		35VDC
C7	1006777-34		.033		100VDC
C8	1006755-79		6.8		35VDC
C9	1006755-57		0.1		35VDC
C10	1006755-69		1.0		35VDC
C11	1006777-27		3300 UUF		100VDC
C12	1006755-65		0.47		35VDC
C13	-65		0.47		
C14	-69		1.0		
C15	-79		6.8		
C16	-55		.068		
C17	1006755-55		.068		35VDC
C18	1006777-27		3300 UUF		100VDC
C19	-27		3300 UUF		
C20	-1		10UUF		
C21	-1		10UUF		
C22	-24		1000 UUF		
C23	1006777-24		1000 UUF		100VDC
C24	1006755-51		.033		35VDC
C25	1006755-51		.033		35VDC
C26	1006777-12		82UUF		100VDC
C27	-8		50 UUF		
C29	-21		560UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	-13		100 UUF		
C34	1006777-24	CAPACITOR	1000UUF	10%	100VDC
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3		2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675		2N2369A		
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4M1322		
CR7	1010385		1N660		
CR8	1010385		1N660		
CR9	1010384		FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	EH-060		

REF DWG
AC DIFFERENTIAL AMPLIFIER AND
INTERROGATOR ASSY
DWG NO. 2007104

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Ed Powers DATE 10-02-63
CHECKED
APPROVAL
APPROVAL J. Sitomer 11-2-64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

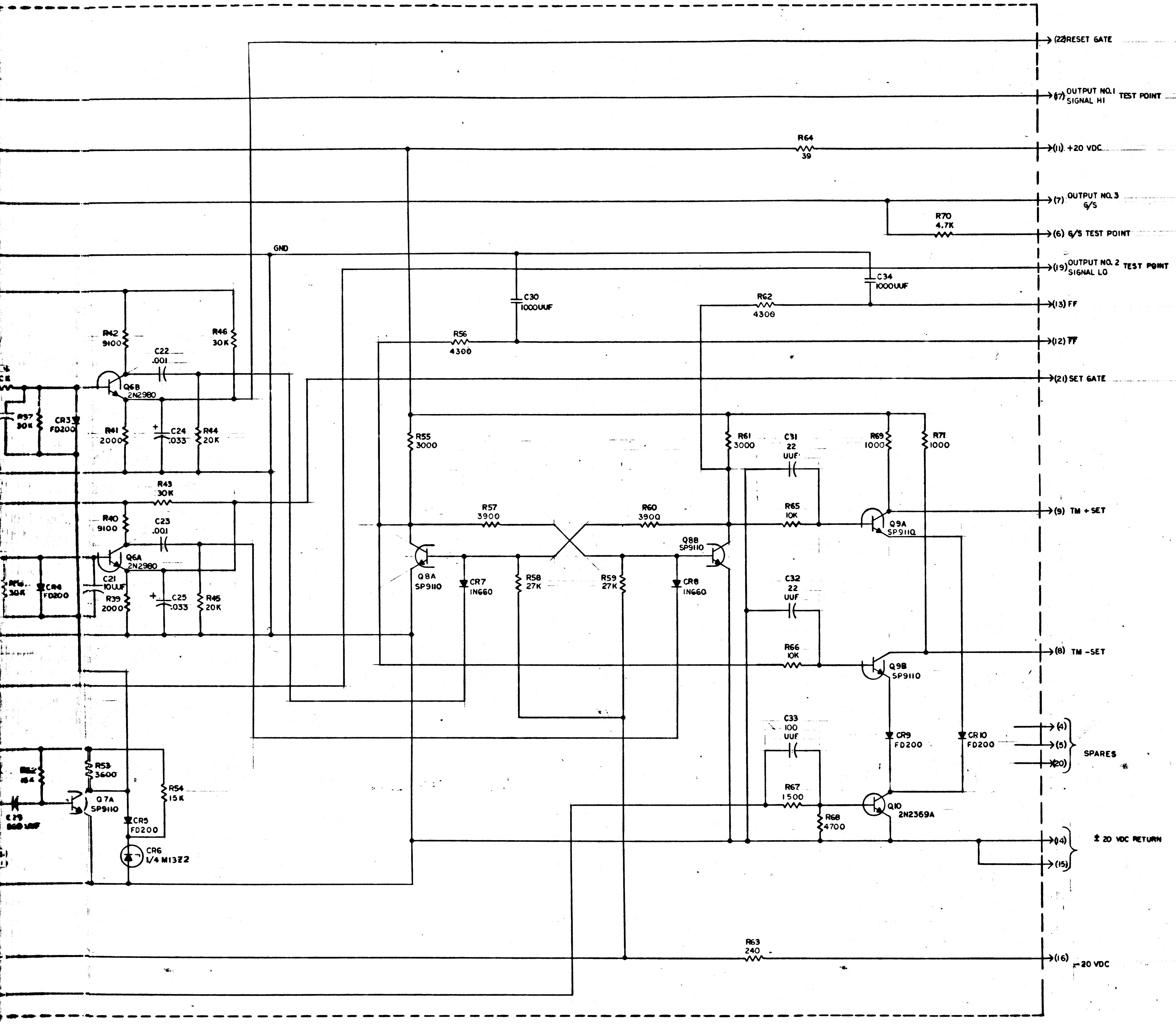
SCHEMATIC, AC DIFFERENTIAL AMPLIFIER AND INTERROGATOR

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010018
SCALE —
WT —
SHEET 1 OF 1

MASTER

E3

7 6 5 4 3


(22) RESET GATE
(17) OUTPUT NO.1 SIGNAL HI TEST POINT
R64 39
(1) +20 VDC
(7) OUTPUT NO.3 6/S
R70 4.7K
(6) 6/S TEST POINT
GND
C34 1000UUF
(19) OUTPUT NO. 2 SIGNAL LO TEST POINT
C30 1000UUF
R62 4300
(13) FF
R56 4300
(12) FF
(21) SET GATE
R42 9100
C22 .001
R46 30K
Q6B 2N2980
R37 30K
CR3 FD200
R41 2000
C24 .033
R44 20K
R55 3000
R61 3000
C31 22 UUF
R69 1000
R71 1000
R43 30K
R57 3900
R60 3900
R65 10K
Q9A SP9110
(9) TM + SET
R40 9100
C23 .001
Q8B SP9110
Q6A 2N2980
C21 10UUF
R39 2000
C25 .033
R45 20K
CR4 FD200
Q8A SP9110
CR7 IN660
R58 27K
R59 27K
CR8 IN660
C32 22 UUF
R66 10K
Q9B SP9110
(8) TM -SET
C33 100 UUF
CR9 FD200
CR10 FD200
(4)
(5)
(20)
SPARES
R53 3600
R54 15K
Q7A SP9110
CR5 FD200
CR6 1/4 M13Z2
R67 1500
R68 4700
Q10 2N2369A
(14)
(15)
± 20 VDC RETURN
R63 240
(16) -20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	↓ -50		5600	↓	↓
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	↓ -47		4300	↓	↓
R63	1006750-17		240	2%	1/4W
R64	1010369-152		39	5%	1/8W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	↓ -48	↓	4.7K	↓	↓
R71	1006750-32	RESISTOR	1000	2%	1/4 W

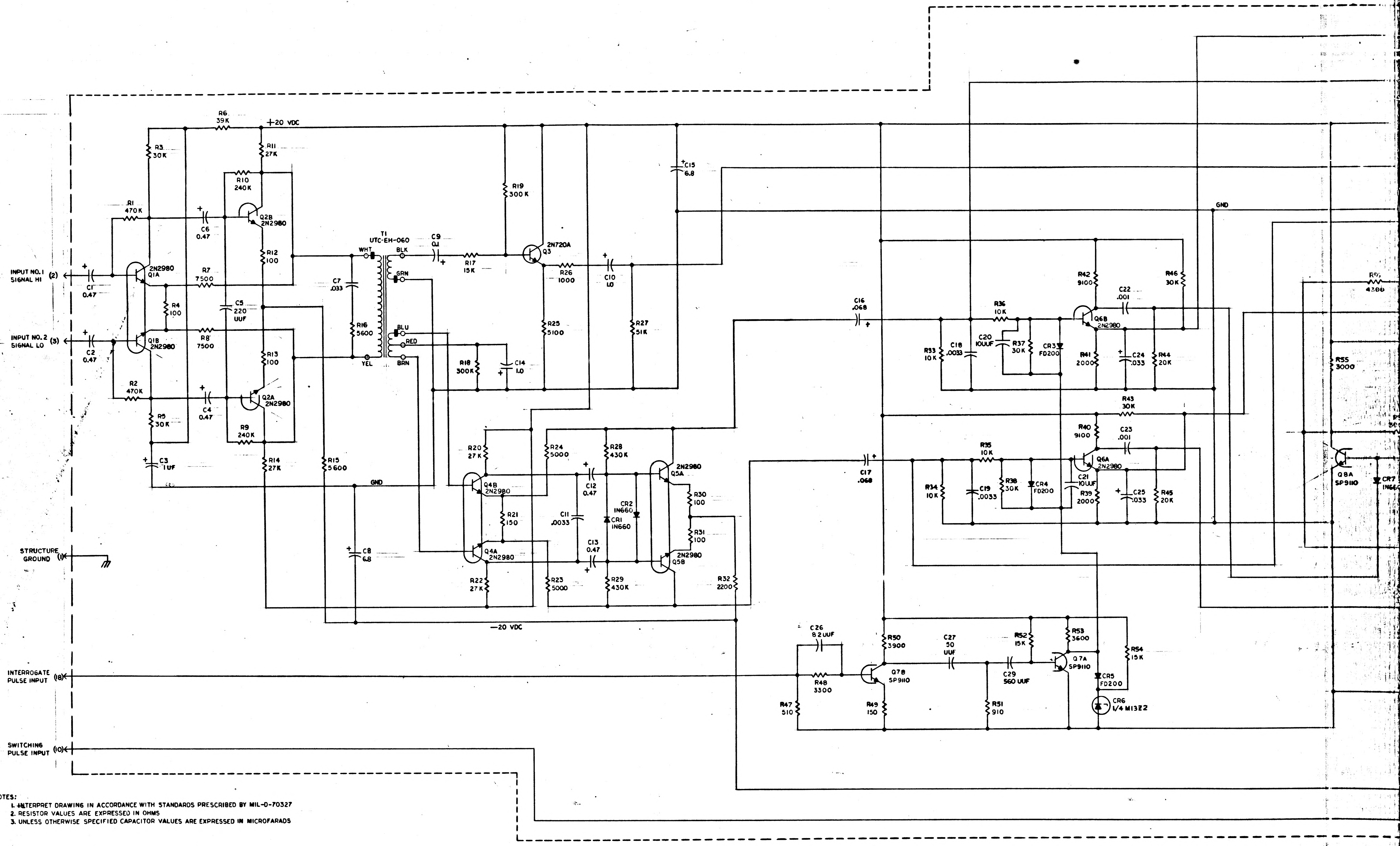
REF DES	PART NO.	DESCRIPTION	VA
C1	1006755-65	CAPACITOR	0.4
C2	1006755-65		0.4
C3	1006755-69		
C4	1006755-65		0.4
C5	1006777-16		220
C6	1006755-65		0.4
C7	1006777-34		.03
C8	1006755-79		6.8
C9	1006755-57		.0
C10	1006755-69		
C11	1006777-27		3300
C12	1006755-65		0.4
C13	-65		0.4
C14	-69		
C15	-79		6.
C16	↓ -55		.0
C17	1006755-55		.0
C18	1006777-27		3300
C19	-27		3300
C20	-1		10
C21	-1		10
C22	↓ -24		1000
C23	1006777-24		1000
C24	1006755-51		.0
C25	1006755-51		.0
C26	1006777-12		82
C27	-8		50
C29	-21		56
C30	-24		1000
C31	-3		22
C32	-3		22
C33	↓ -13	↓	100
C34	1006777-24	CAPACITOR	100
Q1	1010652-3	TRANSISTOR	2N2
Q2	1010652-3		2N2
Q3	1010357-1		2N7
Q4	1010652-3		2N2
Q5	1010652-3		2N2
Q6	1010652-3		2N2
Q7	1010684-1		SP9
Q8	1010684-1		SP9
Q9	1010684-1		SP9
Q10	1010675	↓	2N2
CR1	1010385	DIODE	IN6
CR2	1010385		IN6
CR3	1010384		FD2
CR4	1010384		FD2
CR5	1010384		FD2
CR6	1010372-34		1/4
CR7	1010385		IN6
CR8	1010385		IN6
CR9	1010384	↓	FD2
CR10	1010384	DIODE	FD2
T1	1010335	TRANSFORMER	EH

2010018 B

7 6 5 4 3

E-2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

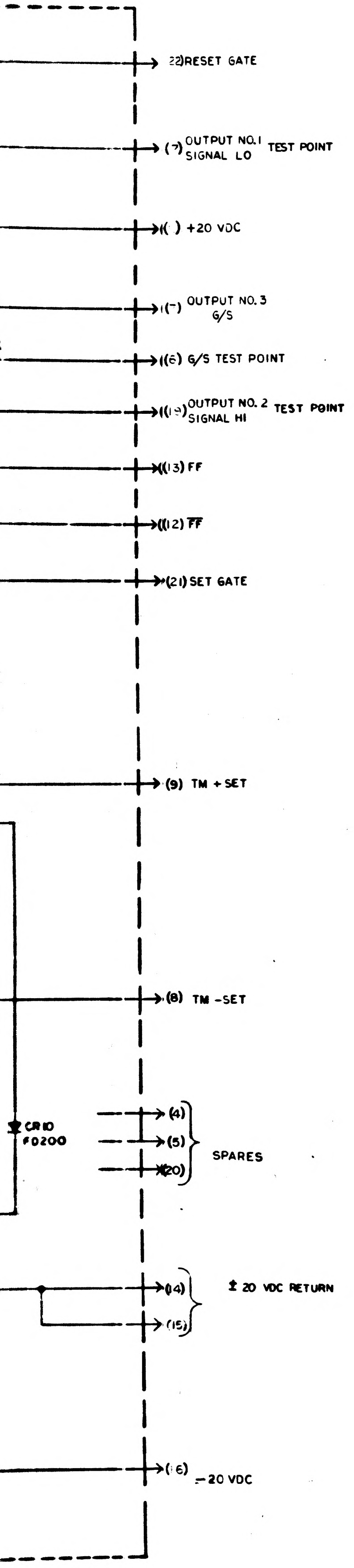

INPUT NO.1 SIGNAL HI (2)
INPUT NO.2 SIGNAL LO (3)
STRUCTURE GROUND (1)
INTERROGATE PULSE INPUT (18)
SWITCHING PULSE INPUT (10)
+20 VDC
-20 VDC
GND
R1 470K
R2 470K
R3 30K
R4 100
R5 30K
R6 39K
R7 7500
R8 7500
R9 240K
R10 240K
R11 27K
R12 100
R13 100
R14 27K
R15 5600
R16 5600
R17 15K
R18 300K
R19 300K
R20 27K
R21 150
R22 27K
R23 5000
R24 5000
R25 5100
R26 1000
R27 51K
R28 430K
R29 430K
R30 100
R31 100
R32 2200
R33 10K
R34 10K
R35 10K
R36 10K
R37 30K
R38 30K
R39 2000
R40 9100
R41 2000
R42 9100
R43 30K
R44 20K
R45 20K
R46 30K
R47 510
R48 3300
R49 150
R50 3900
R51 910
R52 15K
R53 3600
R54 15K
R55 3000
R56 4300
C1 0.47
C2 0.47
C3 1UF
C4 0.47
C5 220 UUF
C6 0.47
C7 .033
C8 6.8
C9 0.1
C10 1.0
C11 .0033
C12 0.47
C13 0.47
C14 1.0
C15 6.8
C16 .068
C17 .068
C18 .0033
C19 .0033
C20 10UUF
C21 10UUF
C22 .001
C23 .001
C24 .033
C25 .033
C26 8.2 UUF
C27 50 UUF
C29 560 UUF
T1 UTC-EH-060
WHT
YEL
BLK
GRN
BLU
RED
BRN
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
Q3 2N720A
Q4A 2N2980
Q4B 2N2980
Q5A 2N2980
Q5B 2N2980
Q6A 2N2980
Q6B 2N2980
Q7A SP9110
Q7B SP9110
Q8A SP9110
CR1 1N660
CR2 1N660
CR3 FD200
CR4 FD200
CR5 FD200
CR6 1/4 M1322
CR7 1N660

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

C	2010018

	REVISIONS 14-27		
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15164	23 Dec '64	
B	REVISED PER TDRR 18795	6 Nov 65	
C	REVISED PER TDRR 21855	30 65	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4 W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65	CAPACITOR	0.47	10%	35VDC
C2	1006755-65		0.47		35VDC
C3	1006755-69		1.0		35VDC
C4	1006755-65		0.47		35VDC
C5	1006777-16		220 UUF		100VDC
C6	1006755-65		0.47		35VDC
C7	1006777-34		.033		100VDC
C8	1006755-79		6.8		35VDC
C9	1006755-57		0.1		35VDC
C10	1006755-69		1.0		35VDC
C11	1006777-27		3300 UUF		100VDC
C12	1006755-65		0.47		35VDC
C13	-65		0.47		
C14	-69		1.0		
C15	-79		6.8		
C16	-55		.068		
C17	1006755-55		.068		35VDC
C18	1006777-27		3300 UUF		100VDC
C19	-27		3300 UUF		
C20	-1		10 UUF		
C21	-1		10 UUF		
C22	-24		1000 UUF		
C23	1006777-24		1000 UUF		100VDC
C24	1006755-51		.033		35VDC
C25	1006755-51		.033		35VDC
C26	1006777-12		82 UUF		100VDC
C27	-13		100 UUF		
C29	-21		560 UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	-13		100 UUF		
C34	1006777-24	CAPACITOR	1000 UUF	10%	100VDC
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3		2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675		2N2369A		
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4M1322		
CR7	1010385		IN660		
CR8	1010385		IN660		
CR9	1010384		FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	EH-060		

REF DWG
AC DIFFERENTIAL AMPLIFIER AND
INTERROGATOR ASSY
DWG NO. 2007104

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

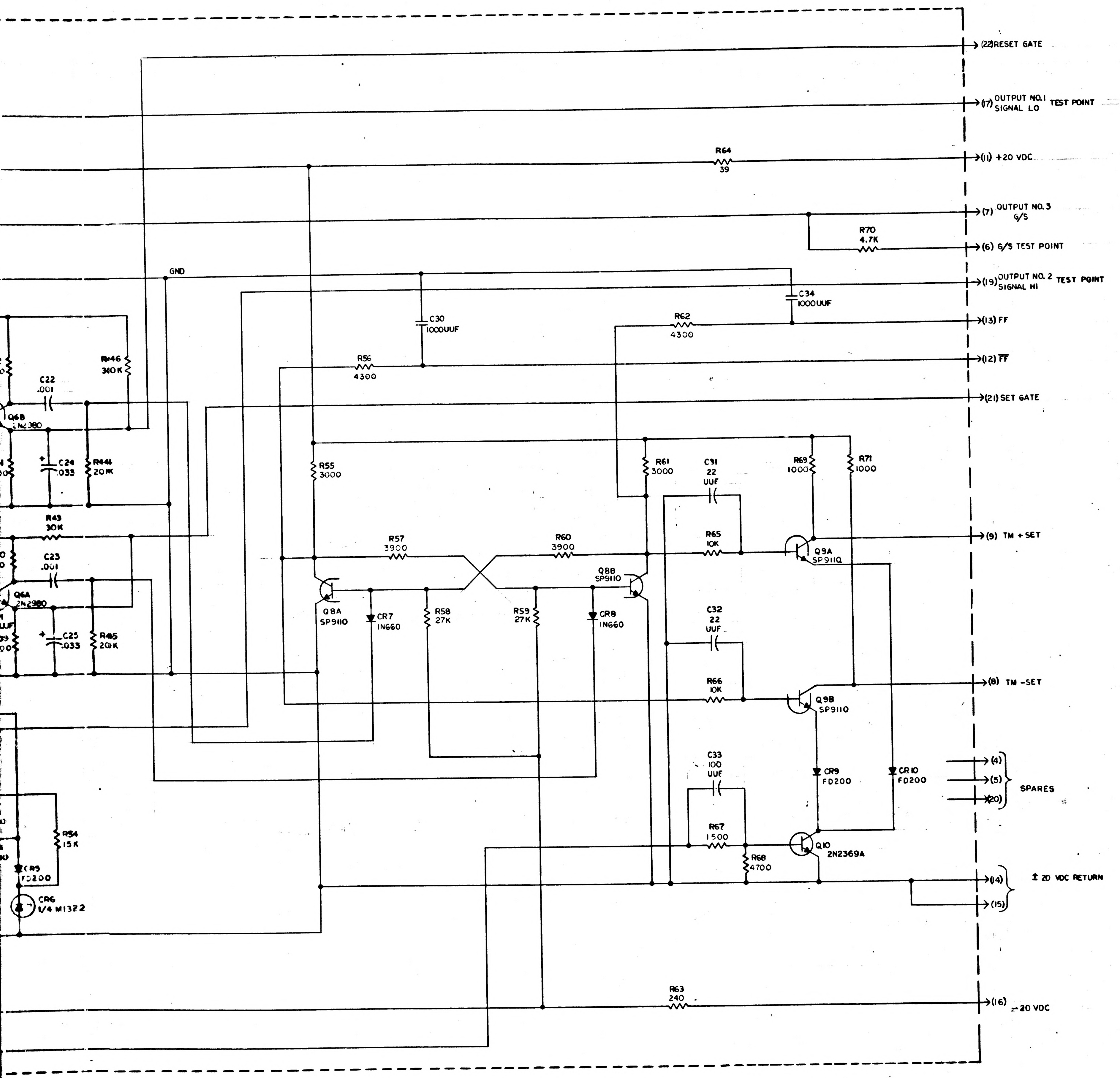
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN Ed Powers DATE 10 Oct 63
CHECKED 9 Mar 64
APPROVAL
APPROVAL J. S. Tomer 11-2-64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO. | SIZE J | NASA DRAWING NO. 2010018
SCALE | WT | SHEET 1 OF 1

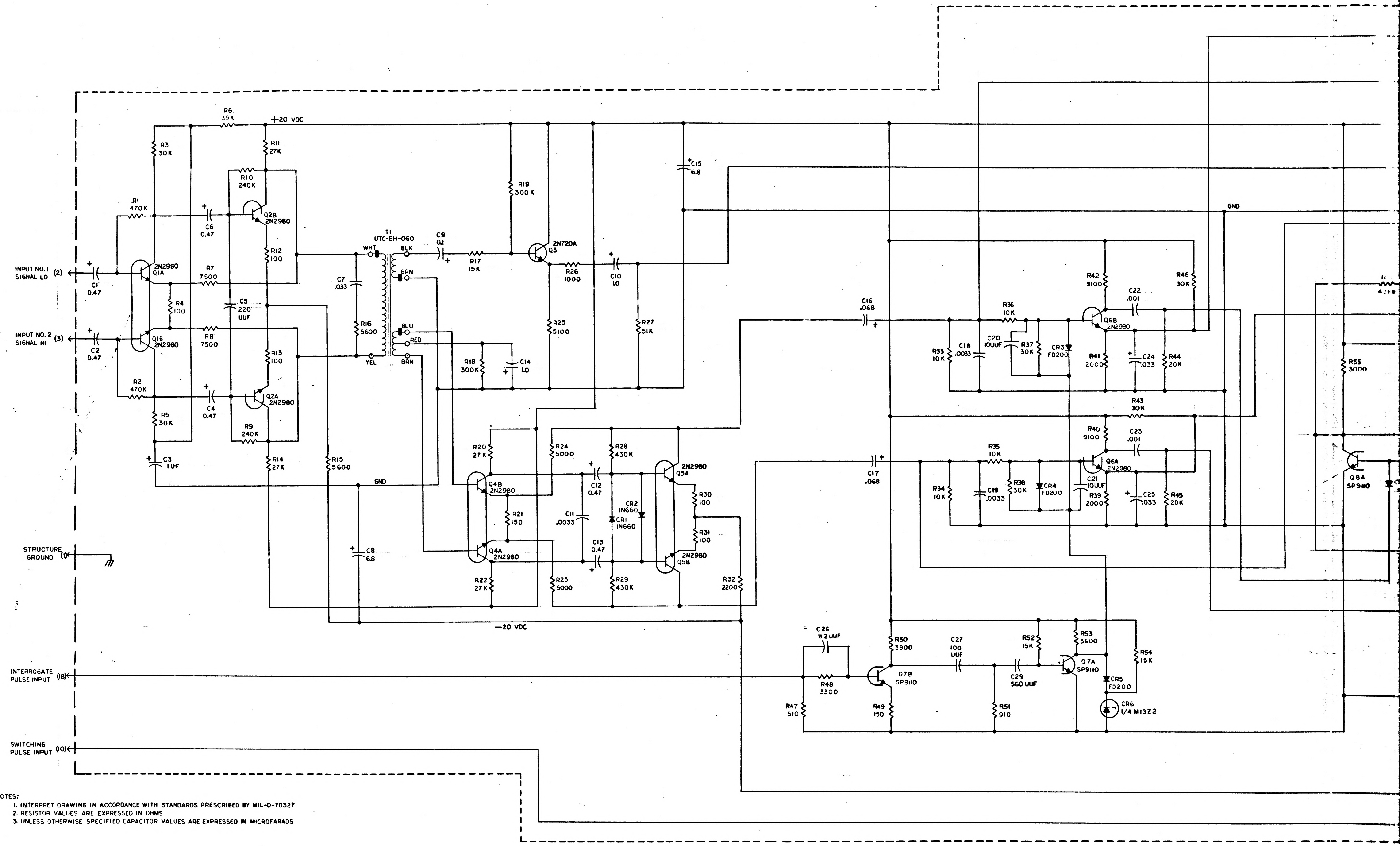
2010018	C


(22) RESET GATE
(7) OUTPUT NO.1 SIGNAL LO TEST POINT
R64 39
(11) +20 VDC
(7) OUTPUT NO.3 G/S
R70 4.7K
(6) G/S TEST POINT
GND
C34 1000UUF
(19) OUTPUT NO.2 SIGNAL HI TEST POINT
C30 1000UUF
R62 4300
(13) FF
R56 4300
(12) FF
(21) SET GATE
R46 360K
C22 .001
Q6B 2N2980
C24 .033
R44 20.1K
R43 30K
C23 .001
Q6A 2N2980
C25 .033
R45 20.1K
R55 3000
R61 3000
C31 22 UUF
R69 1000
R71 1000
R57 3900
R60 3900
R65 10K
Q9A SP9110
(9) TM + SET
Q8B SP9110
Q8A SP9110
CR7 IN660
R58 27K
R59 27K
CR8 IN660
C32 22 UUF
R66 10K
Q9B SP9110
(8) TM - SET
C33 100 UUF
CR9 FD200
CR10 FD200
(4)
(5)
(20)
SPARES
R67 1500
R68 4700
Q10 2N2369A
(14)
± 20 VDC RETURN
(15)
R54 15K
CR5 FD200
CR6 1/4 M1322
R63 240
(16) -20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4 W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65	CAPACITOR	0.47	10%	35VDC
C2	1006755-65		0.47		35VDC
C3	1006755-69		1.0		35VDC
C4	1006755-65		0.47		35VDC
C5	1006777-16		220 UUF		100VDC
C6	1006755-65		0.47		35VDC
C7	1006777-34		.033		100VDC
C8	1006755-79		6.8		35VDC
C9	1006755-57		0.1		35VDC
C10	1006755-69		1.0		35VDC
C11	1006777-27		3300 UUF		100VDC
C12	1006755-65		0.47		35VDC
C13	-65		0.47		
C14	-69		1.0		
C15	-79		6.8		
C16	-55		.068		
C17	1006755-55		.068		35VDC
C18	1006777-27		3300 UUF		100VDC
C19	-27		3300 UUF		
C20	-1		10 UUF		
C21	-1		10 UUF		
C22	-24		1000 UUF		
C23	1006777-24		1000 UUF		100VDC
C24	1006755-51		.033		35VDC
C25	1006755-51		.033		35VDC
C26	1006777-12		82 UUF		100VDC
C27	-13		100 UUF		
C29	-21		560 UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	-13		100 UUF		
C34	1006777-24	CAPACITOR	1000 UUF	10%	100VDC
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3		2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675		2N2369A		
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4M1322		
CR7	1010385		IN660		
CR8	1010385		IN660		
CR9	1010384		FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	EH-000		

2010018 C



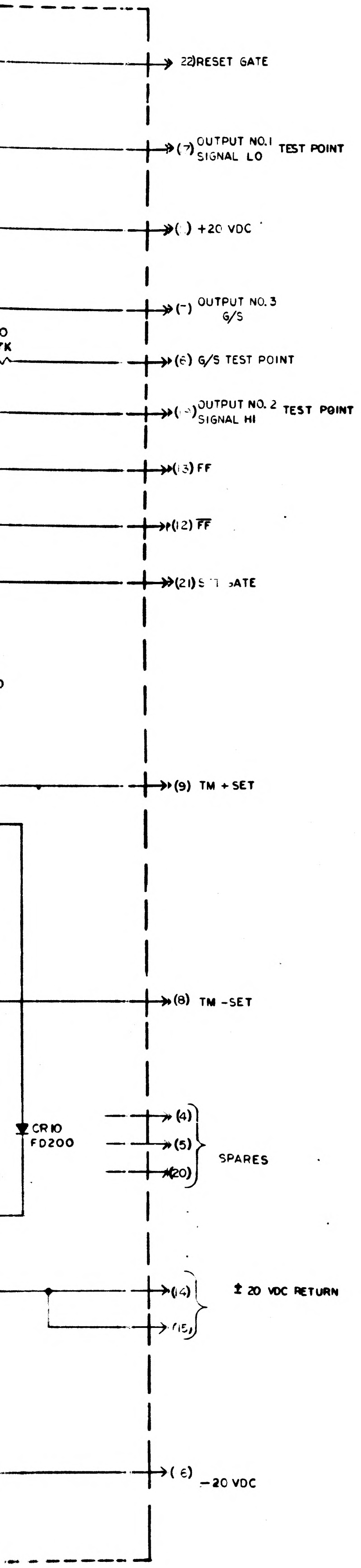
INPUT NO. 1 SIGNAL LO (2)
INPUT NO. 2 SIGNAL HI (3)
STRUCTURE GROUND (1)
INTERROGATE PULSE INPUT (18)
SWITCHING PULSE INPUT (10)
+20 VDC
-20 VDC
GND
C1 0.47
C2 0.47
C3 1 UF
C4 0.47
C5 220 UUF
C6 0.47
C7 .033
C8 6.8
C9 0.1
C10 1.0
C11 .0033
C12 0.47
C13 0.47
C14 1.0
C15 6.8
C16 .068
C17 .068
C18 .0033
C19 .0033
C20 10UUF
C21 10UUF
C22 .001
C23 .001
C24 .033
C25 .033
C26 8.2 UUF
C27 100 UUF
C29 560 UUF
R1 470K
R2 470K
R3 30K
R4 100
R5 30K
R6 39K
R7 7500
R8 7500
R9 240K
R10 240K
R11 27K
R12 100
R13 100
R14 27K
R15 5600
R16 5600
R17 15K
R18 300K
R19 300K
R20 27K
R21 150
R22 27K
R23 5000
R24 5000
R25 5100
R26 1000
R27 51K
R28 430K
R29 430K
R30 100
R31 100
R32 2200
R33 10K
R34 10K
R35 10K
R36 10K
R37 30K
R38 30K
R39 2000
R40 9100
R41 2000
R42 9100
R43 30K
R44 20K
R45 20K
R46 30K
R47 510
R48 3300
R49 150
R50 3900
R51 910
R52 15K
R53 3600
R54 15K
R55 3000
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
Q3 2N720A
Q4A 2N2980
Q4B 2N2980
Q5A 2N2980
Q5B 2N2980
Q6A 2N2980
Q6B 2N2980
Q7A SP9110
Q7B SP9110
Q8A SP9110
T1 UTC-EH-060
WHT
YEL
BLK
GRN
BLU
RED
BRN
CR1 1N660
CR2 1N660
CR3 FD200
CR4 FD200
CR5 FD200
CR6 1/4 M1322

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

2010018 C

D	2010018		

REVISIONS 14327			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15164	23 Dec '64	
B	REVISED PER TDRR 8795	6 Nov 65	
C	REVISED PER TDRR 21855	3 Dec 65	
D	REVISED PER TDRR 24386	8 Dec 65	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65	CAPACITOR	0.47	10%	35VDC
C2	1006755-65		0.47		35VDC
C3	1006755-69		1.0		35VDC
C4	1006755-65		0.47		35VDC
C5	1006777-16		220 UUF		100VDC
C6	1006755-65		0.47		35VDC
C7	1006777-34		.033		100VDC
C8	1006755-79		6.8		35VDC
C9	1006755-57		0.1		35VDC
C10	1006755-69		1.0		35VDC
C11	1006777-7		47 UUF		100VDC
C12	1006755-65		0.47		35VDC
C13	-65		0.47		
C14	-69		1.0		
C15	-79		6.8		
C16	-55		.068		
C17	1006755-55		.068		35VDC
C18	1006777-27		3300 UUF		100VDC
C19	-27		3300 UUF		
C20	-1		10UUF		
C21	-1		10UUF		
C22	-24		1000 UUF		
C23	1006777-24		1000 UUF		100VDC
C24	1006755-51		.033		35VDC
C25	1006755-51		.033		35VDC
C26	1006777-12		82UUF		100VDC
C27	-13		100 UUF		
C29	-21		560UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	-13		100 UUF		
C34	1006777-24	CAPACITOR	1000UUF	10%	100VDC
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3		2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675		2N2369A		
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4M13Z2		
CR7	1010385		IN660		
CR8	1010385		IN660		
CR9	1010384		FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	EH-060		

REF DWG
AC DIFFERENTIAL AMPLIFIER AND
INTERROGATOR ASSY
DWG NO. 2007104

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN Ed Powers DATE 10-02-63
CHECKED
APPROVAL
APPROVAL J. S. Turner 11-2-64
NASA APPROVAL
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

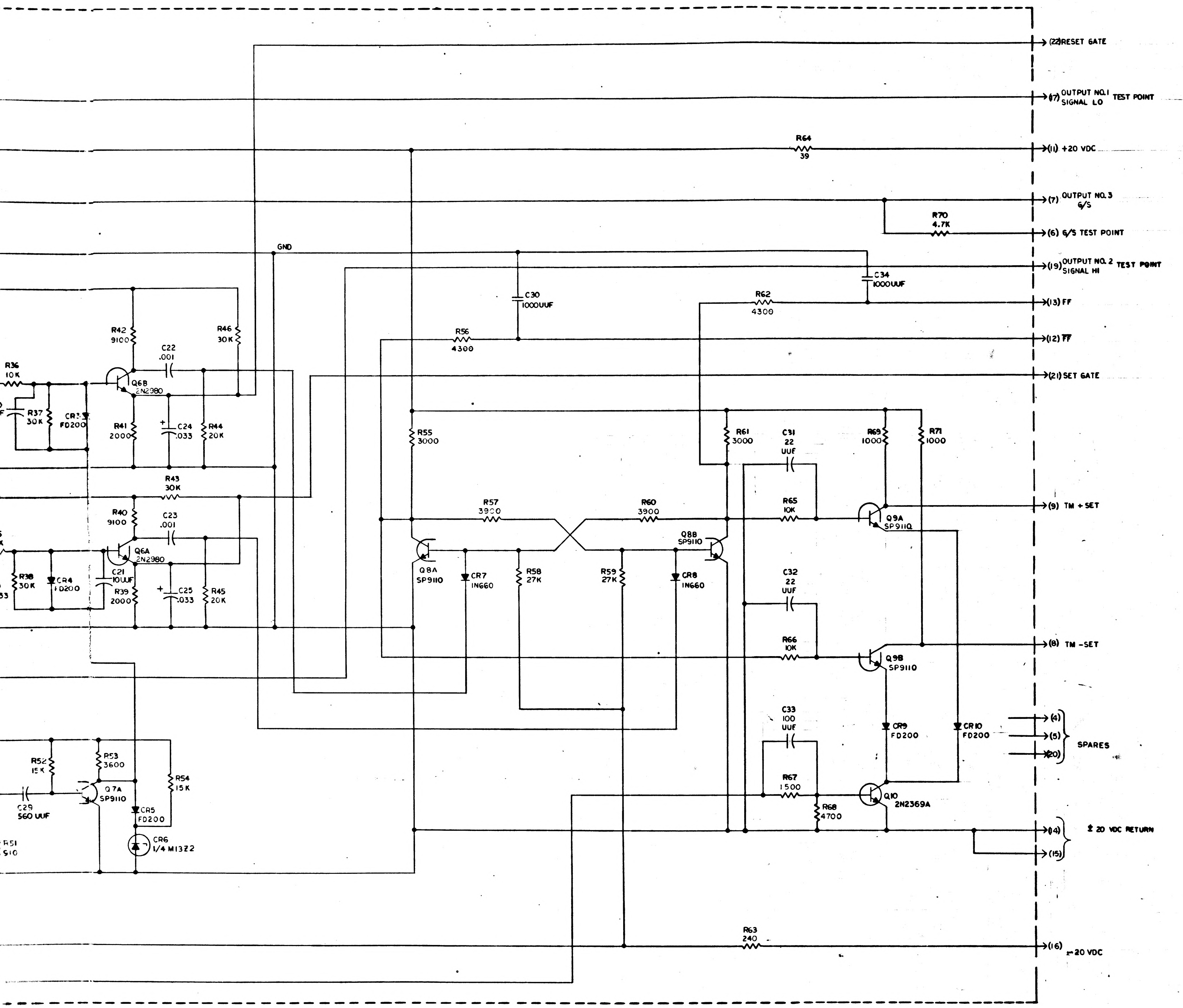
SCHEMATIC,
AC DIFFERENTIAL AMPLIFIER
AND INTERROGATOR

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	J	2010018

SCALE — WT — SHEET 1 OF 1

2010018	D

7 6 5 4 3


(22) RESET GATE
(17) OUTPUT NO.1 SIGNAL LO TEST POINT
(11) +20 VDC
R64 39
(7) OUTPUT NO.3 G/S
R70 4.7K
(6) G/S TEST POINT
GND
(19) OUTPUT NO.2 SIGNAL HI TEST POINT
C34 1000UUF
C30 1000UUF
R62 4300
(13) FF
R56 4300
(12) FF
(21) SET GATE
R36 10K
R42 9100
C22 .001
R46 30K
Q6B 2N2980
R37 30K
CR3 FD200
R41 2000
C24 .033
R44 20K
R43 30K
R40 9100
C23 .001
Q6A 2N2980
C21 10UUF
R38 30K
CR4 FD200
R39 2000
C25 .033
R45 20K
R55 3000
R61 3000
C31 22 UUF
R69 1000
R71 1000
R57 3900
R60 3900
Q8B SP9110
R65 10K
Q9A SP9110
(9) TM + SET
Q8A SP9110
CR7 1N660
R58 27K
R59 27K
CR8 1N660
C32 22 UUF
R66 10K
Q9B SP9110
(8) TM - SET
C33 100 UUF
CR9 FD200
CR10 FD200
(4)
(5)
(20)
SPARES
R67 1500
R68 4700
Q10 2N2369A
(14)
(15)
± 20 VDC RETURN
R52 15K
R53 3600
Q7A SP9110
R54 15K
C29 560 UUF
CR5 FD200
CR6 1/4 M1322
R51 910
R63 240
(16) -20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100	↓	↓
R13	-8		100	↓	↓
R14	-66		27K	↓	↓
R15	-50		5600	↓	↓
R16	-50		5600	↓	↓
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100	↓	↓
R32	-40		2200	↓	↓
R33	-56		10K	↓	↓
R34	-56		10K	↓	↓
R35	-56		10K	↓	↓
R36	-56		10K	↓	↓
R37	-67		30K	↓	↓
R38	-67		30K	↓	↓
R39	-39		2000	↓	↓
R40	-55		9100	↓	↓
R41	-39		2000	↓	↓
R42	-55		9100	↓	↓
R43	-67		30K	↓	↓
R44	-63		20K	↓	↓
R45	-63		20K	↓	↓
R46	-67		30K	↓	↓
R47	-25		510	↓	↓
R48	-44		3300	↓	↓
R49	-12		150	↓	↓
R50	-46		3900	↓	↓
R51	-31		910	↓	↓
R52	-60		15K	↓	↓
R53	-45		3600	↓	↓
R54	-60		15K	↓	↓
R55	-43		3000	↓	↓
R56	-47		4300	↓	↓
R57	-46		3900	↓	↓
R58	-66		27K	↓	↓
R59	-66		27K	↓	↓
R60	-46		3900	↓	↓
R61	-43		3000	↓	↓
R62	-47		4300	↓	↓
R63	1006750-17		240	2%	1/4 W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K	↓	↓
R67	-36		1500	↓	↓
R68	-48		4700	↓	↓
R69	-32		1000	↓	↓
R70	-48		4.7K	↓	↓
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTIO
C1	1006755-65	CAPACITOR
C2	1006755-65	
C3	1006755-69	
C4	1006755-65	
C5	1006777-16	
C6	1006755-65	
C7	1006777-34	
C8	1006755-79	
C9	1006755-57	
C10	1006755-69	
C11	1006777-7	
C12	1006755-65	
C13	-65	
C14	-69	
C15	-79	
C16	-55	
C17	1006755-55	
C18	1006777-27	
C19	-27	
C20	-1	
C21	-1	
C22	-24	
C23	1006777-24	
C24	1006755-51	
C25	1006755-51	
C26	1006777-12	
C27	-13	
C29	-21	
C30	-24	
C31	-3	
C32	-3	
C33	-13	
C34	1006777-24	CAPACITOR
Q1	1010652-3	TRANSISTOR
Q2	1010652-3	
Q3	1010357-1	
Q4	1010652-3	
Q5	1010652-3	
Q6	1010652-3	
Q7	1010684-1	
Q8	1010684-1	
Q9	1010684-1	
Q10	1010675	
CR1	1010385	DIODE
CR2	1010385	
CR3	1010384	
CR4	1010384	
CR5	1010384	
CR6	1010372-34	
CR7	1010385	
CR8	1010385	
CR9	1010384	
CR10	1010384	DIODE
T1	1010335	TRANSFORMER

2010018 D

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E-2

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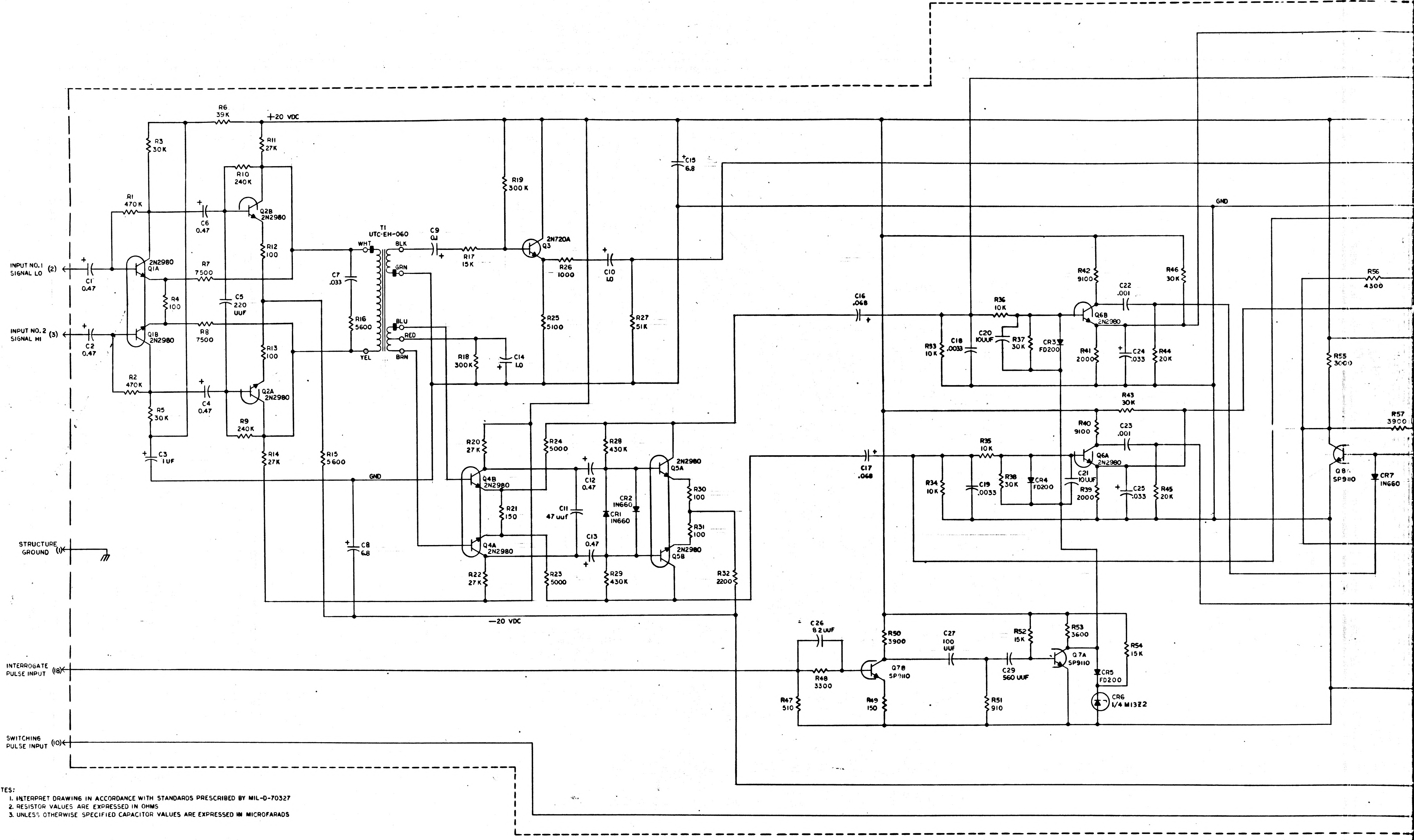
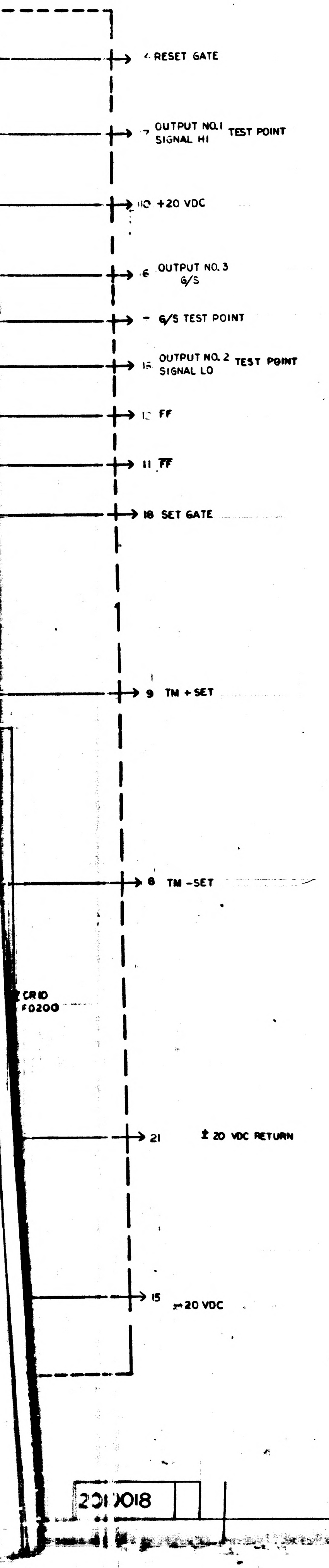

10
9
8
7
D
C
B
A
+20 VDC
R6 39K
R3 30K
R11 27K
R10 240K
R1 470K
C6 0.47
Q2B 2N2980
R12 100
2N2980 Q1A
R7 7500
INPUT NO.1 SIGNAL LO (2)
C1 0.47
R4 100
C5 220 UUF
INPUT NO.2 SIGNAL HI (3)
C2 0.47
Q1B 2N2980
R8 7500
R13 100
R2 470K
C4 0.47
Q2A 2N2980
R5 30K
R9 240K
C3 1UF
R14 27K
R15 5600
GND
T1 UTC-EH-060
WHT
BLK
GRN
BLU
RED
BRN
YEL
C7 .033
R16 5600
C9 0.1
R17 15K
R19 300K
2N720A Q3
R26 1000
C10 1.0
C15 6.8
R25 5100
R27 51K
R18 300K
C14 1.0
C8 6.8
R20 27K
Q4B 2N2980
R21 150
Q4A 2N2980
R22 27K
R24 5000
R23 5000
C11 47 uuf
C12 0.47
C13 0.47
R28 430K
R29 430K
CR1 1N660
CR2 1N660
2N2980 Q5A
2N2980 Q5B
R30 100
R31 100
R32 2200
-20 VDC
STRUCTURE GROUND (1)
INTERROGATE PULSE INPUT (18)
SWITCHING PULSE INPUT (10)
C16 .068
C17 .068
GND
R33 10K
C18 .0033
R36 10K
C20 10UUF
R37 30K
CR3 FD200
R42 9100
Q6B 2N2980
C22 .001
R41 2000
C24 .033
R44 20K
R46 30K
R43 30K
R40 9100
C23 .001
R34 10K
C19 .0033
R35 10K
R38 30K
CR4 FD200
C21 10UUF
Q6A 2N2980
R39 2000
C25 .033
R45 20K
R56 4300
R55 3000
R57 3900
Q8 SP9110
CR7 1N660
C26 82 UUF
R48 3300
R47 510
Q7B SP9110
R50 3900
R49 150
C27 100 UUF
R51 910
C29 560 UUF
R52 15K
R53 3600
Q7A SP9110
R54 15K
CR5 FD200
CR6 1/4 M13Z2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

REVISIONS 14327

SYM	DESCRIPTION	DATE	APPROVAL



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470 K	5%	1/8 W
R2	1010369-97	▲	470 K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27 K	2%	1/4 W
R12	▲ -8		100	▲	▲
R13	-8		100		
R14	-66		27 K		
R15	-50		5600		
R16	▼ -50		5600	▼	▼
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300 K	5%	1/8 W
R19	1010369-92		300 K	5%	1/8 W
R20	1006750-66		27 K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	▲ -8		100	▲	▲
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	▼ -47		4300	▼	▼
R63	1006750-17		.240	2%	1/4W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	▲ -56		10K	▲	▲
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	▼ -48	▼	4.7K	▼	▼
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-65	CAPACITOR	0.47	10%	35VDC
C2	▲ -65	▲	0.47	▲	▲
C3	▼ -69		1		▼
C4	1006755-65		0.47		35VDC
C5	1006777-16		220 UUF		100VDC
C6	1006755-65		0.47		35VDC
C7	1006777-34		.033		100VDC
C8	1006755-79		6.8		35VDC
C9	1006755-57		0.1		35VDC
C10	1006755-69		1.0		35VDC
C11	1006777-27		3300 UUF		100VDC
C12	1006755-65		0.47		35VDC
C13	▲ -65		0.47		▲
C14	-69		1.0		
C15	-79		6.8		
C16	▼ -55		.068		▼
C17	1006755-55		.068		35VDC
C18	1006777-27		3300 UUF		100VDC
C19	▲ -27		3300 UUF		▲
C20	-1		10UUF		
C21	-1		10UUF		
C22	▼ -24		1000 UUF		▼
C23	1006777-24		1000 UUF		100VDC
C24	1006755-51		.033		35VDC
C25	1006755-51		.033		35VDC
C26	1006777-12		82UUF		100VDC
C27	▲ -8		50 UUF		▲
C29	-21		560UUF		
C30	-24		1000 UUF		
C31	-3		22 UUF		
C32	-3		22 UUF		
C33	▼ -13	▼	100 UUF	▼	▼
C34	1006777-24	CAPACITOR	1000UUF	10%	100VDC
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010652-3	▲	2N2980		
Q3	1010357-1		2N720A		
Q4	1010652-3		2N2980		
Q5	1010652-3		2N2980		
Q6	1010652-3		2N2980		
Q7	1010684-1		SP9110		
Q8	1010684-1		SP9110		
Q9	1010684-1		SP9110		
Q10	1010675	▼	2N2369A		
CR1	1010385	DIODE	IN660		
CR2	1010385	▲	IN660		
CR3	1010384		FD200		
CR4	1010384		FD200		
CR5	1010384		FD200		
CR6	1010372-34		1/4M1322		
CR7	1010385		IN660		
CR8	1010385		IN660		
CR9	1010384	▼	FD200		
CR10	1010384	DIODE	FD200		
T1	1010335	TRANSFORMER	EH-060		

REF DWG
AC DIFFERENTIAL AMPLIFIER AND
INTERROGATOR ASSY
DWG NO: 2007104

F3

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

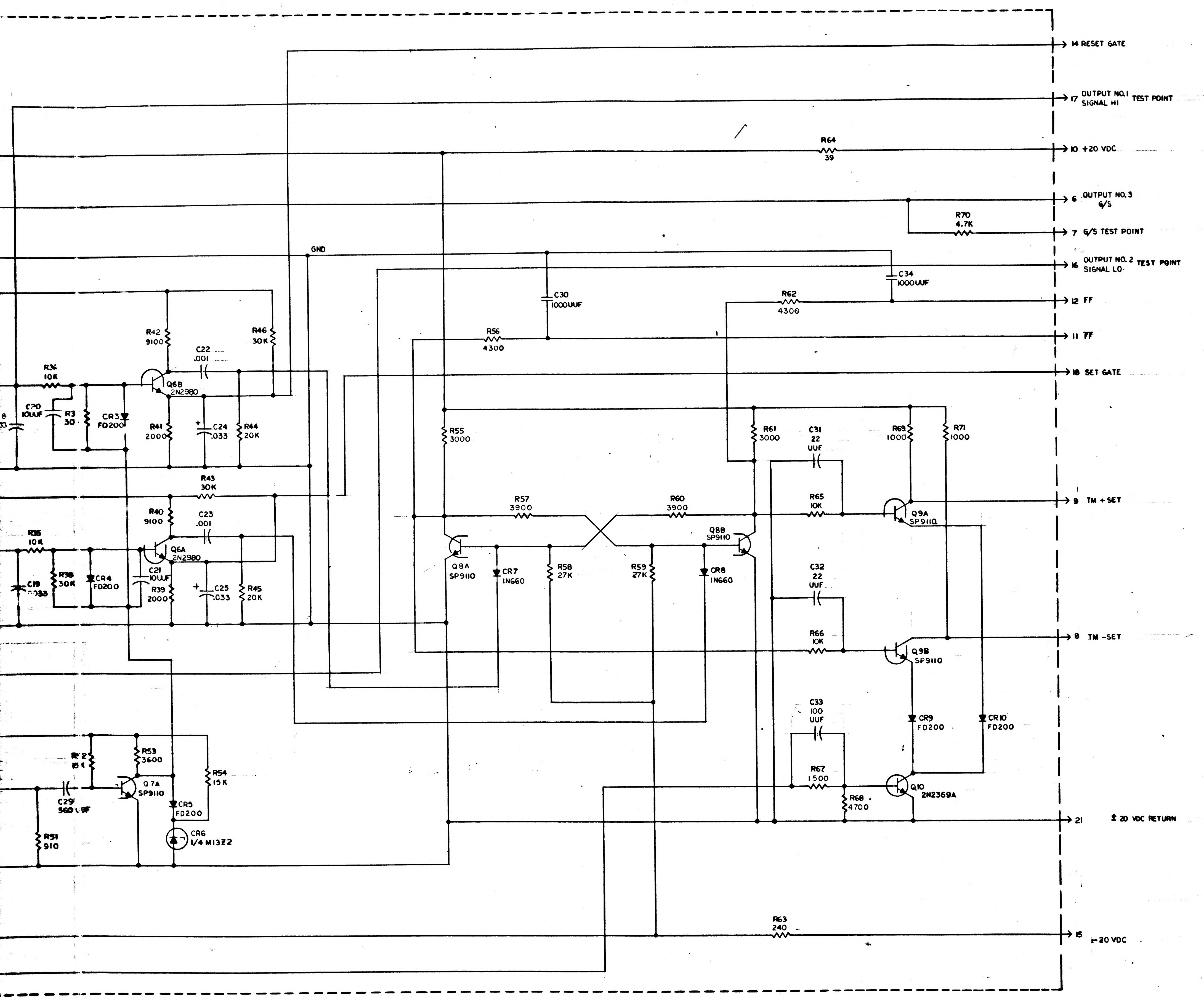
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Ed Powers DATE 10-02-63
CHECKED 9 Mar 64
APPROVAL
APPROVAL J. S. Tomes 11-2-64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, AC DIFFERENTIAL AMPLIFIER AND INTERROGATOR

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010018
SCALE — WT — SHEET 1 OF 1

2010018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R42
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.001
R34
10K
Q6B
2N2980
C70
10UUF
R3
30
CR3
FD200
R41
2000
C24
.033
R44
20K
R43
30K
R40
9100
C23
.001
R35
10K
Q6A
2N2980
C21
10UUF
C19
.0033
R38
30K
CR4
FD200
R39
2000
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.033
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20K
R52
15K
R53
3600
R54
15K
C29
560 UUF
Q7A
SP9110
CR5
FD200
R51
910
CR6
1/4 M13Z2
C30
1000UUF
R56
4300
C34
1000UUF
R62
4300
R64
39
R70
4.7K
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3000
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Q8A
SP9110
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27K
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27K
Q8B
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CR8
IN660
R61
3000
C31
22
UUF
R65
10K
R69
1000
R71
1000
Q9A
SP9110
C32
22
UUF
R66
10K
Q9B
SP9110
C33
100
UUF
CR9
FD200
CR10
FD200
R67
1500
R68
4700
Q10
2N2369A
R63
240
14 RESET GATE
17 OUTPUT NO.1 SIGNAL HI TEST POINT
10 +20 VDC
6 OUTPUT NO.3 G/S
7 G/S TEST POINT
16 OUTPUT NO.2 SIGNAL LO TEST POINT
12 FF
11 $\overline{FF}$
18 SET GATE
9 TM +SET
8 TM -SET
21 ± 20 VDC RETURN
15 -20 VDC

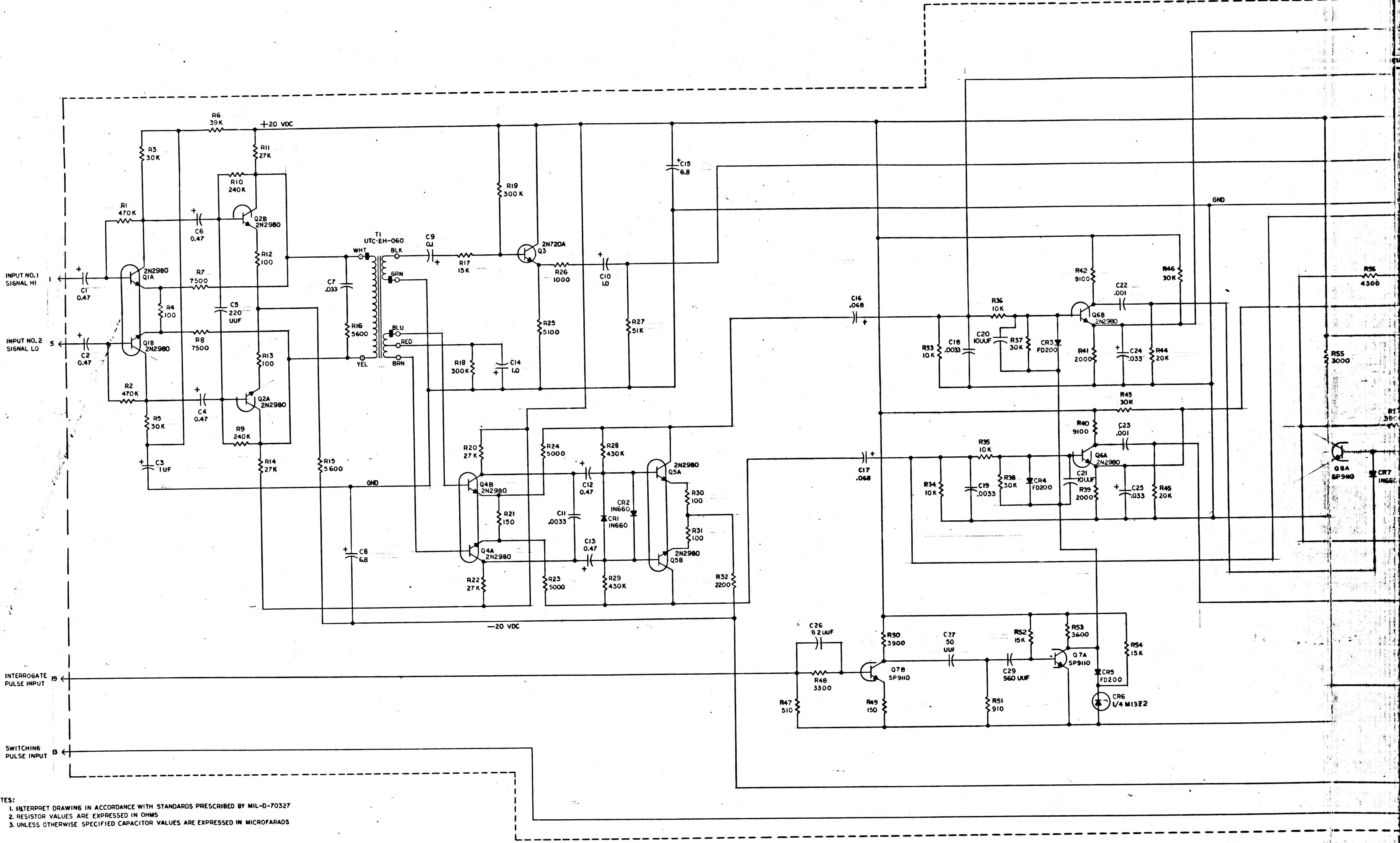
REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010369-97	RESISTOR	470K	5%	1/8 W
R2	1010369-97		470K	5%	1/8 W
R3	1006750-67		30K	2%	1/4 W
R4	1010377-107		100	1%	1/10 W
R5	1006750-67		30K	2%	1/4 W
R6	1006750-70		39K	2%	1/4 W
R7	1010377-109		7500	1%	1/10 W
R8	1010377-109		7500	1%	1/10 W
R9	1010369-90		240K	5%	1/8 W
R10	1010369-90		240K	5%	1/8 W
R11	1006750-66		27K	2%	1/4 W
R12	-8		100		
R13	-8		100		
R14	-66		27K		
R15	-50		5600		
R16	-50		5600		
R17	1006750-60		15K	2%	1/4 W
R18	1010369-92		300K	5%	1/8 W
R19	1010369-92		300K	5%	1/8 W
R20	1006750-66		27K	2%	1/4 W
R21	1010377-108		150	1%	1/10 W
R22	1006750-66		27K	2%	1/4 W
R23	1010377-51		5000	1%	1/10 W
R24	1010377-51		5000	1%	1/10 W
R25	1006750-49		5100	2%	1/4 W
R26	1006750-32		1000	2%	1/4 W
R27	1006750-73		51K	2%	1/4 W
R28	1010369-96		430K	5%	1/8 W
R29	1010369-96		430K	5%	1/8 W
R30	1006750-8		100	2%	1/4 W
R31	-8		100		
R32	-40		2200		
R33	-56		10K		
R34	-56		10K		
R35	-56		10K		
R36	-56		10K		
R37	-67		30K		
R38	-67		30K		
R39	-39		2000		
R40	-55		9100		
R41	-39		2000		
R42	-55		9100		
R43	-67		30K		
R44	-63		20K		
R45	-63		20K		
R46	-67		30K		
R47	-25		510		
R48	-44		3300		
R49	-12		150		
R50	-46		3900		
R51	-31		910		
R52	-60		15K		
R53	-45		3600		
R54	-60		15K		
R55	-43		3000		
R56	-47		4300		
R57	-46		3900		
R58	-66		27K		
R59	-66		27K		
R60	-46		3900		
R61	-43		3000		
R62	-47		4300		
R63	1006750-17		240	2%	1/4 W
R64	1010369-152		39	5%	1/8 W
R65	1006750-56		10K	2%	1/4 W
R66	-56		10K		
R67	-36		1500		
R68	-48		4700		
R69	-32		1000		
R70	-48		4.7K		
R71	1006750-32	RESISTOR	1000	2%	1/4 W

REF DES	PART NO.	DE
C1	100 755-65	C
C2	-65	
C3	-69	
C4	100 755-65	
C5	100 777-16	
C6	100 755-65	
C7	100 777-34	
C8	100 755-79	
C9	100 755-57	
C10	100 755-69	
C11	100 777-27	
C12	100 755-65	
C13	-65	
C14	-69	
C15	-79	
C16	-55	
C17	100 755-55	
C18	100 777-27	
C19	-27	
C20	-1	
C21	-1	
C22	-24	
C23	100 777-24	
C24	100 755-51	
C25	100 755-51	
C26	100 777-12	
C27	-8	
C29	-21	
C30	-24	
C31	-3	
C32	-3	
C33	-13	
C34	100 777-24	CAPA
Q1	101 652-3	TRA
Q2	101 652-3	
Q3	101 357-1	
Q4	101 652-3	
Q5	101 652-3	
Q6	101 652-3	
Q7	101 684-1	
Q8	101 684-1	
Q9	101 684-1	
Q10	101 675	
CR1	101 385	
CR2	101 385	
CR3	101 384	
CR4	101 384	
CR5	101 384	
CR6	101 372-34	
CR7	101 385	
CR8	101 385	
CR9	101 384	
CR10	101 384	
T1	101 335	TRA

F-2

2010018

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


INPUT NO. 1 SIGNAL HI 1
INPUT NO. 2 SIGNAL LO 5
INTERROGATE PULSE INPUT 19
SWITCHING PULSE INPUT 13
+20 VDC
−20 VDC
GND
R1 470K
R2 470K
R3 30K
R4 100
R5 30K
R6 39K
R7 7500
R8 7500
R9 240K
R10 240K
R11 27K
R12 100
R13 100
R14 27K
R15 5600
R16 5600
R17 15K
R18 300K
R19 300K
R20 27K
R21 150
R22 27K
R23 5000
R24 5000
R25 5100
R26 1000
R27 51K
R28 430K
R29 430K
R30 100
R31 100
R32 2200
R33 10K
R34 10K
R35 10K
R36 10K
R37 30K
R38 30K
R39 2000
R40 9100
R41 2000
R42 9100
R43 30K
R44 20K
R45 20K
R46 30K
R47 510
R48 3300
R49 150
R50 3900
R51 910
R52 15K
R53 3600
R54 15K
R55 3000
R56 4300
C1 0.47
C2 0.47
C3 1UF
C4 0.47
C5 220 UUF
C6 0.47
C7 .033
C8 6.8
C9 0.1
C10 1.0
C11 .0033
C12 0.47
C13 0.47
C14 1.0
C15 6.8
C16 .068
C17 .068
C18 .0033
C19 .0033
C20 10UUF
C21 10UUF
C22 .001
C23 .001
C24 .033
C25 .033
C26 8.2 UUF
C27 50 UUF
C29 560 UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
Q3 2N720A
Q4A 2N2980
Q4B 2N2980
Q5A 2N2980
Q5B 2N2980
Q6A 2N2980
Q6B 2N2980
Q7A SP9110
Q7B SP9110
Q8A SP9110
T1 UTC-EH-060
WHT
BLK
GRN
BLU
RED
YEL
BRN
CR1 1N660
CR2 1N660
CR3 FD200
CR4 FD200
CR5 FD200
CR6 1/4 M13Z2
CR7 1N660

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS

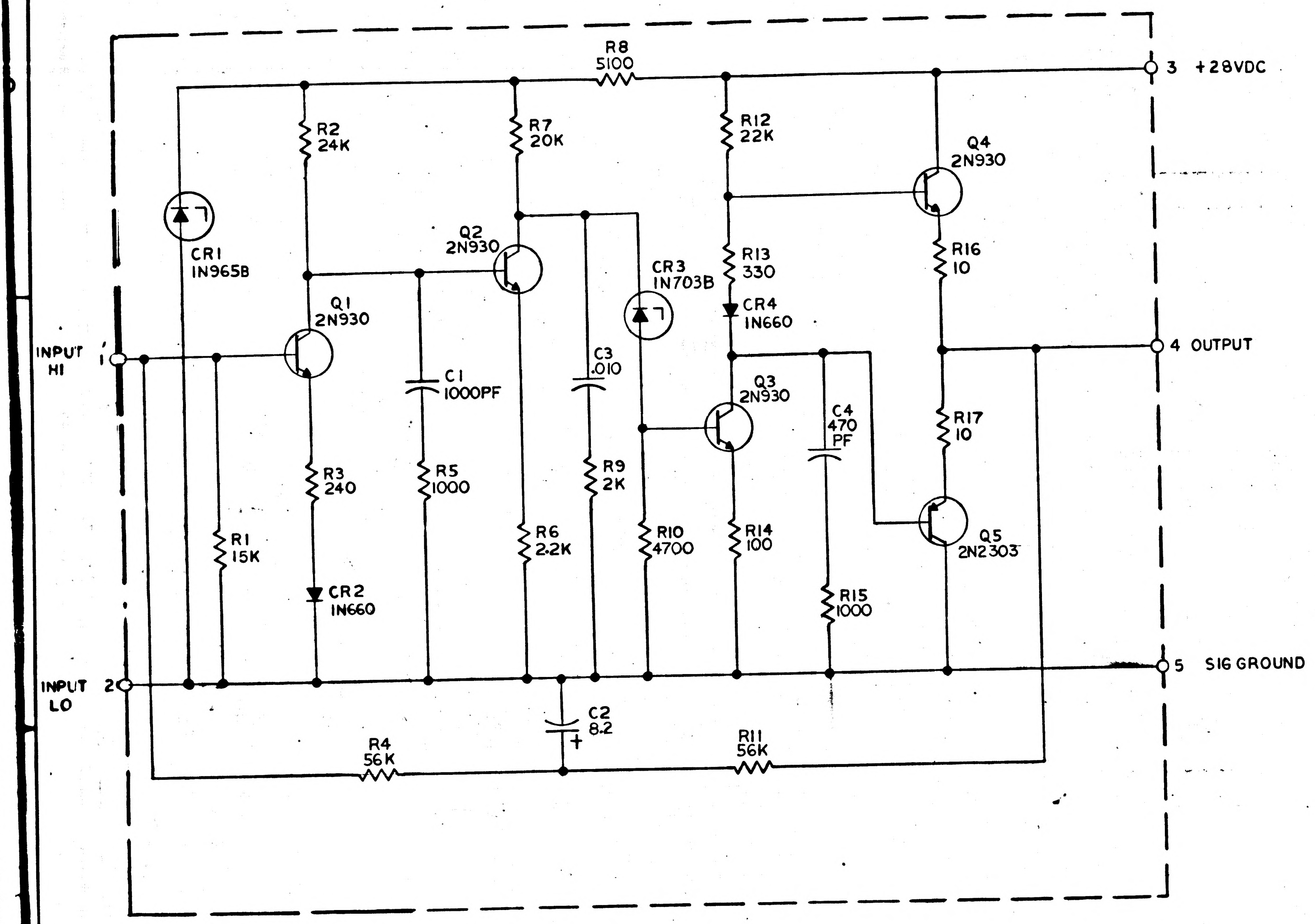
F-1

2010018

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

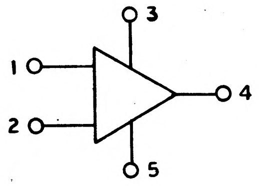
REVISIONS 08491

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15240		wK.


R8
5100
3 +28VDC
R2
24K
R7
20K
R12
22K
Q4
2N930
CR1
1N965B
Q2
2N930
CR3
1N703B
R13
330
R16
10
CR4
1N660
Q1
2N930
INPUT HI 1
C1
1000PF
C3
.010
4 OUTPUT
Q3
2N930
C4
470
PF
R17
10
R3
240
R5
1000
R9
2K
R1
15K
R6
2.2K
R10
4700
R14
100
Q5
2N2303
CR2
1N660
R15
1000
INPUT LO 2
5 SIG GROUND
C2
8.2
+
R4
56K
R11
56K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	↑ -65	↑	24K	↑	↑
R3	-17		240		
R4	-74		56K		
R5	-32		1000		
R6	-40		2200		
R7	-63		20K		
R8	-49		5100		
R9	-39		2000		
R10	-48		4700		
R11	-74		56K		
R12	-64		22K		
R13	-20		330		
R14	↓ -8		100	↓	↓
R15	1006750-32		1000	±2%	1 4W
R16	1010369 -141		10	±5%	1/8W
R17	1010369 -141	↓	10	±5%	1/8W
C1	1006777-24	CAPACITOR	1000 PF	±10%	100VDC
C2	1006755 -30	↑	8.2UF	±10%	20VDC
C3	1006777 -31		.010UF	±10%	100VDC
C4	1006777 -20	↓	470PF	±10%	100VDC
CR1	1010830 -9	DIODE	1N965B		
CR2	1010385	DIODE	1N660		
CR3	1010372 -5	DIODE	1N703B		
CR4	1010385	DIODE	1N660		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	↑	↑	↑		
Q3					
Q4	↓		↓		
Q5	1010633-1	↓	2N2303		

SYMBOL FOR CIRCUIT



REF DWG:

1. OPERATIONAL AMPLIFIER ELECTRONIC CDU ASSY DWG NO.
2. ELECTRICAL SCHEMATIC:
   - A) 2010030
   - B) 2010002
   - C) 2010010

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT

DRAWN J.F. Walsh DATE 12/27/63
CHECKED A.D. Leo 8/4/64
APPROVAL R.M. Kowalski 13 May 64
APPROVAL J.J. Cushman 15 May '64
NASA APPROVAL 5/19/64
MIT APPROVAL 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, OPERATIONAL AMPLIFIER ELECTRONIC CDU

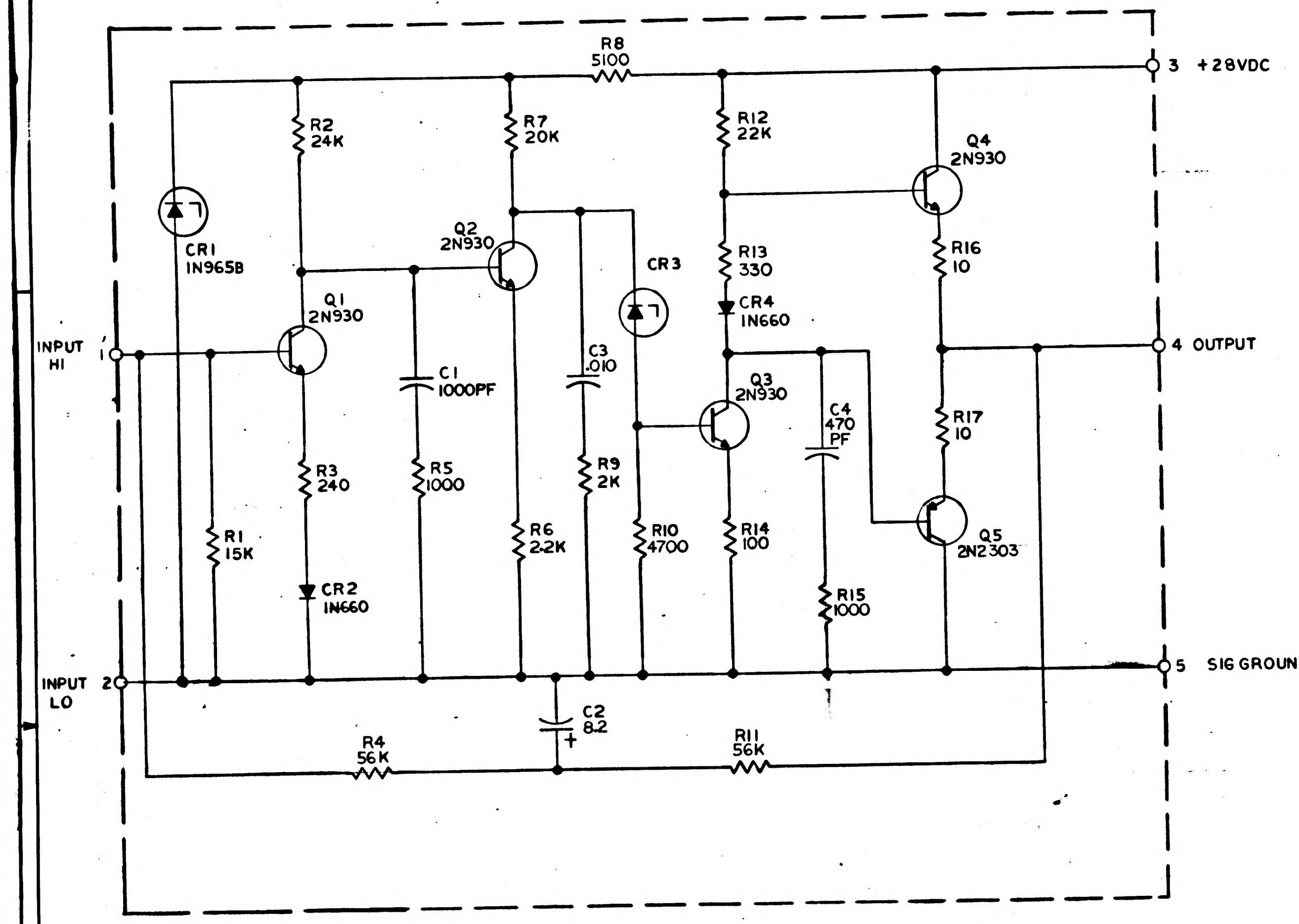
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010019
SCALE —
WT —
SHEET 1 OF 1

2010019 A

NOTICE …HEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA
ARE USE… ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY
RELATED …ERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERN-
MENT TH… BY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER;
AND THE …CT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR
IN ANY … SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS
NOT TO … REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER
LICENS… THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY-
ING A… RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY
PATEN… INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

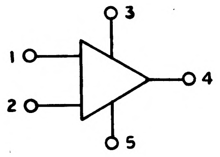
REVISIONS 08491

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15240		WK.
B	REVISED PER TDRR 18425	22 APR 65	WK


R8
5100
3 +28VDC
R2
24K
R7
20K
R12
22K
Q4
2N930
CR1
1N965B
Q2
2N930
CR3
R13
330
R16
10
Q1
2N930
CR4
1N660
INPUT HI
1
4 OUTPUT
C1
1000PF
C3
.010
Q3
2N930
C4
470
PF
R17
10
R3
240
R5
1000
R9
2K
R6
2.2K
R10
4700
R14
100
Q5
2N2303
R1
15K
CR2
1N660
R15
1000
INPUT LO
2
5 SIG GROUND
C2
8.2
+
R4
56K
R11
56K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-65		24K		
R3	-17		240		
R4	-74		56K		
R5	-32		1000		
R6	-40		2200		
R7	-63		20K		
R8	-49		5100		
R9	-39		2000		
R10	-48		4700		
R11	-74		56K		
R12	-64		22K		
R13	-20		330		
R14	-8		100		
R15	1006750-32		1000	±2%	1 4W
R16	1010369 -141		10	±5%	1/8 W
R17	1010369 -141		10	±5%	1/8 W
C1	1006777 - 24	CAPACITOR	1000 PF	±10%	100VDC
C2	1006755 -30		8.2 UF	±10%	20VDC
C3	1006777 - 31		.010UF	±10%	100VDC
C4	1006777 - 20		470 PF	±10%	100VDC
CR1	1010830 - 9	DIODE	1N965B		
CR2	1010385	DIODE	1N660		
CR3	1010372 -10	DIODE			
CR4	1010385	DIODE	1N660		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5	1010633 - 1		2N2303		

SYMBOL FOR CIRCUIT



REF DWG:
1. OPERATIONAL AMPLIFIER ELECTRONIC CDU ASSY
DWG NO.
2. ELECTRICAL SCHEMATIC:
A) 2010030
B) 2010002
C) 2010010

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Walsh DATE 12/27/63
CHECKED A.D. Lee 8/4/64
APPROVAL R. M. Kowalski 13 May 64
APPROVAL J. J. Cushman 15 May '64
NASA APPROVAL 15 May 64
MIT APPROVAL 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
OPERATIONAL AMPLIFIER
ELECTRONIC CDU

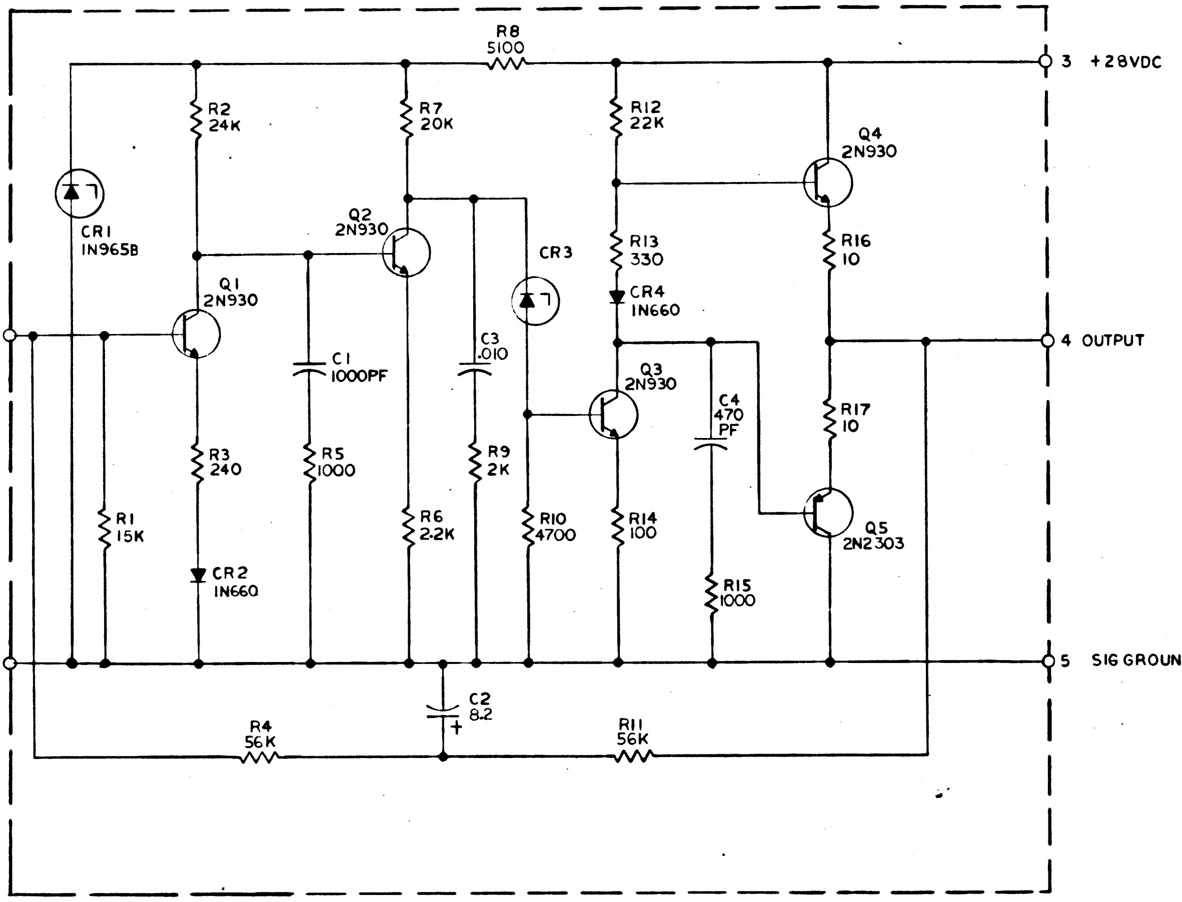
CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	D	2010019

SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 08491

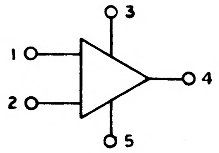
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15240		WH
B	REVISED PER TDRR 18425	22 APR 65	WK
C	REVISED PER TDRR 28185	28-APR-66	B. W.L.


R8
5100
3 +28VDC
R2
24K
R7
20K
R12
22K
Q4
2N930
CR1
IN965B
Q2
2N930
CR3
R13
330
R16
10
Q1
2N930
CR4
IN660
INPUT HI 1
C1
1000PF
C3
.010
Q3
2N930
4 OUTPUT
C4
470
PF
R17
10
R3
240
R5
1000
R9
2K
R1
15K
R6
2.2K
R10
4700
R14
100
Q5
2N2303
R15
1000
CR2
IN660
INPUT LO 2
5 SIG GROUND
C2
8.2
+
R4
56K
R11
56K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-65		24K		
R3	-17		240		
R4	-74		56K		
R5	-32		1000		
R6	-40		2200		
R7	-63		20K		
R8	-49		5100		
R9	-39		2000		
R10	-48		4700		
R11	-74		56K		
R12	-64		22K		
R13	-20		330		
R14	-8		100		
R15	1006750-32		1000	±2%	1 4W
R16	1010369 -141		10	±5%	1/8 W
R17	1010369 -141		10	±5%	1/8 W
C1	1006777-24	CAPACITOR	1000 PF	±10%	100VDC
C2	1006755 -30		8.2 UF	±10%	20VDC
C3	1006777 -31		.010UF	±10%	100VDC
C4	1006777 -20		470 PF	±10%	100VDC
CR1	1008815 -9	DIODE	IN965B		
CR2	1010385	DIODE	IN660		
CR3	1010372 -10	DIODE			
CR4	1010385	DIODE	IN660		
Q1	1010397 -1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5	1010633-1		2N2303		

2010019 C

SYMBOL FOR CIRCUIT



REF DWG:
1. OPERATIONAL AMPLIFIER ELECTRONIC CDU ASSY
DWG NO.
2. ELECTRICAL SCHEMATIC:
A) 2010030
B) 2010002
C) 2010010

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN J.F. Walsh DATE 12/27/63
CHECKED A.D. Leo 8/4/64
APPROVAL R. M. Kowalski 13 May 64
APPROVAL 15 May 64
NASA APPROVAL 5/14/64
MIT APPROVAL 19 May 64

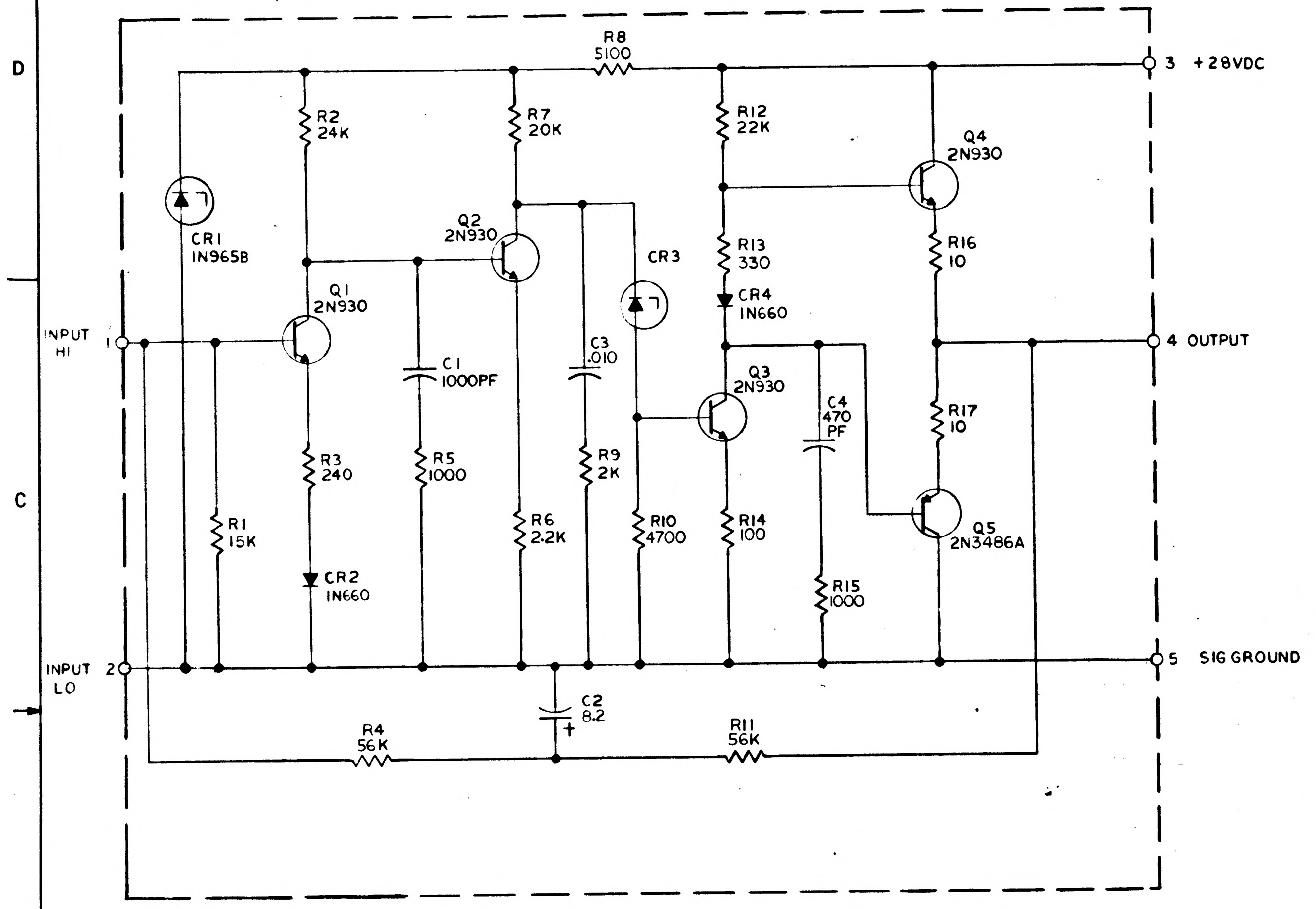
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
OPERATIONAL AMPLIFIER
ELECTRONIC CDU

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010019
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

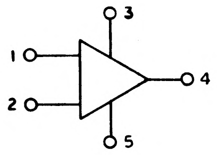
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15240		WR
B	REVISED PER TDRR 18425	22 APR 65	WR
C	***REVISED PER TDRR 28185***	28 APR -66	B. W.E.
D	REVISED PER TDRR 29955	16 JUL 66	PHG T.M.



R8
5100
3 +28VDC
R2
24K
R7
20K
R12
22K
Q4
2N930
CR1
1N965B
Q2
2N930
CR3
R13
330
R16
10
CR4
1N660
Q1
2N930
INPUT HI
1
C1
1000PF
C3
.010
Q3
2N930
4 OUTPUT
C4
470
PF
R17
10
R3
240
R5
1000
R9
2K
R1
15K
R6
2.2K
R10
4700
R14
100
Q5
2N3486A
CR2
1N660
R15
1000
INPUT LO
2
5 SIG GROUND
C2
8.2
R4
56K
R11
56K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-65		24K		
R3	-17		240		
R4	-74		56K		
R5	-32		1000		
R6	-40		2200		
R7	-63		20K		
R8	-49		5100		
R9	-39		2000		
R10	-48		4700		
R11	-74		56K		
R12	-64		22K		
R13	-20		330		
R14	-8		100		
R15	1006750-32		1000	±2%	1 4W
R16	1010369 -141		10	±5%	1/8 W
R17	1010369 -141		10	±5%	1/8 W
C1	1006777-24	CAPACITOR	1000 PF	±10%	100VDC
C2	1006755 -30		8.2 UF	±10%	20VDC
C3	1006777 -31		.010UF	±10%	100VDC
C4	1006777 -20		470 PF	±10%	100VDC
CR1	1008815 -9	DIODE	1N965B		
CR2	1010385	DIODE	1N660		
CR3	1010372 -10	DIODE			
CR4	1010385	DIODE	1N660		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5	1008812-1		2N3486A		

SYMBOL FOR CIRCUIT



REF DWG:
1. OPERATIONAL AMPLIFIER ELECTRONIC CDU ASSY DWG NO.
2. ELECTRICAL SCHEMATIC:
A) 2010030
B) 2010002
C) 2010010

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN J.F. Walsh DATE 12/27/63
CHECKED A.D. Lao 8/4/64
APPROVAL R. M. Kowalski 13 MAY 64
APPROVAL [illegible] 15 May 64
NASA APPROVAL [illegible] 15 May 64
MIT APPROVAL [illegible] 19 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, OPERATIONAL AMPLIFIER ELECTRONIC CDU

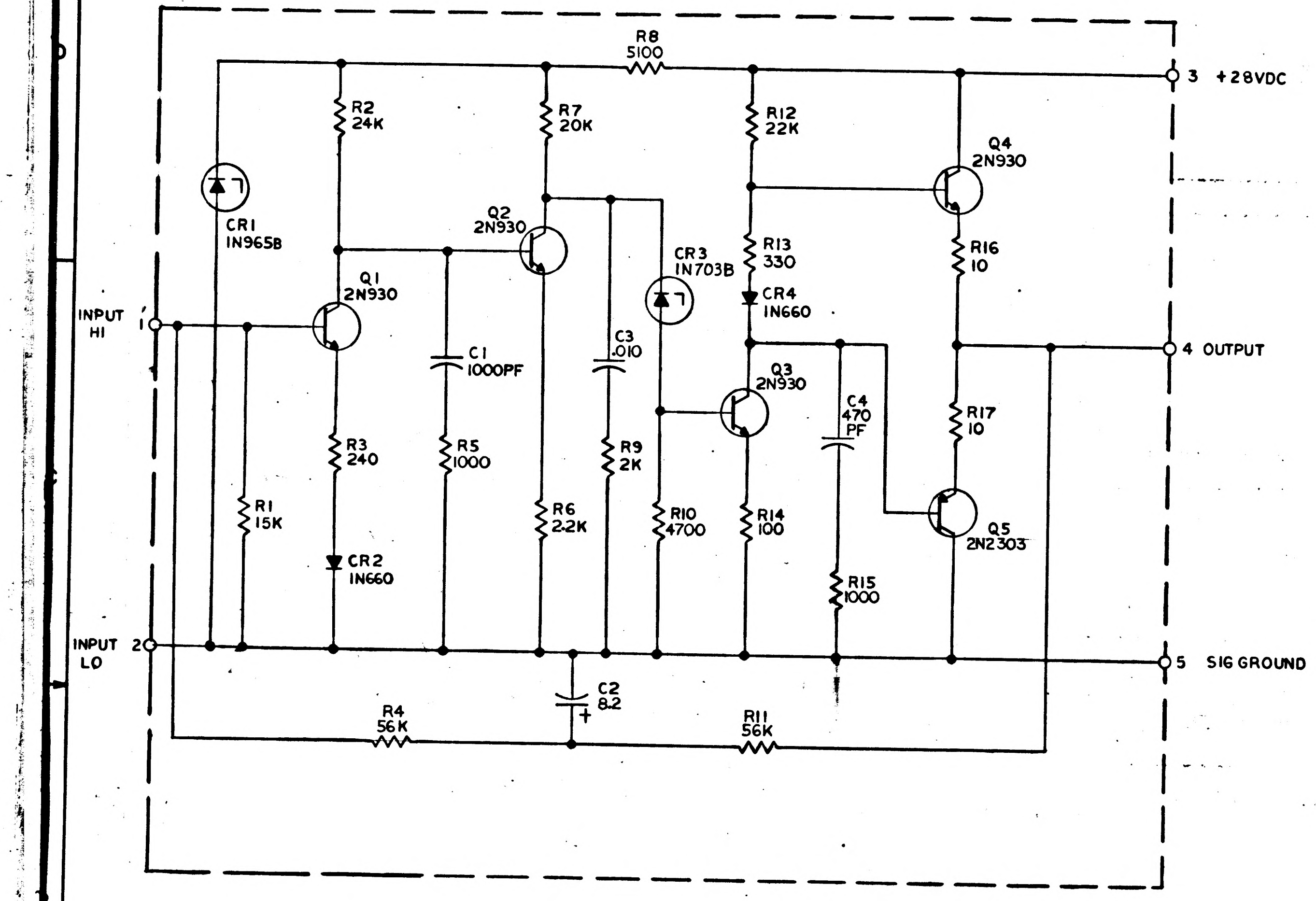
CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	D	2010019

SCALE — WT — SHEET 1 OF 1

2010019 D

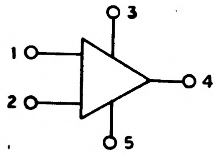
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08491			
SYM	DESCRIPTION	DATE	APPROVAL


R8
5100
3 +28VDC
R2
24K
R7
20K
R12
22K
Q4
2N930
CR1
1N965B
Q2
2N930
CR3
1N703B
R13
330
CR4
1N660
R16
10
INPUT HI 1
Q1
2N930
C1
1000PF
C3
.010
Q3
2N930
4 OUTPUT
C4
470
PF
R17
10
R3
240
R5
1000
R9
2K
R1
15K
R6
2.2K
R10
4700
R14
100
Q5
2N2303
CR2
1N660
R15
1000
INPUT LO 2
5 SIG GROUND
C2
8.2
R4
56K
R11
56K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	± 2%	1/4 W
R2	-65		24K		
R3	-17		240		
R4	-74		56K		
R5	-32		1000		
R6	-40		2200		
R7	-63		20K		
R8	-49		5100		
R9	-39		2000		
R10	-48		4700		
R11	-74		56K		
R12	-64		22K		
R13	-20		330		
R14	-8		100		
R15	1006750-32		1000	± 2%	1 4W
R16	1010369 -141		10	± 5%	1/8 W
R17	1010369 -141		10	± 5%	1/8 W
C1	1006777 - 24	CAPACITOR	1000 PF	±10%	100VDC
C2	1006755 - 30		8.2 UF	±10%	20VDC
C3	1006777 - 31		.010UF	±10%	100VDC
C4	1006777 - 20		470 PF	±10%	100VDC
CR1	1010286 -9	DIODE	IN965B		
CR2	1010385	DIODE	IN660		
CR3	1010372 -5	DIODE	IN703B		
CR4	1010385	DIODE	IN660		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2					
Q3					
Q4					
Q5	1010633 - 1		2N2303		

SYMBOL FOR CIRCUIT



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4.

REF DWG:

1. OPERATIONAL AMPLIFIER ELECTRONIC CDU ASSY DWG NO.
2. ELECTRICAL SCHEMATIC:
   A) 2010030
   B) 2010002
   C) 2010010

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Walsh DATE 12/27/63
CHECKED D.D. Lee 8/4/64
APPROVAL R. M. Kowalski 13 May 64
APPROVAL J. J. Cushman 15 May 64
NASA APPROVAL 5/19/64
MIT APPROVAL 19 May 64

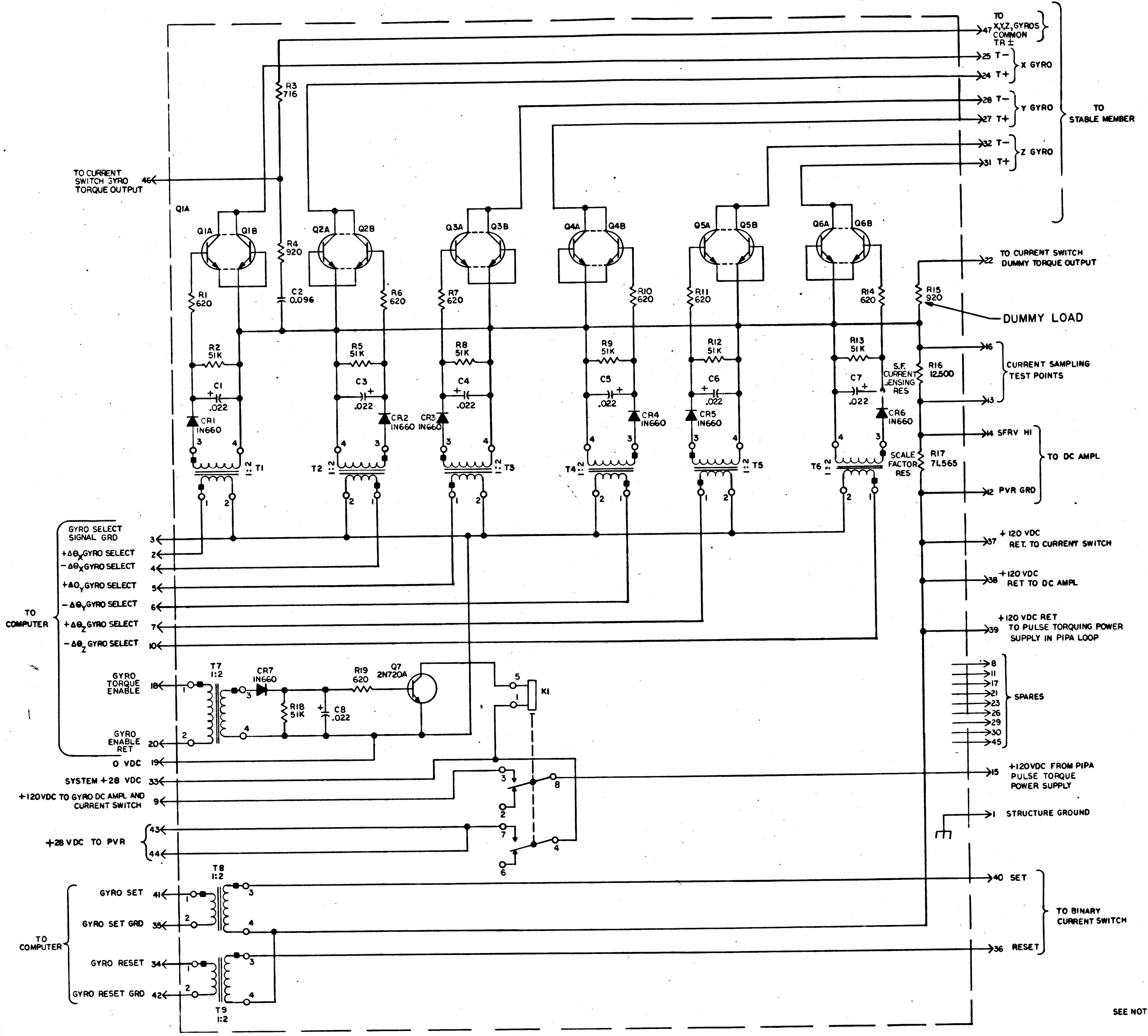
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
OPERATIONAL AMPLIFIER
ELECTRONIC CDU

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010019
SCALE — WT — SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

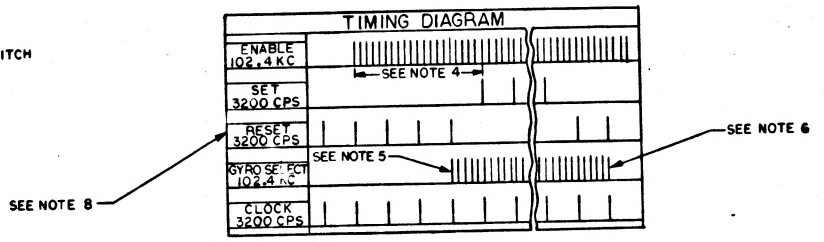
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS 14707						
A		REVISED PER TDRR 15474	R.T.S		18JAN65	



TO X,Y,Z, GYROS COMMON TR ±
47
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
31 T+
Z GYRO
TO STABLE MEMBER
TO CURRENT SWITCH GYRO TORQUE OUTPUT
46
R3 716
R4 920
C2 0.096
Q1A
Q1A Q1B
Q2A Q2B
Q3A Q3B
Q4A Q4B
Q5A Q5B
Q6A Q6B
R1 620
R2 51K
C1 .022
CR1 1N660
T1 1:2
R5 51K
R6 620
C3 .022
CR2 1N660
T2 1:2
R7 620
R8 51K
C4 .022
CR3 1N660
T3 1:2
R9 51K
R10 620
C5 .022
CR4 1N660
T4 1:2
R11 620
R12 51K
C6 .022
CR5 1N660
T5 1:2
R13 51K
R14 620
C7 .022
CR6 1N660
T6 1:2
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
R15 920
DUMMY LOAD
S.F. CURRENT SENSING RES
R16 12,500
16
13
CURRENT SAMPLING TEST POINTS
14 SFRV HI
12 PVR GRD
TO DC AMPL
SCALE FACTOR RES
R17 71,565
37 + 120 VDC RET. TO CURRENT SWITCH
38 +120 VDC RET TO DC AMPL
39 +120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP
8 11 17 21 23 26 29 30 45
SPARES
15 +120VDC FROM PIPA PULSE TORQUE POWER SUPPLY
1 STRUCTURE GROUND
40 SET
36 RESET
TO BINARY CURRENT SWITCH
TO COMPUTER
GYRO SELECT SIGNAL GRD 3
+ΔθX GYRO SELECT 2
−ΔθX GYRO SELECT 4
+ΔθY GYRO SELECT 5
−ΔθY GYRO SELECT 6
+ΔθZ GYRO SELECT 7
−ΔθZ GYRO SELECT 10
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
O VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 9
+28 VDC TO PVR 43 44
T7 1:2
CR7 1N660
R18 51K
C8 .022
R19 620
Q7 2N720A
K1
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
T8 1:2
T9 1:2

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50		.096	±.5%	200VDC
C3	1006755-49		.022	±10%	35VDC
C4					
C5					
C6					
C7					
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	1N660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7	1010385	DIODE	1N660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP9001		
Q2					
Q3					
Q4					
Q5					
Q6	1010715-1		SP9001		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73		51K	±2%	1/4W
R3	1010262-12		716	±1%	10W
R4	1010377-229		920	±.1%	1/10W
R5	1006750-73		51K	±2%	1/4W
R6	-27		620		
R7	-27		620		
R8	-73		51K		
R9	-73		51K		
R10	-27		620		
R11	-27		620		
R12	-73		51K		
R13	-73		51K		
R14	1006750-27		620	±2%	1/4W
R15	1010262-10		920	±1%	10W
R16	1010834-26		12,500	±.01%	1W
R17	1010834-25		71,565	±.01%	1W
R18	1006750-73		51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2					
T3					
T4					
T5					
T6					
T7					
T8					
T9	1006762-2	TRANSFORMER			

TIMING DIAGRAM



ENABLE 102.4 KC
SEE NOTE 4
SET 3200 CPS
RESET 3200 CPS
SEE NOTE 5
GYRO SELECT 102.4 KC
CLOCK 3200 CPS
SEE NOTE 8
SEE NOTE 6

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

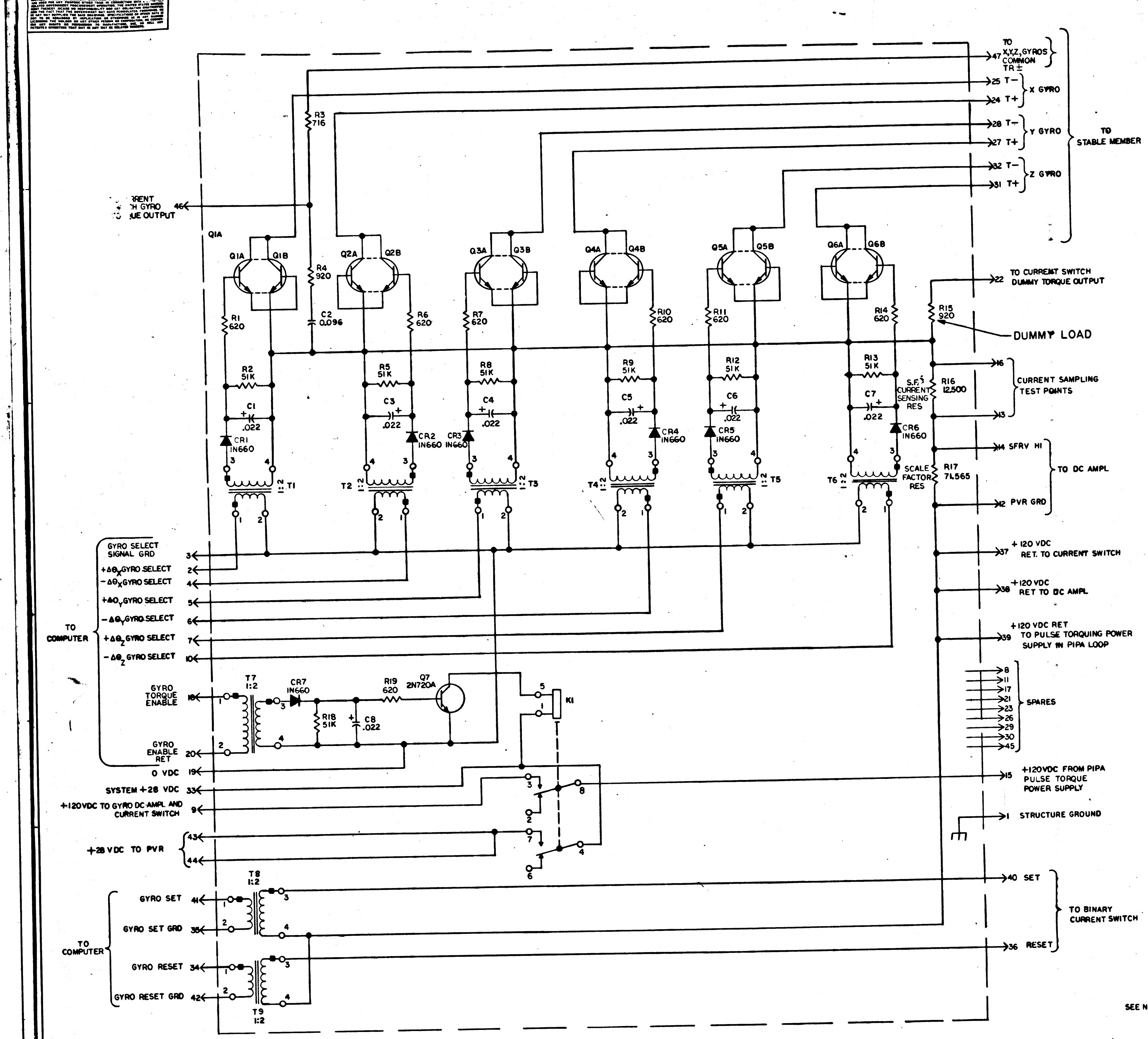
DRAWN 5Nov64
CHECKED 6NOV64
J M BLYSHAK
APPROVED J SITOMER 12/2/64
APPROVED
APPROVED MIT 12/2/64
APPROVED MSC 12 Feb 64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

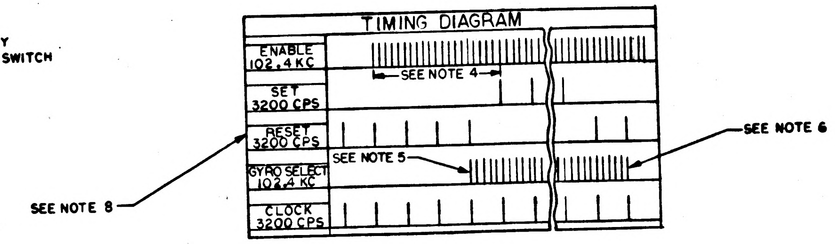
		REVISIONS 14707				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15474	R.T.S		6JAN65	
B		REVISED PER TDRR 16847				



TO X,Y,Z, GYROS COMMON TR±
47
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
31 T+
Z GYRO
TO STABLE MEMBER
CURRENT TO EACH GYRO TORQUE OUTPUT 46
Q1A Q1B Q2A Q2B Q3A Q3B Q4A Q4B Q5A Q5B Q6A Q6B
R3 716
R4 920
C2 0.096
R1 620
R2 51K
C1 .022
CR1 1N660
T1 1:2
R6 620
R5 51K
C3 .022
CR2 1N660
T2 1:2
R7 620
R8 51K
C4 .022
CR3 1N660
T3 1:2
R10 620
R9 51K
C5 .022
CR4 1N660
T4 1:2
R11 620
R12 51K
C6 .022
CR5 1N660
T5 1:2
R14 620
R13 51K
C7 .022
CR6 1N660
T6 1:2
TO CURRENT SWITCH DUMMY TORQUE OUTPUT 22
R15 920
DUMMY LOAD
S.F. CURRENT SENSING RES
R16 12,500
16
13
CURRENT SAMPLING TEST POINTS
SCALE FACTOR RES
R17 71,565
14 SFRV HI
12 PVR GRD
TO DC AMPL
+120 VDC RET. TO CURRENT SWITCH 37
+120 VDC RET TO DC AMPL 38
+120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP 39
8 11 17 21 23 26 29 30 45 SPARES
+120VDC FROM PIPA PULSE TORQUE POWER SUPPLY 15
STRUCTURE GROUND 1
TO COMPUTER
GYRO SELECT SIGNAL GRD 3
+Δθx GYRO SELECT 2
−Δθx GYRO SELECT 4
+Δθy GYRO SELECT 5
−Δθy GYRO SELECT 6
+Δθz GYRO SELECT 7
−Δθz GYRO SELECT 10
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
0 VDC 19
T7 1:2
CR7 1N660
R18 51K
C8 .022
R19 620
Q7 2N720A
K1
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 9
+28 VDC TO PVR 43 44
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
T8 1:2
T9 1:2
40 SET
36 RESET
TO BINARY CURRENT SWITCH

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50		.096	±.5%	200VDC
C3	1006755-49		.022	±10%	35VDC
C4					
C5					
C6					
C7					
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	1N660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7	1010385	DIODE	1N660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP9001		
Q2					
Q3					
Q4					
Q5					
Q6	1010715-1		SP9001		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73		51K	±2%	1/4W
R3	1010262-12		716	±1%	10W
R4	1010377-229		920	±.1%	1/10W
R5	1006750-73		51K	±2%	1/4W
R6	-27		620		
R7	-27		620		
R8	-73		51K		
R9	-73		51K		
R10	-27		620		
R11	-27		620		
R12	-73		51K		
R13	-73		51K		
R14	1006750-27		620	±2%	1/4W
R15	1010262-10		920	±1%	10W
R16	1010923-26		12500	±.01%	1W
R17	1010923-25		71,565	±.01%	1W
R18	1006750-73		51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2					
T3					
T4					
T5					
T6					
T7					
T8					
T9	1006762-2	TRANSFORMER			

TIMING DIAGRAM



ENABLE 102.4KC
SET 3200 CPS
RESET 3200 CPS
GYRO SELECT 102.4 KC
CLOCK 3200 CPS
SEE NOTE 4
SEE NOTE 5
SEE NOTE 6
SEE NOTE 8

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

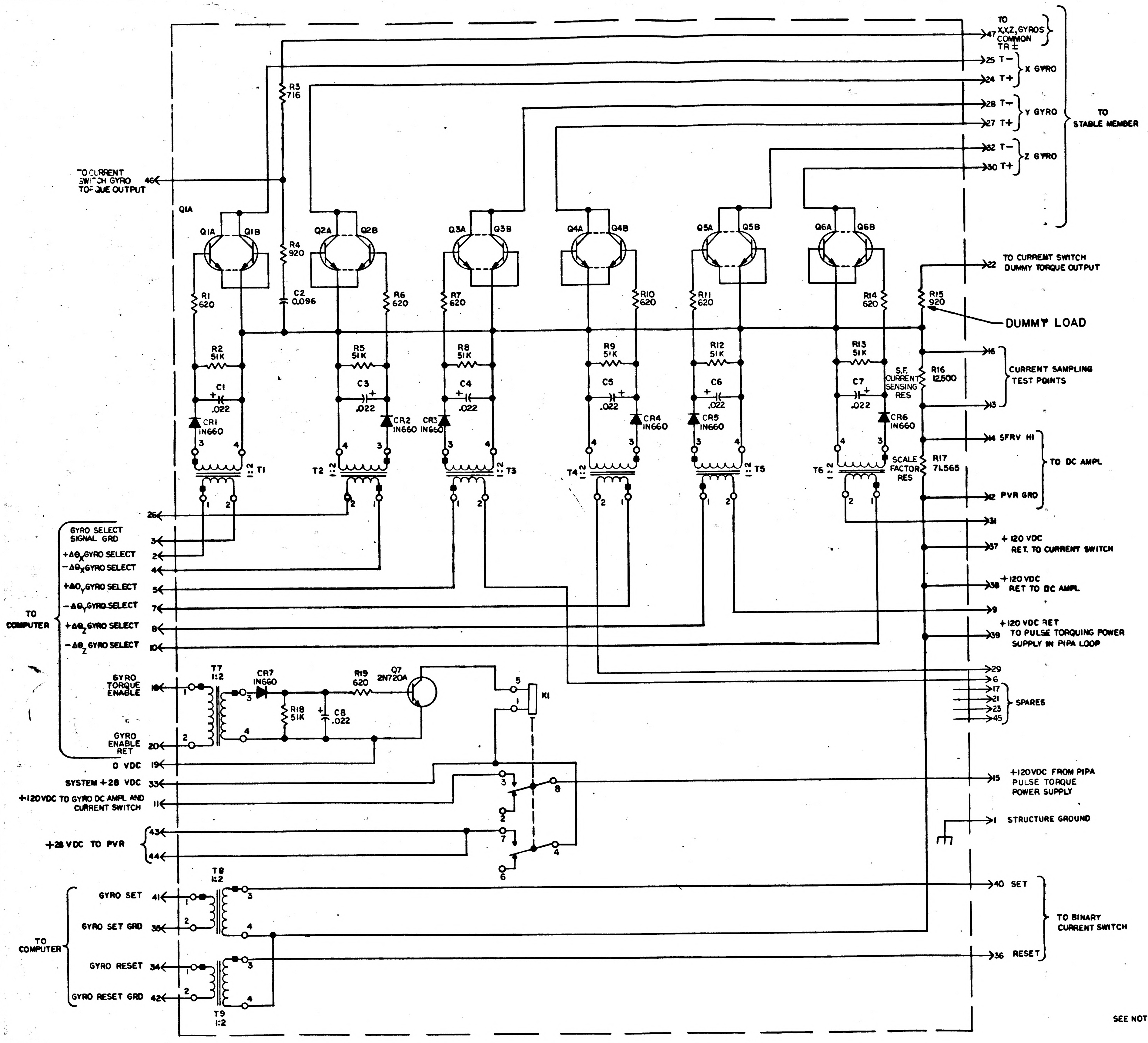
DRAWN E. Fellhauer 5Nov64
CHECKED cc/R. Bohnsau 6Nov64
J M ELYSHAK
APPROVED J. Sitomer 12/2/64
APPROVED
APPROVED MIT 12/2/64
APPROVED MSC 12-5-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

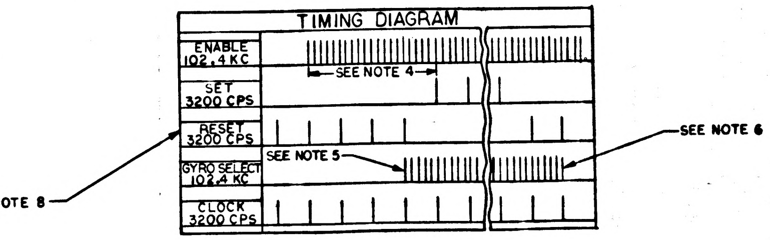
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISIONS 14707				
A		REVISED PER TDRR 15479	R.T.S		18 JAN 65	
B		REVISED PER TDRR 16847				
C		REVISED PER TDRR 17191				


TO X,Y,Z, GYROS COMMON TR ±
47
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
30 T+
Z GYRO
TO STABLE MEMBER
TO CURRENT SWITCH GYRO TORQUE OUTPUT 46
R3 716
R4 920
C2 0.096
Q1A Q1B Q2A Q2B Q3A Q3B Q4A Q4B Q5A Q5B Q6A Q6B
R1 620
R6 620
R7 620
R10 620
R11 620
R14 620
R15 920
R2 51K
R5 51K
R8 51K
R9 51K
R12 51K
R13 51K
C1 .022
C3 .022
C4 .022
C5 .022
C6 .022
C7 .022
CR1 1N660
CR2 1N660
CR3 1N660
CR4 1N660
CR5 1N660
CR6 1N660
T1 T2 T3 T4 T5 T6 1:2
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
DUMMY LOAD
R16 12,500 S.F. CURRENT SENSING RES
16 13 CURRENT SAMPLING TEST POINTS
R17 71,565 SCALE FACTOR RES
14 SFRV HI
12 PVR GRD
TO DC AMPL
31
+120 VDC RET. TO CURRENT SWITCH 37
+120 VDC RET TO DC AMPL 38
9
+120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP 39
29 6 17 21 23 45 SPARES
+120VDC FROM PIPA PULSE TORQUE POWER SUPPLY 15
1 STRUCTURE GROUND
40 SET
36 RESET
TO BINARY CURRENT SWITCH
26
GYRO SELECT SIGNAL GRD 3
+Δθx GYRO SELECT 2
−Δθx GYRO SELECT 4
+Δθy GYRO SELECT 5
−Δθy GYRO SELECT 7
+Δθz GYRO SELECT 8
−Δθz GYRO SELECT 10
TO COMPUTER
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
T7 1:2
CR7 1N660
R18 51K
C8 .022
R19 620
Q7 2N720A
K1
0 VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 11
+28 VDC TO PVR 43 44
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
T8 1:2
T9 1:2
TO COMPUTER

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50		.096	±.5%	200VDC
C3	1006755-49		.022	±10%	35VDC
C4					
C5					
C6					
C7					
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7	1010385	DIODE	IN660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP900I		
Q2					
Q3					
Q4					
Q5					
Q6	1010715-1		SP900I		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73		51K	±2%	1/4W
R3	1010262-12		716	±1%	10W
R4	1010377-229		920	±.1%	1/10W
R5	1006750-73		51K	±2%	1/4W
R6	-27		620		
R7	-27		620		
R8	-73		51K		
R9	-73		51K		
R10	-27		620		
R11	-27		620		
R12	-73		51K		
R13	-73		51K		
R14	1006750-27		620	±2%	1/4W
R15	1010262-10		920	±1%	10W
R16	1010923-26		12500	±.01%	1W
R17	1010923-25		71,565	±.01%	1W
R18	1006750-73		51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2					
T3					
T4					
T5					
T6					
T7					
T8					
T9	1006762-2	TRANSFORMER			


TIMING DIAGRAM
ENABLE 102.4KC
SET 3200 CPS
SEE NOTE 4
RESET 3200 CPS
GYRO SELECT 102.4 KC
SEE NOTE 5
CLOCK 3200 CPS
SEE NOTE 6
SEE NOTE 8

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 5 Nov 64
CHECKED 6 Nov 64
APPROVED J. Sitomer 12/2/64
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

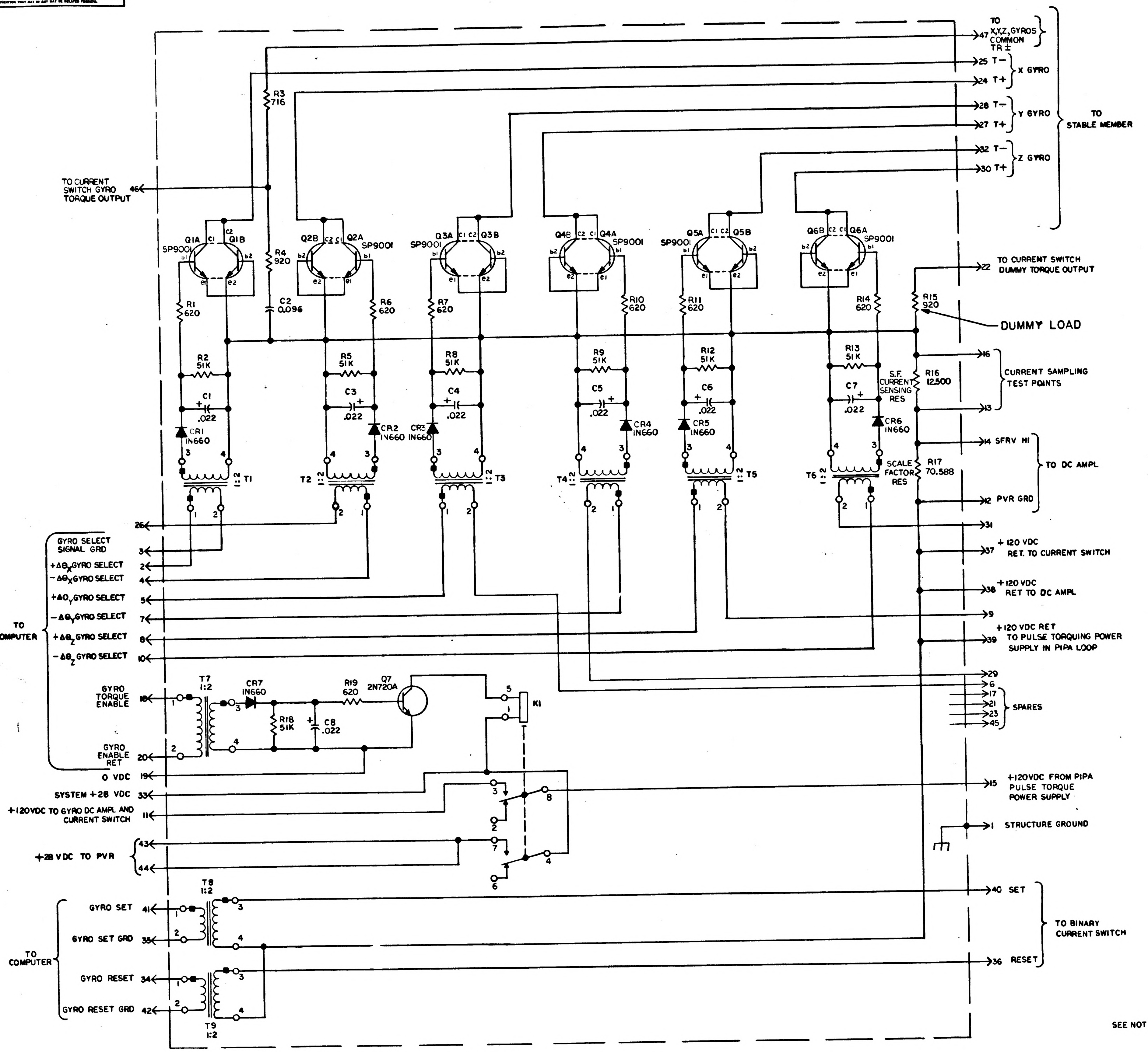
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

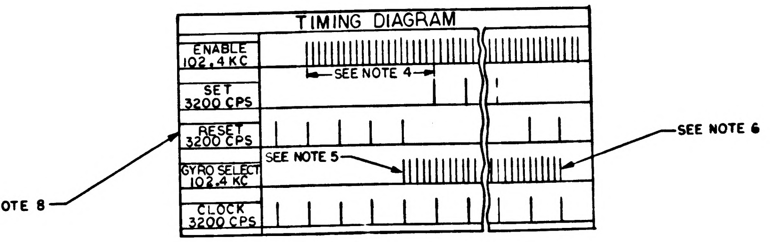
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14707

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15474	R.T.S		18JAN65	
B		REVISED PER TDRR 16847				
C		REVISED PER TDRR 17191			19 MAR 65	
D		REVISED PER TDRR 13960			12 MAY 65	


TO X,Y,Z, GYROS COMMON TR ±
47
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
30 T+
Z GYRO
TO STABLE MEMBER
TO CURRENT SWITCH GYRO TORQUE OUTPUT
46
R3 716
R4 920
C2 0.096
Q1A Q1B SP9001
Q2B Q2A SP9001
Q3A Q3B SP9001
Q4B Q4A SP9001
Q5A Q5B SP9001
Q6B Q6A SP9001
c1 c2 b1 b2 e1 e2
R1 620
R6 620
R7 620
R10 620
R11 620
R14 620
R2 51K
R5 51K
R8 51K
R9 51K
R12 51K
R13 51K
C1 .022
C3 .022
C4 .022
C5 .022
C6 .022
C7 .022
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
T1 1:2
T2 1:2
T3 1:2
T4 1:2
T5 1:2
T6 1:2
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
R15 920
DUMMY LOAD
R16 12,500
S.F. CURRENT SENSING RES
16
13
CURRENT SAMPLING TEST POINTS
14 SFRV HI
R17 70.588
SCALE FACTOR RES
12 PVR GRD
TO DC AMPL
31
37 + 120 VDC RET. TO CURRENT SWITCH
38 +120 VDC RET TO DC AMPL
9
39 +120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP
29
6
17
21
23
45
SPARES
15 +120VDC FROM PIPA PULSE TORQUE POWER SUPPLY
1 STRUCTURE GROUND
40 SET
36 RESET
TO BINARY CURRENT SWITCH
26
GYRO SELECT SIGNAL GRD 3
+ΔθX GYRO SELECT 2
−ΔθX GYRO SELECT 4
+ΔθY GYRO SELECT 5
−ΔθY GYRO SELECT 7
+ΔθZ GYRO SELECT 8
−ΔθZ GYRO SELECT 10
TO COMPUTER
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
0 VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 11
+28 VDC TO PVR 43 44
T7 1:2
CR7 IN660
R18 51K
C8 .022
R19 620
Q7 2N720A
K1
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
TO COMPUTER
T8 1:2
T9 1:2

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50	↓	.096	±.5%	200VDC
C3	1006755-49	↓	.022	±10%	35VDC
C4	↓	↓	↓	↓	↓
C5	↓	↓	↓	↓	↓
C6	↓	↓	↓	↓	↓
C7	↓	↓	↓	↓	↓
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	↓	↓	↓		
CR3	↓	↓	↓		
CR4	↓	↓	↓		
CR5	↓	↓	↓		
CR6	↓	↓	↓		
CR7	1010385	DIODE	IN660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP9001		
Q2	↓	↓	↓		
Q3	↓	↓	↓		
Q4	↓	↓	↓		
Q5	↓	↓	↓		
Q6	1010715-1	↓	SP9001		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73	↓	51K	±2%	1/4W
R3	1010262-12	↓	716	±1%	10W
R4	1010377-229	↓	920	±.1%	1/10W
R5	1006750-73	↓	51K	±2%	1/4W
R6	-27	↓	620	↓	↓
R7	-27	↓	620	↓	↓
R8	-73	↓	51K	↓	↓
R9	-73	↓	51K	↓	↓
R10	-27	↓	620	↓	↓
R11	-27	↓	620	↓	↓
R12	-73	↓	51K	↓	↓
R13	-73	↓	51K	↓	↓
R14	1006750-27	↓	620	±2%	1/4W
R15	1010262-10	↓	920	±1%	10W
R16	1010923-26	↓	12,500	±.01%	1W
R17	1010923-40	↓	70,588	±.01%	1W
R18	1006750-73	↓	51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2	↓	↓			
T3	↓	↓			
T4	↓	↓			
T5	↓	↓			
T6	↓	↓			
T7	↓	↓			
T8	↓	↓			
T9	1006762-2	TRANSFORMER			


TIMING DIAGRAM
ENABLE 102.4 KC
SET 3200 CPS
RESET 3200 CPS
GYRO SELECT 102.4 KC
CLOCK 3200 CPS
SEE NOTE 4
SEE NOTE 5
SEE NOTE 6
SEE NOTE 8

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 5 Nov 64
CHECKED 6 NOV 64
J M ELISHAR
APPROVED J. S. 12/2/64
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

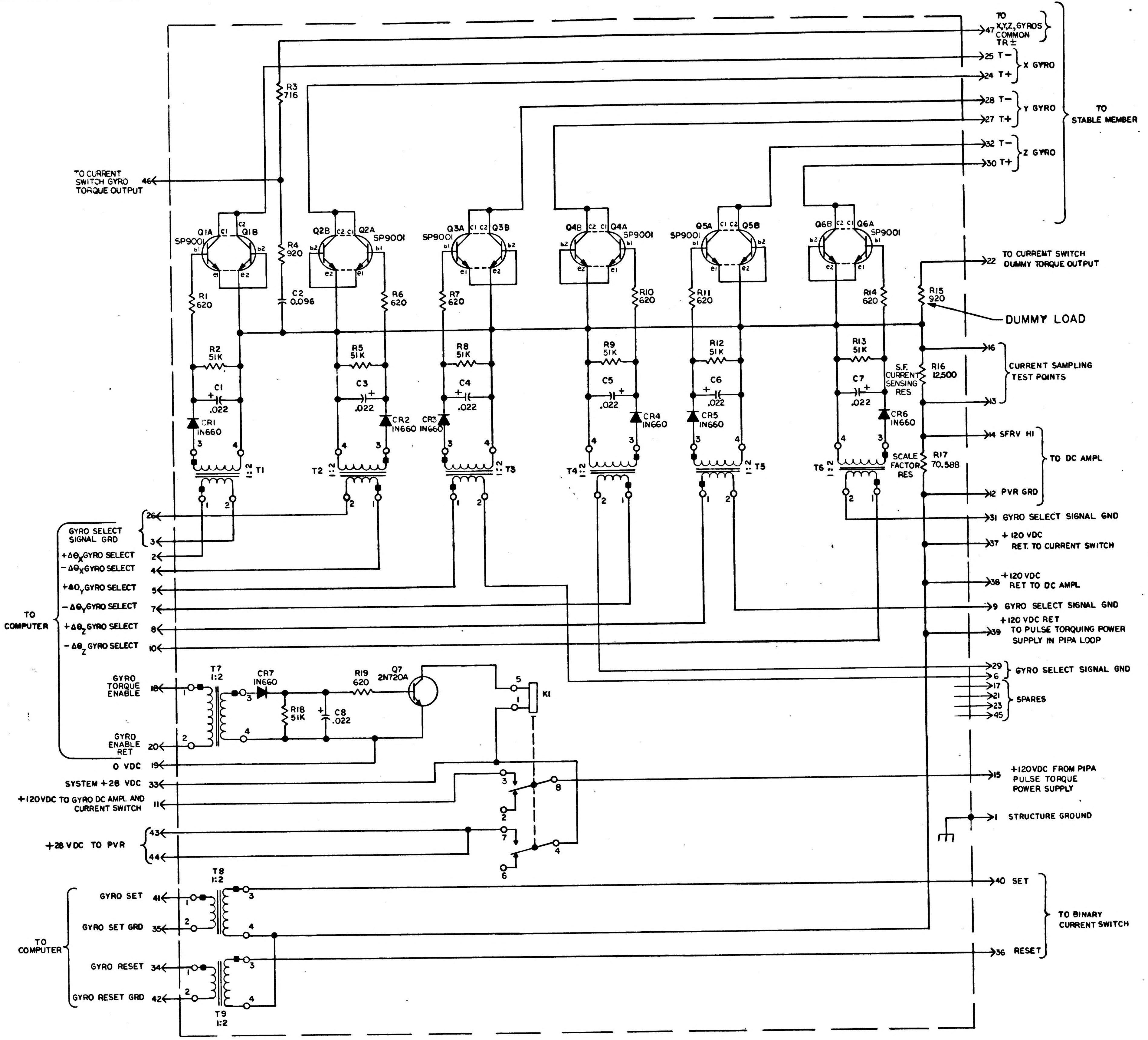
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 14707

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15474	R.T.S		19JAN65	
B		REVISED PER TDRR 16847			2MAR65	
C		REVISED PER TDRR 17191			13 MAR 65	
D		REVISED PER TDRR 18960	ZMK		2MAY65	
E		REVISED PER TDRR 21766			30 65	

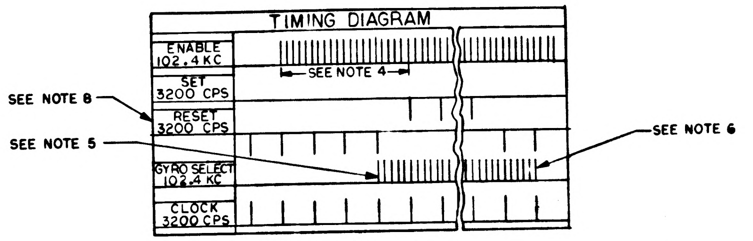


TO CURRENT SWITCH GYRO TORQUE OUTPUT 46
R3 716
R4 920
C2 0.096
Q1A Q1B C1 C2 SP9001 b1 b2 e1 e2
Q2B Q2A SP9001
Q3A Q3B SP9001
Q4B Q4A SP9001
Q5A Q5B SP9001
Q6B Q6A SP9001
R1 620
R2 51K
C1 .022
CR1 IN660
T1 1:2
R5 51K
R6 620
C3 .022
CR2 IN660
T2 1:2
R7 620
R8 51K
C4 .022
CR3 IN660
T3 1:2
R9 51K
R10 620
C5 .022
CR4 IN660
T4 1:2
R11 620
R12 51K
C6 .022
CR5 IN660
T5 1:2
R13 51K
R14 620
C7 .022
CR6 IN660
T6 1:2
47 TO X,Y,Z, GYROS COMMON TR ±
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
30 T+
Z GYRO
TO STABLE MEMBER
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
R15 920
DUMMY LOAD
16
S.F. CURRENT SENSING RES
R16 12.500
13
CURRENT SAMPLING TEST POINTS
14 SFRV HI
SCALE FACTOR RES
R17 70.588
12 PVR GRD
TO DC AMPL
31 GYRO SELECT SIGNAL GND
37 +120 VDC RET. TO CURRENT SWITCH
38 +120 VDC RET TO DC AMPL
9 GYRO SELECT SIGNAL GND
39 +120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP
29
6
GYRO SELECT SIGNAL GND
17
21
23
45
SPARES
15 +120VDC FROM PIPA PULSE TORQUE POWER SUPPLY
1 STRUCTURE GROUND
40 SET
36 RESET
TO BINARY CURRENT SWITCH
TO COMPUTER
GYRO SELECT SIGNAL GRD 26 3
+Δθ_X GYRO SELECT 2
−Δθ_X GYRO SELECT 4
+Δθ_Y GYRO SELECT 5
−Δθ_Y GYRO SELECT 7
+Δθ_Z GYRO SELECT 8
−Δθ_Z GYRO SELECT 10
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
T7 1:2
CR7 IN660
R18 51K
C8 .022
R19 620
Q7 2N720A
K1
0 VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 11
+28 VDC TO PVR 43 44
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
T8 1:2
T9 1:2

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50		.096	±.5%	200VDC
C3	1006755-49		.022	±10%	35VDC
C4					
C5					
C6					
C7					
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7	1010385	DIODE	IN660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP9001		
Q2					
Q3					
Q4					
Q5					
Q6	1010715-1		SP9001		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73		51K	±2%	1/4W
R3	1010262-12		716	±1%	10W
R4	1010377-229		920	±.1%	1/10W
R5	1006750-73		51K	±2%	1/4W
R6	-27		620		
R7	-27		620		
R8	-73		51K		
R9	-73		51K		
R10	-27		620		
R11	-27		620		
R12	-73		51K		
R13	-73		51K		
R14	1006750-27		620	±2%	1/4W
R15	1010262-10		920	±1%	10W
R16	1010923-37		12.500	±.01%	1W
R17	1010923-40		70.588	±.01%	1W
R18	1006750-73		51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2					
T3					
T4					
T5					
T6					
T7					
T8					
T9	1006762-2	TRANSFORMER			

TIMING DIAGRAM



ENABLE 102.4 KC
SET 3200 CPS
RESET 3200 CPS
GYRO SELECT 102.4 KC
CLOCK 3200 CPS
SEE NOTE 4
SEE NOTE 8
SEE NOTE 5
SEE NOTE 6

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 5Nov64
CHECKED CC 6Nov64
APPROVED J. S. TOMER 12/2/64 J.M. BLYSHAK
APPROVED
APPROVED MIT
APPROVED MSC 12 Feb 64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

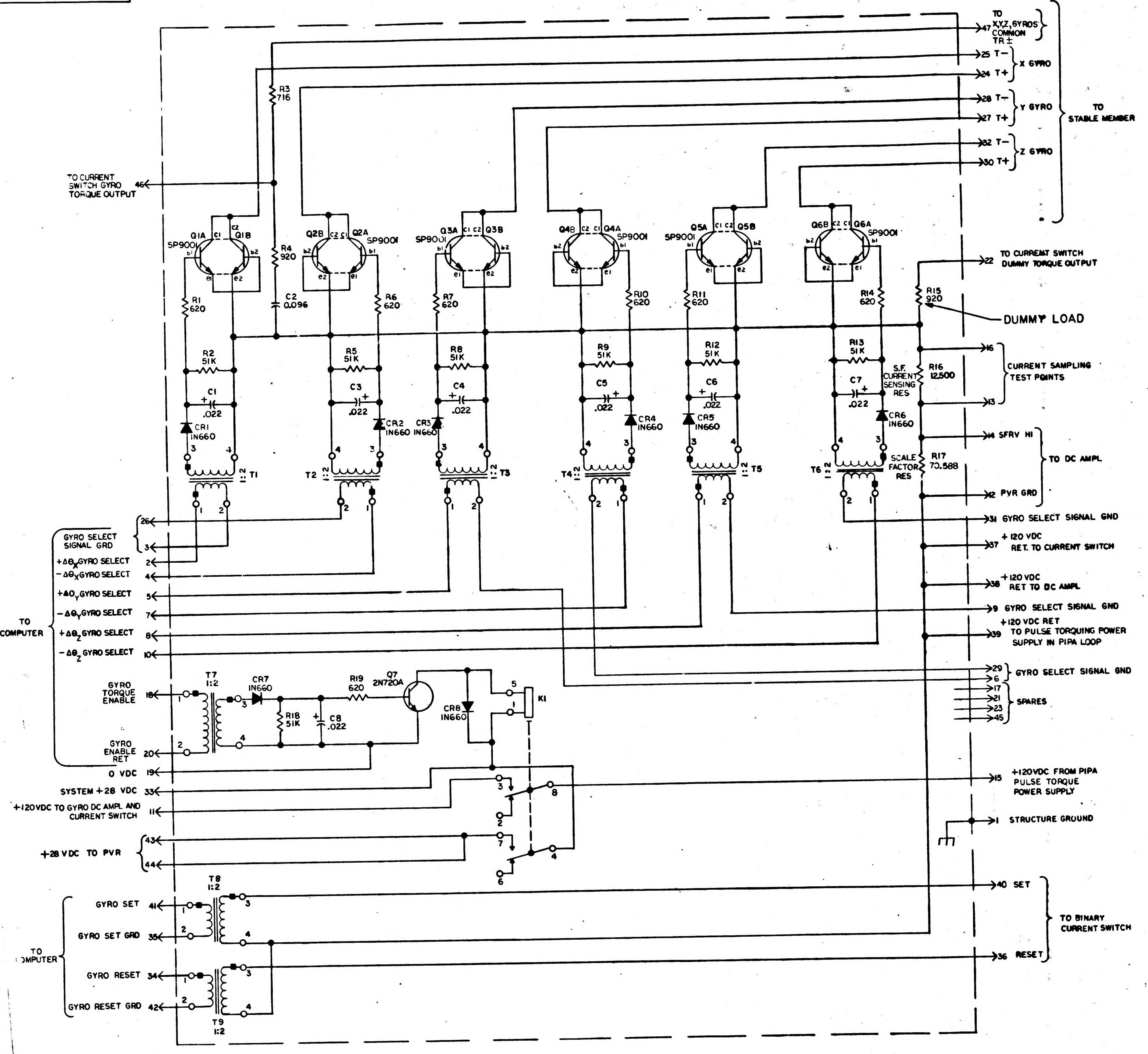
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

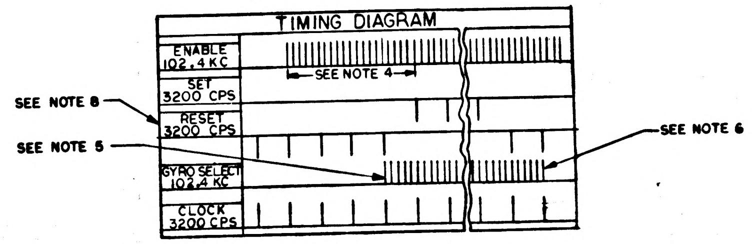
REVISIONS 14707

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15474	R.T.S			
B		REVISED PER TDRR 16847				
C		REVISED PER TDRR 17191			19 MAR 65	
D		REVISED PER TDRR 18960				
E		REVISED PER TDRR 21766				
F		REVISED PER TDRR 23332			5 OCT 65	


TO X,Y,Z, GYROS COMMON TR ±
47
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
30 T+
Z GYRO
TO STABLE MEMBER
R3 716
R4 920
C2 0.096
TO CURRENT SWITCH GYRO TORQUE OUTPUT 46
Q1A Q1B SP9001
Q2B Q2A SP9001
Q3A Q3B SP9001
Q4B Q4A SP9001
Q5A Q5B SP9001
Q6B Q6A SP9001
R1 620
R2 51K
C1 .022
CR1 IN660
T1
R6 620
R5 51K
C3 .022
CR2 IN660
T2
R7 620
R8 51K
C4 .022
CR3 IN660
T3
R10 620
R9 51K
C5 .022
CR4 IN660
T4
R11 620
R12 51K
C6 .022
CR5 IN660
T5
R14 620
R13 51K
C7 .022
CR6 IN660
T6
1:2
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
R15 920
DUMMY LOAD
16
R16 12,500
S.F. CURRENT SENSING RES
13
CURRENT SAMPLING TEST POINTS
14 SFRV HI
R17 70.588
SCALE FACTOR RES
12 PVR GRD
TO DC AMPL
31 GYRO SELECT SIGNAL GND
37 +120 VDC RET. TO CURRENT SWITCH
38 +120 VDC RET TO DC AMPL
9 GYRO SELECT SIGNAL GND
39 +120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP
29 6 GYRO SELECT SIGNAL GND
17 21 23 45 SPARES
15 +120VDC FROM PIPA PULSE TORQUE POWER SUPPLY
1 STRUCTURE GROUND
40 SET
36 RESET
TO BINARY CURRENT SWITCH
GYRO SELECT SIGNAL GRD 26 3
+ΔθX GYRO SELECT 2
−ΔθX GYRO SELECT 4
+ΔθY GYRO SELECT 5
−ΔθY GYRO SELECT 7
+ΔθZ GYRO SELECT 8
−ΔθZ GYRO SELECT 10
TO COMPUTER
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
T7 1:2
CR7 IN660
R18 51K
C8 .022
R19 620
Q7 2N720A
CR8 IN660
K1
0 VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 11
+28 VDC TO PVR 43 44
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
TO COMPUTER
T8 1:2
T9 1:2

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50		.096	±.5%	200VDC
C3	1006755-49		.022	±10%	35VDC
C4					
C5					
C6					
C7					
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8	1010385	DIODE	IN660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP9001		
Q2					
Q3					
Q4					
Q5					
Q6	1010715-1		SP9001		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73		51K	±2%	1/4W
R3	1010262-12		716	±1%	10W
R4	1010377-229		920	±.1%	1/10W
R5	1006750-73		51K	±2%	1/4W
R6	-27		620		
R7	-27		620		
R8	-73		51K		
R9	-73		51K		
R10	-27		620		
R11	-27		620		
R12	-73		51K		
R13	-73		51K		
R14	1006750-27		620	±2%	1/4W
R15	1010262-10		920	±1%	10W
R16	1010923-37		12500	±.01%	1W
R17	1010923-40		70,588	±.01%	1W
R18	1006750-73		51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2					
T3					
T4					
T5					
T6					
T7					
T8					
T9	1006762-2	TRANSFORMER			

TIMING DIAGRAM


ENABLE 102.4 KC
SEE NOTE 4
SET 3200 CPS
RESET 3200 CPS
GYRO SELECT 102.4 KC
CLOCK 3200 CPS
SEE NOTE 8
SEE NOTE 5
SEE NOTE 6

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 5 Nov 64
CHECKED 5 Nov 64
APPROVED J. SITOMER 12/2/64
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

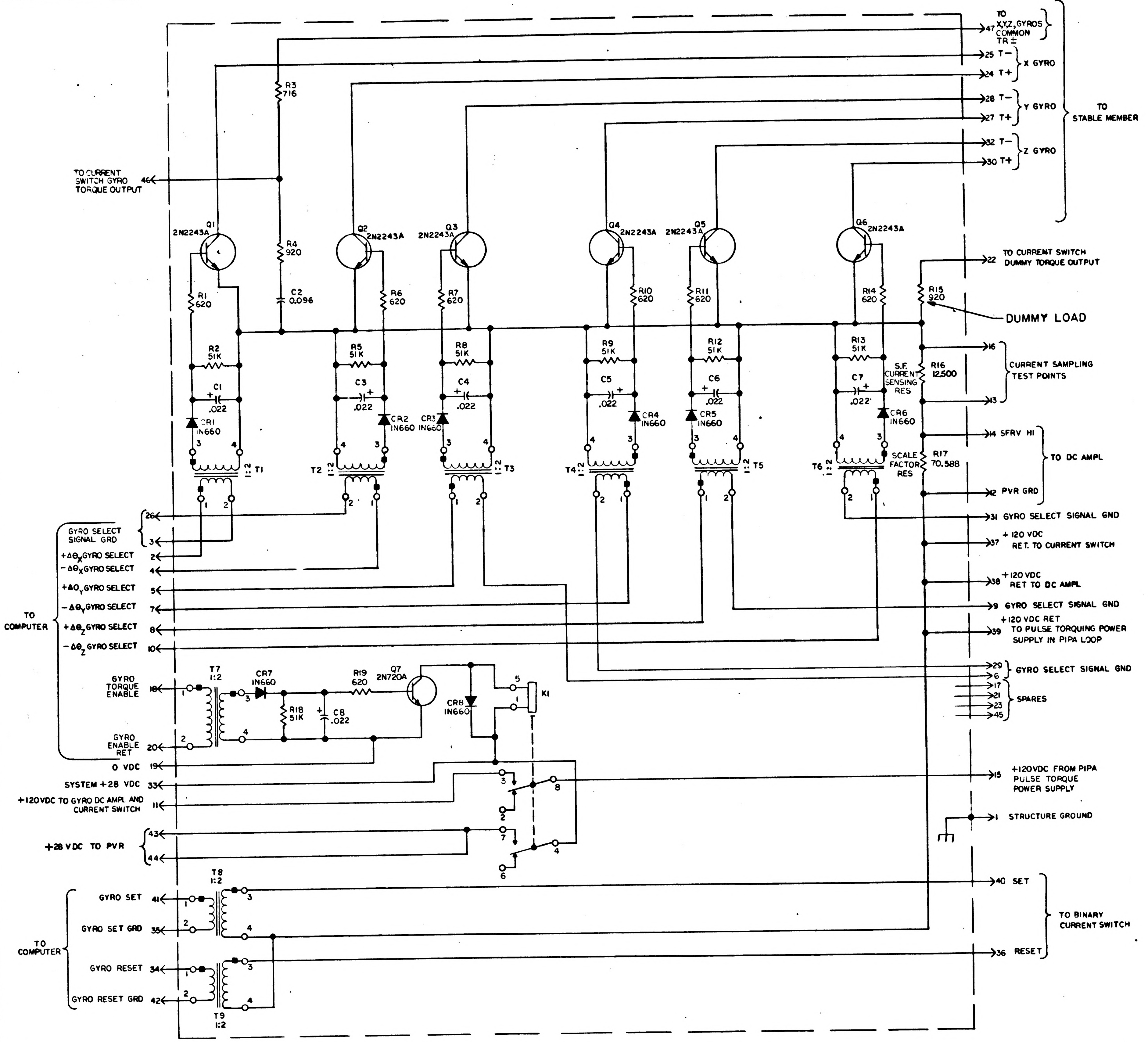
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

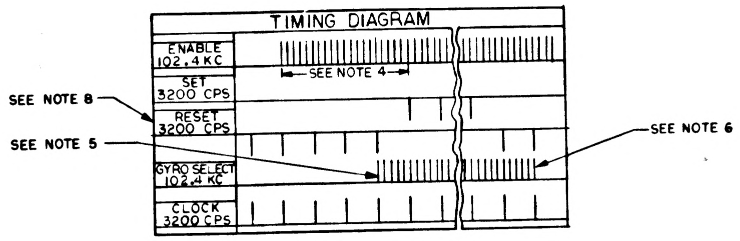
REVISIONS 14707

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15474	R.T.S	[illegible]	[illegible] JAN 65	[illegible]
B		REVISED PER TDRR 16847	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 17191	[illegible]	[illegible]	[illegible] MAR 65	[illegible]
D		REVISED PER TDRR 18960	[illegible]	[illegible]	2 MAY 65	[illegible]
E		REV'SED PER TDRR 21766	[illegible]	[illegible]	30 [illegible] 65	[illegible]
F		REVISED PER TDRR 23332	KCH	[illegible]	25 OCT 65	[illegible]
G		REVISED PER TDRR 31604	[illegible]	[illegible]	NOV [illegible]	



TO X,Y,Z, GYROS COMMON TR ±
47
25 T−
24 T+
X GYRO
28 T−
27 T+
Y GYRO
32 T−
30 T+
Z GYRO
TO STABLE MEMBER
R3 716
TO CURRENT SWITCH GYRO TORQUE OUTPUT
46
R4 920
C2 0.096
Q1 2N2243A
Q2 2N2243A
Q3 2N2243A
Q4 2N2243A
Q5 2N2243A
Q6 2N2243A
R1 620
R6 620
R7 620
R10 620
R11 620
R14 620
R2 51K
R5 51K
R8 51K
R9 51K
R12 51K
R13 51K
C1 .022
C3 .022
C4 .022
C5 .022
C6 .022
C7 .022
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
T1 1:2
T2 1:2
T3 1:2
T4 1:2
T5 1:2
T6 1:2
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
R15 920
DUMMY LOAD
16
S.F. CURRENT SENSING RES
R16 12,500
CURRENT SAMPLING TEST POINTS
13
14 SFRV HI
SCALE FACTOR RES
R17 70.588
TO DC AMPL
12 PVR GRD
31 GYRO SELECT SIGNAL GND
37 +120 VDC RET. TO CURRENT SWITCH
38 +120 VDC RET TO DC AMPL
9 GYRO SELECT SIGNAL GND
39 +120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP
29
6
GYRO SELECT SIGNAL GND
17
21
23
45
SPARES
15 +120VDC FROM PIPA PULSE TORQUE POWER SUPPLY
1 STRUCTURE GROUND
40 SET
TO BINARY CURRENT SWITCH
36 RESET
GYRO SELECT SIGNAL GRD 26
3
+ΔθX GYRO SELECT 2
−ΔθX GYRO SELECT 4
+ΔθY GYRO SELECT 5
−ΔθY GYRO SELECT 7
+ΔθZ GYRO SELECT 8
−ΔθZ GYRO SELECT 10
TO COMPUTER
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
T7 1:2
CR7 IN660
R18 51K
C8 .022
R19 620
Q7 2N720A
CR8 IN660
K1
0 VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 11
+28 VDC TO PVR 43
44
T8 1:2
GYRO SET 41
GYRO SET GRD 35
TO COMPUTER
GYRO RESET 34
GYRO RESET GRD 42
T9 1:2

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50		.096	±.5%	200VDC
C3	1006755-49		.022	±10%	35VDC
C4					
C5					
C6					
C7					
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8	1010385	DIODE	IN660		
K1	1010353-7	RELAY			
Q1	1010398-3	TRANSISTOR	2N2243A		
Q2					
Q3					
Q4					
Q5					
Q6	1010398-3		2N2243A		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73		51K	±2%	1/4W
R3	1010262-12		716	±1%	10W
R4	1010377-229		920	±.1%	1/10W
R5	1006750-73		51K	±2%	1/4W
R6	-27		620		
R7	-27		620		
R8	-73		51K		
R9	-73		51K		
R10	-27		620		
R11	-27		620		
R12	-73		51K		
R13	-73		51K		
R14	1006750-27		620	±2%	1/4W
R15	1010262-10		920	±1%	10W
R16	1010923-37		12,500	±.01%	1W
R17	1010923-40		70,588	±.01%	1W
R18	1006750-73		51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2					
T3					
T4					
T5					
T6					
T7					
T8					
T9	1006762-2	TRANSFORMER			



TIMING DIAGRAM
ENABLE 102.4 KC
SEE NOTE 4
SET 3200 CPS
RESET 3200 CPS
GYRO SELECT 102.4 KC
CLOCK 3200 CPS
SEE NOTE 8
SEE NOTE 5
SEE NOTE 6

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 5 Nov 64
CHECKED 5 NOV 64
J M BLYSHAK
APPROVED J. SITOMER 12/2/64
APPROVED
APPROVED MIT [illegible]
APPROVED MSC 12 [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

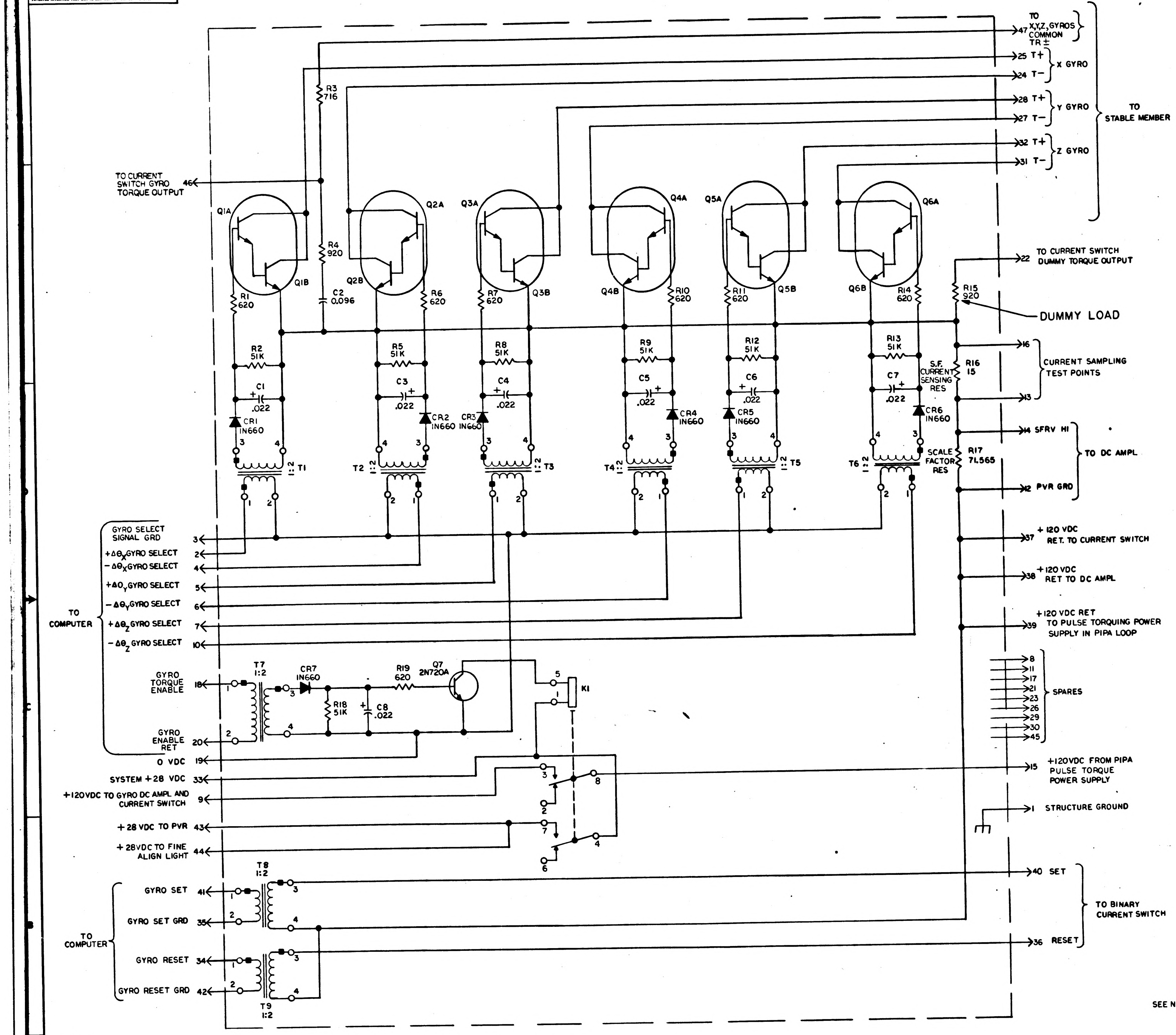
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

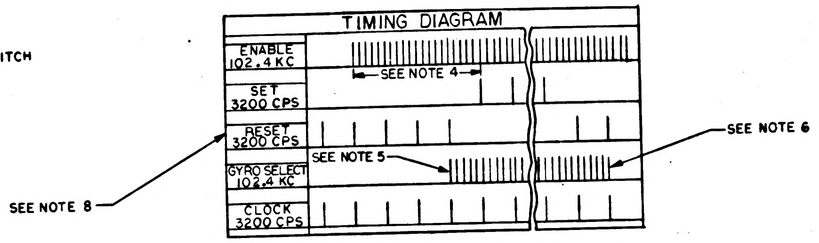
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


TO X,Y,Z, GYROS COMMON TR ±
47
25 T+
24 T−
X GYRO
28 T+
27 T−
Y GYRO
32 T+
31 T−
Z GYRO
TO STABLE MEMBER
R3 716
R4 920
C2 0.096
TO CURRENT SWITCH GYRO TORQUE OUTPUT 46
Q1A
Q1B
Q2A
Q2B
Q3A
Q3B
Q4A
Q4B
Q5A
Q5B
Q6A
Q6B
R1 620
R6 620
R7 620
R10 620
R11 620
R14 620
R15 920
22 TO CURRENT SWITCH DUMMY TORQUE OUTPUT
DUMMY LOAD
R2 51K
R5 51K
R8 51K
R9 51K
R12 51K
R13 51K
C1 .022
C3 .022
C4 .022
C5 .022
C6 .022
C7 .022
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
S.F. CURRENT SENSING RES
R16 15
16
13
CURRENT SAMPLING TEST POINTS
14 SERV HI
12 PVR GRD
TO DC AMPL
SCALE FACTOR RES
R17 71.565
T1 1:2
T2 1:2
T3 1:2
T4 1:2
T5 1:2
T6 1:2
GYRO SELECT SIGNAL GRD 3
+Δθ$_X$ GYRO SELECT 2
−Δθ$_X$ GYRO SELECT 4
+Δθ$_Y$ GYRO SELECT 5
−Δθ$_Y$ GYRO SELECT 6
+Δθ$_Z$ GYRO SELECT 7
−Δθ$_Z$ GYRO SELECT 10
TO COMPUTER
+120 VDC RET. TO CURRENT SWITCH 37
+120 VDC RET TO DC AMPL 38
+120 VDC RET TO PULSE TORQUING POWER SUPPLY IN PIPA LOOP 39
8 11 17 21 23 26 29 30 45 SPARES
GYRO TORQUE ENABLE 18
GYRO ENABLE RET 20
T7 1:2
CR7 IN660
R18 51K
C8 .022
R19 620
Q7 2N720A
K1
0 VDC 19
SYSTEM +28 VDC 33
+120VDC TO GYRO DC AMPL AND CURRENT SWITCH 9
+28 VDC TO PVR 43
+28VDC TO FINE ALIGN LIGHT 44
15 +120VDC FROM PIPA PULSE TORQUE POWER SUPPLY
1 STRUCTURE GROUND
GYRO SET 41
GYRO SET GRD 35
GYRO RESET 34
GYRO RESET GRD 42
T8 1:2
T9 1:2
40 SET
36 RESET
TO BINARY CURRENT SWITCH

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. GYRO TORQUE ENABLE SIGNAL MUST BE RECEIVED AT LEAST 20 MILLISECONDS PRIOR TO ANY TORQUE SET PULSE
5. GYRO SELECT SIGNAL MUST BE RECEIVED AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO ANY TORQUE SET PULSE
6. GYRO RESET PULSE MUST BE GIVEN AT LEAST ONE CLOCK TIME (3200 CPS) PRIOR TO DE-ENERGIZING THE GYRO SELECT SIGNAL LINE
7. ALL INPUTS FROM THE COMPUTER ARE TO BE TWISTED SHIELDED PAIRS
8. CURRENT SWITCH MUST BE IN RESET CONDITION PRIOR TO RECEIVING GYRO TORQUE ENABLE SIGNAL FROM THE COMPUTER
9. THIS MODULE INTENDED FOR USE WITH APOLLO II GYRO

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-49	CAPACITOR	.022	±10%	35VDC
C2	1010289-50	↓	.096	±.5%	200VDC
C3	1006755-49	↓	.022	±10%	35VDC
C4	↓	↓	↓	↓	↓
C5	↓	↓	↓	↓	↓
C6	↓	↓	↓	↓	↓
C7	↓	↓	↓	↓	↓
C8	1006755-49	CAPACITOR	.022	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	↓	↓	↓		
CR3	↓	↓	↓		
CR4	↓	↓	↓		
CR5	↓	↓	↓		
CR6	↓	↓	↓		
CR7	1010385	DIODE	IN660		
K1	1010353-7	RELAY			
Q1	1010715-1	TRANSISTOR	SP9001		
Q2	↓	↓	↓		
Q3	↓	↓	↓		
Q4	↓	↓	↓		
Q5	↓	↓	↓		
Q6	1010715-1	↓	SP9001		
Q7	1010357-1	TRANSISTOR	2N720A		
R1	1006750-27	RESISTOR	620	±2%	1/4W
R2	1006750-73	↓	51K	±2%	1/4W
R3	1010262-12	↓	716	±1%	10W
R4	1010377-229	↓	920	±.1%	1/10W
R5	1006750-73	↓	51K	±2%	1/4W
R6	-27	↓	620	↓	↓
R7	-27	↓	620	↓	↓
R8	-73	↓	51K	↓	↓
R9	-73	↓	51K	↓	↓
R10	-27	↓	620	↓	↓
R11	-27	↓	620	↓	↓
R12	-73	↓	51K	↓	↓
R13	-73	↓	51K	↓	↓
R14	1006750-27	↓	620	±2%	1/4W
R15	1010262-10	↓	920	±1%	10W
R16	1010834-23	↓	15	±.01%	1W
R17	1010834-25	↓	71.565	±.01%	1W
R18	1006750-73	↓	51K	±2%	1/4W
R19	1006750-27	RESISTOR	620	±2%	1/4W
T1	1006762-2	TRANSFORMER			
T2	↓	↓			
T3	↓	↓			
T4	↓	↓			
T5	↓	↓			
T6	↓	↓			
T7	↓	↓			
T8	↓	↓			
T9	1006762-2	TRANSFORMER			


TIMING DIAGRAM
ENABLE 102.4 KC
SEE NOTE 4
SET 3200 CPS
RESET 3200 CPS
GYRO SELECT 102.4 KC
SEE NOTE 5
SEE NOTE 6
SEE NOTE 8
CLOCK 3200 CPS

REF DWG:
GYRO CALIBRATION ASSY
DWG NO. 2007102

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E. Gilhooley 5 Nov 64
CHECKED J M BLYSHAK 5 NOV 64
APPROVED J S TOMER 12/2/64
APPROVED
APPROVED MIT 12/2/64
APPROVED MSC 12-8-64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

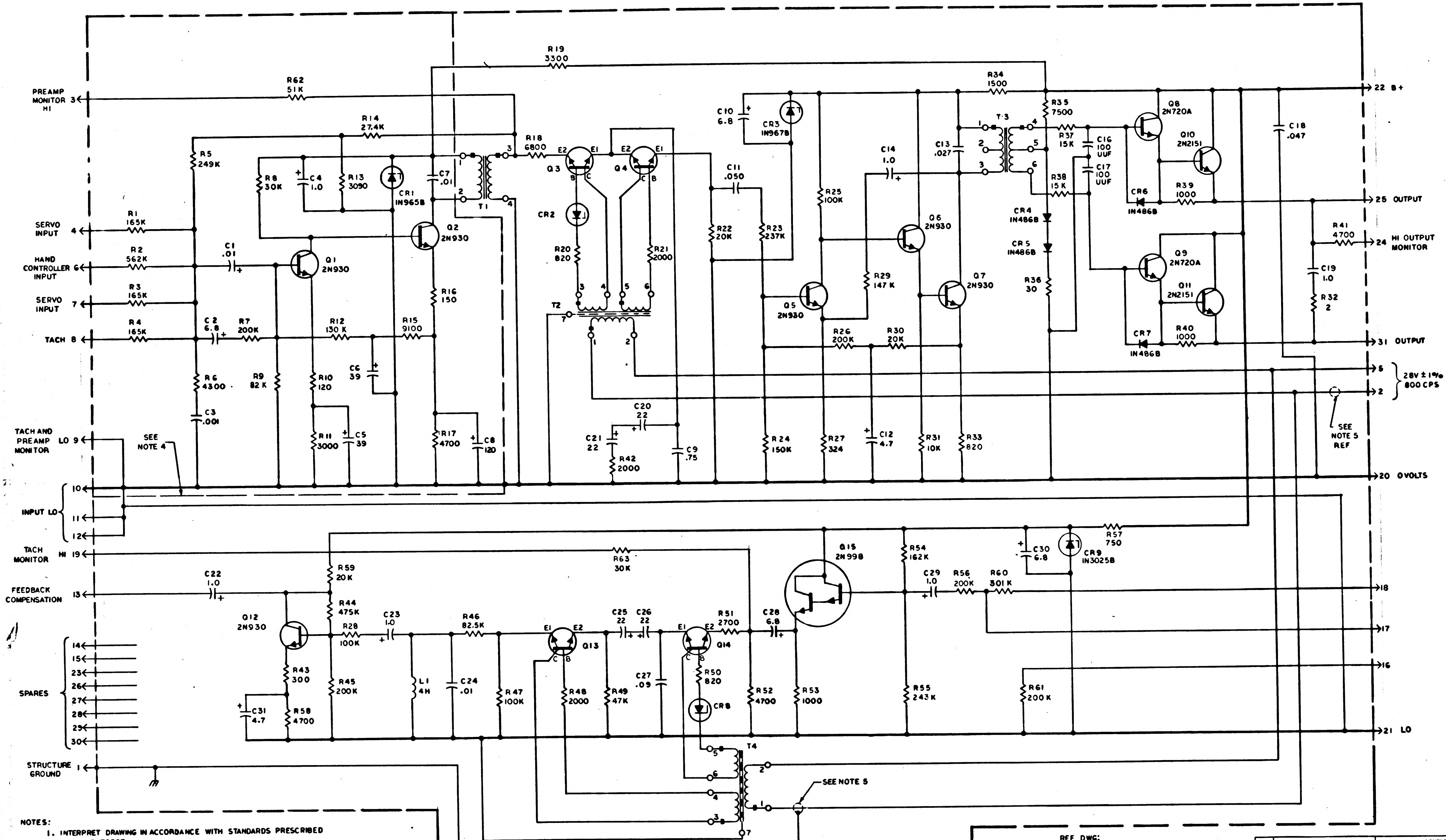
SCHEMATIC
GYRO CALIBRATION

CODE IDENT NO. —
SIZE E
DRAWING NO. 2010020
SCALE NONE
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15483

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12098		


6
5
4
3
2
1
PREAMP MONITOR HI 3
SERVO INPUT 4
HAND CONTROLLER INPUT 6
SERVO INPUT 7
TACH 8
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10
11
12
TACH MONITOR HI 19
FEEDBACK COMPENSATION 13
SPARES 14 15 23 26 27 28 29 30
STRUCTURE GROUND 1
R62 51K
R19 3300
R14 27.4K
R18 6800
R5 249K
R8 30K
C4 1.0
R13 3090
CR1 1N965B
C7 .01
T1
R1 165K
R2 562K
R3 165K
R4 165K
C1 .01
Q1 2N930
Q2 2N930
C2 6.8
R7 200K
R12 130K
R15 9100
R16 150
R6 4300
R9 82K
R10 120
C6 39
C3 .001
R11 3000
C5 39
R17 4700
C8 120
Q3
Q4
E2 E1 E2 E1
B C C B
CR2
R20 820
R21 2000
T2
C11 .050
C10 6.8
CR3 1N967B
R22 20K
R23 237K
C20 22
C21 22
R42 2000
C9 .75
R25 100K
C14 1.0
C13 .027
R34 1500
T3
R35 7500
R37 15K
R38 15K
C16 100 UUF
C17 100 UUF
Q8 2N720A
Q10 2N2151
R39 1000
CR6 1N486B
CR4 1N486B
CR5 1N486B
R36 30
Q6 2N930
R29 147K
Q5 2N930
Q7 2N930
R26 200K
R30 20K
R24 150K
R27 324
C12 4.7
R31 10K
R33 820
Q9 2N720A
Q11 2N2151
R40 1000
CR7 1N486B
C18 .047
C19 1.0
R32 2
R41 4700
22 B+
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0 VOLTS
R59 20K
R63 30K
C22 1.0
Q12 2N930
R44 475K
R28 100K
C23 1.0
R46 82.5K
Q13
C25 22
C26 22
R51 2700
Q14
C28 6.8
Q15 2N998
R54 162K
C29 1.0
R56 200K
R60 301K
C30 6.8
CR9 1N3025B
R57 750
R43 300
C31 4.7
R58 4700
R45 200K
L1 4H
C24 .01
R47 100K
R48 2000
R49 47K
C27 .09
R50 820
CR8
R52 4700
R53 1000
R55 243K
R61 200K
18
17
16
21 LO
T4
SEE NOTE 5

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. D. Lee DATE 23 JUN 64
CHECKED 30 Dec 64
APPROVAL
APPROVAL 1-8-65
NASA APPROVAL W. J. 1-13-65
MIT APPROVAL 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MOTOR DRIVE AMPLIFIER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2010021

SCALE — WT — SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15C P3

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	1/13/65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	± 1 %	1/8 W
R 2	1010374-693		562K		
R 3	1010364-677		165K		
R 4	1010364-677		165K		
R 5	1010364 -711		249K		
R 6	1006750-47		4300	± 2 %	1/4 W
R 7	1010369-88		200K	± 5 %	1/8 W
R 8	1006750-67		30K	± 2 %	1/4 W
R 9	-78		82K		
R 10	-10		120		
R 11	-43		3000		
R 12	1006750-83		130K		
R 13	1010364-345		3090	± 1 %	1/8 W
R 14	1010364-527		27.4K	± 1 %	1/8 W
R 15	1006750-55		9100	± 2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-82		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	-39		2000		
R 22	1006750-63		20K		
R 23	1010364-707		237K	± 1 %	1/8 W
R 24	1010364-669		150K	± 1 %	1/8 W
R 25	1006750-80		100K	± 2 %	1/4 W
R 26	1010364-693		200K	± 1 %	1/8 W
R 27	1010364 -157		324	± 1 %	1/8 W
R 28	1010364 -635		100K	± 1%	1/8 W
R 29	1010364 -667		147K	± 1%	1/8 W
R 30	1006750-63		20K	± 2 %	1/4 W
R 31	1006750 -56		10K	±2%	1/4W
R 32	1006788 -22		2	± 1%	1/4W
R 33	1006750 -30		820	±2%	1/4W
R 34	1006750-36		1500	± 2%	1/4W
R 35	1006750-53		7500	± 2%	1/4W
R 36	1010369-138		30	± 5 %	1/8 W
R 37	1006750-60		15K	± 2 %	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	-39		2000		
R 43	1006750-19		300		
R 44	1010364-765		475K	± 1 %	1/8 W
R 45	1010364 -693		200K	± 1%	1/8 W
R 46	1010364 -619		82.5K	± 1%	1/8W
R 47	1006750-80		100K	± 2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	-48		4700		
R 53	1006750 -32		1000		
R 54	1010364-675		162K	± 1%	1/8 W
R 55	1010364 -709		243K	± 1%	1/8W
R 56	1010364 -693		200K	± 1%	1/8W
R 57	1010604 -16		750	± 1%	1 W
R 58	1006750-48		4700	± 2 %	1/4 W
R 59	1006750-63		20K	± 2 %	1/4 W
R 60	1010364-727		301K	± 1 %	1/8 W
R 61	1010364-693		200K	± 1 %	1/8 W
R 62	1006750-73		51K	± 2 %	1/4 W
R 63	1006750-67	RESISTOR	30K	± 2 %	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1010264-13	CAPACITOR	0.01	± 5 %	200VDC
C 2	1006755-2		6.8	± 10 %	6
C 3	1010264-1		0.001	± 5 %	200
C 4	1006755-69		1.0	± 10 %	35
C 5	1006755 -13		39	± 10%	10
C 6	1006755 -13		39	± 10%	10
C 7	1010264-13		0.01	± 5 %	200
C 8	1006755-15		120	± 10 %	10
C 9	1010279 -110		0.75		15
C 10	1006755-79		6.8		35
C 11	1010279-216		0.050		35
C 12	1006755-10		4.7		10
C 13	1010264-18		0.027	± 5 %	200
C 14	1006755-69		1.0	± 10 %	35
C 16	1010359-5		100UUF	± 10%	200
C 17	1010359-5		100UUF	± 10%	200
C 18	1010264-21		0.047	± 5 %	200
C 19	1010264-37		1.0	± 5%	200
C 20	1006755-21		22	±10%	15
C 21	1006755 -21		22	±10%	15
C 22	1006755 -69		1.0	±10%	35
C 23	1006755 -69		1.0	±10%	35
C 24	1010264-13		0.01	± 5 %	200
C 25	1006755-21		22	± 10%	15
C 26	1006755-21		22		15
C 27	1010279-219		0.09		35
C 28	1006755-79		6.8		35
C 29	1006755 -69		1.0		35
C 30	1006755 -79		6.8		35
C 31	1006755 - 10	CAPACITOR	4.7		10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1010830 -9	DIODE	IN965B		
CR2	1010372-11				
CR3	1010830-11		IN967B		
CR4	1010392-1		IN486B		
CR5	1010392 -1		IN486B		
CR6	1010392 -1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010829-10	DIODE	IN3025B		
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397 - 1	TRANSISTOR	2N 930		
Q 6	1010397 - 1		2N 930		
Q 7	1010397 - 1		2N 930		
Q 8	1010357 - 1		2N 720A		
Q 9	1010357 - 1		2N 720A		
Q10	1010269 - 2		2N2151	MATCHED PAIR	
Q11					
Q12	1010397 - 1	TRANSISTOR	2N930		
Q13	1010367	CHOPPER			
Q14	1010367	CHOPPER			
Q15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN a. Di Lego DATE 23 Jul 64
CHECKED A. Livingston 30 Dec 64
APPROVAL 12/30/64
APPROVAL D. A. Koso 1-8-65
NASA APPROVAL W. J. Rhine 1-13-65
MIT APPROVAL 13 Jan 65

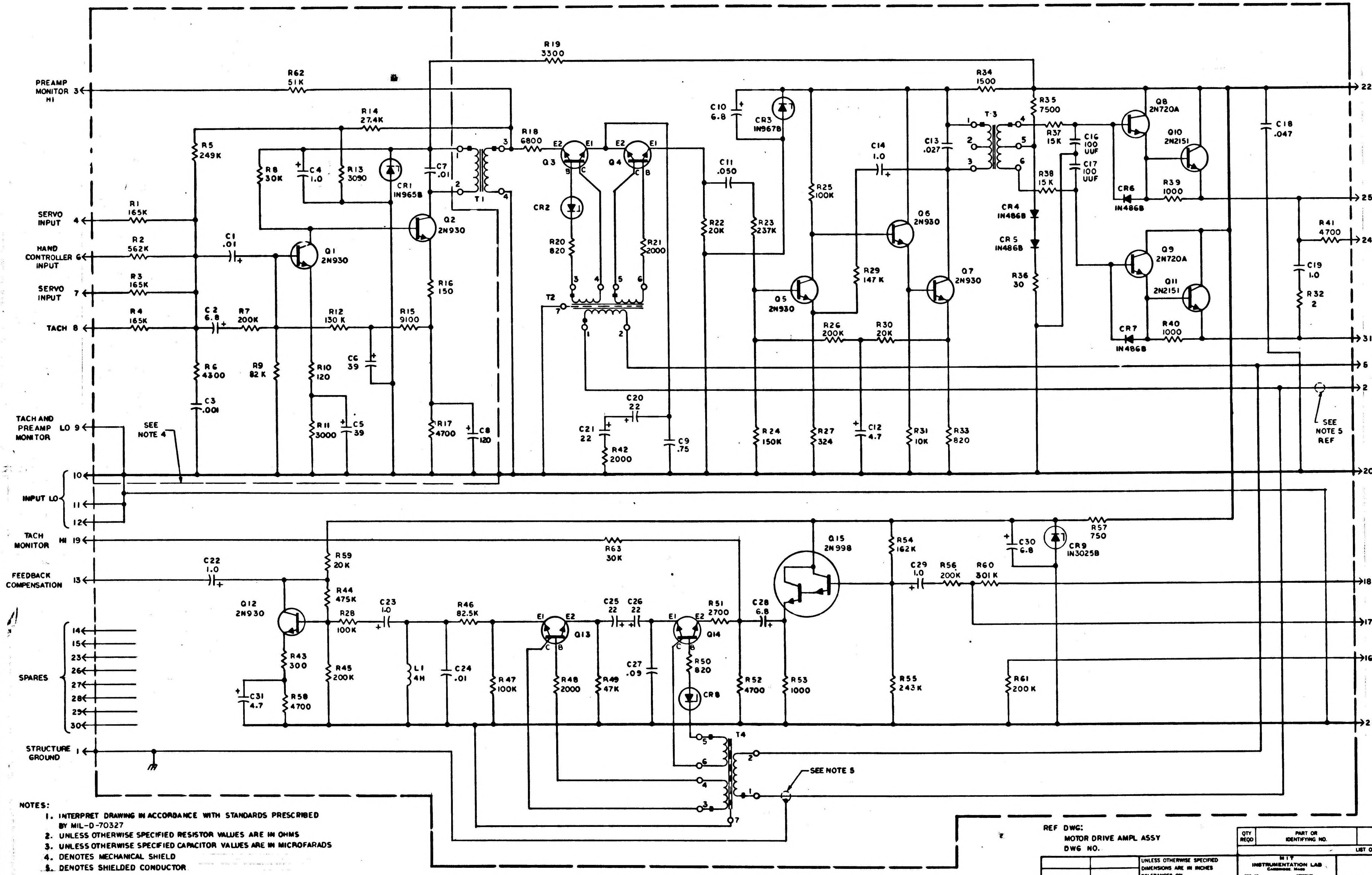
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010021
SCALE —
WT —
SHEET 2 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15483			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	4/13/65	
B	REVISED PER TDRR 18796	6 MAY 65	



PREAMP MONITOR HI 3
SERVO INPUT 4
HAND CONTROLLER INPUT 6
SERVO INPUT 7
TACH 8
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10 11 12
TACH MONITOR HI 19
FEEDBACK COMPENSATION 13
SPARES 14 15 23 26 27 28 29 30
STRUCTURE GROUND 1
R62 51K
R19 3300
R14 27.4K
R5 249K
R8 30K
C4 1.0
R13 3090
CR1 1N965B
C7 .01
T1
R18 6800
Q3
Q4
E2 E1 B C
CR2
R20 820
R21 2000
T2
R1 165K
R2 562K
C1 .01
Q1 2N930
Q2 2N930
R3 165K
R4 165K
C2 6.8
R7 200K
R12 130K
R15 9100
R16 150
C6 39
R6 4300
R9 82K
R10 120
C3 .001
R11 3000
C5 39
R17 4700
C8 120
C20 22
C21 22
R42 2000
C9 .75
C10 6.8
CR3 1N967B
C11 .050
R22 20K
R23 237K
R25 100K
C14 1.0
Q6 2N930
Q5 2N930
Q7 2N930
R29 147K
R26 200K
R30 20K
R24 150K
R27 324
C12 4.7
R31 10K
R33 820
R34 1500
C13 .027
T3
R35 7500
R37 15K
C16 100 UUF
C17 100 UUF
R38 15K
CR4 1N486B
CR5 1N486B
R36 30
Q8 2N720A
Q10 2N2151
CR6 1N486B
R39 1000
C18 .047
Q9 2N720A
Q11 2N2151
CR7 1N486B
R40 1000
R41 4700
C19 1.0
R32 2
22 B+
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0VOLTS
R63 30K
R59 20K
C22 1.0
Q12 2N930
R44 475K
R28 100K
C23 1.0
R46 82.5K
Q13
C25 22
C26 22
Q14
R51 2700
C28 6.8
Q15 2N998
R54 162K
C29 1.0
R56 200K
R60 301K
C30 6.8
CR9 1N3025B
R57 750
R43 300
R45 200K
L1 4H
C24 .01
R47 100K
R48 2000
R49 47K
C27 .09
R50 820
CR8
R52 4700
R53 1000
R55 243K
R61 200K
R58 4700
C31 4.7
18
17
16
21 LO
T4
SEE NOTE 5

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. D. Lee DATE 25 JUN 64
CHECKED A. Lindstrom 30 Dec 64
APPROVAL
APPROVAL 1-8-65
NASA APPROVAL W. J. 1-13-65
MIT APPROVAL 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2010021
SCALE —	WT —	SHEET 1 OF 2

MASTER

2010021

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	1/13/[illegible]	[illegible]
B	REVISED PER TDRR 18796	6 MAY 65	[illegible]

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	±1%	1/8 W
R 2	1010374-5	↓	562K	↓	↓
R 3	1010364-677	↓	165K	↓	↓
R 4	1010364-677	↓	165K	↓	↓
R 5	1010364 -711	↓	249K	↓	↓
R 6	1006750-47	↓	4300	±2%	1/4 W
R 7	1010369-88	↓	200K	±5%	1/8 W
R 8	1006750-67	↓	30K	±2%	1/4 W
R 9	↓ -78	↓	82K	↓	↓
R 10	↓ -10	↓	120	↓	↓
R 11	↓ -43	↓	3000	↓	↓
R 12	1006750-83	↓	130K	↓	↓
R 13	1010364-345	↓	3090	±1%	1/8 W
R 14	1010364-527	↓	27.4K	±1%	1/8 W
R 15	1006750-55	↓	9100	±2%	1/4 W
R 16	↓ -12	↓	150	↓	↓
R 17	↓ -48	↓	4700	↓	↓
R 18	↓ -52	↓	6800	↓	↓
R 19	↓ -44	↓	3300	↓	↓
R 20	↓ -30	↓	820	↓	↓
R 21	↓ -39	↓	2000	↓	↓
R 22	1006750-63	↓	20K	↓	↓
R 23	1010364-707	↓	237K	±1%	1/8 W
R 24	1010364-669	↓	150K	±1%	1/8 W
R 25	1006750-80	↓	100K	±2%	1/4 W
R 26	1010364-693	↓	200K	±1%	1/8 W
R 27	1010364 -157	↓	324	±1%	1/8 W
R 28	1010364 -635	↓	100K	±1%	1/8 W
R 29	1010364 -667	↓	147K	±1%	1/8 W
R 30	1006750-63	↓	20K	±2%	1/4 W
R 31	1006750 -56	↓	10K	±2%	1/4W
R 32	1006788 -22	↓	2	±1%	1/4W
R 33	1006750 -30	↓	820	±2%	1/4W
R 34	1006750-36	↓	1500	±2%	1/4W
R 35	1006750-53	↓	7500	±2%	1/4W
R 36	1010369-138	↓	30	±5%	1/8 W
R 37	1006750-60	↓	15K	±2%	1/4 W
R 38	↓ -60	↓	15K	↓	↓
R 39	↓ -32	↓	1000	↓	↓
R 40	↓ -32	↓	1000	↓	↓
R 41	↓ -48	↓	4700	↓	↓
R 42	↓ -39	↓	2000	↓	↓
R 43	1006750-19	↓	300	↓	↓
R 44	1010364-765	↓	475K	±1%	1/8 W
R 45	1010364 -693	↓	200K	±1%	1/8 W
R 46	1010364 -619	↓	82.5K	±1%	1/8W
R 47	1006750-80	↓	100K	±2%	1/4 W
R 48	↓ -39	↓	2000	↓	↓
R 49	↓ -72	↓	47K	↓	↓
R 50	↓ -30	↓	820	↓	↓
R 51	↓ -42	↓	2700	↓	↓
R 52	↓ -48	↓	4700	↓	↓
R 53	1006750 -32	↓	1000	↓	↓
R 54	1010364-675	↓	162K	±1%	1/8 W
R 55	1010364 -709	↓	243K	±1%	1/8W
R 56	1010364 -693	↓	200K	±1%	1/8W
R 57	1010604 -16	↓	750	±1%	1 W
R 58	1006750-48	↓	4700	±2%	1/4 W
R 59	1006750-63	↓	20K	±2%	1/4 W
R 60	1010364-727	↓	301K	±1%	1/8 W
R 61	1010364-693	↓	200K	±1%	1/8 W
R 62	1006750-73	↓	51K	±2%	1/4 W
R 63	1006750-67	RESISTOR	30K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1010264 -13	CAPACITOR	0.01	±5%	200VDC
C 2	1006755-2	↓	6.8	±10%	6
C 3	1010264-1	↓	0.001	±5%	200
C 4	1006755-69	↓	1.0	±10%	35
C 5	1006755 -13	↓	39	±10%	10
C 6	1006755 -13	↓	39	±10%	10
C 7	1010264 -13	↓	0.01	±5%	200
C 8	1006755-15	↓	120	±10%	10
C 9	1010279 -110	↓	0.75	↓	15
C 10	1006755-79	↓	6.8	↓	35
C 11	1010279-216	↓	0.050	↓	35
C 12	1006755-10	↓	4.7	↓	10
C 13	1010264 -18	↓	0.027	±5%	200
C 14	1006755-69	↓	1.0	±10%	35
		↓			
C 16	1010359-5	↓	100UUF	±10%	200
C 17	1010359-5	↓	100UUF	±10%	200
C 18	1010264-21	↓	0.047	±5%	200
C 19	1010264-37	↓	1.0	±5%	200
C 20	1006755-21	↓	22	±10%	15
C 21	1006755 -21	↓	22	±10%	15
C 22	1006755 -69	↓	1.0	±10%	35
C 23	1006755 -69	↓	1.0	±10%	35
C 24	1010264-13	↓	0.01	±5%	200
C 25	1006755-21	↓	22	±10%	15
C 26	1006755-21	↓	22	↓	15
C 27	1010279-219	↓	0.09	↓	35
C 28	1006755-79	↓	6.8	↓	35
C 29	1006755 -69	↓	1.0	↓	35
C 30	1006755 -79	↓	6.8	↓	35 ↓
C 31	1006755 - 10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1010830 -9	DIODE	IN965B		
CR2	1010372-11	↓			
CR3	1010830-11	↓	IN967B		
CR4	1010392-1	↓	IN486B		
CR5	1010392 -1	↓	IN486B		
CR6	1010392 -1	↓	IN486B		
CR7	1010392-1	↓	IN486B		
CR8	1010372-11	↓			
CR9	1010829-10	DIODE	IN3025B		
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397 - 1	TRANSISTOR	2N 930		
Q 6	1010397 - 1	↓	2N 930		
Q 7	1010397 - 1	↓	2N 930		
Q 8	1010357 - 1	↓	2N 720A		
Q 9	1010357 - 1	↓	2N 720A		
Q10	1010269 - 2	↓	2N2151	MATCHED PAIR	
Q11		↓			
Q12	1010397 - 1	TRANSISTOR	2N930		
Q13	1010367	CHOPPER			
Q14	1010367	CHOPPER			
Q15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
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HEAT TREATMENT —
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INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. DiLeo DATE 23 June 64
CHECKED [illegible] 30 Dec 64
APPROVAL [illegible] 12/31/64
APPROVAL [illegible] 1-8-65
NASA APPROVAL [illegible] 1-13-65
MIT APPROVAL [illegible] 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

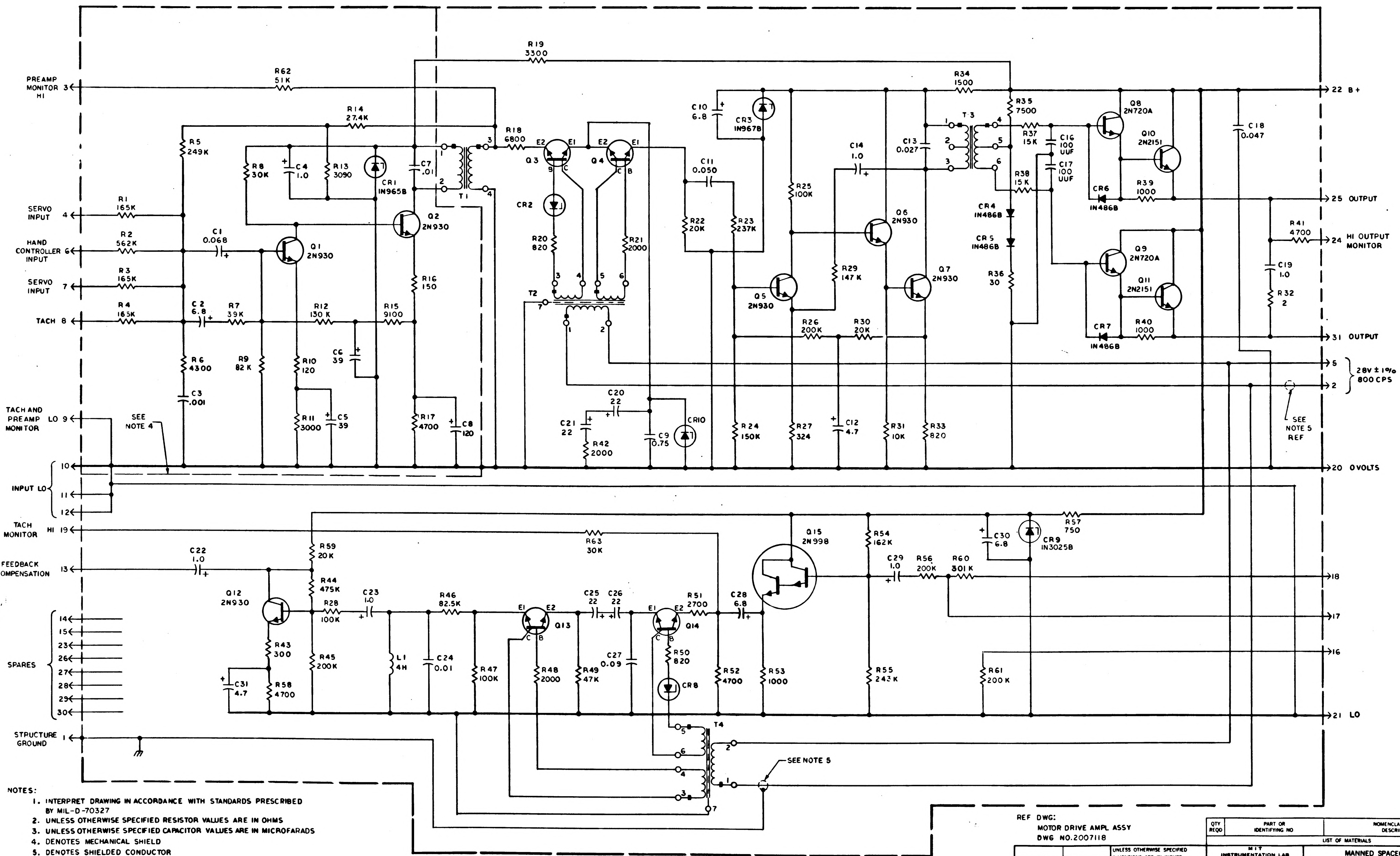
SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010021
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15483

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	4/13/65	CAP JK
B	REVISED PER TDRR 18796	6 MAY 65	CAP JK
C	REVISED PER TDRR 20679	13 Jul 65	[illegible]


PREAMP MONITOR HI 3
SERVO INPUT 4
HAND CONTROLLER INPUT 6
SERVO INPUT 7
TACH 8
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10 11 12
TACH MONITOR HI 19
FEEDBACK COMPENSATION 13
SPARES 14 15 23 26 27 28 29 30
STRUCTURE GROUND 1
R62 51K
R14 27.4K
R19 3300
R18 6800
R5 249K
R8 30K
C4 1.0
R13 3090
CR1 1N965B
C7 .01
T1
R1 165K
R2 562K
C1 0.068
Q1 2N930
Q2 2N930
R3 165K
R16 150
R4 165K
C2 6.8
R7 39K
R12 130K
R15 9100
C6 39
R6 4300
R9 82K
R10 120
C3 .001
R11 3000
C5 39
R17 4700
C8 120
Q3
Q4
E1 E2 B C
CR2
R20 820
R21 2000
T2
C20 22
C21 22
R42 2000
C9 0.75
CR10
C10 6.8
CR3 1N967B
C11 0.050
R22 20K
R23 237K
R24 150K
R25 100K
C14 1.0
Q5 2N930
Q6 2N930
Q7 2N930
R29 147K
R26 200K
R30 20K
R27 324
C12 4.7
R31 10K
R33 820
R34 1500
C13 0.027
T3
R35 7500
R37 15K
C16 100 UUF
C17 100 UUF
R38 15K
CR4 1N486B
CR5 1N486B
R36 30
Q8 2N720A
Q10 2N2151
CR6 1N486B
R39 1000
Q9 2N720A
Q11 2N2151
CR7 1N486B
R40 1000
C18 0.047
R41 4700
C19 1.0
R32 2
22 B+
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0 VOLTS
R63 30K
C22 1.0
Q12 2N930
R59 20K
R44 475K
R28 100K
C23 1.0
R46 82.5K
Q13
C25 22
C26 22
Q14
R51 2700
C28 6.8
R43 300
R58 4700
C31 4.7
R45 200K
L1 4H
C24 0.01
R47 100K
R48 2000
R49 47K
C27 0.09
R50 820
CR8
R52 4700
R53 1000
Q15 2N998
R54 162K
C29 1.0
R56 200K
R60 301K
C30 6.8
CR9 1N3025B
R57 750
R55 243K
R61 200K
18
17
16
21 LO
T4
SEE NOTE 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO. 2007118

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DWG NO CONTRACT

DRAWN A. D. Lee DATE 23 JUN 64
CHECKED A. [illegible] 30 Dec 64
APPROVAL [illegible]
APPROVAL [illegible] 1-8-65
NASA APPROVAL [illegible] 1-13-65
MIT APPROVAL [illegible] 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010021
SCALE —
WT —
SHEET 1 OF 2

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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098		
B	REVISED PER TDRR 18796	6 MAY 65	
C	REVISED PER TDRR 20679	13 July 65	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	± 1%	1/8 W
R 2	1010374-5		562K		
R 3	1010364-677		165K		
R 4	1010364-677		165K		
R 5	1010364-711		249K	↓	↓
R 6	1006750-47		4300	± 2%	1/4 W
R 7	1006750-70		39K	± 2%	1/4 W
R 8	1006750-67		30K	± 2%	1/4 W
R 9	-78		82K		
R 10	-10		120		
R 11	↓ -43		3000		
R 12	1006750-83		130K	↓	↓
R 13	1010364-345		3090	± 1%	1/8 W
R 14	1010364-527		27.4K	± 1%	1/8 W
R 15	1006750-55		9100	± 2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-52		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	↓ -39		2000		
R 22	1006750-63		20K	↓	↓
R 23	1010364-707		237K	± 1%	1/8 W
R 24	1010364-669		150K	± 1%	1/8 W
R 25	1006750-80		100K	± 2%	1/4 W
R 26	1010364-693		200K	± 1%	1/8 W
R 27	1010364-157		324	± 1%	1/8 W
R 28	1010364-635		100K	± 1%	1/8 W
R 29	1010364-667		147K	± 1%	1/8 W
R 30	1006750-63		20K	± 2%	1/4 W
R 31	1006750-56		10K	± 2%	1/4 W
R 32	1006788-22		2	± 1%	1/4W
R 33	1006750-30		820	± 2%	1/4W
R 34	1006750-36		1500	± 2%	1/4W
R 35	1006750-53		7500	± 2%	1/4W
R 36	1010369-138		30	± 5%	1/8 W
R 37	1006750-60		15K	± 2%	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	↓ -39		2000		
R 43	1006750-19		300	↓	↓
R 44	1010364-765		475K	± 1%	1/8 W
R 45	1010364-693		200K	± 1%	1/8 W
R 46	1010364-619		82.5K	± 1%	1/8W
R 47	1006750-80		100K	± 2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	↓ -48		4700		
R 53	1006750-32		1000	↓	↓
R 54	1010364-675		162K	± 1%	1/8 W
R 55	1010364-709		243K	± 1%	1/8W
R 56	1010364-693		200K	± 1%	1/8W
R 57	1010604-16		750	± 1%	1 W
R 58	1006750-48		4700	± 2%	1/4 W
R 59	1006750-63		20K	± 2%	1/4 W
R 60	1010364-727		301K	± 1%	1/8 W
R 61	1010364-693		200K	± 1%	1/8 W
R 62	1006750-73	↓	51K	± 2%	1/4 W
R 63	1006750-67	RESISTOR	30K	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-55	CAPACITOR	0.068	±10%	35 VDC
C 2	1006755-2		6.8	± 10%	6
C 3	1010264-1		0.001	± 5%	200
C 4	1006755-69		1.0	± 10%	35
C 5	1006755-13		39	± 10%	10
C 6	1006755-13		39	± 10%	10
C 7	1010264-13		0.01	± 5%	200
C 8	1006755-15		120	± 10%	10
C 9	1010279-110		0.75		15
C 10	1006755-79		6.8		35
C 11	1010279-216		0.050		35
C 12	1006755-10		4.7	↓	10
C 13	1010264-18		0.027	± 5%	200
C 14	1006755-69		1.0	± 10%	35
C 16	1010359-5		100UUF	± 10%	200
C 17	1010359-5		100UUF	± 10%	200
C 18	1010264-21		0.047	± 5%	200
C 19	1010264-37		1.0	± 5%	200
C 20	1006755-21		22	±10%	15
C 21	1006755-21		22	±10%	15
C 22	1006755-69		1.0	±10%	35
C 23	1006755-69		1.0	±10%	35
C 24	1010264-13		0.01	± 5%	200
C 25	1006755-21		22	± 10%	15
C 26	1006755-21		22		15
C 27	1010279-219		0.09		35
C 28	1006755-79		6.8		35
C 29	1006755-69		1.0		35
C 30	1006755-79	↓	6.8		35 ↓
C 31	1006755-10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1010830-9	DIODE	IN965B		
CR2	1010372-11				
CR3	1010830-11		IN967B		
CR4	1010392-1		IN486B		
CR5	1010392-1		IN486B		
CR6	1010392-1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010829-10	↓	IN3025B		
CR10	1010372-1	DIODE			
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397-1	TRANSISTOR	2N930		
Q 6	1010397-1		2N930		
Q 7	1010397-1		2N930		
Q 8	1010357-1		2N720A		
Q 9	1010357-1		2N720A		
Q 10 Q 11	1010269-2	↓	2N2151	MATCHED PAIR	
Q 12	1010397-1	TRANSISTOR	2N930		
Q 13	1010367	CHOPPER			
Q 14	1010367	CHOPPER			
Q 15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DWG NO CONTRACT
DRAWN A. Di Leo DATE 23 Jun 64
CHECKED 30 Dec 64
APPROVAL 2/3/64
APPROVAL -8-65
NASA APPROVAL 1-13-65
MIT APPROVAL 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MOTOR DRIVE AMPLIFIER

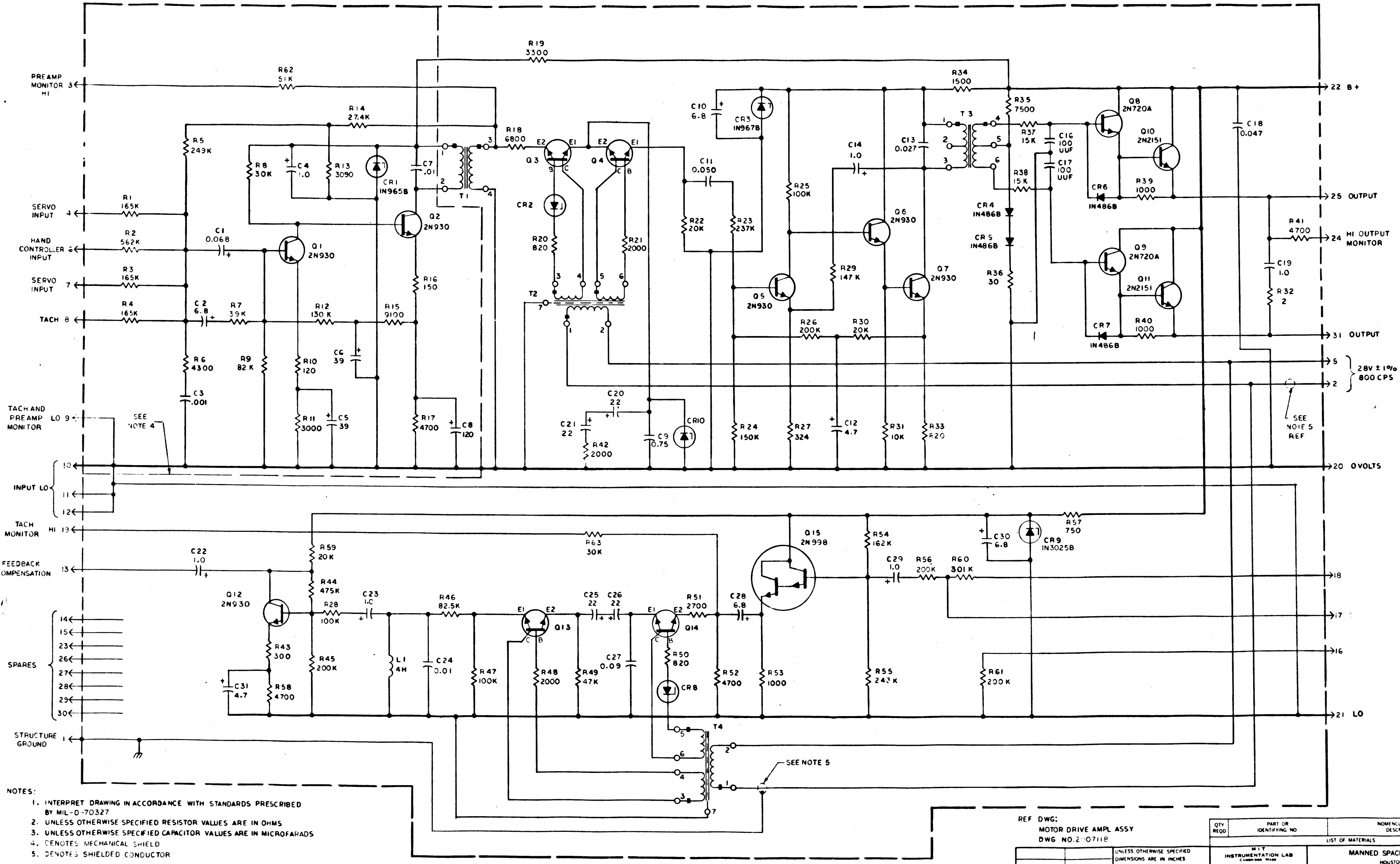
CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010021
SCALE —
WT —
SHEET 2 OF 2

2010021 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15483

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	4/13/65	WK
B	REVISED PER TDRR 18796	6 MAY 65	JMP WK
C	REVISED PER TDRR 20679	13 July 65	WK
D	REVISION STATUS CHANGED	22 APR 66	JMP RWH


PREAMP MONITOR HI 3
R62 51K
R19 3300
R14 27.4K
R5 249K
R8 30K
C4 1.0
R13 3090
CR1 1N965B
C7 .01
T1
R18 6800
SERVO INPUT 4
R1 165K
HAND CONTROLLER INPUT 6
R2 562K
C1 0.068
Q1 2N930
Q2 2N930
SERVO INPUT 7
R3 165K
TACH 8
R4 165K
C2 6.8
R7 39K
R12 130K
R15 9100
R16 150
R6 4300
R9 82K
R10 120
C6 39
C3 .001
R11 3000
C5 39
R17 4700
C8 120
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10 11 12
TACH MONITOR HI 19
Q3
Q4
E2 E1 B C
CR2
R20 820
R21 2000
T2
C20 22
C21 22
R42 2000
C9 0.75
CR10
C10 6.8
CR3 1N967B
C11 0.050
R22 20K
R23 237K
R24 150K
R25 100K
C14 1.0
Q5 2N930
Q6 2N930
Q7 2N930
R29 147K
R26 200K
R30 20K
R27 324
C12 4.7
R31 10K
R33 820
R34 1500
C13 0.027
T3
R35 7500
R37 15K
R38 15K
C16 100 UUF
C17 100 UUF
CR4 1N486B
CR5 1N486B
R36 30
Q8 2N720A
Q10 2N2151
CR6 1N486B
R39 1000
Q9 2N720A
Q11 2N2151
CR7 1N486B
R40 1000
C18 0.047
R41 4700
C19 1.0
R32 2
22 B+
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0 VOLTS
FEEDBACK COMPENSATION 13
C22 1.0
Q12 2N930
R59 20K
R44 475K
R28 100K
C23 1.0
R43 300
C31 4.7
R58 4700
R45 200K
SPARES 14 15 23 26 27 28 29 30
STRUCTURE GROUND 1
R46 82.5K
L1 4H
C24 0.01
R47 100K
Q13
R48 2000
R63 30K
C25 22
C26 22
R49 47K
C27 0.09
Q14
R50 820
CR8
R51 2700
R52 4700
C28 6.8
R53 1000
Q15 2N998
R54 162K
R55 243K
C29 1.0
R56 200K
R60 301K
C30 6.8
CR9 1N3025B
R57 750
R61 200K
18
17
16
21 LO
T4
SEE NOTE 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO. 2007118

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
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DRAWN D. Leo DATE 23 JUN 64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 9-13-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010021
SCALE —
WT —
SHEET 1 OF 2

NOTICE [illegible]

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	[illegible]	[illegible]
B	REVISED PER TDRR 18796	[illegible]	[illegible]
C	REVISED PER TDRR 20679	13 Jul 65	[illegible]
D	REVISED PER TDRR 28191	27 APR 66	JMP RWH

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364 - 677	RESISTOR	165K	± 1 %	1/8 W
R 2	1010374 - 5		562K		
R 3	1010364 - 677		165K		
R 4	1010364 - 677		165K		
R 5	1010364 - 711		249K	↓	↓
R 6	1006750 - 47		4300	± 2 %	1/4 W
R 7	1006750 - 70		39K	± 2 %	1/4 W
R 8	1006750 - 67		30K	± 2 %	1/4 W
R 9	- 78		82K		
R 10	- 10		120		
R 11	↓ - 43		3000		
R 12	1006750 - 83		130K	↓	↓
R 13	1010364 - 345		3090	± 1 %	1/8 W
R 14	1010364 - 527		27.4K	± 1 %	1/8 W
R 15	1006750 - 55		9100	± 2 %	1/4 W
R 16	- 12		150		
R 17	- 48		4700		
R 18	- 52		6800		
R 19	- 44		3300		
R 20	- 30		820		
R 21	↓ - 39		2000		
R 22	1006750 - 63		20K	↓	↓
R 23	1010364 - 707		237K	± 1 %	1/8 W
R 24	1010364 - 669		150K	± 1 %	1/8 W
R 25	1006750 - 80		100K	± 2 %	1/4 W
R 26	1010364 - 693		200K	± 1 %	1/8 W
R 27	1010364 - 157		324	± 1 %	1/8 W
R 28	1010364 - 635		100K	± 1%	1/8 W
R 29	1010364 - 667		147K	± 1%	1/8 W
R 30	1006750 - 63		20K	± 2 %	1/4 W
R 31	1006750 - 56		10K	± 2%	1/4 W
R 32	1006788 - 22		2	± 1%	1/4W
R 33	1006750 - 30		820	± 2%	1/4W
R 34	1006750 - 36		1500	± 2%	1/4W
R 35	1006750 - 53		7500	± 2%	1/4W
R 36	1010369 - 138		30	± 5 %	1/8 W
R 37	1006750 - 60		15K	± 2 %	1/4 W
R 38	- 60		15K		
R 39	- 32		1000		
R 40	- 32		1000		
R 41	- 48		4700		
R 42	↓ - 39		2000		
R 43	1006750 - 19		300	↓	↓
R 44	1010364 - 765		475K	± 1 %	1/8 W
R 45	1010364 - 693		200K	± 1%	1/8 W
R 46	1010364 - 619		82.5K	± 1%	1/8W
R 47	1006750 - 80		100K	± 2 %	1/4 W
R 48	- 39		2000		
R 49	- 72		47K		
R 50	- 30		820		
R 51	- 42		2700		
R 52	↓ - 48		4700		
R 53	1006750 - 32		1000	↓	↓
R 54	1010364 - 675		162K	± 1 %	1/8 W
R 55	1010364 - 709		243K	± 1%	1/8W
R 56	1010364 - 693		200K	± 1%	1/8W
R 57	1010604 - 16		750	± 1%	1 W
R 58	1006750 - 48		4700	± 2 %	1/4 W
R 59	1006750 - 63		20K	± 2 %	1/4 W
R 60	1010364 - 727		301K	± 1 %	1/8 W
R 61	1010364 - 693		200K	± 1 %	1/8 W
R 62	1006750 - 73	↓	51K	± 2 %	1/4 W
R 63	1006750 - 67	RESISTOR	30K	± 2 %	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755 - 55	CAPACITOR	0.068	± 10 %	35 VDC
C 2	1006755 - 2		6.8	± 10 %	6
C 3	1010264 - 1		0.001	± 5 %	200
C 4	1006755 - 69		1.0	± 10 %	35
C 5	1006755 - 13		39	± 10%	10
C 6	1006755 - 13		39	± 10%	10
C 7	1010264 - 13		0.01	± 5 %	200
C 8	1006755 - 15		120	± 10 %	10
C 9	1010279 - 110		0.75		15
C 10	1006755 - 79		6.8		35
C 11	1010279 - 216		0.050		35
C 12	1006755 - 10		4.7	↓	10
C 13	1010264 - 18		0.027	± 5 %	200
C 14	1006755 - 69		1.0	± 10 %	35
C 16	1010359 - 5		100UUF	± 10%	200
C 17	1010359 - 5		100UUF	± 10%	200
C 18	1010264 - 21		0.047	± 5 %	200
C 19	1010264 - 37		1.0	± 5 %	200
C 20	1006755 - 21		22	± 10%	15
C 21	1006755 - 21		22	± 10%	15
C 22	1006755 - 69		1.0	± 10%	35
C 23	1006755 - 69		1.0	± 10%	35
C 24	1010264 - 13		0.01	± 5 %	200
C 25	1006755 - 21		22	± 10 %	15
C 26	1006755 - 21		22		15
C 27	1010279 - 219		0.09		35
C 28	1006755 - 79		6.8		35
C 29	1006755 - 69		1.0		35
C 30	1006755 - 79	↓	6.8		35 ↓
C 31	1006755 - 10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277 - 6	INDUCTOR	4 H		
CR1	1008815 - 9	DIODE	IN965B		
CR2	1010372 - 11				
CR3	1008815 - 11		IN967B		
CR4	1010392 - 1		IN486B		
CR5	1010392 - 1		IN486B		
CR6	1010392 - 1		IN486B		
CR7	1010392 - 1		IN486B		
CR8	1010372 - 11				
CR9	1010829 - 10	↓	IN3025B		
CR10	1010372 - 1	DIODE			
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397 - 1	TRANSISTOR	2N 930		
Q 6	1010397 - 1		2N 930		
Q 7	1010397 - 1		2N 930		
Q 8	1010357 - 1		2N 720A		
Q 9	1010357 - 1		2N 720A		
Q10 Q11	1010269 - 2	↓	2N2151	MATCHED PAIR	
Q12	1010397 - 1	TRANSISTOR	2N930		
Q13	1010367	CHOPPER			
Q14	1010367	CHOPPER			
Q15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. DiLeo DATE 23 June 64
CHECKED [illegible] 30 Dec 64
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

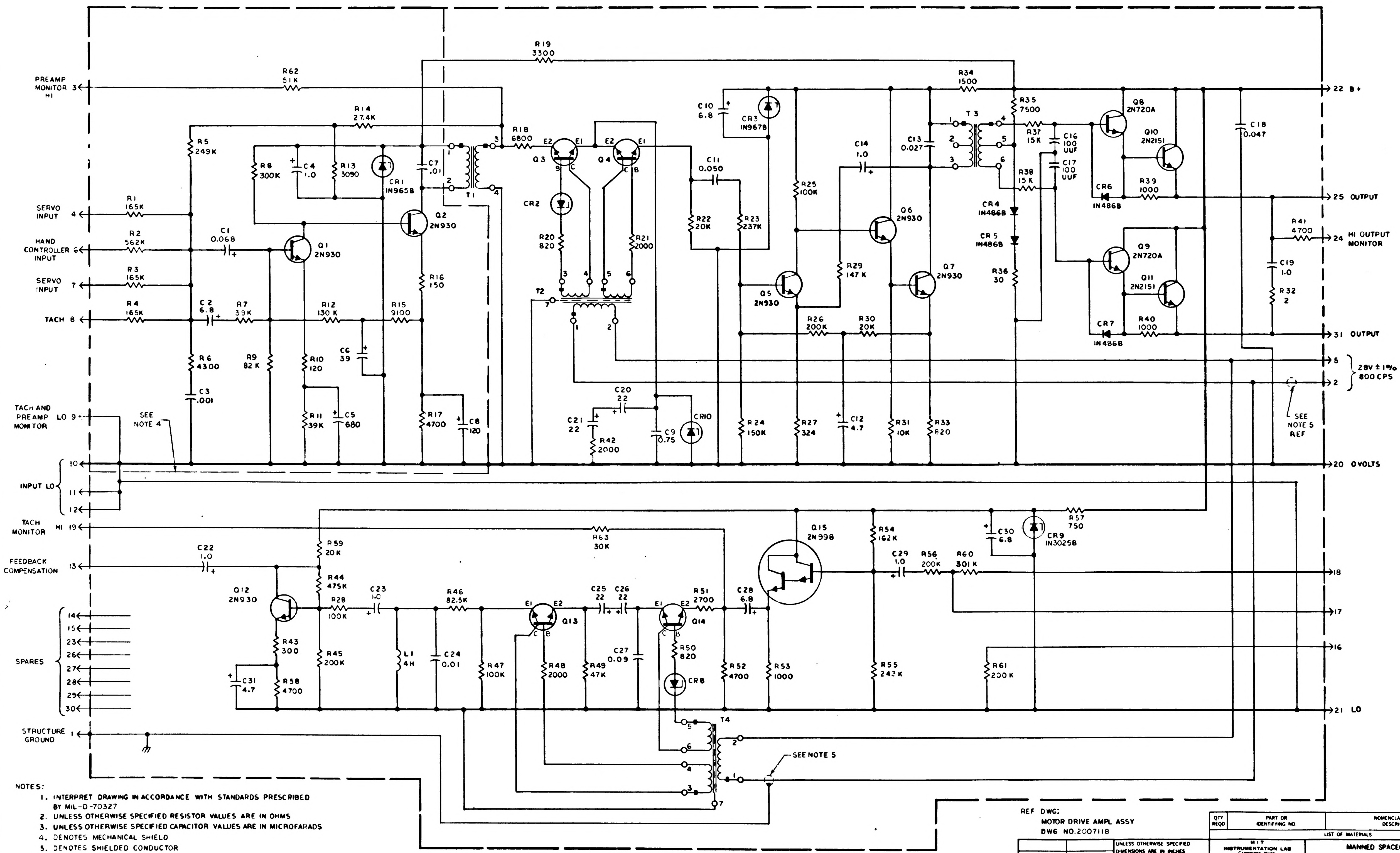
SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010021
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	7/1/65	[illegible]
B	REVISED PER TDRR 8796	6 MAY 65	[illegible]
C	REVISED PER TDRR 20679	13 Jul 65	[illegible]
D	REVISION STATUS CHANGED	22 APR 66	JMP RWH
E	REVISED PER TDRR 29132	[illegible] 66	JMP RWH


PREAMP MONITOR HI 3
SERVO INPUT 4
HAND CONTROLLER INPUT 6
SERVO INPUT 7
TACH 8
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10 11 12
TACH MONITOR HI 19
FEEDBACK COMPENSATION 13
SPARES 14 15 23 26 27 28 29 30
STRUCTURE GROUND 1
R1 165K
R2 562K
R3 165K
R4 165K
R5 249K
R6 4300
C3 .001
C1 0.068
C2 6.8
R7 39K
R8 300K
R9 82K
Q1 2N930
R10 120
R11 39K
C5 680
C4 1.0
R13 3090
R14 27.4K
R62 51K
CR1 1N965B
R12 130K
C6 39
R15 9100
C7 .01
Q2 2N930
R16 150
R17 4700
C8 120
T1 1 2 3 4
R19 3300
R18 6800
E2 E1 Q3 B C
E2 E1 Q4 C B
CR2
R20 820
R21 2000
T2 7 3 4 5 6 1 2
C20 22
C21 22
R42 2000
C9 0.75
CR10
C10 6.8
CR3 1N967B
C11 0.050
R22 20K
R23 237K
R24 150K
R25 100K
Q5 2N930
R26 200K
R27 324
C14 1.0
R29 147K
Q6 2N930
C12 4.7
R30 20K
R31 10K
Q7 2N930
R33 820
R34 1500
C13 0.027
T3 1 2 3 4 5 6
R35 7500
R37 15K
R38 15K
C16 100 UUF
C17 100 UUF
CR4 1N486B
CR5 1N486B
R36 30
Q8 2N720A
Q10 2N2151
CR6 1N486B
R39 1000
Q9 2N720A
Q11 2N2151
CR7 1N486B
R40 1000
C18 0.047
R41 4700
C19 1.0
R32 2
22 B+
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0VOLTS
C22 1.0
Q12 2N930
R43 300
C31 4.7
R58 4700
R59 20K
R44 475K
R28 100K
R45 200K
C23 1.0
L1 4H
C24 0.01
R46 82.5K
R47 100K
E1 E2 Q13 C B
R48 2000
R49 47K
C25 22
C26 22
C27 0.09
E1 E2 Q14 C B
R50 820
CR8
R51 2700
R52 4700
R63 30K
C28 6.8
R53 1000
Q15 2N998
R54 162K
R55 243K
C29 1.0
R56 200K
R60 301K
C30 6.8
CR9 1N3025B
R57 750
R61 200K
18
17
16
21 LO
T4 5 6 4 3 7 2 1
SEE NOTE 5

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO.2007118

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

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DIMENSIONS ARE IN INCHES
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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN D. Lee DATE 25 JUN 64
CHECKED [illegible] 30 Jun 64
APPROVAL [illegible]
APPROVAL [illegible] 1-8-65
NASA APPROVAL [illegible] 7-13-65
MIT APPROVAL [illegible] 13 Jul 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010021
SCALE —
WT —
SHEET 1 OF 2

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 5422

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	4/13/65	
B	REVISED PER TDRR 18796	6 MAY 65	
C	REVISED PER TDRR 20679	13 Jul 65	
D	REVISED PER TDRR 28191	27 APR 66	JJAP R. H.
E	REVISED PER TDRR 29132	Jul 66	R. H.

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	± 1%	1/8 W
R 2	1010374-5		562K		
R 3	1010364-677		165K		
R 4	1010364-677		165K		
R 5	1010364-711		249K	↓	↓
R 6	1006750-47		4300	± 2%	1/4 W
R 7	1006750-70		39K	± 2%	1/4 W
R 8	1010369-92		300K	± 5%	1/8 W
R 9	1006750-78		82K	± 2%	1/4 W
R 10	-10		120		
R 11	↓ -70		39K		
R 12	1006750-83		130K	↓	↓
R 13	1010364-345		3090	± 1%	1/8 W
R 14	1010364-527		27.4K	± 1%	1/8 W
R 15	1006750-55		9100	± 2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-52		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	↓ -39		2000		
R 22	1006750-63		20K	↓	↓
R 23	1010364-707		237K	± 1%	1/8 W
R 24	1010364-669		150K	± 1%	1/8 W
R 25	1006750-80		100K	± 2%	1/4 W
R 26	1010364-693		200K	± 1%	1/8 W
R 27	1010364-157		324	± 1%	1/8 W
R 28	1010364-635		100K	± 1%	1/8 W
R 29	1010364-667		147K	± 1%	1/8 W
R 30	1006750-63		20K	± 2%	1/4 W
R 31	1006750-56		10K	± 2%	1/4 W
R 32	1006788-22		2	± 1%	1/4 W
R 33	1006750-30		820	± 2%	1/4 W
R 34	1006750-36		1500	± 2%	1/4 W
R 35	1006750-53		7500	± 2%	1/4 W
R 36	1010369-138		30	± 5%	1/8 W
R 37	1006750-60		15K	± 2%	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	↓ -39		2000		
R 43	1006750-19		300	↓	↓
R 44	1010364-765		475K	± 1%	1/8 W
R 45	1010364-693		200K	± 1%	1/8 W
R 46	1010364-619		82.5K	± 1%	1/8 W
R 47	1006750-80		100K	± 2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	↓ -48		4700		
R 53	1006750-32		1000	↓	↓
R 54	1010364-675		162K	± 1%	1/8 W
R 55	1010364-709		243K	± 1%	1/8 W
R 56	1010364-693		200K	± 1%	1/8 W
R 57	1010604-16		750	± 1%	1 W
R 58	1006750-48		4700	± 2%	1/4 W
R 59	1006750-63		20K	± 2%	1/4 W
R 60	1010364-727		301K	± 1%	1/8 W
R 61	1010364-693		200K	± 1%	1/8 W
R 62	1006750-73	↓	51K	± 2%	1/4 W
R 63	1006750-67	RESISTOR	30K	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-55	CAPACITOR	0.068	± 10%	35 VDC
C 2	1006755-2		6.8	± 10%	6
C 3	1010264-1		0.001	± 5%	200
C 4	1006755-69		1.0	± 10%	35
C 5	1006755-79		6.8	± 10%	35
C 6	1006755-13		39	± 10%	10
C 7	1010264-13		0.01	± 5%	200
C 8	1006755-15		120	± 10%	10
C 9	1010279-110		0.75		15
C 10	1006755-79		6.8		35
C 11	1010279-216		0.050		35
C 12	1006755-10		4.7	↓	10
C 13	1010264-18		0.027	± 5%	200
C 14	1006755-69		1.0	± 10%	35
C 16	1010359-5		100UUF	± 10%	200
C 17	1010359-5		100UUF	± 10%	200
C 18	1010264-21		0.047	± 5%	200
C 19	1010264-37		1.0	± 5%	200
C 20	1006755-21		22	± 10%	15
C 21	1006755-21		22	± 10%	15
C 22	1006755-69		1.0	± 10%	35
C 23	1006755-69		1.0	± 10%	35
C 24	1010264-13		0.01	± 5%	200
C 25	1006755-21		22	± 10%	15
C 26	1006755-21		22		15
C 27	1010279-219		0.09		35
C 28	1006755-79		6.8		35
C 29	1006755-69		1.0		35
C 30	1006755-79	↓	6.8		35 ↓
C 31	1006755-10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1008815-9	DIODE	IN965B		
CR2	1010372-11				
CR3	1008815-11		IN967B		
CR4	1010392-1		IN486B		
CR5	1010392-1		IN486B		
CR6	1010392-1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010829-10	↓	IN3025B		
CR10	1010372-1	DIODE			
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397-1	TRANSISTOR	2N930		
Q 6	1010397-1		2N930		
Q 7	1010397-1		2N930		
Q 8	1010357-1		2N720A		
Q 9	1010357-1		2N720A		
Q10	1010269-2		2N2151	MATCHED PAIR	
Q11		↓			
Q12	1010397-1	TRANSISTOR	2N930		
Q13	1010367	CHOPPER			
Q14	1010367	CHOPPER			
Q15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
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MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. DiLeo DATE 23 June
CHECKED A. Lingfelter 30 Dec 64
APPROVAL 1/13/64
APPROVAL 1-8-65
NASA APPROVAL 1-13-65
MIT APPROVAL 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

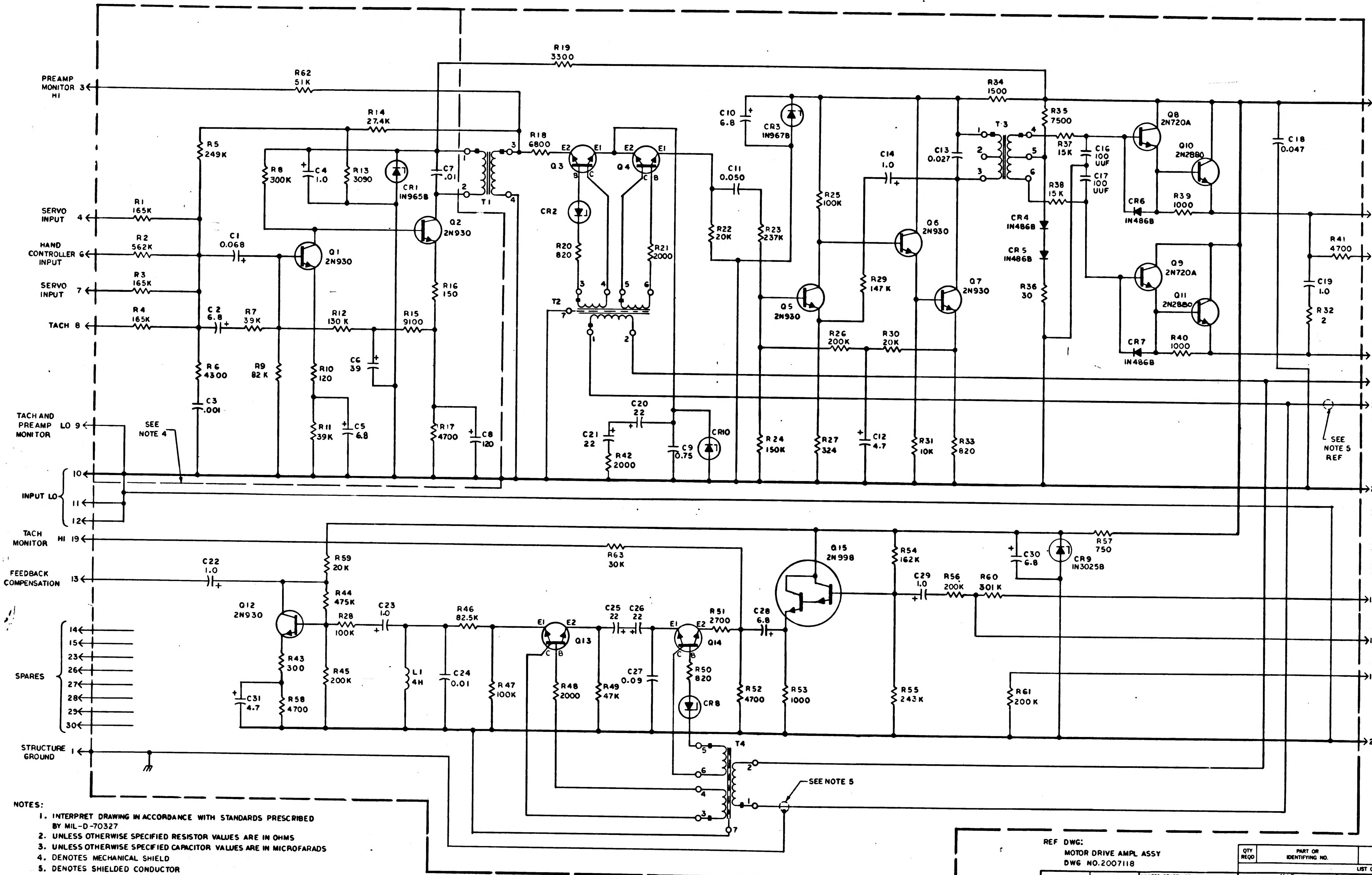
SCHEMATIC, MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010021
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15483

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	4/13/65	WR
B	REVISED PER TDRR 18796	6 MAY 65	WR
C	REVISED PER TDRR 20679	13 Jul 65	[illegible]
D	REVISION STATUS CHANGED	22 APR 66	JIMP RWH
E	REVISED PER TDRR 29132	1 JUN 66	JIMP RWH
F	REVISED PER TDRR 32504	11 JAN 67	REF



PREAMP MONITOR HI 3
SERVO INPUT 4
HAND CONTROLLER INPUT 6
SERVO INPUT 7
TACH 8
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10 11 12
TACH MONITOR HI 19
FEEDBACK COMPENSATION 13
SPARES 14 15 23 26 27 28 29 30
STRUCTURE GROUND 1
R1 165K
R2 562K
R3 165K
R4 165K
R5 249K
R6 4300
R7 39K
R8 300K
R9 82K
R10 120
R11 39K
R12 130K
R13 3090
R14 27.4K
R15 9100
R16 150
R17 4700
R18 6800
R19 3300
R20 820
R21 2000
R22 20K
R23 237K
R24 150K
R25 100K
R26 200K
R27 324
R29 147K
R30 20K
R31 10K
R33 820
R34 1500
R35 7500
R36 30
R37 15K
R38 15K
R39 1000
R40 1000
R41 4700
R32 2
R42 2000
R62 51K
C1 0.068
C2 6.8
C3 .001
C4 1.0
C5 6.8
C6 39
C7 .01
C8 120
C9 0.75
C10 6.8
C11 0.050
C12 4.7
C13 0.027
C14 1.0
C16 100 UUF
C17 100 UUF
C18 0.047
C19 1.0
C20 22
C21 22
Q1 2N930
Q2 2N930
Q3
Q4
Q5 2N930
Q6 2N930
Q7 2N930
Q8 2N720A
Q9 2N720A
Q10 2N2880
Q11 2N2880
CR1 1N965B
CR2
CR3 1N967B
CR4 1N486B
CR5 1N486B
CR6 1N486B
CR7 1N486B
CR10
T1
T2
T3
E1 E2 B C
22 B+
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0 VOLTS
R59 20K
R44 475K
R28 100K
R45 200K
R43 300
R58 4700
C31 4.7
C22 1.0
C23 1.0
R46 82.5K
L1 4H
C24 0.01
R47 100K
Q12 2N930
Q13
R48 2000
R49 47K
C25 22
C26 22
C27 0.09
Q14
R50 820
CR8
R51 2700
C28 6.8
R52 4700
R53 1000
R63 30K
Q15 2N998
R54 162K
R55 243K
C29 1.0
R56 200K
R60 301K
C30 6.8
CR9 1N3025B
R57 750
R61 200K
18
17
16
21 LO
T4
SEE NOTE 5

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO.2007118

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. D. Loo DATE 23 JUN 64
CHECKED A. Lindstrom 30 Dec 64
APPROVAL [illegible]
APPROVAL [illegible] 1-8-65
NASA APPROVAL W. J. [illegible] 1-13-65
MIT APPROVAL [illegible] 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010021
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15473

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 18098	4/13/6	
B	REVISED PER TDRR 18796	6 MAY 65	
C	REVISED PEP TDRR 20679	13 Jul, 65	
D	REVISED PER TDRR 28191	27 APR 66	JMP RMH
E	REVISED PER TDRR 29132	Jun 66	RMH
F	REVISED PER TDRR	13 JAN 67	REF E.S.

(M)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	± 1%	1/8 W
R 2	1010374-5		562K		
R 3	1010364-677		165K		
R 4	1010364-677		165K		
R 5	1010364 -711		249K	↓	↓
R 6	1006750-47		4300	± 2%	1/4 W
R 7	1006750-70		39K	± 2%	1/4 W
R 8	1010369-92		300K	± 5%	1/8 W
R 9	1006750-78		82K	± 2%	1/4 W
R 10	-10		120		
R 11	↓ -70		39K		
R 12	1006750-83		130K	↓	↓
R 13	1010364-345		3090	± 1%	1/8 W
R 14	1010364-527		27.4K	± 1%	1/8 W
R 15	1006750-55		9100	± 2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-52		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	↓ -39		2000		
R 22	1006750-63		20K	↓	↓
R 23	1010364-707		237K	± 1%	1/8 W
R 24	1010364-669		150K	± 1%	1/8 W
R 25	1006750-80		100K	± 2%	1/4 W
R 26	1010364-693		200K	± 1%	1/8 W
R 27	1010364 -157		324	± 1%	1/8 W
R 28	1010364 -635		100K	± 1%	1/8 W
R 29	1010364 -667		147K	± 1%	1/8 W
R 30	1006750-63		20K	± 2%	1/4 W
R 31	1006750 -56		10K	± 2%	1/4 W
R 32	1006788 -22		2	± 1%	1/4W
R 33	1006750 -30		820	± 2%	1/4W
R 34	1006750-36		1500	± 2%	1/4W
R 35	1006750-53		7500	± 2%	1/4W
R 36	1010369-138		30	± 5%	1/8 W
R 37	1006750-60		15K	± 2%	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	↓ -39		2000		
R 43	1006750-19		300	↓	↓
R 44	1010364-765		475K	± 1%	1/8 W
R 45	1010364 -693		200K	± 1%	1/8 W
R 46	1010364 -619		82.5K	± 1%	1/8W
R 47	1006750-80		100K	± 2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	↓ -48		4700		
R 53	1006750 -32		1000	↓	↓
R 54	1010364-675		162K	± 1%	1/8 W
R 55	1010364 -709		243K	± 1%	1/8W
R 56	1010364 -693		200K	± 1%	1/8W
R 57	1010604 -16		750	± 1%	1 W
R 58	1006750-48		4700	± 2%	1/4 W
R 59	1006750-63		20K	± 2%	1/4 W
R 60	1010364-727		301K	± 1%	1/8 W
R 61	1010364-693		200K	± 1%	1/8 W
R 62	1006750-73	↓	51K	± 2%	1/4 W
R 63	1006750-67	RESISTOR	30K	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-55	CAPACITOR	0.068	±10%	35 VDC
C 2	1006755-2		6.8	± 10%	6
C 3	1010264-1		0.001	± 5%	200
C 4	1006755-69		1.0	± 10%	35
C 5	1006755 -79		6.8	± 10%	35
C 6	1006755 -13		39	± 10%	10
C 7	1010264 -13		0.01	± 5%	200
C 8	1006755 -15		120	± 10%	10
C 9	1010279 -110		0.75		15
C 10	1006755 -79		6.8		35
C 11	1010279 -216		0.050		35
C 12	1006755-10		4.7	↓	10
C 13	1010264 -18		0.027	± 5%	200
C 14	1006755-69		1.0	± 10%	35
C 16	1010359-5		100UUF	± 10%	200
C 17	1010359-5		100UUF	± 10%	200
C 18	1010264-21		0.047	± 5%	200
C 19	1010264-37		1.0	± 5%	200
C 20	1006755 -21		22	±10%	15
C 21	1006755 -21		22	±10%	15
C 22	1006755 -69		1.0	±10%	35
C 23	1006755 -69		1.0	±10%	35
C 24	1010264-13		0.01	± 5%	200
C 25	1006755-21		22	± 10%	15
C 26	1006755-21		22		15
C 27	1010279-219		0.09		35
C 28	1006755 -79		6.8		35
C 29	1006755 -69		1.0		35
C 30	1006755 -79	↓	6.8		35 ↓
C 31	1006755 - 10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1008815 -9	DIODE	IN965B		
CR2	1010372-11				
CR3	1008815 -11		IN967B		
CR4	1010392-1		IN486B		
CR5	1010392 -1		IN486B		
CR6	1010392 -1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010829-10	↓	IN3025B		
CR10	1010372-1	DIODE			
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397 - 1	TRANSISTOR	2N930		
Q 6	1010397 - 1		2N930		
Q 7	1010397 - 1		2N930		
Q 8	1010357 - 1		2N720A		
Q 9	1010357 - 1		2N720A		
Q 10	1010843-2		2N2880	MATCHED PAIR	
Q 11		↓			
Q 12	1010397 - 1	TRANSISTOR	2N930		
Q 13	1010367	CHOPPER			
Q 14	1010367	CHOPPER			
Q 15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN a. DiLeo DATE 23 Jun 64
CHECKED A. Livingston 30 Dec 64
APPROVAL 1/13/64
APPROVAL Al Koso 1-8-65
NASA APPROVAL 1-13-65
MIT APPROVAL 13 Jan 65

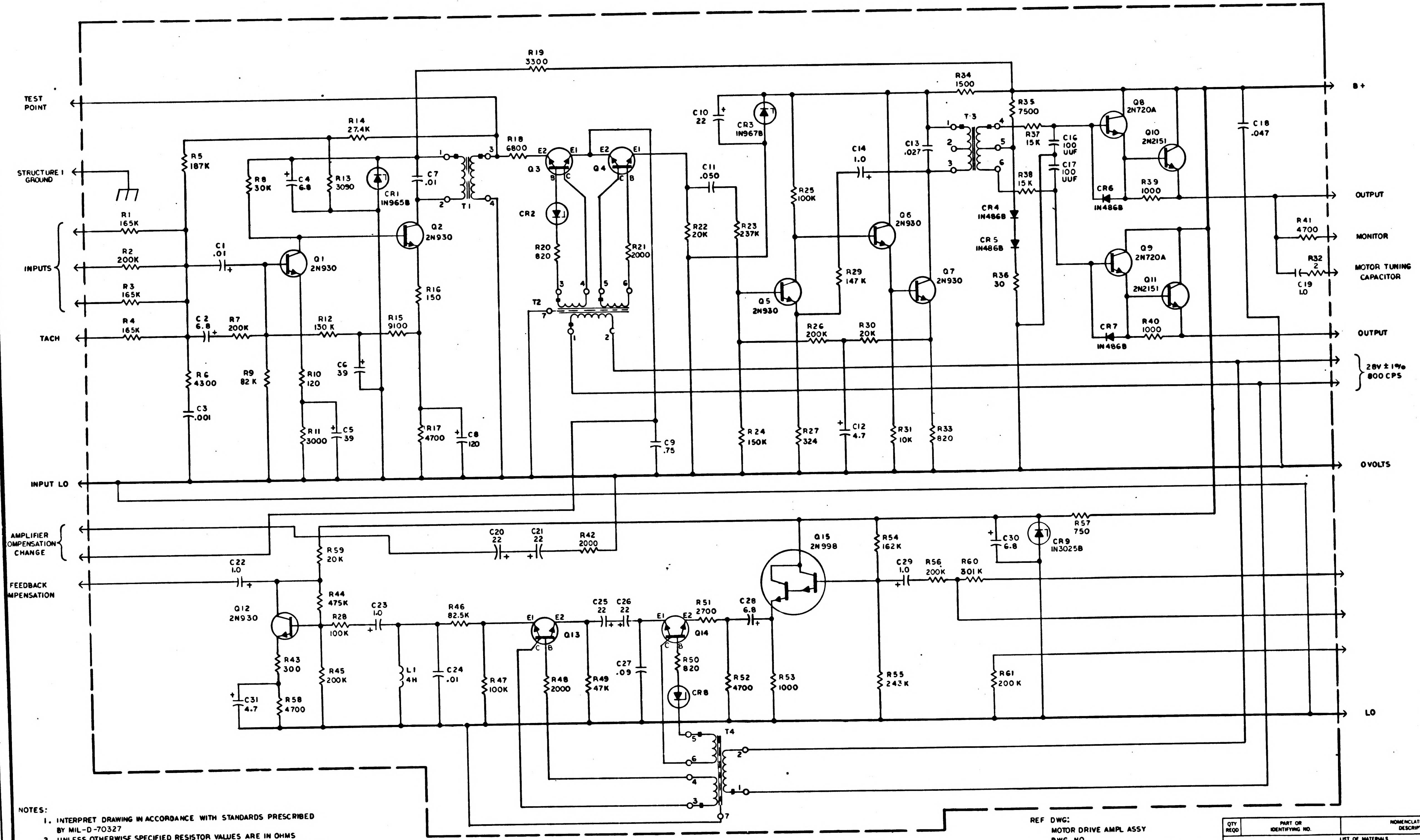
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010021
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



TEST POINT
STRUCTURE I GROUND
INPUTS
TACH
INPUT LO
AMPLIFIER COMPENSATION CHANGE
FEEDBACK COMPENSATION
B+
OUTPUT
MONITOR
MOTOR TUNING CAPACITOR
OUTPUT
28V ± 1% 800 CPS
0 VOLTS
LO
R1 165K
R2 200K
R3 165K
R4 165K
R5 187K
R6 4300
R7 200K
R8 30K
R9 82K
R10 120
R11 3000
R12 130K
R13 3090
R14 27.4K
R15 9100
R16 150
R17 4700
R18 6800
R19 3300
R20 820
R21 2000
R22 20K
R23 237K
R24 150K
R25 100K
R26 200K
R27 324
R29 147K
R30 20K
R31 10K
R33 820
R34 1500
R35 7500
R36 30
R37 15K
R38 15K
R39 1000
R40 1000
R41 4700
R32 2
R42 2000
R43 300
R44 475K
R45 200K
R46 82.5K
R47 100K
R48 2000
R49 47K
R50 820
R51 2700
R52 4700
R53 1000
R54 162K
R55 243K
R56 200K
R57 750
R58 4700
R59 20K
R60 301K
R61 200K
R28 100K
C1 .01
C2 6.8
C3 .001
C4 6.8
C5 39
C6 39
C7 .01
C8 120
C9 .75
C10 22
C11 .050
C12 4.7
C13 .027
C14 1.0
C16 100 UUF
C17 100 UUF
C18 .047
C19 1.0
C20 22
C21 22
C22 1.0
C23 1.0
C24 .01
C25 22
C26 22
C27 .09
C28 6.8
C29 1.0
C30 6.8
C31 4.7
CR1 1N965B
CR2
CR3 1N967B
CR4 1N486B
CR5 1N486B
CR6 1N486B
CR7 1N486B
CR8
CR9 1N3025B
Q1 2N930
Q2 2N930
Q3
Q4
Q5 2N930
Q6 2N930
Q7 2N930
Q8 2N720A
Q9 2N720A
Q10 2N2151
Q11 2N2151
Q12 2N930
Q13
Q14
Q15 2N998
E1 E2 B C
T1
T2
T·3
T4
L1 4H
1 2 3 4 5 6 7

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS

REF DWG:
MOTOR DRIVE AMPL ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
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MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT

DRAWN A. D. Lee DATE 25 JUN 64
CHECKED A. Lindstrom 30 Dec 64
APPROVAL
APPROVAL 1-8-65
NASA APPROVAL 1-13-65
MIT APPROVAL 13 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MOTOR DRIVE AMPLIFIER

CODE IDENT NO. ___
SIZE E
NASA DRAWING NO 2010021
SCALE ___ WT ___ SHEET 1 OF 2

2010021

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15483			
SYM	DESCRIPTION	DATE	APPROVAL

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	± 1%	1/8 W
R 2	-693		200K		
R 3	-677		165K		
R 4	-677		165K		
R 5	1010364 -687		187K		
R 6	1006750-47		4300	± 2%	1/4 W
R 7	1010369-88		200K	± 5%	1/8 W
R 8	1006750-67		30K	± 2%	1/4 W
R 9	-78		82K		
R 10	-10		120		
R 11	-43		3000		
R 12	1006750-83		130K		
R 13	1010364-345		3090	± 1%	1/8 W
R 14	1010364-527		27.4K	± 1%	1/8 W
R 15	1006750-55		9100	± 2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-52		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	-39		2000		
R 22	1006750-63		20K		
R 23	1010364-707		237K	± 1%	1/8 W
R 24	1010364-669		150K	± 1%	1/8 W
R 25	1006750-80		100K	± 2%	1/4 W
R 26	1010364-693		200K	± 1%	1/8 W
R 27	1010364 -157		324	± 1%	1/8 W
R 28	1010364 -635		100K	± 1%	1/8 W
R 29	1010364 -667		147K	± 1%	1/8 W
R 30	1006750-63		20K	± 2%	1/4 W
R 31	1006750 -56		10K	± 2%	1/4W
R 32	1006788 -22		2	± 1%	1/4W
R 33	1006750 -30		820	± 2%	1/4W
R 34	1006750-36		1500	± 2%	1/4W
R 35	1006750-53		7500	± 2%	1/4W
R 36	1010369-138		30	± 5%	1/8 W
R 37	1006750-60		15K	± 2%	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	-39		2000		
R 43	1006750-19		300		
R 44	1010364-765		475K	± 1%	1/8 W
R 45	1010364 -693		200K	± 1%	1/8 W
R 46	1010364 -619		82.5K	± 1%	1/8W
R 47	1006750-80		100K	± 2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	-48		4700		
R 53	1006750 -32		1000		
R 54	1010364-675		162K	± 1%	1/8 W
R 55	1010364 -709		243K	± 1%	1/8W
R 56	1010364 -693		200K	± 1%	1/8W
R 57	1010604 -16		750	± 1%	1 W
R 58	1006750-48		4700	± 2%	1/4 W
R 59	1006750-63		20K	± 2%	1/4 W
R 60	1010364-727		301K	± 1%	1/8 W
R 61	1010364-693	RESISTOR	200K	± 1%	1/8 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1010264-13	CAPACITOR	.01	± 5%	200VDC
C 2	1006755-2		6.8	± 10%	6
C 3	1010264-1		.001	± 5%	200
C 4	1006755-2		6.8	± 10%	6
C 5	1006755 -13		39	± 10%	10
C 6	1006755 -13		39	± 10%	10
C 7	1010264-13		.01	± 5%	200
C 8	1006755-15		120	± 10%	10
C 9	1010279 -110		.75		15
C 10	1006755 -21		22		15
C 11	1010279-216		.050		35
C 12	1006755-10		4.7		10
C 13	1010264 -18		.027	± 5%	200
C 14	1006755-69		1.0	± 10%	35
C 16	1010359-5		100UUF	± 10%	200
C 17	1010359-5		100UUF	± 10%	200
C 18	1010264-21		.047	± 5%	200
C 19	1010264-37		1.0	± 5%	200
C 20	1006755-21		22	± 10%	15
C 21	1006755 -21		22	± 10%	15
C 22	1006755 -69		1.0	± 10%	35
C 23	1006755 -69		1.0	± 10%	35
C 24	1010264-13		.01	± 5%	200
C 25	1006755-21		22	± 10%	15
C 26	1006755-21		22		15
C 27	1010279-219		.09		35
C 28	1006755-79		6.8		35
C 29	1006755 -69		1.0		35
C 30	1006755 -79		6.8		35
C 31	1006755 - 10	CAPACITOR	4.7		10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1010286-9	DIODE	IN965B		
CR2	1010372-11				
CR3	1010286-11		IN967B		
CR4	1010392-1		IN486B		
CR5	1010392-1		IN486B		
CR6	1010392-1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010265-10	DIODE	IN3025B		
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397-1	TRANSISTOR	2N 930		
Q 6	1010397-1		2N 930		
Q 7	1010397-1		2N 930		
Q 8	1010357-1		2N 720A		
Q 9	1010357-1		2N 720A		
Q 10	1010269-2		2N2151	MATCHED PAIR	
Q 11					
Q 12	1010397-1	TRANSISTOR	2N930		
Q 13	1010367	CHOPPER			
Q 14	1010367	CHOPPER			
Q 15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN A. Di Leo DATE 23 June
CHECKED A. Lingstrom 30 Dec 64
APPROVAL [illegible] 12/31/64
APPROVAL [illegible] -8-65
NASA APPROVAL [illegible] 1-13-65
MIT APPROVAL [illegible] 13 Jan 65

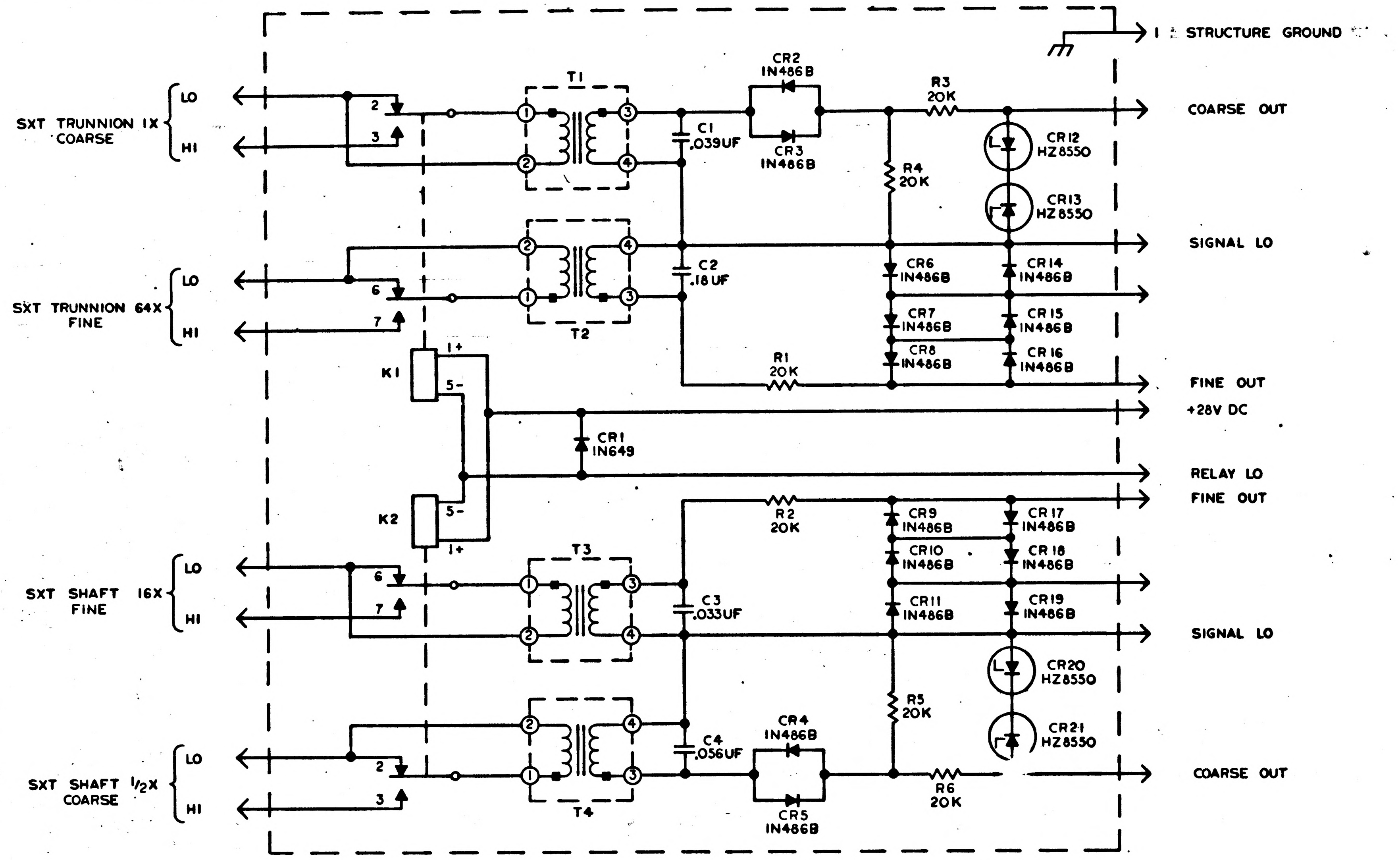
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MOTOR DRIVE AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010021
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 16270			


STRUCTURE GROUND
SXT TRUNNION 1X COARSE
LO
HI
2
3
T1
1
2
3
4
C1 .039UF
CR2 IN486B
CR3 IN486B
R3 20K
R4 20K
CR12 HZ8550
CR13 HZ8550
COARSE OUT
SXT TRUNNION 64X FINE
LO
HI
6
7
T2
C2 .18UF
CR6 IN486B
CR7 IN486B
CR8 IN486B
CR14 IN486B
CR15 IN486B
CR16 IN486B
SIGNAL LO
R1 20K
FINE OUT
K1
1+
5-
+28V DC
CR1 IN649
RELAY LO
K2
5-
1+
R2 20K
FINE OUT
CR9 IN486B
CR10 IN486B
CR11 IN486B
CR17 IN486B
CR18 IN486B
CR19 IN486B
SXT SHAFT 16X FINE
LO
HI
6
7
T3
C3 .033UF
SIGNAL LO
CR20 HZ8550
CR21 HZ8550
R5 20K
SXT SHAFT 1/2X COARSE
LO
HI
2
3
T4
C4 .056UF
CR4 IN486B
CR5 IN486B
R6 20K
COARSE OUT

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1010264-20	CAPACITOR	.039UF	±5%	200 V
C2	1010264-28	CAPACITOR	.18 UF	±5%	200 V
C3	1010264-19	CAPACITOR	.033UF	±5%	200 V
C4	1010264-22	CAPACITOR	.056UF	±5%	200 V
CR1	1010362-3	DIODE	IN649		
CR2	1010392-1	DIODE	IN486B		
CR3	1010392-1	DIODE	IN486B		
CR4	1010392-1	DIODE	IN486B		
CR5	1010392-1	DIODE	IN486B		
CR6	1010392-1	DIODE	IN486B		
CR7	1010392-1	DIODE	IN486B		
CR8	1010392-1	DIODE	IN486B		
CR9	1010392-1	DIODE	IN486B		
CR10	1010392-1	DIODE	IN486B		
CR11	1010392-1	DIODE	IN486B		
CR12	1010372-21	DIODE	HZ8550		
CR13	1010372-21	DIODE	HZ8550		
CR14	1010392-1	DIODE	IN486B		
CR15	1010392-1	DIODE	IN486B		
CR16	1010392-1	DIODE	IN486B		
CR17	1010392-1	DIODE	IN486B		
CR18	1010392-1	DIODE	IN486B		
CR19	1010392-	DIODE	IN486B		
CR20	1010372-21	DIODE	HZ8550		
CR21	1010372-21	DIODE	HZ8550		
K1	1010353-4	RELAY			
K2	1010353-4	RELAY			
R1	1010363-501	RESISTOR	20K	±1%	1/4 W
R2	1010363-501	RESISTOR	20K	±1%	1/4 W
R3	1010363-501	RESISTOR	20K	±1%	1/4 W
R4	1010363-501	RESISTOR	20K	±1%	1/4 W
R5	1010363-501	RESISTOR	20K	±1%	1/4 W
R6	1010363-501	RESISTOR	20K	±1%	1/4 W
T1	1010759	TRANSFORMER			
T2	1010759	TRANSFORMER			
T3	1010759	TRANSFORMER			
T4	1010759	TRANSFORMER			

NOTE
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REF DWG
TWO SPEED SWITCH ASSY
DWG NO. 2007121

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN Wunderlich DATE 1-FEB-65
CHECKED R. W. Drozewski 1-FEB-65
APPROVAL DA Koso 1-Feb-65
APPROVAL
NASA APPROVAL W J Rhine 2-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

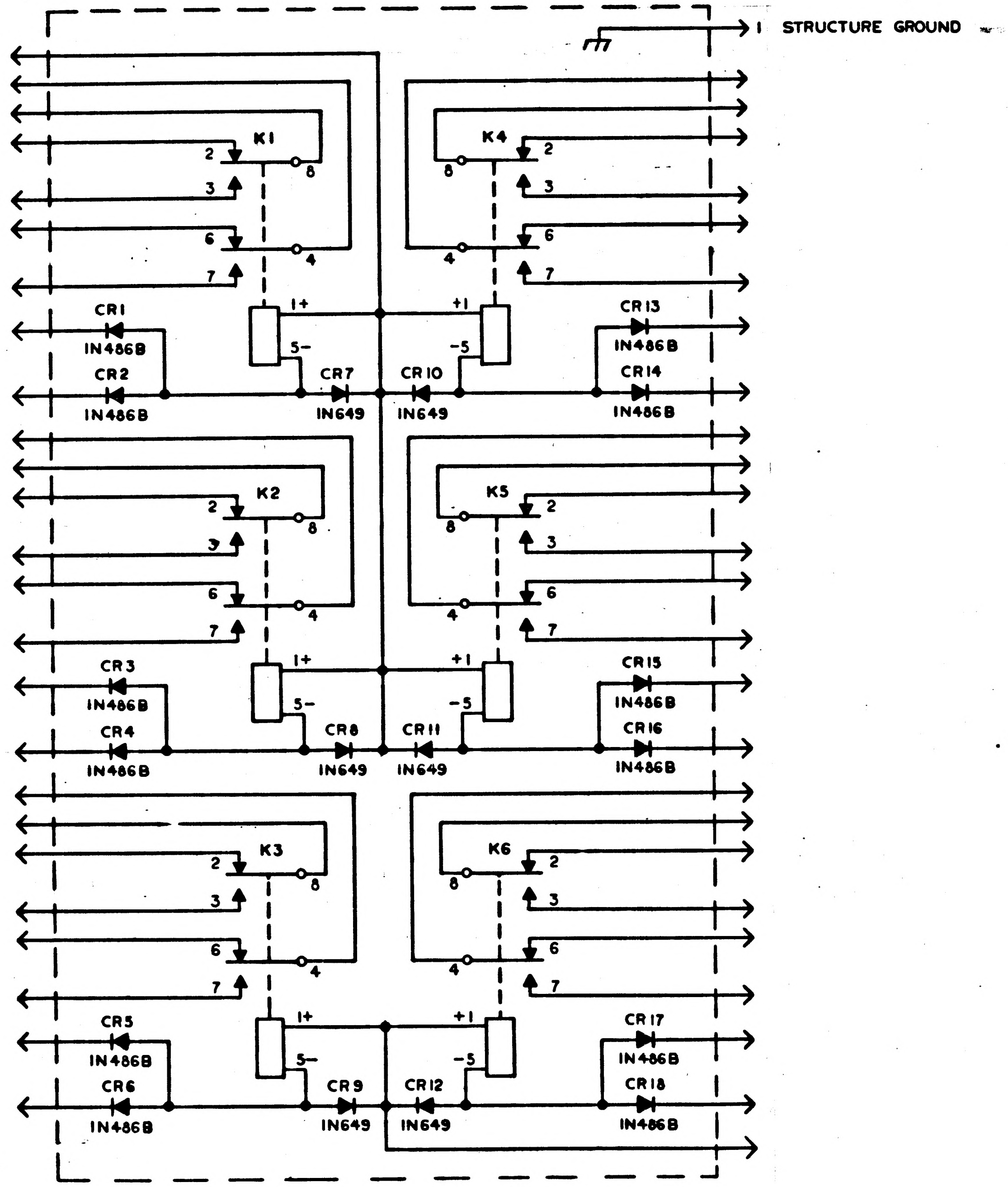
SCHEMATIC
TWO SPEED SWITCH

CODE IDENT NO.
SIZE D
NASA DRAWING NO. 2010023
SCALE —
WT
SHEET 1 OF 1

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16819			
SYM	DESCRIPTION	DATE	APPROVAL



REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
CR 1	1010392-1	DIODE	IN486B		
CR 2	1010392-1	DIODE	IN486B		
CR 3	1010392-1	DIODE	IN486B		
CR 4	1010392-1	DIODE	IN486B		
CR 5	1010392-1	DIODE	IN486B		
CR 6	1010392-1	DIODE	IN486B		
CR 7	1010837-3	DIODE	IN649		
CR 8	1010837-3	DIODE	IN649		
CR 9	1010837-3	DIODE	IN649		
CR10	1010837-3	DIODE	IN649		
CR11	1010837-3	DIODE	IN649		
CR12	1010837-3	DIODE	IN649		
CR13	1010392-1	DIODE	IN486B		
CR14	1010392-1	DIODE	IN486B		
CR15	1010392-1	DIODE	IN486B		
CR16	1010392-1	DIODE	IN486B		
CR17	1010392-1	DIODE	IN486B		
CR18	1010392-1	DIODE	IN486B		
K 1	1010353-4	RELAY			
K 2	1010353-4	RELAY			
K 3	1010353-4	RELAY			
K 4	1010353-4	RELAY			
K 5	1010353-4	RELAY			
K 6	1010353-4	RELAY			

2010025

REF DWG
RELAY ASSY
DWG NO 2007123

NOTE
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN Wunderlich DATE 1-Mar-65
CHECKED R.W. Drozewski
APPROVAL D.A. Koso 4-2-65
APPROVAL
NASA APPROVAL
MIT APPROVAL 24 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
RELAY ASSY

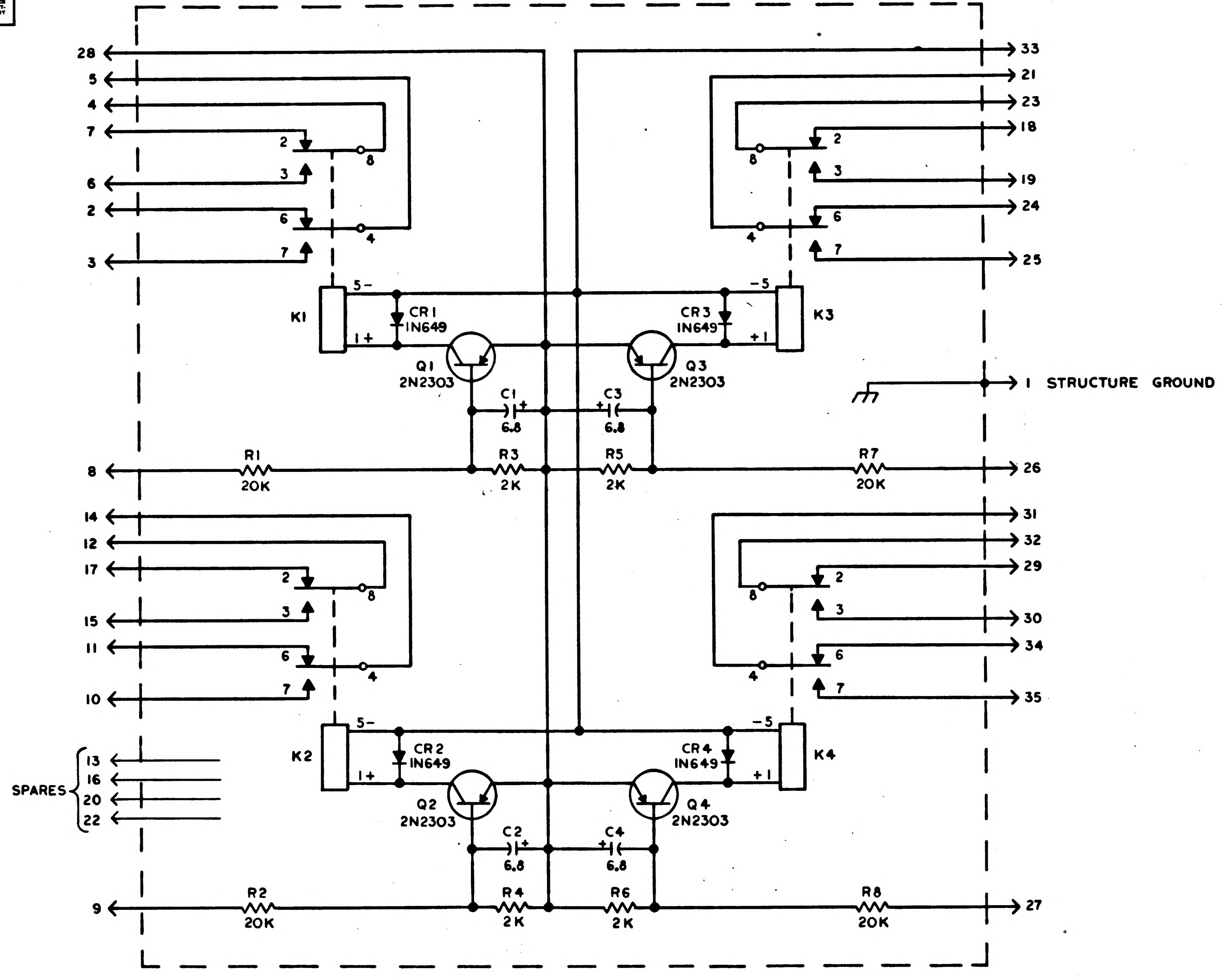
CODE IDENT NO. SIZE D NASA DRAWING NO. 2010025
SCALE — WT SHEET 1 OF 1

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16820

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20146	JJS	RL	18JUN65	WGM



28
5
4
7
6
2
3
33
21
23
18
19
24
25
2
3
6
7
8
4
K1
5-
1+
CR1
IN649
Q1
2N2303
CR3
IN649
-5
+1
K3
Q3
2N2303
1 STRUCTURE GROUND
C1
6.8
C3
6.8
8
R1
20K
R3
2K
R5
2K
R7
20K
26
14
12
17
15
11
10
31
32
29
30
34
35
K2
CR2
IN649
Q2
2N2303
CR4
IN649
K4
Q4
2N2303
SPARES
13
16
20
22
C2
6.8
C4
6.8
9
R2
20K
R4
2K
R6
2K
R8
20K
27

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-79	CAPACITOR	6.8	±10%	35V
C2	1006755-79	CAPACITOR	6.8	±10%	35V
C3	1006755-79	CAPACITOR	6.8	±10%	35V
C4	1006755-79	CAPACITOR	6.8	±10%	35V
CR1	1010837-3	DIODE	IN649		
CR2	1010837-3	DIODE	IN649		
CR3	1010837-3	DIODE	IN649		
CR4	1010837-3	DIODE	IN649		
K1	1010353-7	RELAY			
K2	1010353-7	RELAY			
K3	1010353-7	RELAY			
K4	1010353-7	RELAY			
Q1	1010345-1	TRANSISTOR	2N2303		
Q2	1010345-1	TRANSISTOR	2N2303		
Q3	1010345-1	TRANSISTOR	2N2303		
Q4	1010345-1	TRANSISTOR	2N2303		
R1	1006750-63	RESISTOR	20K	±2%	1/4 W
R2	1006750-63	RESISTOR	20K	±2%	1/4 W
R3	1006750-39	RESISTOR	2K	±2%	1/4 W
R4	1006750-39	RESISTOR	2K	±2%	1/4 W
R5	1006750-39	RESISTOR	2K	±2%	1/4 W
R6	1006750-39	RESISTOR	2K	±2%	1/4 W
R7	1006750-63	RESISTOR	20K	±2%	1/4 W
R8	1006750-63	RESISTOR	20K	±2%	1/4 W

NOTE
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REF DWG
OPTICS AUTOMATIC OPERATE RELAY ASSY
DWG NO. 2007126

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Wunderlich 19-FEB-65
CHECKED R.W. Arozewski 19-FEB-65
APPROVED LaRosso 19-Feb-65
APPROVED
APPROVED MIT W Cuyler 24Feb65
APPROVED MSC 2/25/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC OPTICS AUTOMATIC OPERATE RELAY

CODE IDENT NO.
SIZE D
DRAWING NO. 2010026
SCALE —
SHEET 1 OF 1

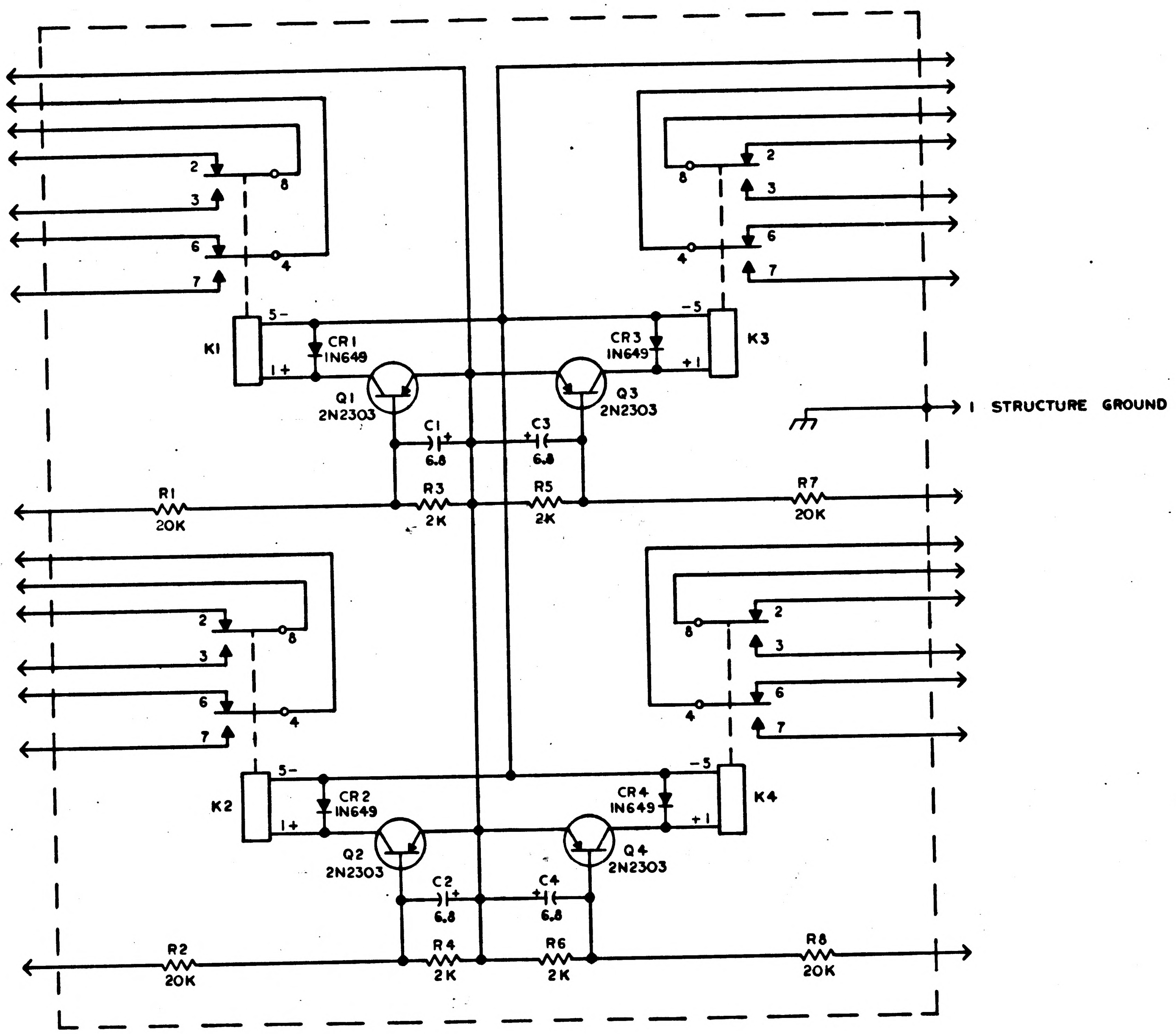
2010026 A

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16820

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-79	CAPACITOR	6.8	±10%	35V
C2	1006755-79	CAPACITOR	6.8	±10%	35V
C3	1006755-79	CAPACITOR	6.8	±10%	35V
C4	1006755-79	CAPACITOR	6.8	±10%	35V
CR1	1010837-3	DIODE	IN649		
CR2	1010837-3	DIODE	IN649		
CR3	1010837-3	DIODE	IN649		
CR4	1010837-3	DIODE	IN649		
K1	1010353-4	RELAY			
K2	1010353-4	RELAY			
K3	1010353-4	RELAY			
K4	1010353-4	RELAY			
Q1	1010345-1	TRANSISTOR	2N2303		
Q2	1010345-1	TRANSISTOR	2N2303		
Q3	1010345-1	TRANSISTOR	2N2303		
Q4	1010345-1	TRANSISTOR	2N2303		
R1	1006750-63	RESISTOR	20K	±2%	1/4W
R2	1006750-63	RESISTOR	20K	±2%	1/4W
R3	1006750-39	RESISTOR	2K	±2%	1/4W
R4	1006750-39	RESISTOR	2K	±2%	1/4W
R5	1006750-39	RESISTOR	2K	±2%	1/4W
R6	1006750-39	RESISTOR	2K	±2%	1/4W
R7	1006750-63	RESISTOR	20K	±2%	1/4W
R8	1006750-63	RESISTOR	20K	±2%	1/4W

NOTE
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REF DWG
OPTICS AUTOMATIC OPERATE RELAY ASSY
DWG NO

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Wunderlich 19-Feb-65
CHECKED R.W. Sroczewski 19-Feb-65
APPROVED [illegible] 19-Feb-65
APPROVED
APPROVED MIT [illegible] 24 Feb 65
APPROVED MSC [illegible] 2/23/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC OPTICS AUTOMATIC OPERATE RELAY

CODE IDENT NO.
SIZE D
DRAWING NO. 2010026
SCALE —
SHEET 1 OF 1

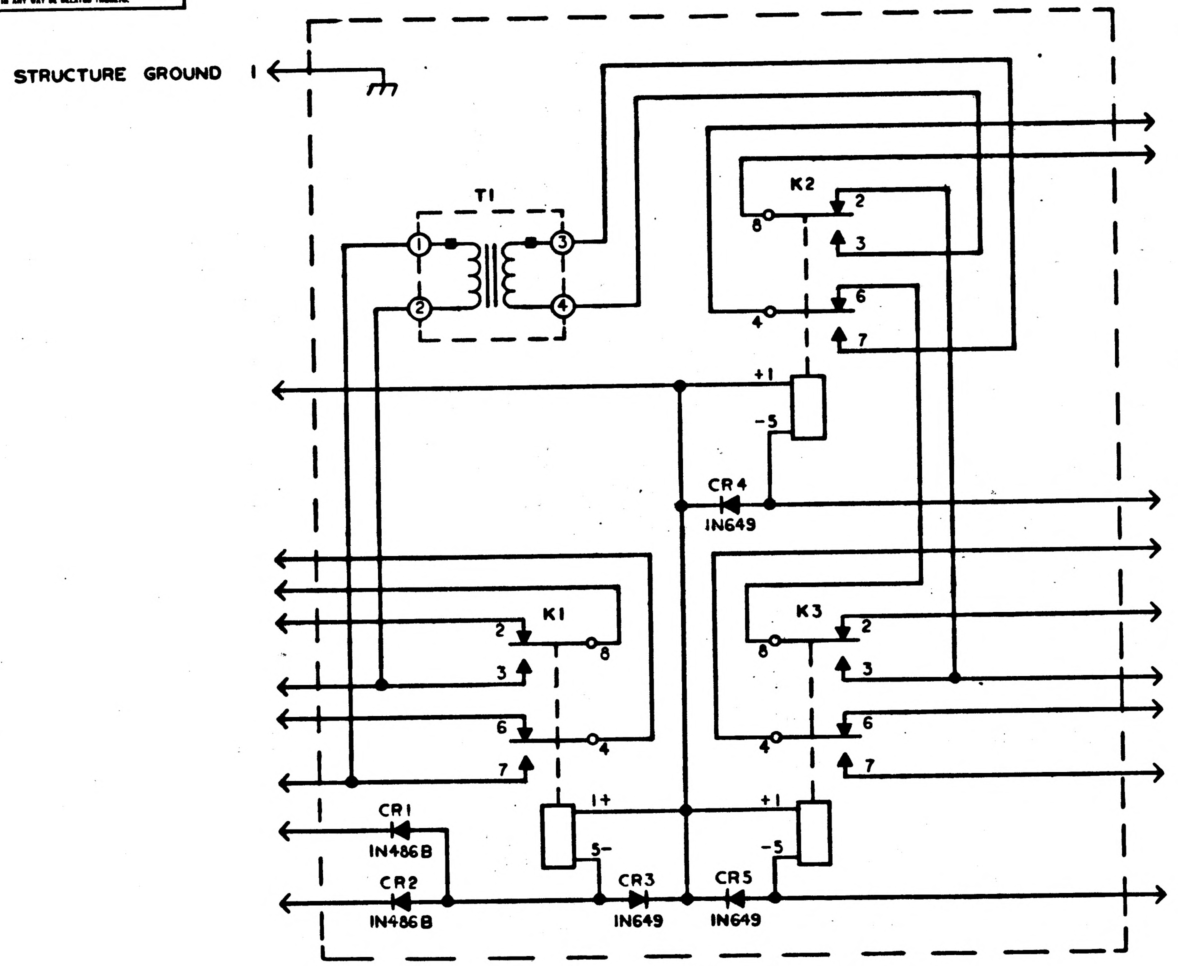
2010026

MASTER

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 16819

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
CR 1	1010392-1	DIODE	IN486B		
CR 2	1010392-1	DIODE	IN486B		
CR 3	1010837-3	DIODE	IN649		
CR 4	1010837-3	DIODE	IN649		
CR 5	1010837-3	DIODE	IN649		
K1	1010353-4	RELAY			
K2	1010353-4	RELAY			
K3	1010353-4	RELAY			
T1	1010605	TRANSFORMER			

2010027

REF DWG
SCT MODING TRANSFORMER ASSY
DWG NO 2007128

NOTE
INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Wunderlich 9-FEB-65
CHECKED R.W. Strozewski 16-FEB-65
APPROVED D.W. Kosso 16-2-65
APPROVED

APPROVED MIT W. Kupfer 24 Feb 65
APPROVED MSC 2/24/65
DATE

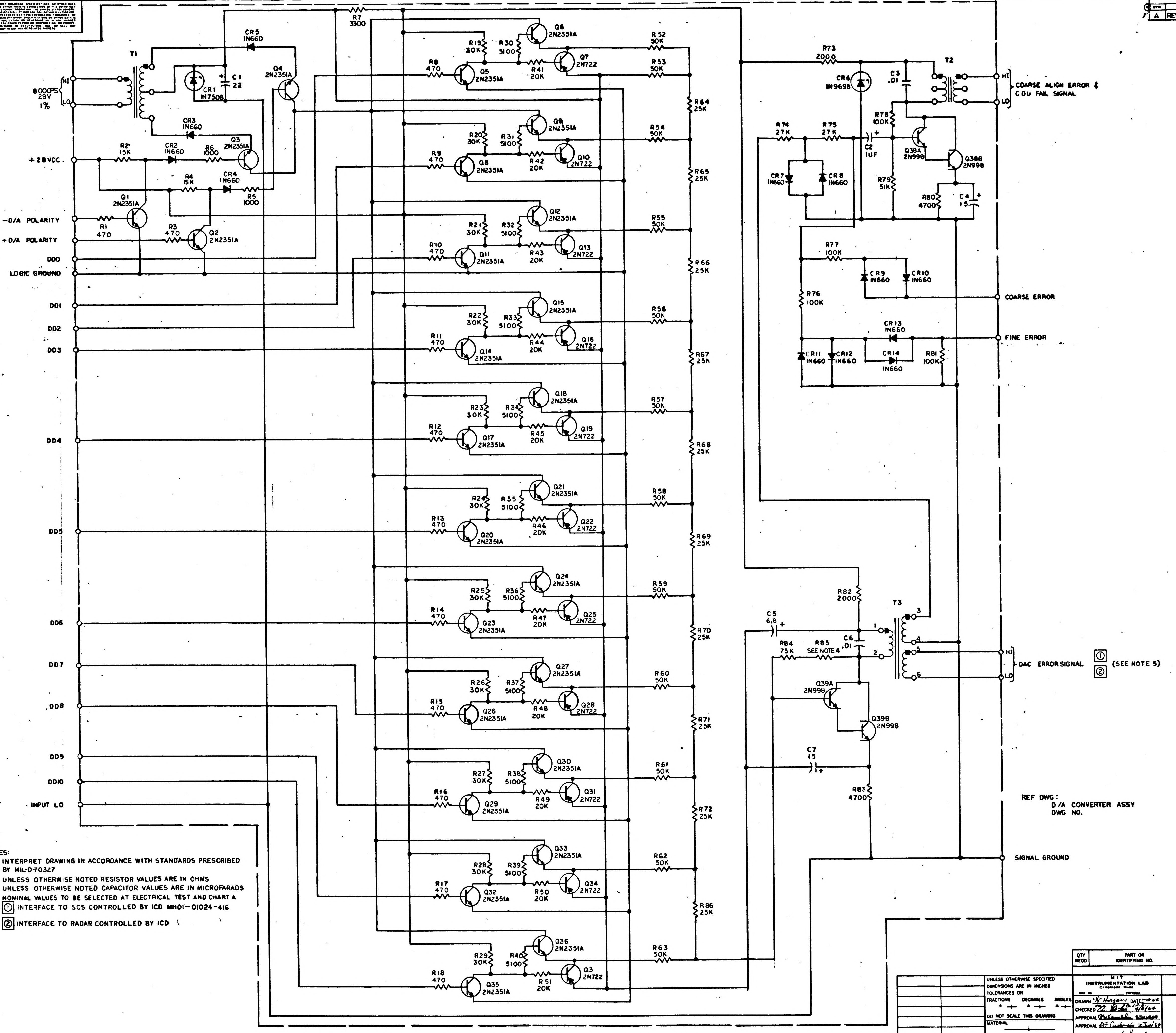
SCHEMATIC SCT MODING

CODE IDENT NO.
SIZE D
DRAWING NO. 2010027
SCALE —
SHEET 1 OF 1

LWD

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 0/7/64			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO 11355	8/12/64	


800CPS 28V 1%
HI
LO
T1
CR5 1N660
CR1 1N750B
C1 22
Q4 2N2351A
CR3 1N660
R7 3300
+28VDC
R2* 15K
CR2 1N660
R6 1000
Q3 2N2351A
R4 15K
CR4 1N660
R5 1000
Q1 2N2351A
-D/A POLARITY
R1 470
+D/A POLARITY
R3 470
Q2 2N2351A
DD0
LOGIC GROUND
DD1
DD2
DD3
DD4
DD5
DD6
DD7
DD8
DD9
DD10
INPUT LO
R8 470
Q5 2N2351A
R19 30K
R30 5100
Q6 2N2351A
R41 20K
Q7 2N722
R52 50K
R53 50K
R64 25K
R9 470
Q8 2N2351A
R20 30K
R31 5100
Q9 2N2351A
R42 20K
Q10 2N722
R54 50K
R65 25K
R10 470
Q11 2N2351A
R21 30K
R32 5100
Q12 2N2351A
R43 20K
Q13 2N722
R55 50K
R66 25K
R11 470
Q14 2N2351A
R22 30K
R33 5100
Q15 2N2351A
R44 20K
Q16 2N722
R56 50K
R67 25K
R12 470
Q17 2N2351A
R23 30K
R34 5100
Q18 2N2351A
R45 20K
Q19 2N722
R57 50K
R68 25K
R13 470
Q20 2N2351A
R24 30K
R35 5100
Q21 2N2351A
R46 20K
Q22 2N722
R58 50K
R69 25K
R14 470
Q23 2N2351A
R25 30K
R36 5100
Q24 2N2351A
R47 20K
Q25 2N722
R59 50K
R70 25K
R15 470
Q26 2N2351A
R26 30K
R37 5100
Q27 2N2351A
R48 20K
Q28 2N722
R60 50K
R71 25K
R16 470
Q29 2N2351A
R27 30K
R38 5100
Q30 2N2351A
R49 20K
Q31 2N722
R61 50K
R72 25K
R17 470
Q32 2N2351A
R28 30K
R39 5100
Q33 2N2351A
R50 20K
Q34 2N722
R62 50K
R86 25K
R18 470
Q35 2N2351A
R29 30K
R40 5100
Q36 2N2351A
R51 20K
Q3 2N722
R63 50K
R73 2000
CR6 1N969B
C3 .01
T2
HI
LO
COARSE ALIGN ERROR & CDU FAIL SIGNAL
R74 27K
R75 27K
C2 1UF
R78 100K
Q38A 2N998
Q38B 2N998
CR7 1N660
CR8 1N660
R79 51K
R80 4700
C4 15
R77 100K
CR9 1N660
CR10 1N660
R76 100K
COARSE ERROR
CR13 1N660
FINE ERROR
CR11 1N660
CR12 1N660
CR14 1N660
R81 100K
R82 2000
T3
C5 6.8
R84 75K
R85 SEE NOTE 4
C6 .01
1
2
3
4
5
6
HI
LO
DAC ERROR SIGNAL
①
②
(SEE NOTE 5)
Q39A 2N998
Q39B 2N998
C7 15
R83 4700
SIGNAL GROUND

REF DWG:
D/A CONVERTER ASSY
DWG NO.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. NOMINAL VALUES TO BE SELECTED AT ELECTRICAL TEST AND CHART A
5. ① INTERFACE TO SCS CONTROLLED BY ICD MH01-01024-416
   ② INTERFACE TO RADAR CONTROLLED BY ICD

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN W. Horgan DATE 1-13-64
CHECKED 4/6/64
APPROVAL 3 JUNE 64
APPROVAL D. F. Cushman 2 Jun '64
NASA APPROVAL 6/3/64
MIT APPROVAL 2 June 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010028
SCALE —
WT —
SHEET 1 OF 2

INCHES
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 09666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO 11355	9/11/64	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 -24	RESISTOR	470	± 2%	1/4 W
R2	-59		15K		
R3	-24		470		
R4	-59		15K		
R5	-32		1000		
R6	1006750-32		1000	± 2%	1/4W
R7	1010604-44		3300	± 1%	1W
R8	1006750-24		470	± 2%	1/4W
R9	-24		470		
R10	-24		470		
R11	-24		470		
R12	-24		470		
R13	-24		470		
R14	-24		470		
R15	-24		470		
R16	-24		470		
R17	-24		470		
R18	-24		470		
R19	-67		30K		
R20	-67		30K		
R21	67		30K		
R22	67		30K		
R23	67		30K		
R24	67		30K		
R25	67		30K		
R26	67		30K		
R27	67		30K		
R28	67		30K		
R29	67		30K		
R30	49		5100		
R31	49		5100		
R32	49		5100		
R33	49		5100		
R34	49		5100		
R35	49		5100		
R36	49		5100		
R37	49		5100		
R38	49		5100		
R39	49		5100		
R40	-49		5100		
R41	-63		20K		
R42	-63		20K		
R43	-63		20K		
R44	-63		20K		
R45	-63		20K		
R46	-63		20K		
R47	-63		20K		
R48	-63		20K		
R49	-63		20K		
R50	-63		20K		
R51	1006750-63		20K	±2%	1/4 W
R52	1010733-13		50K	±.1%	1/10 W
R53	-13		50K		
R54	-13		50K		
R55	-13		50K		
R56	-13		50K		
R57	-13		50K		
R58	-13		50K		
R59	-13		50K		
R60	-13		50K		
R61	-13		50K		
R62	-13		50K		
R63	-13		50K		
R64	-12		25K		
R65	-12		25K		
R66	-12		25K		
R67	-12		25K		
R68	-12		25K		
R69	-12		25K		
R70	-12		25K		
R71	-12		25K		
R72	1010733 - 12		25K	±.1 %	1/10 W
R73	1006750-39		2000	±2 %	1/4 W
R74	-66		27K		
R75	-66		27K		
R76	-80		100K		
R77	-80		100K		
R78	-80		100K		
R79	-73		51K		
R80	-48		4700		
R81	-80		100K		
R82	-39		2000		
R83	1006750-48		4700	±2 %	1/4 W
R84	1010733 -116		75K	±1 %	1/10W
R85	SEE CHART A		NOM		
R86	1010733 - 12		25K	±.1%	1/10W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2	1010343-3				
Q3	1010343-3				
Q4	1010343-3				
Q5	1010343-3				
Q6	1010343-3		2N2351A		
Q7	1010285		2N722		
Q8	1010343-3		2N2351A		
Q9	1010343-3		2N2351A		
Q10	1010285		2N722		
Q11	1010343-3		2N2351A		
Q12	1010343-3		2N2351A		
Q13	1010285		2N722		
Q14	1010343-3		2N2351A		
Q15	1010343-3		2N2351A		
Q16	1010285		2N722		
Q17	1010343-3		2N2351A		
Q18	1010343-3		2N2351A		
Q19	1010285		2N722		
Q20	1010343-3		2N2351A		
Q21	1010343-3		2N2351A		
Q22	1010285		2N722		
Q23	1010343-3		2N2351A		
Q24	1010343-3		2N2351A		
Q25	1010285		2N722		
Q26	1010343-3		2N2351A		
Q27	1010343-3		2N2351A		
Q28	1010285		2N722		
Q29	1010343-3		2N2351A		
Q30	1010343-3		2N2351A		
Q31	1010285		2N722		
Q32	1010343-3		2N2351A		
Q33	1010343-3		2N2351A		
Q34	1010285		2N722		
Q35	1010343-3		2N2351A		
Q36	1010343-3		2N2351A		
Q37	1010285		2N722		
Q38	1010342		2N998		
Q39	1010342		2N998		
CR1	1010372-10	DIODE	IN750B	±5%	
CR2	1010385		IN660		
CR3	1010385				
CR4	1010385				
CR5	1010385		IN660		
CR6	1010286 -13		IN969B		
CR7	1010385		IN660		
CR8	1010385				
CR9	1010385				
CR10	1010385				
CR11	1010385				
CR12	1010385				
CR13	1010385				
CR14	1010385		IN660		
C1	1006755-21	CAPACITOR	22 UF	±10%	15 VDC
C2	1006755-69		1.0		35
C3	1006777-31		.01		100
C4	1006755-33		15		20
C5	1006777-79		6.8		35
C6	1006777-31		.01 UF	±10%	100VDC
T1	1010723	TRANSFORMER			
T2	1010324				
T3	1010726				

CHART A

R85 ±1% 1/10W

PART NO.	VALUE
1010733-105	10K
-106	11K
-107	12K
-108	13K
-109	14K
-110	15K
-111	16K
-112	17K
-113	18K
-114	19K
1010733-115	20K

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN W. Horgan DATE 1-15-64
CHECKED 2/6/64
APPROVAL 23 Jun 64
APPROVAL 2 Jun 64
NASA APPROVAL 6/2/64
MIT APPROVAL 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

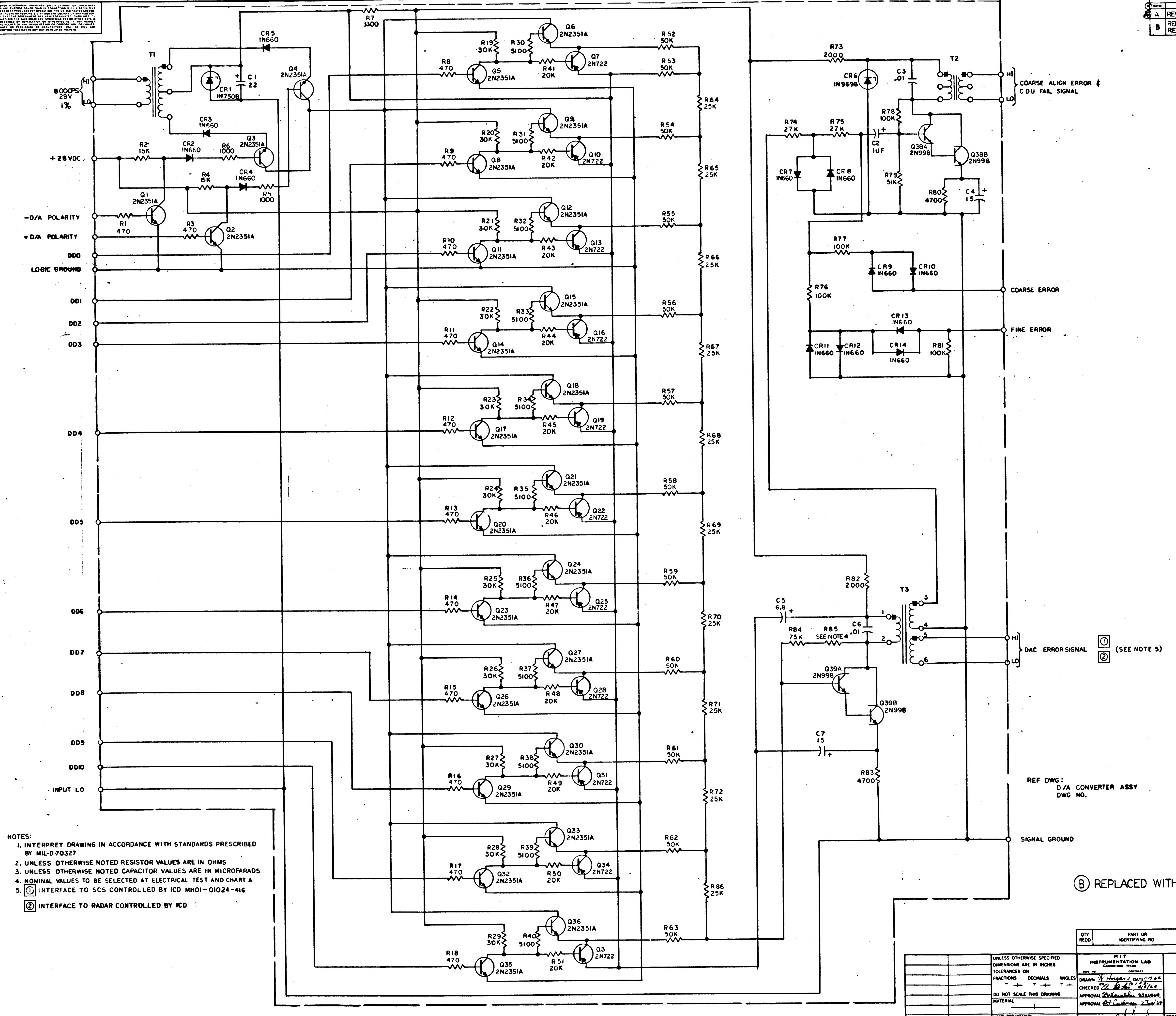
CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010028
SCALE —
WT —
SHEET 2 OF 2

2010028

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 09766			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO 11355	8/12/64	
B	REPLACED WITH CHANGE BY REV C PER TDRR 15733	1/26/65	WK


800CPS
28V
1%
HI
LO
T1
CR1
IN750B
C1
22
CR5
IN660
Q4
2N2351A
CR3
IN660
R7
3300
+28VDC
R2*
15K
CR2
IN660
R6
1000
Q3
2N2351A
R4
15K
CR4
IN660
R5
1000
Q1
2N2351A
R1
470
R3
470
Q2
2N2351A
-D/A POLARITY
+D/A POLARITY
DD0
LOGIC GROUND
DD1
DD2
DD3
DD4
DD5
DD6
DD7
DD8
DD9
DD10
INPUT LO
R8 470
Q5 2N2351A
R19 30K
R30 5100
Q6 2N2351A
R41 20K
Q7 2N722
R52 50K
R53 50K
R64 25K
R9 470
Q8 2N2351A
R20 30K
R31 5100
Q9 2N2351A
R42 20K
Q10 2N722
R54 50K
R65 25K
R10 470
Q11 2N2351A
R21 30K
R32 5100
Q12 2N2351A
R43 20K
Q13 2N722
R55 50K
R66 25K
R11 470
Q14 2N2351A
R22 30K
R33 5100
Q15 2N2351A
R44 20K
Q16 2N722
R56 50K
R67 25K
R12 470
Q17 2N2351A
R23 30K
R34 5100
Q18 2N2351A
R45 20K
Q19 2N722
R57 50K
R68 25K
R13 470
Q20 2N2351A
R24 30K
R35 5100
Q21 2N2351A
R46 20K
Q22 2N722
R58
R69 25K
R14 470
Q23 2N2351A
R25 30K
R36 5100
Q24 2N2351A
R47 20K
Q25 2N722
R59 50K
R70 25K
R15 470
Q26 2N2351A
R26 30K
R37 5100
Q27 2N2351A
R48 20K
Q28 2N722
R60 50K
R71 25K
R16 470
Q29 2N2351A
R27 30K
R38 5100
Q30 2N2351A
R49 20K
Q31 2N722
R61 50K
R72 25K
R17 470
Q32 2N2351A
R28 30K
R39 5100
Q33 2N2351A
R50 20K
Q34 2N722
R62 50K
R86 25K
R18 470
Q35 2N2351A
R29 30K
R40 5100
Q36 2N2351A
R51 20K
Q3 2N722
R63 50K
R73 2000
CR6 IN969B
C3 .01
T2
HI
LO
COARSE ALIGN ERROR &
CDU FAIL SIGNAL
R74 27K
R75 27K
C2 1UF
R78 100K
Q38A 2N998
Q38B 2N998
CR7 IN660
CR8 IN660
R79 51K
R80 4700
C4 15
R77 100K
CR9 IN660
CR10 IN660
R76 100K
COARSE ERROR
CR13 IN660
FINE ERROR
CR11 IN660
CR12 IN660
CR14 IN660
R81 100K
R82 2000
T3
C5 6.8
R84 75K
R85 SEE NOTE 4
C6 .01
1
2
3
4
5
6
DAC ERROR SIGNAL
① ② (SEE NOTE 5)
Q39A 2N998
Q39B 2N998
C7 15
R83 4700
SIGNAL GROUND

REF DWG:
D/A CONVERTER ASSY
DWG NO.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. NOMINAL VALUES TO BE SELECTED AT ELECTRICAL TEST AND CHART A
5. ① INTERFACE TO SCS CONTROLLED BY ICD MH01-01024-416
   ② INTERFACE TO RADAR CONTROLLED BY ICD

Ⓑ REPLACED WITH CHANGE BY REV C

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN W. Horgan DATE 1-15-64
CHECKED 4/6/64
APPROVAL 2 Jun 64
APPROVAL 2 Jun '64
NASA APPROVAL 6/5/64
MIT APPROVAL 2 June 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, D/A CONVERTER

CODE IDENT NO —
SIZE E
NASA DRAWING NO 2010028
SCALE —
WT —
SHEET 1 OF 2

MASTER

2010028 B

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 096666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO 11355	6/12/64	
B	REPLACED WITH CHANGE BY REV C PER TDRR 15733	1/26/65	WK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 -24	RESISTOR	470	± 2%	1/4 W
R2	-59		15 K		
R3	-24		470		
R4	-59		15 K		
R5	-32		1000		
R6	1006750 -32		1000	± 2%	1/4W
R7	1010604 -44		3300	± 1%	1W
R8	1006750 -24		470	± 2%	1/4W
R9	-24		470		
R10	-24		470		
R11	-24		470		
R12	-24		470		
R13	-24		470		
R14	-24		470		
R15	-24		470		
R16	-24		470		
R17	-24		470		
R18	-24		470		
R19	-67		30K		
R20	-67		30K		
R21	67		30K		
R22	67		30K		
R23	67		30K		
R24	67		30K		
R25	67		30K		
R26	67		30K		
R27	67		30K		
R28	67		30K		
R29	67		30K		
R30	49		5100		
R31	49		5100		
R32	49		5100		
R33	49		5100		
R34	49		5100		
R35	49		5100		
R36	49		5100		
R37	49		5100		
R38	49		5100		
R39	49		5100		
R40	-49		5100		
R41	-63		20K		
R42	-63		20K		
R43	-63		20K		
R44	-63		20K		
R45	-63		20K		
R46	-63		20K		
R47	-63		20K		
R48	-63		20K		
R49	-63		20K		
R50	-63		20K		
R51	1006750 -63		20K	±2%	1/4 W
R52	1010733 - 13		50K	±1%	1/10 W
R53	- 13		50K		
R54	- 13		50K		
R55	- 13		50K		
R56	- 13		50K		
R57	- 13		50K		
R58	- 13		50K		
R59	- 13		50K		
R60	- 13		50K		
R61	- 13		50K		
R62	- 13		50K		
R63	- 13		50K		
R64	- 12		25K		
R65	- 12		25K		
R66	- 12		25K		
R67	- 12		25K		
R68	- 12		25K		
R69	- 12		25K		
R70	- 12		25K		
R71	- 12		25K		
R72	1010733 - 12		25K	±1%	1/10 W
R73	1006750 - 39		2000	±2%	1/4 W
R74	- 66		27K		
R75	- 66		27K		
R76	- 80		100K		
R77	- 80		100K		
R78	- 80		100K		
R79	- 73		51K		
R80	- 48		4700		
R81	- 80		100K		
R82	- 39		2000		
R83	1006750 - 48		4700	±2%	1/4 W
R84	1010733 - 116		75K	±1%	1/10 W
R85	SEE CHART A		NOM		
R86	1010733 - 12		25K	±1%	1/10W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2	1010343-3				
Q3	1010343-3				
Q4	1010343-3				
Q5	1010343-3				
Q6	1010343-3		2N2351A		
Q7	1010285		2N722		
Q8	1010343-3		2N2351A		
Q9	1010343-3		2N2351A		
Q10	1010285		2N722		
Q11	1010343-3		2N2351A		
Q12	1010343-3		2N2351A		
Q13	1010285		2N722		
Q14	1010343-3		2N2351A		
Q15	1010343-3		2N2351A		
Q16	1010285		2N722		
Q17	1010343-3		2N2351A		
Q18	1010343-3		2N2351A		
Q19	1010285		2N722		
Q20	1010343-3		2N2351A		
Q21	1010343-3		2N2351A		
Q22	1010285		2N722		
Q23	1010343-3		2N2351A		
Q24	1010343-3		2N2351A		
Q25	1010285		2N722		
Q26	1010343-3		2N2351A		
Q27	1010343-3		2N2351A		
Q28	1010285		2N722		
Q29	1010343-3		2N2351A		
Q30	1010343-3		2N2351A		
Q31	1010285		2N722		
Q32	1010343-3		2N2351A		
Q33	1010343-3		2N2351A		
Q34	1010285		2N722		
Q35	1010343-3		2N2351A		
Q36	1010343-3		2N2351A		
Q37	1010285		2N722		
Q38	1010342		2N998		
Q39	1010342		2N998		
CR1	1010372-10	DIODE	1N750B	±5%	
CR2	1010385		1N660		
CR3	1010385				
CR4	1010385				
CR5	1010385		1N660		
CR6	1010286 -13		1N969B		
CR7	1010385		1N660		
CR8	1010385				
CR9	1010385				
CR10	1010385				
CR11	1010385				
CR12	1010385				
CR13	1010385				
CR14	1010385		1N660		
C1	1006755-21	CAPACITOR	22 UF	±10%	15 VDC
C2	1006755-69		1.0		35
C3	1006777-31		.01		100
C4	1006755-33		15		20
C5	1006777-79		6.8		35
C6	1006777-31		.01 UF	±10%	100VDC
T1	1010723	TRANSFORMER			
T2	1010324				
T3	1010726				

CHART A

R85 ± 1% 1/10 W

PART NO.	VALUE
1010733 - 105	10 K
- 106	11 K
- 107	12 K
- 108	13 K
- 109	14 K
- 110	15 K
- 111	16 K
- 112	17 K
- 113	18 K
- 114	19 K
1010733 - 115	20 K

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN W. Horgan DATE 1-15-64
CHECKED 4/6/64
APPROVAL
APPROVAL 2 Jun '64
NASA APPROVAL 6/12/64
MIT APPROVAL 2 Jun 64

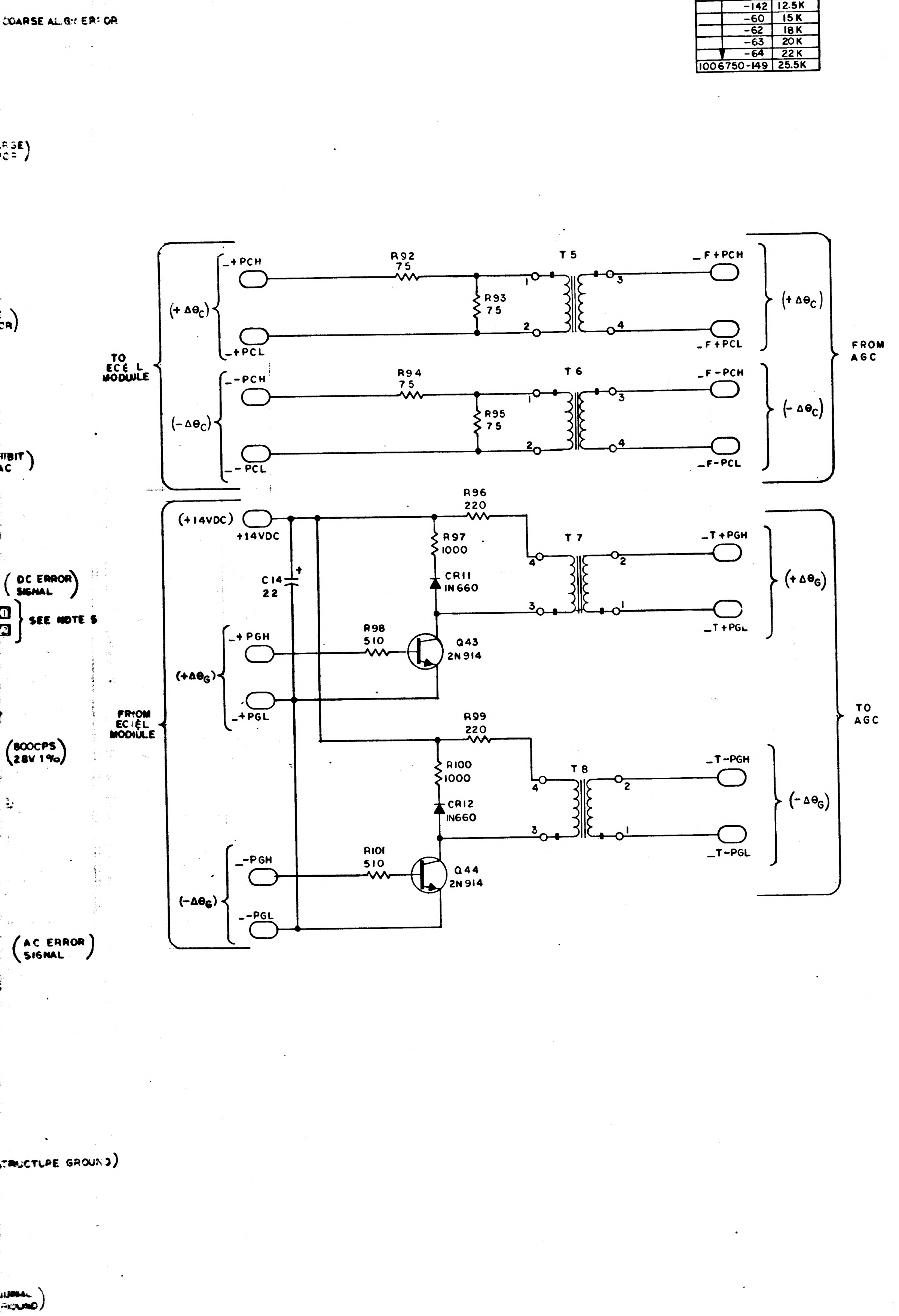
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO —
SIZE E
NASA DRAWING NO 2010028
SCALE —
WT —
SHEET 2 OF 2

MASTER

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WR.


COARSE ALIGN ERROR
ERSE)
TC=)
CR)
IBIT)
AC
(DC ERROR SIGNAL)
SEE NOTE 5
(800CPS 28V 1%)
(AC ERROR SIGNAL)
STRUCTURE GROUND)
SIGNAL GROUND)
TO ECEL MODULE
FROM ECIEL MODULE
FROM AGC
TO AGC
(+Δθ_C)
(−Δθ_C)
(+Δθ_G)
(−Δθ_G)
+PCH
+PCL
−PCH
−PCL
+PGH
+PGL
−PGH
−PGL
F+PCH
F+PCL
F−PCH
F−PCL
T+PGH
T+PGL
T−PGH
T−PGL
(+14VDC)
+14VDC
R92 75
R93 75
R94 75
R95 75
R96 220
R97 1000
R98 510
R99 220
R100 1000
R101 510
T5
T6
T7
T8
C14 22
CR11 IN660
CR12 IN660
Q43 2N914
Q44 2N914
1
2
3
4

R64	
PART NO.	VALUE
1006750-41	2.4K
-49	5.1K
-53	7.5K
-56	10K
-142	12.5K
-60	15K
-62	18K
-63	20K
-64	22K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1006750-31		910	±2%	1/4W
R63	1006750-80		100K		
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-39		2000	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-32		1000		1/4W
R74	-66		27K		
R75	-80		100K		
R76	-73		51K		
R77	-51		6200		
R78	-79		91K		
R79	-48		4700		
R80	1006750-52		6800	±2%	1/4W
R81	1006750-20		330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	-53		7500		
R86	-24		470		
R87	-37		1600		
R88	1006750-32		1000	±2%	1/4W
R89	1010369-86		160K	±5%	1/8W
R90	1006750-68		33K	±2%	1/4W
R91	-39		2000		
R92	-5		75		
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	1006750-25	RESISTOR	510	±2%	1/8W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-81		10.0		35
C12	1006755-21		22		15
C13	1006755-79		6.8		35
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-10				
CR5	1010385		IN660		
CR6	1010830-13		IN969B		
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	IN660		
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010315-1		2N2303		
Q35	1010342		2N998		
Q36	1010357-1		2N720A		
Q37	1010357-1		2N720A		
Q38	1010652-1		2N2980		
Q39	1010652-1		2N2980		
Q40	1010285		2N722		
Q41	1010285		2N722		
Q42	1010397-1		2N930		
Q43	1006752		2N914		
Q44	1006752	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010324				
T3	1010726				
T4	1010365				
T5	1006762				
T6	1006762				
T7	1006762				
T8	1006762	TRANFORMER			

REF DWG:
D/A CONVERTER MODULE ASSY
DWG NO. 2007137

Ⓒ REPLACES REV. B WITH CHANGE

㉞

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

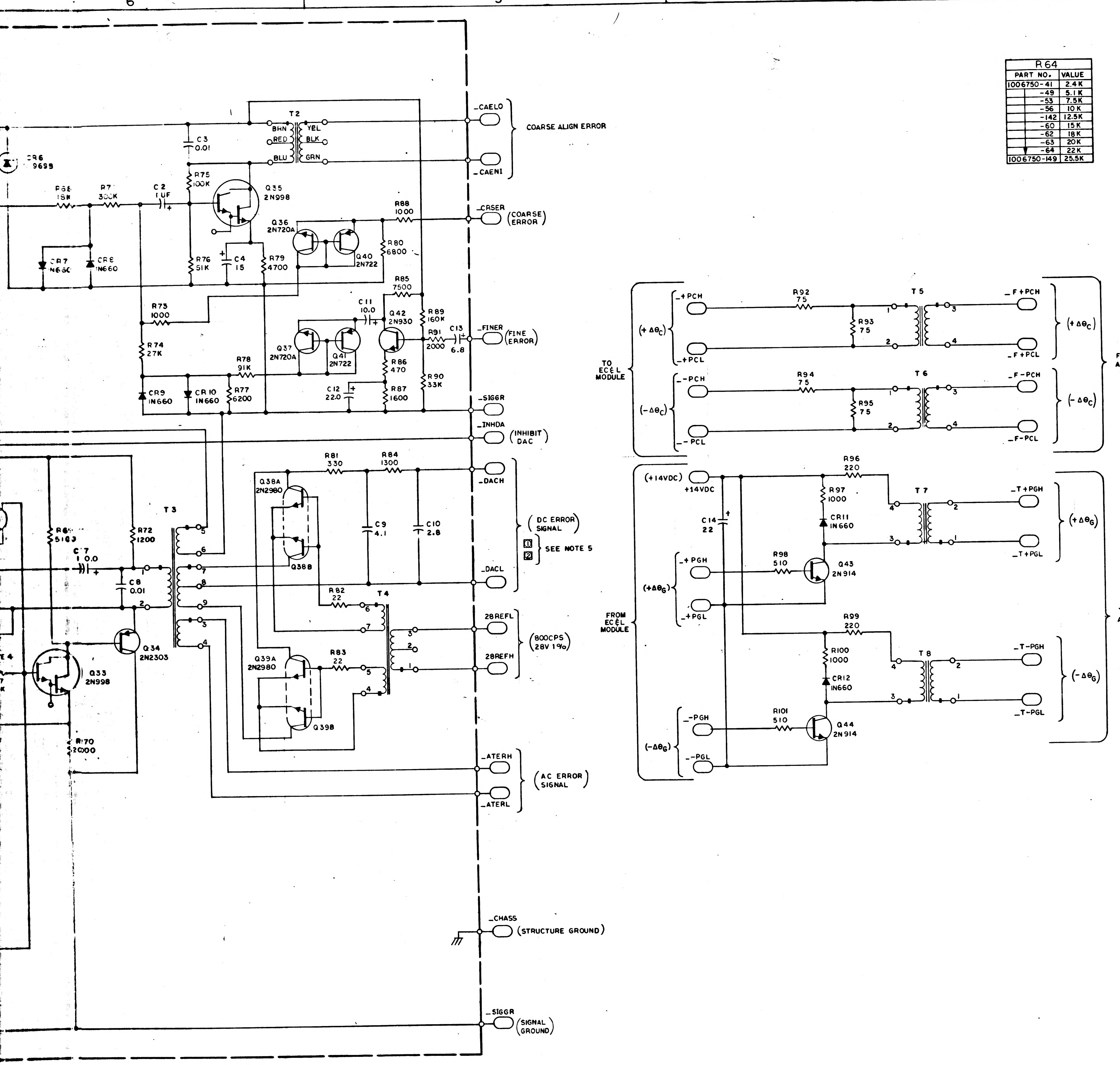
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. Di Leo DATE 18 DEC 64
CHECKED E. Lindstrom 15 Jan 65
APPROVAL 22 Jan 65
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. — | SIZE J | NASA DRAWING NO. 2010028
SCALE — | WT — | SHEET 1 OF 1


T2
BRN
RED
BLU
YEL
BLK
GRN
C3
0.01
CR6
9659
R68
18K
R71
300K
C2
1 UF
R75
100K
Q35
2N998
CR7
1N660
CR8
1N660
R76
51K
C4
15
R79
4700
Q36
2N720A
Q40
2N722
R88
1000
R80
6800
R85
7500
R73
1000
C11
10.0
Q42
2N930
R89
160K
R91
2000
C13
6.8
R74
27K
Q37
2N720A
Q41
2N722
R86
470
R78
91K
C12
22.0
R87
1600
R90
33K
CR9
1N660
CR10
1N660
R77
6200
_CAELO
_CAENI
COARSE ALIGN ERROR
_CASER
(COARSE ERROR)
_FINER
(FINE ERROR)
_SIGGR
_INHDA
(INHIBIT DAC)
R81
330
R84
1300
Q38A
2N2980
Q38B
C9
4.1
C10
2.8
_DACH
_DACL
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
T3
R69
5100
R72
1200
C7
10.0
C8
0.01
Q34
2N2303
Q33
2N998
R170
2000
R82
22
T4
Q39A
2N2980
Q39B
R83
22
28REFL
28REFH
(800CPS 28V 1%)
_ATERH
_ATERL
(AC ERROR SIGNAL)
_CHASS
(STRUCTURE GROUND)
_SIGGR
(SIGNAL GROUND)
TO EC&L MODULE
(+Δθ_C)
_+PCH
_+PCL
R92
75
R93
75
T5
_F+PCH
_F+PCL
(+Δθ_C)
(−Δθ_C)
_−PCH
_−PCL
R94
75
R95
75
T6
_F−PCH
_F−PCL
(−Δθ_C)
FROM AGC
FROM EC&L MODULE
(+14VDC)
+14VDC
C14
22
R96
220
R97
1000
CR11
1N660
T7
_T+PGH
_T+PGL
(+Δθ_G)
(+Δθ_G)
_+PGH
_+PGL
R98
510
Q43
2N914
R99
220
R100
1000
CR12
1N660
T8
_T−PGH
_T−PGL
(−Δθ_G)
TO AGC
(−Δθ_G)
_−PGH
_−PGL
R101
510
Q44
2N914

R 64	
PART NO.	VALUE
1006750-41	2.4K
-49	5.1K
-53	7.5K
-56	10K
-142	12.5K
-60	15K
-62	18K
-63	20K
-64	22K
1006750-149	25.5K

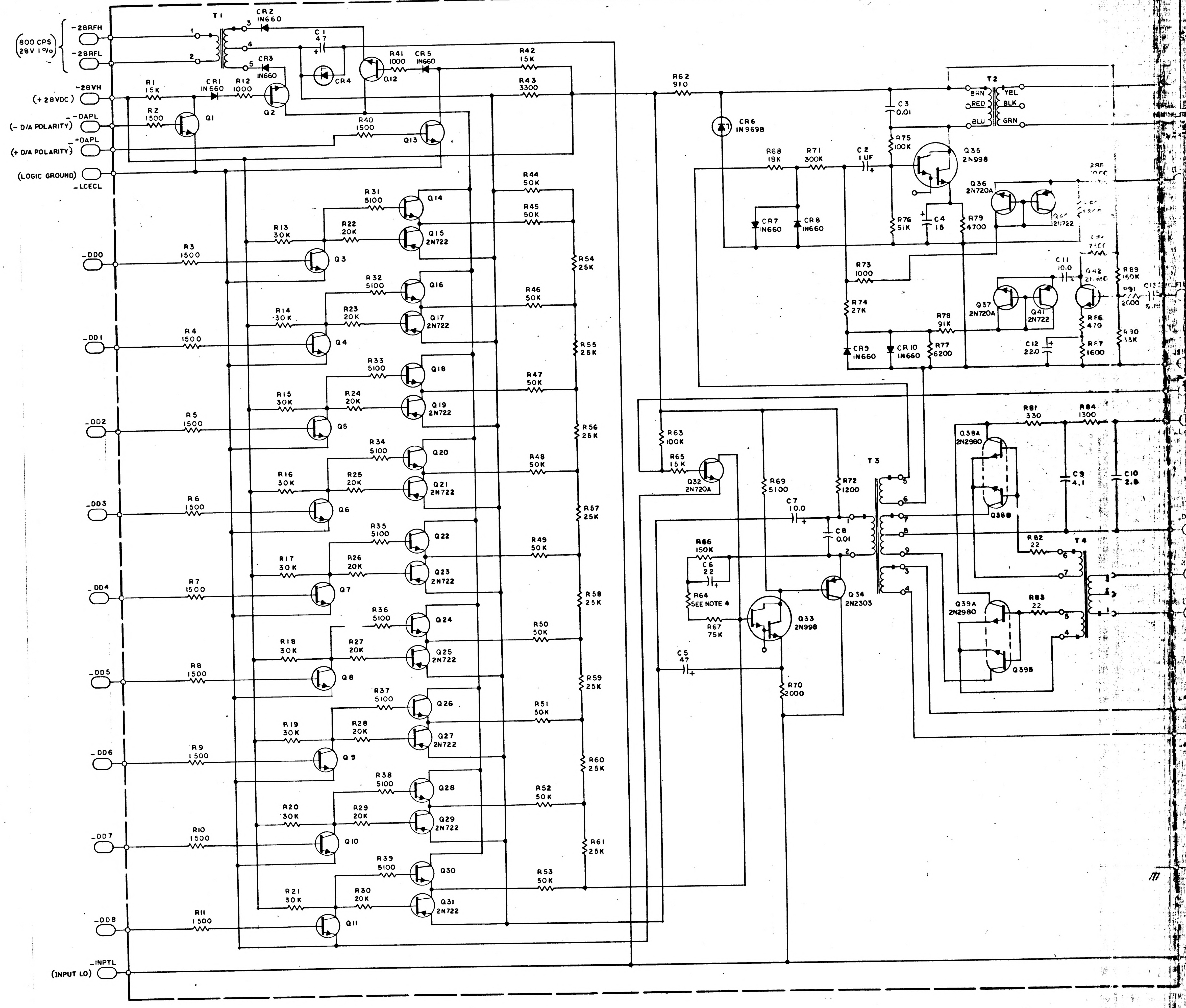
REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4 W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1006750-31		910	±2%	1/4 W
R63	1006750-80		100K		
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-39		2000	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-32		1000		1/4 W
R74	-66		27K		
R75	-80		100K		
R76	-73		51K		
R77	-51		6200		
R78	-79		91K		
R79	-48		4700		
R80	1006750-52		6800	±2%	1/4 W
R81	1006750-20		330	±2%	1/4 W
R82	1010369-9		22	±5%	1/8 W
R83	1010369-9		22	±5%	1/8 W
R84	1006750-35		1300	±2%	1/4 W
R85	-53		7500		
R86	-24		470		
R87	-37		1600		
R88	1006750-32		1000	±2%	1/4 W
R89	1010369-86		160K	±5%	1/8 W
R90	1006750-68		33K	±2%	1/4 W
R91	-39		2000		
R92	-5		75		
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	1006750-25	RESISTOR	510	±2%	1/8 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47 UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-30		[illegible]		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-81		[illegible]		35
C12	1006755-21		22		15
C13	1006755-79		[illegible]		35
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010385		1N660		
CR4	1010372-10				
CR5	1010385		1N660		
CR6	1010330-13		[illegible]		
CR7	1010385		1N660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	1N660		
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010315-1		2N2303		
Q35	1010342		2N998		
Q36	1010357-1		2N720A		
Q37	1010357-1		2N720A		
Q38	1010652-1		2N2980		
Q39	1010652-1		2N2980		
Q40	1010285		2N722		
Q41	1010285		2N722		
Q42	1010397-1		2N930		
Q43	1006752		2N914		
Q44	1006752	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010324				
T3	1010726				
T4	1010365				
T5	1006762				
T6	1006762				
T7	1006762				
T8	1006762	TRANFORMER			

NEXT ASSY	USED ON
APPLICATION	

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

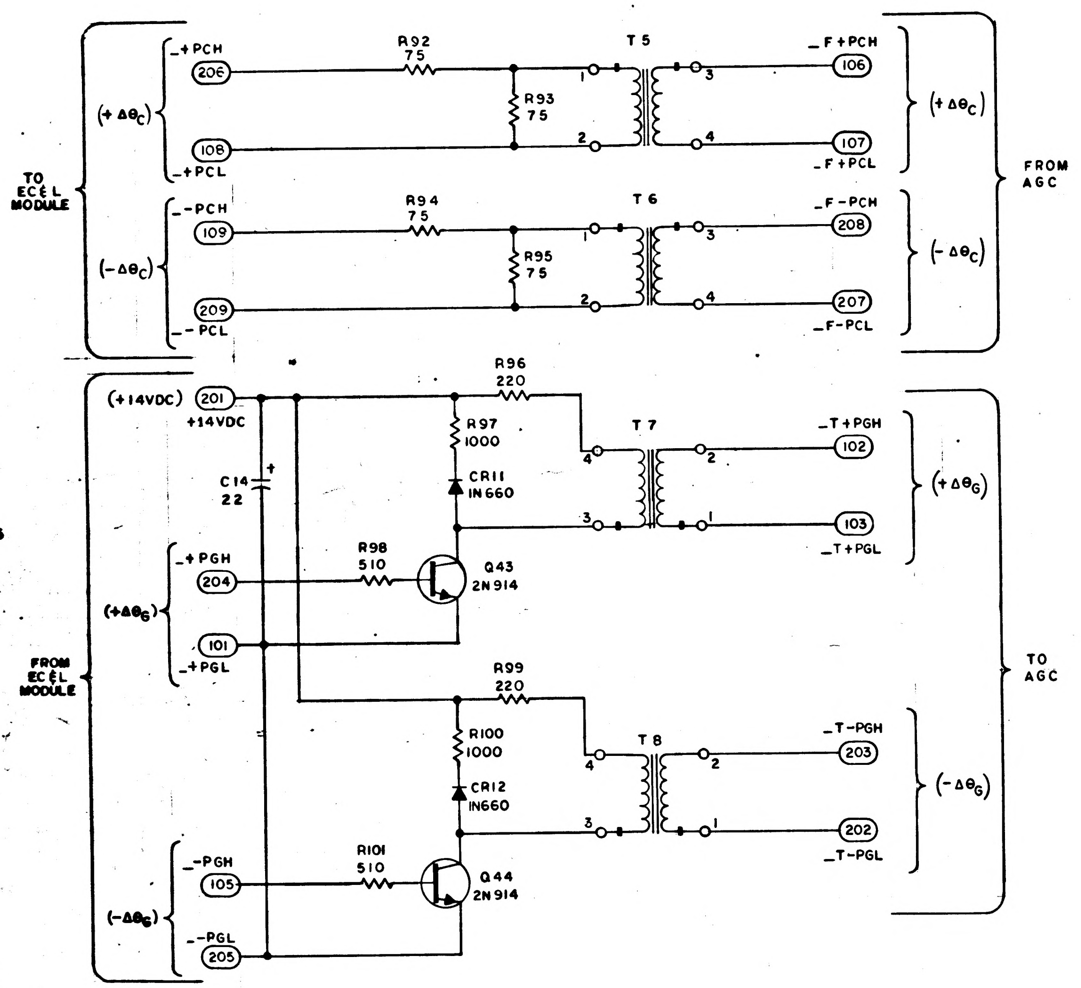

9
8
7
6
D
C
B
A
800 CPS
28V 1%
-28RFH
-28RFL
-28VH
(+28VDC)
-DAPL
(- D/A POLARITY)
+DAPL
(+ D/A POLARITY)
(LOGIC GROUND)
-LCECL
-DD0
-DD1
-DD2
-DD3
-DD4
-DD5
-DD6
-DD7
-DD8
-INPTL
(INPUT LO)
T1
CR2 1N660
CR3 1N660
C1 47
CR4
R41 1000
CR5 1N660
Q12
R42 15K
R43 3300
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
R13 30K
R14 30K
R15 30K
R16 30K
R17 30K
R18 30K
R19 30K
R20 30K
R21 30K
R22 20K
R23 20K
R24 20K
R25 20K
R26 20K
R27 20K
R28 20K
R29 20K
R30 20K
R31 5100
R32 5100
R33 5100
R34 5100
R35 5100
R36 5100
R37 5100
R38 5100
R39 5100
Q14
Q15 2N722
Q16
Q17 2N722
Q18
Q19 2N722
Q20
Q21 2N722
Q22
Q23 2N722
Q24
Q25 2N722
Q26
Q27 2N722
Q28
Q29 2N722
Q30
Q31 2N722
R44 50K
R45 50K
R46 50K
R47 50K
R48 50K
R49 50K
R50 50K
R51 50K
R52 50K
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
R62 910
CR6 1N969B
R68 18K
R71 300K
C2 1UF
CR7 1N660
CR8 1N660
T2
BRN
RED
BLU
YEL
BLK
GRN
C3 0.01
R75 100K
Q35 2N998
Q36 2N720A
R76 51K
C4 15
R79 4700
R73 1000
R74 27K
CR9 1N660
CR10 1N660
R78 91K
R77 6200
Q37 2N720A
Q41 2N722
C11 10.0
C12 22.0
R86 470
R87 1600
R69 150K
R90 3.3K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 2000
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39A 2N2980
Q39B
R83 22

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

34

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV.B WITH CHANGE PER TDRR 15733	1/24/65	WK
D	REVISED PER TDRR 16621	23 Jun 65	WK

R64	
PART NO.	VALUE
1006750-41	2.4K
-49	5.1K
-53	7.5K
-56	10K
-142	12.5K
-60	15K
-62	18K
-63	20K
-64	22K
1006750-149	25.5K



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1006750-31		910	±2%	1/4 W
R63	1006750-80		100K		
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-39		2000	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-32		1000		1/4 W
R74	-66		27K		
R75	-80		100K		
R76	-73		51K		
R77	-51		6200		
R78	-79		91K		
R79	-48		4700		
R80	1006750-52		6800	±2%	1/4W
R81	1006750-20		330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	-53		7500		
R86	-24		470		
R87	-37		1600		
R88	1006750-32		1000	±2%	1/4 W
R89	1010369-86		160K	±5%	1/8 W
R90	1006750-68		33K	±2%	1/4 W
R91	-39		2000		
R92	-5		75		
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	1006750-25	RESISTOR	510	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-81		10.0		35
C12	1006755-21		22		15
C13	1006755-79		6.8		35
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-10				
CR5	1010385		IN660		
CR6	1010830-13		IN969B		
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	IN660		
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342		2N998		
Q36	1010357-1		2N720A		
Q37	1010357-1		2N720A		
Q38	1010652-1		2N2980		
Q39	1010652-1		2N2980		
Q40	1010285		2N722		
Q41	1010285		2N722		
Q42	1010397-1		2N930		
Q43	1006752		2N914		
Q44	1006752	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			

REF DWG:
D/A CONVERTER MODULE ASSY
DWG NO. 2007137

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

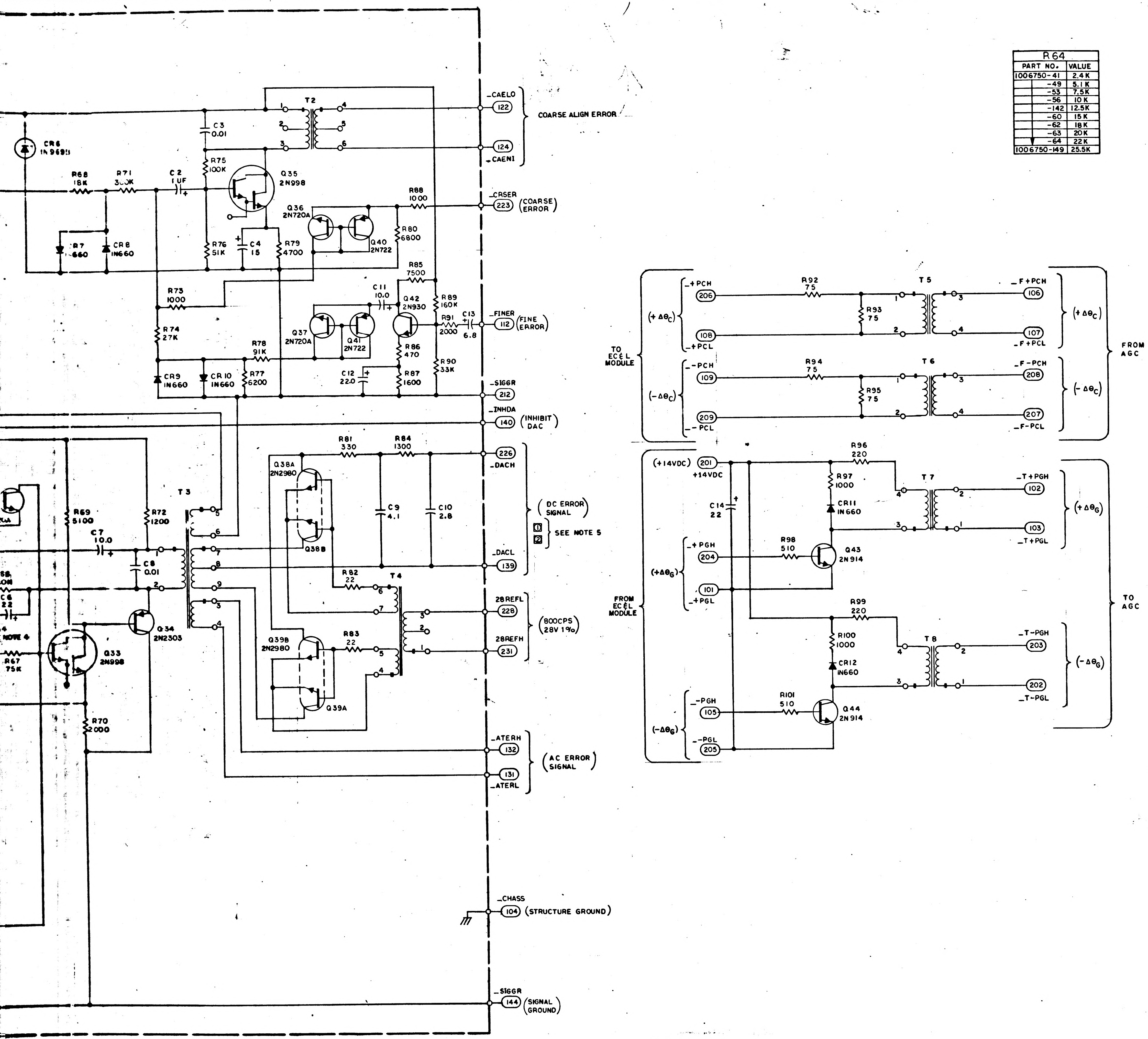
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN A. Di... DATE 18 DEC 64
CHECKED 15 Jan 65
APPROVAL 22 Jan 65
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010028
SCALE — WT — SHEET 1 OF 1

MASTER



CR6
1N9695
R68 18K
R71 300K
C2 1 UF
C3 0.01
T2
R75 100K
Q35 2N998
Q36 2N720A
Q40 2N722
R76 51K
C4 15
R79 4700
R7
1N660
CR8 1N660
R73 1000
R74 27K
C11 10.0
Q42 2N930
Q37 2N720A
Q41 2N722
R78 91K
R77 6200
CR9 1N660
CR10 1N660
C12 22.0
R87 1600
R86 470
R85 7500
R89 160K
R90 33K
R91 2000
C13 6.8
R80 6800
R88 1000
_CAELO 122
124 _CAENI
COARSE ALIGN ERROR
_CRSER 223 (COARSE ERROR)
_FINER 112 (FINE ERROR)
_SIGGR 212
_INHDA 140 (INHIBIT DAC)
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
226 _DACH
_DACL 139
(DC ERROR SIGNAL)
1 2 SEE NOTE 5
T3
R69 5100
R72 1200
C7 10.0
C8 0.01
R82 22
T4
R83 22
Q39B 2N2980
Q39A
28REFL 228
28REFH 231
(800CPS 28V 1%)
Q34 2N2303
Q33 2N998
R67 75K
R70 2000
NOTE 4
_ATERH 132
131 _ATERL
(AC ERROR SIGNAL)
_CHASS 104 (STRUCTURE GROUND)
_SIGGR 144 (SIGNAL GROUND)
TO EC&L MODULE
(+Δθ_C)
_+PCH 206
108 _+PCL
R92 75
R93 75
T5
_F+PCH 106
107 _F+PCL
(+Δθ_C)
(-Δθ_C)
_-PCH 109
209 _-PCL
R94 75
R95 75
T6
_F-PCH 208
207 _F-PCL
(-Δθ_C)
FROM AGC
(+14VDC) 201 +14VDC
C14 22
R96 220
R97 1000
CR11 1N660
T7
_T+PGH 102
103 _T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH 204
101 _+PGL
R98 510
Q43 2N914
R99 220
R100 1000
CR12 1N660
T8
_T-PGH 203
202 _T-PGL
(-Δθ_G)
TO AGC
(-Δθ_G)
_-PGH 105
_-PGL 205
R101 510
Q44 2N914

R64	
PART NO.	VALUE
1006750-41	2.4K
-49	5.1K
-53	7.5K
-56	10K
-142	12.5K
-60	15K
-62	18K
-63	20K
-64	22K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4 W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1006750-31		910	±2%	1/4 W
R63	1006750-80		100K		
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-39		2000	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-32		1000		1/4 W
R74	-66		27K		
R75	-80		100K		
R76	-73		51K		
R77	-51		6200		
R78	-79		91K		
R79	-48		4700		
R80	1006750-52		6800	±2%	1/4 W
R81	1006750-20		330	±2%	1/4 W
R82	1010369-9		22	±5%	1/8 W
R83	1010369-9		22	±5%	1/8 W
R84	1006750-35		1300	±2%	1/4 W
R85	-53		7500		
R86	-24		470		
R87	-37		1600		
R88	1006750-32		1000	±2%	1/4 W
R89	1010369-86		160K	±5%	1/8 W
R90	1006750-68		33K	±2%	1/4 W
R91	-39		2000		
R92	-5		75		
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	1006750-25	RESISTOR	510	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE
C1	1006755-36	CAPACITOR	47UF
C2	1006755-69		1.0
C3	1006777-31		0.01
C4	1006755-33		[illegible]
C5	1006755-36		47
C6	1006755-85		22
C7	1006755-30		[illegible]
C8	1006777-31		[illegible]
C9	1010279-119		4.1
C10	1010279-117		2.8
C11	1006755-81		[illegible]
C12	1006755-21		22
C13	1006755-79		6.8
C14	1006755-85	CAPACITOR	22 UF
CR1	1010385	DIODE	1N660
CR2	1010385		1N660
CR3	1010385		1N660
CR4	1010372-10		
CR5	1010385		1N660
CR6	1010830-13		1N3698
CR7	1010385		1N660
CR8			
CR9			
CR10			
CR11			
CR12	1010385	DIODE	1N660
Q1	1010343-3	TRANSISTOR	
Q2	-3		
Q3	-3		
Q4	-3		
Q5	-3		
Q6	-3		
Q7	-3		
Q8	-3		
Q9	-3		
Q10	-3		
Q11	-3		
Q12	-3		
Q13	-3		
Q14	1010343-3		
Q15	1010285		2N722
Q16	1010343-3		
Q17	1010285		2N722
Q18	1010343-3		
Q19	1010285		2N722
Q20	1010343-3		
Q21	1010285		2N722
Q22	1010343-3		
Q23	1010285		2N722
Q24	1010343-3		
Q25	1010285		2N722
Q26	1010343-3		
Q27	1010285		2N722
Q28	1010343-3		
Q29	1010285		2N722
Q30	1010343-3		
Q31	1010285		2N722
Q32	1010357-1		2N720A
Q33	1010342		2N998
Q34	1010633-1		2N2303
Q35	1010342		2N998
Q36	1010357-1		2N720A
Q37	1010357-1		2N720A
Q38	1010652-1		2N2980
Q39	1010652-1		2N2980
Q40	1010285		2N722
Q41	1010285		2N722
Q42	1010397-1		2N930
Q43	1006752		2N914
Q44	1006752	TRANSISTOR	2N914
T1	1010723	TRANSFORMER	
T2	1010274		
T3	1010726		
T4	1010365		
T5	1006762-2		
T6	1006762-2		
T7	1006762-2		
T8	1006762-2	TRANSFORMER	

MASTER

2010028 D

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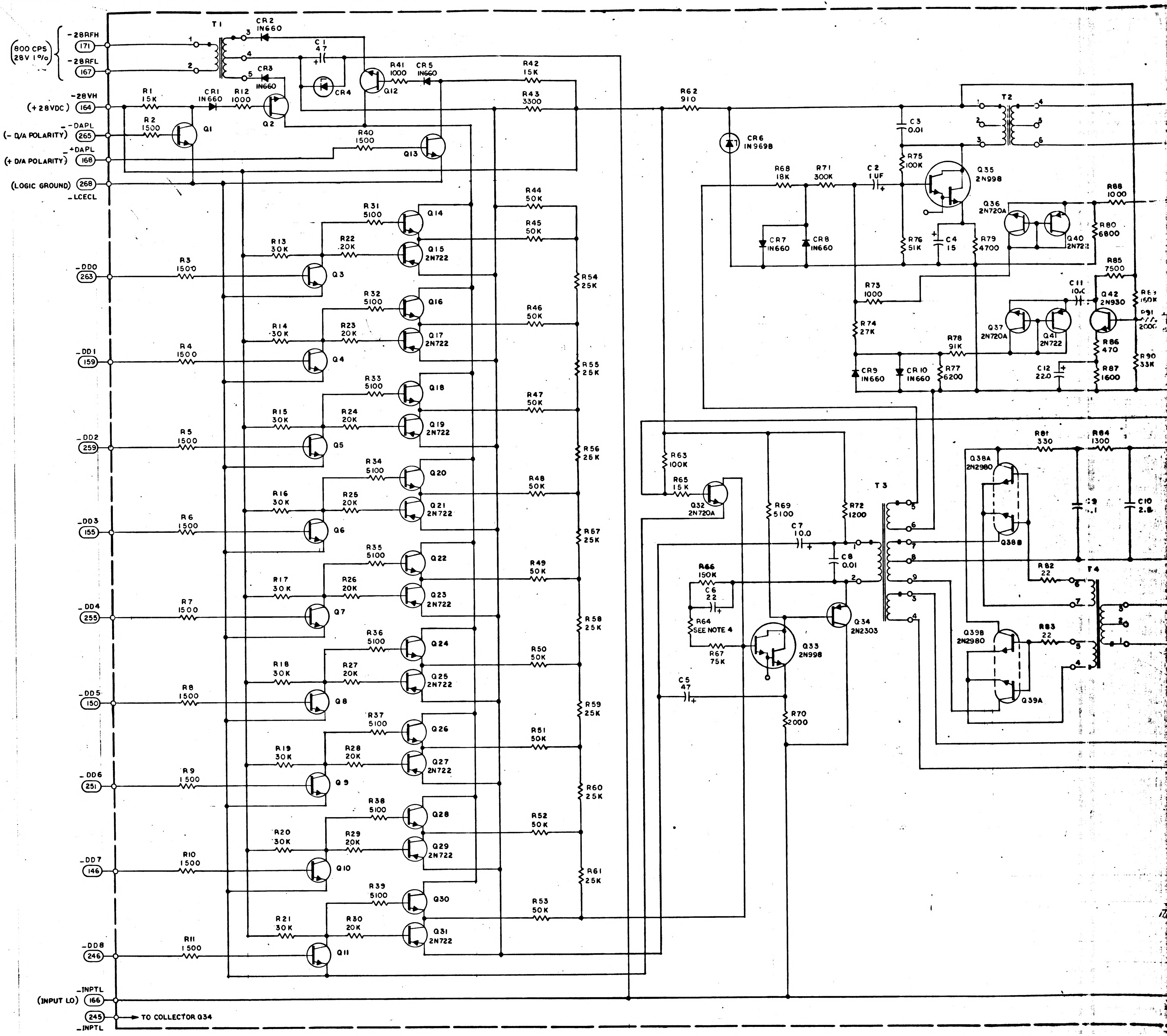


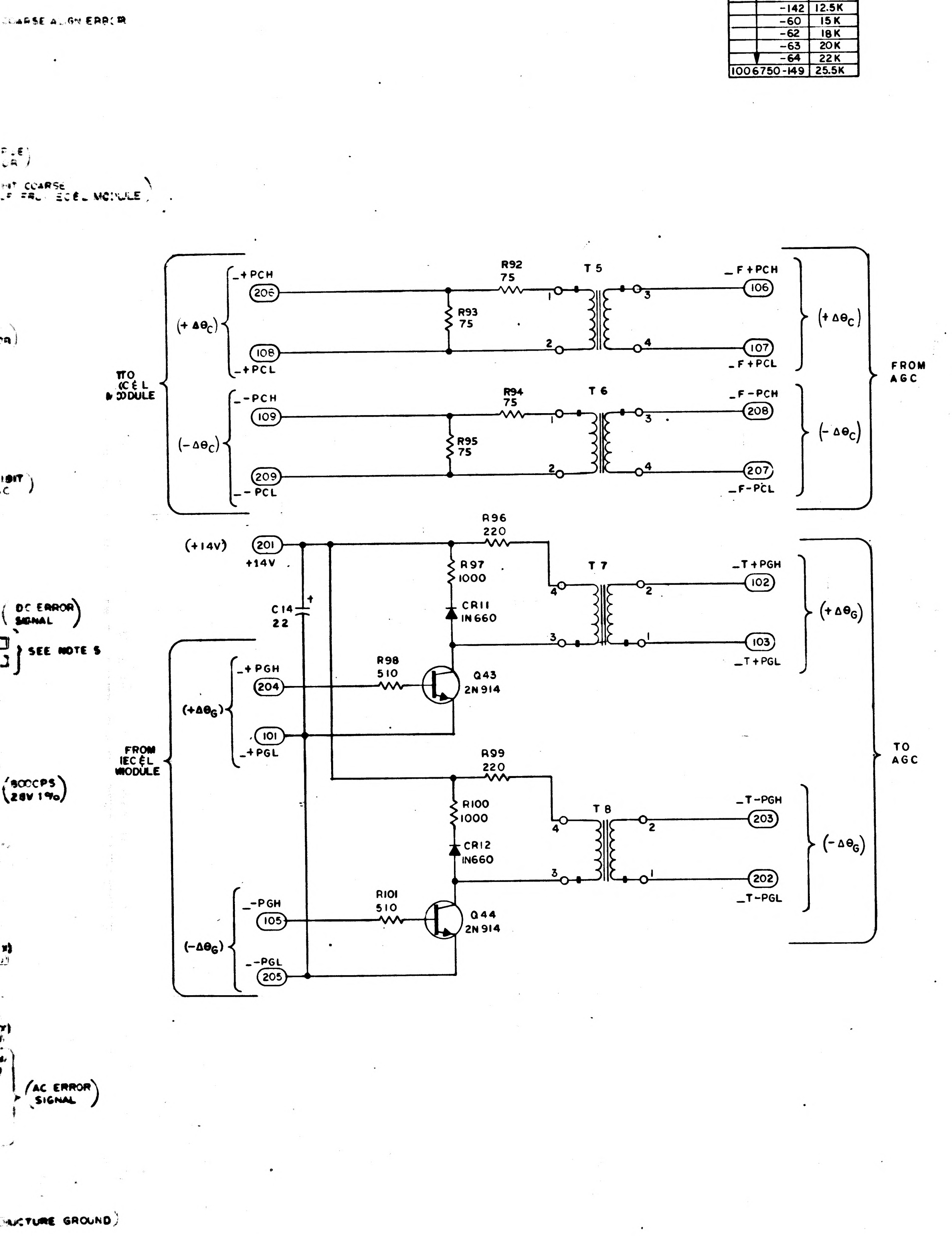
800 CPS
28V 1%
-28RFH
171
-28RFL
167
-28VH
(+28VDC)
164
-DAPL
(- D/A POLARITY)
265
+DAPL
(+ D/A POLARITY)
168
(LOGIC GROUND)
268
-LCECL
T1
CR2 1N660
C1 47
CR3 1N660
CR4
R41 1000
CR5 1N660
Q12
R42 15K
R43 3300
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R31 5100
Q14
R13 30K
R22 20K
Q15 2N722
R44 50K
R45 50K
-DD0
263
R3 1500
Q3
R32 5100
Q16
R14 30K
R23 20K
Q17 2N722
R46 50K
R54 25K
-DD1
159
R4 1500
Q4
R33 5100
Q18
R15 30K
R24 20K
Q19 2N722
R47 50K
R55 25K
-DD2
259
R5 1500
Q5
R34 5100
Q20
R16 30K
R25 20K
Q21 2N722
R48 50K
R56 25K
-DD3
155
R6 1500
Q6
R35 5100
Q22
R17 30K
R26 20K
Q23 2N722
R49 50K
R57 25K
-DD4
255
R7 1500
Q7
R36 5100
Q24
R18 30K
R27 20K
Q25 2N722
R50 50K
R58 25K
-DD5
150
R8 1500
Q8
R37 5100
Q26
R19 30K
R28 20K
Q27 2N722
R51 50K
R59 25K
-DD6
251
R9 1500
Q9
R38 5100
Q28
R20 30K
R29 20K
Q29 2N722
R52 50K
R60 25K
-DD7
146
R10 1500
Q10
R39 5100
Q30
R21 30K
R30 20K
Q31 2N722
R53 50K
R61 25K
-DD8
246
R11 1500
Q11
-INPTL
(INPUT LO)
166
245
TO COLLECTOR Q34
-INPTL
R62 910
CR6 1N9698
C3 0.01
T2
R75 100K
Q35 2N998
R68 18K
R71 300K
C2 1UF
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
Q36 2N720A
Q40 2N722
R88 1000
R80 6800
R85 7500
R73 1000
R74 27K
C11 10.0
Q42 2N930
Q37 2N720A
Q41 2N722
R86 470
R78 91K
CR9 1N660
CR10 1N660
R77 6200
C12 22.0
R87 1600
R90 33K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
T3
C7 10.0
C8 0.01
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 2000
R81 330
R84 1300
Q38A 2N2980
Q38B
C9
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

34

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS		
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WR
D	REVISED PER TDRR 16621	[illegible]	WR
E	REVISED PER TDRR 20304	23 JUNE 66	WR

R64	
PART NO.	VALUE
1006750-41	2.4K
-49	5.1K
-53	7.5K
-56	10K
-142	12.5K
-60	15K
-62	18K
-63	20K
-64	22K
1006750-149	25.5K



COARSE ALIGN ERROR
COARSE
ECDU MODULE
DC ERROR SIGNAL
SEE NOTE 5
800CPS 28V 1%
AC ERROR SIGNAL
STRUCTURE GROUND
TO ICDU MODULE
FROM ICDU MODULE
FROM AGC
TO AGC
(+ΔθC)
(−ΔθC)
(+ΔθG)
(−ΔθG)
+PCH
206
108
+PCL
-PCH
109
209
-PCL
R92 75
R93 75
R94 75
R95 75
T5
T6
T7
T8
F+PCH
106
107
F+PCL
F-PCH
208
207
F-PCL
(+14V)
201
+14V
R96 220
R97 1000
CR11 IN660
C14 22
T+PGH
102
103
T+PGL
+PGH
204
R98 510
Q43 2N914
101
+PGL
R99 220
R100 1000
CR12 IN660
T-PGH
203
202
T-PGL
-PGH
105
R101 510
Q44 2N914
-PGL
205
1
2
3
4

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4 W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-77		75K		1/4 W
R75	1006750-80		100K		1/4 W
R76	1006750-73	RESISTOR	51K	±2%	1/4 W
R79	1006750-48	RESISTOR	4700	±2%	1/4 W
R81	1006750-20	RESISTOR	330	±2%	1/4 W
R82	1010369-9		22	±5%	1/8 W
R83	1010369-9		22	±5%	1/8 W
R84	1006750-35		1300	±2%	1/4 W
R85	1006750-47	RESISTOR	4300	±2%	1/4 W
R87	1006750-56	RESISTOR	10K	±2%	1/4 W
R88	1006750-63	RESISTOR	20K	±2%	1/4 W
R89	1006750-80	RESISTOR	100K	±2%	1/4 W
R90	1006750-80	RESISTOR	100K	±2%	1/4 W
R92	1006750-5	RESISTOR	75	±2%	1/4 W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-13		IN969B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
	LIST OF MATERIALS		

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

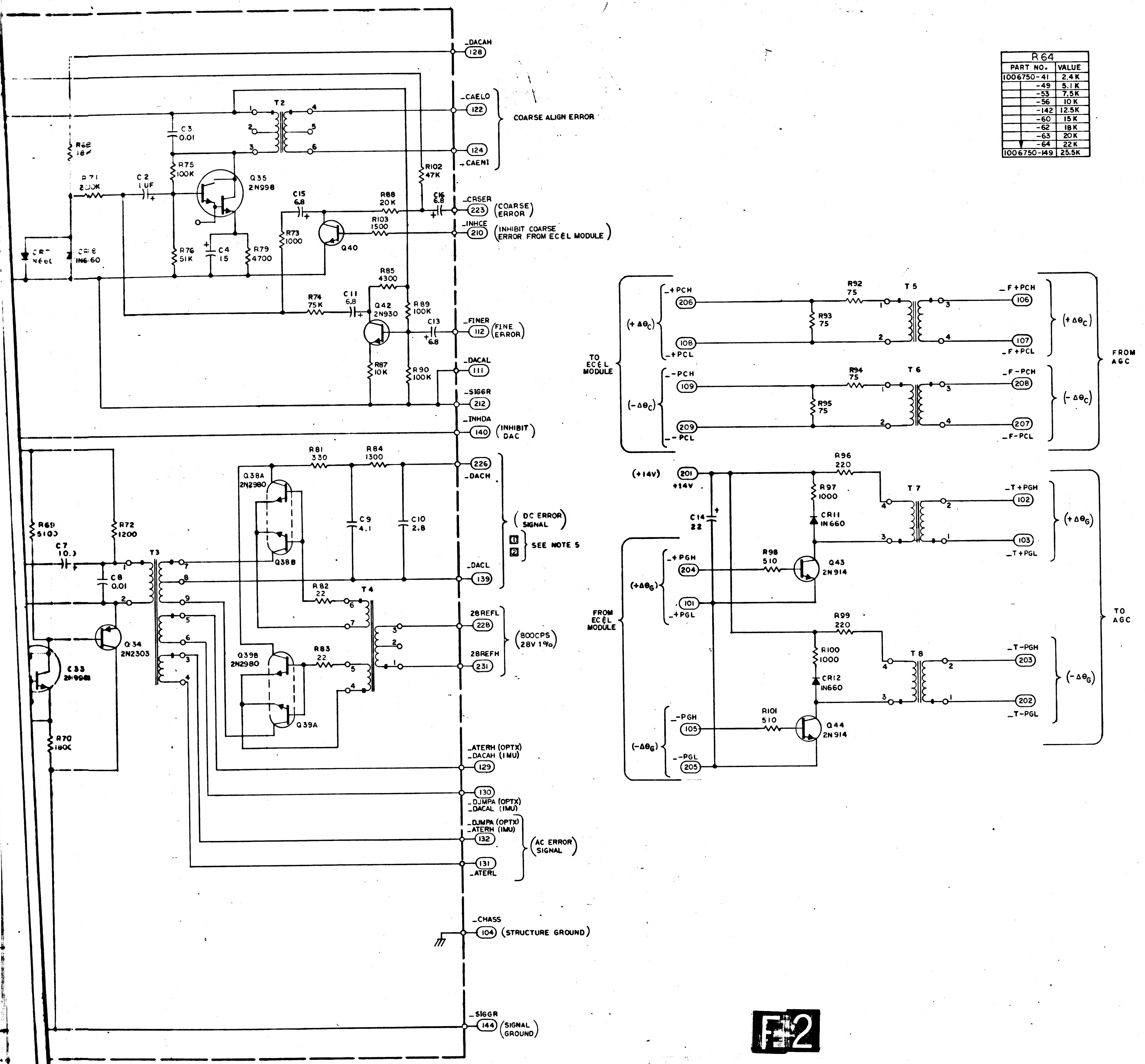
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. Di... DATE 18 DEC 64
CHECKED ... 15 Jan 65
APPROVAL ... 22 Jan 65
APPROVAL ...
NASA APPROVAL
MIT APPROVAL ... 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, D/A CONVERTER

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010028
SCALE —
WT —
SHEET 1 OF 1

F-3


_DACAH
128
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
T2
1 2 3 4 5 6
C3
0.01
R68
18K
R71
200K
C2
1 UF
R75
100K
Q35
2N998
C15
6.8
R88
20K
R102
47K
C16
6.8
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
1000
Q40
CR7
N660
CR8
IN660
R76
51K
C4
15
R79
4700
R85
4300
R74
75K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
R81
330
R84
1300
226
_DACH
Q38A
2N2980
Q38B
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
_DACL
139
R69
5100
R72
1200
C7
10.0
C8
0.01
T3
1 2 3 4 5 6 7 8 9
R82
22
T4
Q34
2N2303
C33
2N998
Q39B
2N2980
R83
22
Q39A
28REFL
228
28REFH
231
(800CPS 28V 1%)
R70
1800
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
TO EC&L MODULE
(+ΔθC)
_+PCH
206
108
_+PCL
R92
75
R93
75
T5
_F+PCH
106
107
_F+PCL
(−ΔθC)
_−PCH
109
209
_−PCL
R94
75
R95
75
T6
_F−PCH
208
207
_F−PCL
FROM AGC
(+14V)
201
+14V
C14
22
R96
220
R97
1000
CR11
IN660
T7
_T+PGH
102
103
_T+PGL
(+ΔθG)
FROM EC&L MODULE
_+PGH
204
R98
510
Q43
2N914
101
_+PGL
R99
220
R100
1000
CR12
IN660
T8
_T−PGH
203
202
_T−PGL
(−ΔθG)
TO AGC
_−PGH
105
R101
510
Q44
2N914
_−PGL
205

F2

R64	
PART NO.	VALUE
1006750-41	2.4K
-49	5.1K
-53	7.5K
-56	10K
-142	12.5K
-60	15K
-62	18K
-63	20K
-64	22K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-77		75K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALU	
C1	1006755-36	CAPACITOR	[illegible]	[illegible]
C2	1006755-69		1.0	
C3	1006777-31		0.01	
C4	1006755-33		[illegible]	
C5	1006755-36		[illegible]	
C6	1006755-85		22	
C7	1006755-30		[illegible]	
C8	1006777-31		[illegible]	
C9	1010279-119		4.1	
C10	1010279-117		2.8	
C11	1006755-79	CAPACITOR	[illegible]	
C13	1006755-79	CAPACITOR	[illegible]	[illegible]
C14	1006755-85	CAPACITOR	22 UF	[illegible]
CR1	1010385	DIODE	[illegible]	
CR2	1010385		[illegible]	
CR3	1010385		[illegible]	
CR4	1010372-6			
CR5	1010385		[illegible]	
CR6	1010830-13		[illegible]	
CR7	1010385		[illegible]	
CR8	1010385	DIODE	[illegible]	
CR11	1010385	DIODE	1N660	
CR12	1010385	DIODE	1N660	
C15	1006755-128	CAPACITOR	6.8 UF	[illegible]
C16	1006755-128	CAPACITOR	6.8 UF	[illegible]
Q1	1010343-3	TRANSISTOR		
Q2	-3			
Q3	-3			
Q4	-3			
Q5	-3			
Q6	-3			
Q7	-3			
Q8	-3			
Q9	-3			
Q10	-3			
Q11	-3			
Q12	-3			
Q13	-3			
Q14	1010343-3			
Q15	1010285		2N722	
Q16	1010343-3			
Q17	1010285		2N722	
Q18	1010343-3			
Q19	1010285		2N722	
Q20	1010343-3			
Q21	1010285		2N722	
Q22	1010343-3			
Q23	1010285		2N722	
Q24	1010343-3			
Q25	1010285		2N722	
Q26	1010343-3			
Q27	1010285		2N722	
Q28	1010343-3			
Q29	1010285		2N722	
Q30	1010343-3			
Q31	1010285		2N722	
Q32	1010357-1		2N720A	
Q33	1010342		2N998	
Q34	1010633-1		2N2303	
Q35	1010342	TRANSISTOR	2N998	
Q38	1010652-1	TRANSISTOR	2N2980	
Q39	1010652-1	TRANSISTOR	2N2980	
Q40	1010343-3	TRANSISTOR		
Q42	1010397-1	TRANSISTOR	2N930	
Q43	1010966-1	TRANSISTOR	2N914	
Q44	1010966-1	TRANSISTOR	2N914	
T1	1010723	TRANSFORMER		
T2	1010274			
T3	1010726			
T4	1010365			
T5	1006762-2			
T6	1006762-2			
T7	1006762-2			
T8	1006762-2	TRANSFORMER		

MASTER

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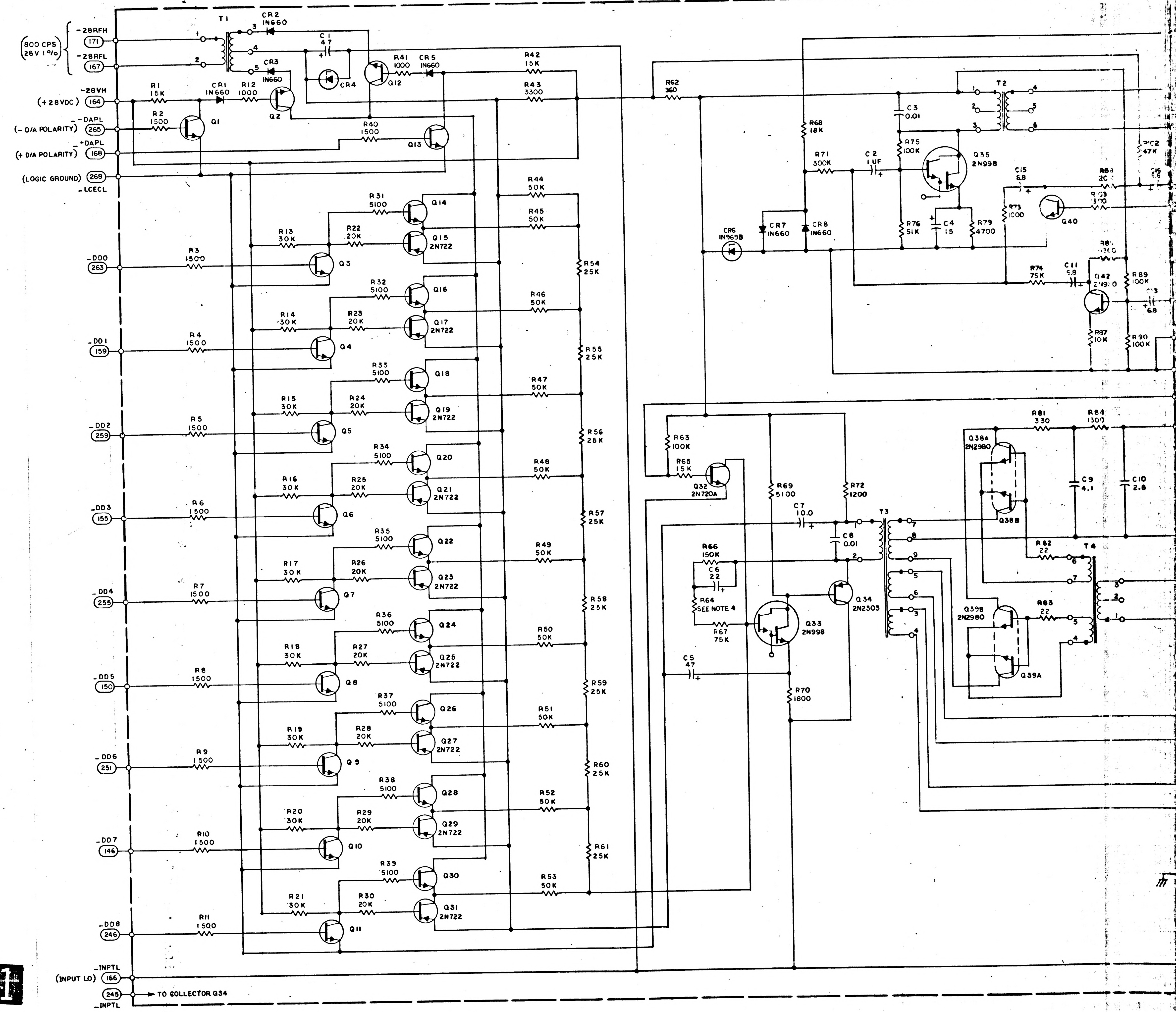
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171
-28RFL
167
-28VH
(+28VDC)
164
-DAPL
(- D/A POLARITY)
265
+DAPL
(+ D/A POLARITY)
168
(LOGIC GROUND)
268
-LCECL
T1
CR2 IN660
C1 47
CR3 IN660
CR4
R41 1000
CR5 IN660
Q12
R1 15K
CR1 IN660
R12 1000
Q2
R2 1500
Q1
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Q13
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R46 50K
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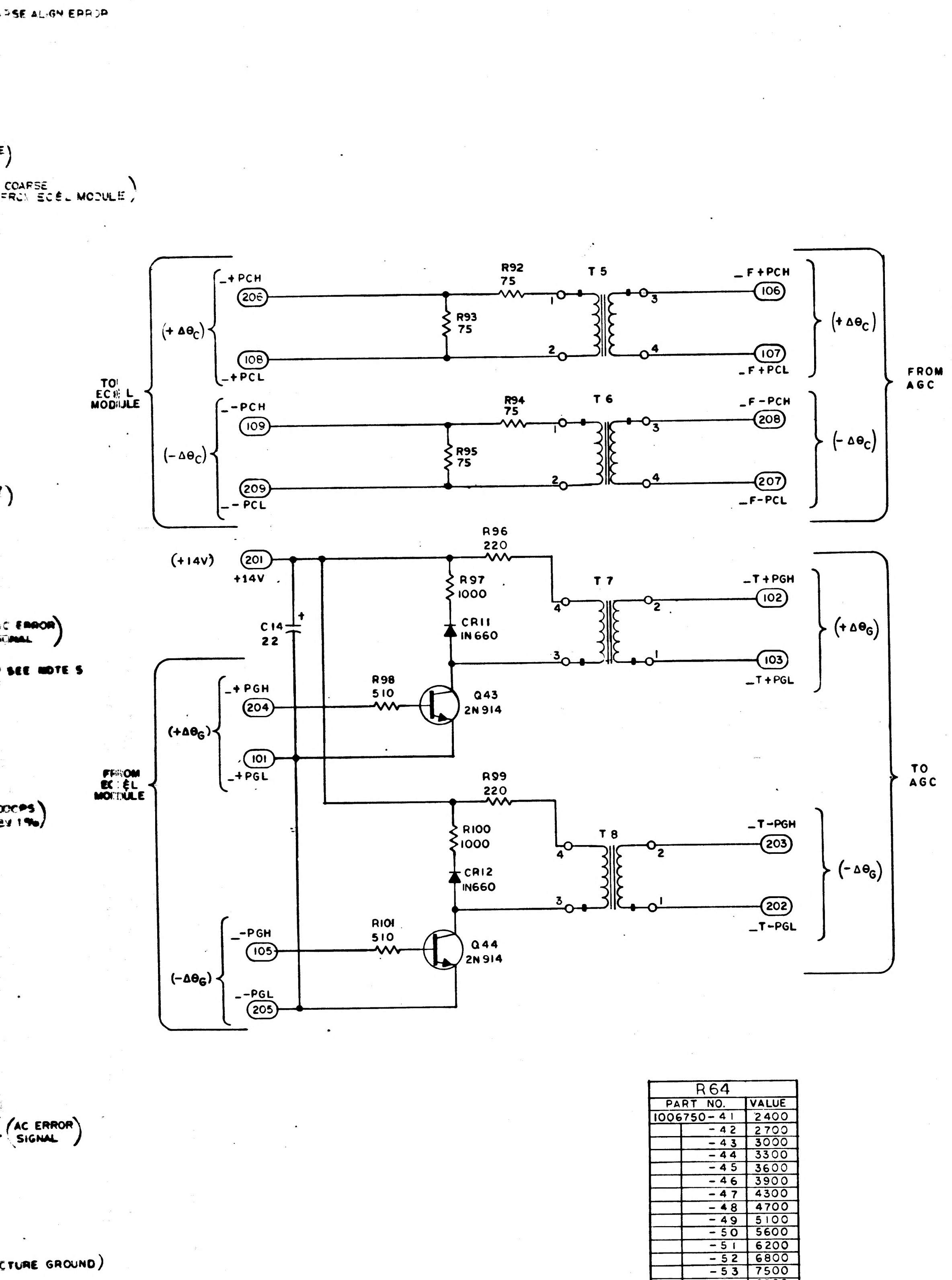
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
-DD0
263
R3 1500
Q3
R13 30K
R22 20K
R31 5100
Q14
Q15 2N722
-DD1
159
R4 1500
Q4
R14 30K
R23 20K
R32 5100
Q16
Q17 2N722
-DD2
259
R5 1500
Q5
R15 30K
R24 20K
R33 5100
Q18
Q19 2N722
-DD3
155
R6 1500
Q6
R16 30K
R25 20K
R34 5100
Q20
Q21 2N722
-DD4
255
R7 1500
Q7
R17 30K
R26 20K
R35 5100
Q22
Q23 2N722
-DD5
150
R8 1500
Q8
R18 30K
R27 20K
R36 5100
Q24
Q25 2N722
-DD6
251
R9 1500
Q9
R19 30K
R28 20K
R37 5100
Q26
Q27 2N722
-DD7
146
R10 1500
Q10
R20 30K
R29 20K
R38 5100
Q28
Q29 2N722
-DD8
246
R11 1500
Q11
R21 30K
R30 20K
R39 5100
Q30
Q31 2N722
-INPTL
(INPUT LO)
166
245
TO COLLECTOR Q34
-INPTL
R62 360
R68 18K
R71 300K
C2 1 UF
C3 0.01
T2
R75 100K
Q35 2N998
R76 51K
C4 15
R79 4700
CR6 IN969B
CR7 IN660
CR8 IN660
C15 6.8
R73 1000
Q40
R88 20
R103 1500
R102 47K
C16 6.8
R86 4300
R74 75K
C11 6.8
Q42 2N1930
R89 100K
C13 6.8
R87 10K
R90 100K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A
9
8
7
6
D
C
B
A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

F-1

2010028 E

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/26/65	WR
D	REVISED PER TDRR 16621	[illegible]	WR
E	REVISED PER TDRR 20304	23 JUNE [illegible]	WR
F	REVISED PEP TDRR 20776	[illegible]	WR



…RSE ALIGN ERROR
E)
COARSE
FROM ECEL MODULE
TO ECEL MODULE
C ERROR SIGNAL
SEE NOTE 5
FROM ECEL MODULE
00CPS
EV 1%
(AC ERROR SIGNAL)
CTURE GROUND)
+PCH
206
(+Δθ_C)
108
+PCL
-PCH
109
(-Δθ_C)
209
-PCL
R92 75
R93 75
R94 75
R95 75
T5
T6
1
2
3
4
F+PCH
106
107
F+PCL
F-PCH
208
207
F-PCL
(+Δθ_C)
(-Δθ_C)
FROM AGC
(+14V)
201
+14V
C14 22
R96 220
R97 1000
CR11 IN660
T7
T+PGH
102
103
T+PGL
(+Δθ_G)
+PGH
204
(+Δθ_G)
101
+PGL
R98 510
Q43 2N914
R99 220
R100 1000
CR12 IN660
T8
T-PGH
203
202
T-PGL
(-Δθ_G)
TO AGC
-PGH
105
(-Δθ_G)
-PGL
205
R101 510
Q44 2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10 K
-57	11 K
-58	12 K
-59	13 K
-60	15 K
-61	16 K
-62	18 K
-63	20 K
-64	22 K
-65	24 K
-66	27 K
-142	12.5 K
1006750-149	25.5 K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15 K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-77		75K		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-13		IN969B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

ⓒ REPLACES REV. B WITH CHANGE

(3A)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

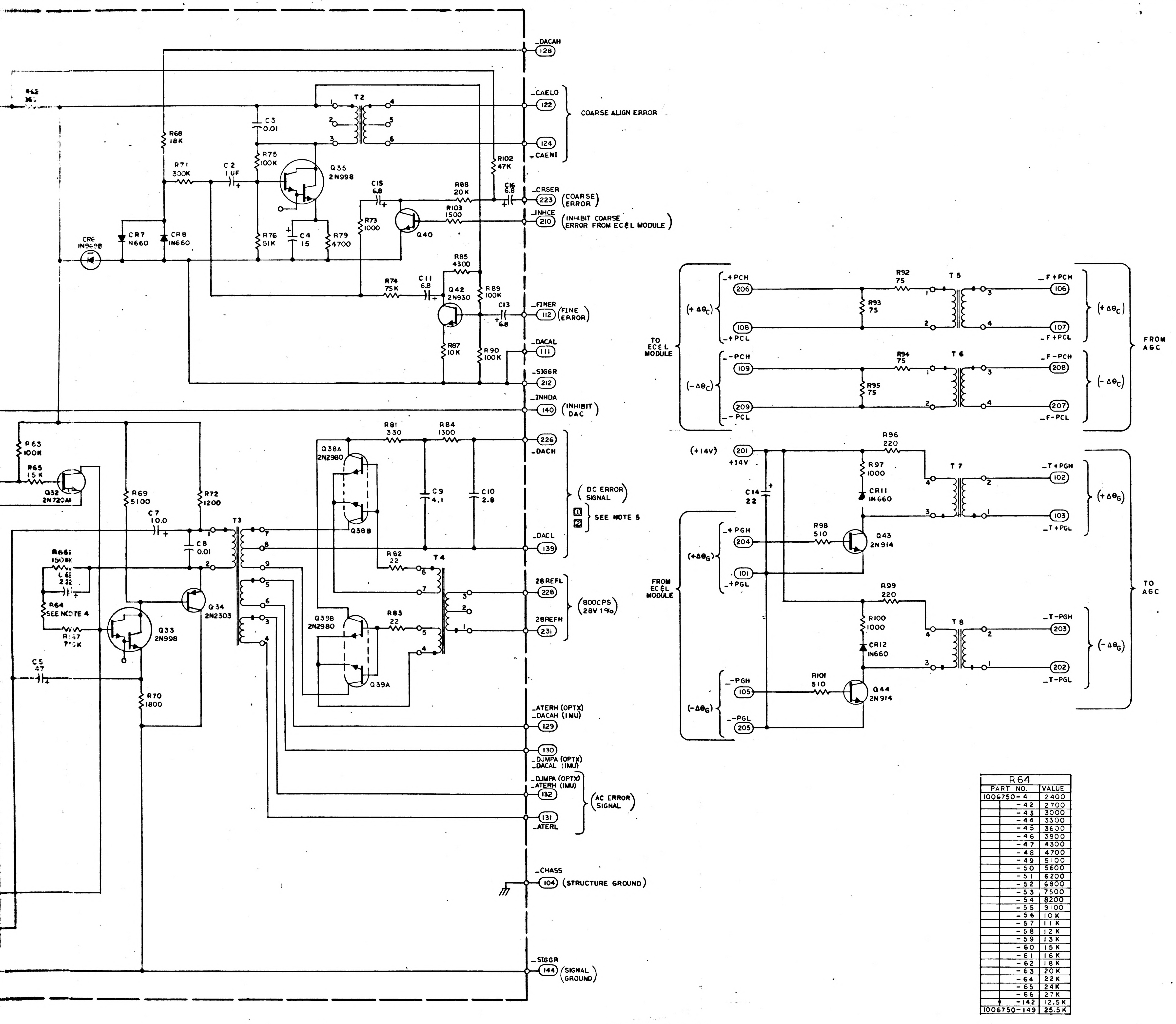
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO. CONTRACT
DRAWN DATE 18 DEC 64
CHECKED 15 Jan 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010028
SCALE — WT — SHEET 1 OF 1


_DACAH
128
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
_CRSER
223
(COARSE) ERROR)
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
_FINER
112
(FINE ERROR)
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
226
_DACH
(DC ERROR) SIGNAL
1
2
SEE NOTE 5
_DACL
139
28REFL
228
28REFH
231
(800CPS 28V 1%)
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
R62 360
R68 18K
C3 0.01
T2
R75 100K
Q35 2N998
R71 300K
C2 1UF
R102 47K
C15 6.8
R88 20K
C16 6.8
R103 1500
R73 1000
Q40
CR6 1N969B
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
R85 4300
R74 75K
C11 6.8
Q42 2N930
R89 100K
C13 6.8
R87 10K
R90 100K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 2.2
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A
TO EC&L MODULE
(+Δθ_C)
_+PCH
206
108
_+PCL
R92 75
R93 75
T5
_F+PCH
106
107
_F+PCL
(+Δθ_C)
FROM AGC
(-Δθ_C)
_-PCH
109
209
_-PCL
R94 75
R95 75
T6
_F-PCH
208
207
_F-PCL
(-Δθ_C)
(+14V)
201
+14V
R96 220
R97 1000
CR11 1N660
C14 22
T7
_T+PGH
102
103
_T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH
204
101
_+PGL
R98 510
Q43 2N914
R99 220
R100 1000
CR12 1N660
T8
_T-PGH
203
202
_T-PGL
(-Δθ_G)
TO AGC
(-Δθ_G)
_-PGH
105
_-PGL
205
R101 510
Q44 2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-77		75K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPT
C1	1006755-36	CAPACITOR
C2	1006755-69	
C3	1006777-31	
C4	1006755-33	
C5	1006755-36	
C6	1006755-35	
C7	1006755-3	
C8	1006777-31	
C9	1010279-1	
C10	1010279-17	
C11	1006755-79	CAPACITOR
C13	1006755-79	CAPACITOR
C14	1006755-88	CAPACITOR
CR1	1010385	DIODE
CR2	1010385	
CR3	1010385	
CR4	1010372-5	
CR5	1010385	
CR6	[illegible]-3	
CR7	1010385	
CR8	1010385	DIODE
CR11	1010385	DIODE
CR12	1010385	DIODE
C15	1006755-12	CAPACITOR
C16	1006755-12	CAPACITOR
Q1	1010343-3	TRANSISTOR
Q2	-3	
Q3	-3	
Q4	-3	
Q5	-3	
Q6	-3	
Q7	-3	
Q8	-3	
Q9	-3	
Q10	-3	
Q11	-3	
Q12	-3	
Q13	-3	
Q14	1010343-3	
Q15	1010285	
Q16	1010343-3	
Q17	1010285	
Q18	1010343-3	
Q19	1010285	
Q20	1010343-3	
Q21	1010285	
Q22	1010343-3	
Q23	1010285	
Q24	1010343-3	
Q25	1010285	
Q26	1010343-3	
Q27	1010285	
Q28	1010343-3	
Q29	1010285	
Q30	1010343-3	
Q31	1010285	
Q32	1010357-1	
Q33	1010342	
Q34	1010633-1	
Q35	1010342	TRANSISTOR
Q38	1010652-1	TRANSISTOR
Q39	1010652-1	TRANSISTOR
Q40	1010343-3	TRANSISTOR
Q42	1010397-1	TRANSISTOR
Q43	1010966-1	TRANSISTOR
Q44	1010966-1	TRANSISTOR
T1	1010723	TRANSFORMER
T2	1010274	
T3	1010726	
T4	1010365	
T5	1006762-2	
T6	1006762-2	
T7	1006762-2	
T8	1006762-2	TRANSFORMER

MASTER

2010028 F

E-2

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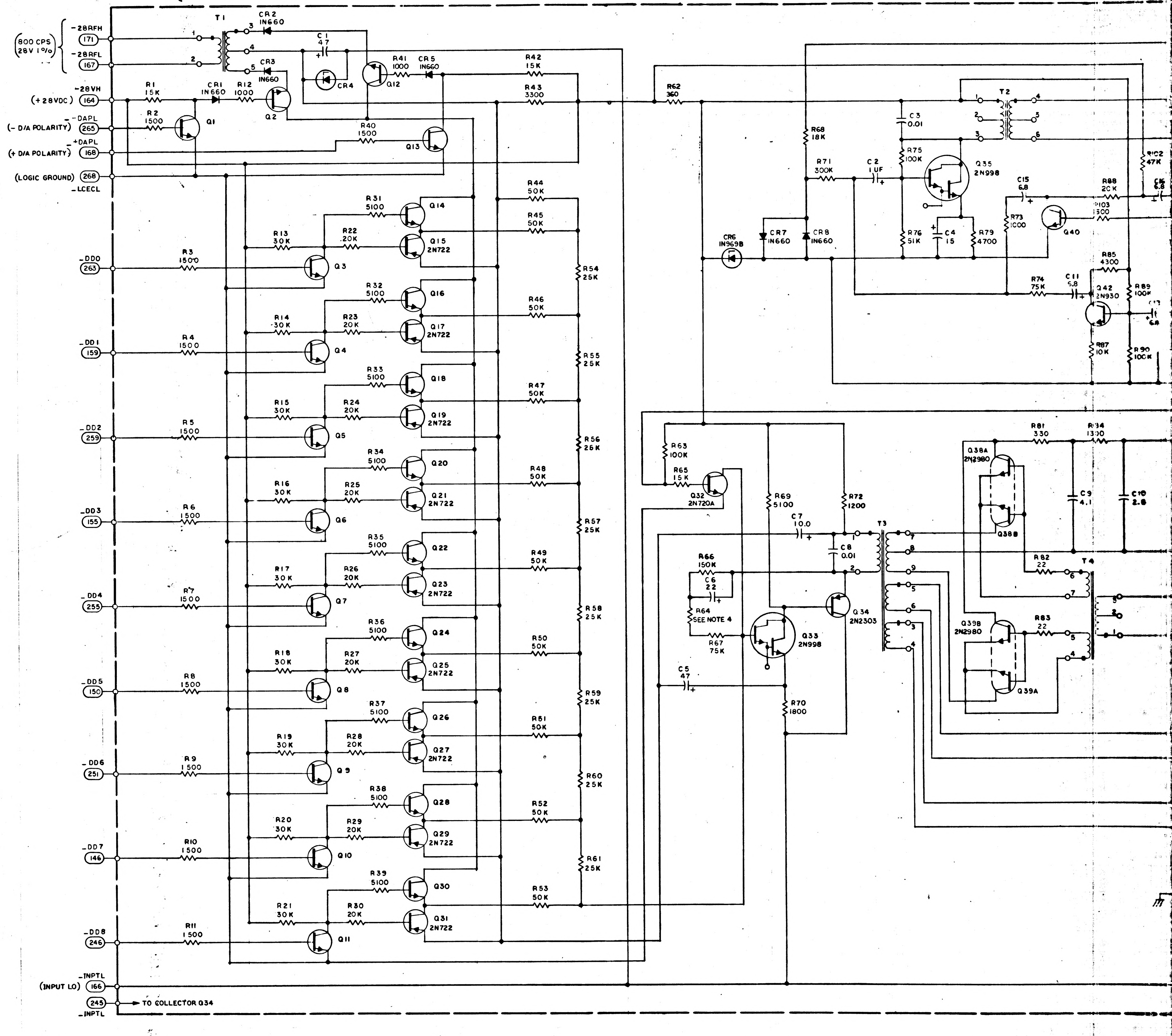

800 CPS
28V 1%
-28RFH
171
-28RFL
167
-28VH
(+28VDC)
164
-DAPL
(- D/A POLARITY)
265
+DAPL
(+ D/A POLARITY)
168
(LOGIC GROUND)
268
-LCECL
-DD0
263
-DD1
159
-DD2
259
-DD3
155
-DD4
255
-DD5
150
-DD6
251
-DD7
146
-DD8
246
-INPTL
(INPUT LO)
166
245
TO COLLECTOR Q34
-INPTL
T1
CR2 IN660
CR3 IN660
C1 47
CR4
Q12
R41 1000
CR5 IN660
R42 15K
R43 3300
R1 15K
CR1 IN660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R31 5100
Q14
R13 30K
R22 20K
Q15 2N722
R3 1500
Q3
R44 50K
R45 50K
R54 25K
R32 5100
Q16
R14 30K
R23 20K
Q17 2N722
R4 1500
Q4
R46 50K
R55 25K
R33 5100
Q18
R15 30K
R24 20K
Q19 2N722
R5 1500
Q5
R47 50K
R56 25K
R34 5100
Q20
R16 30K
R25 20K
Q21 2N722
R6 1500
Q6
R48 50K
R57 25K
R35 5100
Q22
R17 30K
R26 20K
Q23 2N722
R7 1500
Q7
R49 50K
R58 25K
R36 5100
Q24
R18 30K
R27 20K
Q25 2N722
R8 1500
Q8
R50 50K
R59 25K
R37 5100
Q26
R19 30K
R28 20K
Q27 2N722
R9 1500
Q9
R51 50K
R60 25K
R38 5100
Q28
R20 30K
R29 20K
Q29 2N722
R10 1500
Q10
R52 50K
R61 25K
R39 5100
Q30
R21 30K
R30 20K
Q31 2N722
R11 1500
Q11
R53 50K
R62 360
R68 18K
R71 300K
C2 1UF
C3 0.01
T2
R75 100K
Q35 2N998
CR6 IN969B
CR7 IN660
CR8 IN660
R76 51K
C4 15
R79 4700
R73 1000
C15 6.8
Q40
R88 20K
R103 1500
R102 47K
C16 6.8
R85 4300
R74 75K
C11 6.8
Q42 2N930
R89 100K
C17 6.8
R87 10K
R90 100K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
   ② INTERFACE TO RADAR CONTROLLED BY ICD

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WK
D	REVISED PER TDRR 16621		WK
E	REVISED PER TDRR 20304	23 JUNE 65	WK
F	REVISED PER TDRR 20776	16 July 65	WK
G	REVISED PER TDRR 21764		WK

RSE ALIGN ERROR

COARSE
FROM ECEL MODULE

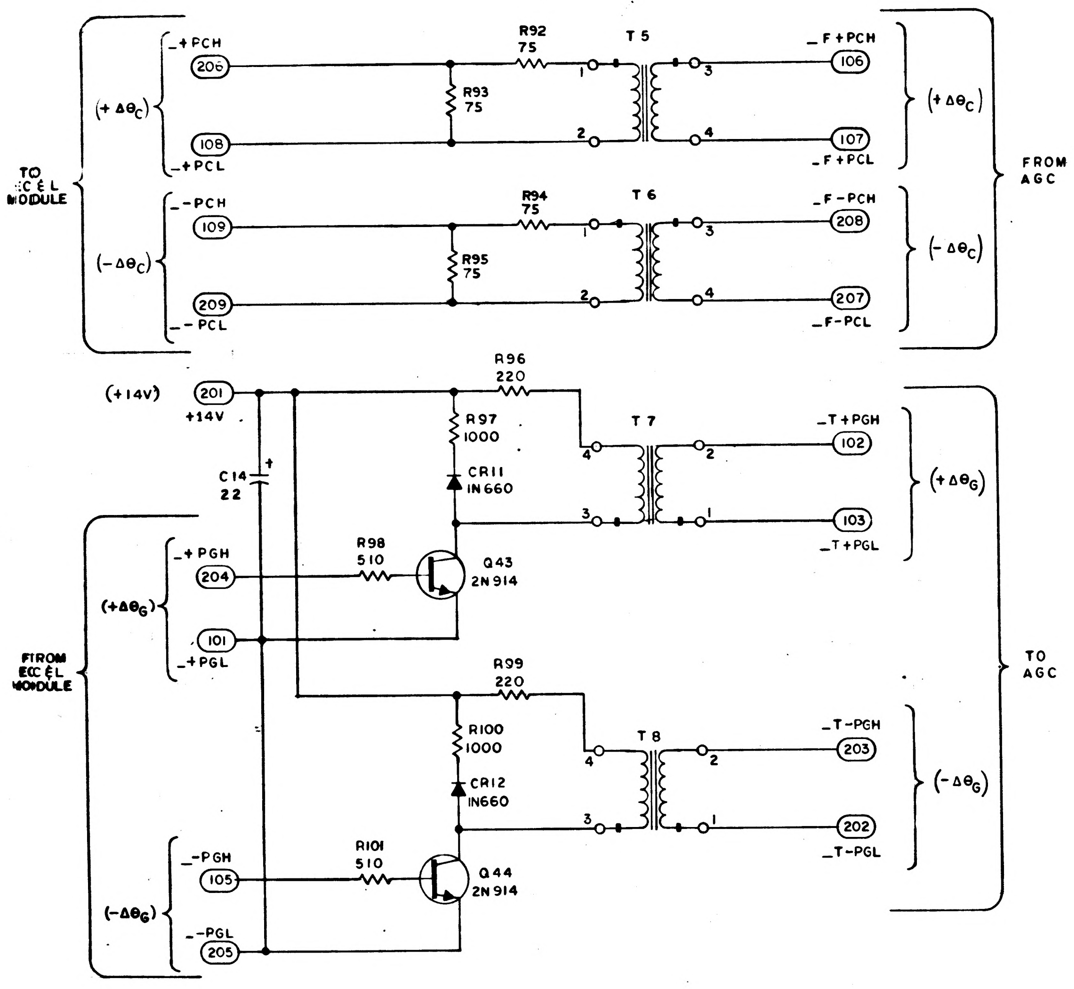
C ERROR
SIGNAL

SEE NOTE 5

OCPS
RV 1%

(AC ERROR
SIGNAL)

TURE GROUND)



R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-13		IN969B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

(C) REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

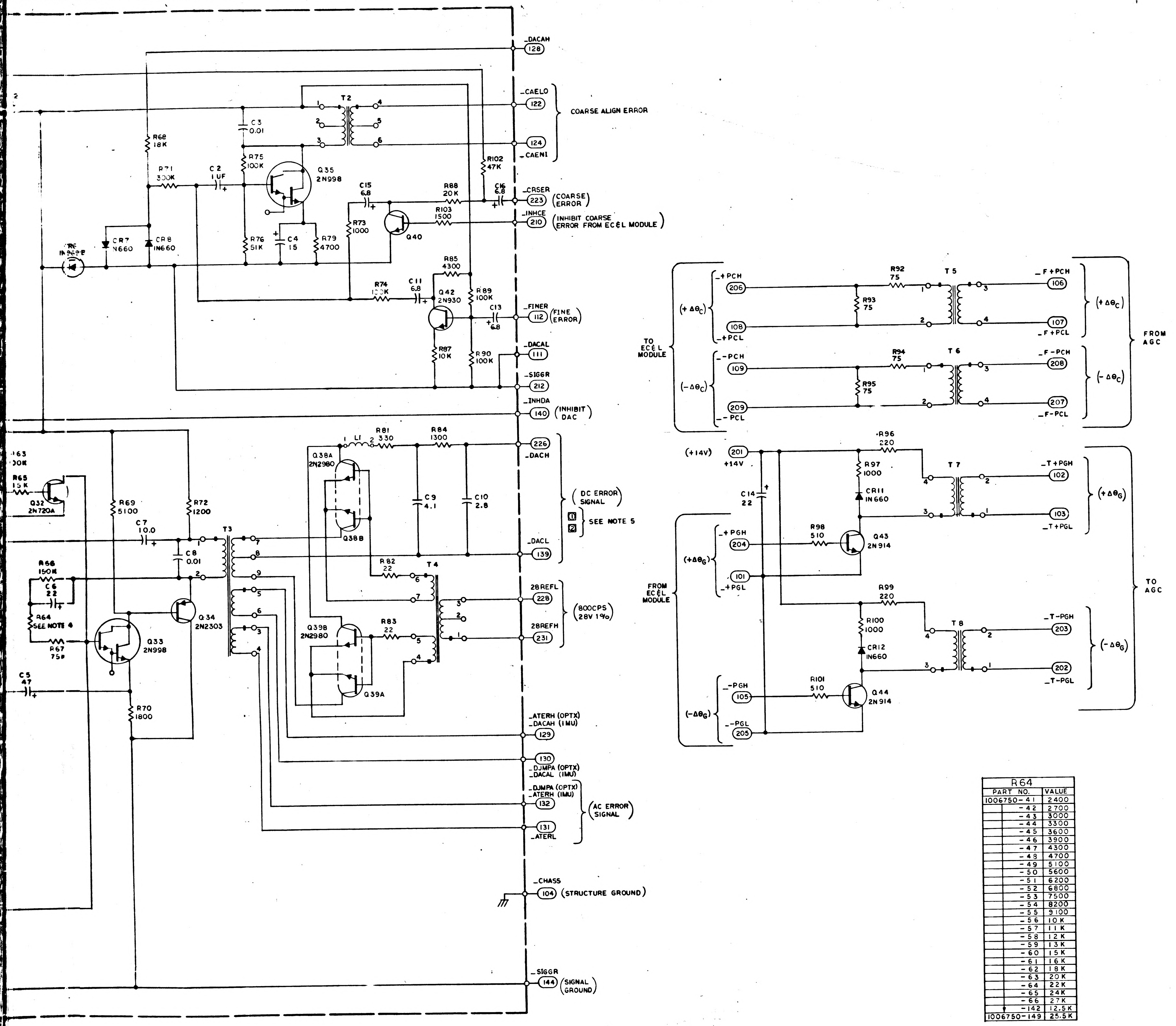
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. Di. Leo DATE 18 DEC 64
CHECKED 15 Jan 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010028
SCALE — WT — SHEET 1 OF 1

3A


_DACAH
128
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
_CRSER
223
(COARSE ERROR)
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
_FINER
112
(FINE ERROR)
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
226
_DACH
_DACL
139
(DC ERROR SIGNAL)
SEE NOTE 5
28REFL
228
(800CPS 28V 1%)
28REFH
231
_ATERH (OPTX) _DACAH (IMU)
129
130
_DJMPA (OPTX) _DACAL (IMU)
_DJMPA (OPTX) _ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
T2
C3 0.01
R62 18K
R71 300K
C2 1 UF
R75 100K
Q35 2N998
C15 6.8
R88 20K
C16 6.8
R102 47K
R103 1500
R73 1000
Q40
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
R85 4300
R74 100K
C11 6.8
Q42 2N930
R89 100K
C13 6.8
R87 10K
R90 100K
Q38A 2N2980
L1
R81 330
R84 1300
C9 4.1
C10 2.8
Q38B
R82 22
T4
T3
Q39B 2N2980
R83 22
Q39A
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
TO EC&L MODULE
(+Δθ_C)
_+PCH
206
108
_+PCL
R92 75
R93 75
T5
_F+PCH
106
107
_F+PCL
(+Δθ_C)
(−Δθ_C)
_−PCH
109
209
_−PCL
R94 75
R95 75
T6
_F−PCH
208
207
_F−PCL
(−Δθ_C)
FROM AGC
(+14V)
201
+14V
R96 220
R97 1000
CR11 1N660
C14 22
T7
_T+PGH
102
103
_T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH
204
101
_+PGL
R98 510
Q43 2N914
R99 220
R100 1000
CR12 1N660
T8
_T−PGH
203
202
_T−PGL
(−Δθ_G)
TO AGC
(−Δθ_G)
_−PGH
105
_−PGL
205
R101 510
Q44 2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION
C1	1006755-36	CAPACITOR
C2	1006755-69	
C3	1006777-31	
C4	1006755-33	
C5	1006755-36	
C6	1006755-85	
C7	1006755-30	
C8	1006777-31	
C9	1010279-119	
C10	1010279-117	
C11	1006755-79	CAPACITOR
C13	1006755-79	CAPACITOR
C14	1006755-85	CAPACITOR
CR1	1010385	DIODE
CR2	1010385	
CR3	1010385	
CR4	1010372-6	
CR5	1010385	
CR6	1010330-13	
CR7	1010385	
CR8	1010385	DIODE
CR11	1010385	DIODE
CR12	1010385	DIODE
C15	1006755-128	CAPACITOR
C16	1006755-128	CAPACITOR
Q1	1010343-3	TRANSISTOR
Q2	-3	
Q3	-3	
Q4	-3	
Q5	-3	
Q6	-3	
Q7	-3	
Q8	-3	
Q9	-3	
Q10	-3	
Q11	-3	
Q12	-3	
Q13	-3	
Q14	1010343-3	
Q15	1010285	
Q16	1010343-3	
Q17	1010285	
Q18	1010343-3	
Q19	1010285	
Q20	1010343-3	
Q21	1010285	
Q22	1010343-3	
Q23	1010285	
Q24	1010343-3	
Q25	1010285	
Q26	1010343-3	
Q27	1010285	
Q28	1010343-3	
Q29	1010285	
Q30	1010343-3	
Q31	1010285	
Q32	1010357-1	
Q33	1010342	
Q34	1010633-1	
Q35	1010342	TRANSISTOR
Q38	1010652-1	TRANSISTOR
Q39	1010652-1	TRANSISTOR
Q40	1010343-3	TRANSISTOR
Q42	1010397-1	TRANSISTOR
Q43	1010966-1	TRANSISTOR
Q44	1010966-1	TRANSISTOR
T1	1010723	TRANSFORMER
T2	1010274	
T3	1010726	
T4	1010365	
T5	1006762-2	
T6	1006762-2	
T7	1006762-2	
T8	1006762-2	TRANSFORMER
L1	1008811	INDUCTOR

2010028 G

MASTER

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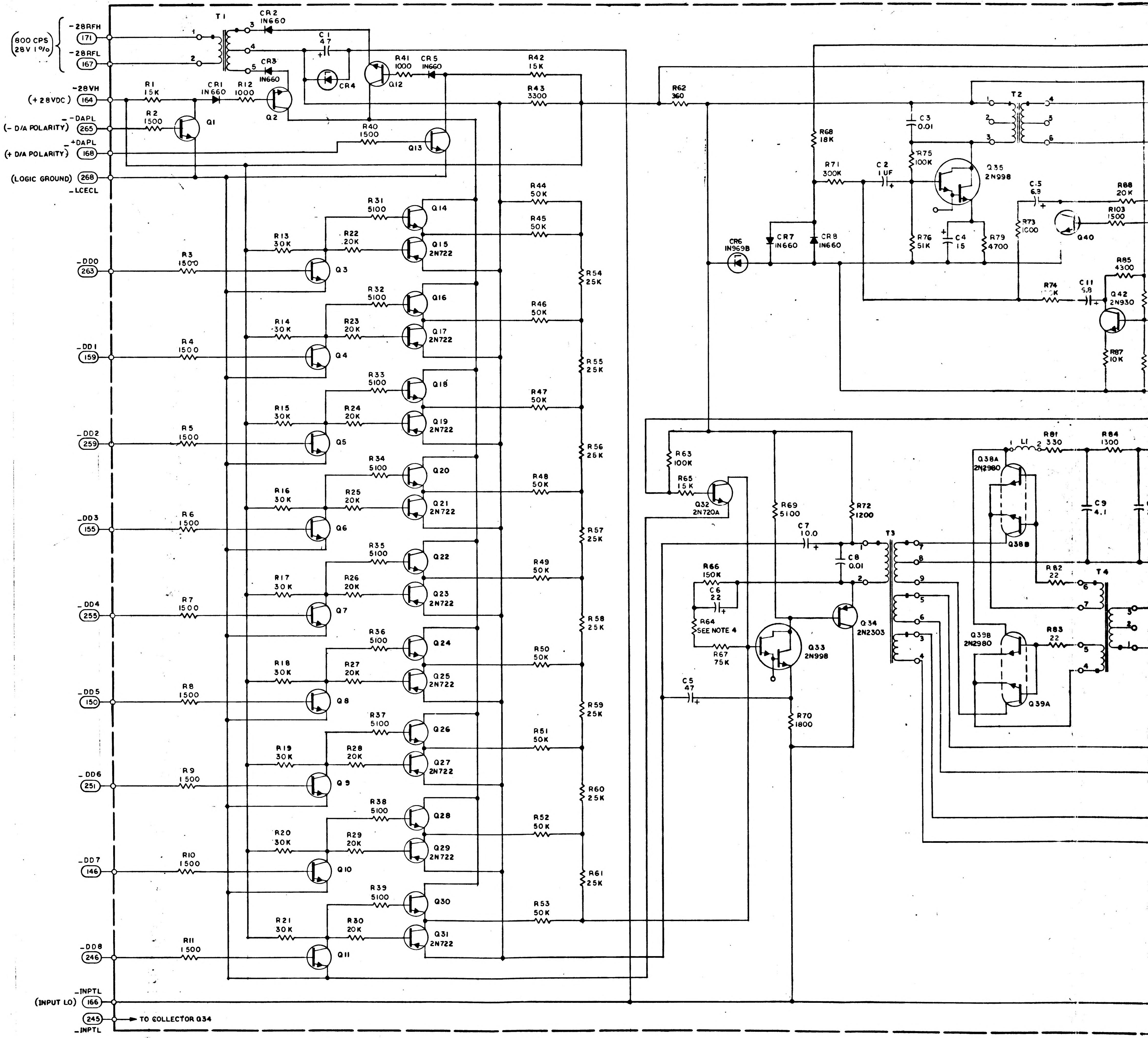
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-28RFH 171
-28RFL 167
-28VH (+28VDC) 164
-DAPL (- D/A POLARITY) 265
+DAPL (+ D/A POLARITY) 168
(LOGIC GROUND) 268 -LCECL
-DD0 263
-DD1 159
-DD2 259
-DD3 155
-DD4 255
-DD5 150
-DD6 251
-DD7 146
-DD8 246
-INPTL (INPUT LO) 166
245 TO COLLECTOR Q34
-INPTL
T1
CR2 1N660
C1 47
CR3 1N660
CR4
R41 1000
CR5 1N660
Q12
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R42 15K
R43 3300
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
R13 30K
R14 30K
R15 30K
R16 30K
R17 30K
R18 30K
R19 30K
R20 30K
R21 30K
R22 20K
R23 20K
R24 20K
R25 20K
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R27 20K
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R29 20K
R30 20K
R31 5100
R32 5100
R33 5100
R34 5100
R35 5100
R36 5100
R37 5100
R38 5100
R39 5100
Q14
Q15 2N722
Q16
Q17 2N722
Q18
Q19 2N722
Q20
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Q22
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Q30
Q31 2N722
R44 50K
R45 50K
R46 50K
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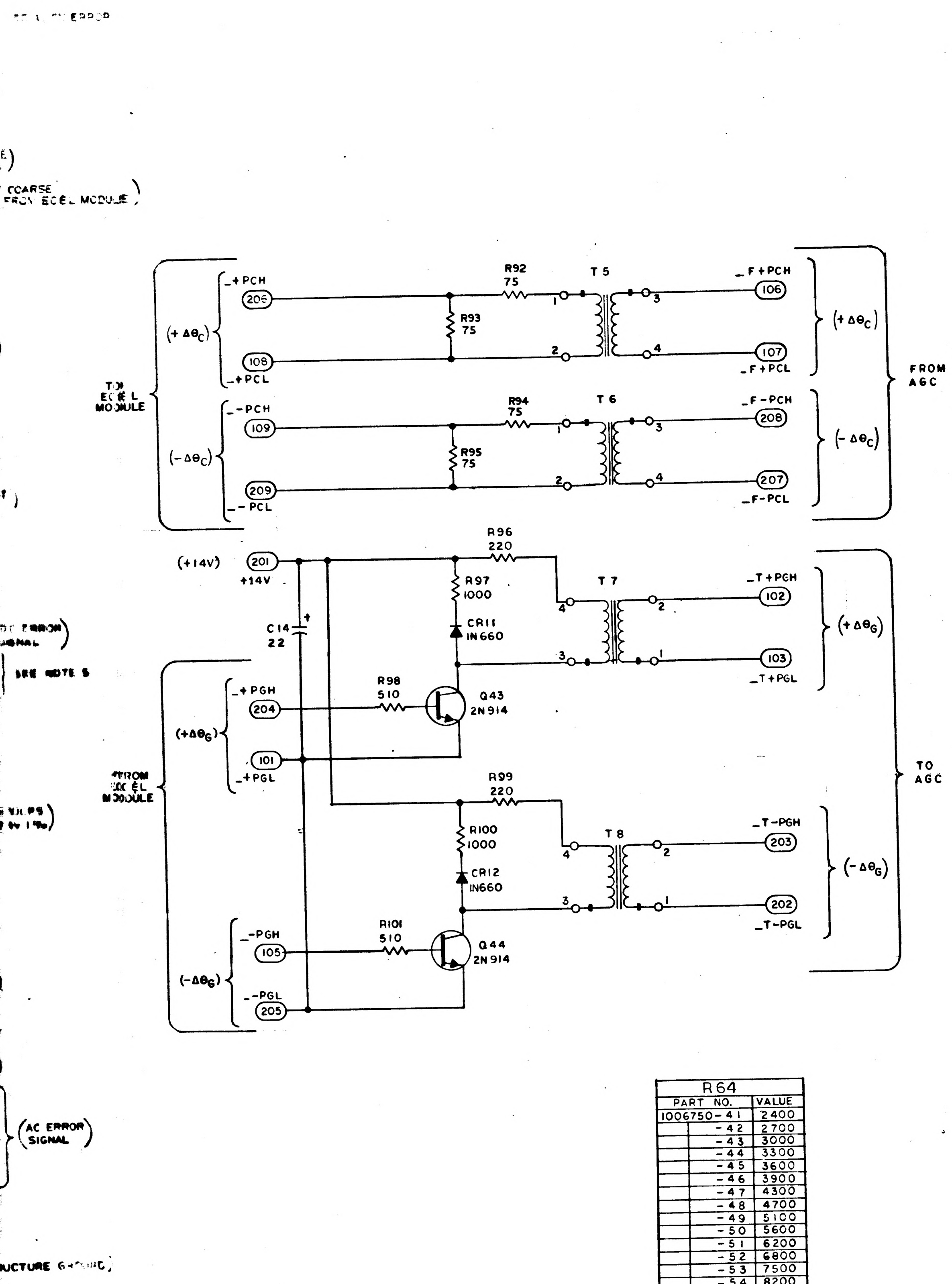
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
R62 360
CR6 1N969B
CR7 1N660
CR8 1N660
R68 18K
R71 300K
C2 1 UF
C3 0.01
R75 100K
Q35 2N998
R76 51K
C4 15
R79 4700
T2
C5 6.8
R73 1000
Q40
R88 20K
R103 1500
R85 4300
R74 K
C11 6.8
Q42 2N930
R87 10K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
L1
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WK
D	REVISED PER TDRR 16621	[illegible]	WK
E	REVISED PER TDRR 20304	[illegible]	WK
F	REVISED PER TDRR 20776	[illegible]	WK
G	REVISED PER TDRR 21769	[illegible]	WK
H	REVISED PER TDRR 22190	[illegible]	[illegible]


E)
COARSE
FROM ECEL MODULE
ERROR
SIGNAL
SEE NOTE 5
(AC ERROR SIGNAL)
STRUCTURE GROUND
TO ECEL MODULE
(+Δθ_C)
(−Δθ_C)
+PCH
206
108
+PCL
−PCH
109
209
−PCL
R92 75
R93 75
R94 75
R95 75
T5
T6
1
2
3
4
F+PCH
106
107
F+PCL
F−PCH
208
207
F−PCL
(+Δθ_C)
(−Δθ_C)
FROM AGC
(+14V)
201
+14V
C14 22
R96 220
R97 1000
CR11 IN660
T7
T+PGH
102
103
T+PGL
(+Δθ_G)
R98 510
Q43 2N914
FROM ECEL MODULE
+PGH
204
(+Δθ_G)
101
+PGL
R99 220
R100 1000
CR12 IN660
T8
T−PGH
203
202
T−PGL
(−Δθ_G)
TO AGC
R101 510
Q44 2N914
−PGH
105
(−Δθ_G)
−PGL
205

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-13		IN969B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 15 Jan 65
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 26 Jan 65

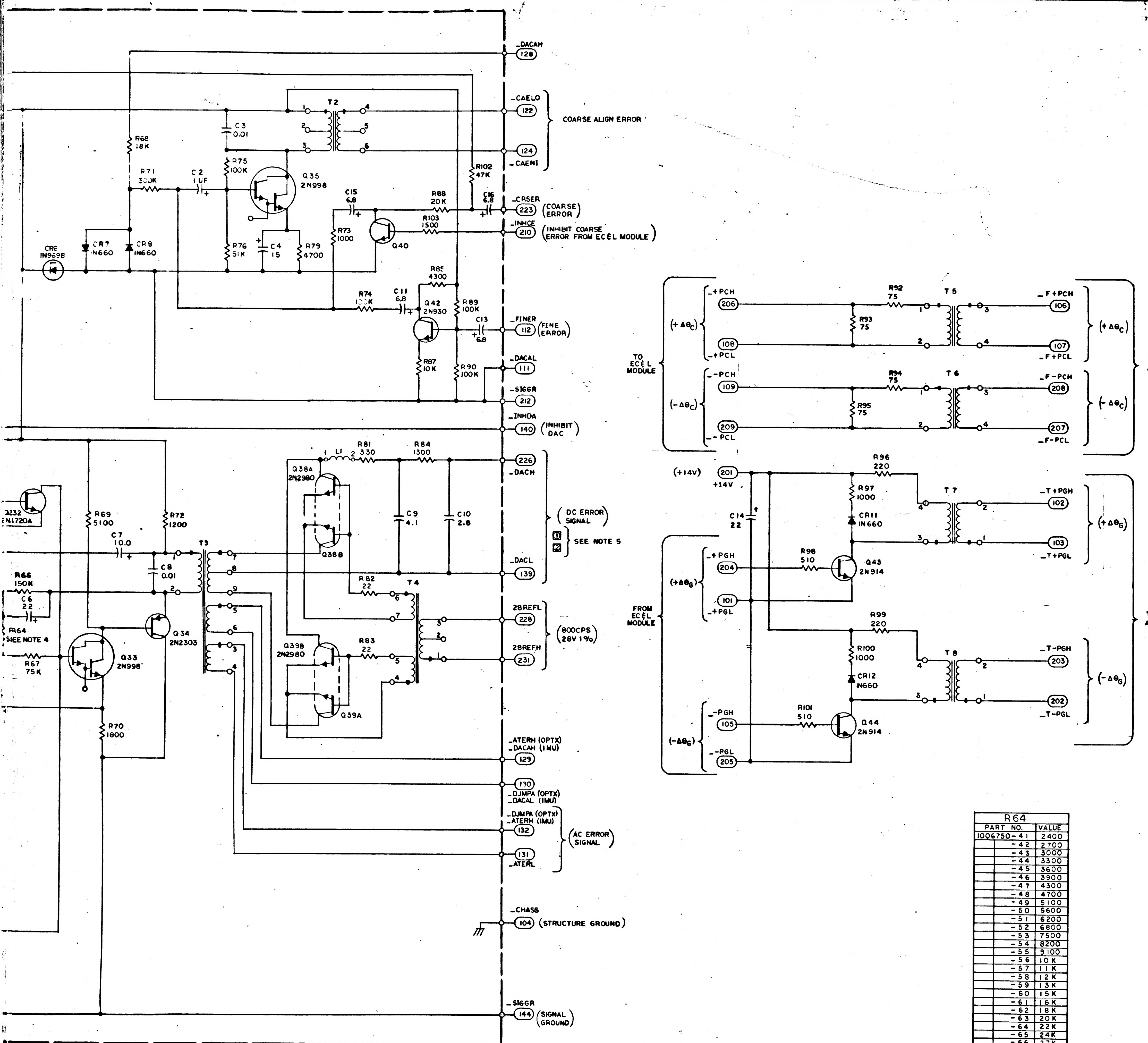
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010028
SCALE — WT — SHEET 1 OF 1

2010028 H

MASTER


_DACAH
128
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
_CRSER
223
(COARSE ERROR)
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
_FINER
112
(FINE ERROR)
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
226
_DACH
(DC ERROR SIGNAL)
SEE NOTE 5
_DACL
139
28REFL
228
(800CPS 28V 1%)
28REFH
231
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
T2
C3 0.01
R68 18K
R71 300K
C2 1 UF
R75 100K
Q35 2N998
R102 47K
C15 6.8
R88 20K
C16 6.8
R103 1500
R73 1000
Q40
CR6 1N969B
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
R85 4300
R74 100K
C11 6.8
Q42 2N930
R89 100K
C13 6.8
R87 10K
R90 100K
Q38A 2N2980
L1
R81 330
R84 1300
C9 4.1
C10 2.8
Q38B
Q32 2N1720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
R82 22
T4
Q39B 2N2980
R83 22
Q39A
R70 1800
TO EC&L MODULE
(+Δθ_C)
_+PCH
206
108
_+PCL
R92 75
R93 75
T5
_F+PCH
106
107
_F+PCL
(+Δθ_C)
FROM AGC
(-Δθ_C)
_-PCH
109
209
_-PCL
R94 75
R95 75
T6
_F-PCH
208
207
_F-PCL
(-Δθ_C)
(+14V)
201
+14V
C14 22
R96 220
R97 1000
CR11 1N660
T7
_T+PGH
102
103
_T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH
204
101
_+PGL
R98 510
Q43 2N914
R99 220
R100 1000
CR12 1N660
T8
_T-PGH
203
202
_T-PGL
(-Δθ_G)
TO AGC
(-Δθ_G)
_-PGH
105
_-PGL
205
R101 510
Q44 2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15 K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIP
C1	1006 755-36	CAPACI
C2	1006 55-69	
C3	1006 77-31	
C4	1006 55-33	
C5	1006 55-36	
C6	1006 55-85	
C7	1006 55-30	
C8	1006 77-31	
C9	1010 79-119	
C10	1010 79-117	
C11	1006 55-79	CAPA
C13	006 55-79	CAPAC
C14	006 55-85	CAPACI
CR1	1010 85	DIOD
CR2	1010 85	
CR3	1010 85	
CR4	1010 72-6	
CR5	1010 85	
CR6	1010 30-13	
CR7	1010 85	
CR8	1010 85	
CR11	1010 85	DIOD
CR12	1010 85	DIOD
C15	1006 755-128	CAPACITO
C16	1006 755-128	CAPACITO
Q1	1010 43-3	TRANSIS
Q2	-3	
Q3	-3	
Q4	-3	
Q5	-3	
Q6	-3	
Q7	-3	
Q8	-3	
Q9	-3	
Q10	-3	
Q11	-3	
Q12	-3	
Q13	-3	
Q14	1010 43-3	
Q15	1010 85	
Q16	1010 43-3	
Q17	1010 85	
Q18	1010 43-3	
Q19	1010 85	
Q20	1010 43-3	
Q21	1010 85	
Q22	1010 43-3	
Q23	1010 85	
Q24	1010 43-3	
Q25	1010 85	
Q26	1010 43-3	
Q27	1010 85	
Q28	1010 43-3	
Q29	1010 85	
Q30	1010 43-3	
Q31	1010 85	
Q32	1010 57-1	
Q33	1010 42	
Q34	1010 33-1	
Q35	1010 42	TRANSIS
Q38	1010 52-1	TRANSIS
Q39	1010 52-1	TRANSIS
Q40	1010 43-3	TRANSIS
Q42	1010 97-1	TRANSIS
Q43	1010 66-1	TRANSIS
Q44	1010 66-1	TRANSIS
T1	1010 23	TRANSFO
T2	1010 74	
T3	1010 26	
T4	1010 65	
T5	1006 62-2	
T6	1006 62-2	
T7	1006 62-2	
T8	1006 762-2	TRANSFO
L1	1006 811	INDUCTO

2010028 H

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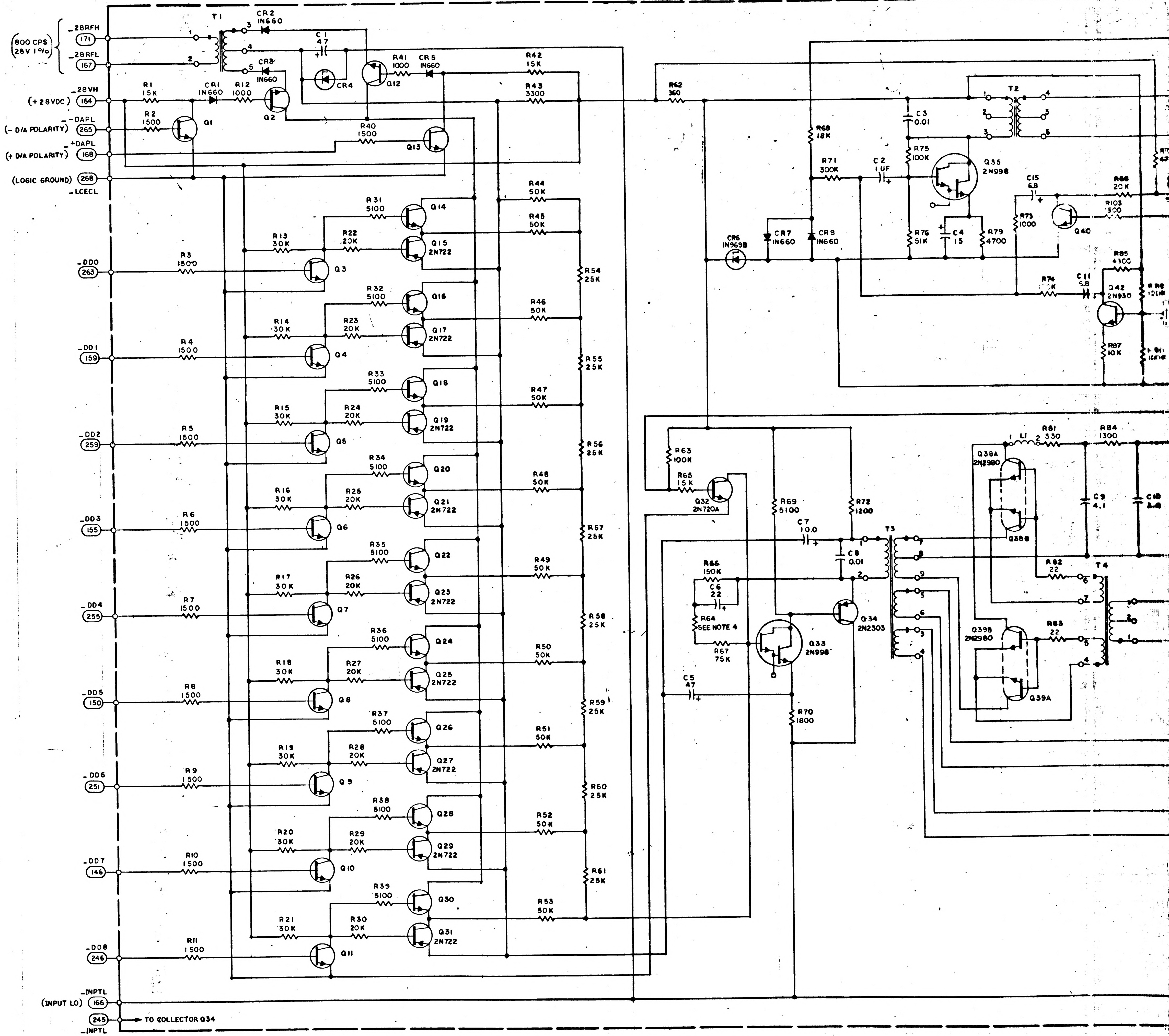

(800 CPS 28V 1%)
_28RFH 171
_28RFL 167
(+28VDC) _28VH 164
(- D/A POLARITY) _DAPL 265
(+ D/A POLARITY) +DAPL 168
(LOGIC GROUND) 268
_LCECL
_DD0 263
_DD1 159
_DD2 259
_DD3 155
_DD4 255
_DD5 150
_DD6 251
_DD7 146
_DD8 246
(INPUT LO) _INPTL 166
245 TO COLLECTOR Q34
_INPTL
T1
CR2 1N660
CR3 1N660
C1 47
CR4
R41 1000
CR5 1N660
Q12
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R42 15K
R43 3300
R44 50K
R45 50K
R46 50K
R47 50K
R48 50K
R49 50K
R50 50K
R51 50K
R52 50K
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
R3 1500
R4 1500
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R7 1500
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Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q14
Q15 2N722
Q16
Q17 2N722
Q18
Q19 2N722
Q20
Q21 2N722
Q22
Q23 2N722
Q24
Q25 2N722
Q26
Q27 2N722
Q28
Q29 2N722
Q30
Q31 2N722
R62 360
CR6 1N969B
CR7 1N660
CR8 1N660
R68 18K
R71 300K
C2 1 UF
C3 0.01
R75 100K
R76 51K
C4 15
R79 4700
Q35 2N998
T2
C15 6.8
R73 1000
Q40
R88 20K
R103 500
R85 4300
R74
C11 6.8
Q42 2N930
R87 10K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
L1
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

2010028 H

ARSE ALIGN ERROR

SE)
R)

T COARSE
R FROM EC&L MODULE)

IT)

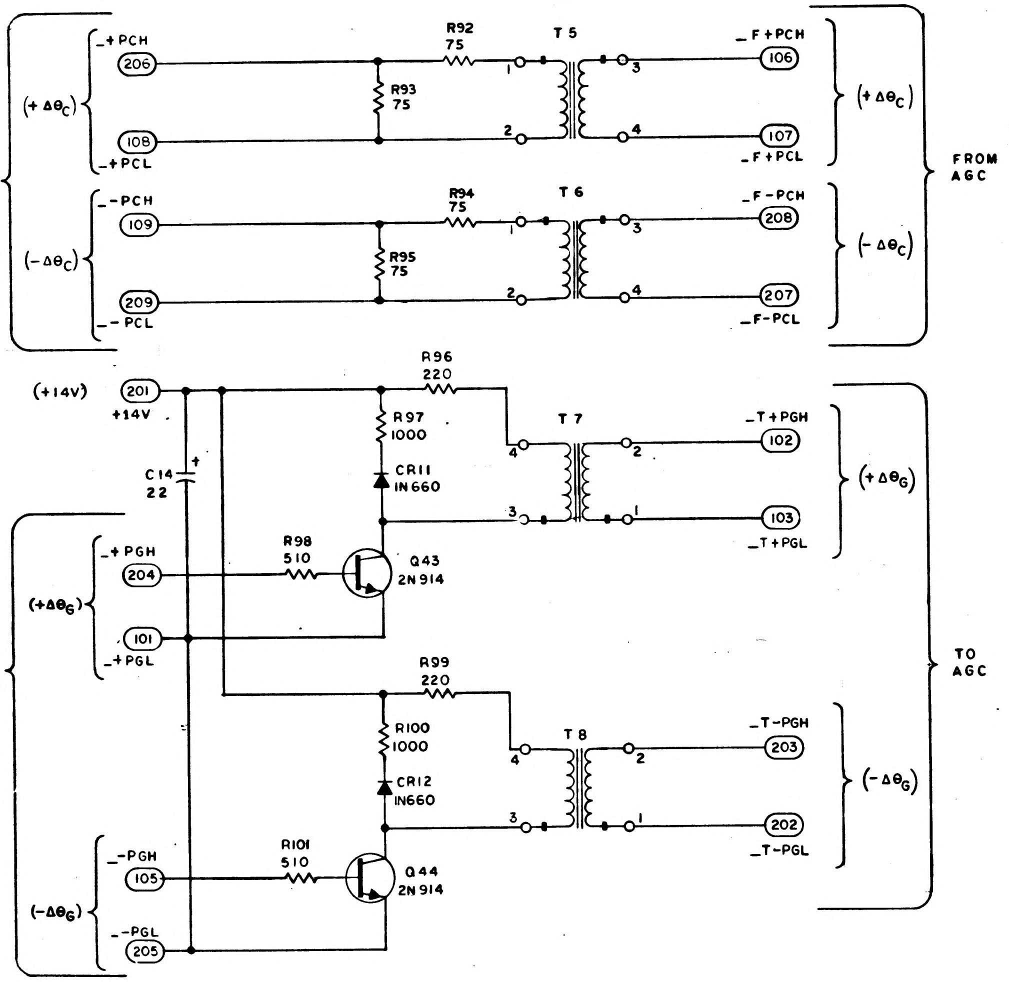
DC ERROR)
SIGNAL

} SEE NOTE 5

800CPS)
28V 1%)

(AC ERROR)
SIGNAL)

CTURE GROUND)



R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-5		IN961B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1010830-7	DIODE	IN963B		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WH
D	REVISED PER TDRR 16621	23 Feb 65	WH
E	REVISED PER TDRR 20304	23 June 65	WH
F	REVISED PER TDRR 20776	16 July 65	WH
G	REVISED PER TDRR 21765	24 Aug 65	WH
H	REVISED PER TDRR 22190	8 Sep 65	WGM
J	REVISED PER TDRR 22514	15 Oct 65	WGM

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. DiLeo DATE 18 DEC 64
CHECKED 15 Jan 65
APPROVAL 22 Jan 65
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

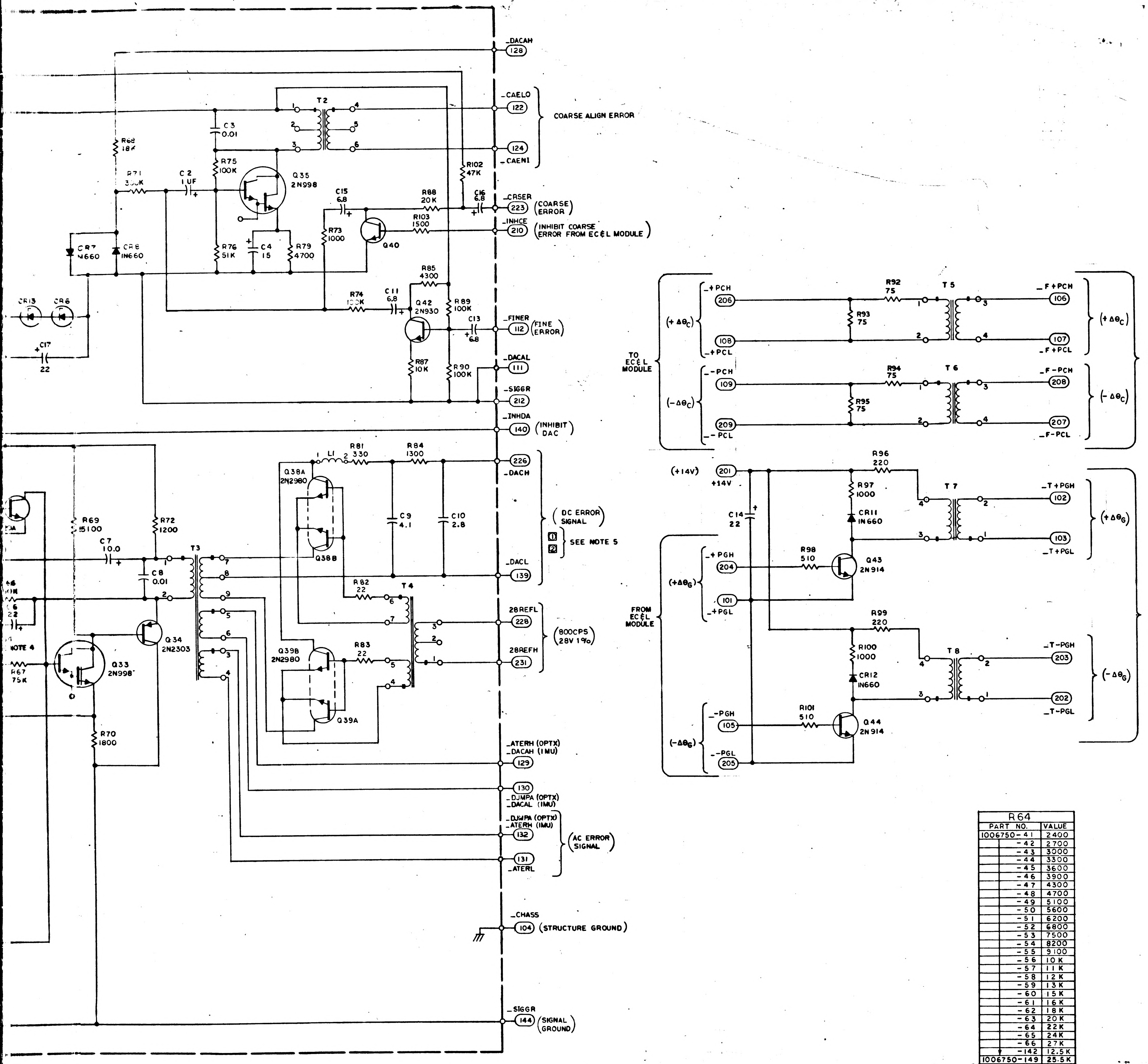
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, D/A CONVERTER

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010028
SCALE — WT — SHEET 1 OF 1

MASTER

34


_DACAH
128
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
T2
1 2 3 4 5 6
C3
0.01
R68
18K
R75
100K
Q35
2N998
R71
300K
C2
1 UF
R102
47K
C15
6.8
C16
6.8
R88
20K
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
1000
Q40
CR7
1N660
CR8
1N660
R76
51K
C4
15
R79
4700
R85
4300
R74
100K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
CR13
CR6
C17
22
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
L1
R81
330
R84
1300
226
_DACH
Q38A
2N2980
Q38B
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1 2 SEE NOTE 5
_DACL
139
R69
5100
R72
1200
C7
10.0
C8
0.01
T3
R82
22
T4
C6
22
NOTE 4
R67
75K
Q33
2N998
Q34
2N2303
28REFL
228
(800CPS 28V 1%)
28REFH
231
Q39B
2N2980
R83
22
Q39A
R70
1800
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
TO EC&L MODULE
(+Δθ_C)
_+PCH
206
108
_+PCL
R92
75
R93
75
T5
_F+PCH
106
107
_F+PCL
(+Δθ_C)
FROM AGC
(-Δθ_C)
_-PCH
109
209
_-PCL
R94
75
R95
75
T6
_F-PCH
208
207
_F-PCL
(-Δθ_C)
(+14V)
201
+14V
R96
220
R97
1000
CR11
1N660
C14
22
T7
_T+PGH
102
103
_T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH
204
R98
510
Q43
2N914
101
_+PGL
R99
220
R100
1000
CR12
1N660
T8
_T-PGH
203
202
_T-PGL
(-Δθ_G)
TO AGC
(-Δθ_G)
_-PGH
105
R101
510
Q44
2N914
_-PGL
205

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
↓ -142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36		↓		
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67		↓		
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63		↓		
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49		↓		
R39	-49		5100		
R40	-36		1500		
R41	↓ -32		1000	↓	↓
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13		↓		
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	↓ -12		↓	↓	↓
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	↓ -49		5100	↓	↓
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80	↓	100K	↓	1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-9		22	±5%	1/8W
R83	1010369-9		22	±5%	1/8W
R84	1006750-35	↓	1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	↓ -72	↓	47K	↓	↓
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL
C1	1006755-36	CAPACITOR	47UF	±1
C2	1006755-69		1.0	
C3	1006777-31		0.01	
C4	1006755-33		15	
C5	1006755-36		47	
C6	1006755-85		22	
C7	1006755-130		10.0	
C8	1006777-31		0.01	
C9	1010279-119		4.1	
C10	1010279-117	↓	2.8 ↓	↓
C11	1006755-79	CAPACITOR	6.8UF	±10%
C13	1006755-79	CAPACITOR	6.8UF	±10%
C14	1006755-85	CAPACITOR	22 UF	±10%
CR1	1010385	DIODE	1N660	
CR2	1010385		1N660	
CR3	1010385		1N660	
CR4	1010372-6			
CR5	1010385		1N660	
CR6	1010830-5		[illegible]	
CR7	1010385	↓	1N660	
CR8	1010385	DIODE	1N660	
CR11	1010385	DIODE	1N660	
CR12	1010385	DIODE	1N660	
CR13	1010830-7	DIODE	1N963B	
C15	1006755-128	CAPACITOR	6.8 UF	±10%
C16	1006755-128	CAPACITOR	6.8 UF	±10%
C17	1006755-85	CAPACITOR	22UF	±10%
Q1	1010343-3	TRANSISTOR		
Q2	-3			
Q3	-3			
Q4	-3			
Q5	-3			
Q6	-3			
Q7	-3			
Q8	-3			
Q9	-3			
Q10	-3			
Q11	-3			
Q12	-3			
Q13	↓ -3			
Q14	1010343-3			
Q15	1010285		2N722	
Q16	1010343-3			
Q17	1010285		2N722	
Q18	1010343-3			
Q19	1010285		2N722	
Q20	1010343-3			
Q21	1010285		2N722	
Q22	1010343-3			
Q23	1010285		2N722	
Q24	1010343-3			
Q25	1010285		2N722	
Q26	1010343-3			
Q27	1010285		2N722	
Q28	1010343-3			
Q29	1010285		2N722	
Q30	1010343-3			
Q31	1010285		2N722	
Q32	1010357-1		2N720A	
Q33	1010342		2N998	
Q34	1010633-1	↓	2N2303	
Q35	1010342	TRANSISTOR	2N998	
Q38	1010652-1	TRANSISTOR	2N2980	
Q39	1010652-1	TRANSISTOR	2N2980	
Q40	1010343-3	TRANSISTOR		
Q42	1010397-1	TRANSISTOR	2N930	
Q43	1010966-1	TRANSISTOR	2N914	
Q44	1010966-1	TRANSISTOR	2N914	
T1	1010723	TRANSFORMER		
T2	1010274			
T3	1010726			
T4	1010365			
T5	1006762-2			
T6	1006762-2			
T7	1006762-2	↓		
T8	1006762-2	TRANSFORMER		
L1	1008811	INDUCTOR		

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2010028 J

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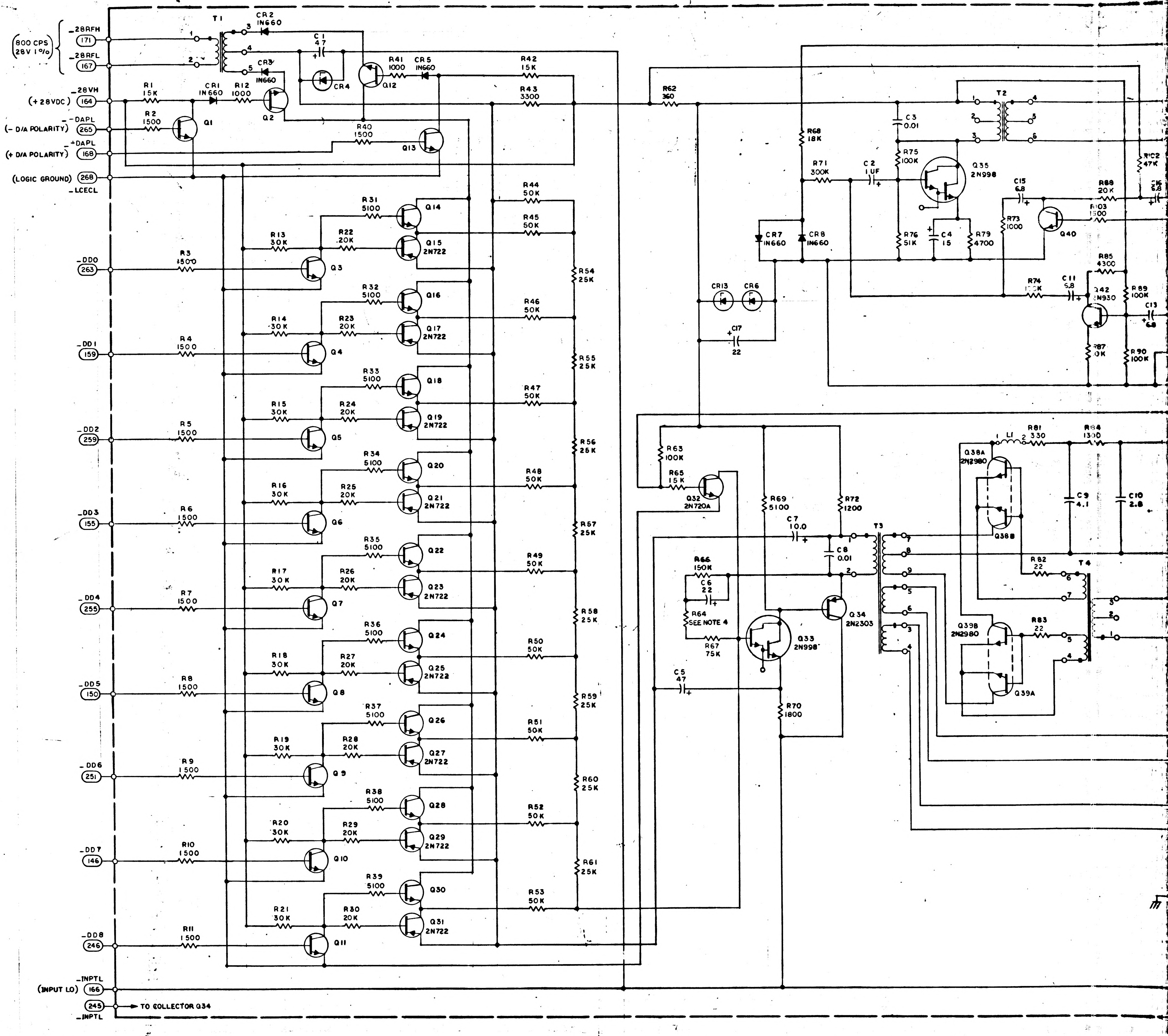
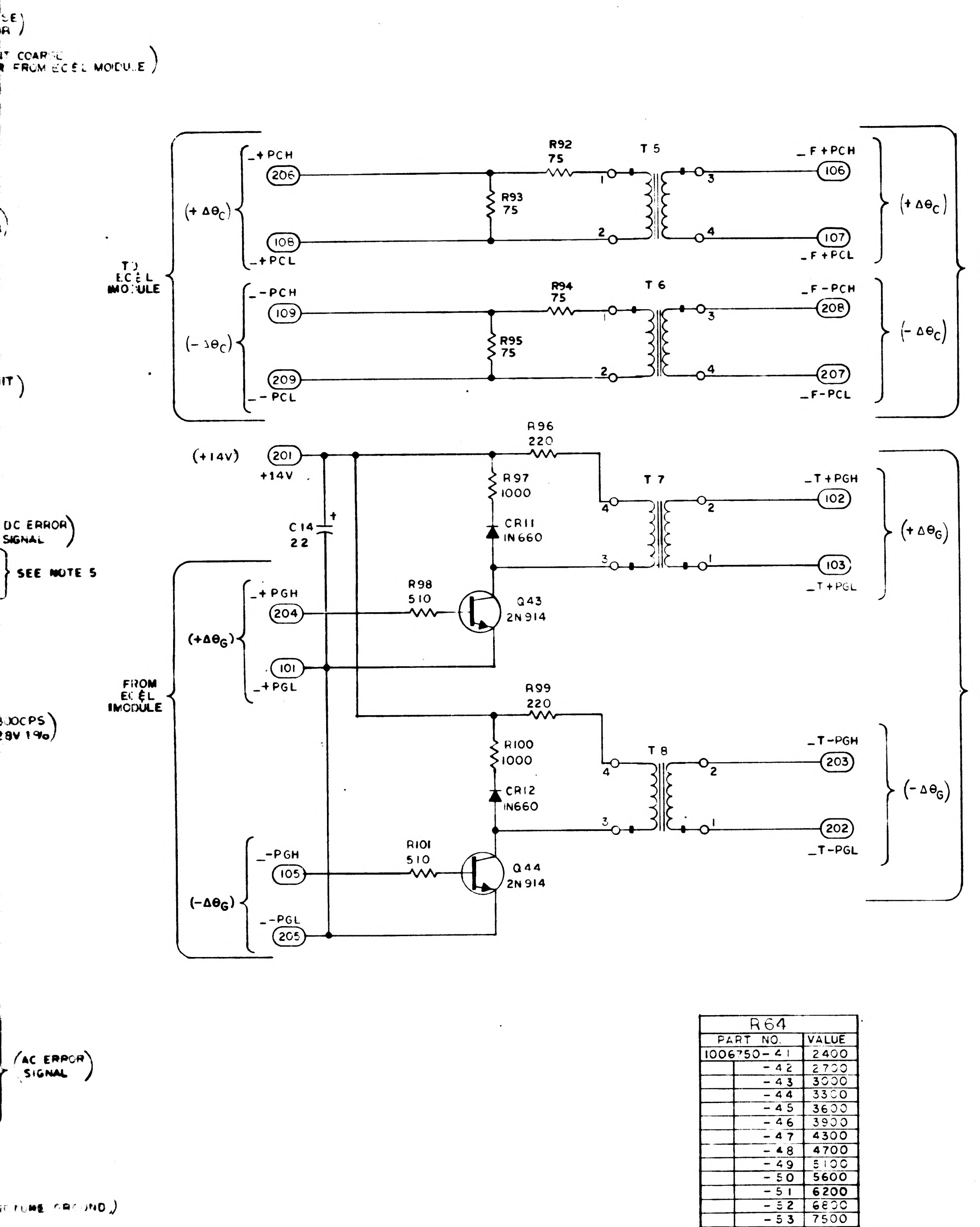


800 CPS
28V 1%
-28RFH 171
-28RFL 167
-28VH (+28VDC) 164
-DAPL (- D/A POLARITY) 265
+DAPL (+ D/A POLARITY) 168
(LOGIC GROUND) 268 -LCECL
-DD0 263
-DD1 159
-DD2 259
-DD3 155
-DD4 255
-DD5 150
-DD6 251
-DD7 146
-DD8 246
-INPTL (INPUT LO) 166
245 TO COLLECTOR Q34
-INPTL
T1
CR2 1N660
C1 47
CR3 1N660
CR4
R41 1000
CR5 1N660
Q12
R42 15K
R43 3300
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
R13 30K
R14 30K
R15 30K
R16 30K
R17 30K
R18 30K
R19 30K
R20 30K
R21 30K
R22 20K
R23 20K
R24 20K
R25 20K
R26 20K
R27 20K
R28 20K
R29 20K
R30 20K
R31 5100
R32 5100
R33 5100
R34 5100
R35 5100
R36 5100
R37 5100
R38 5100
R39 5100
Q14
Q15 2N722
Q16
Q17 2N722
Q18
Q19 2N722
Q20
Q21 2N722
Q22
Q23 2N722
Q24
Q25 2N722
Q26
Q27 2N722
Q28
Q29 2N722
Q30
Q31 2N722
R44 50K
R45 50K
R46 50K
R47 50K
R48 50K
R49 50K
R50 50K
R51 50K
R52 50K
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
R62 360
R68 18K
CR7 1N660
CR8 1N660
R71 300K
C2 1UF
C3 0.01
R75 100K
Q35 2N998
R76 51K
C4 15
R79 4700
T2
C15 6.8
R73 1000
Q40
R88 20K
R103 1500
R85 4300
R74
C11 6.8
Q42 1N930
R89 100K
R87 10K
R90 100K
C13 6.8
R102 47K
C16 6.8
CR13
CR6
C17 22
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
C5 47
R70 1800
Q38A 2N2980
Q38B
L1
R81 330
R84 1300
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACTTOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

2010028 J

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WK
D	REVISED PER TDRR 16621	[illegible]	WK
E	REVISED PER TDRR 20304	23 JUNE 65	WK
F	REVISED PER TDRR 20776	[illegible]	WK
G	REVISED PER TDRR [illegible]	[illegible]	WK
H	REVISED PER TDRR 22190	[illegible]	[illegible]
J	REVISED PER TDRR 22514	[illegible]	[illegible]
K	REVISED PER TDRR 23898	15 Nov 65	WK



R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4 W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4 W
R76	1006750-73	RESISTOR	51K	±2%	1/4 W
R79	1006750-48	RESISTOR	4700	±2%	1/4 W
R81	1006750-20	RESISTOR	330	±2%	1/4 W
R82	1010369-139		22	±5%	1/8 W
R83	1010369-139		22	±5%	1/8 W
R84	1006750-35		1300	±2%	1/4 W
R85	1006750-47	RESISTOR	4300	±2%	1/4 W
R87	1006750-56	RESISTOR	10K	±2%	1/4 W
R88	1006750-63	RESISTOR	20K	±2%	1/4 W
R89	1006750-80	RESISTOR	100K	±2%	1/4 W
R90	1006750-80	RESISTOR	100K	±2%	1/4 W
R92	1006750-5	RESISTOR	75	±2%	1/4 W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010385		1N660		
CR4	1010372-6				
CR5	1010385		1N660		
CR6	1010830-5		1N961B		
CR7	1010385		1N660		
CR8	1010385	DIODE	1N660		
CR11	1010385	DIODE	1N660		
CR12	1010385	DIODE	1N660		
CR13	1010830-7	DIODE	1N963B		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. G. Lao DATE 18 DEC 64
CHECKED A. Lindstrom 15 Jan 65
APPROVAL [illegible] 22 Jan 65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL W. Wyler 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

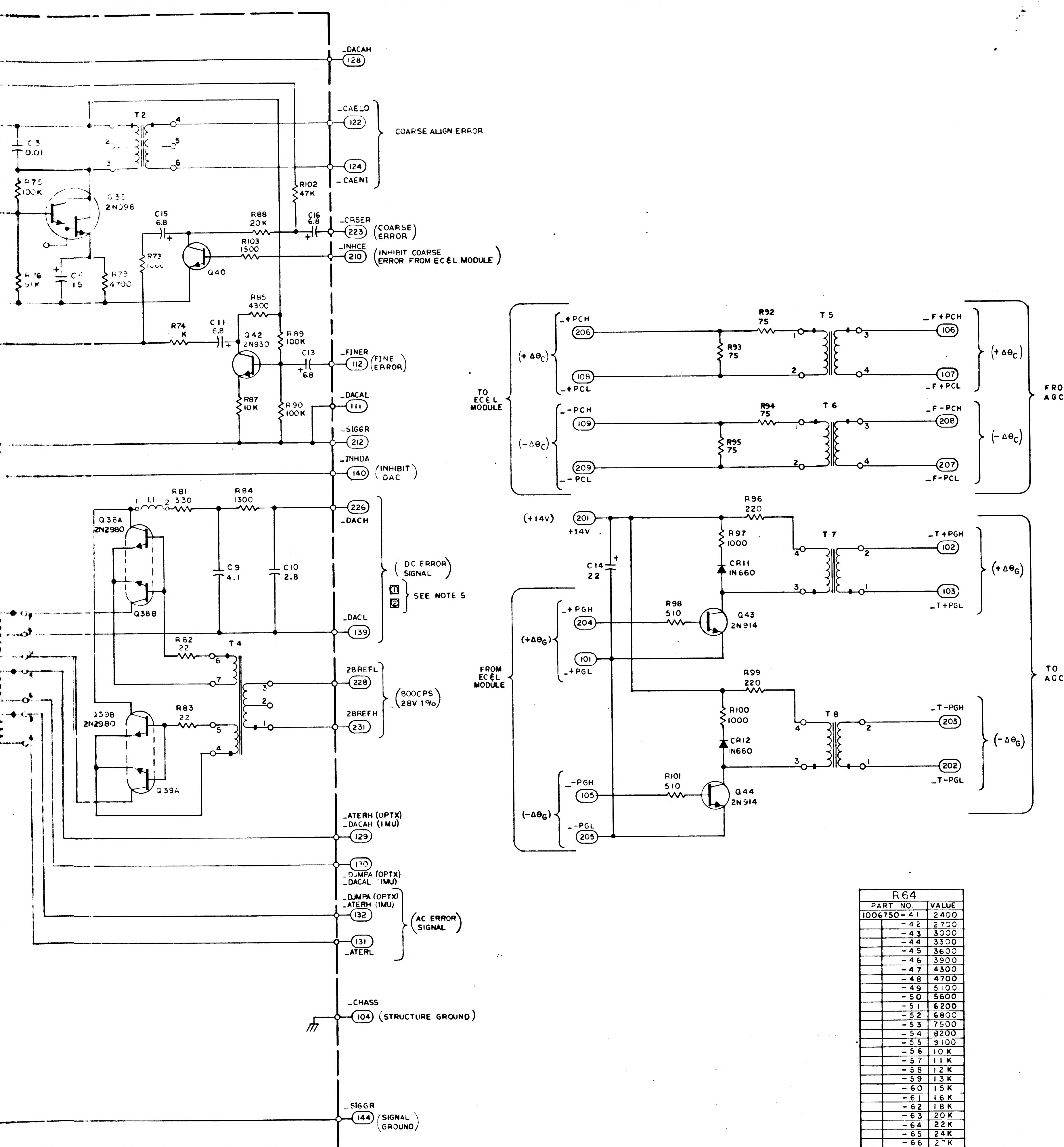
SCHEMATIC,
D/A CONVERTER

CODE IDENT NO 80230 | SIZE J | NASA DRAWING NO 2010028
SCALE — | WT — | SHEET 1 OF 1

2010028

2010028 K

3/2010028


_DACAH
128
T2
C3
0.01
R75
100K
Q35
2N998
R102
47K
_CAELO
122
124
_CAENI
COARSE ALIGN ERROR
C15
6.8
R88
20K
C16
6.8
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
1000
Q40
R76
51K
C4
15
R79
4700
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
L1
R81
330
R84
1300
226
_DACH
Q38A
2N2980
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
Q38B
_DACL
139
R82
22
T4
28REFL
228
(800CPS 28V 1%)
Q39B
2N2980
R83
22
28REFH
231
Q39A
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
TO EC&L MODULE
_+PCH
206
(+ΔθC)
108
_+PCL
R92
75
R93
75
T5
_F+PCH
106
107
_F+PCL
(+ΔθC)
FROM AGC
_-PCH
109
(-ΔθC)
209
_-PCL
R94
75
R95
75
T6
_F-PCH
208
207
_F-PCL
(-ΔθC)
(+14V)
201
+14V
C14
22
R96
220
R97
1000
CR11
IN660
T7
_T+PGH
102
103
_T+PGL
(+ΔθG)
FROM EC&L MODULE
_+PGH
204
(+ΔθG)
101
_+PGL
R98
510
Q43
2N914
R99
220
R100
1000
CR12
IN660
T8
_T-PGH
203
202
_T-PGL
(-ΔθG)
TO AGC
_-PGH
105
(-ΔθG)
_-PGL
205
R101
510
Q44
2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15 K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-5		[illegible]		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1010830-7	DIODE	IN963B		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1010285		2N722		
Q16	1010343-3				
Q17	1010285		2N722		
Q18	1010343-3				
Q19	1010285		2N722		
Q20	1010343-3				
Q21	1010285		2N722		
Q22	1010343-3				
Q23	1010285		2N722		
Q24	1010343-3				
Q25	1010285		2N722		
Q26	1010343-3				
Q27	1010285		2N722		
Q28	1010343-3				
Q29	1010285		2N722		
Q30	1010343-3				
Q31	1010285		2N722		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1010633-1		2N2303		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG:
DWG CON
1. DWG NO.
2. DWG NO.

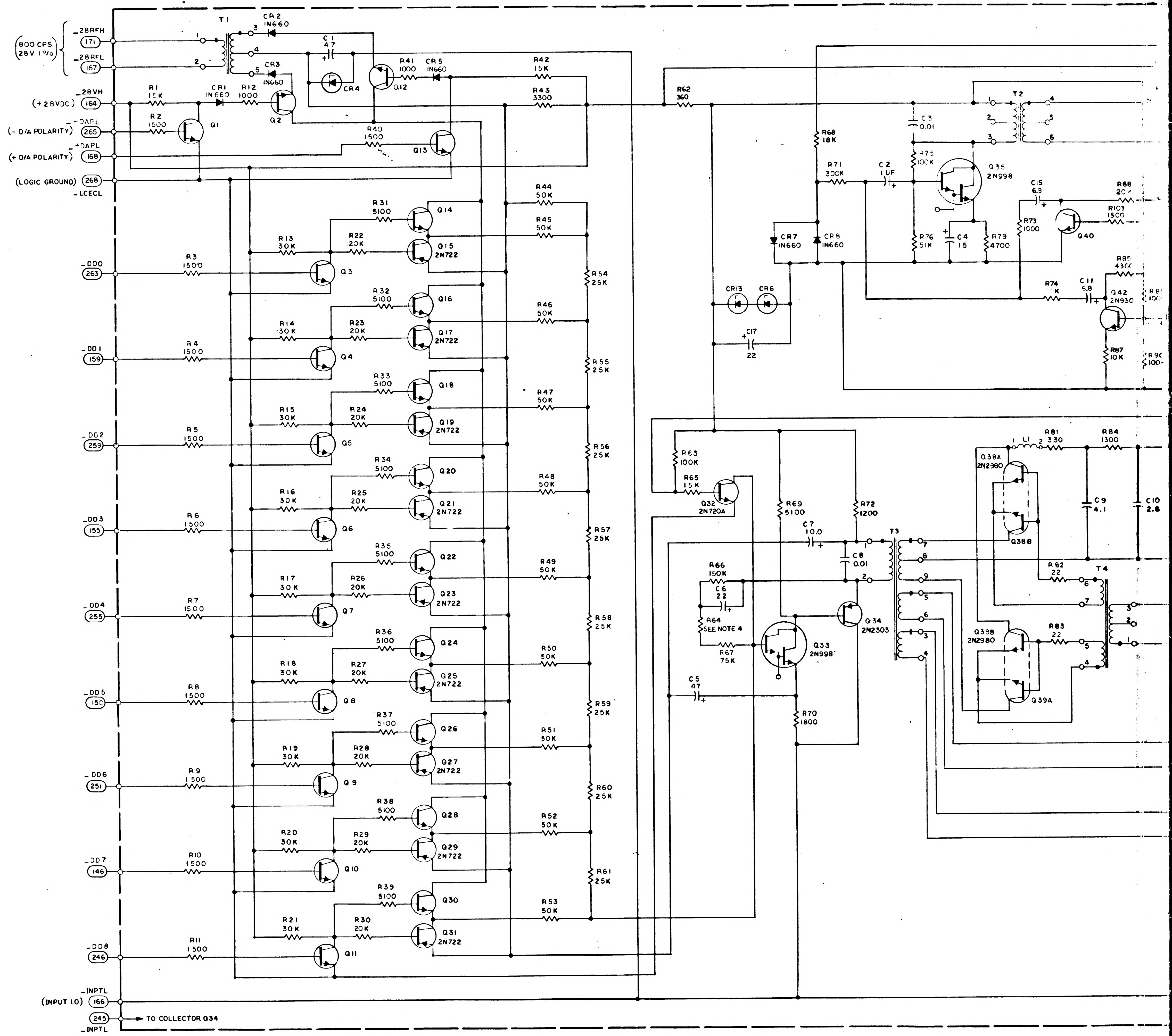
Ⓒ REPLACES

QTY REQD

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

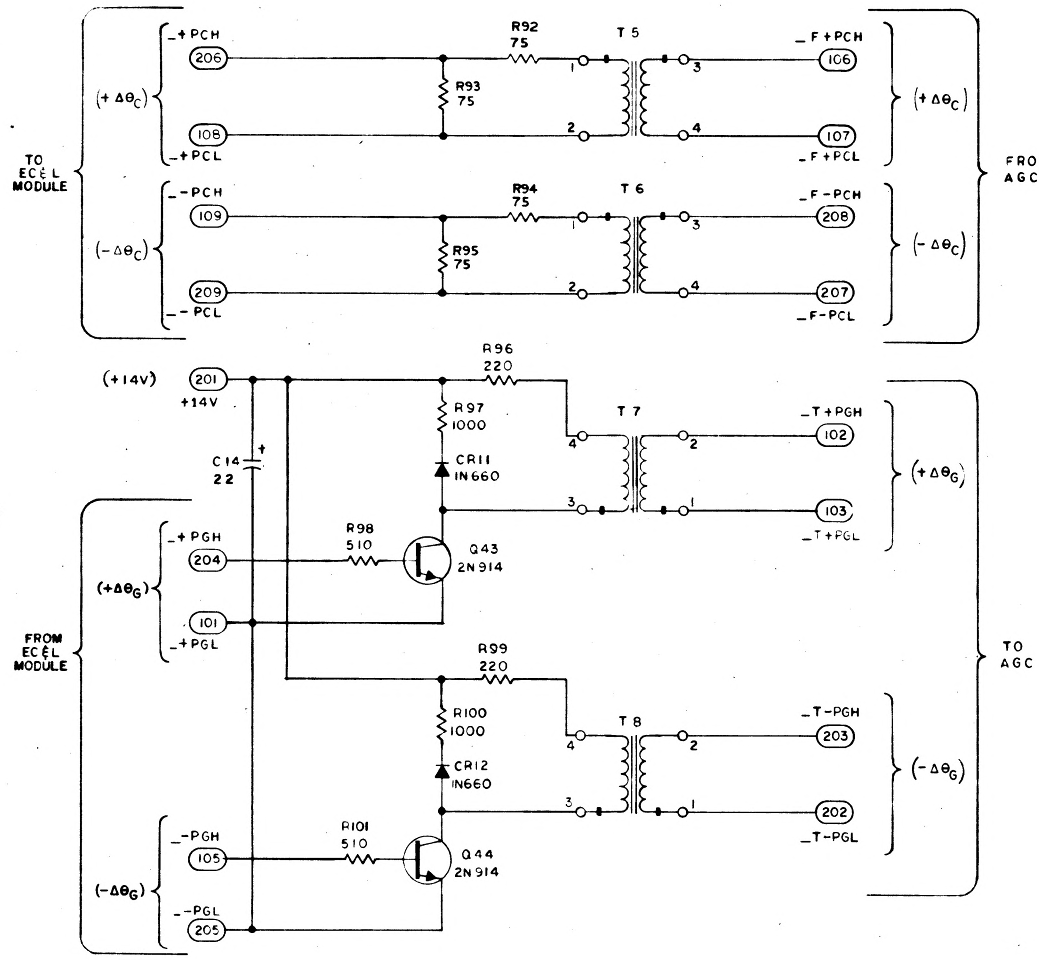
DRAWN
CHECKED
APPROVED
APPROVED
NASA
MIT



9
8
7
6
D
C
B
A
800 CPS 28V 1%
_28RFH 171
_28RFL 167
_28VH (+28VDC) 164
_-DAPL (- D/A POLARITY) 265
_+DAPL (+ D/A POLARITY) 168
(LOGIC GROUND) 268 _LCECL
_DD0 263
_DD1 159
_DD2 259
_DD3 155
_DD4 255
_DD5 150
_DD6 251
_DD7 146
_DD8 246
_INPTL (INPUT LO) 166
245 TO COLLECTOR Q34
_INPTL
T1
CR2 1N660
C1 47
CR3 1N660
CR4
R41 1000
CR5 1N660
R42 15K
R43 3300
Q12
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R44 50K
R45 50K
R31 5100
Q14
R13 30K
R22 20K
Q15 2N722
R3 1500
Q3
R54 25K
R32 5100
Q16
R14 30K
R23 20K
Q17 2N722
R46 50K
R4 1500
Q4
R55 25K
R33 5100
Q18
R47 50K
R15 30K
R24 20K
Q19 2N722
R5 1500
Q5
R56 25K
R34 5100
Q20
R48 50K
R16 30K
R25 20K
Q21 2N722
R6 1500
Q6
R57 25K
R35 5100
Q22
R49 50K
R17 30K
R26 20K
Q23 2N722
R7 1500
Q7
R58 25K
R36 5100
Q24
R50 50K
R18 30K
R27 20K
Q25 2N722
R8 1500
Q8
R59 25K
R37 5100
Q26
R51 50K
R19 30K
R28 20K
Q27 2N722
R9 1500
Q9
R60 25K
R38 5100
Q28
R52 50K
R20 30K
R29 20K
Q29 2N722
R10 1500
Q10
R61 25K
R39 5100
Q30
R53 50K
R21 30K
R30 20K
Q31 2N722
R11 1500
Q11
R62 360
R68 18K
C3 0.01
T2
R71 300K
C2 1UF
R75 100K
Q35 2N998
C15 63
R88 20
R103 1500
R73 1000
Q40
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
R85 430
R74 1K
C11 6.8
Q42 2N930
R87 10K
CR13
CR6
C17 22
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
Q38A 2N2980
L1
R81 330
R84 1300
C9 4.1
C10 2.8
Q38B
R82 22
T4
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N2303
Q39B 2N2980
R83 22
Q39A
C5 47
R70 1800

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

2010028 K



R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
↓ -142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36		↓		
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67		↓		
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63		↓		
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49		↓		
R39	-49		5100		
R40	-36		1500		
R41	↓ -32		1000	↓	↓
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13		↓		
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	↓ -12		↓	↓	↓
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	↓ -49		5100	↓	↓
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80	↓	100K	↓	1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35	↓	1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	↓ -72	↓	47K	↓	↓
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117	↓	2.8 ↓	↓	15 ↓
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-5		IN961B		
CR7	1010385	↓	IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1010830-7	DIODE	IN963B		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	↓ -3				
Q14	1010343-3				
Q15	1008814-1				
Q16	1010343-3				
Q17	1008814-1				
Q18	1010343-3				
Q19	1008814-1				
Q20	1010343-3				
Q21	1008814-1				
Q22	1010343-3				
Q23	1008814-1				
Q24	1010343-3				
Q25	1008814-1				
Q26	1010343-3				
Q27	1008814-1				
Q28	1010343-3				
Q29	1008814-1				
Q30	1010343-3				
Q31	1008814-1				
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008812-1	↓			
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2	↓			
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV.B WITH CHANGE PER TDRR 15733	1/24/65	WK
D	REVISED PER TDRR 16621	[illegible] 65	WK
E	REVISED PER TDRR 20304	23 JUNE 65	WK
F	REVISED PER TDRR 20776	16 July 65	WK
G	REVISED PER TDRR [illegible]	27 Aug 65	WK
H	REVISED PER TDRR 22190	[illegible]	[illegible]
J	REVISED PER TDRR 22514	21 Sep 65	[illegible]
K	REVISED PER TDRR 23898	15 Nov 65	WK
L	REVISED PER TDRR 27180	23 MAR 66	[illegible]

Ⓜ

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

(3A)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Di Leo DATE 18 DEC 64
CHECKED [illegible] 15 Jan 65
APPROVAL [illegible] 22 Jan 65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

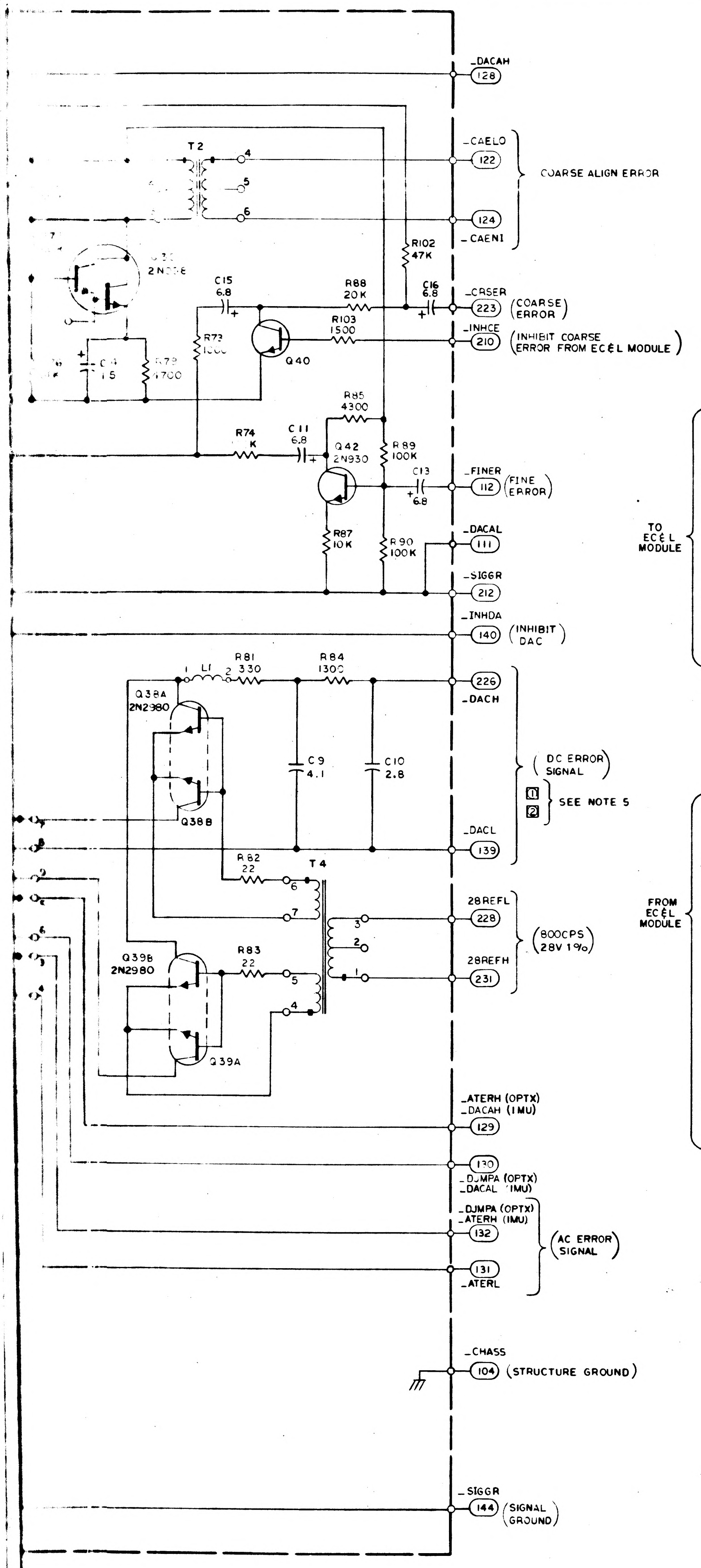
SCHEMATIC,
D/A CONVERTER

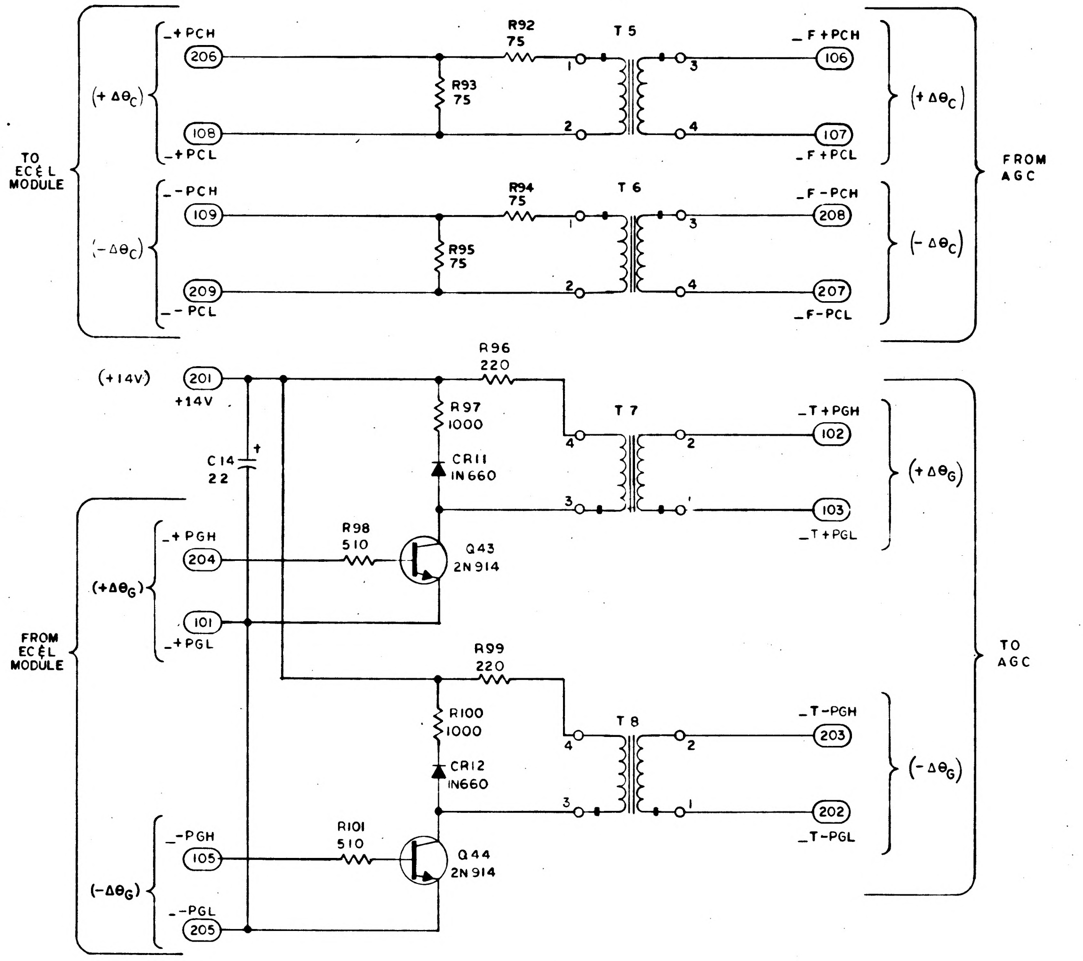
CODE IDENT NO 80230
SIZE J
NASA DRAWING NO. 2010028
SCALE —
SHEET 1 OF 1

2010028 L

2010028 L

3/2010028


_DACAH
128
T2
4
5
6
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
R102
47K
2N
C15
6.8
R88
20K
C16
6.8
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
1000
Q40
C
15
R78
4700
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
R81
330
L1
1
2
R84
1300
226
_DACH
Q38A
2N2980
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
Q38B
_DACL
139
R82
22
T4
6
7
3
2
1
28REFL
228
(800CPS 28V 1%)
28REFH
231
Q39B
2N2980
R83
22
5
4
Q39A
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)


TO EC&L MODULE
(+ Δθ_C)
_+PCH
206
108
_+PCL
R92
75
R93
75
T5
1
2
3
4
_F+PCH
106
107
_F+PCL
(+Δθ_C)
FROM AGC
(- Δθ_C)
_-PCH
109
209
_-PCL
R94
75
R95
75
T6
_F-PCH
208
207
_F-PCL
(- Δθ_C)
(+14V)
201
+14V
R96
220
R97
1000
CR11
IN660
C14
22
T7
_T+PGH
102
103
_T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH
204
R98
510
Q43
2N914
101
_+PGL
R99
220
R100
1000
CR12
IN660
T8
_T-PGH
203
202
_T-PGL
(-Δθ_G)
TO AGC
(-Δθ_G)
_-PGH
105
R101
510
Q44
2N914
_-PGL
205

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1010830-5		IN[illegible]		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1010830-7	DIODE	IN963B		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1				
Q16	1010343-3				
Q17	1008814-1				
Q18	1010343-3				
Q19	1008814-1				
Q20	1010343-3				
Q21	1008814-1				
Q22	1010343-3				
Q23	1008814-1				
Q24	1010343-3				
Q25	1008814-1				
Q26	1010343-3				
Q27	1008814-1				
Q28	1010343-3				
Q29	1008814-1				
Q30	1010343-3				
Q31	1008814-1				
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008812-1				
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	NDUCTOR			

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DWG

D/A CONV

1. DWG NO. 2

2. DWG NO. 2

Ⓒ REPLACES R

QTY REQD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —

DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

NEXT ASSY | USED ON

APPLICATION

DRAWN

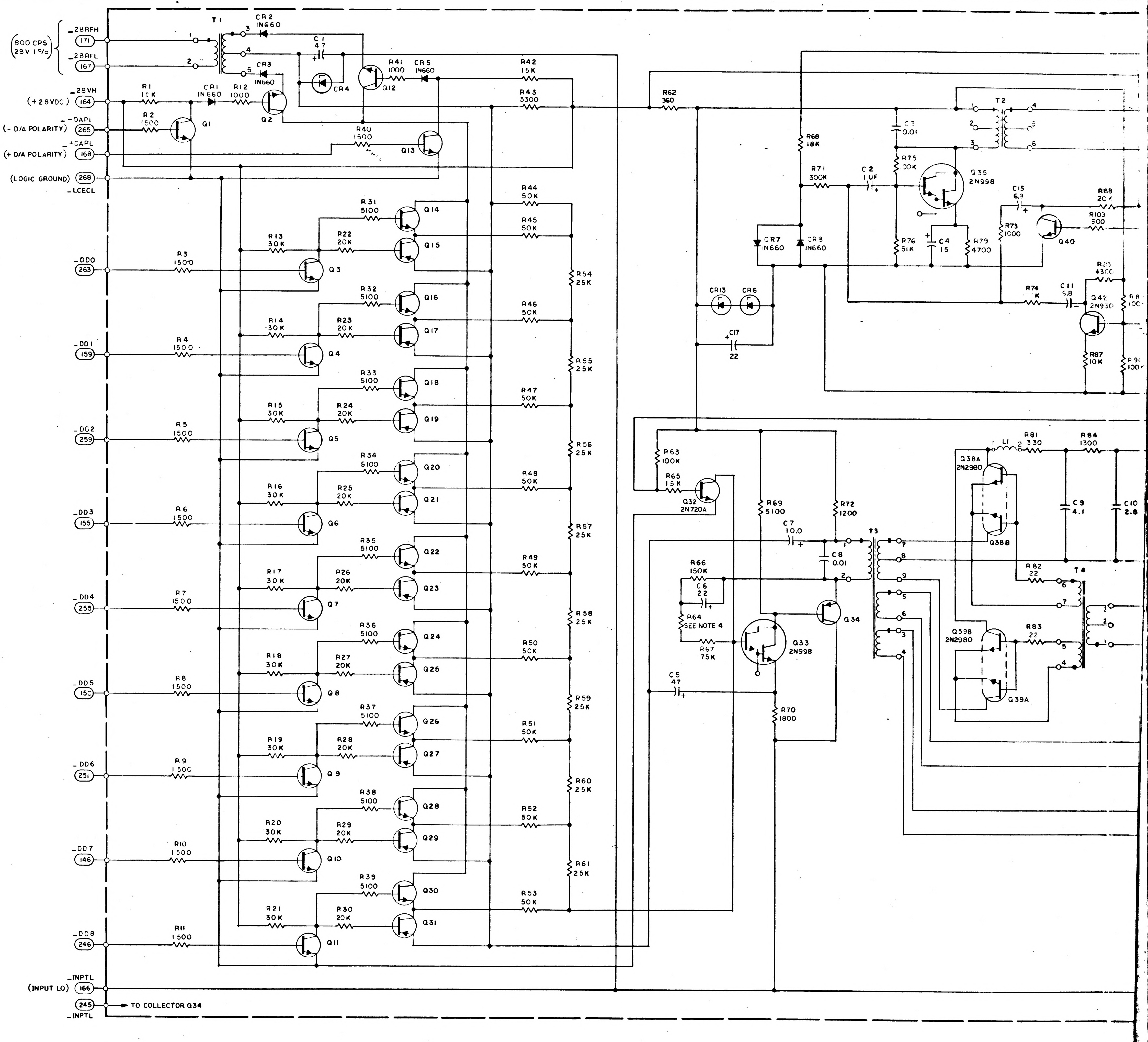
CHECKED

APPROVED

APPROVED

NASA APPROVAL

MIT APPROVAL

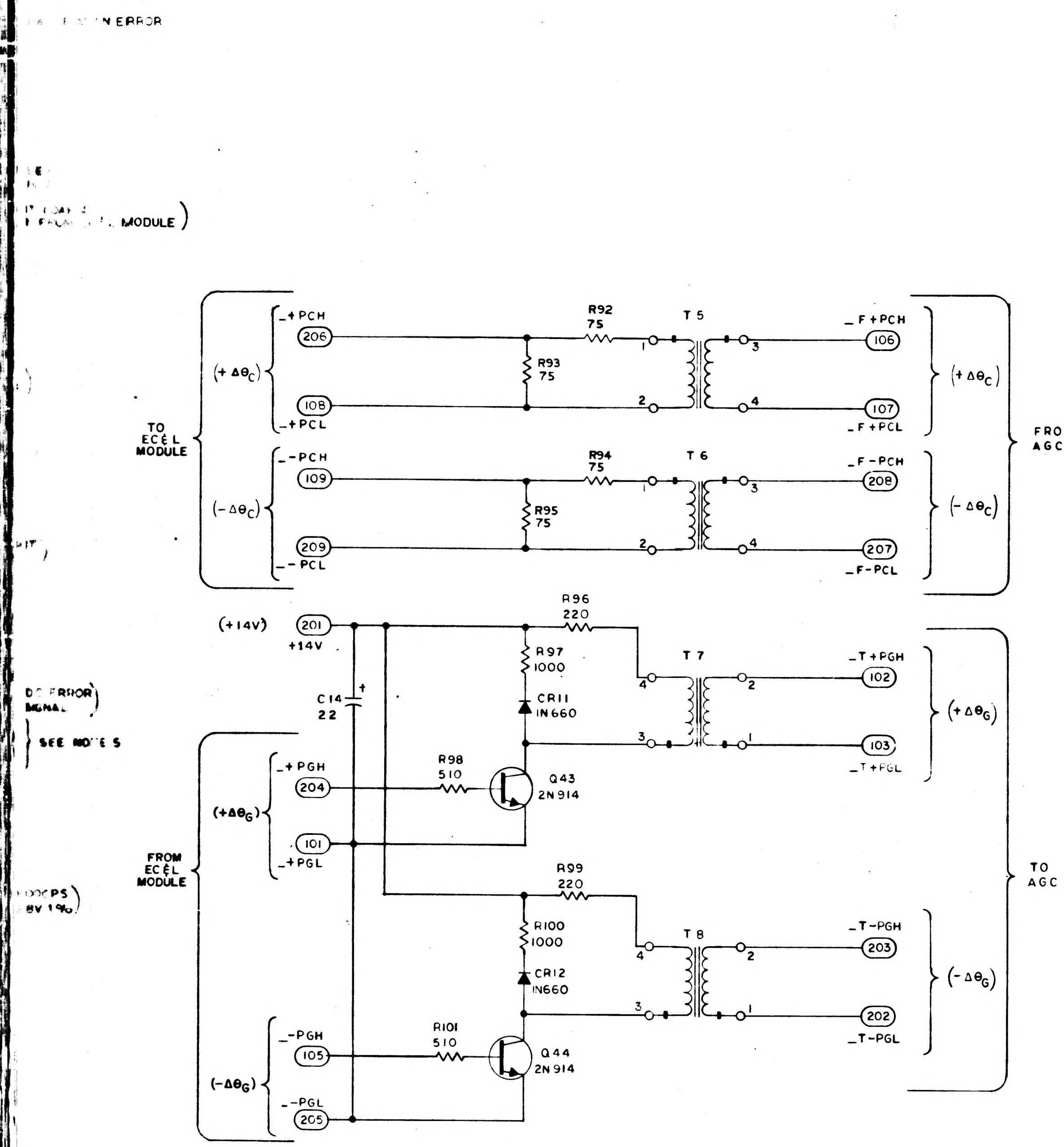

(800 CPS 28V 1%)
_28RFH
171
_28RFL
167
_28VH
(+28VDC)
164
_-DAPL
(- D/A POLARITY)
265
_+DAPL
(+ D/A POLARITY)
168
(LOGIC GROUND)
268
_LCECL
T1
CR2 IN660
C1 47
CR3 IN660
CR4
R41 1000
CR5 IN660
Q12
R42 15K
R43 3300
R1 15K
CR1 IN660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
_DD0
263
R3 1500
Q3
R13 30K
R22 20K
R31 5100
Q14
Q15
R44 50K
R45 50K
R54 25K
_DD1
159
R4 1500
Q4
R14 30K
R23 20K
R32 5100
Q16
Q17
R46 50K
R55 25K
_DD2
259
R5 1500
Q5
R15 30K
R24 20K
R33 5100
Q18
Q19
R47 50K
R56 25K
_DD3
155
R6 1500
Q6
R16 30K
R25 20K
R34 5100
Q20
Q21
R48 50K
R57 25K
_DD4
255
R7 1500
Q7
R17 30K
R26 20K
R35 5100
Q22
Q23
R49 50K
R58 25K
_DD5
150
R8 1500
Q8
R18 30K
R27 20K
R36 5100
Q24
Q25
R50 50K
R59 25K
_DD6
251
R9 1500
Q9
R19 30K
R28 20K
R37 5100
Q26
Q27
R51 50K
R60 25K
_DD7
146
R10 1500
Q10
R20 30K
R29 20K
R38 5100
Q28
Q29
R52 50K
R61 25K
_DD8
246
R11 1500
Q11
R21 30K
R30 20K
R39 5100
Q30
Q31
R53 50K
_INPTL
(INPUT LO)
166
245
TO COLLECTOR Q34
_INPTL
R62 360
R68 18K
R71 300K
C2 1 UF
C3 0.01
T2
R75 100K
Q35 2N998
C15 6.3
R88 20K
R103 500
R73 1000
Q40
CR7 IN660
CR8 IN660
R76 51K
C4 15
R79 4700
R85 4300
R74 K
C11 6.8
Q42 2N930
R8 100
R87 10K
R91 100
CR13
CR6
C17 22
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34
C5 47
R70 1800
L1
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
   ② INTERFACE TO RADAR CONTROLLED BY ICD

2010028 L

1/2010028



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4 W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15 K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4 W
R76	1006750-73	RESISTOR	51 K	±2%	1/4 W
R79	1006750-48	RESISTOR	4700	±2%	1/4 W
R81	1006750-20	RESISTOR	330	±2%	1/4 W
R82	1010369-139		22	±5%	1/8 W
R83	1010369-139		22	±5%	1/8 W
R84	1006750-35		1300	±2%	1/4 W
R85	1006750-47	RESISTOR	4300	±2%	1/4 W
R87	1006750-56	RESISTOR	10K	±2%	1/4 W
R88	1006750-63	RESISTOR	20K	±2%	1/4 W
R89	1006750-80	RESISTOR	100 K	±2%	1/4 W
R90	1006750-80	RESISTOR	100K	±2%	1/4 W
R92	1006750-5	RESISTOR	75	±2%	1/4 W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		IN961B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1				
Q16	1010343-3				
Q17	1008814-1				
Q18	1010343-3				
Q19	1008814-1				
Q20	1010343-3				
Q21	1008814-1				
Q22	1010343-3				
Q23	1008814-1				
Q24	1010343-3				
Q25	1008814-1				
Q26	1010343-3				
Q27	1008814-1				
Q28	1010343-3				
Q29	1008814-1				
Q30	1010343-3				
Q31	1008814-1				
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008812-1				
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10 K
-57	11 K
-58	12 K
-59	13 K
-60	15 K
-61	16 K
-62	18 K
-63	20 K
-64	22 K
-65	24 K
-66	27 K
-142	12.5 K
1006750-149	25.5 K

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV.B WITH CHANGE PER TDRR 15737	1/26/65	
D	REVISED PER TDRR 16621	[illegible]	
E	REVISED PER TDRR 20304	23 JUNE 65	
F	REVISED PER TDRR 20776	[illegible]	
G	REVISED PER TDRR [illegible]	27 AUG 65	
H	REVISED PER TDRR 22190	[illegible]	
J	REVISED PER TDRR 22514	21 SEP 65	
K	REVISED PER TDRR 23898	15 NOV 65	
L	REVISED PER TDRR 27180	23 MAR 66	
M	REVISED PER TDRR 28185	28 APR 66	

REF DWG:

D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

(3A)

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. Di[illegible] DATE 18 DEC 64
CHECKED 15 Jan 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

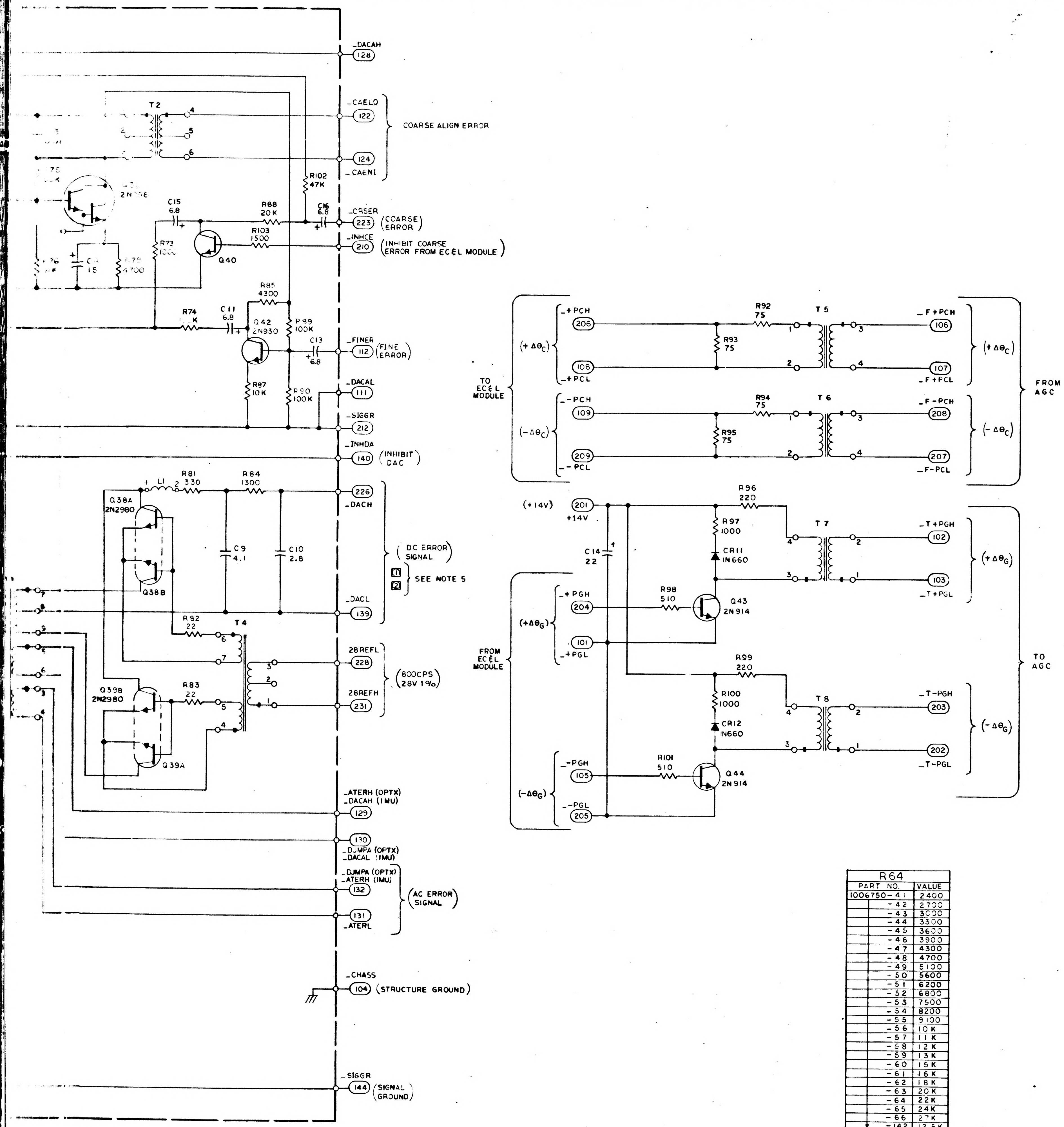
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO 80230 | SIZE J | NASA DRAWING NO 2010028
SCALE — | WT — | SHEET 1 OF 1

2010028 M

3/2010028


_DACAH
128
T2
4
5
6
_CAELO
122
124
_CAENI
COARSE ALIGN ERROR
R102
47K
C15
6.8
R88
20K
C16
6.8
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
1000
Q40
C4
15
R79
4700
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
L1
1
2
R81
330
R84
1300
226
_DACH
Q38A
2N2980
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
Q38B
_DACL
139
R82
22
T4
6
7
3
2
1
5
4
28REFL
228
28REFH
231
(800CPS 28V 1%)
Q39B
2N2980
R83
22
Q39A
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
TO EC&L MODULE
_+PCH
206
108
_+PCL
(+ Δθ_C)
R92
75
R93
75
T5
1
2
3
4
_F+PCH
106
107
_F+PCL
(+ Δθ_C)
_-PCH
109
209
_-PCL
(- Δθ_C)
R94
75
R95
75
T6
_F-PCH
208
207
_F-PCL
(- Δθ_C)
FROM AGC
(+14V)
201
+14V
R96
220
R97
1000
CR11
IN660
T7
_T+PGH
102
103
_T+PGL
(+ Δθ_G)
C14
22
FROM EC&L MODULE
_+PGH
204
R98
510
Q43
2N914
101
_+PGL
(+Δθ_G)
R99
220
R100
1000
CR12
IN660
T8
_T-PGH
203
202
_T-PGL
(- Δθ_G)
TO AGC
_-PGH
105
R101
510
Q44
2N914
_-PGL
205
(-Δθ_G)

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		[illegible]		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-128	CAPACITOR	6.8UF	±10%	50VDC
C16	1006755-128	CAPACITOR	6.8UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1				
Q16	1010343-3				
Q17	1008814-1				
Q18	1010343-3				
Q19	1008814-1				
Q20	1010343-3				
Q21	1008814-1				
Q22	1010343-3				
Q23	1008814-1				
Q24	1010343-3				
Q25	1008814-1				
Q26	1010343-3				
Q27	1008814-1				
Q28	1010343-3				
Q29	1008814-1				
Q30	1010343-3				
Q31	1008814-1				
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008812-1				
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG:
D/A CO
1. DWG NO.
2. DWG NO.

Ⓒ REPLACES R

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± DO NOT SCALE THIS DRAWING
		MATERIAL
		HEAT TREATMENT
NEXT ASSY	USED ON	FINAL FINISH
APPLICATION		

INSTRUM
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL

2010028 M

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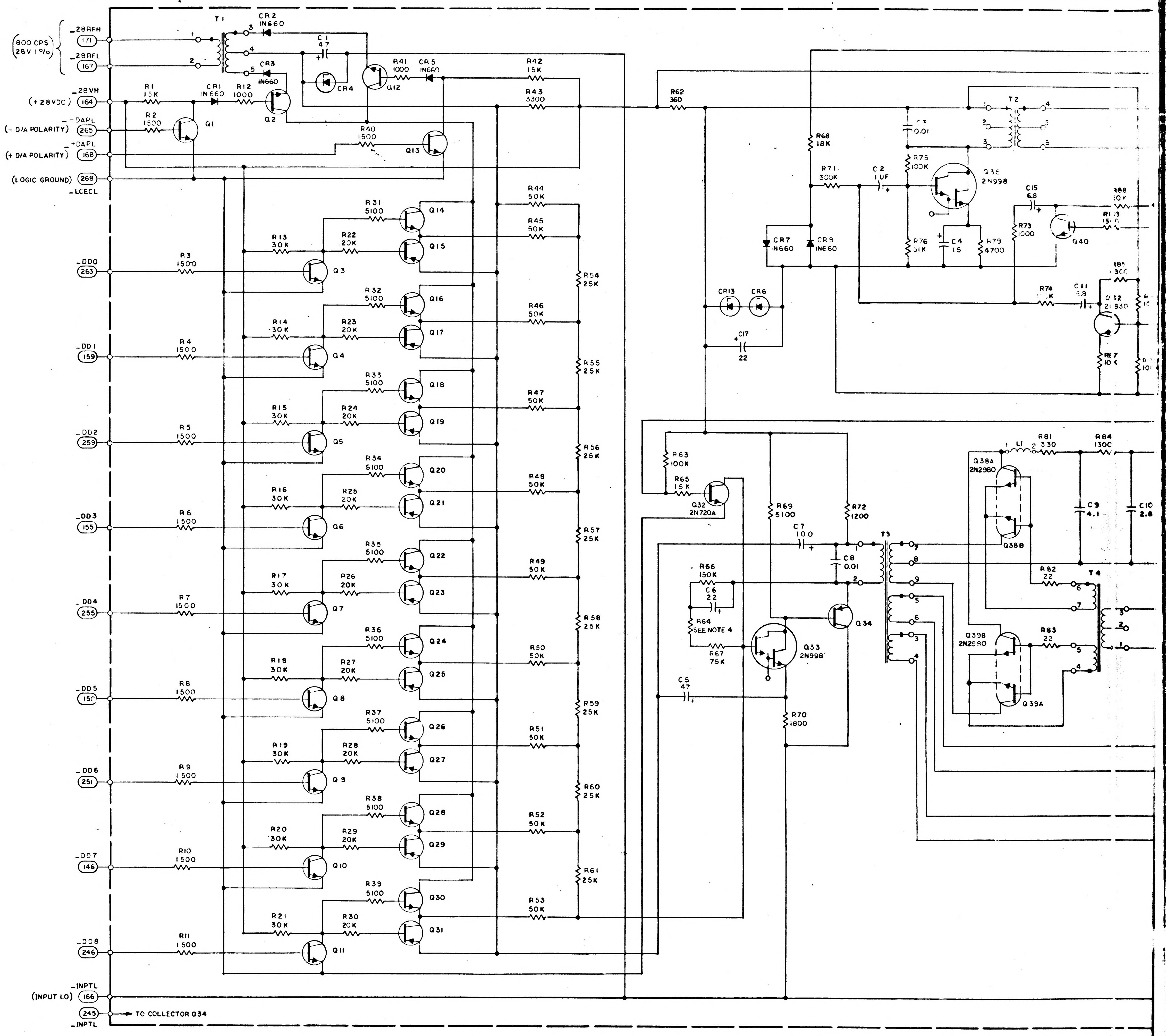


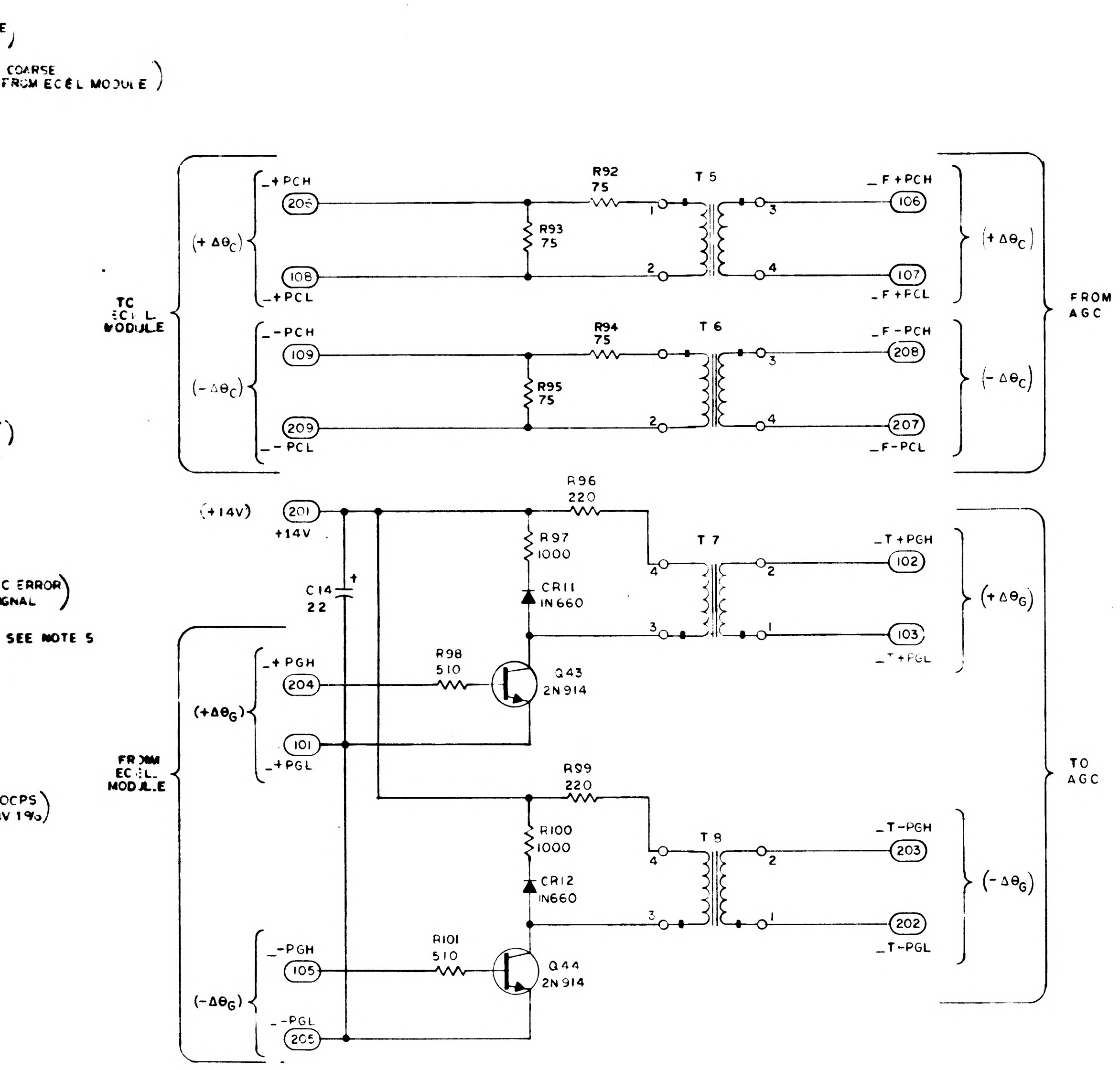
800 CPS 28V 1%
_28RFH 171
_28RFL 167
_28VH (+28VDC) 164
_-DAPL (- D/A POLARITY) 265
_+DAPL (+ D/A POLARITY) 168
(LOGIC GROUND) 268
_LCECL
_DD0 263
_DD1 159
_DD2 259
_DD3 155
_DD4 255
_DD5 150
_DD6 251
_DD7 146
_DD8 246
_INPTL (INPUT LO) 166
245 TO COLLECTOR Q34
_INPTL
T1
CR2 1N660
C1 47
CR3 1N660
CR4
Q12
R41 1000
CR5 1N660
R42 15K
R43 3300
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R31 5100
R32 5100
R33 5100
R34 5100
R35 5100
R36 5100
R37 5100
R38 5100
R39 5100
R13 30K
R14 30K
R15 30K
R16 30K
R17 30K
R18 30K
R19 30K
R20 30K
R21 30K
R22 20K
R23 20K
R24 20K
R25 20K
R26 20K
R27 20K
R28 20K
R29 20K
R30 20K
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q31
R44 50K
R45 50K
R46 50K
R47 50K
R48 50K
R49 50K
R50 50K
R51 50K
R52 50K
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
R62 360
R68 18K
R71 300K
C2 1 UF
C3 0.01
R75 100K
Q35 2N998
T2
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
C15 6.8
R73 1000
Q40
R88 10K
R113 150
R85 300
R74
C11 6.8
Q42 2N930
R17 10K
CR13
CR6
C17 22
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34
C5 47
R70 1800
L1
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
   ② INTERFACE TO RADAR CONTROLLED BY ICD

2010028	M

1/2010028



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		IN[illegible]IB		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1				
Q16	1010343-3				
Q17	1008814-1				
Q18	1010343-3				
Q19	1008814-1				
Q20	1010343-3				
Q21	1008814-1				
Q22	1010343-3				
Q23	1008814-1				
Q24	1010343-3				
Q25	1008814-1				
Q26	1010343-3				
Q27	1008814-1				
Q28	1010343-3				
Q29	1008814-1				
Q30	1010343-3				
Q31	1008814-1				
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008812-1				
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV.B WITH CHANGE PER TDRR 15733	1/26/65	WK
D	REVISED PER TDRR 16621		WK
E	REVISED PER TDRR 20304	23 JUNE 65	
F	REVISED PER TDRR 20776		WK
G	REVISED PER TDRR [illegible]	[illegible] AUG 65	WK
H	REVISED PER TDRR 22190	[illegible]	
J	REVISED PER TDRR 22514		
K	REVISED PER TDRR 23898	15 Nov 65	
L	REVISED PER TDRR 27180	23 MAR 66	
M	REVISED PER TDRR 28185	28 [illegible] 66	B.
N	REVISED PER TDRR 29434		

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN A. G. [illegible] DATE 18 DEC 64
CHECKED [illegible] 15 Jan 65
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 26 Jan 65

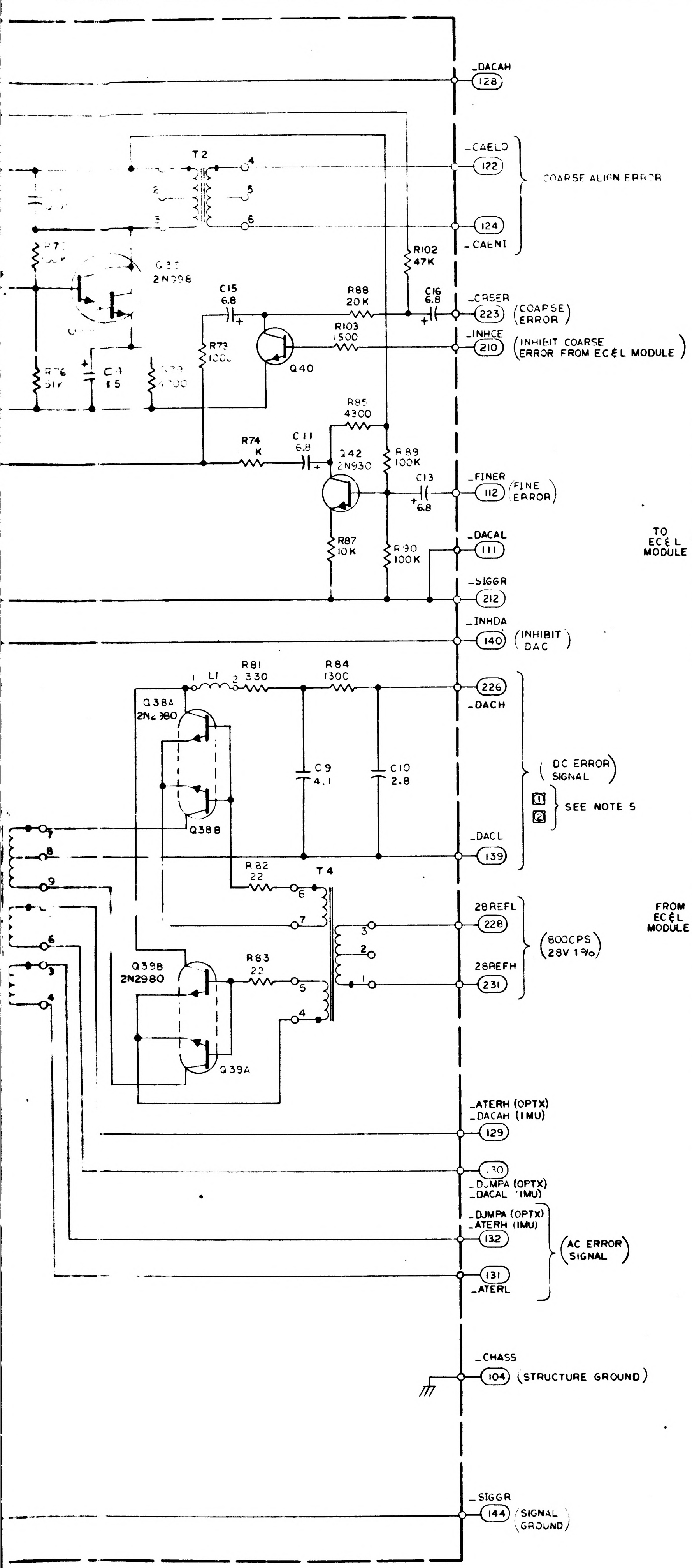
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

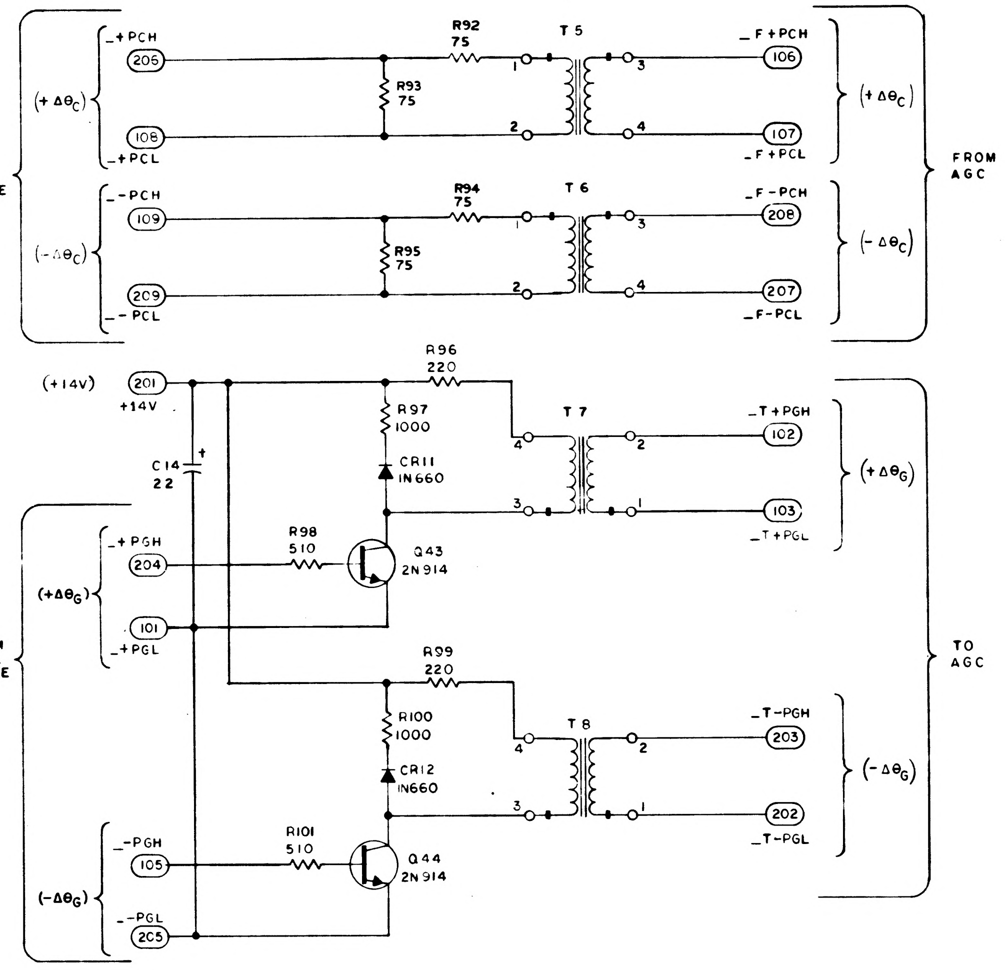
SCHEMATIC, D/A CONVERTER

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2010028
SCALE WT SHEET 1 OF 1

2010028 N

3/2010028


_DACAH
128
T2
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
R102
47K
Q37
2N2906
C15
6.8
R88
20K
C16
6.8
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM ECEL MODULE)
R73
1200
R76
51K
C1
15
Q40
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
L1
R81
330
R84
1300
Q38A
2N2980
226
_DACH
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
Q38B
_DACL
139
R82
22
T4
28REFL
228
(800CPS 28V 1%)
28REFH
231
Q39B
2N2980
R83
22
Q39A
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)


TO ECEL MODULE
(+Δθ_C)
_+PCH
205
R92
75
T5
_F+PCH
106
R93
75
108
_+PCL
107
_F+PCL
(+Δθ_C)
FROM AGC
(-Δθ_C)
_-PCH
109
R94
75
T6
_F-PCH
208
R95
75
209
_-PCL
207
_F-PCL
(-Δθ_C)
(+14V)
201
+14V
R96
220
C14
22
R97
1000
CR11
IN660
T7
_T+PGH
102
(+Δθ_G)
103
_T+PGL
FROM ECEL MODULE
(+Δθ_G)
_+PGH
204
R98
510
Q43
2N914
101
_+PGL
R99
220
R100
1000
CR12
IN660
T8
_T-PGH
203
TO AGC
(-Δθ_G)
202
_T-PGL
(-Δθ_G)
_-PGH
105
R101
510
Q44
2N914
_-PGL
205

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.7		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		[illegible]		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1				
Q16	1010343-3				
Q17	1008814-1				
Q18	1010343-3				
Q19	1008814-1				
Q20	1010343-3				
Q21	1008814-1				
Q22	1010343-3				
Q23	1008814-1				
Q24	1010343-3				
Q25	1008814-1				
Q26	1010343-3				
Q27	1008814-1				
Q28	1010343-3				
Q29	1008814-1				
Q30	1010343-3				
Q31	1008814-1				
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008812-1				
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	NDUCTOR			

REF DWG:
D/A CO
1. DWG NO
2. DWG

ⓒ REPLACES

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING
		MATERIAL
		HEAT TREATMENT
NEXT ASSY	USED ON	FINAL FINISH
APPLICATION		

QTY REQ.
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

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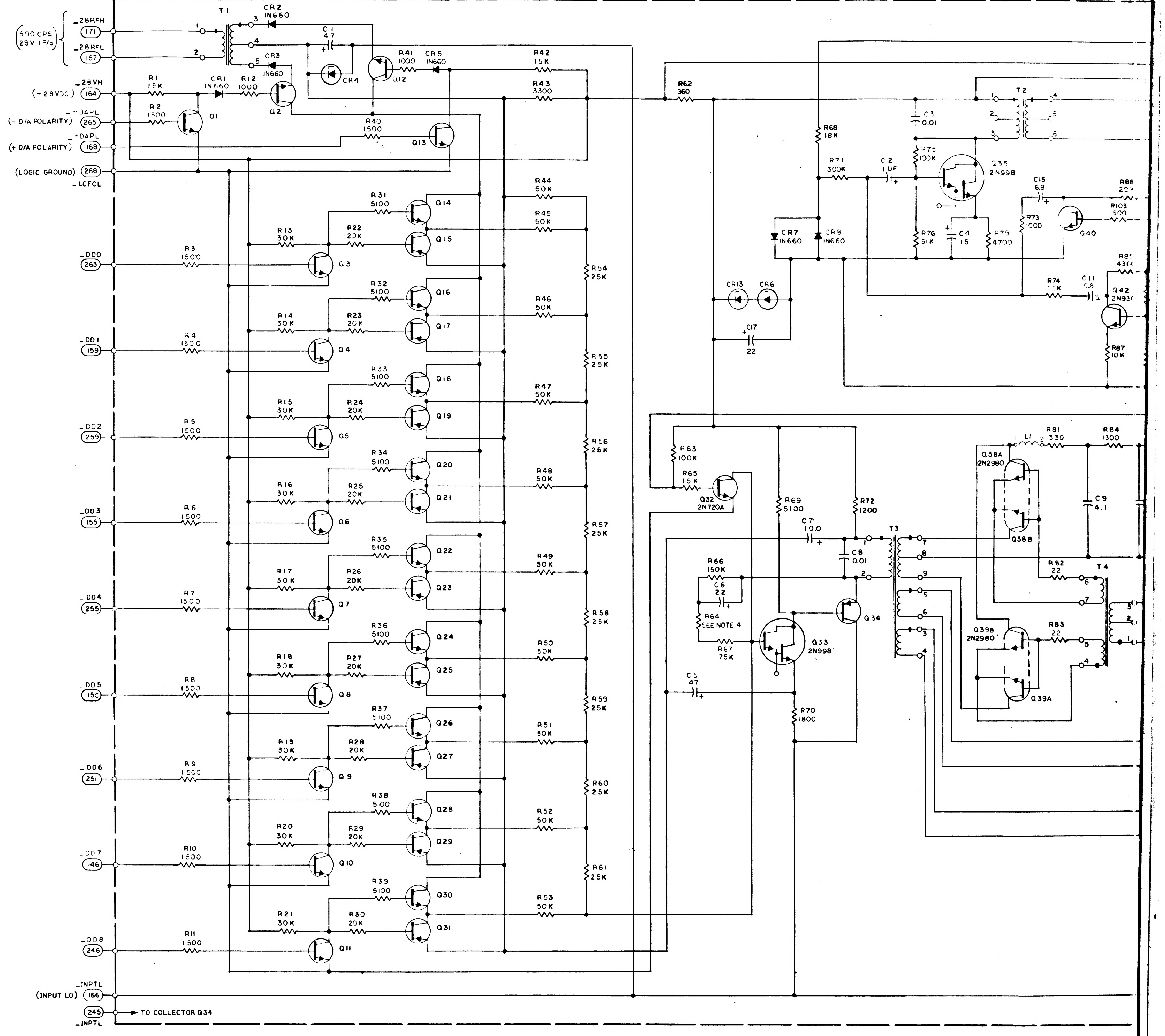

800 CPS 28V 1%
_28RFH 171
_28RFL 167
_28VH (+28VDC) 164
_-DAPL (- D/A POLARITY) 265
_+DAPL (+ D/A POLARITY) 168
(LOGIC GROUND) 268 _LCECL
_DD0 263
_DD1 159
_DD2 259
_DD3 155
_DD4 255
_DD5 150
_DD6 251
_DD7 146
_DD8 246
_INPTL (INPUT LO) 166
245 → TO COLLECTOR Q34
_INPTL
T1
CR2 1N660
CR3 1N660
C1 47
CR4
Q12
R41 1000
CR5 1N660
R42 15K
R43 3300
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
R40 1500
Q13
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11
R13 30K
R14 30K
R15 30K
R16 30K
R17 30K
R18 30K
R19 30K
R20 30K
R21 30K
R22 20K
R23 20K
R24 20K
R25 20K
R26 20K
R27 20K
R28 20K
R29 20K
R30 20K
R31 5100
R32 5100
R33 5100
R34 5100
R35 5100
R36 5100
R37 5100
R38 5100
R39 5100
Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30 Q31
R44 50K
R45 50K
R46 50K
R47 50K
R48 50K
R49 50K
R50 50K
R51 50K
R52 50K
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
R62 360
R68 18K
R71 300K
C2 1UF
C3 0.01
R75 100K
Q35 2N998
T2
R76 51K
C4 15
R79 4700
CR7 1N660
CR8 1N660
CR13
CR6
C17 22
C15 6.8
R73 1000
Q40
R88 20
R103 500
R85 4300
R74
C11 6.8
Q42 2N930
R87 10K
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34
C5 47
R70 1800
L1
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

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ARSE ALIGN ER

E)

COARSE
FROM ECEL MODULE)

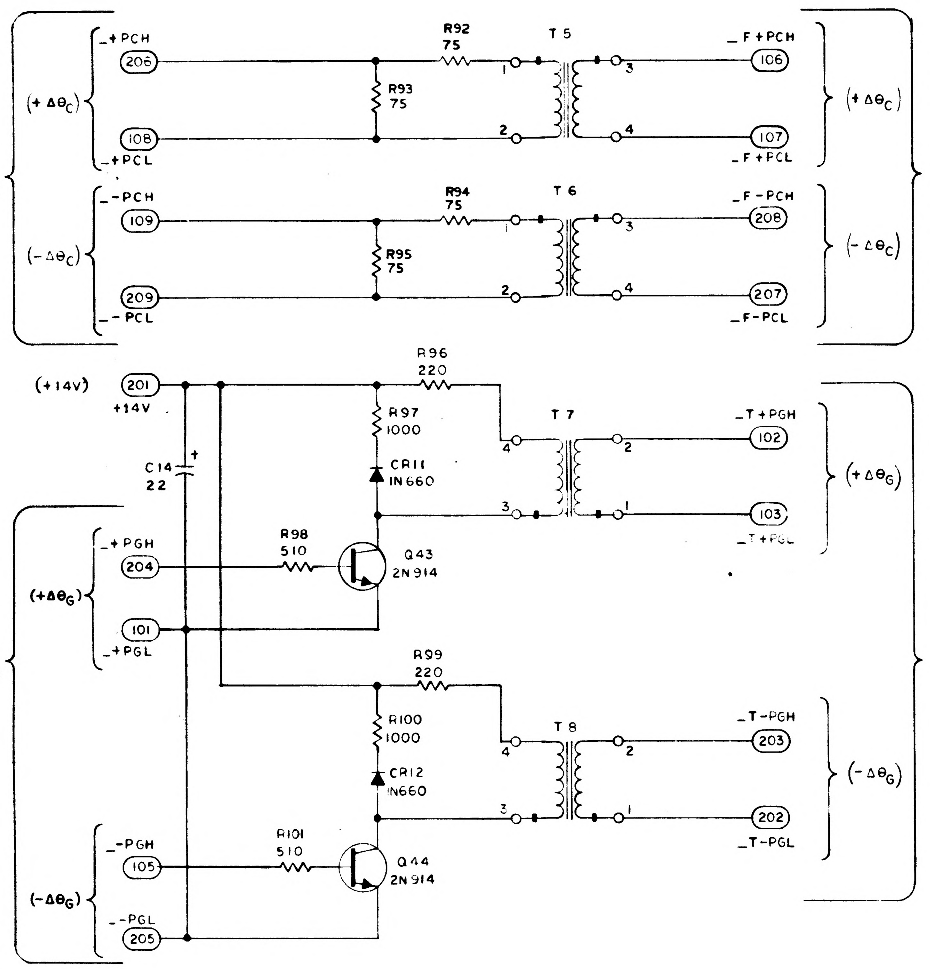
IT)

DC ERROR SIGNAL)
SEE NOTE 5

-00CPS
28V 1%)

(AC ERROR SIGNAL)

ICTURE GROUND)



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		IN961B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1		2N2907A		
Q16	1010343-3				
Q17	1008814-1		2N2907A		
Q18	1010343-3				
Q19	1008814-1		2N2907A		
Q20	1010343-3				
Q21	1008814-1		2N2907A		
Q22	1010343-3				
Q23	1008814-1		2N2907A		
Q24	1010343-3				
Q25	1008814-1		2N2907A		
Q26	1010343-3				
Q27	1008814-1		2N2907A		
Q28	1010343-3				
Q29	1008814-1		2N2907A		
Q30	1010343-3				
Q31	1008814-1		2N2907A		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008813-1		2N3486A		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV.B WITH CHANGE PER TDRR 15733	1/26/65	WK
D	REVISED PER TDRR 16621	[illegible]	WK
E	REVISED PER TDRR 20304	23 JUNE 65	WK
F	REVISED PER TDRR 20776	[illegible]	WK
G	REVISED PER TDRR [illegible]	[illegible] AUG 65	WK
H	REVISED PER TDRR 22190	[illegible]	[illegible]
J	REVISED PER TDRR 22514	21 Sep 65	[illegible]
K	REVISED PER TDRR 23898	15 Nov 65	WK
L	REVISED PER TDRR 27180	23 MAR 66	[illegible]
M	REVISED PER TDRR 28185	28 APR 66	B.
N	REVISED PER TDRR 29434	[illegible]	JNP
P	REVISED PER TDRR 29555	[illegible]	[illegible]

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

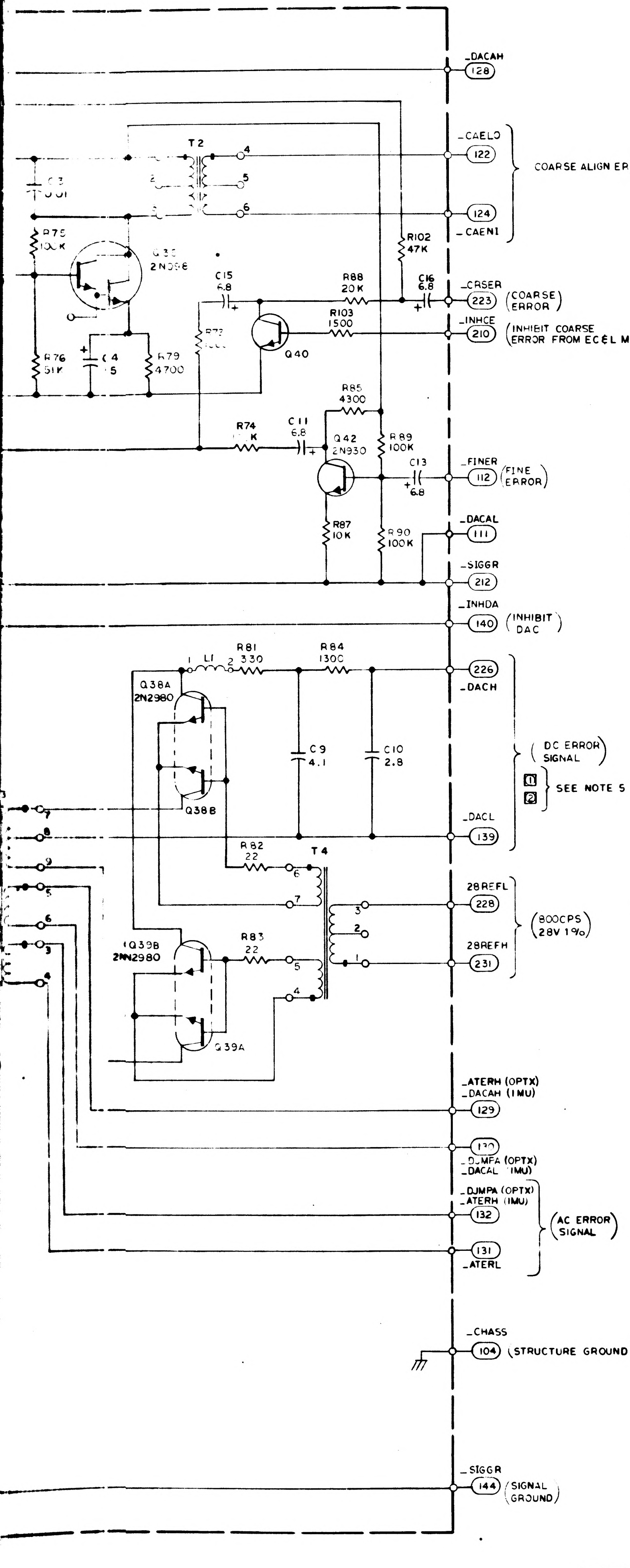
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. Di [illegible] DATE 18 DEC 64
CHECKED [illegible] 15 Jan 65
APPROVAL [illegible]
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible] 26 Jan 65

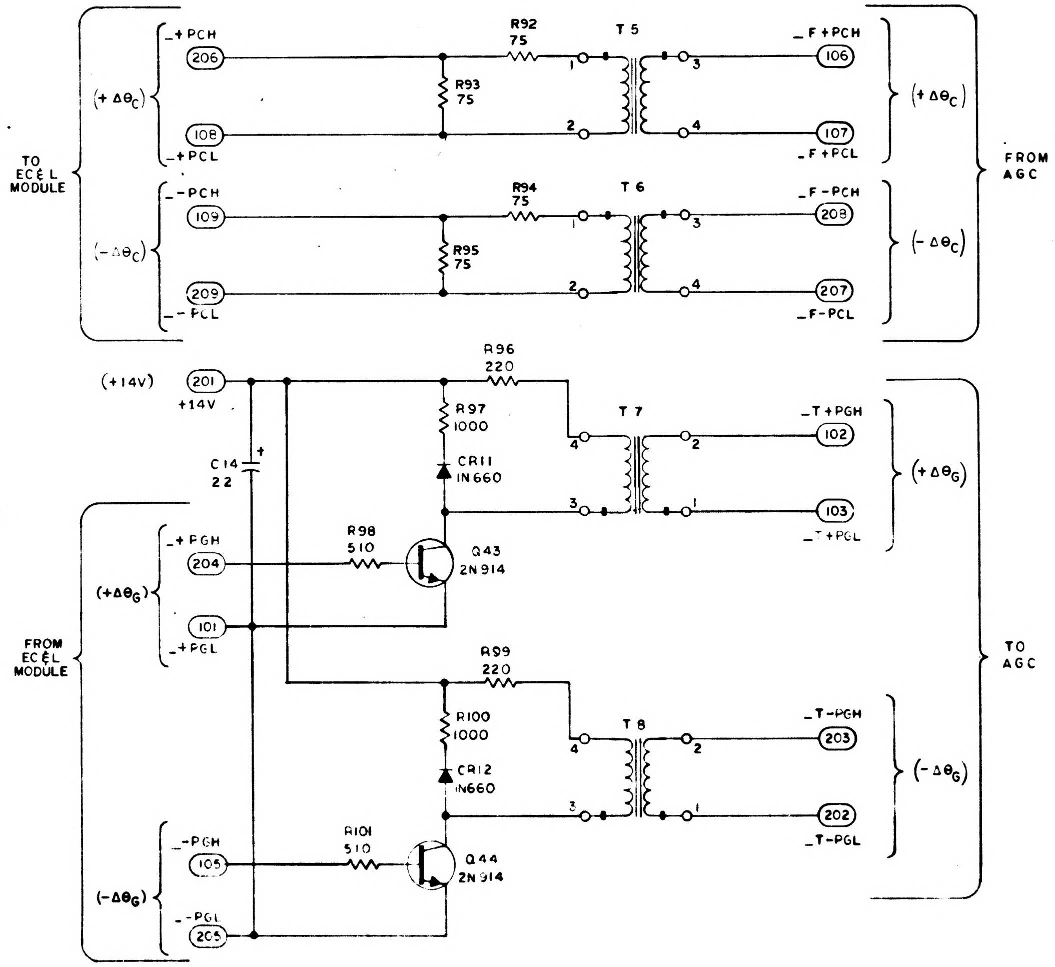
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
D/A CONVERTER

CODE IDENT NO 80230 | SIZE J | NASA DRAWING NO 2010028
SCALE — | WT — | SHEET 1 OF 1

2010028 P


_DACAH
128
T2
4
5
6
_CAELO
122
124
_CAENI
COARSE ALIGN ERROR
C3
.001
R75
100K
Q35
2N998
R102
47K
C15
6.8
R88
20K
C16
6.8
_CASER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
R76
51K
C4
15
R79
4700
Q40
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
Q38A
2N2980
L1
R81
330
R84
1300
226
_DACH
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
Q38B
_DACL
139
R82
22
T4
28REFL
228
(800CPS 28V 1%)
28REFH
231
Q39B
2N2980
R83
22
Q39A
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMFA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)


TO EC&L MODULE
(+Δθ_C)
_+PCH
206
108
_+PCL
R92
75
R93
75
T5
_F+PCH
106
107
_F+PCL
(+Δθ_C)
FROM AGC
(−Δθ_C)
_−PCH
109
209
_−PCL
R94
75
R95
75
T6
_F−PCH
208
207
_F−PCL
(−Δθ_C)
(+14V)
201
+14V
C14
22
R96
220
R97
1000
CR11
1N660
T7
_T+PGH
102
103
_T+PGL
(+Δθ_G)
FROM EC&L MODULE
(+Δθ_G)
_+PGH
204
101
_+PGL
R98
510
Q43
2N914
R99
220
R100
1000
CR12
1N660
T8
_T−PGH
203
202
_T−PGL
(−Δθ_G)
TO AGC
(−Δθ_G)
_−PGH
105
_−PGL
205
R101
510
Q44
2N914

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-[illegible]		[illegible]		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-39		22	±5%	1/8W
R84	1006750 35		1300	±2%	1/4W
R85	1006750 47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	32		1000		
R98	25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		[illegible]
C6	1006755-85		22		35
C7	1006755-130		10.0		[illegible]
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010385		1N660		
CR4	1010372-6				
CR5	1010385		1N660		
CR6	1008815-5		1N[illegible]		
CR7	1010385		1N660		
CR8	1010385	DIODE	1N660		
CR11	1010385	DIODE	1N660		
CR12	1010385	DIODE	1N660		
CR13	1008815-7	DIODE	1N963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1		2N2907A		
Q16	1010343-3				
Q17	1008814-1		2N2907A		
Q18	1010343-3				
Q19	1008814-1		2N2907A		
Q20	1010343-3				
Q21	1008814-1		2N2907A		
Q22	1010343-3				
Q23	1008814-1		2N2907A		
Q24	1010343-3				
Q25	1008814-1		2N2907A		
Q26	1010343-3				
Q27	1008814-1		2N2907A		
Q28	1010343-3				
Q29	1008814-1		2N2907A		
Q30	1010343-3				
Q31	1008814-1		2N2907A		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008813-1		2N3486A		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	10102[illegible]4				
T3	1010726				
T4	1010[illegible]65				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

R64	
PART NO	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

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		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLE ± DO NOT SCALE THIS DRAWING
		MATERIAL
		HEAT TREATMENT
NEXT ASSY	USED ON	FINAL FINISH
APPLICATION		

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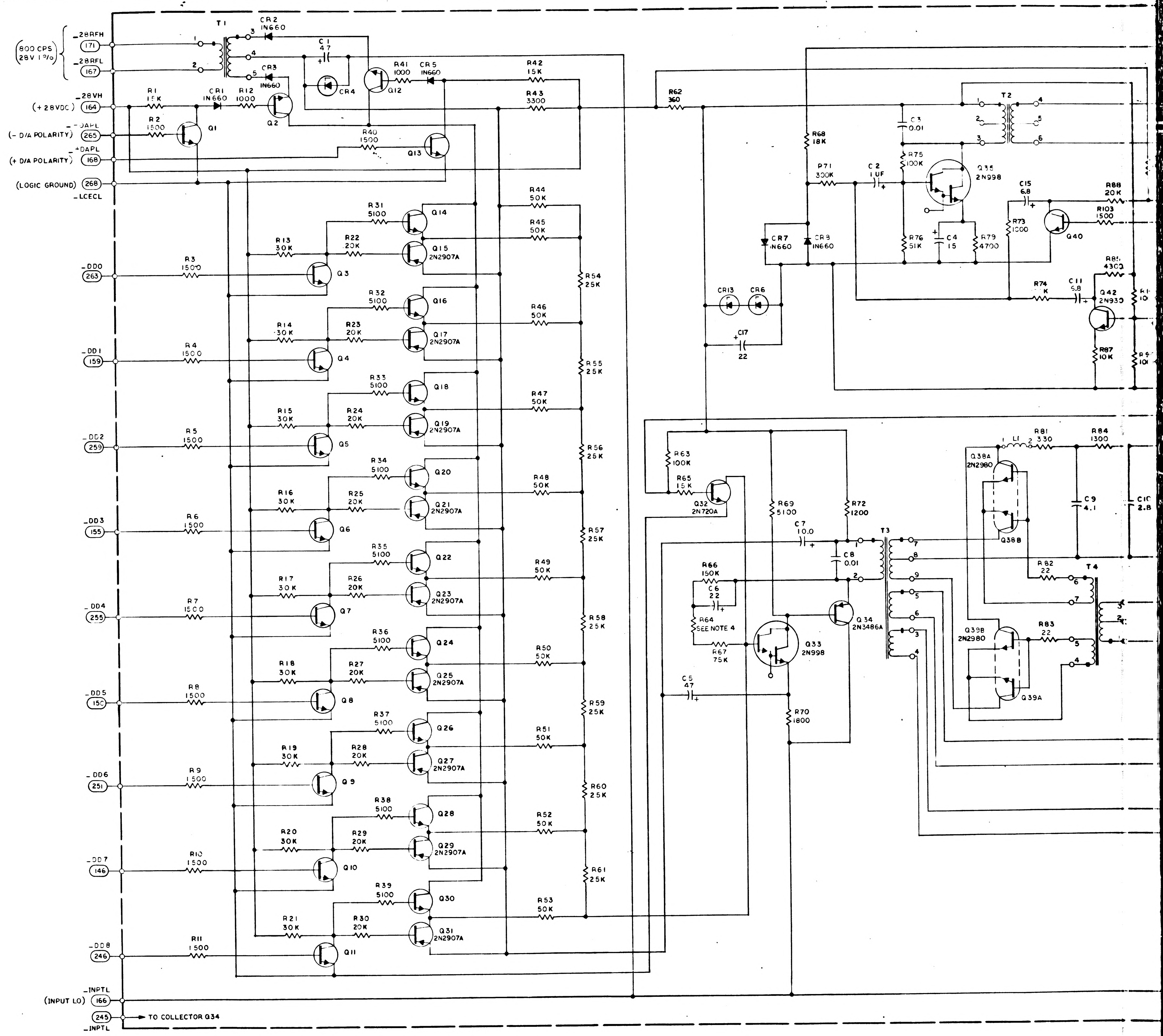
8
7
6
D
C
B
A
800 CPS
28V 1 ɸ
_28RFH
171
_28RFL
167
_28VH
(+28VDC)
164
_ -DAPL
(- D/A POLARITY)
265
_+DAPL
(+ D/A POLARITY)
168
(LOGIC GROUND)
268
_LCECL
T1
1
2
3
4
5
CR2
1N660
C1
47
CR3
1N660
CR4
Q12
R41
1000
CR5
1N660
R42
15K
R43
3300
R1
15K
CR1
1N660
R12
1000
Q2
R2
1500
Q1
R40
1500
Q13
R44
50K
R45
50K
R31
5100
Q14
R13
30K
R22
20K
Q15
2N2907A
_DD0
263
R3
1500
Q3
R54
25K
R32
5100
Q16
R46
50K
R14
30K
R23
20K
Q17
2N2907A
_DD1
159
R4
1500
Q4
R55
25K
R33
5100
Q18
R47
50K
R15
30K
R24
20K
Q19
2N2907A
_DD2
259
R5
1500
Q5
R56
25K
R34
5100
Q20
R48
50K
R16
30K
R25
20K
Q21
2N2907A
_DD3
155
R6
1500
Q6
R57
25K
R35
5100
Q22
R49
50K
R17
30K
R26
20K
Q23
2N2907A
_DD4
255
R7
1500
Q7
R58
25K
R36
5100
Q24
R50
50K
R18
30K
R27
20K
Q25
2N2907A
_DD5
150
R8
1500
Q8
R59
25K
R37
5100
Q26
R51
50K
R19
30K
R28
20K
Q27
2N2907A
_DD6
251
R9
1500
Q9
R60
25K
R38
5100
Q28
R52
50K
R20
30K
R29
20K
Q29
2N2907A
_DD7
146
R10
1500
Q10
R61
25K
R39
5100
Q30
R53
50K
R21
30K
R30
20K
Q31
2N2907A
_DD8
246
R11
1500
Q11
_INPTL
(INPUT LO)
166
245
TO COLLECTOR Q34
_INPTL
R62
360
R68
18K
R71
300K
C2
1 UF
C3
0.01
R75
100K
Q35
2N998
T2
1
2
3
4
5
6
C15
6.8
R88
20K
R103
1500
R73
1000
Q40
CR7
1N660
CR8
1N660
R76
51K
C4
15
R79
4700
R85
4300
R74
K
C11
6.8
Q42
2N930
R87
10K
CR13
CR6
C17
22
R63
100K
R65
15K
Q32
2N720A
R69
5100
R72
1200
C7
10.0
C8
0.01
T3
1
2
7
8
9
5
6
3
4
R66
150K
C6
22
R64
SEE NOTE 4
R67
75K
Q33
2N998
Q34
2N3486A
C5
47
R70
1800
L1
1
2
R81
330
R84
1300
Q38A
2N2980
Q38B
C9
4.1
C10
2.8
R82
22
T4
6
7
3
2
1
5
4
Q39B
2N2980
R83
22
Q39A
9

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
② INTERFACE TO RADAR CONTROLLED BY ICD

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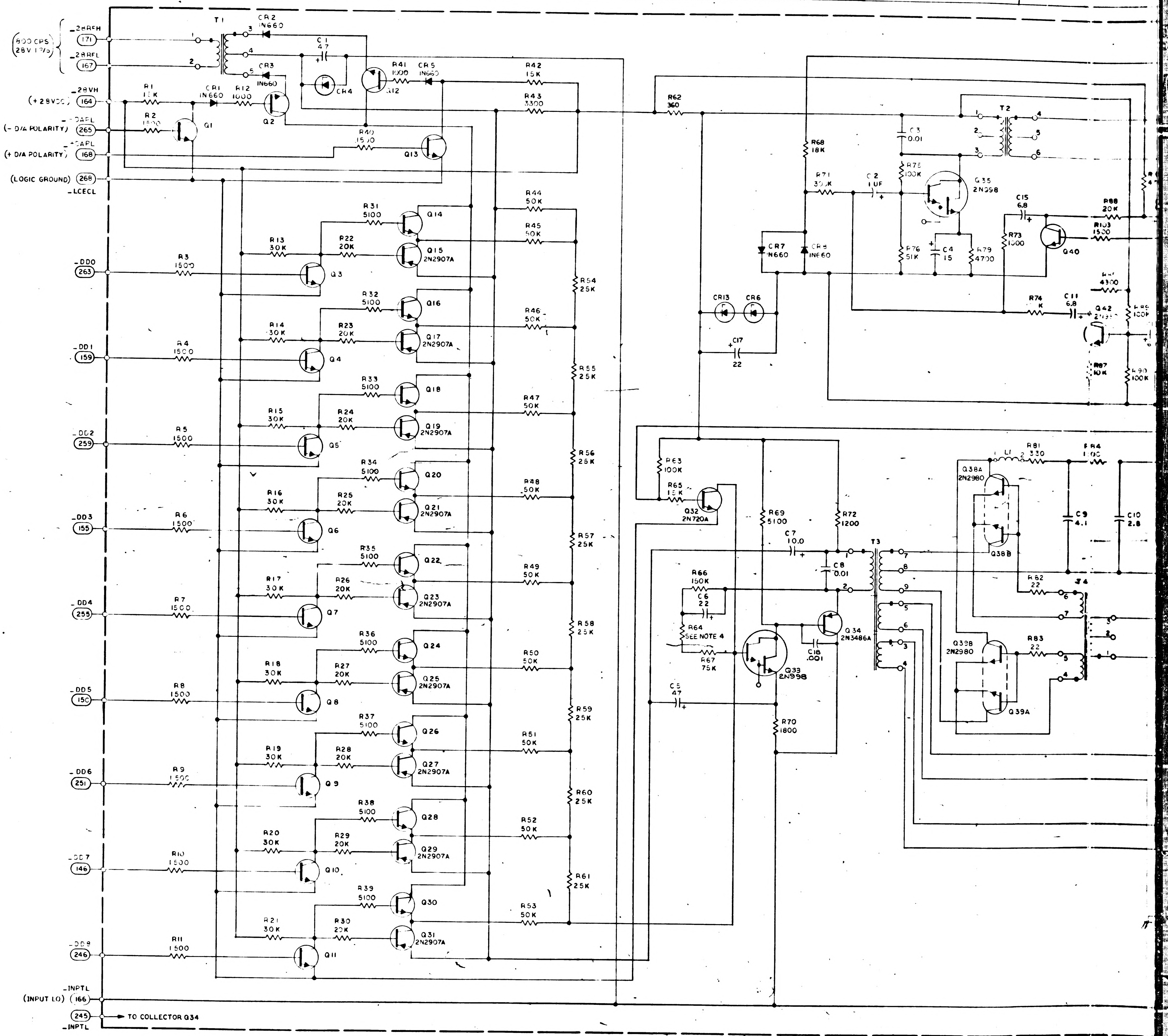

9
8
7
6
D
C
B
A
T1
CR2 1N660
CR3 1N660
C1 47
CR4
Q12
R41 1000
CR5 1N660
R42 15K
R43 3300
(800 CPS 28V 1Ø/S)
_28RFH 171
_28RFL 167
_28VH
(+28VDC) 164
_-DAPL
(- D/A POLARITY) 265
_+DAPL
(+ D/A POLARITY) 168
(LOGIC GROUND) 268
_LCECL
R1 13K
R2 1500
Q1
CR1 1N660
R12 1000
Q2
R40 1500
Q13
R44 50K
R45 50K
R46 50K
R47 50K
R48 50K
R49 50K
R50 50K
R51 50K
R52 50K
R53 50K
R54 25K
R55 25K
R56 25K
R57 25K
R58 25K
R59 25K
R60 25K
R61 25K
_DD0 263
_DD1 159
_DD2 259
_DD3 155
_DD4 255
_DD5 150
_DD6 251
_DD7 146
_DD8 246
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
R13 30K
R14 30K
R15 30K
R16 30K
R17 30K
R18 30K
R19 30K
R20 30K
R21 30K
R22 20K
R23 20K
R24 20K
R25 20K
R26 20K
R27 20K
R28 20K
R29 20K
R30 20K
R31 5100
R32 5100
R33 5100
R34 5100
R35 5100
R36 5100
R37 5100
R38 5100
R39 5100
Q14
Q15 2N2907A
Q16
Q17 2N2907A
Q18
Q19 2N2907A
Q20
Q21 2N2907A
Q22
Q23 2N2907A
Q24
Q25 2N2907A
Q26
Q27 2N2907A
Q28
Q29 2N2907A
Q30
Q31 2N2907A
_INPTL
(INPUT LO) 166
245 TO COLLECTOR Q34
_INPTL
R62 360
R68 18K
R71 300K
C2 1 UF
C3 0.01
T2
R75 100K
Q35 2N998
R76 51K
C4 15
R79 4700
C15 6.8
R73 1000
Q40
R88 20K
R103 1500
4300
R74
C11 6.8
Q42
R89 100K
R87 10K
R90 100K
CR7 1N660
CR8 1N660
CR13
CR6
C17 22
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
Q34 2N3486A
C18 .001
C5 47
R70 1800
L1
R81 330
R84 1100
Q38A 2N2980
Q38B
C9 4.1
C10 2.8
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:
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3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
   ② INTERFACE TO RADAR CONTROLLED BY ICD

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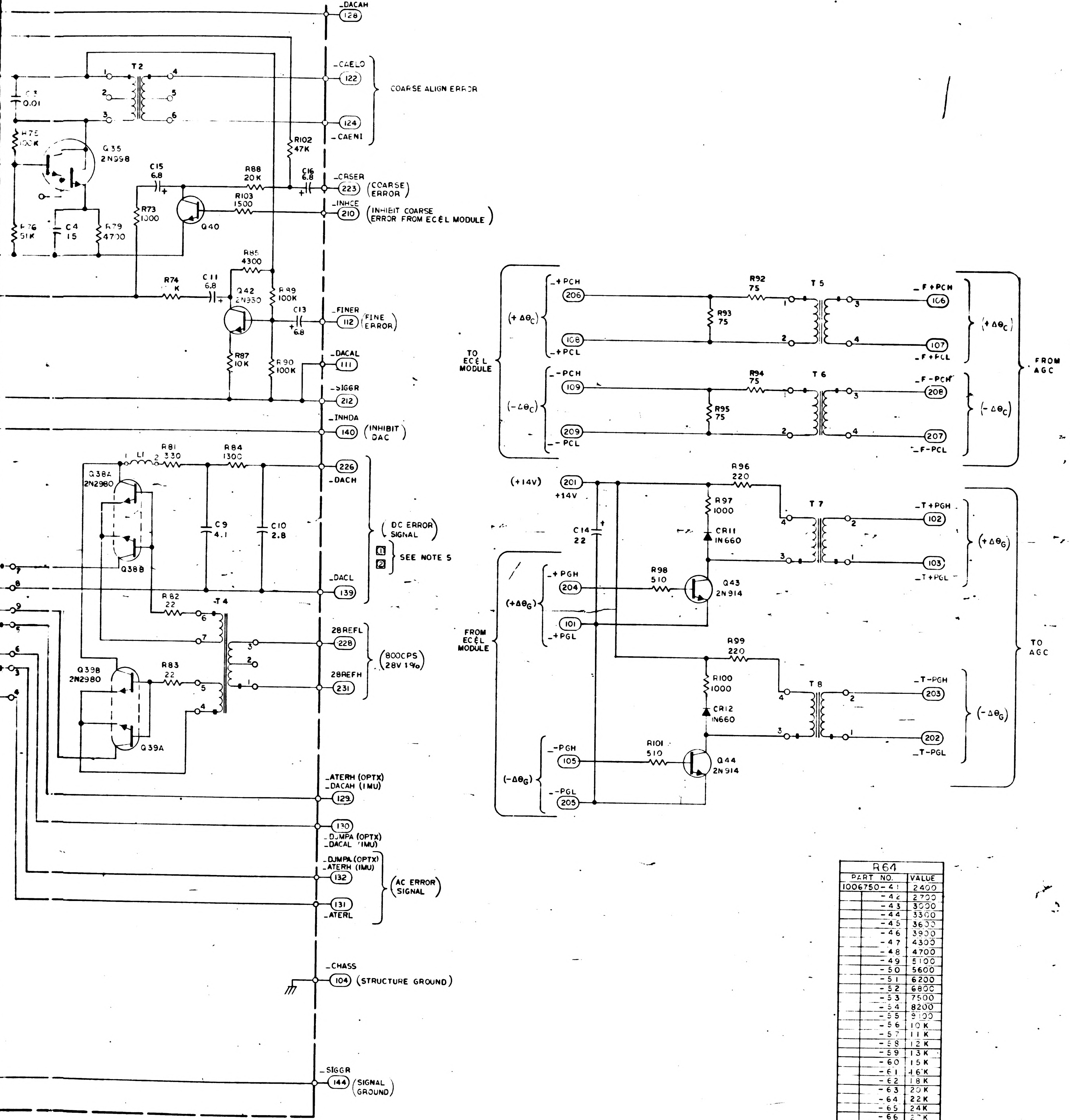

_DACAH
128
_CAELO
122
T2
1
2
3
4
5
6
COARSE ALIGN ERROR
124
_CAENI
C3
0.01
R75
100K
Q35
2N998
R76
51K
C4
15
R79
4700
C15
6.8
R73
1000
Q40
R88
20K
R103
1500
R102
47K
C16
6.8
_CRSER
223
(COARSE ERROR)
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
R81
330
L1
1
2
R84
1300
226
_DACH
Q38A
2N2980
Q38B
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
_DACL
139
R82
22
T4
6
7
3
2
1
28REFL
228
(800CPS 28V 1%)
28REFH
231
Q39B
2N2980
R83
22
5
4
Q39A
7
8
9
5
6
3
4
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
TO EC&L MODULE
(+ΔθC)
_+PCH
206
108
_+PCL
R92
75
T5
R93
75
1
2
3
4
_F+PCH
106
107
_F+PCL
(+ΔθC)
FROM AGC
(−ΔθC)
_−PCH
109
209
_−PCL
R94
75
T6
R95
75
_F−PCH
208
207
_F−PCL
(−ΔθC)
(+14V)
201
+14V
R96
220
R97
1000
CR11
IN660
C14
22
T7
4
2
3
1
_T+PGH
102
103
_T+PGL
(+ΔθG)
FROM EC&L MODULE
(+ΔθG)
_+PGH
204
101
_+PGL
R98
510
Q43
2N914
R99
220
R100
1000
CR12
IN660
T8
_T−PGH
203
202
_T−PGL
(−ΔθG)
TO AGC
(−ΔθG)
_−PGH
105
_−PGL
205
R101
510
Q44
2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-[illegible]		[illegible]		1/4W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		[illegible]		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
C18	1006777-24	CAPACITOR	0.001	±10%	100VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1		2N2907A		
Q16	1010343-3				
Q17	1008814-1		2N2907A		
Q18	1010343-3				
Q19	1008814-1		2N2907A		
Q20	1010343-3				
Q21	1008814-4		2N2907A		
Q22	1010343-3				
Q23	1008814-1		2N2907A		
Q24	1010343-3				
Q25	1008814-1		2N2907A		
Q26	1010343-3				
Q27	1008814-1		2N2907A		
Q28	1010343-3				
Q29	1008814-1		2N2907A		
Q30	1010343-3				
Q31	1008814-1		2N2907A		
Q32	1010397-1		2N720A		
Q33	1010342		2N998		
Q34	1008813-1		[illegible]		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG
D/A CONVE
1. DWG NO. 2
2. DWG NO. 2

Ⓒ REPLACES RE

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING
		MATERIAL
		HEAT TREATMENT
NEXT ASSY	USED ON	FINAL FINISH
APPLICATION		

SE ALIGN ERROR

COARSE
FROM ECEL MODULE)

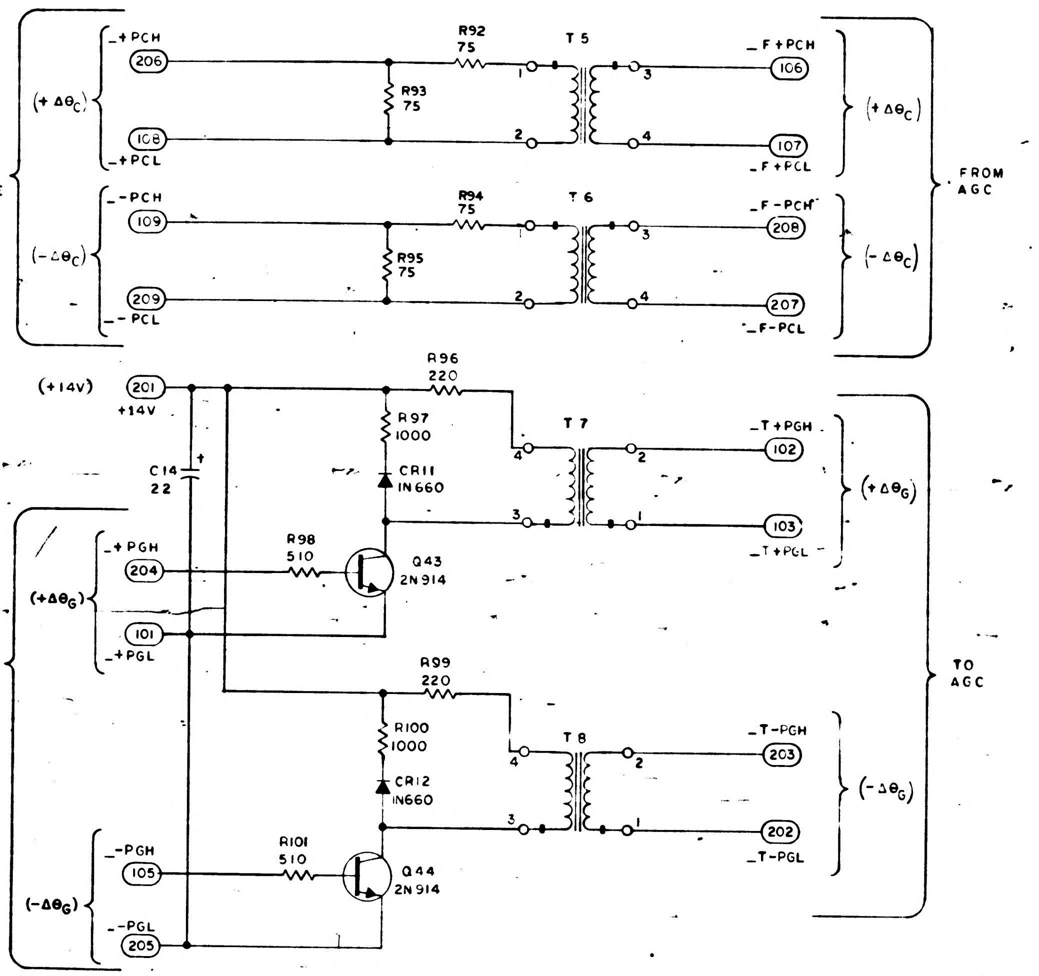
ERROR
AL)

EE NOTE 5

PS
1%)

ERROR
GNAL)

E GROUND)



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4 W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10 W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		[illegible]		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-38		1800	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006750-31		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-[illegible]		[illegible]		1/4 W
R75	1006750-80		100K		1/4 W
R76	1006750-73	RESISTOR	51K	±2%	1/4 W
R79	1006750-48	RESISTOR	4700	±2%	1/4 W
R81	1006750-20	RESISTOR	330	±2%	1/4 W
R82	1010369-139		22	±5%	1/8 W
R83	1010369-39		22	±5%	1/8 W
R84	1006750-35		1300	±2%	1/4 W
R85	1006750-47	RESISTOR	4300	±2%	1/4 W
R87	1006750-56	RESISTOR	10K	±2%	1/4 W
R88	1006750-63	RESISTOR	20K	±2%	1/4 W
R89	1006750-80	RESISTOR	100K	±2%	1/4 W
R90	1006750-80	RESISTOR	100K	±2%	1/4 W
R92	1006750-5	RESISTOR	75	±2%	1/4 W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4 W

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		IN[illegible]		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
C18	1006777-24	CAPACITOR	0.001	±10%	100VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1		2N2907A		
Q16	1010343-3				
Q17	1008814-1		2N2907A		
Q18	1010343-3				
Q19	1008814-1		2N2907A		
Q20	1010343-3				
Q21	1008814-1		2N2907A		
Q22	1010343-3				
Q23	1008814-1		2N2907A		
Q24	1010343-3				
Q25	1008814-1		2N2907A		
Q26	1010343-3				
Q27	1008814-1		2N2907A		
Q28	1010343-3				
Q29	1008814-1		2N2907A		
Q30	1010343-3				
Q31	1008814-1		2N2907A		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008813-1		[illegible]		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV. B WITH CHANGE PER TDRR 15733	1/24/65	WR
D	REVISED PER TDRR 16621	[illegible]	WR
E	REVISED PER TDRR 20304	[illegible]	WR
F	REVISED PER TDRR 20776	[illegible]	WR
G	REVISED PER TDRR [illegible]	27 AUG 65	WR
H	REVISED PER TDRR 22190	6 SEP 65	[illegible]
J	REVISED PER TDRR 22514	[illegible]	[illegible]
K	REVISED PER TDRR 23898	15 Nov 65	WR
L	REVISED PER TDRR 27180	29 MAR 66	[illegible]
M	REVISED PER TDRR 28185	28 APR 66	B.
N	REVISED PER TDRR 29434	10 JUN 66	JWP
P	REVISED PER TDRR 29955	16 JUL 66	PHG
R	REVISED PER TDRR 30605	16 AUG 66	GW ELW

D
C
B
A

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN R. G. [illegible] DATE [illegible]
CHECKED [illegible] 15 [illegible] 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

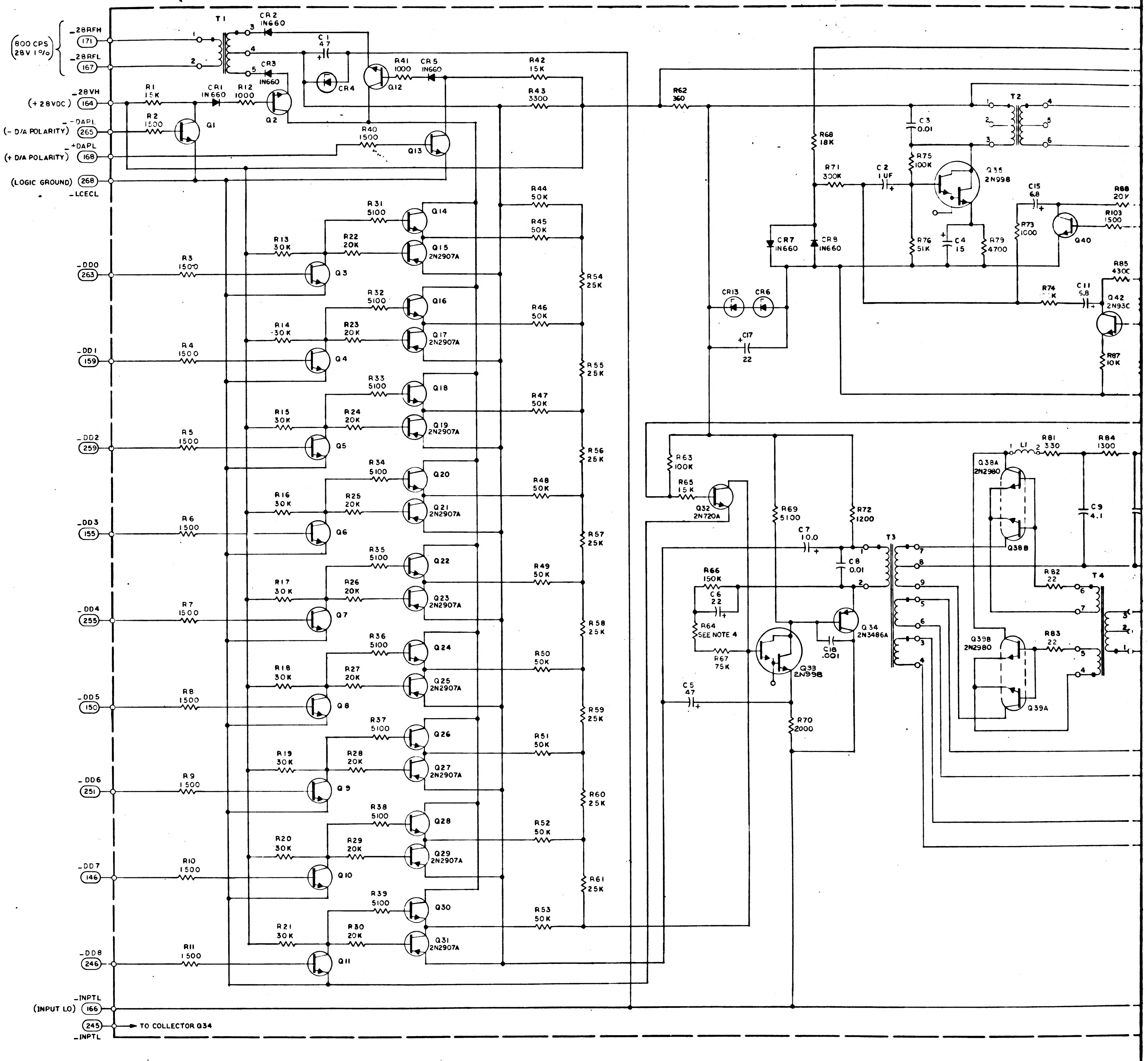
SCHEMATIC, D/A CONVERTER

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010028
SCALE —
WT —
SHEET 1 OF 1

2010028 R

2010028 R

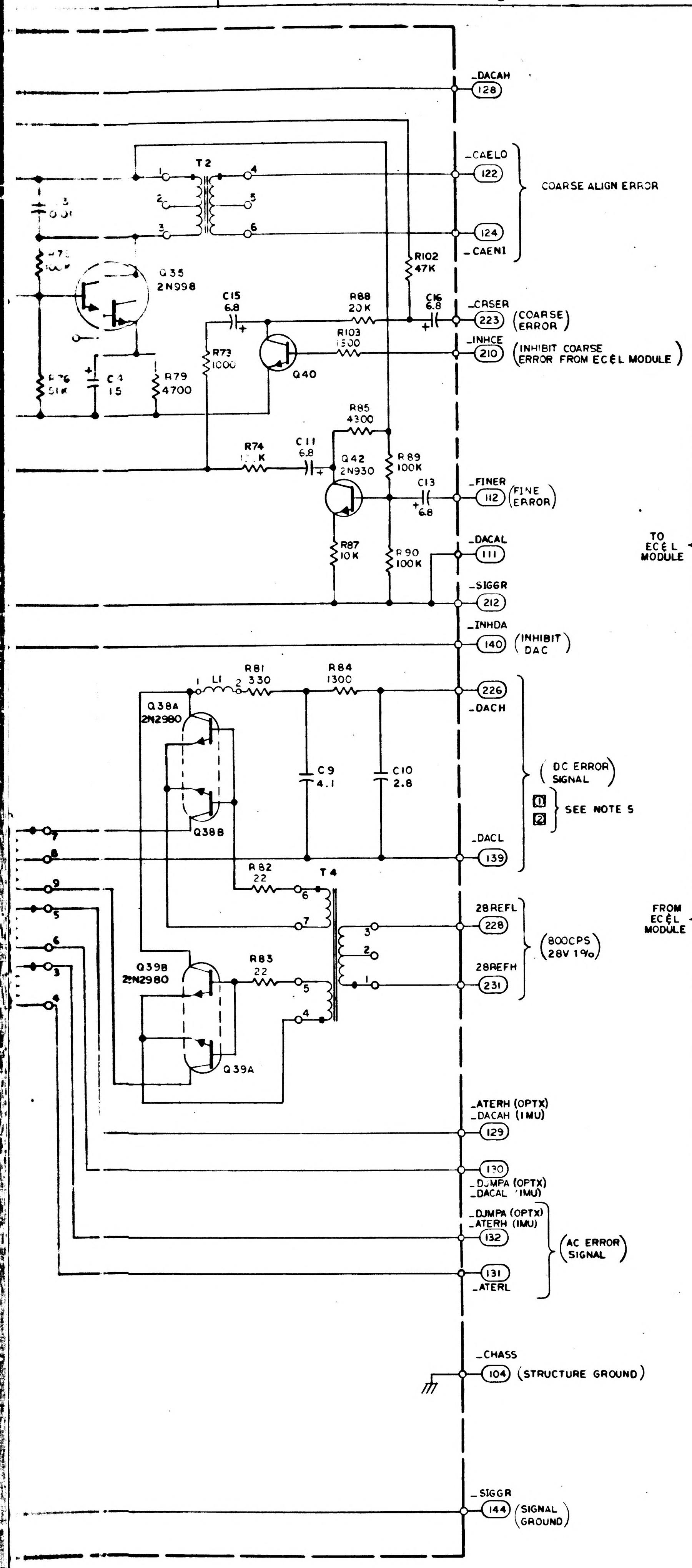
3/2010028

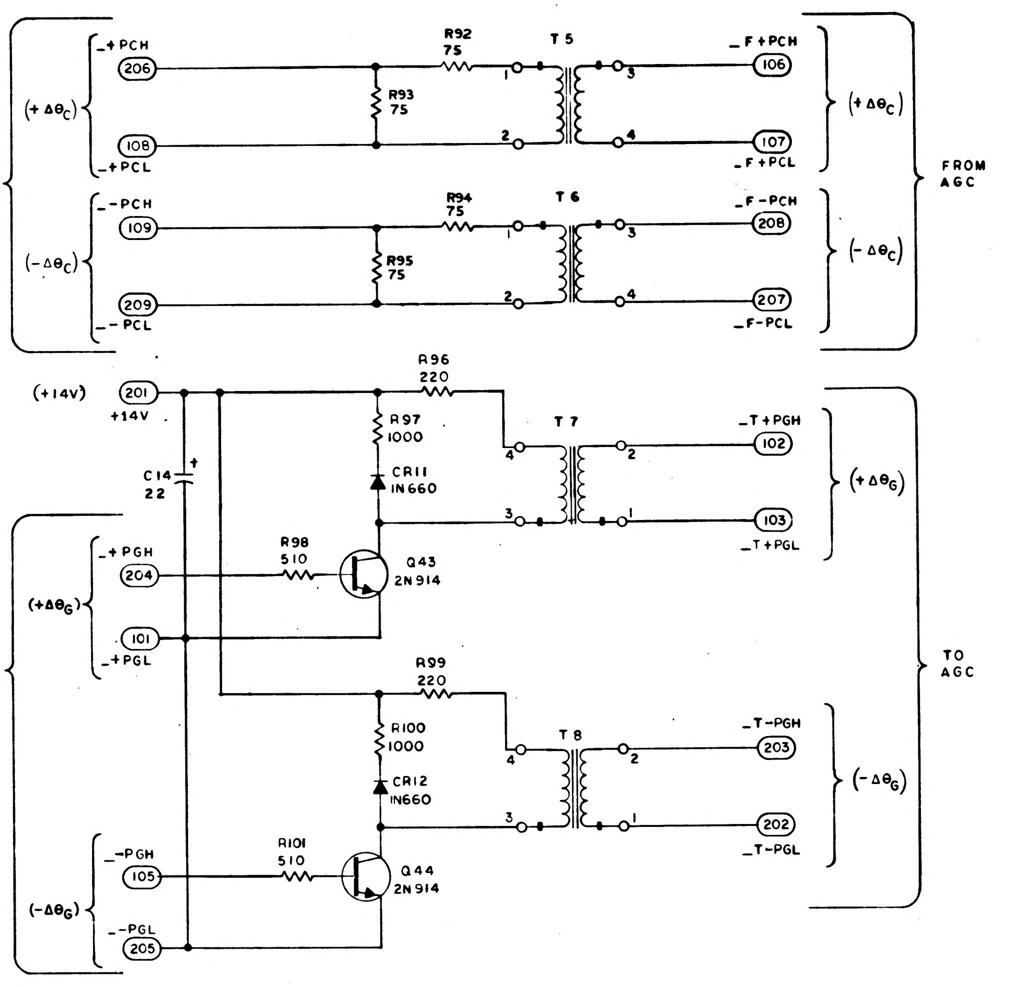


T1
CR2 1N660
CR3 1N660
C1 47
CR4
Q12
R41 1000
CR5 1N660
R42 15K
R43 3300
R62 360
T2
C3 0.01
R68 18K
R75 100K
Q35 2N998
R71 300K
C2 1UF
C15 6.8
R88 20K
R103 1500
R73 1000
Q40
CR7 1N660
CR8 1N660
R76 51K
C4 15
R79 4700
R85 4300
R74
C11 6.8
Q42 2N930
R87 10K
CR13
CR6
C17 22
800 CPS 28V 1%
-28RFH 171
-28RFL 167
-28VH
(+28VDC) 164
R1 15K
CR1 1N660
R12 1000
Q2
R2 1500
Q1
-DAPL
(-D/A POLARITY) 265
+DAPL
(+D/A POLARITY) 168
R40 1500
Q13
(LOGIC GROUND) 268
-LCECL
R31 5100
Q14
R13 30K
R22 20K
Q15 2N2907A
R44 50K
R45 50K
-DD0 263
R3 1500
Q3
R54 25K
R32 5100
Q16
R14 30K
R23 20K
Q17 2N2907A
R46 50K
-DD1 159
R4 1500
Q4
R55 25K
R33 5100
Q18
R15 30K
R24 20K
Q19 2N2907A
R47 50K
-DD2 259
R5 1500
Q5
R56 25K
R34 5100
Q20
R16 30K
R25 20K
Q21 2N2907A
R48 50K
-DD3 155
R6 1500
Q6
R57 25K
R35 5100
Q22
R17 30K
R26 20K
Q23 2N2907A
R49 50K
-DD4 255
R7 1500
Q7
R58 25K
R36 5100
Q24
R18 30K
R27 20K
Q25 2N2907A
R50 50K
-DD5 150
R8 1500
Q8
R59 25K
R37 5100
Q26
R19 30K
R28 20K
Q27 2N2907A
R51 50K
-DD6 251
R9 1500
Q9
R60 25K
R38 5100
Q28
R20 30K
R29 20K
Q29 2N2907A
R52 50K
-DD7 146
R10 1500
Q10
R61 25K
R39 5100
Q30
R21 30K
R30 20K
Q31 2N2907A
R53 50K
-DD8 246
R11 1500
Q11
-INPTL
(INPUT LO) 166
245
TO COLLECTOR Q34
-INPTL
R63 100K
R65 15K
Q32 2N720A
R69 5100
R72 1200
C7 10.0
C8 0.01
T3
R66 150K
C6 22
R64 SEE NOTE 4
R67 75K
Q33 2N998
C18 .001
Q34 2N3486A
C5 47
R70 2000
L1
R81 330
R84 1300
Q38A 2N2980
Q38B
C9 4.1
R82 22
T4
Q39B 2N2980
R83 22
Q39A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R64 PER ATP FROM APPROPRIATE CHART
5. ① INTERFACE TO SCS CONTROLLED BY ICD
   ② INTERFACE TO RADAR CONTROLLED BY ICD


_DACAH
128
_CAELO
122
COARSE ALIGN ERROR
124
_CAENI
T2
1
2
3
4
5
6
C3
0.01
R75
100K
Q35
2N998
R102
47K
C15
6.8
R88
20K
C16
6.8
_CRSER
223
(COARSE ERROR)
R103
1500
_INHCE
210
(INHIBIT COARSE ERROR FROM EC&L MODULE)
R73
1000
Q40
R76
51K
C4
15
R79
4700
R85
4300
R74
K
C11
6.8
Q42
2N930
R89
100K
C13
6.8
_FINER
112
(FINE ERROR)
R87
10K
R90
100K
_DACAL
111
_SIGGR
212
_INHDA
140
(INHIBIT DAC)
L1
R81
330
R84
1300
226
_DACH
Q38A
2N2980
C9
4.1
C10
2.8
(DC ERROR SIGNAL)
1
2
SEE NOTE 5
Q38B
_DACL
139
R82
22
T4
28REFL
228
(800CPS 28V 1%)
28REFH
231
Q39B
2N2980
R83
22
Q39A
_ATERH (OPTX)
_DACAH (IMU)
129
130
_DJMPA (OPTX)
_DACAL (IMU)
_DJMPA (OPTX)
_ATERH (IMU)
132
(AC ERROR SIGNAL)
131
_ATERL
_CHASS
104
(STRUCTURE GROUND)
_SIGGR
144
(SIGNAL GROUND)
TO EC&L MODULE
FROM EC&L MODULE


_+PCH
206
(+Δθc)
108
_+PCL
R92
75
R93
75
T5
1
2
3
4
_F+PCH
106
107
_F+PCL
(+Δθc)
FROM AGC
_-PCH
109
(-Δθc)
209
_-PCL
R94
75
R95
75
T6
_F-PCH
208
207
_F-PCL
(-Δθc)
(+14V)
201
+14V
C14
22
R96
220
R97
1000
CR11
IN660
T7
_T+PGH
102
103
_T+PGL
(+ΔθG)
_+PGH
204
(+ΔθG)
101
_+PGL
R98
510
Q43
2N914
TO AGC
R99
220
R100
1000
CR12
IN660
T8
_T-PGH
203
202
_T-PGL
(-ΔθG)
_-PGH
105
(-ΔθG)
_-PGL
205
R101
510
Q44
2N914

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
↓ -142	12.5K
1006750-149	25.5K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36		↓		
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67		↓		
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63		↓		
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49		↓		
R39	-49		5100		
R40	-36		1500		
R41	↓ -32		1000	↓	↓
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1W
R44	1010733-13		50K	±0.1%	1/10W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13		↓		
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	↓ -12		↓	↓	↓
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1W
R63	1006750-80		100K	±2%	1/4W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	↓ -49		5100	↓	↓
R70	1006750-39		2000	±2%	1/4W
R71	1010369-92		300K	±5%	1/8W
R72	1006760-34		1200	±2%	1/2W
R73	1006750-56		10K		1/4W
R74	1006750-80		100K		1/4W
R75	1006750-80	↓	100K	↓	1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35	↓	1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	↓ -72	↓	47K	↓	↓
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		2[illegible]
C6	1006755-85		22		35
C7	1006755-130		10.0		[illegible]
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117	↓	2.8	↓	15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		IN[illegible]		
CR7	1010385	↓	IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
C18	1006777-24	CAPACITOR	0.001	±10%	100VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	↓ -3				
Q14	1010343-3				
Q15	1008814-1		2N2907A		
Q16	1010343-3				
Q17	1008814-1		2N2907A		
Q18	1010343-3				
Q19	1008814-1		2N2907A		
Q20	1010343-3				
Q21	1008814-1		2N2907A		
Q22	1010343-3				
Q23	1008814-1		2N2907A		
Q24	1010343-3				
Q25	1008814-1		2N2907A		
Q26	1010343-3				
Q27	1008814-1		2N2907A		
Q28	1010343-3				
Q29	1008814-1		2N2907A		
Q30	1010343-3				
Q31	1008814-1		2N2907A		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008813-1	↓	2N[illegible]A		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2	↓			
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

REF DWG

D/A CO

1. DWG NO

2. DWG NO

© REPLACES

NEXT ASSY	USED ON
APPLICATION	

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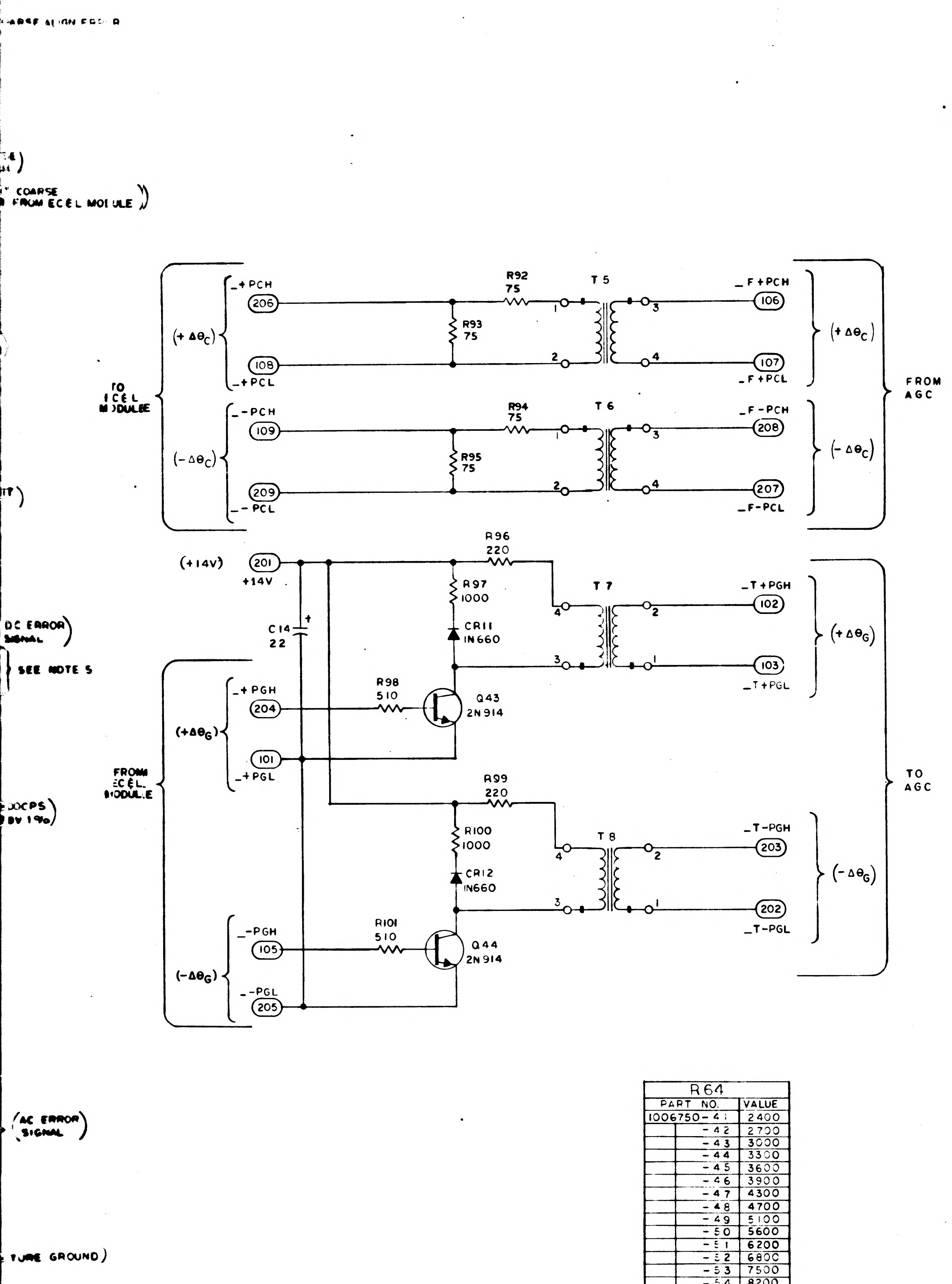

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-60	RESISTOR	15K	±2%	1/4 W
R2	-36		1500		
R3	-36				
R4	-36				
R5	-36				
R6	-36				
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36		1500		
R12	-32		1000		
R13	-67		30K		
R14	-67				
R15	-67				
R16	-67				
R17	-67				
R18	-67				
R19	-67				
R20	-67				
R21	-67		30K		
R22	-63		20K		
R23	-63				
R24	-63				
R25	-63				
R26	-63				
R27	-63				
R28	-63				
R29	-63				
R30	-63		20K		
R31	-49		5100		
R32	-49				
R33	-49				
R34	-49				
R35	-49				
R36	-49				
R37	-49				
R38	-49				
R39	-49		5100		
R40	-36		1500		
R41	-32		1000		
R42	1006750-60		15K	±2%	1/4W
R43	1010604-38		3300	±1%	1 W
R44	1010733-13		50K	±0.1%	1/10 W
R45	-13				
R46	-13				
R47	-13				
R48	-13				
R49	-13				
R50	-13				
R51	-13				
R52	-13				
R53	-13		50K		
R54	-12		25K		
R55	-12				
R56	-12				
R57	-12				
R58	-12				
R59	-12				
R60	-12				
R61	1010733-12		25K	±0.1%	1/10W
R62	1010604-45		360	±1%	1 W
R63	1006750-80		100K	±2%	1/4 W
R64	SEE NOTE 4		NOM		
R65	1006750-60		15 K		
R66	-84		150K		
R67	-77		75K		
R68	-62		18K		
R69	-49		5100		
R70	1006750-39		2000	±2%	1/4 W
R71	1010369-92		300K	±5%	1/8 W
R72	1006760-34		1200	±2%	1/2 W
R73	1006750-56		10K		1/4 W
R74	1006750-80		100K		1/4 W
R75	1006750-80		100K		1/4W
R76	1006750-73	RESISTOR	51K	±2%	1/4W
R79	1006750-48	RESISTOR	4700	±2%	1/4W
R81	1006750-20	RESISTOR	330	±2%	1/4W
R82	1010369-139		22	±5%	1/8W
R83	1010369-139		22	±5%	1/8W
R84	1006750-35		1300	±2%	1/4W
R85	1006750-47	RESISTOR	4300	±2%	1/4W
R87	1006750-56	RESISTOR	10K	±2%	1/4W
R88	1006750-63	RESISTOR	20K	±2%	1/4W
R89	1006750-80	RESISTOR	100K	±2%	1/4W
R90	1006750-80	RESISTOR	100K	±2%	1/4W
R92	1006750-5	RESISTOR	75	±2%	1/4W
R93	-5		75		
R94	-5		75		
R95	-5		75		
R96	-16		220		
R97	-32		1000		
R98	-25		510		
R99	-16		220		
R100	-32		1000		
R101	-25		510		
R102	-72		47K		
R103	1006750-36	RESISTOR	1500	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-36	CAPACITOR	47UF	±10%	20VDC
C2	1006755-69		1.0		35
C3	1006777-31		0.01		100
C4	1006755-33		15		20
C5	1006755-36		47		20
C6	1006755-85		22		35
C7	1006755-130		10.0		50
C8	1006777-31		0.01		100
C9	1010279-119		4.1		15
C10	1010279-117		2.8		15
C11	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C13	1006755-79	CAPACITOR	6.8UF	±10%	35VDC
C14	1006755-85	CAPACITOR	22 UF	±10%	35VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010372-6				
CR5	1010385		IN660		
CR6	1008815-5		IN961B		
CR7	1010385		IN660		
CR8	1010385	DIODE	IN660		
CR11	1010385	DIODE	IN660		
CR12	1010385	DIODE	IN660		
CR13	1008815-7	DIODE	IN963B		
C15	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C16	1006755-181	CAPACITOR	6.8 UF	±10%	50VDC
C17	1006755-85	CAPACITOR	22UF	±10%	35VDC
C18	1006777-24	CAPACITOR	0.001	±10%	100VDC
Q1	1010343-3	TRANSISTOR			
Q2	-3				
Q3	-3				
Q4	-3				
Q5	-3				
Q6	-3				
Q7	-3				
Q8	-3				
Q9	-3				
Q10	-3				
Q11	-3				
Q12	-3				
Q13	-3				
Q14	1010343-3				
Q15	1008814-1		2N2907A		
Q16	1010343-3				
Q17	1008814-1		2N2907A		
Q18	1010343-3				
Q19	1008814-1		2N2907A		
Q20	1010343-3				
Q21	1008814-1		2N2907A		
Q22	1010343-3				
Q23	1008814-1		2N2907A		
Q24	1010343-3				
Q25	1008814-1		2N2907A		
Q26	1010343-3				
Q27	1008814-1		2N2907A		
Q28	1010343-3				
Q29	1008814-1		2N2907A		
Q30	1010343-3				
Q31	1008814-1		2N2907A		
Q32	1010357-1		2N720A		
Q33	1010342		2N998		
Q34	1008813-1		2N3486A		
Q35	1010342	TRANSISTOR	2N998		
Q38	1010652-1	TRANSISTOR	2N2980		
Q39	1010652-1	TRANSISTOR	2N2980		
Q40	1010343-3	TRANSISTOR			
Q42	1010397-1	TRANSISTOR	2N930		
Q43	1010966-1	TRANSISTOR	2N914		
Q44	1010966-1	TRANSISTOR	2N914		
T1	1010723	TRANSFORMER			
T2	1010274				
T3	1010726				
T4	1010365				
T5	1006762-2				
T6	1006762-2				
T7	1006762-2				
T8	1006762-2	TRANSFORMER			
L1	1008811	INDUCTOR			

R64	
PART NO.	VALUE
1006750-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100
-56	10K
-57	11K
-58	12K
-59	13K
-60	15K
-61	16K
-62	18K
-63	20K
-64	22K
-65	24K
-66	27K
-142	12.5K
1006750-149	25.5K

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
C	REPLACES REV.B WITH CHANGE PER TDRR 15733	1/24/65	WK
D	REVISED PER TDRR 16621	[illegible]	WK
E	REVISED PER TDRR 20304	23 [illegible]	WK
F	REVISED PER TDRR 20776	[illegible]	WK
G	REVISED PER TDRR [illegible]	27 Aug 65	WK
H	REVISED PER TDRR 22190	[illegible]	[illegible]
J	REVISED PER TDRR 22514	[illegible]	[illegible]
K	REVISED PER TDRR 23896	15 Nov 65	WK
L	REVISED PER TDRR 27180	23 MAR 66	W.D.
M	REVISED PER TDRR 28185	28 APR 66	B. W.D.
N	REVISED PER TDRR 29434	16 JUN 66	[illegible]
P	REVISED PER TDRR 29955	16 JUL 66	[illegible]
R	REVISED PER TDRR 30608	18 AUG 66	RW
S	REVISED PER TDRR 30607	25 AUG 66	JI

REF DWG:
D/A CONVERTER MODULE ASSY
1. DWG NO. 2007137
2. DWG NO. 2007237

Ⓒ REPLACES REV. B WITH CHANGE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. D. [illegible] DATE 18 DEC 64
CHECKED A. [illegible] 15 Jan 65
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 26 Jan 65

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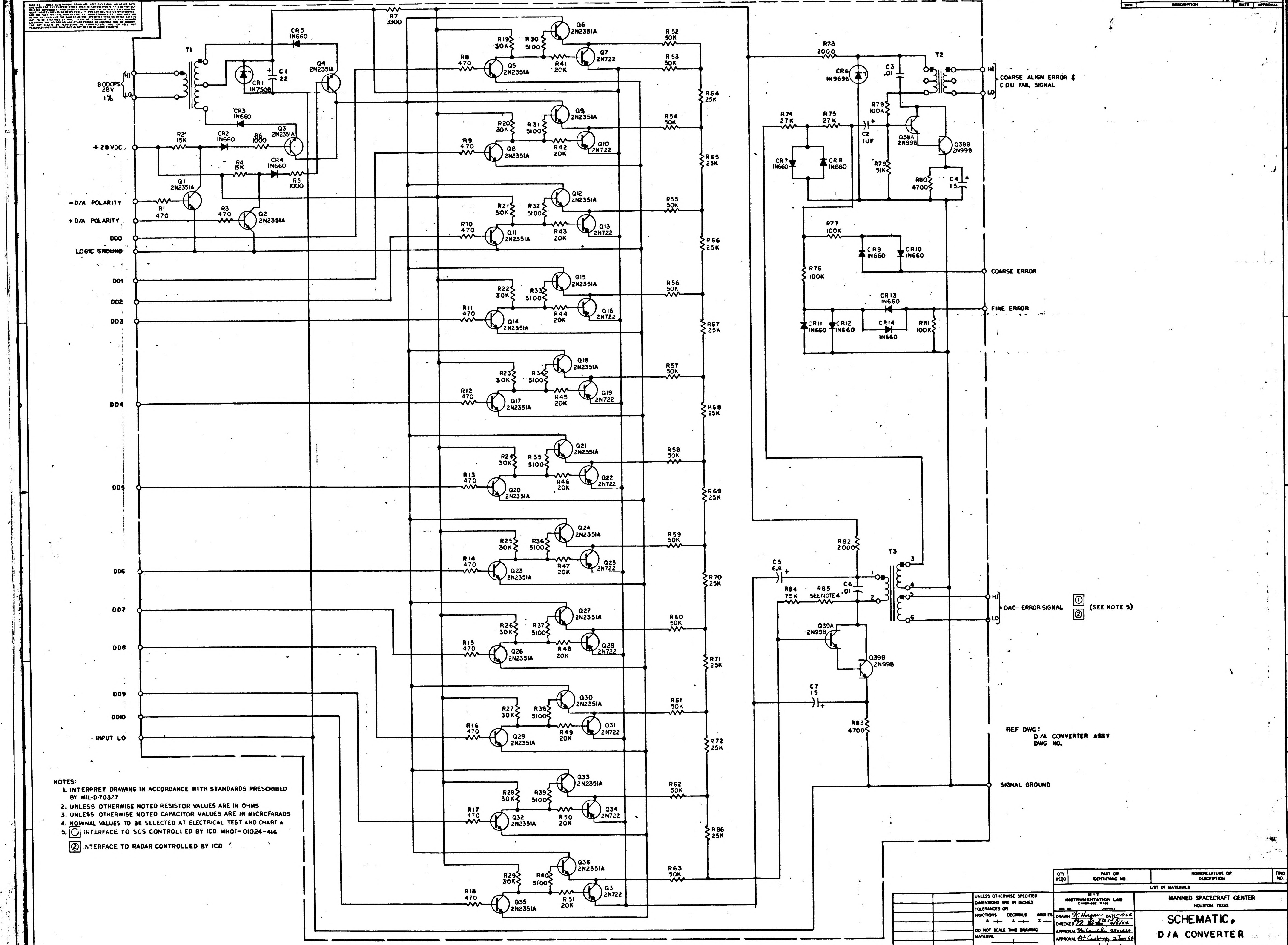
SCHEMATIC,
D/A CONVERTER

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2010028
SCALE —
WT —
SHEET 1 OF 1


REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
T1
800CPS 28V 1%
HI
LO
CR5 1N660
CR1 1N750B
C1 22
Q4 2N2351A
CR3 1N660
Q3 2N2351A
R2 15K
CR2 1N660
R6 1000
+28VDC.
R4 15K
CR4 1N660
R5 1000
Q1 2N2351A
R1 470
R3 470
Q2 2N2351A
-D/A POLARITY
+D/A POLARITY
DD0
LOGIC GROUND
DD1
DD2
DD3
DD4
DD5
DD6
DD7
DD8
DD9
DD10
INPUT LO
R7 3300
R19 30K
R30 5100
Q6 2N2351A
Q7 2N722
R41 20K
R8 470
Q5 2N2351A
R52 50K
R53 50K
R64 25K
R20 30K
R31 5100
Q9 2N2351A
Q10 2N722
R42 20K
R9 470
Q8 2N2351A
R54 50K
R65 25K
R21 30K
R32 5100
Q12 2N2351A
Q13 2N722
R43 20K
R10 470
Q11 2N2351A
R55 50K
R66 25K
R22 30K
R33 5100
Q15 2N2351A
Q16 2N722
R44 20K
R11 470
Q14 2N2351A
R56 50K
R67 25K
R23 30K
R34 5100
Q18 2N2351A
Q19 2N722
R45 20K
R12 470
Q17 2N2351A
R57 50K
R68 25K
R24 30K
R35 5100
Q21 2N2351A
Q22 2N722
R46 20K
R13 470
Q20 2N2351A
R58 50K
R69 25K
R25 30K
R36 5100
Q24 2N2351A
Q25 2N722
R47 20K
R14 470
Q23 2N2351A
R59 50K
R70 25K
R26 30K
R37 5100
Q27 2N2351A
Q28 2N722
R48 20K
R15 470
Q26 2N2351A
R60 50K
R71 25K
R27 30K
R38 5100
Q30 2N2351A
Q31 2N722
R49 20K
R16 470
Q29 2N2351A
R61 50K
R72 25K
R28 30K
R39 5100
Q33 2N2351A
Q34 2N722
R50 20K
R17 470
Q32 2N2351A
R62 50K
R86 25K
R29 30K
R40 5100
Q36 2N2351A
Q3 2N722
R51 20K
R18 470
Q35 2N2351A
R63 50K
R73 2000
CR6 1N969B
C3 .01
T2
HI
LO
COARSE ALIGN ERROR & CDU FAIL SIGNAL
R74 27K
R75 27K
C2 1UF
R78 100K
Q38A 2N998
Q38B 2N998
CR7 1N660
CR8 1N660
R79 51K
R80 4700
C4 15
R77 100K
CR9 1N660
CR10 1N660
R76 100K
COARSE ERROR
CR13 1N660
FINE ERROR
CR11 1N660
CR12 1N660
CR14 1N660
R81 100K
R82 2000
T3
C5 6.8
R84 75K
R85 SEE NOTE 4
C6 .01
1
2
3
4
5
6
HI
LO
DAC ERROR SIGNAL
① ② (SEE NOTE 5)
Q39A 2N998
Q39B 2N998
C7 15
R83 4700
SIGNAL GROUND
6
5
4
3
2
1

REF DWG:
D/A CONVERTER ASSY
DWG NO.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
4. NOMINAL VALUES TO BE SELECTED AT ELECTRICAL TEST AND CHART A
5. ① INTERFACE TO SCS CONTROLLED BY ICD MH01-01024-416

   ② INTERFACE TO RADAR CONTROLLED BY ICD

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ON
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DRAWN W. Horgan DATE 1-15-64
CHECKED 4/8/64
APPROVAL 2 Jul 64
APPROVAL D. F. Cushing 2 Jun '64
NASA APPROVAL 6/2/64
MIT APPROVAL 2 Jun 64

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SCHEMATIC, D/A CONVERTER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010028
SCALE —
WT —
SHEET 1 OF 2

2010028

MASTER

INCHES
0 1 2

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REVISIONS 09666			
SYM	DESCRIPTION	DATE	APPROVAL

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 24	RESISTOR	470	± 2%	1/4 W
R2	- 59		15 K		
R3	- 24		470		
R4	- 59		15 K		
R5	- 32		1000		
R6	- 32		1000		
R7	- 44		3300		
R8	- 24		470		
R9	- 24		470		
R10	- 24		470		
R11	- 24		470		
R12	- 24		470		
R13	- 24		470		
R14	- 24		470		
R15	- 24		470		
R16	- 24		470		
R17	- 24		470		
R18	- 24		470		
R19	- 67		30 K		
R20	- 67		30 K		
R21	67		30 K		
R22	67		30 K		
R23	67		30 K		
R24	67		30 K		
R25	67		30 K		
R26	67		30 K		
R27	67		30 K		
R28	67		30 K		
R29	67		30 K		
R30	49		5100		
R31	49		5100		
R32	49		5100		
R33	49		5100		
R34	49		5100		
R35	49		5100		
R36	49		5100		
R37	49		5100		
R38	49		5100		
R39	49		5100		
R40	- 49		5100		
R41	- 63		20 K		
R42	- 63		20 K		
R43	- 63		20 K		
R44	- 63		20 K		
R45	- 63		20 K		
R46	- 63		20 K		
R47	- 63		20 K		
R48	- 63		20 K		
R49	- 63		20 K		
R50	- 63		20 K		
R51	1006750 - 63		20 K	±2%	1/4 W
R52	1010733 - 13		50 K	±.1%	1/10 W
R53	- 13		50 K		
R54	- 13		50 K		
R55	- 13		50 K		
R56	- 13		50 K		
R57	- 13		50 K		
R58	- 13		50 K		
R59	- 13		50 K		
R60	- 13		50 K		
R61	- 13		50 K		
R62	- 13		50 K		
R63	- 13		50 K		
R64	- 12		25 K		
R65	- 12		25 K		
R66	- 12		25 K		
R67	- 12		25 K		
R68	- 12		25 K		
R69	- 12		25 K		
R70	- 12		25 K		
R71	- 12		25 K		
R72	1010733 - 12		25 K	±.1%	1/10 W
R73	1006750 - 39		2000	±2%	1/4 W
R74	- 66		27 K		
R75	- 66		27 K		
R76	- 80		100 K		
R77	- 80		100 K		
R78	- 80		100 K		
R79	- 73		51 K		
R80	- 48		4700		
R81	- 80		100 K		
R82	- 39		2000		
R83	1006750 - 48		4700	±2%	1/4 W
R84	1010733 - 116		75 K	±1%	1/10 W
R85	SEE CHART A		NOM		
R86	1010733 - 12		25 K	±.1%	1/10 W

33

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2	1010343-3				
Q3	1010343-3				
Q4	1010343-3				
Q5	1010343-3				
Q6	1010343-3		2N2351A		
Q7	1010285		2N722		
Q8	1010343-3		2N2351A		
Q9	1010343-3		2N2351A		
Q10	1010285		2N722		
Q11	1010343-3		2N2351A		
Q12	1010343-3		2N2351A		
Q13	1010285		2N722		
Q14	1010343-3		2N2351A		
Q15	1010343-3		2N2351A		
Q16	1010285		2N722		
Q17	1010343-3		2N2351A		
Q18	1010343-3		2N2351A		
Q19	1010285		2N722		
Q20	1010343-3		2N2351A		
Q21	1010343-3		2N2351A		
Q22	1010285		2N722		
Q23	1010343-3		2N2351A		
Q24	1010343-3		2N2351A		
Q25	1010285		2N722		
Q26	1010343-3		2N2351A		
Q27	1010343-3		2N2351A		
Q28	1010285		2N722		
Q29	1010343-3		2N2351A		
Q30	1010343-3		2N2351A		
Q31	1010285		2N722		
Q32	1010343-3		2N2351A		
Q33	1010343-3		2N2351A		
Q34	1010285		2N722		
Q35	1010343-3		2N2351A		
Q36	1010343-3		2N2351A		
Q37	1010285		2N722		
Q38	1010342		2N998		
Q39	1010342		2N998		
CR1	1010372-10	DIODE	IN750B	±5%	
CR2	1010385		IN660		
CR3	1010385				
CR4	1010385				
CR5	1010385		IN660		
CR6	1010286 -13		IN969B		
CR7	1010385		IN660		
CR8	1010385				
CR9	1010385				
CR10	1010385				
CR11	1010385				
CR12	1010385				
CR13	1010385				
CR14	1010385		IN660		
C1	1006755-21	CAPACITOR	22 UF	±10%	15 VDC
C2	1006755-69		1.0		35
C3	1006755-31		.01		100
C4	1006755-33		15		20
C5	1006777-79		6.8		35
C6	1006755-31		.01 UF	±10%	100VDC
T1	1010723	TRANSFORMER			
T2	1010324				
T3	1010726				

CHART A	
R85 ± 1% 1/10 W	
PART NO.	VALUE
1010733-105	10 K
-106	11 K
-107	12 K
-108	13 K
-109	14 K
-110	15 K
-111	16 K
-112	17 K
-113	18 K
-114	19 K
1010733-115	20 K

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN W. Horgan DATE 1-15-64
CHECKED [illegible] 4/6/64
APPROVAL [illegible]
APPROVAL [illegible] 2 Jun '64
NASA APPROVAL [illegible] 6/10/64
MIT APPROVAL [illegible] 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

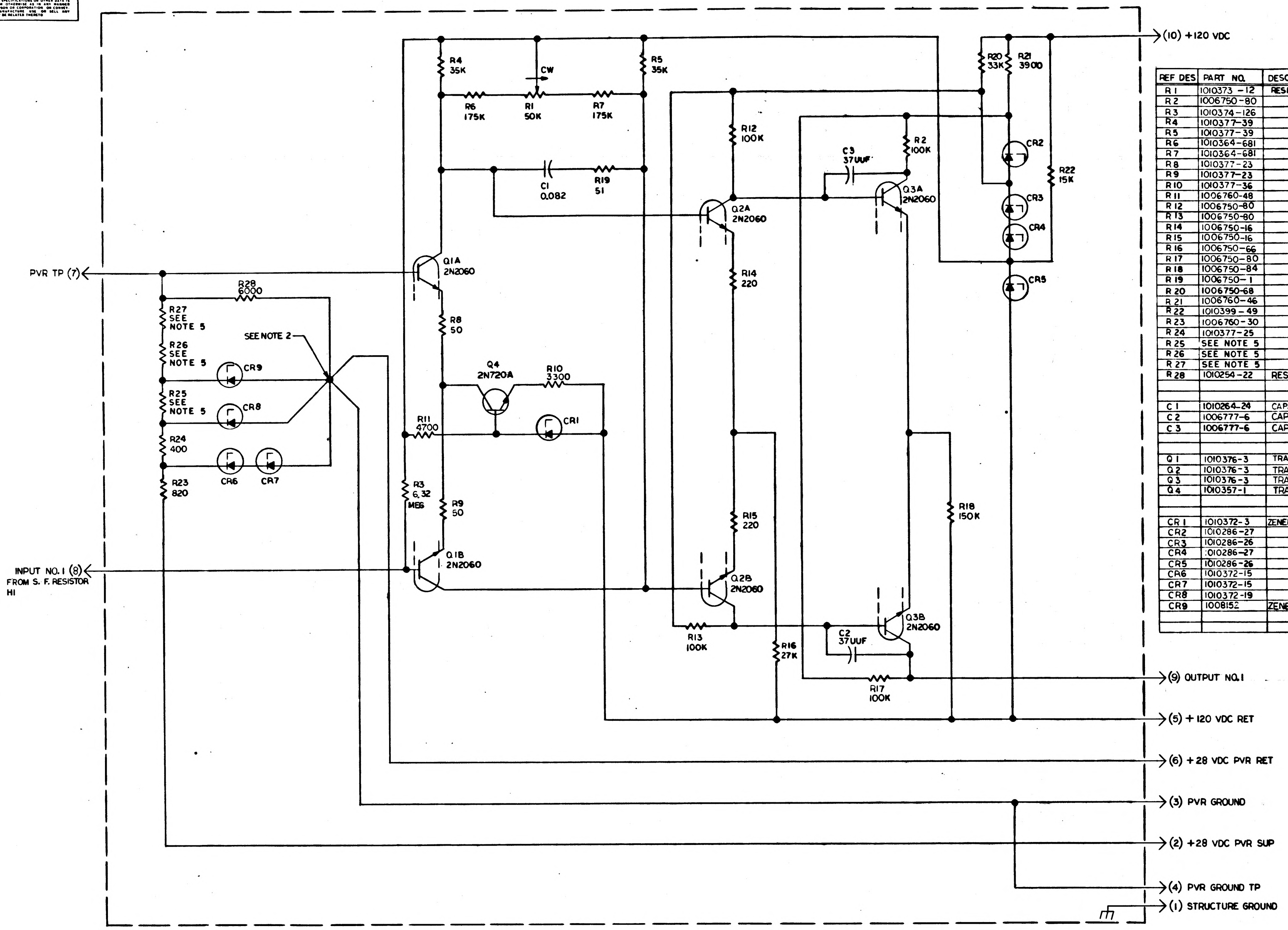
SCHEMATIC,
D/A CONVERTER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010028
SCALE —
WT —
SHEET 2 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 1036			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14692	12/15/64	


(10) +120 VDC
R4
35K
R5
35K
CW
R6
175K
R1
50K
R7
175K
C1
0.082
R19
51
R12
100K
R2
100K
C3
37UUF
R20
33K
R21
3900
R22
15K
CR2
CR3
CR4
CR5
Q1A
2N2060
Q2A
2N2060
Q3A
2N2060
R14
220
PVR TP (7)
R28
6000
R27
SEE
NOTE 5
R26
SEE
NOTE 5
R25
SEE
NOTE 5
SEE NOTE 2
CR9
CR8
R24
400
CR6
CR7
R23
820
R8
50
Q4
2N720A
R10
3300
R11
4700
CR1
R3
6.32
MEG
R9
50
INPUT NO. 1 (8)
FROM S. F. RESISTOR
HI
Q1B
2N2060
R15
220
R18
150K
Q2B
2N2060
Q3B
2N2060
R13
100K
R16
27K
C2
37UUF
R17
100K
(9) OUTPUT NO. 1
(5) +120 VDC RET
(6) +28 VDC PVR RET
(3) PVR GROUND
(2) +28 VDC PVR SUP
(4) PVR GROUND TP
(1) STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010373 -12	RESISTOR	50 K	5%	1 W
R 2	1006750-80		100 K	2%	1/4 W
R 3	1010374-126		6.32MEG	1%	1/8 W
R4	1010377-39		35 K		1/10W
R5	1010377-39		35 K		1/10W
R6	1010364-681		174K		1/8 W
R 7	1010364-681		174 K		1/8 W
R 8	1010377-23		50		1/10W
R 9	1010377-23		50		1/10W
R 10	1010377-36		3300	1%	1/10 W
R 11	1006760-48		4700	2%	1/2 W
R 12	1006750-80		100 K		1/4 W
R 13	1006750-80		100 K		
R 14	1006750-16		220		
R 15	1006750-16		220		
R 16	1006750-66		27 K		
R 17	1006750-80		100 K		
R 18	1006750-84		150 K		
R 19	1006750-1		51		
R 20	1006750-68		33 K		1/4 W
R 21	1006760-46		3900	2%	1/2 W
R 22	1010399-49		15 K	5%	5 W
R 23	1006760-30		820	2%	1/2 W
R 24	1010377-25		400	1%	1/10W
R 25	SEE NOTE 5			1%	1/10W
R 26	SEE NOTE 5			0.5%	1/10W
R 27	SEE NOTE 5			0.02%	1/8 W
R 28	1010254-22	RESISTOR	6000	0.1%	1/8 W
C 1	1010264-24	CAPACITOR	0.082	5%	200 V
C 2	1006777-6	CAPACITOR	37UUF	10%	100 V
C 3	1006777-6	CAPACITOR	37UUF	10%	100 V
Q 1	1010376-3	TRANSISTOR	2N2060		
Q 2	1010376-3	TRANSISTOR	2N2060		
Q 3	1010376-3	TRANSISTOR	2N2060		
Q 4	1010357-1	TRANSISTOR	2N720A		
CR 1	1010372-3	ZENER DIODE	HZ8532		
CR2	1010286-27		4M2622		
CR3	1010286-26		4M2422		
CR4	1010286-27		4M2622		
CR5	1010286-26		4M2422		
CR6	1010372-15		HZ8544		
CR7	1010372-15		HZ8544		
CR8	1010372-19		HZ8548		
CR9	1008152	ZENER DIODE			

R25	
PART NO.	VALUE
1010377-26	600
-27	650
-28	700
-29	750
-30	775
-31	850
-32	925
-33	1000
-34	1100
1010377-35	1200

R26	
PART NO.	VALUE
1010377-57	1
-58	2
-59	3
-60	4
-61	5
-62	6
-63	7
-64	8
-65	9
-66	10
-67	11
-68	12
-69	13
-70	14
-71	15
-72	16
-73	17
-74	18
1010377-75	19

R27	
PART NO.	VALUE
1010836-1	100
-2	120
-3	140
-4	160
-5	180
-6	200
-7	220
-8	240
-9	260
-10	280
-11	300
-12	320
-13	340
-14	360
-15	380
-16	400
-17	420
-18	440
-19	460
-20	480
1010836-21	500

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WIRING TO BE A SINGLE POINT AS SHOWN
3. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
4. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
5. VALUES OF R25, R26, AND R27 TO BE SELECTED AT FINAL TEST FROM APPROPRIATE CHART PER ATP

REF DWG:
DC DIFFERENTIAL AMPLIFIER AND PVR
DWG. NO. 2007101

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, DC DIFFERENTIAL AMPLIFIER AND PVR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010029
SCALE
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 10362

SYM	DESCRIPTION	DATE	APPROVAL
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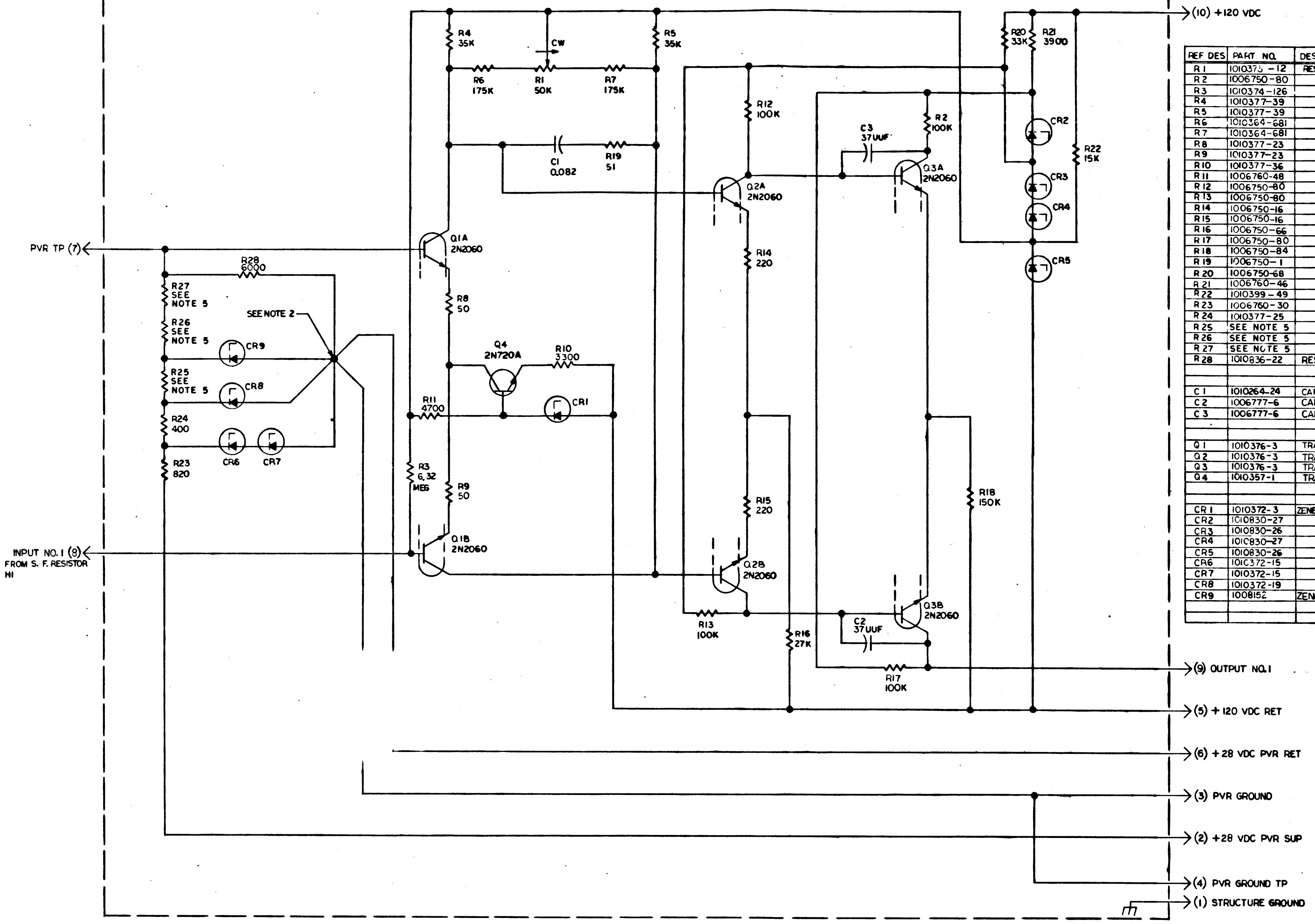
B	REVISED PER TDRR 15471		[illegible]


R4
35K
CW
R5
35K
R6
175K
R1
50K
R7
175K
C1
0.082
R19
51
PVR TP (7)
R28
6000
R27
SEE
NOTE 5
R26
SEE
NOTE 5
SEE NOTE 2
CR9
R25
SEE
NOTE 5
CR8
R24
400
CR6
CR7
R23
820
Q1A
2N2060
R8
50
Q4
2N720A
R10
3300
R11
4700
CR1
R3
6.32
MEG
R9
50
Q1B
2N2060
INPUT NO. 1 (8)
FROM S. F. RESISTOR
HI
R12
100K
Q2A
2N2060
R14
220
R15
220
Q2B
2N2060
R13
100K
R16
27K
C3
37UUF
R2
100K
Q3A
2N2060
R18
150K
C2
37UUF
Q3B
2N2060
R17
100K
R20
33K
R21
3900
CR2
R22
15K
CR3
CR4
CR5
(10) +120 VDC
(9) OUTPUT NO. 1
(5) + 120 VDC RET
(6) + 28 VDC PVR RET
(3) PVR GROUND
(2) +28 VDC PVR SUP
(4) PVR GROUND TP
(1) STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010373 -12	RESISTOR	50 K	5%	1 W
R 2	1006750-80		100 K	2%	1/4 W
R 3	1010374-126		6.32 MEG	1%	1/8 W
R 4	1010377-39		35 K		1/10W
R 5	1010377-39		35 K		1/10W
R 6	1010364-681		174K		1/8 W
R 7	1010364-681		174 K		1/8 W
R 8	1010377-23		50		1/10W
R 9	1010377-23		50		1/10 W
R 10	1010377-36		3300	1%	1/10 W
R 11	1006760-48		4700	2%	1/2 W
R 12	1006750-80		100 K		1/4 W
R 13	1006750-80		100 K		
R 14	1006750-16		220		
R 15	1006750-16		220		
R 16	1006750-66		27 K		
R 17	1006750-80		100 K		
R 18	1006750-84		150 K		
R 19	1006750-1		51		
R 20	1006750-68		33 K		1/4 W
R 21	1006760-46		3900	2%	1/2 W
R 22	1010399-49		15 K	5%	5 W
R 23	1006760-30		820	2%	1/2 W
R 24	1010377-25		400	1%	1/10W
R 25	SEE NOTE 5			1%	1/10W
R 26	SEE NOTE 5			0.5%	1/10W
R 27	SEE NOTE 5			0.02%	1/8 W
R 28	1010836-22	RESISTOR	6000	0.1%	1/8 W
C 1	1010264-24	CAPACITOR	0.082	5%	200 V
C 2	1006777-6	CAPACITOR	37UUF	10%	100 V
C 3	1006777-6	CAPACITOR	37UUF	10%	100 V
Q 1	1010376-3	TRANSISTOR	2N2060		
Q 2	1010376-3	TRANSISTOR	2N2060		
Q 3	1010376-3	TRANSISTOR	2N2060		
Q 4	1010357-1	TRANSISTOR	2N720A		
CR 1	1010372-3	ZENER DIODE	HZ8532		
CR2	1010830-27		4M26Z2		
CR3	1010830-26		4M24Z2		
CR4	1010830-27		4M26Z2		
CR5	1010830-26		4M24Z2		
CR6	1010372-15		HZ8544		
CR7	1010372-15		HZ8544		
CR8	1010372-19		HZ8548		
CR9	1008152	ZENER DIODE			

R25

PART NO.	VALUE
1010377-26	600
-27	650
-28	700
-29	750
-30	775
-31	850
-32	925
-33	1000
-34	1100
1010377-35	1200

R26

PART NO.	VALUE
1010377-57	1
-58	2
-59	3
-60	4
-61	5
-62	6
-63	7
-64	8
-65	9
-66	10
-67	11
-68	12
-69	13
-70	14
-71	15
-72	16
-73	17
-74	18
1010377-75	19

R27

PART NO.	VALUE
1010836-1	100
-2	120
-3	140
-4	160
-5	180
-6	200
-7	220
-8	240
-9	260
-10	280
-11	300
-12	320
-13	340
-14	360
-15	380
-16	400
-17	420
-18	440
-19	460
-20	480
1010836-21	500

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WIRING TO BE A SINGLE POINT AS SHOWN
3. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
4. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
5. VALUES OF R25, R26, AND R27 TO BE SELECTED AT FINAL TEST FROM APPROPRIATE CHART PER ATP

REF DWG:
DC DIFFERENTIAL AMPLIFIER AND PVR
DWG. NO. 2007101

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] APR 10 69
APPROVAL J L S[illegible] 6/10/69
APPROVAL J E Miller 6/23/69
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 23 June 69

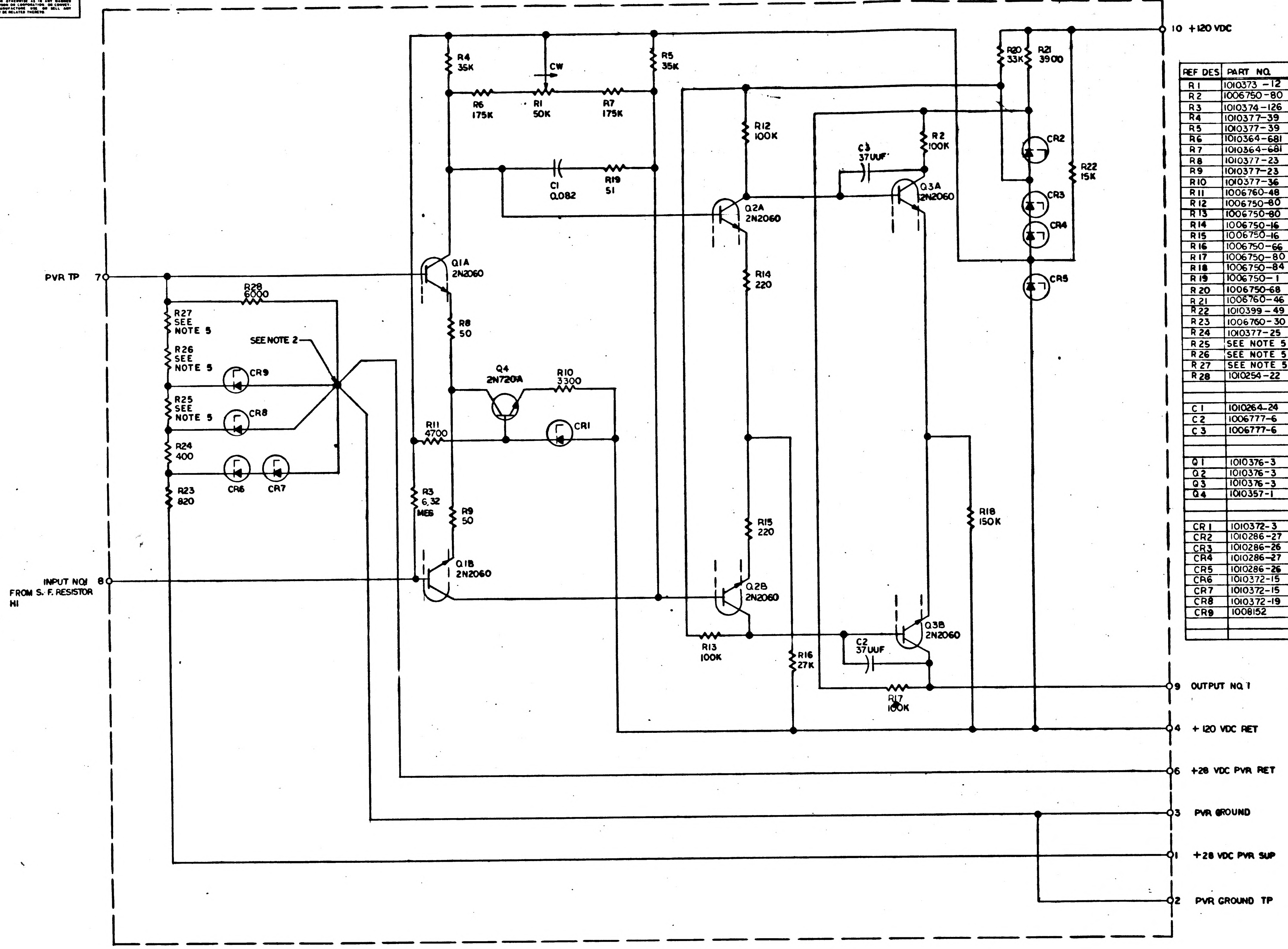
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, DC DIFFERENTIAL AMPLIFIER AND PVR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO 2010029
SCALE
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 10362			
SYM	DESCRIPTION	DATE	APPROVAL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R4 35K
R5 35K
CW
R6 175K
R1 50K
R7 175K
C1 0.082
R19 51
R12 100K
R20 33K
R21 3900
C3 37UUF
R2 100K
CR2
R22 15K
CR3
CR4
CR5
Q2A 2N2060
Q3A 2N2060
Q1A 2N2060
PVR TP 7
R28 6000
R27 SEE NOTE 5
R26 SEE NOTE 5
SEE NOTE 2
CR9
R25 SEE NOTE 5
CR8
R24 400
CR6
CR7
R23 820
R8 50
Q4 2N720A
R10 3300
CR1
R11 4700
R3 6.32 MEG
R9 50
R14 220
R15 220
R18 150K
Q1B 2N2060
INPUT NO1 8
FROM S. F. RESISTOR HI
Q2B 2N2060
Q3B 2N2060
R13 100K
C2 37UUF
R16 27K
R17 100K
9 OUTPUT NO. 1
4 +120 VDC RET
6 +28 VDC PVR RET
3 PVR GROUND
1 +28 VDC PVR SUP
2 PVR GROUND TP

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010373 -12	RESISTOR	50 K	5%	1 W
R 2	1006750-80		100 K	2%	1/4 W
R 3	1010374-126		6.32MEG	1%	1/8 W
R 4	1010377-39		35 K		1/10W
R 5	1010377-39		35 K		1/10W
R 6	1010364-681		174K		1/8 W
R 7	1010364-681		174 K		1/8 W
R 8	1010377-23		50		1/10W
R 9	1010377-23		50		1/10W
R 10	1010377-36		3300	1%	1/10W
R 11	1006760-48		4700	2%	1/2 W
R 12	1006750-80		100 K		1/4 W
R 13	1006750-80		100 K		
R 14	1006750-16		220		
R 15	1006750-16		220		
R 16	1006750-66		27 K		
R 17	1006750-80		100 K		
R 18	1006750-84		150 K		
R 19	1006750-1		51		
R 20	1006750-68		33 K		1/4 W
R 21	1006760-46		3900	2%	1/2 W
R 22	1010399-49		15 K	5%	5 W
R 23	1006760-30		820	2%	1/2 W
R 24	1010377-25		400	1%	1/10W
R 25	SEE NOTE 5			1%	1/10W
R 26	SEE NOTE 5			0.5%	1/10W
R 27	SEE NOTE 5			0.02%	1/8 W
R 28	1010254-22		6000	0.1%	1/8 W
C 1	1010264-24	CAPACITOR	0.082	5 %	200 V
C 2	1006777-6		37UUF	10%	100 V
C 3	1006777-6		37UUF	10%	100 V
Q 1	1010376-3	TRANSISTOR	2N2060		
Q 2	1010376-3		2N2060		
Q 3	1010376-3		2N2060		
Q 4	1010357-1		2N720A		
CR 1	1010372-3	ZENER DIODE	HZ8532		
CR2	1010286-27		4M2622		
CR3	1010286-26		4M2422		
CR4	1010286-27		4M2622		
CR5	1010286-26		4M2422		
CR6	1010372-15		HZ8544		
CR7	1010372-15		HZ8544		
CR8	1010372-19		HZ8548		
CR9	1008152	ZENER DIODE			

CHART A	
R25 ± 1% 1/10 W	
PART NO.	VALUE
1010377 -26	600
-27	650
-28	700
-29	750
-30	775
-31	850
-32	925
-33	1000
-34	1100
1010377 - 35	1200

CHART B	
R26 ± 0.5% 1/10 W	
PART NO.	VALUE
1010377-57	1
-58	2
-59	3
-60	4
-61	5
-62	6
-63	7
-64	8
-65	9
-66	10
-67	11
-68	12
-69	13
-70	14
-71	15
-72	16
-73	17
-74	18
1010377 - 75	19

CHART C	
R27 ± 2% 1/8 W	
PART NO.	VALUE
1010254-1	100
-2	120
-3	140
-4	160
-5	180
-6	200
-7	220
-8	240
-9	260
-10	280
-11	300
-12	320
-13	340
-14	360
-15	380
-16	400
-17	420
-18	440
-19	460
-20	480
1010254 - 21	500

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. WIRING TO BE A SINGLE POINT AS SHOWN
3. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS
4. UNLESS OTHERWISE NOTED CAPACITOR VALUES ARE IN MICROFARADS
5. VALUE TO BE DETERMINED BY ELECTRICAL TEST FROM CHARTS A, B AND C

REF DWG:
DC DIFFERENTIAL AMPLIFIER AND PVR
DWG. NO. 2007101

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN Brady DATE
CHECKED [illegible] 10, 69
APPROVAL J. L. Sitomer 6/10/69
APPROVAL J. E. Miller 6/23/69
NASA APPROVAL
MIT APPROVAL 23 Jun 69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

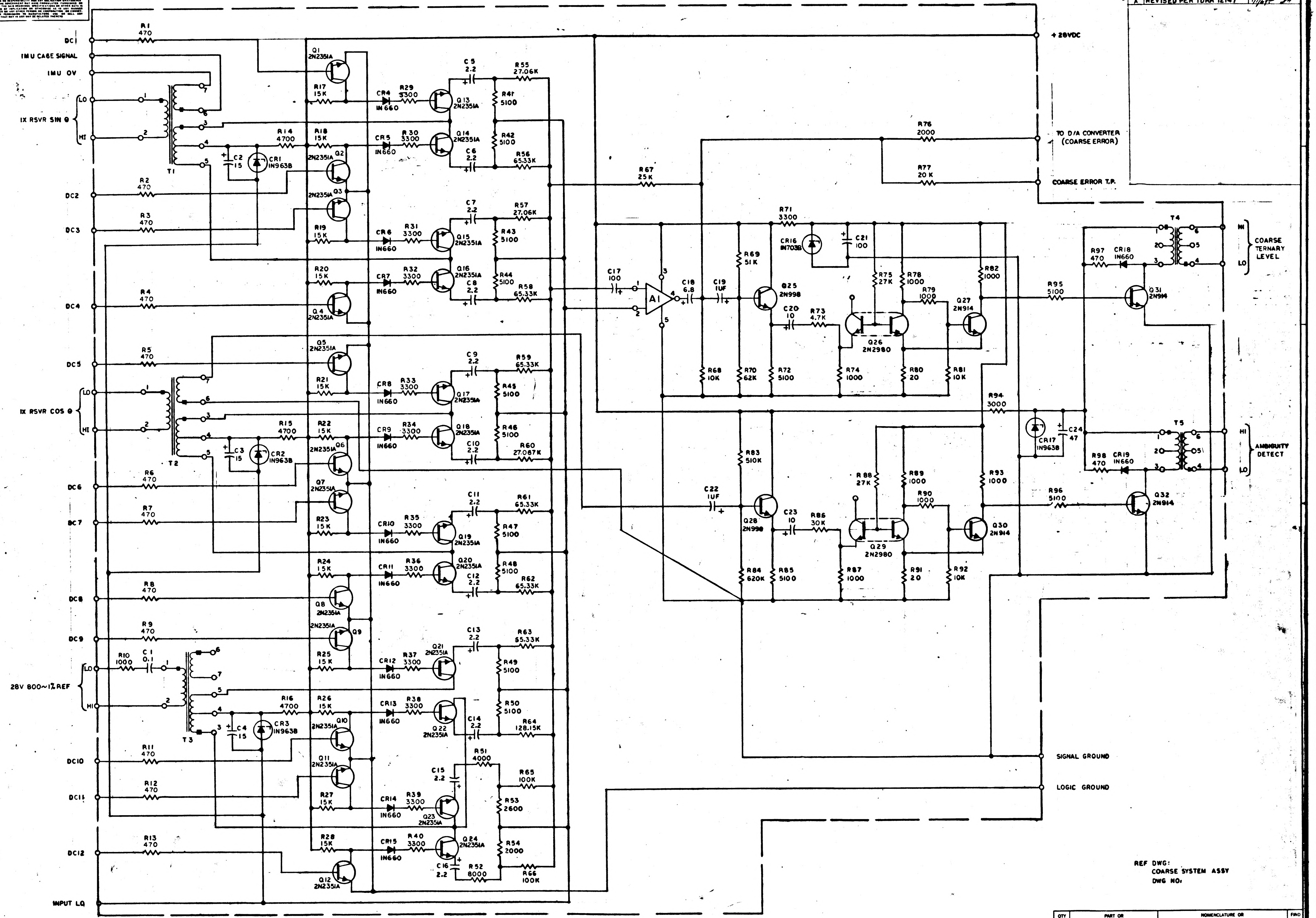
SCHEMATIC,
DC DIFFERENTIAL AMPLIFIER
AND PVR

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010029
SCALE
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS Q 9/6/65

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/65	JW


DC1
IMU CAGE SIGNAL
IMU OV
LO
1X RSVR SIN θ
HI
DC2
DC3
DC4
DC5
LO
1X RSVR COS θ
HI
DC6
DC7
DC8
DC9
LO
28V 800~1% REF
HI
DC10
DC11
DC12
INPUT LQ
R1 470
R2 470
R3 470
R4 470
R5 470
R6 470
R7 470
R8 470
R9 470
R10 1000
C1 0.1
R11 470
R12 470
R13 470
T1
T2
T3
C2 15
CR1 1N963B
C3 15
CR2 1N963B
C4 15
CR3 1N963B
R14 4700
R15 4700
R16 4700
Q1 2N2351A
Q2 2N2351A
Q3 2N2351A
Q4 2N2351A
Q5 2N2351A
Q6 2N2351A
Q7 2N2351A
Q8 2N2351A
Q9 2N2351A
Q10 2N2351A
Q11 2N2351A
Q12 2N2351A
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14 1N660
CR15 1N660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
Q13 2N2351A
Q14 2N2351A
Q15 2N2351A
Q16 2N2351A
Q17 2N2351A
Q18 2N2351A
Q19 2N2351A
Q20 2N2351A
Q21 2N2351A
Q22 2N2351A
Q23 2N2351A
Q24 2N2351A
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R55 27.06K
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.067K
R61 65.33K
R62 65.33K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
+28VDC
TO D/A CONVERTER (COARSE ERROR)
COARSE ERROR T.P.
R76 2000
R77 20K
R67 25K
C17 100
A1
C18 6.8
C19 1UF
R68 10K
R69 51K
R70 62K
R71 3300
CR16 1N703B
C21 100
Q25 2N998
C20 10
R72 5100
R73 4.7K
R74 1000
R75 27K
R78 1000
R79 1000
R80 20
R81 10K
R82 1000
Q26 2N2980
Q27 2N914
R94 3000
CR17 1N963B
C24 47
R95 5100
Q31 2N914
R97 470
CR18 1N660
T4
HI
LO
COARSE TERNARY LEVEL
C22 1UF
R83 510K
R84 620K
Q28 2N998
C23 10
R85 5100
R86 30K
R87 1000
R88 27K
R89 1000
R90 1000
R91 20
R92 10K
R93 1000
Q29 2N2980
Q30 2N914
R96 5100
Q32 2N914
R98 470
CR19 1N660
T5
HI
LO
AMBIGUITY DETECT
SIGNAL GROUND
LOGIC GROUND

REF DWG:
COARSE SYSTEM ASSY
DWG NO:

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN Q. DiLeo DATE 17 APR 64
CHECKED CC L.T. Babbly 1 June 64
APPROVAL 2 June 64
APPROVAL 2 Jun 64
NASA APPROVAL 6/2/64
MIT APPROVAL 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 196666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 24	RESISTOR	470	±2 %	1/4 W
R 2	- 24		470		
R 3	- 24		470		
R 4	- 24		470		
R 5	- 24		470		
R 6	- 24		470		
R 7	- 24		470		
R 8	- 24		470		
R 9	- 24		470		
R 10	- 32		1000		
R 11	- 24		470		
R 12	- 24		470		
R 13	- 24		470		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15K		
R 18	- 60		15K		
R 19	- 60		15K		
R 20	- 60		15K		
R 21	- 60		15K		
R 22	- 60		15K		
R 23	- 60		15K		
R 24	- 60		15K		
R 25	- 60		15K		
R 26	- 60		15K		
R 27	- 60		15K		
R 28	- 60		15K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2%	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± .1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 10		65.33K		
R 63	- 10		65.33K		
R 64	- 17		128.15K		
R 65	- 117		100K	± 1%	
R 66	- 117		100K	± 1%	
R 67	1010733 - 12		25K	±.1%	1/10 W
R 68	1006750 - 56		10K	±2%	1/4 W
R 69	- 73		51K		
R 70	- 75		62K		
R 71	- 44		3300		
R 72	- 49		5100		
R 73	- 48		4700		
R 74	- 32		1000		
R 75	- 66		27K		
R 76	- 39		2000		
R 77	- 63		20K		
R 78	- 32		1000		
R 79	1006750 - 32		1000	±2%	1/4 W
R 80	1010369 - 148		20	±5%	1/8 W
R 81	1006750 - 56		10K	±2%	1/4 W
R 82	1006750 - 32		1000	±2%	1/4 W
R 83	1010369 - 98		510K	±5%	1/8 W
R 84	1010369 - 100		620K	±5%	1/8 W
R 85	1006750 - 49		5100	±2%	1/4 W
R 86	- 67		30K		
R 87	- 32		1000		
R 88	- 66		27K		
R 89	- 32		1000		
R 90	1006750 - 32		1000	±2%	1/4 W
R 91	1010369 - 148		20	±5%	1/8 W
R 92	1006750 - 56		10K	±2%	1/4 W
R 93	- 32		1000		
R 94	- 43		3000		
R 95	- 49		5100		
R 96	- 49		5100		
R 97	- 24		470		
R 98	1006750 - 24		470		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006777 - 38	CAPACITOR	0.1 UF	±10%	100VDC
C 2	1006755 - 33		15		20
C 3	- 33		15		
C 4	- 33		15		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		10		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		10		20
C 24	1006755 - 36		47 UF	±10%	20 VDC
CR 1	1010286 - 7	DIODE	IN963B		
CR 2	1010286 - 7		IN963B		
CR 3	1010286 - 7		IN963B		
CR 4	1010385		IN660		
CR 5					
CR 6					
CR 7					
CR 8					
CR 9					
CR 10					
CR 11					
CR 12					
CR 13					
CR 14					
CR 15	1010385		IN 660		
CR 16	1010372 - 5		IN 703B	±5%	
CR 17	1010286-7		IN963B		
CR 18	1010385		IN 660		
CR 19	1010385		IN 660		
Q 1	1010343 - 3	TRANSISTOR	2N2351A		
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3		2N2351A		
Q 25	1010342		2N998		
Q 26	1010652		2N2980		
Q 27	1006752		2N914		
Q 28	1010342		2N998		
Q 29	1010652		2N2980		
Q 30	1006752		2N914		
Q 31	1006752		2N914		
Q 32	1006752		2N914		
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN A. Di Leo DATE 7 APR 66
CHECKED J. T. 1 JUNE 66
APPROVAL 2 JUNE 66
APPROVAL 2 JUN 66
NASA APPROVAL 6/7/66
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

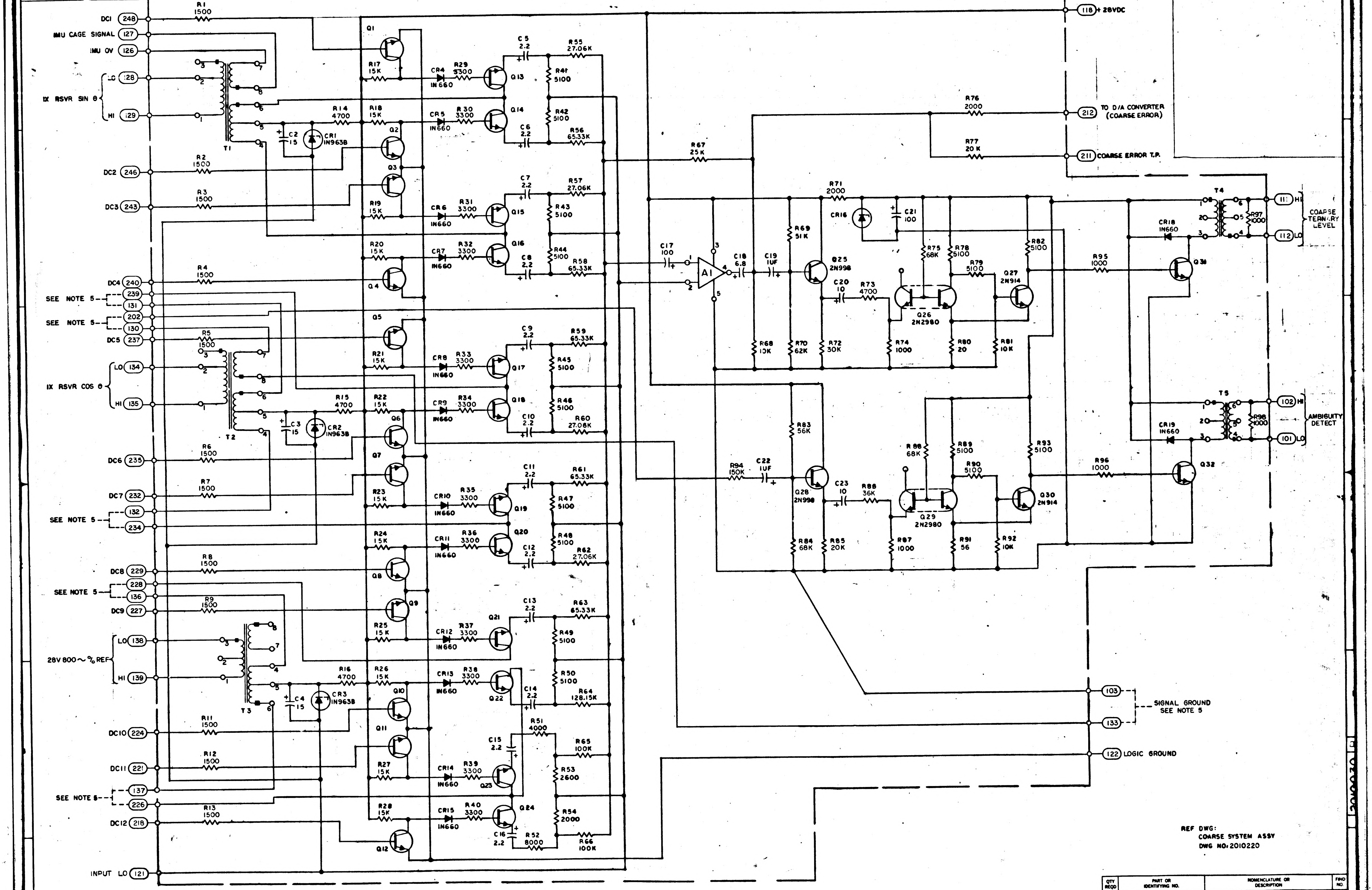
SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO.	SIZE	NASA DRAWING NO.
—	E	2010030
SCALE —	WT —	SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 096666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	
B	REVISED PER TDRR 12775	29 Sep 64	


DCI 248
IMU CAGE SIGNAL 127
IMU OV 126
1X RSVR SIN θ
LO 128
HI 129
T1
DC2 246
DC3 243
DC4 240
SEE NOTE 5
239
131
202
130
DC5 237
1X RSVR COS θ
LO 134
HI 135
T2
DC6 235
DC7 232
132
234
DC8 229
228
136
DC9 227
28V 800 ~ REF
LO 138
HI 139
T3
DC10 224
DC11 221
137
226
DC12 218
INPUT LO 121
R1 1500
R2 1500
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R11 1500
R12 1500
R13 1500
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
R14 4700
R15 4700
R16 4700
C2 15
C3 15
C4 15
CR1 1N963B
CR2 1N963B
CR3 1N963B
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14 1N660
CR15 1N660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R55 27.06K
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.06K
R61 65.33K
R62 27.06K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
118 +28VDC
R76 2000
212 TO D/A CONVERTER (COARSE ERROR)
R77 20K
211 COARSE ERROR T.P.
R67 25K
R71 2000
CR16
C21 100
C17 100
A1
C18 6.8
C19 1UF
R69 51K
Q25 2N998
C20 10
R73 4700
Q26 2N2980
R75 68K
R78 5100
R79 5100
Q27 2N914
R82 5100
R68 10K
R70 62K
R72 30K
R74 1000
R80 20
R81 10K
R95 1000
Q31
T4
R97 1000
CR18 1N660
111 HI
112 LO
COARSE TERNARY LEVEL
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 36K
Q29 2N2980
R88 68K
R89 5100
R90 5100
Q30 2N914
R93 5100
R96 1000
Q32
T5
R98 1000
CR19 1N660
102 HI
101 LO
AMBIGUITY DETECT
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
103
133
SIGNAL GROUND SEE NOTE 5
122 LOGIC GROUND

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (239) TO (131); (202) TO (130); (234) TO (132); (228) TO (136); (226) TO (137); (103) TO (133).

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN Q. D. Lee DATE 17 APR 64
CHECKED C. L. T. Buckley 1 June 64
APPROVAL R. Kowalski 2 June 64
APPROVAL D. J. Cushman 3 Jun 64
NASA APPROVAL 6/2/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 036666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/1/64	
B	REVISED PER TDRR 12775	29 SEP 64	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	- 36		1900		
R 3	- 36		1500		
R 4	- 36		1500		
R 5	- 36		1500		
R 6	- 36		1500		
R 7	- 36		1500		
R 8	- 36		1500		
R 9	1006750 - 36		1500		
R 11	1006750 - 36	RESISTOR	1500	±2%	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15 K		
R 18	- 60		15 K		
R 19	- 60		15 K		
R 20	- 60		15 K		
R 21	- 60		15 K		
R 22	- 60		15 K		
R 23	- 60		15 K		
R 24	- 60		15 K		
R 25	- 60		15 K		
R 26	- 60		15 K		
R 27	- 60		15 K		
R 28	- 60		15 K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2 %	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± 1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15 K		
R 65	- 117		100 K	± 1%	
R 66	- 117		100 K	± 1%	
R 67	1010733 - 12		25 K	±.1%	1/10 W
R 68	1006750 - 56		10 K	±2 %	1/4 W
R 69	1006750 - 73		51 K		
R 70	1006750 - 75		62 K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 67		30 K	±2%	1/4 W
R 73	- 48		4700		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20 K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10 K		
R 82	- 49		5100		
R 83	- 74		56 K		
R 84	- 76		68 K		
R 85	- 63		20 K		
R 86	- 69		36 K		
R 87	- 32		1000		
R 88	- 76		68 K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10 K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	1 5 UF	±10%	20 VDC
C 3	- 33		1 5		
C 4	- 33		1 5		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		1 0		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	1006755 - 31		1 0		20
C R1	1010286 - 7	DIODE	IN963B		
C R2	1010286 - 7		IN963B		
C R3	1010286 - 7		IN963B		
C R4	1010385		IN660		
C R5					
C R6					
C R7					
C R8					
C R9					
C R10					
C R11					
C R12					
C R13					
C R14					
C R15	1010385		IN 660		
C R16	1010372-13				
C R18	1010385	DIODE	IN 660		
C R19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652		2N2980		
Q 27	1006752		2N 914		
Q 28	1010342		2N 998		
Q 29	1010652		2N2980		
Q 30	1006752		2N914		
Q 31	1010343-3				
Q 32	1010343-3				
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

2010030

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN A. Di Leo DATE 17 APR 64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

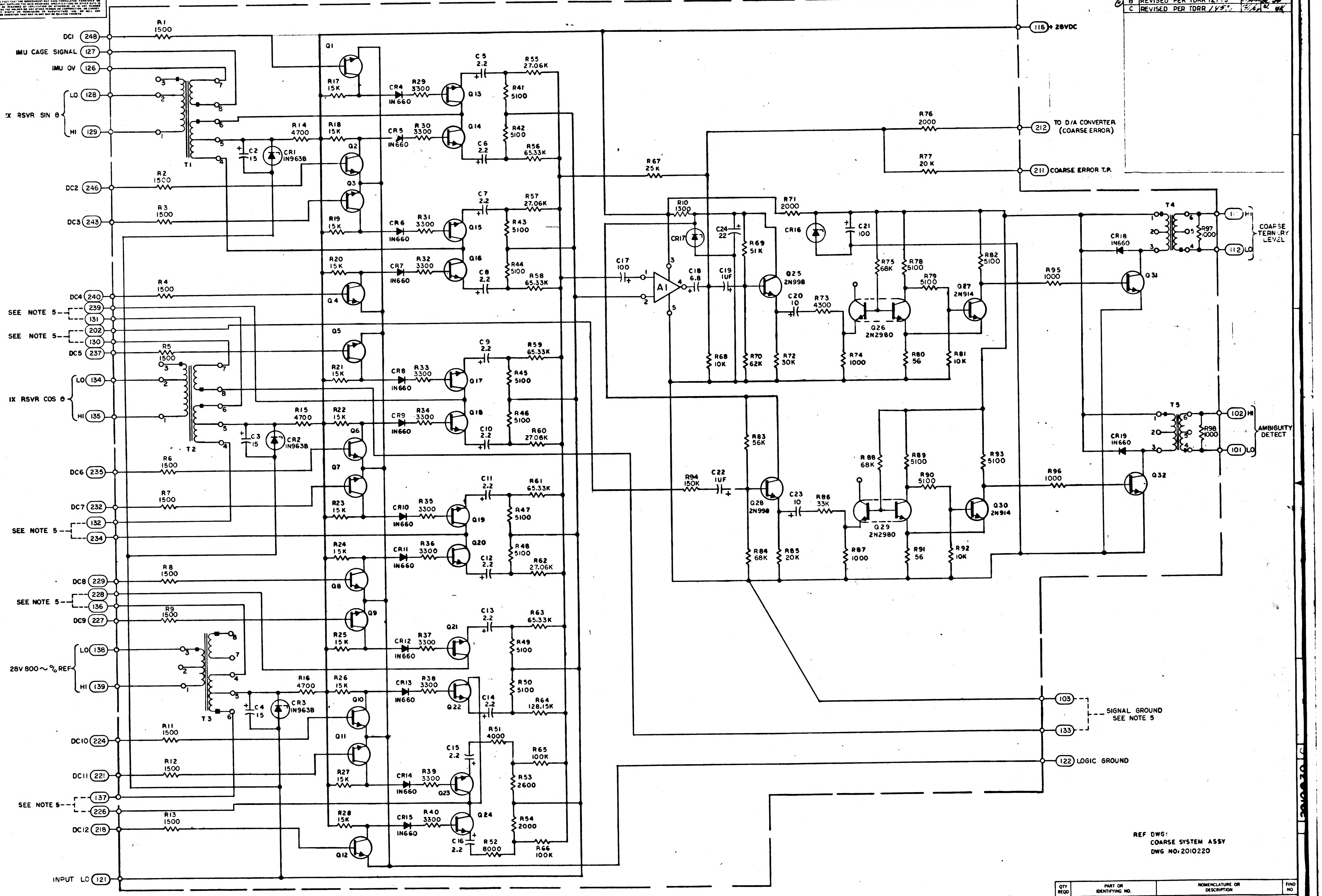
SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
C D U

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 09666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	[illegible]
B	REVISED PER TDRR 12775	[illegible]	[illegible]
C	REVISED PER TDRR 145[illegible]	[illegible]	[illegible]



6
5
4
3
2
1
DCI 248
IMU CAGE SIGNAL 127
IMU OV 126
LO 128
1X RSVR SIN θ
HI 129
DC2 246
DC3 243
DC4 240
SEE NOTE 5
239
131
202
130
DC5 237
LO 134
1X RSVR COS θ
HI 135
DC6 235
DC7 232
132
234
DC8 229
228
136
DC9 227
LO 138
28V 800~∿ REF
HI 139
DC10 224
DC11 221
137
226
DC12 218
INPUT LO 121
R1 1500
R2 1500
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R11 1500
R12 1500
R13 1500
T1
T2
T3
C2 15
CR1 1N963B
C3 15
CR2 1N963B
C4 15
CR3 1N963B
R14 4700
R15 4700
R16 4700
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14 1N660
CR15 1N660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R55 27.06K
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.06K
R61 65.33K
R62 27.06K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
116 +28VDC
R76 2000
212 TO D/A CONVERTER (COARSE ERROR)
R77 20K
211 COARSE ERROR T.P.
R67 25K
R10 1300
CR17
C24 22
R69 51K
R71 2000
CR16
C21 100
C17 100
A1
C18 6.8
C19 1UF
Q25 2N998
C20 10
R73 4300
R75 68K
R78 5100
R79 5100
Q26 2N2980
Q27 2N914
R82 5100
R68 10K
R70 62K
R72 30K
R74 1000
R80 56
R81 10K
R95 1000
Q31
T4
R97 1000
CR18 1N660
111 HI
112 LO
COARSE TERNARY LEVEL
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 33K
R88 68K
R89 5100
R90 5100
Q29 2N2980
Q30 2N914
R93 5100
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
R96 1000
Q32
T5
R98 1000
CR19 1N660
102 HI
101 LO
AMBIGUITY DETECT
103
133
SIGNAL GROUND SEE NOTE 5
122 LOGIC GROUND

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (239) TO (131); (202) TO (130); (234) TO (132); (228) TO (136); (226) TO (137); (103) TO (133).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. D. Leo DATE 17 APR 64
CHECKED CC I. F. Rabley [illegible] 64
APPROVAL R. Kowalski 2 June 64
APPROVAL [illegible] 2 Jun 64
NASA APPROVAL [illegible] 6/2/64
MIT APPROVAL W Kupfer 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 1 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 29666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	[illegible]	[illegible]
B	REVISED PER TDRR 12775	[illegible] SEP 64	[illegible]
C	REVISED PER TDRR 14591	12/1/64	WK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	- 36		1500		
R 3	- 36		1500		
R 4	- 36		1500		
R 5	- 36		1500		
R 6	- 36		1500		
R 7	- 36		1500		
R 8	- 36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1%	1 W
R 11	1006750 - 36		1500	±2%	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15 K		
R 18	- 60		15 K		
R 19	- 60		15 K		
R 20	- 60		15 K		
R 21	- 60		15 K		
R 22	- 60		15 K		
R 23	- 60		15 K		
R 24	- 60		15 K		
R 25	- 60		15 K		
R 26	- 60		15 K		
R 27	- 60		15 K		
R 28	- 60		15 K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2%	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± .1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15K		
R 65	-117		100K	± 1%	
R 66	-117		100K	± 1%	
R 67	1010733 - 12		25 K	±.1%	1/10 W
R 68	1006750 - 56		10 K	±2%	1/4 W
R 69	1006750 - 73		51 K		
R 70	1006750 - 75		62 K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 67		30 K	±2%	1/4 W
R 73	- 47		4300		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20 K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10 K		
R 82	- 49		5100		
R 83	- 74		56K		
R 84	- 76		68K		
R 85	- 63		20K		
R 86	- 68		33 K		
R 87	- 32		1000		
R 88	- 76		68K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	15 UF	±10%	20 VDC
C 3	- 33		15		
C 4	- 33		15		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		10		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		10		20
C 24	1006755 - 85		22		35
C R1	1010286 - 7	DIODE	IN963B		
C R2	1010286 - 7		IN963B		
C R3	1010286 - 7		IN963B		
C R4	1010385		IN660		
C R5					
C R6					
C R7					
C R8					
C R9					
C R10					
C R11					
C R12					
C R13					
C R14					
C R15	1010385		IN 660		
C R16	1010372-13				
C R17	1010286 - 9		IN965B		
C R18	1010385		IN 660		
C R19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652		2N2980		
Q 27	1006752		2N914		
Q 28	1010342		2N 998		
Q 29	1010652		2N2980		
Q 30	1006752		2N914		
Q 31	1010343-3				
Q 32	1010343-3				
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

2010030 C

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN A. Di Leo DATE 17 APR 64
CHECKED [illegible] 1 JUNE 64
APPROVAL [illegible] 2 JUNE 64
APPROVAL [illegible] Cushman 2 JUN 64
NASA APPROVAL [illegible] 6/7/64
MIT APPROVAL [illegible]

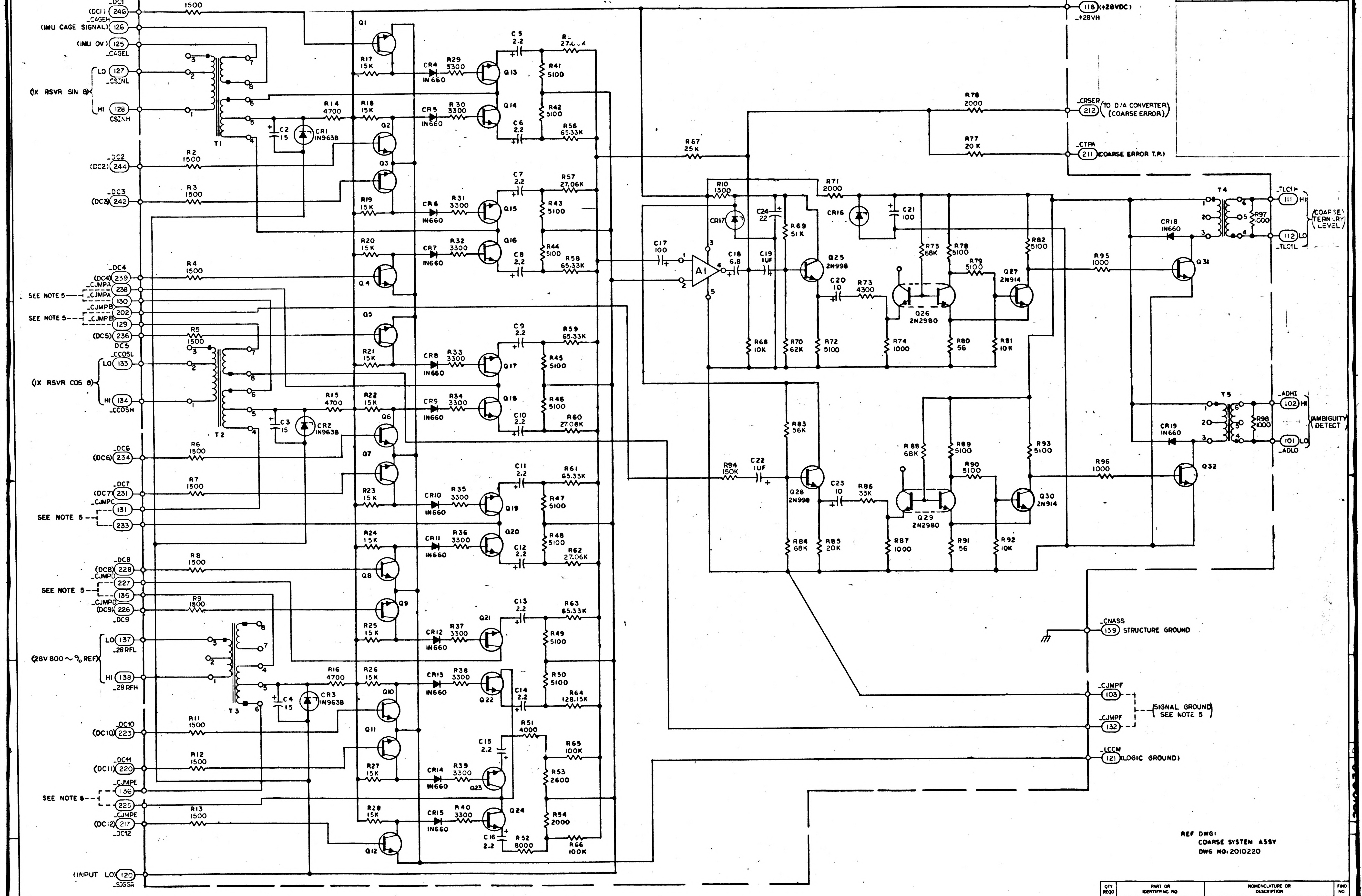
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 09666			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	
B	REVISED PER TDRR 12775	23 Sep 64	
C	REVISED PER TDRR 14591	12/1/64	
D	REVISED PER TDRR 15146	29 Dec '64	



_DC1
(DC1) 246
_CAGEH
(IMU CAGE SIGNAL) 126
(IMU OV) 125
_CAGEL
LO 127
_CSINL
(1X RSVR SIN θ)
HI 128
_CSINH
T1
_DC2
(DC2) 244
_DC3
(DC3) 242
_DC4
(DC4) 239
_CJMPA
238
SEE NOTE 5
130
_CJMPB
202
129
(DC5) 236
DC5
_CCOSL
LO 133
(1X RSVR COS θ)
HI 134
_CCOSH
T2
_DC6
(DC6) 234
_DC7
(DC7) 231
_CJMPC
131
233
_DC8
(DC8) 228
_CJMPD
227
135
(DC9) 226
_DC9
LO 137
_28RFL
(28V 800 ~ % REF)
HI 138
_28RFH
T3
_DC10
(DC10) 223
_DC11
(DC11) 220
_CJMPE
136
225
(DC12) 217
_DC12
(INPUT LO) 120
_SIGGR
R1 1500
R2 1500
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R11 1500
R12 1500
R13 1500
C2 15
CR1 IN963B
R14 4700
C3 15
CR2 IN963B
R15 4700
C4 15
CR3 IN963B
R16 4700
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9 IN660
CR10 IN660
CR11 IN660
CR12 IN660
CR13 IN660
CR14 IN660
CR15 IN660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.06K
R61 65.33K
R62 27.06K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
118 (+28VDC)
_+28VH
R76 2000
R77 20K
_CRSER
212 (TO D/A CONVERTER) (COARSE ERROR)
_CTPA
211 (COARSE ERROR T.P.)
R67 25K
R10 1300
CR17
C17 100
A1
C24 22
R69 51K
C18 6.8
C19 1UF
Q25 2N998
C20 10
R73 4300
R71 2000
CR16
C21 100
R75 68K
R78 5100
R79 5100
Q26 2N2980
Q27 2N914
R82 5100
R68 10K
R70 62K
R72 5100
R74 1000
R80 56
R81 10K
R95 1000
Q31
T4
CR18 IN660
R97 1000
_TLC1H
111 HI
(COARSE TERNARY LEVEL)
112 LO
_TLC1L
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 33K
R88 68K
R89 5100
R90 5100
Q29 2N2980
Q30 2N914
R93 5100
R96 1000
Q32
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
T5
CR19 IN660
R98 1000
_ADHI
102 HI
(AMBIGUITY DETECT)
101 LO
_ADLO
_CNASS
139 STRUCTURE GROUND
_CJMPF
103
(SIGNAL GROUND SEE NOTE 5)
_CJMPF
132
_LCCM
121 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (238) TO (130); (202) TO (129); (233) TO (131); (227) TO (135); (225) TO (136); (103) TO (132).

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN Q. DiLeo DATE 17 APR 64
CHECKED C.C. / F. T. Bradley 1 June 64
APPROVAL R. Kowalski 2 June 64
APPROVAL E.J. Cushman 2 June 64
NASA APPROVAL 6/2/64
MIT APPROVAL W. Kupfer 2 June 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO 2010030
SCALE — WT — SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 094666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/1/64	
B	REVISED PER TDRR 12775	29 SEP 64	
C	REVISED PER TDRR 14591	12/1/64	WK
D	REVISED PER TDRR 13146	23 Dec 64	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	- 36		1500		
R 3	- 36		1500		
R 4	- 36		1500		
R 5	- 36		1500		
R 6	- 36		1500		
R 7	- 36		1500		
R 8	- 36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1%	1 W
R 11	1006750 - 36		1500	±2%	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15 K		
R 18	- 60		15 K		
R 19	- 60		15 K		
R 20	- 60		15 K		
R 21	- 60		15 K		
R 22	- 60		15 K		
R 23	- 60		15 K		
R 24	- 60		15 K		
R 25	- 60		15 K		
R 26	- 60		15 K		
R 27	- 60		15 K		
R 28	- 60		15 K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2 %	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± .1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15K		
R 65	- 117		100K	± 1%	
R 66	- 117		100K	± 1%	
R 67	1010733 - 12		25 K	±.1%	1/10 W
R 68	1006750 - 56		10 K	±2 %	1/4 W
R 69	1006750 - 73		51 K		
R 70	1006750 - 75		62 K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 49		5100	±2%	1/4 W
R 73	- 47		4300		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20 K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10 K		
R 82	- 49		5100		
R 83	- 74		56K		
R 84	- 76		68K		
R 85	- 63		20K		
R 86	- 68		33 K		
R 87	- 32		1000		
R 88	- 76		68K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C2	1006755 - 33	CAPACITOR	15 UF	±10%	20VDC
C3	- 33		15		
C4	- 33		15		
C5	- 73		2.2		
C6	- 73		2.2		
C7	- 73		2.2		
C8	- 73		2.2		
C9	- 73		2.2		
C10	- 73		2.2		
C11	- 73		2.2		
C12	- 73		2.2		
C13	- 73		2.2		
C14	- 73		2.2		
C15	- 73		2.2		
C16	- 73		2.2		20
C17	- 14		100		10
C18	- 79		6.8		35
C19	- 69		1.0		35
C20	- 31		10		20
C21	- 14		100		10
C22	- 69		1.0		35
C23	- 31		10		20
C24	1006755 - 85		22		35
CR1	1010830 - 7	DIODE	IN963B		
CR2	1010830 - 7		IN963B		
CR3	1010830 - 7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN 660		
CR16	1010372-13				
CR17	1010830 - 9		IN965B		
CR18	1010385		IN660		
CR19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652		2N2980		
Q 27	1006752		2N914		
Q 28	1010342		2N998		
Q 29	1010652		2N2980		
Q 30	1006752		2N914		
Q 31	1010343-3				
Q 32	1010343-3				
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

2010030 D

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT

DRAWN A. Di Leo DATE 17 APR 64
CHECKED L. T. Batalay 1 JUNE 64
APPROVAL R M Kowalski 2 JUNE 64
APPROVAL D J Cushman 2 JUN 64
NASA APPROVAL 6/7/64
MIT APPROVAL

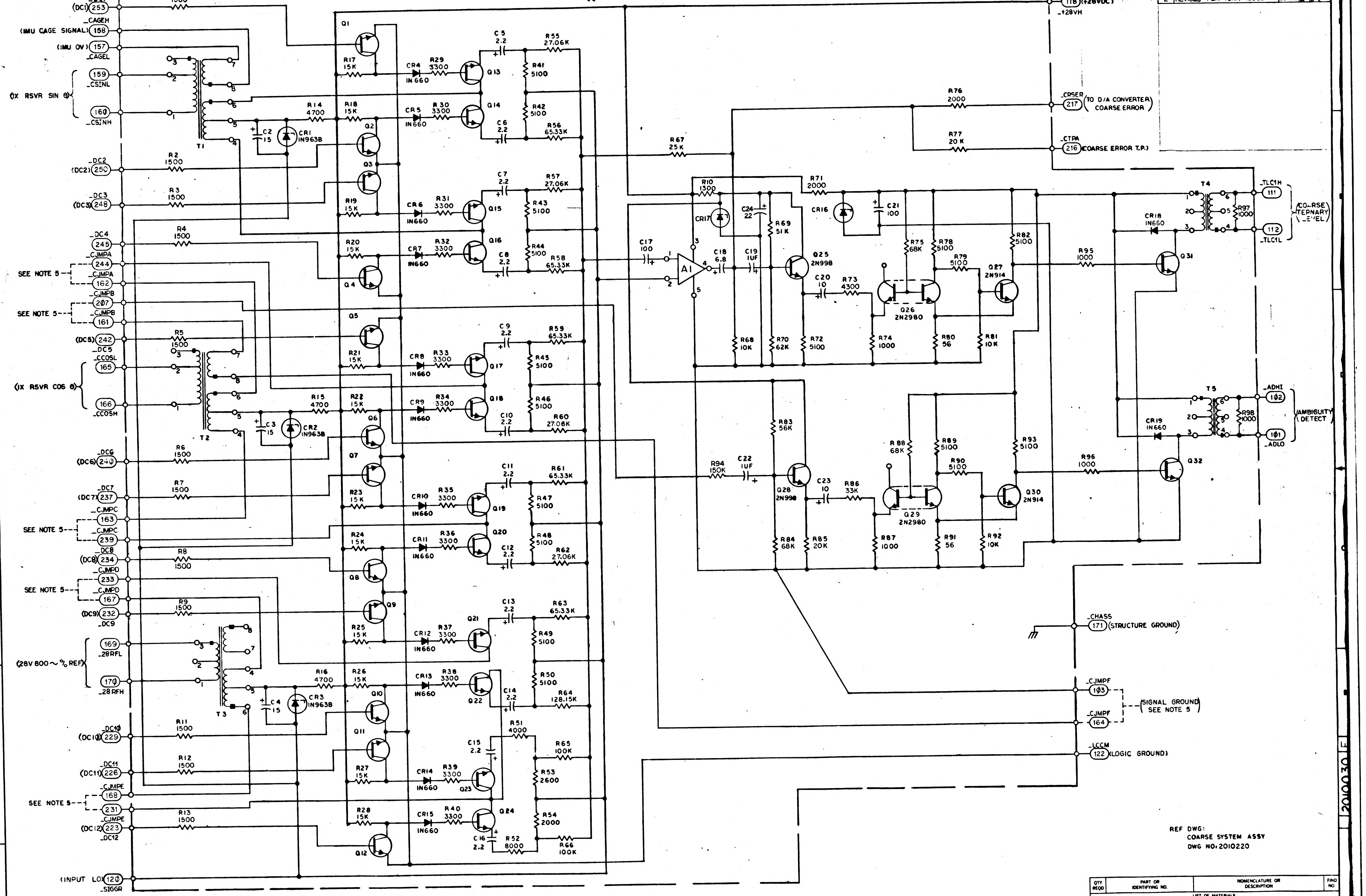
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 2 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 09666			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	
B	REVISED PER TDRR 12775	29 Sep 64	
C	REVISED PER TDRR 14591	12/ /64	
D	REVISED PER TDRR 1514E	29 Dec '64	
E	REVISED PER TDRR 15563	15 JAN 65	



_DC1 (DC1) 253
_CAGEH (IMU CAGE SIGNAL) 158
(IMU OV) 157
_CAGEL
159
_CSINL
(1X RSVR SIN θ)
160
_CSINH
T1
_DC2 (DC2) 250
_DC3 (DC3) 248
_DC4 245
_CJMPA 244
SEE NOTE 5
_CJMPA 162
_CJMPB 207
SEE NOTE 5
_CJMPB 161
(DC5) 242
_DC5
_CCOSL 165
(1X RSVR COS θ)
166
_CCOSH
T2
_DC6 (DC6) 240
_DC7 (DC7) 237
_CJMPC 163
SEE NOTE 5
_CJMPC 239
_DC8 (DC8) 234
_CJMPD 233
SEE NOTE 5
_CJMPD 167
(DC9) 232
_DC9
169
_28RFL
(28V 800 ~ % REF)
170
_28RFH
T3
_DC10 (DC10) 229
_DC11 (DC11) 226
_CJMPE 168
SEE NOTE 5
231
_CJMPE
(DC12) 223
_DC12
(INPUT LO) 120
_SIGGR
R1 1500
R2 1500
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R11 1500
R12 1500
R13 1500
C2 15
CR1 1N963B
C3 15
CR2 1N963B
C4 15
CR3 1N963B
R14 4700
R15 4700
R16 4700
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14 1N660
CR15 1N660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R55 27.06K
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.06K
R61 65.33K
R62 27.06K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
118 (+28VDC)
_+28VH
R76 2000
_CRSER 217 (TO D/A CONVERTER) COARSE ERROR
R77 20K
_CTPA 216 (COARSE ERROR T.P.)
R67 25K
R10 1300
CR17
C24 22
R71 2000
CR16
C21 100
C17 100
A1
C18 6.8
C19 1UF
R69 51K
Q25 2N998
C20 10
R73 4300
Q26 2N2980
R75 68K
R78 5100
R79 5100
Q27 2N914
R82 5100
R68 10K
R70 62K
R72 5100
R74 1000
R80 56
R81 10K
R95 1000
Q31
CR18 1N660
T4
R97 1000
_TLC1H 111
112
_TLC1L
(CO-RSE TERNARY LEVEL)
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 33K
Q29 2N2980
R88 68K
R89 5100
R90 5100
R93 5100
Q30 2N914
R96 1000
Q32
CR19 1N660
T5
R98 1000
_ADHI 102
101
_ADLO
(AMBIGUITY DETECT)
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103
(SIGNAL GROUND SEE NOTE 5)
_CJMPF 164
_LCCM 122 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. D. Leo DATE 17 APR 64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO 2010030
SCALE —
WT —
SHEET 1 OF 2

2010030 E

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 34666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/1/64	SW
B	REVISED PER TDRR 12775	29 SEP 64	SW
C	REVISED PER TDRR 14591	11/1/64	WK
D	REVISED PER TDRR 15146	5 Dec 64	
E	REVISED PER TDRR 15563	05 JAN 65	WK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	- 36		1500		
R 3	- 36		1500		
R 4	- 36		1500		
R 5	- 36		1500		
R 6	- 36		1500		
R 7	- 36		1500		
R 8	- 36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1%	1 W
R 11	1006750 - 36		1500	±2%	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15K		
R 18	- 60		15K		
R 19	- 60		15K		
R 20	- 60		15K		
R 21	- 60		15K		
R 22	- 60		15K		
R 23	- 60		15K		
R 24	- 60		15K		
R 25	- 60		15K		
R 26	- 60		15K		
R 27	- 60		15K		
R 28	- 60		15K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2%	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	±.1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15K		
R 65	- 117		100K	± 1%	
R 66	- 117		100K	± 1%	
R 67	1010733 - 12		25K	±.1%	1/10 W
R 68	1006750 - 56		10K	±2%	1/4 W
R 69	1006750 - 73		51K		
R 70	1006750 - 75		62K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 49		5100	±2%	1/4 W
R 73	- 47		4300		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10K		
R 82	- 49		5100		
R 83	- 74		56K		
R 84	- 76		68K		
R 85	- 63		20K		
R 86	- 68		33K		
R 87	- 32		1000		
R 88	- 76		68K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	15 UF	±10%	20 VDC
C 3	- 33		15		
C 4	- 33		15		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		10		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		10		20
C 24	1006755 - 85		22		35
CR1	1010830 - 7	DIODE	IN963B		
CR2	1010830 - 7		IN963B		
CR3	1010830 - 7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN660		
CR16	1010372-13				
CR17	1010830 - 9		IN965B		
CR18	1010385		IN660		
CR19	1010385	DIODE	IN660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652		2N2980		
Q 27	1006752		2N914		
Q 28	1010342		2N998		
Q 29	1010652		2N2980		
Q 30	1006752		2N914		
Q 31	1010343-3				
Q 32	1010343-3				
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. Di Leo DATE 17 APR 64
CHECKED C. L. T. Baker 1 JUNE 64
APPROVAL R M Kowalski 2 JUNE 64
APPROVAL A J. Cushman 2 JUN 64
NASA APPROVAL 6/5/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

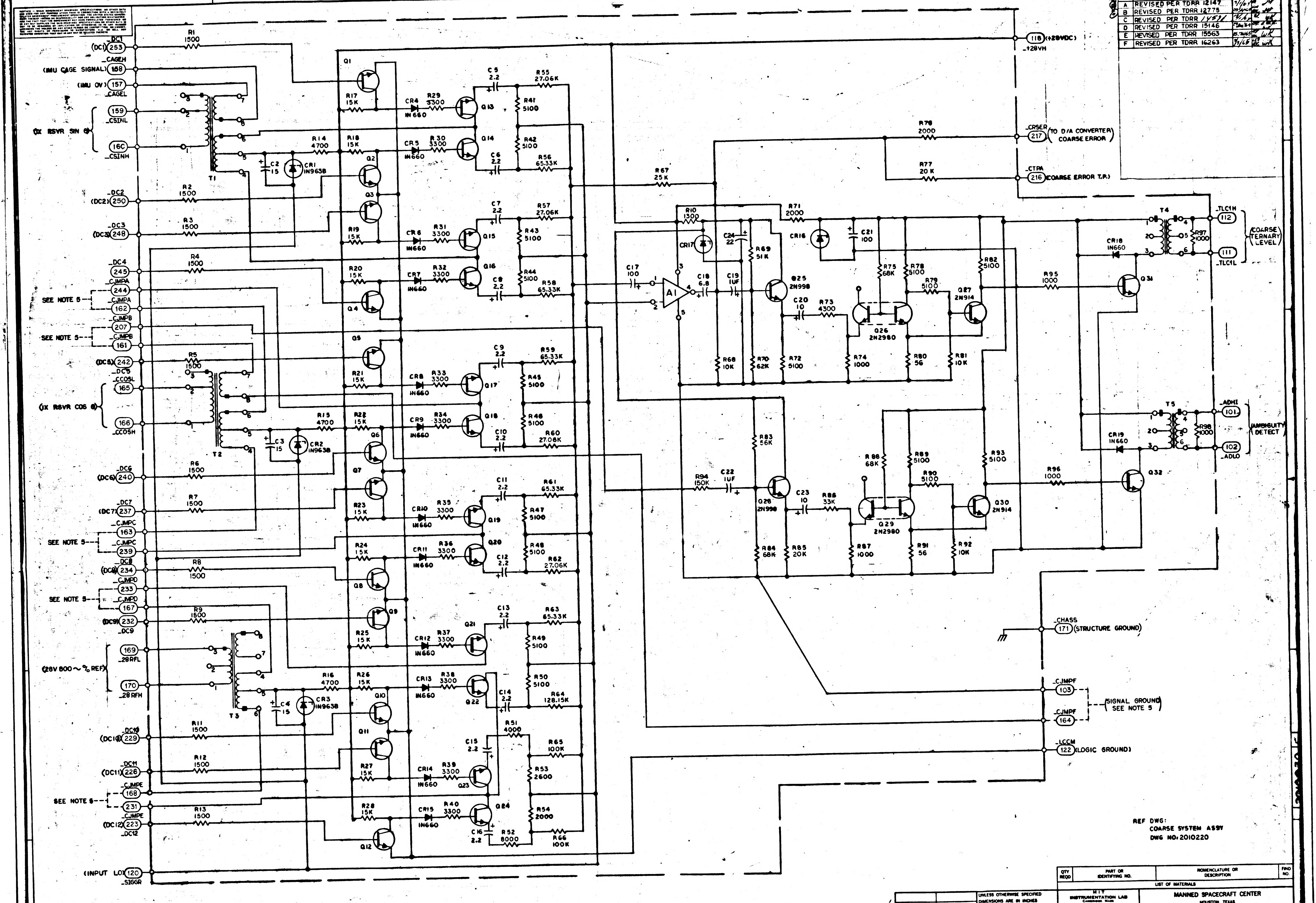
CODE IDENT NO. —
SIZE E
NASA DRAWING NO 2010030
SCALE — WT — SHEET 2 OF 2

2010030 E

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 096666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	[illegible]
B	REVISED PER TDRR 12775	29 Sep 64	[illegible]
C	REVISED PER TDRR 14591	11/1/64	WK
D	REVISED PER TDRR 15146	29 Dec 64	[illegible]
E	REVISED PER TDRR 15563	25 Jan 65	WK
F	REVISED PER TDRR 16263	7/7/65	WK



(DC1) 253 _DC1
(IMU CAGE SIGNAL) 158 _CAGEH
(IMU OV) 157 _CAGEL
(1X RSVR SIN θ) 159 _CSINL 160 _CSINH
T1
(DC2) 250 _DC2
(DC3) 248 _DC3
245 _DC4
SEE NOTE 5 244 _CJMPA 162 _CJMPA
SEE NOTE 5 207 _CJMPB 161 _CJMPB
(DC5) 242 _DC5
(1X RSVR COS θ) 165 _CCOSL 166 _CCOSH
T2
(DC6) 240 _DC6
(DC7) 237 _DC7
SEE NOTE 5 163 _CJMPC 239 _CJMPC
(DC8) 234 _DC8
SEE NOTE 5 233 _CJMPD 167 _CJMPD
(DC9) 232 _DC9
(28V 800~% REF) 169 _28RFL 170 _28RFH
T3
(DC10) 229 _DC10
(DC11) 226 _DC11
SEE NOTE 5 168 _CJMPE 231
(DC12) 223 _DC12 _CJMPE
(INPUT LO) 120 _SIGGR
R1 1500
R2 1500
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R11 1500
R12 1500
R13 1500
R14 4700
R15 4700
R16 4700
C2 15 CR1 1N963B
C3 15 CR2 1N963B
C4 15 CR3 1N963B
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
R17 15K R18 15K R19 15K R20 15K R21 15K R22 15K R23 15K R24 15K R25 15K R26 15K R27 15K R28 15K
CR4 1N660 CR5 1N660 CR6 1N660 CR7 1N660 CR8 1N660 CR9 1N660 CR10 1N660 CR11 1N660 CR12 1N660 CR13 1N660 CR14 1N660 CR15 1N660
R29 3300 R30 3300 R31 3300 R32 3300 R33 3300 R34 3300 R35 3300 R36 3300 R37 3300 R38 3300 R39 3300 R40 3300
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24
C5 2.2 C6 2.2 C7 2.2 C8 2.2 C9 2.2 C10 2.2 C11 2.2 C12 2.2 C13 2.2 C14 2.2 C15 2.2 C16 2.2
R41 5100 R42 5100 R43 5100 R44 5100 R45 5100 R46 5100 R47 5100 R48 5100 R49 5100 R50 5100
R51 4000 R52 8000 R53 2600 R54 2000
R55 27.06K R56 65.33K R57 27.06K R58 65.33K R59 65.33K R60 27.06K R61 65.33K R62 27.06K R63 65.33K R64 128.15K R65 100K R66 100K
118 (+28VDC) _+28VH
R76 2000 R77 20K
_CRSER 217 (TO D/A CONVERTER COARSE ERROR)
_CTPA 216 (COARSE ERROR T.P.)
R67 25K
R10 1300 CR17 C24 22 R69 51K
R71 2000 CR16 C21 100
C17 100 A1 C18 6.8 C19 1UF
Q25 2N998 C20 10 R73 4300 Q26 2N2980 R75 68K R78 5100 R79 5100 Q27 2N914 R82 5100
R68 10K R70 62K R72 5100 R74 1000 R80 56 R81 10K
R95 1000 Q31 CR18 1N660 T4 R97 1000
_TLC1H 112 _TLC1L 111 (COARSE TERNARY LEVEL)
R83 56K R94 150K C22 1UF Q28 2N998 C23 10 R86 33K R88 68K R89 5100 R90 5100 Q29 2N2980 Q30 2N914 R93 5100
R84 68K R85 20K R87 1000 R91 56 R92 10K
R96 1000 Q32 CR19 1N660 T5 R98 1000
_ADHI 101 _ADLO 102 (AMBIGUITY DETECT)
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103 _CJMPF 164 (SIGNAL GROUND SEE NOTE 5)
_LCCM 122 (LOGIC GROUND)
6 5 4 3 2 1

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. D. Leo DATE 17 APR 64
CHECKED C.C. L. J. Bailey [illegible] 64
APPROVAL [illegible]
APPROVAL [illegible] 2 Jun 64
NASA APPROVAL [illegible] 6/2/64
MIT APPROVAL [illegible] 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS [illegible]

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	[illegible]	[illegible]
B	REVISED PER TDRR 12775	[illegible]	[illegible]
C	REVISED PER TDRR 14591	[illegible]	WK
D	REVISED PER TDRR 15146	[illegible]	[illegible]
E	REVISED PER TDRR 15563	[illegible]	WK
F	REVISED PER TDRR 16263	/65	WK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 -36	RESISTOR	1500	±2 %	1/4 W
R 2	-36		1500		
R 3	-36		1500		
R 4	-36		1500		
R 5	-36		1500		
R 6	-36		1500		
R 7	-36		1500		
R 8	-36		1500		
R 9	1006750 -36		1500		
R 10	1010604 -47		1300	±1%	1 W
R 11	1006750 -36		1500	±2%	1/4 W
R 12	-36		1500		
R 13	-36		1500		
R 14	-48		4700		
R 15	-48		4700		
R 16	-48		4700		
R 17	-60		15K		
R 18	-60		15K		
R 19	-60		15K		
R 20	-60		15K		
R 21	-60		15K		
R 22	-60		15K		
R 23	-60		15K		
R 24	-60		15K		
R 25	-60		15K		
R 26	-60		15K		
R 27	-60		15K		
R 28	-60		15K		
R 29	-44		3300		
R 30	-44		3300		
R 31	-44		3300		
R 32	-44		3300		
R 33	-44		3300		
R 34	-44		3300		
R 35	-44		3300		
R 36	-44		3300		
R 37	-44		3300		
R 38	-44		3300		
R 39	-44		3300		
R 40	-44		3300		
R 41	-49		5100		
R 42	-49		5100		
R 43	-49		5100		
R 44	-49		5100		
R 45	-49		5100		
R 46	-49		5100		
R 47	-49		5100		
R 48	-49		5100		
R 49	-49		5100		
R 50	1006750 -49		5100	±2 %	1/4 W
R 51	1010733 -103		4000	± 1%	1/10 W
R 52	-104		8000		
R 53	-102		2600		
R 54	-101		2000		
R 55	-8		27.06K	±.1%	
R 56	-10		65.33K		
R 57	-8		27.06K		
R 58	-10		65.33K		
R 59	-10		65.33K		
R 60	-8		27.06K		
R 61	-10		65.33K		
R 62	-8		27.06K		
R 63	-10		65.33K		
R 64	-17		128.15K		
R 65	-117		100K	± 1%	
R 66	-117		100K	± 1%	
R 67	1010733 -12		25K	±.1%	1/10 W
R 68	1006750 -56		10K	±2 %	1/4 W
R 69	1006750 -73		51K		
R 70	1006750 -75		62K		
R 71	1010604 -39		2000	±1%	1 W
R 72	1006750 -49		5100	±2%	1/4 W
R 73	-47		4300		
R 74	-32		1000		
R 75	-76		68 K		
R 76	-39		2000		
R 77	-63		20K		
R 78	-49		5100		
R 79	-49		5100		
R 80	-2		56		
R 81	-56		10K		
R 82	-49		5100		
R 83	-74		56K		
R 84	-76		68K		
R 85	-63		20K		
R 86	-68		33 K		
R 87	-32		1000		
R 88	-76		68K		
R 89	-49		5100		
R 90	-49		5100		
R 91	-2		56		
R 92	-56		10K		
R 93	-49		5100		
R 94	-84		150 K		
R 95	-32		1000		
R 96	-32		1000		
R 97	-32		1000		
R 98	1006750 -32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C2	1006755 -33	CAPACITOR	15 UF	±10%	20VDC
C3	-33		15		
C4	-33		15		
C5	-73		2.2		
C6	-73		2.2		
C7	-73		2.2		
C8	-73		2.2		
C9	-73		2.2		
C10	-73		2.2		
C11	-73		2.2		
C12	-73		2.2		
C13	-73		2.2		
C14	-73		2.2		
C15	-73		2.2		
C16	-73		2.2		20
C17	-14		100		10
C18	-79		6.8		35
C19	-69		1.0		35
C20	-31		10		20
C21	-14		100		10
C22	-69		1.0		35
C23	-31		10		20
C24	1006755 -85		22		35
CR1	1010830 -7	DIODE	IN963B		
CR2	1010830 -7		IN963B		
CR3	1010830 -7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN660		
CR16	1010 72-13				
CR17	1010830 -9		IN965B		
CR18	1010385		IN660		
CR19	1010385	DIODE	IN660		
Q1	1010343 -3	TRANSISTOR			
Q2	-				
Q3	-				
Q4	-				
Q5	-				
Q6	-				
Q7	-				
Q8	-				
Q9	-				
Q10	-				
Q11	-				
Q12	-				
Q13	-				
Q14	-				
Q15	-				
Q16	-				
Q17	-				
Q18	-				
Q19	-				
Q20	-				
Q21	-				
Q22	-				
Q23	-				
Q24	1010343 -3				
Q25	1010342		2N998		
Q26	1010652		2N2980		
Q27	1006752		2N914		
Q28	1010342		2N998		
Q29	1010652		2N2980		
Q30	1006752		2N914		
Q31	1010343-3				
Q32	1010343-3				
A1	SEE NOTE 4	AMPLIFIER			
T1	1010725	TRANSFORMER			
T2	1010725				
T3	1010725				
T4	1010274				
T5	1010274				

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT

DRAWN A. Di Leo DATE 17 APR 64
CHECKED [illegible] 1 JUNE 64
APPROVAL [illegible] 2 JUNE 64
APPROVAL A. J. Cushman 2 Jun 64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 2 OF [illegible]

2010030 F

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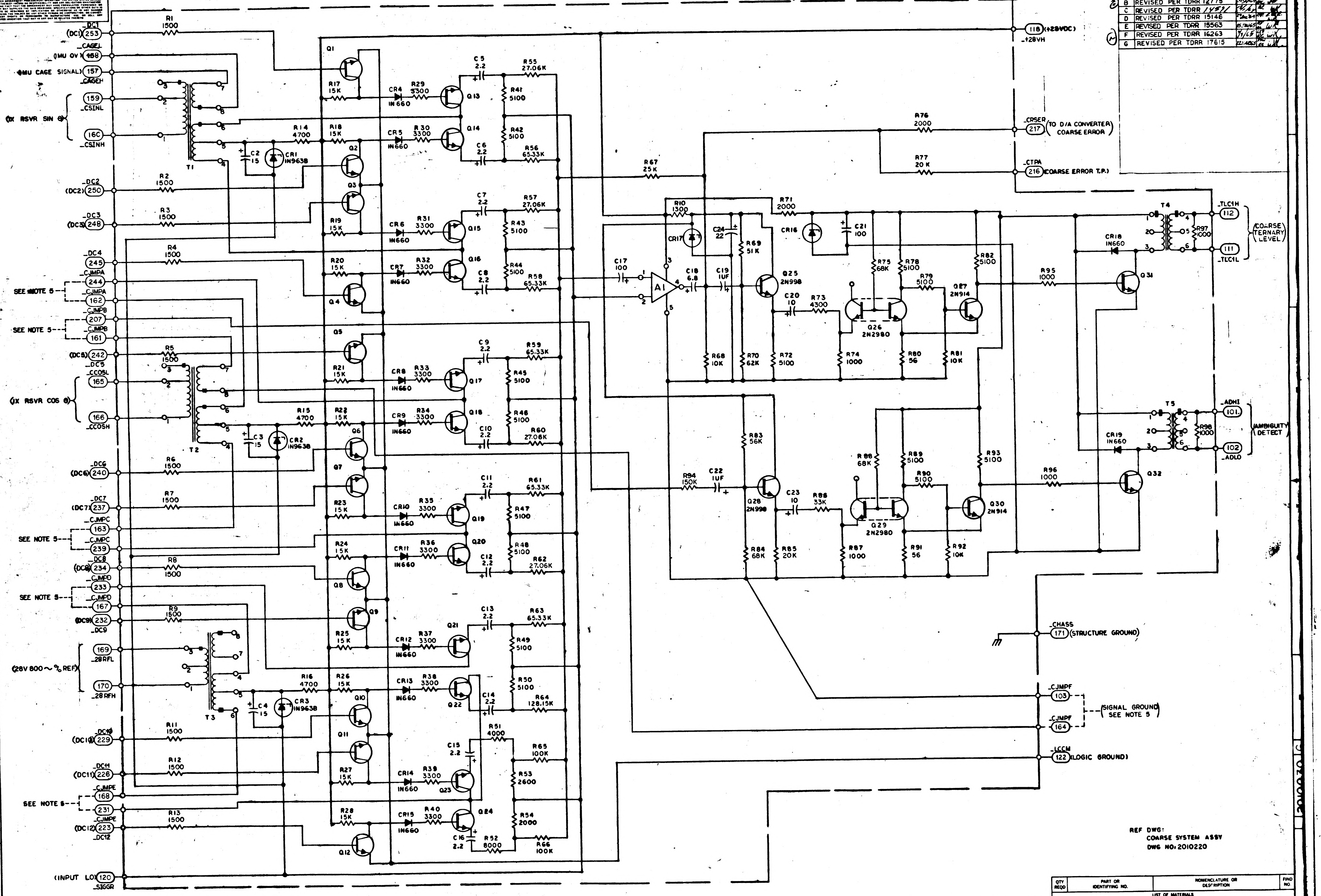
REVISIONS 0 96666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	JW
B	REVISED PER TDRR 12775	29 Sep 64	JW
C	REVISED PER TDRR 14591	12/1/64	WK
D	REVISED PER TDRR 15146	29 Dec 64	WK
E	REVISED PER TDRR 15563	25 JAN 65	WK
F	REVISED PER TDRR 16263	7/7/65	WK
G	REVISED PER TDRR 17615	22 AUG 65	WK



6
5
4
3
2
1
(DC1) 253 _DC1
R1 1500
(IMU OV) 158 _CAGEL
(IMU CAGE SIGNAL) 157 _CAGEH
(1X RSVR SIN θ) 159 _CSINL 160 _CSINH
T1
Q1
R17 15K
CR4 IN660
R29 3300
Q13
C5 2.2
R55 27.06K
R41 5100
R14 4700
R18 15K
CR5 IN660
R30 3300
Q14
R42 5100
C6 2.2
R56 65.33K
C2 15
CR1 IN963B
Q2
Q3
(DC2) 250 _DC2
R2 1500
(DC3) 248 _DC3
R3 1500
R19 15K
CR6 IN660
R31 3300
Q15
C7 2.2
R57 27.06K
R43 5100
(DC4) 245 _DC4
R4 1500
R20 15K
CR7 IN660
R32 3300
Q16
R44 5100
C8 2.2
R58 65.33K
Q4
SEE NOTE 5 244 _CJMPA 162 _CJMPA
SEE NOTE 5 207 _CJMPB 161 _CJMPB
(DC5) 242 _DC5
R5 1500
Q5
(1X RSVR COS θ) 165 _CCOSL 166 _CCOSH
T2
R21 15K
CR8 IN660
R33 3300
Q17
C9 2.2
R59 65.33K
R45 5100
R15 4700
R22 15K
CR9 IN660
R34 3300
Q18
R46 5100
C10 2.2
R60 27.06K
C3 15
CR2 IN963B
Q6
(DC6) 240 _DC6
R6 1500
Q7
(DC7) 237 _DC7
R7 1500
R23 15K
CR10 IN660
R35 3300
Q19
C11 2.2
R61 65.33K
R47 5100
SEE NOTE 5 163 _CJMPC 239 _CJMPC
R24 15K
CR11 IN660
R36 3300
Q20
R48 5100
C12 2.2
R62 27.06K
(DC8) 234 _DC8
R8 1500
SEE NOTE 5 233 _CJMPD 167 _CJMPD
Q8
Q9
(DC9) 232 _DC9
R9 1500
(28V 800~ ⁰/₀ REF) 169 _28RFL 170 _28RFH
T3
R25 15K
CR12 IN660
R37 3300
Q21
C13 2.2
R63 65.33K
R49 5100
R16 4700
R26 15K
CR13 IN660
R38 3300
Q22
R50 5100
C14 2.2
R64 128.15K
C4 15
CR3 IN963B
Q10
Q11
(DC10) 229 _DC10
R11 1500
(DC11) 226 _DC11
R12 1500
R27 15K
CR14 IN660
R39 3300
Q23
C15 2.2
R51 4000
R65 100K
R53 2600
SEE NOTE 5 168 _CJMPE 231 _CJMPE
(DC12) 223 _DC12
R13 1500
R28 15K
CR15 IN660
R40 3300
Q24
R54 2000
C16 2.2
R52 8000
R66 100K
Q12
(INPUT LO) 120 _SIGGR
118 (+28VDC) _+28VH
R76 2000
_CRSER 217 (TO D/A CONVERTER COARSE ERROR)
R77 20K
_CTPA 216 (COARSE ERROR T.P.)
R67 25K
R10 1300
R71 2000
CR17
C24 22
CR16
C21 100
C17 100
A1
C18 6.8
C19 1UF
R69 51K
Q25 2N998
C20 10
R73 4300
R75 68K
R78 5100
R79 5100
Q26 2N2980
Q27 2N914
R82 5100
R95 1000
Q31
T4
CR18 IN660
R97 1000
_TLC1H 112
111 _TLC1L
(COARSE TERNARY LEVEL)
R68 10K
R70 62K
R72 5100
R74 1000
R80 56
R81 10K
T5
CR19 IN660
R98 1000
_ADHI 101
102 _ADLO
(AMBIGUITY DETECT)
R83 56K
R88 68K
R89 5100
R90 5100
R93 5100
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 33K
Q29 2N2980
Q30 2N914
R96 1000
Q32
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103
_CJMPF 164
(SIGNAL GROUND SEE NOTE 5)
_LCCM 122 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. D. Leo DATE 17 APR 64
CHECKED L. J. Bakeley 64
APPROVAL
APPROVAL 3 Jun '64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 3/16/66

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	[illegible]	[illegible]
B	REVISED PER TDRR 12775	29 SEP 64	[illegible]
C	REVISED PER TDRR 14571	[illegible]	WK
D	REVISED PER TDRR 15146	[illegible]	[illegible]
E	REVISED PER TDRR 15563	25 JAN 65	WK
F	REVISED PER TDRR 16263	[illegible]/65	WK.
G	REVISED. PER TDRR 176'5	[illegible]	[illegible]

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	-36		1500		
R 3	-36		1500		
R 4	-36		1500		
R 5	-36		1500		
R 6	-36		1500		
R 7	-36		1500		
R 8	-36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1%	1 W
R 11	1006750 - 36		1500	±2%	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15K		
R 18	- 60		15K		
R 19	- 60		15K		
R 20	- 60		15K		
R 21	- 60		15K		
R 22	- 60		15K		
R 23	- 60		15K		
R 24	- 60		15K		
R 25	- 60		15K		
R 26	- 60		15K		
R 27	- 60		15K		
R 28	- 60		15K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2%	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	±.1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15K		
R 65	-117		100K	± 1%	
R 66	-117		100K	± 1%	
R 67	1010733 - 12		25K	±.1%	1/10 W
R 68	1006750 - 56		10K	±2%	1/4 W
R 69	1006750 - 73		51K		
R 70	1006750 - 75		62K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 49		5100	±2%	1/4 W
R 73	- 47		4300		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10K		
R 82	- 49		5100		
R 83	- 74		56K		
R 84	- 76		68K		
R 85	- 63		20K		
R 86	- 68		33K		
R 87	- 32		1000		
R 88	- 76		68K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	15 UF	±10%	20VDC
C 3	- 33		15		
C 4	- 33		15		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		10		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		10		20
C 24	1006755 - 85		22		35
CR 1	1010830 - 7	DIODE	IN963B		
CR 2	1010830 - 7		IN963B		
CR 3	1010830 - 7		IN963B		
CR 4	1010385		IN660		
CR 5					
CR 6					
CR 7					
CR 8					
CR 9					
CR 10					
CR 11					
CR 12					
CR 13					
CR 14					
CR 15	1010385		IN 660		
CR 16	1010372-13				
CR 17	1010830 - 9		IN965B		
CR 18	1010385		IN 660		
CR 19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652		2N2980		
Q 27	1006752		2N914		
Q 28	1010342		2N 998		
Q 29	1010652		2N2980		
Q 30	1006752		2N914		
Q 31	1010343-3				
Q 32	1010343-3				
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

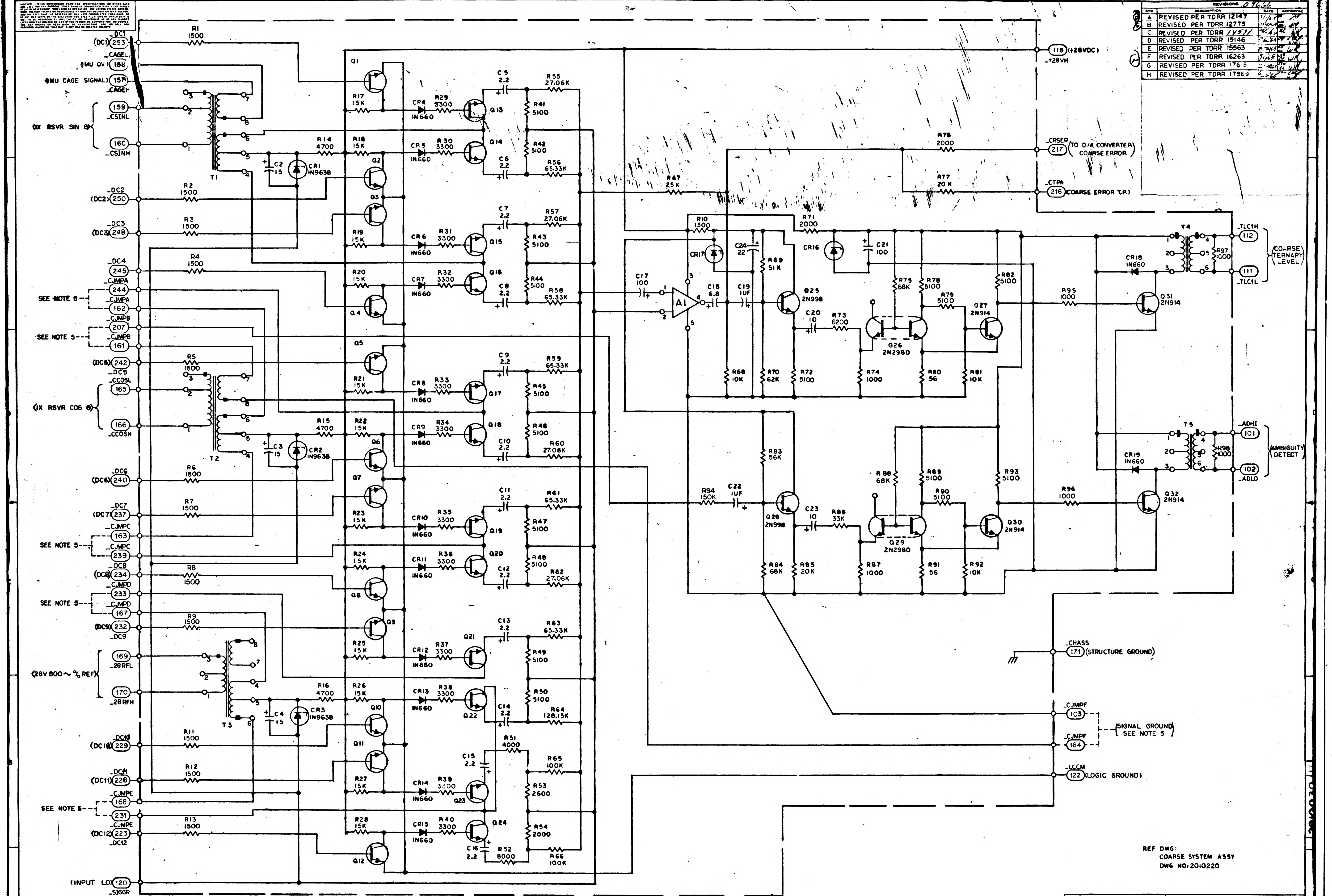
DRAWN A. Di Leo DATE 17 APR 64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible] 2 Jun 64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

SCHEMATIC, COARSE SYSTEM ELECTRONICS CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET [illegible] OF [illegible]

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	[illegible]
B	REVISED PER TDRR 12775	[illegible]	[illegible]
C	REVISED PER TDRR 14591	[illegible]	[illegible]
D	REVISED PER TDRR 15146	[illegible]	[illegible]
E	REVISED PER TDRR 15563	[illegible]	WK
F	REVISED PER TDRR 16263	7/1/65	WK
G	REVISED PER TDRR 176 5	[illegible]	WK
H	REVISED PER TDRR 17969	6-2-66	[illegible]

REVISIONS 0 96 66


(DC1) 253 _DC1
(IMU OV) 158 _CAGEL
(IMU CAGE SIGNAL) 157 _CAGEH
(1X RSVR SIN θ) 159 _CSINL 16C _CSINH
(DC2) 250 _DC2
(DC3) 248 _DC3
(DC4) 245 _DC4
SEE NOTE 5 244 _CJMPA 162 _CJMPA
SEE NOTE 5 207 _CJMPB 161 _CJMPB
(DC5) 242 _DC5
(1X RSVR COS θ) 165 _CCOSL 166 _CCOSH
(DC6) 240 _DC6
(DC7) 237 _DC7
SEE NOTE 5 163 _CJMPC 239 _CJMPC
(DC8) 234 _DC8
SEE NOTE 5 233 _CJMPD 167 _CJMPD
(DC9) 232 _DC9
(28V 800 ~ % REF) 169 _28RFL 170 _28RFH
(DC10) 229 _DC10
(DC11) 226 _DC11
SEE NOTE 5 168 _CJMPE 231 _CJMPE
(DC12) 223 _DC12
(INPUT LO) 120 _SIGGR
T1 T2 T3 T4 T5
R1 1500 R2 1500 R3 1500 R4 1500 R5 1500 R6 1500 R7 1500 R8 1500 R9 1500 R11 1500 R12 1500 R13 1500
R14 4700 R15 4700 R16 4700
C2 15 C3 15 C4 15
CR1 1N963B CR2 1N963B CR3 1N963B
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
R17 15K R18 15K R19 15K R20 15K R21 15K R22 15K R23 15K R24 15K R25 15K R26 15K R27 15K R28 15K
CR4 1N660 CR5 1N660 CR6 1N660 CR7 1N660 CR8 1N660 CR9 1N660 CR10 1N660 CR11 1N660 CR12 1N660 CR13 1N660 CR14 1N660 CR15 1N660
R29 3300 R30 3300 R31 3300 R32 3300 R33 3300 R34 3300 R35 3300 R36 3300 R37 3300 R38 3300 R39 3300 R40 3300
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24
C5 2.2 C6 2.2 C7 2.2 C8 2.2 C9 2.2 C10 2.2 C11 2.2 C12 2.2 C13 2.2 C14 2.2 C15 2.2 C16 2.2
R41 5100 R42 5100 R43 5100 R44 5100 R45 5100 R46 5100 R47 5100 R48 5100 R49 5100 R50 5100
R51 4000 R52 8000 R53 2600 R54 2000
R55 27.06K R56 65.33K R57 27.06K R58 65.33K R59 65.33K R60 27.06K R61 65.33K R62 27.06K R63 65.33K R64 128.15K R65 100K R66 100K
118 (+28VDC) _+28VH
_CRSER 217 (TO D/A CONVERTER COARSE ERROR)
_CTPA 216 (COARSE ERROR T.P.)
R76 2000 R77 20K R67 25K
R10 1300 R71 2000
CR17 CR16
C24 22 C21 100
C17 100 A1 C18 6.8 C19 1UF
R69 51K Q25 2N998
C20 10 R73 6200
R75 68K R78 5100 R79 5100 Q26 2N2980 Q27 2N914
R82 5100 R95 1000 Q31 2N914
R68 10K R70 62K R72 5100 R74 1000 R80 56 R81 10K
CR18 1N660 CR19 1N660
R97 1000 R98 1000
_TLC1H 112 111 _TLC1L (COARSE TERNARY LEVEL)
_ADHI 101 102 _ADLO (AMBIGUITY DETECT)
R83 56K R94 150K C22 1UF Q28 2N998
C23 10 R86 33K
R88 68K R89 5100 R90 5100 Q29 2N2980 Q30 2N914
R93 5100 R96 1000 Q32 2N914
R84 68K R85 20K R87 1000 R91 56 R92 10K
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103 _CJMPF 164 (SIGNAL GROUND SEE NOTE 5)
_LCCM 122 (LOGIC GROUND)
6 5 4 3 2 1

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN A. D. Leo DATE 11 APR 64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010030
SCALE — WT — SHEET 1 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-36	RESISTOR	1500	±2%	1/4 W
R2	-36		1500		
R3	-36		1500		
R4	-36		1500		
R5	-36		1500		
R6	-36		1500		
R7	-36		1500		
R8	-36		1500		
R9	1006750-36		1500		
R10	1010604-47		1300	±1%	1W
R11	1006750-36		1500	±2%	1/4 W
R12	-36		1500		
R13	-36		1500		
R14	-48		4700		
R15	-48		4700		
R16	-48		4700		
R17	-60		15K		
R18	-60		15K		
R19	-60		15K		
R20	-60		15K		
R21	-60		15K		
R22	-60		15K		
R23	-60		15K		
R24	-60		15K		
R25	-60		15K		
R26	-60		15K		
R27	-60		15K		
R28	-60		15K		
R29	-44		3300		
R30	-44		3300		
R31	-44		3300		
R32	-44		3300		
R33	-44		3300		
R34	-44		3300		
R35	-44		3300		
R36	-44		3300		
R37	-44		3300		
R38	-44		3300		
R39	-44		3300		
R40	-44		3300		
R41	-49		5100		
R42	-49		5100		
R43	-49		5100		
R44	-49		5100		
R45	-49		5100		
R46	-49		5100		
R47	-49		5100		
R48	-49		5100		
R49	-49		5100		
R50	1006750-49		5100	±2%	1/4 W
R51	1010733-103		4000	±1%	1/10 W
R52	-104		8000		
R53	-102		2600		
R54	-101		2000		
R55	-8		27.06K	±.1%	
R56	-10		65.33K		
R57	-8		27.06K		
R58	-10		65.33K		
R59	-10		65.33K		
R60	-8		27.06K		
R61	-10		65.33K		
R62	-8		27.06K		
R63	-10		65.33K		
R64	-17		128.15K		
R65	-117		100K	±1%	
R66	-117		100K	±1%	
R67	1010733-12		25K	±.1%	1/10 W
R68	1006750-56		10K	±2%	1/4 W
R69	1006750-73		51K		
R70	1006750-75		62K		
R71	1010604-39		2000	±1%	1 W
R72	1006750-49		5100	±2%	1/4 W
R73	-51		6200		
R74	-32		1000		
R75	-76		68 K		
R76	-39		2000		
R77	-63		20K		
R78	-49		5100		
R79	-49		5100		
R80	-2		56		
R81	-56		10K		
R82	-49		5100		
R83	-74		56K		
R84	-76		68K		
R85	-63		20K		
R86	-68		33K		
R87	-32		1000		
R88	-76		68K		
R89	-49		5100		
R90	-49		5100		
R91	-2		56		
R92	-56		10K		
R93	-49		5100		
R94	-84		150 K		
R95	-32		1000		
R96	-32		1000		
R97	-32		1000		
R98	1006750-32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C2	1006755-33	CAPACITOR	15 UF	±10%	20VDC
C3	-33		15		
C4	-33		15		
C5	-73		2.2		
C6	-73		2.2		
C7	-73		2.2		
C8	-73		2.2		
C9	-73		2.2		
C10	-73		2.2		
C11	-73		2.2		
C12	-73		2.2		
C13	-73		2.2		
C14	-73		2.2		
C15	-73		2.2		
C16	-73		2.2		20
C17	-14		100		10
C18	-79		6.8		35
C19	-69		1.0		35
C20	-31		10		20
C21	-14		100		10
C22	-69		1.0		35
C23	-31		10		20
C24	1006755-85		22		35
CR1	1010830-7	DIODE	IN963B		
CR2	1010830-7		IN963B		
CR3	1010830-7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN660		
CR16	1010372-13				
CR17	1010830-9		IN965B		
CR18	1010385		IN660		
CR19	1010385	DIODE	IN660		
Q1	1010343-3	TRANSISTOR			
Q2	-				
Q3	-				
Q4	-				
Q5	-				
Q6	-				
Q7	-				
Q8	-				
Q9	-				
Q10	-				
Q11	-				
Q12	-				
Q13	-				
Q14	-				
Q15	-				
Q16	-				
Q17	-				
Q18	-				
Q19	-				
Q20	-				
Q21	-				
Q22	-				
Q23	-				
Q24	1010343-3				
Q25	1010342		2N998		
Q26	1010652		2N2980		
Q27	1006752		2N914		
Q28	1010342		2N998		
Q29	1010652		2N2980		
Q30	1006752		2N914		
Q31	1006752		2N914		
Q32	1006752		2N914		
A1	SEE NOTE 4	AMPLIFIER			
T1	1010725	TRANSFORMER			
T2	1010725				
T3	1010725				
T4	1010274				
T5	1010274				

REVISIONS [illegible]

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	[illegible]	[illegible]
B	REVISED PER TDRR 12775	29 SEP 64	[illegible]
C	REVISED PER TDRR 14591	[illegible]	WK
D	REVISED PER TDRR 15146	Dec '64	[illegible]
E	REVISED PER TDRR 15563	25 JAN 65	WK
F	REVISED PER TDRR 16263	[illegible]/65	WK
G	REVISED PER TDRR 17615	[illegible]	[illegible]
H	REVISED PER TDRR 17969	[illegible]	[illegible]

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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DO NOT SCALE THIS DRAWING
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FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO
CONTRACT
DRAWN A. Di Leo DATE 17 APR 64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL D. J. Cushman 2 Jun 64
NASA APPROVAL [illegible] 6/7/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

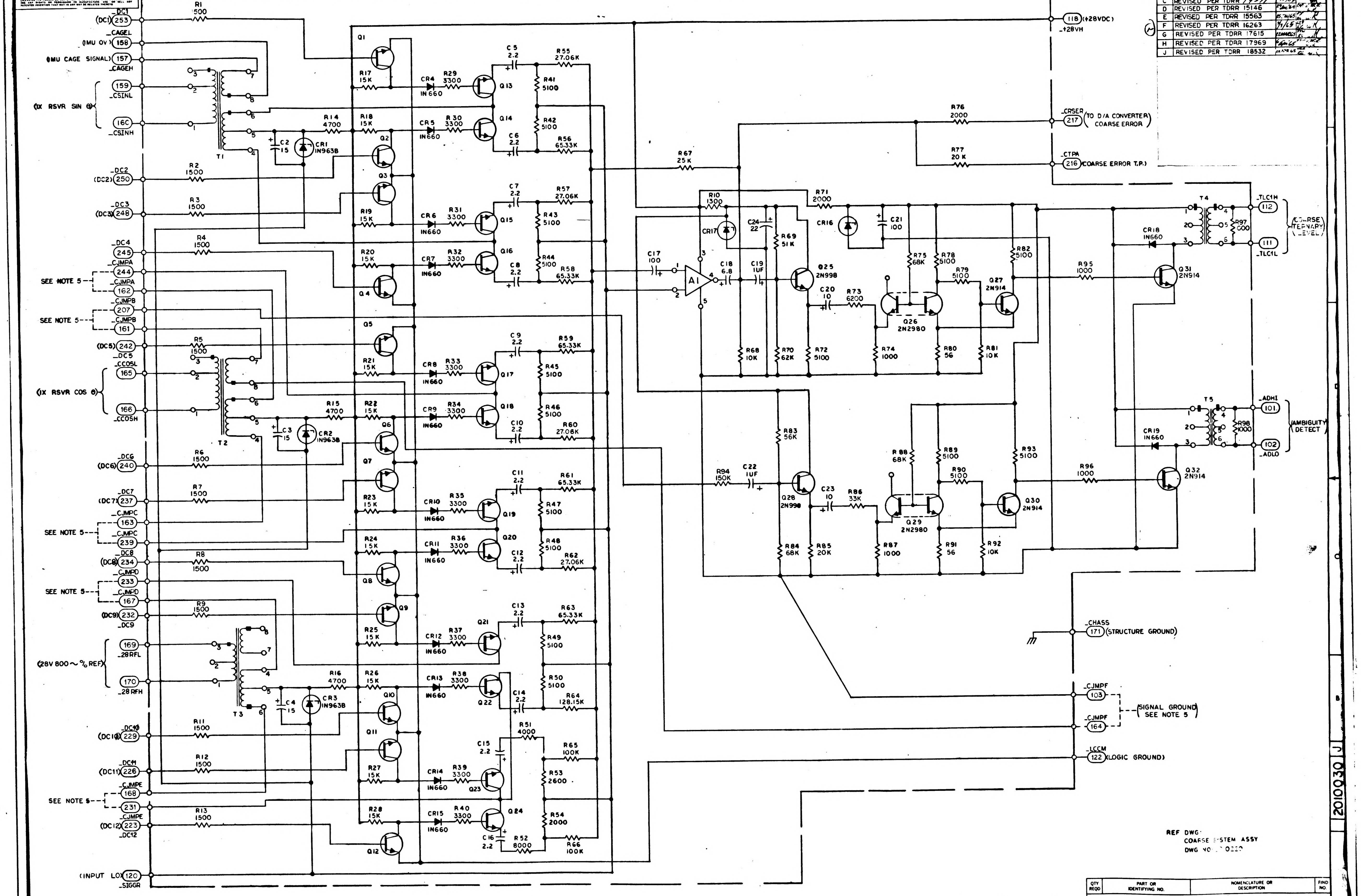
SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 2 OF 2

MASTER

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 0 96 66			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	
B	REVISED PER TDRR 12775	29 Sep 64	
C	REVISED PER TDRR 14591		
D	REVISED PER TDRR 15146	29 Dec 64	
E	REVISED PER TDRR 15563	25 JAN 65	
F	REVISED PER TDRR 16263	9/9/65	
G	REVISED PER TDRR 17615	22 MAR 65	
H	REVISED PER TDRR 17969	6 Apr 65	
J	REVISED PER TDRR 18532	22 APR 65	


6
5
4
3
2
1
(DC1) 253 _DC1
R1 1500
(IMU OV) 158 _CAGEL
(IMU CAGE SIGNAL) 157 _CAGEH
(1X RSVR SIN θ)
159 _CSINL
16C _CSINH
T1
C2 15
CR1 1N963B
R14 4700
(DC2) 250 _DC2
R2 1500
(DC3) 248 _DC3
R3 1500
_DC4 245
R4 1500
SEE NOTE 5
_CJMPA 244
_CJMPA 162
_CJMPB 207
_CJMPB 161
(DC5) 242 _DC5
R5 1500
(1X RSVR COS θ)
165 _CCOSL
166 _CCOSH
T2
C3 15
CR2 1N963B
R15 4700
(DC6) 240 _DC6
R6 1500
(DC7) 237 _DC7
R7 1500
_CJMPC 163
_CJMPC 239
(DC8) 234 _DC8
R8 1500
_CJMPD 233
_CJMPD 167
(DC9) 232 _DC9
R9 1500
(28V 800 ~ % REF)
169 _28RFL
170 _28RFH
T3
C4 15
CR3 1N963B
R16 4700
(DC10) 229 _DC10
R11 1500
(DC11) 226 _DC11
R12 1500
_CJMPE 168
231
(DC12) 223 _CJMPE _DC12
R13 1500
(INPUT LO) 120 _SIGGR
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 1N660 R29 3300 Q13
CR5 1N660 R30 3300 Q14
CR6 1N660 R31 3300 Q15
CR7 1N660 R32 3300 Q16
CR8 1N660 R33 3300 Q17
CR9 1N660 R34 3300 Q18
CR10 1N660 R35 3300 Q19
CR11 1N660 R36 3300 Q20
CR12 1N660 R37 3300 Q21
CR13 1N660 R38 3300 Q22
CR14 1N660 R39 3300 Q23
CR15 1N660 R40 3300 Q24
C5 2.2 R55 27.06K R41 5100
R42 5100 C6 2.2 R56 65.33K
C7 2.2 R57 27.06K R43 5100
R44 5100 C8 2.2 R58 65.33K
C9 2.2 R59 65.33K R45 5100
R46 5100 C10 2.2 R60 27.08K
C11 2.2 R61 65.33K R47 5100
R48 5100 C12 2.2 R62 27.06K
C13 2.2 R63 65.33K R49 5100
R50 5100 C14 2.2 R64 128.15K
R51 4000 C15 2.2 R65 100K R53 2600
C16 2.2 R52 8000 R54 2000 R66 100K
118 (+28VDC) _+28VH
R76 2000
_CRSER 217 (TO D/A CONVERTER COARSE ERROR)
R77 20K
_CTPA 216 (COARSE ERROR T.P.)
R67 25K
R10 1300
CR17
C24 22
R71 2000
CR16
C21 100
C17 100
A1
C18 6.8
C19 1UF
R69 51K
Q25 2N998
C20 10
R73 6200
R75 68K
R78 5100
R79 5100
Q26 2N2980
Q27 2N914
R82 5100
R68 10K
R70 62K
R72 5100
R74 1000
R80 56
R81 10K
R95 1000
Q31 2N914
CR18 1N660
T4
R97 600
_TLC1H 112
111 _TLC1L
(COARSE TERNARY LEVEL)
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 33K
R88 68K
R89 5100
R90 5100
Q29 2N2980
Q30 2N914
R93 5100
R96 1000
Q32 2N914
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
CR19 1N660
T5
R98 1000
_ADHI 101
102 _ADLO
(AMBIGUITY DETECT)
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103
_CJMPF 164
(SIGNAL GROUND SEE NOTE 5)
_LCCM 122 (LOGIC GROUND)
B
A

REF DWG:
COARSE SYSTEM ASSY
DWG NO. 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN A. D. Lao DATE 17 APR 64
CHECKED C. L. F. Bohlig
APPROVAL 2 June 64
APPROVAL 2 Jun 64
NASA APPROVAL 6/2/64
MIT APPROVAL 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO	SIZE	NASA DRAWING NO.
802	E	2010030
SCALE —	WT —	SHEET 1 OF 2

2010030 J

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REVISIONS 0̸9666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/1/64	[illegible]
B	REVISED PER TDRR 12775	29 SEP 64	[illegible]
C	REVISED PER TDRR 14591	12/1/64	WK
D	REVISED PER TDRR 15146	29 Dec '64	[illegible]
E	REVISED PER TDRR 15563	25 JAN 65	WK
F	REVISED PER TDRR 16263	3/9/65	WK
G	REVISED PER TDRR 17615	22 Mar 65	WK
H	REVISED PER TDRR 17969	6 Apr 65	WK
J	REVISED PER TDRR 18532	22 APR 65	WK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 -36	RESISTOR	1500	±2 %	1/4 W
R 2	-36		1500		
R 3	-36		1500		
R 4	-36		1500		
R 5	-36		1500		
R 6	-36		1500		
R 7	-36		1500		
R 8	-36		1500		
R 9	1006750 -36		1500		
R 10	1010604 -47		1300	±1%	1 W
R 11	1006750 -36		1500	±2%	1/4 W
R 12	-36		1500		
R 13	-36		1500		
R 14	-48		4700		
R 15	-48		4700		
R 16	-48		4700		
R 17	-60		15K		
R 18	-60		15K		
R 19	-60		15K		
R 20	-60		15K		
R 21	-60		15K		
R 22	-60		15K		
R 23	-60		15K		
R 24	-60		15K		
R 25	-60		15K		
R 26	-60		15K		
R 27	-60		15K		
R 28	-60		15K		
R 29	-44		3300		
R 30	-44		3300		
R 31	-44		3300		
R 32	-44		3300		
R 33	-44		3300		
R 34	-44		3300		
R 35	-44		3300		
R 36	-44		3300		
R 37	-44		3300		
R 38	-44		3300		
R 39	-44		3300		
R 40	-44		3300		
R 41	-49		5100		
R 42	-49		5100		
R 43	-49		5100		
R 44	-49		5100		
R 45	-49		5100		
R 46	-49		5100		
R 47	-49		5100		
R 48	-49		5100		
R 49	-49		5100		
R 50	1006750 -49		5100	±2%	1/4 W
R 51	1010733 -103		4000	±1%	1/10 W
R 52	-104		8000		
R 53	-102		2600		
R 54	-101		2000		
R 55	-8		27.06K	±.1%	
R 56	-10		65.33K		
R 57	-8		27.06K		
R 58	-10		65.33K		
R 59	-10		65.33K		
R 60	-8		27.06K		
R 61	-10		65.33K		
R 62	-8		27.06K		
R 63	-10		65.33K		
R 64	-17		128.15K		
R 65	-117		100K	±1%	
R 66	-117		100K	±1%	
R 67	1010733 -12		25K	±.1%	1/10 W
R 68	1006750 -56		10K	±2%	1/4 W
R 69	1006750 -73		51K		
R 70	1006750 -75		62K		
R 71	1010604 -39		2000	±1%	1 W
R 72	1006750 -49		5100	±2%	1/4 W
R 73	-51		6200		
R 74	-32		1000		
R 75	-76		68K		
R 76	-39		2000		
R 77	-63		20K		
R 78	-49		5100		
R 79	-49		5100		
R 80	-2		56		
R 81	-56		10K		
R 82	-49		5100		
R 83	-74		56K		
R 84	-76		68K		
R 85	-63		20K		
R 86	-68		33K		
R 87	-32		1000		
R 88	-76		68K		
R 89	-49		5100		
R 90	-49		5100		
R 91	-2		56		
R 92	-56		10K		
R 93	-49		5100		
R 94	-84		150K		
R 95	-32		1000		
R 96	-32		1000		
R 97	-32		1000		
R 98	1006750 -32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C2	1006755 -33	CAPACITOR	15 UF	±10%	20VDC
C3	-33		15		
C4	-33		15		
C5	-73		2.2		
C6	-73		2.2		
C7	-73		2.2		
C8	-73		2.2		
C9	-73		2.2		
C10	-73		2.2		
C11	-73		2.2		
C12	-73		2.2		
C13	-73		2.2		
C14	-73		2.2		
C15	-73		2.2		
C16	-73		2.2		20
C17	-14		100		10
C18	-79		6.8		35
C19	-69		1.0		35
C20	-31		10		20
C21	-14		100		10
C22	-69		1.0		35
C23	-31		10		20
C24	1006755 -85		22		35
CR1	1010830 -7	DIODE	IN963B		
CR2	1010830 -7		IN963B		
CR3	1010830 -7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN660		
CR16	1010372-13				
CR17	1010830 -9		IN965B		
CR18	1010385		IN660		
CR19	1010385	DIODE	IN660		
Q1	1010343 -3	TRANSISTOR			
Q2	-				
Q3	-				
Q4	-				
Q5	-				
Q6	-				
Q7	-				
Q8	-				
Q9	-				
Q10	-				
Q11	-				
Q12	-				
Q13	-				
Q14	-				
Q15	-				
Q16	-				
Q17	-				
Q18	-				
Q19	-				
Q20	-				
Q21	-				
Q22	-				
Q23	-				
Q24	1010343 -3				
Q25	1010342		2N998		
Q26	1010652 -1		2N2980		
Q27	1006752		2N914		
Q28	1010342		2N998		
Q29	1010652 -1		2N2980		
Q30	1006752		2N914		
Q31	1006752		2N914		
Q32	1006752		2N914		
A1	SEE NOTE 4	AMPLIFIER			
T1	1010725	TRANSFORMER			
T2	1010725				
T3	1010725				
T4	1010274				
T5	1010274				

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN Q. Di Leo DATE 17 APR 64
CHECKED CC L. T. Bakaley 1 JUNE 64
APPROVAL R. Kowalski 2 JUNE 64
APPROVAL D. J. Cushman 2 JUN 64
NASA APPROVAL 6/3/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010030
SCALE — WT — SHEET 2 OF 2

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REVISIONS 096666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	7/1/64	
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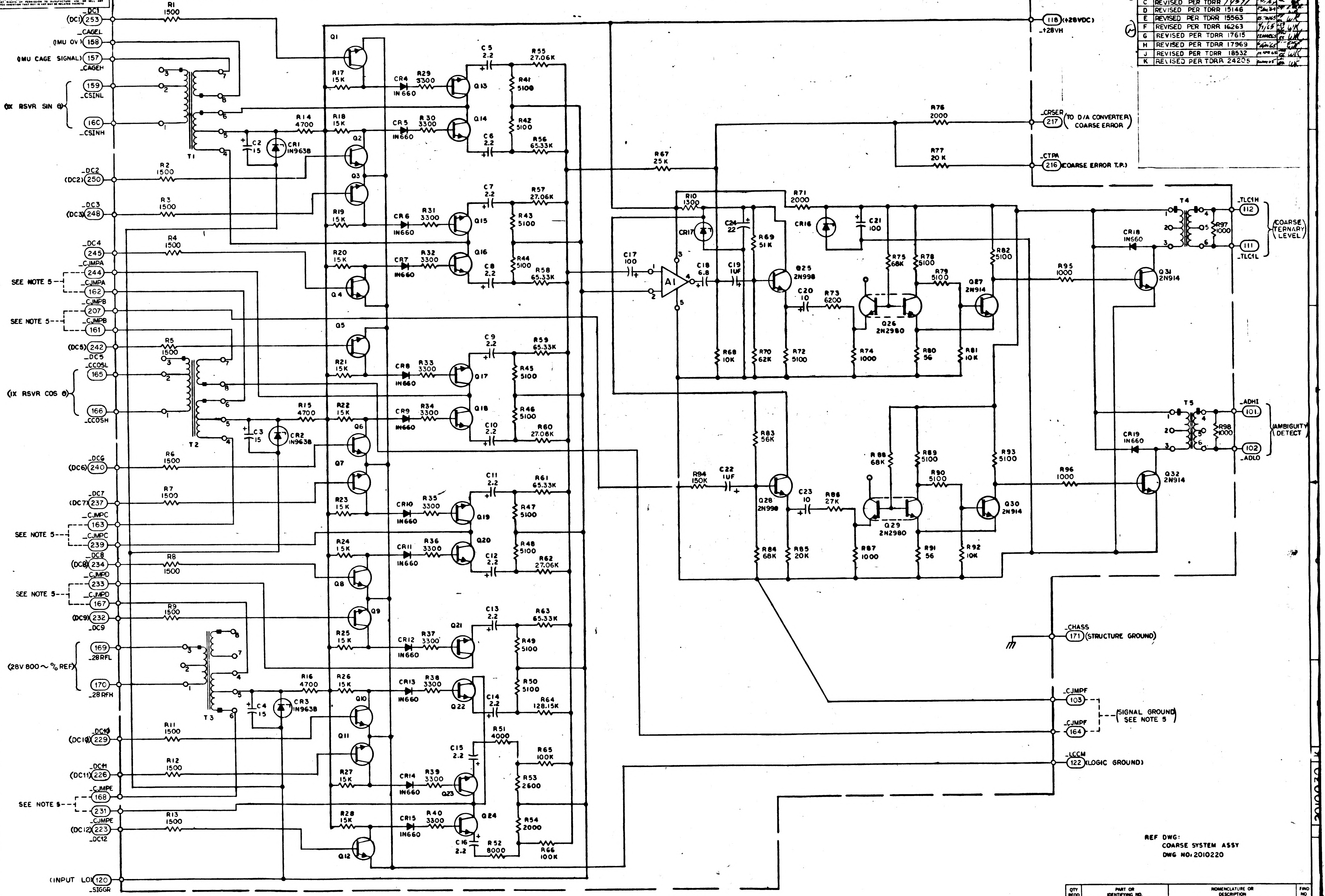
J	REVISED PER TDRR 18532	22 APR 65	WK
K	REVISED PER TDRR 24205		WK


6
5
4
3
2
1
(DC1) 253 _DC1
(IMU OV) 158 _CAGEL
(IMU CAGE SIGNAL) 157 _CAGEH
(1X RSVR SIN θ)
159 _CSINL
160 _CSINH
(DC2) 250 _DC2
(DC3) 248 _DC3
245 _DC4
SEE NOTE 5
244 _CJMPA
162 _CJMPA
207 _CJMPB
161 _CJMPB
(DC5) 242 _DC5
(1X RSVR COS θ)
165 _CCOSL
166 _CCOSH
(DC6) 240 _DCG
(DC7) 237 _DC7
163 _CJMPC
239 _CJMPC
(DC8) 234 _DC8
233 _CJMPD
167 _CJMPD
(DC9) 232 _DC9
(28V 800 ~ % REF)
169 _28RFL
170 _28RFH
(DC10) 229 _DC10
(DC11) 226 _DC11
168 _CJMPE
231
(DC12) 223 _CJMPE _DC12
(INPUT LO) 120 _SIGGR
R1 1500
R2 1500
R3 1500
R4 1500
R5 1500
R6 1500
R7 1500
R8 1500
R9 1500
R11 1500
R12 1500
R13 1500
T1
T2
T3
C2 15
C3 15
C4 15
CR1 1N963B
CR2 1N963B
CR3 1N963B
R14 4700
R15 4700
R16 4700
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14 1N660
CR15 1N660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R55 27.06K
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.06K
R61 65.33K
R62 27.06K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
118 (+28VDC) _+28VH
R76 2000
_CRSER 217 (TO D/A CONVERTER) COARSE ERROR)
R77 20K
_CTPA 216 (COARSE ERROR T.P.)
R67 25K
R10 1300
CR17
C24 22
R71 2000
CR16
C21 100
C17 100
A1
C18 6.8
C19 1UF
R69 51K
Q25 2N998
C20 10
R73 6200
R75 68K
R78 5100
R79 5100
Q26 2N2980
Q27 2N914
R82 5100
R68 10K
R70 62K
R72 5100
R74 1000
R80 56
R81 10K
R95 1000
Q31 2N914
CR18 1N660
T4
R97 1000
_TLC1H 112
111 _TLC1L
(COARSE TERNARY LEVEL)
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 27K
R88 68K
R89 5100
R90 5100
Q29 2N2980
Q30 2N914
R93 5100
R96 1000
Q32 2N914
CR19 1N660
T5
R98 1000
_ADHI 101
102 _ADLO
(AMBIGUITY DETECT)
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103
_CJMPF 164
(SIGNAL GROUND SEE NOTE 5)
_LCCM 122 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DWG NO. CONTRACT	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		MATERIAL —	DRAWN A. Di Leo DATE 17 APR 64 CHECKED APPROVAL APPROVAL 3 JUN 64	SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU
		HEAT TREATMENT —	NASA APPROVAL 6/2/64	CODE IDENT NO. 80230 · SIZE E · NASA DRAWING NO. 2010030
		FINAL FINISH —	MIT APPROVAL 2 Jun 64	SCALE — · WT — · SHEET 1 OF 2

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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	[illegible]	
B	REVISED PER TDRR 12775	[illegible]	
C	REVISED PER TDRR 19591	[illegible]	
D	REVISED PER TDRR 15146	23 Dec 64	
E	REVISED PER TDRR 15563	05 JAN 65	
F	REVISED PER TDRR 16263	[illegible]/65	
G	REVISED PER TDRR 17615	22 MAR 65	
H	REVISED PER TDRR 17969	[illegible]	
J	REVISED PER TDRR 18532	22 APR 65	
K	REVISED PER TDRR 24205	[illegible]	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 -36	RESISTOR	1500	±2 %	1/4 W
R 2	-36		1500		
R 3	-36		1500		
R 4	-36		1500		
R 5	-36		1500		
R 6	-36		1500		
R 7	-36		1500		
R 8	-36		1500		
R 9	1006750 -36		1500		
R 10	1010604 -47		1300	±1%	1 W
R 11	1006750 -36		1500	±2%	1/4 W
R 12	-36		1500		
R 13	-36		1500		
R 14	-48		4700		
R 15	-48		4700		
R 16	-48		4700		
R 17	-60		15K		
R 18	-60		15K		
R 19	-60		15K		
R 20	-60		15K		
R 21	-60		15K		
R 22	-60		15K		
R 23	-60		15K		
R 24	-60		15K		
R 25	-60		15K		
R 26	-60		15K		
R 27	-60		15K		
R 28	-60		15K		
R 29	-44		3300		
R 30	-44		3300		
R 31	-44		3300		
R 32	-44		3300		
R 33	-44		3300		
R 34	-44		3300		
R 35	-44		3300		
R 36	-44		3300		
R 37	-44		3300		
R 38	-44		3300		
R 39	-44		3300		
R 40	-44		3300		
R 41	-49		5100		
R 42	-49		5100		
R 43	-49		5100		
R 44	-49		5100		
R 45	-49		5100		
R 46	-49		5100		
R 47	-49		5100		
R 48	-49		5100		
R 49	-49		5100		
R 50	1006750 -49		5100	±2 %	1/4 W
R 51	1010733 -103		4000	±1%	1/10 W
R 52	-104		8000		
R 53	-102		2600		
R 54	-101		2000		
R 55	-8		27.06K	±.1%	
R 56	-10		65.33K		
R 57	-8		27.06K		
R 58	-10		65.33K		
R 59	-10		65.33K		
R 60	-8		27.06K		
R 61	-10		65.33K		
R 62	-8		27.06K		
R 63	-10		65.33K		
R 64	-17		128.15K		
R 65	-117		100K	±1%	
R 66	-117		100K	±1%	
R 67	1010733 -12		25K	±.1%	1/10 W
R 68	1006750 -56		10K	±2 %	1/4 W
R 69	1006750 -73		51K		
R 70	1006750 -75		62K		
R 71	1010604 -39		2000	±1%	1 W
R 72	1006750 -49		5100	±2%	1/4 W
R 73	-51		6200		
R 74	-32		1000		
R 75	-76		68 K		
R 76	-39		2000		
R 77	-63		20K		
R 78	-49		5100		
R 79	-49		5100		
R 80	-2		56		
R 81	-56		10K		
R 82	-49		5100		
R 83	-74		56K		
R 84	-76		68K		
R 85	-63		20K		
R 86	-66		27K		
R 87	-32		1000		
R 88	-76		68K		
R 89	-49		5100		
R 90	-49		5100		
R 91	-2		56		
R 92	-56		10K		
R 93	-49		5100		
R 94	-84		150 K		
R 95	-32		1000		
R 96	-32		1000		
R 97	-32		1000		
R 98	1006750 -32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C2	1006755 -33	CAPACITOR	15 UF	±10%	20VDC
C3	-33		15		
C4	-33		15		
C5	-73		2.2		
C6	-73		2.2		
C7	-73		2.2		
C8	-73		2.2		
C9	-73		2.2		
C10	-73		2.2		
C11	-73		2.2		
C12	-73		2.2		
C13	-73		2.2		
C14	-73		2.2		
C15	-73		2.2		
C16	-73		2.2		20
C17	-14		100		10
C18	-79		6.8		35
C19	-69		1.0		35
C20	-31		10		20
C21	-14		100		10
C22	-69		1.0		35
C23	-31		10		20
C24	1006755 -85		22		35
CR1	1010830 -7	DIODE	IN963B		
CR2	1010830 -7		IN963B		
CR3	1010830 -7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN660		
CR16	1010372-13				
CR17	1010830 -9		IN965B		
CR18	1010385		IN660		
CR19	1010385	DIODE	IN660		
Q1	1010343 -3	TRANSISTOR			
Q2	-				
Q3	-				
Q4	-				
Q5	-				
Q6	-				
Q7	-				
Q8	-				
Q9	-				
Q10	-				
Q11	-				
Q12	-				
Q13	-				
Q14	-				
Q15	-				
Q16	-				
Q17	-				
Q18	-				
Q19	-				
Q20	-				
Q21	-				
Q22	-				
Q23	-				
Q24	1010343 -3				
Q25	1010342		2N998		
Q26	1010652 -1		2N2980		
Q27	1006752		2N914		
Q28	1010342		2N998		
Q29	1010652 -1		2N2980		
Q30	1006752		2N914		
Q31	1006752		2N914		
Q32	1006752		2N914		
A1	SEE NOTE 4	AMPLIFIER			
T1	1010725	TRANSFORMER			
T2	1010725				
T3	1010725				
T4	1010274				
T5	1010274				

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. Di Leo DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

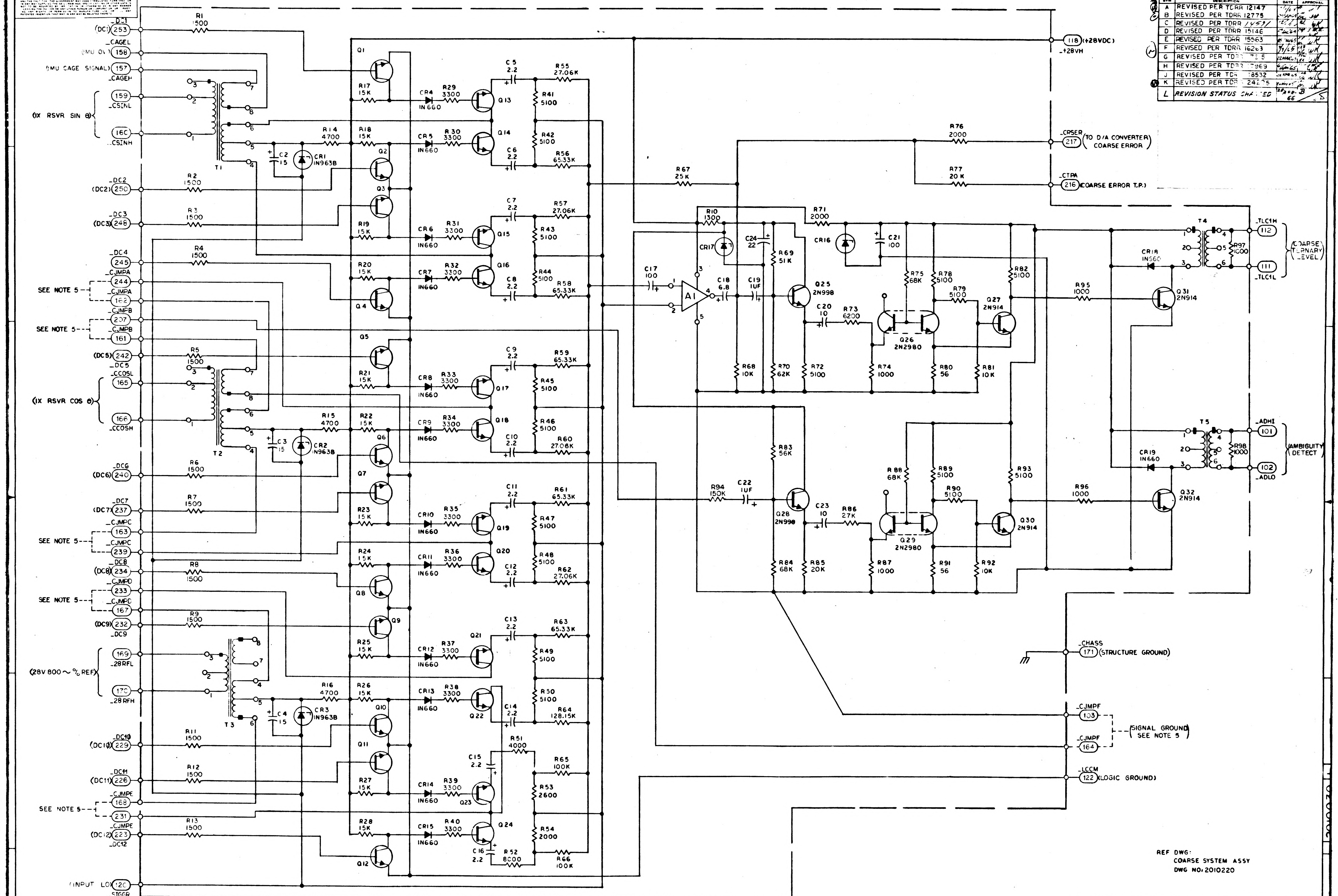
SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 2 OF 2

MASTER

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	1/6/64	WK
B	REVISED PER TDRR 12775	29 SEP 64	WK
C	REVISED PER TDRR 14591	12/1/64	WK
D	REVISED PER TDRR 15146	29 Dec 64	WK
E	REVISED PER TDRR 15563	25 JAN 65	WK
F	REVISED PER TDRR 16263	3/9/65	WK
G	REVISED PER TDRR 17315	22 MAR 65	WK
H	REVISED PER TDRR 17969	6 Apr 65	WK
J	REVISED PER TDRR 18532	22 APR 65	WK
K	REVISED PER TDRR 24205	20 Nov 65	WK
L	REVISION STATUS CHANGED	28 APR 66	B

REVISIONS 0 96 56



_DC1 (DC1) 253
R1 500
_CAGEL (IMU OV) 158
(IMU CAGE SIGNAL) 157 _CAGEH
159 _CSINL
(1X RSVR SIN θ)
160 _CSINH
T1
R2 1500 (DC2) 250 _DC2
R3 1500 (DC3) 246 _DC3
R4 1500 _DC4 245
_CJMPA 244 _CJMPA 162
SEE NOTE 5
_CJMPB 207 _CJMPB 161
SEE NOTE 5
(DC5) 242 _DC5
R5 1500
_CCOSL 165
(1X RSVR COS θ)
166 _CCOSH
T2
R6 1500 _DC6 (DC6) 240
R7 1500 _DC7 (DC7) 237
_CJMPC 163 _CJMPC 239
SEE NOTE 5
(DC8) 234 _DC8 R8 1500
_CJMPD 233 _CJMPD 167
SEE NOTE 5
R9 1500 (DC9) 232 _DC9
169 _28RFL
(28V 800 ~ % REF)
170 _28RFH
T3
R11 1500 _DC10 (DC10) 229
R12 1500 _DC11 (DC11) 226
_CJMPE 168 231 _CJMPE
SEE NOTE 5
R13 1500 (DC12) 223 _DC12
(INPUT LO) 120 _SIGGR
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
R14 4700 R15 4700 R16 4700
C2 15 C3 15 C4 15
CR1 IN963B CR2 IN963B CR3 IN963B
R17 15K R18 15K R19 15K R20 15K R21 15K R22 15K R23 15K R24 15K R25 15K R26 15K R27 15K R28 15K
CR4 IN660 CR5 IN660 CR6 IN660 CR7 IN660 CR8 IN660 CR9 IN660 CR10 IN660 CR11 IN660 CR12 IN660 CR13 IN660 CR14 IN660 CR15 IN660
R29 3300 R30 3300 R31 3300 R32 3300 R33 3300 R34 3300 R35 3300 R36 3300 R37 3300 R38 3300 R39 3300 R40 3300
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24
C5 2.2 C6 2.2 C7 2.2 C8 2.2 C9 2.2 C10 2.2 C11 2.2 C12 2.2 C13 2.2 C14 2.2 C15 2.2 C16 2.2
R41 5100 R42 5100 R43 5100 R44 5100 R45 5100 R46 5100 R47 5100 R48 5100 R49 5100 R50 5100
R51 4000 R52 8000 R53 2600 R54 2000
R55 27.06K R56 65.33K R57 27.06K R58 65.33K R59 65.33K R60 27.06K R61 65.33K R62 27.06K R63 65.33K R64 128.15K R65 100K R66 100K
118 (+28VDC) _+28VH
_CPSER 217 (TO D/A CONVERTER) COARSE ERROR
_CTPA 216 (COARSE ERROR T.P.)
R76 2000 R77 20K R67 25K
R10 1300 R71 2000
CR17 CR16
C24 22 C21 100
C17 100 A1 C18 6.8 C19 1UF
R69 51K Q25 2N998
C20 10 R73 6200
R75 68K R78 5100 R79 5100 R82 5100
Q26 2N2980 Q27 2N914
R68 10K R70 62K R72 5100 R74 1000 R80 56 R81 10K
R95 1000 Q31 2N914
CR18 IN660 T4 R97 1600
_TLC1H 112 (COARSE TERNARY LEVEL) 111 _TLC1L
R83 56K R94 150K C22 1UF
Q28 2N998 C23 10 R86 27K
R88 68K R89 5100 R90 5100 R93 5100
Q29 2N2980 Q30 2N914
R84 68K R85 20K R87 1000 R91 56 R92 10K
R96 1000 Q32 2N914
CR19 IN660 T5 R98 1000
_ADHI 101 (AMBIGUITY DETECT) 102 _ADLO
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103 _CJMPF 164 (SIGNAL GROUND SEE NOTE 5)
_LCCM 122 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT

DRAWN R. D. Leo DATE 7 APR 64
CHECKED CC / J. Bobley 5 June 64
APPROVAL Mikowalski 8 June 64
APPROVAL
NASA APPROVAL 6/12/64
MIT APPROVAL W Kupfer 2 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010030
SCALE —
WT —
SHEET 1 OF 2

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	-36		1500		
R 3	-36		1500		
R 4	-36		1500		
R 5	-36		1500		
R 6	-36		1500		
R 7	-36		1500		
R 8	-36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1%	1 W
R 11	1006750 - 36		1500	±2 %	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15 K		
R 18	- 60		15 K		
R 19	- 60		15 K		
R 20	- 60		15 K		
R 21	- 60		15 K		
R 22	- 60		15 K		
R 23	- 60		15 K		
R 24	- 60		15 K		
R 25	- 60		15 K		
R 26	- 60		15 K		
R 27	- 60		15 K		
R 28	- 60		15 K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2 %	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± .1%	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15 K		
R 65	-117		100 K	± 1%	
R 66	-117		100 K	± 1%	
R 67	1010733 - 12		25 K	±.1%	1/10 W
R 68	1006750 - 56		10 K	±2 %	1/4 W
R 69	1006750 - 73		51 K		
R 70	1006750 - 75		62 K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 49		5100	±2%	1/4 W
R 73	- 51		6200		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20 K		
R 78	-49		5100		
R 79	-49		5100		
R 80	- 2		56		
R 81	- 56		10 K		
R 82	-49		5100		
R 83	-74		56K		
R 84	-76		68K		
R 85	-63		20K		
R 86	- 66		27K		
R 87	- 32		1000		
R 88	-76		68K		
R 89	-49		5100		
R 90	-49		5100		
R 91	- 2		56		
R 92	- 56		10 K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	-32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 -32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	1 5 UF	±10%	20 VDC
C 3	- 33		1 5		
C 4	- 33		1 5		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		1 0		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		1 0		20
C 24	1006755 - 85		22		35
C R1	1008815 - 7	DIODE	IN963B		
C R2	1008815 - 7		IN963B		
C R3	1008815 - 7		IN963B		
C R4	1010385		IN660		
C R5					
C R6					
C R7					
C R8					
C R9					
C R10					
C R11					
C R12					
C R13					
C R14					
C R15	1010385		IN 660		
C R16	1010372-13				
C R17	1008815 - 9		IN965B		
C R18	1010385		IN660		
C R19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652 - 1		2N2980		
Q 27	1006752		2N 914		
Q 28	1010342		2N 998		
Q 29	1010652 - 1		2N2980		
Q 30	1006752		2N914		
Q 31	1006752		2N914		
Q 32	1006752		2N914		
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/1/64	
B	REVISED PER TDRR 12775	29 SEP 64	
C	REVISED PER TDRR 14591		WK
D	REVISED PER TDRR 15146	29 Dec 64	
E	REVISED PER TDRR 15563	25 JAN 65	
F	REVISED PER TDRR 16263	65	WK
G	REVISED PER TDRR 17615	65	
H	REVISED PER TDRR 17969	6 Apr 65	WK
J	REVISED PER TDRR 18532	22 APR 65	WK
K	REVISED PER TDRR 24205		WK
L	REVISED PER TDRR 28185	28 APR -66	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

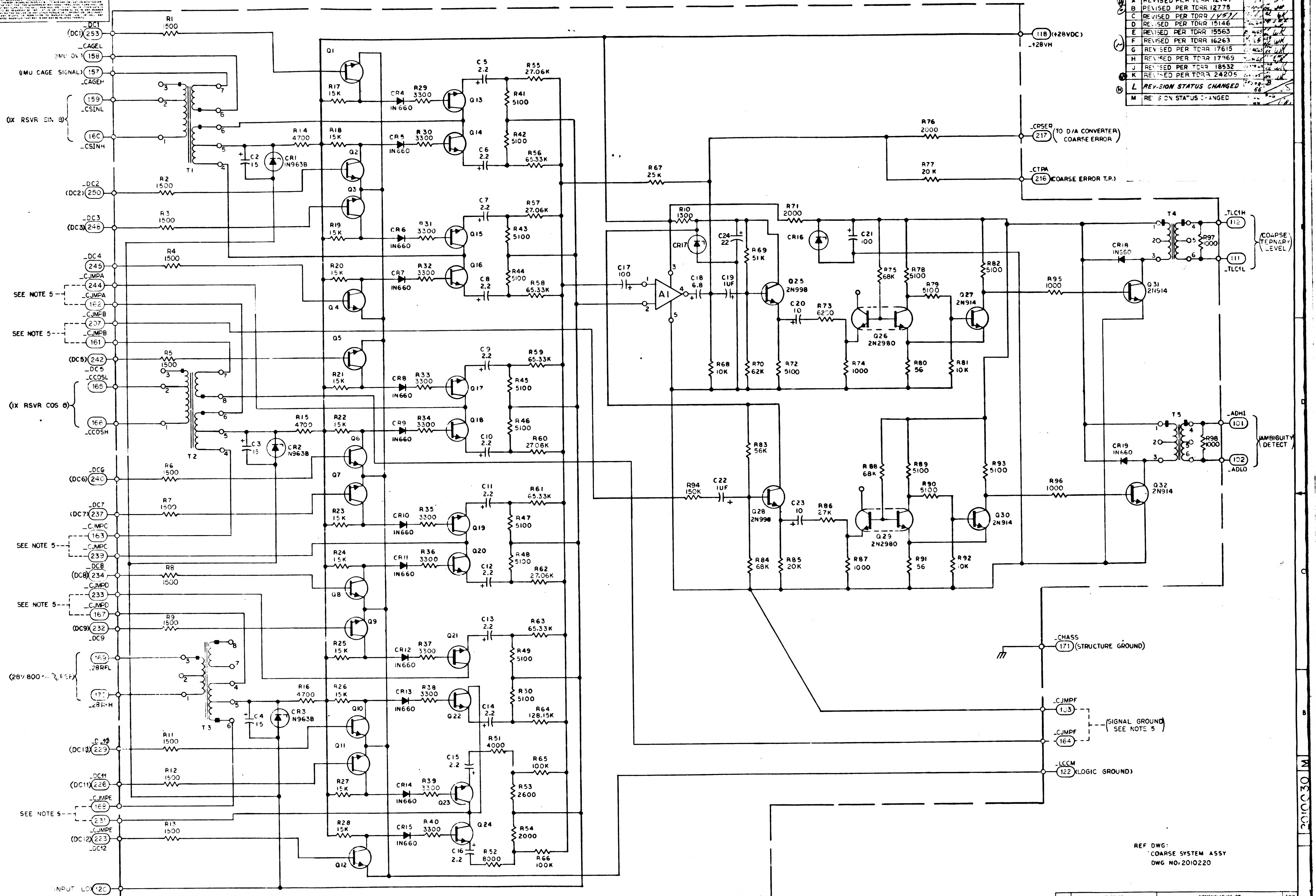
M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. D. Lee DATE 17 APR 64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010030
SCALE —
WT —
SHEET 2 OF 2

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	[illegible]	[illegible]
B	REVISED PER TDRR 12775	[illegible]	[illegible]
C	REVISED PER TDRR 14591	[illegible]	WK
D	REVISED PER TDRR 15146	[illegible] 64	WK
E	REVISED PER TDRR 15563	[illegible] 65	WK
F	REVISED PER TDRR 16263	[illegible] 65	WK
G	REVISED PER TDRR 17615	[illegible] 65	WK
H	REVISED PER TDRR 17969	[illegible] 65	WK
J	REVISED PER TDRR 18532	[illegible] 65	WK
K	REVISED PER TDRR 24205	[illegible] 65	WK
L	REVISION STATUS CHANGED	[illegible] 66	B
M	REVISION STATUS CHANGED	[illegible]	[illegible]



_DC1
(DC1) 253
R1 1500
_CAGEL
(IMU ON) 158
(IMU CAGE SIGNAL) 157
_CAGEH
(1X RSVR SIN θ)
159
_CSINL
160
_CSINH
T1
(DC2) 250
_DC2
R2 1500
(DC3) 248
_DC3
R3 1500
_DC4
245
R4 1500
SEE NOTE 5
_CJMPA
244
162
_CJMPB
207
161
SEE NOTE 5
(DC5) 242
_DC5
R5 1500
_CCOSL
165
(1X RSVR COS θ)
166
_CCOSH
T2
(DC6) 240
_DC6
R6 1500
(DC7) 237
_DC7
R7 1500
_CJMPC
163
SEE NOTE 5
233
_DC8
(DC8) 234
R8 1500
SEE NOTE 5
_CJMPD
233
167
(DC9) 232
_DC9
R9 1500
(28V 800 ~ REF)
169
_28RFL
170
_28RFH
T3
(DC10) 229
_DC10
R11 1500
(DC11) 226
_DC11
R12 1500
SEE NOTE 5
_CJMPE
168
231
_CJMPE
(DC12) 223
_DC12
R13 1500
INPUT LO 120
_SIGGR
Q1
R17 15K
CR4 1N660
R29 3300
Q13
C5 2.2
R55 27.06K
R41 5100
R14 4700
C2 15
CR1 1N963B
R18 15K
Q2
CR5 1N660
R30 3300
Q14
R42 5100
C6 2.2
R56 65.33K
Q3
R19 15K
CR6 1N660
R31 3300
Q15
C7 2.2
R57 27.06K
R43 5100
R20 15K
CR7 1N660
R32 3300
Q16
R44 5100
C8 2.2
R58 65.33K
Q4
Q5
R21 15K
CR8 1N660
R33 3300
Q17
C9 2.2
R59 65.33K
R45 5100
R15 4700
C3 15
CR2 1N963B
R22 15K
CR9 1N660
R34 3300
Q18
R46 5100
C10 2.2
R60 27.06K
Q6
Q7
R23 15K
CR10 1N660
R35 3300
Q19
C11 2.2
R61 65.33K
R47 5100
R24 15K
CR11 1N660
R36 3300
Q20
R48 5100
C12 2.2
R62 27.06K
Q8
Q9
R25 15K
CR12 1N660
R37 3300
Q21
C13 2.2
R63 65.33K
R49 5100
R16 4700
C4 15
CR3 1N963B
R26 15K
CR13 1N660
R38 3300
Q22
R50 5100
C14 2.2
R64 128.15K
Q10
Q11
R51 4000
C15 2.2
R65 100K
R27 15K
CR14 1N660
R39 3300
Q23
R53 2600
R28 15K
CR15 1N660
R40 3300
Q24
R54 2000
C16 2.2
R52 8000
R66 100K
Q12
118 (+28VDC)
_+28VH
R76 2000
_CPSER
217 (TO D/A CONVERTER COARSE ERROR)
R77 20K
_CTPA
216 (COARSE ERROR T.P.)
R67 25K
R10 1300
R71 2000
C17 100
A1
C18 6.8
C19 1UF
C24 22
CR17
R69 51K
Q25 2N998
CR16
C21 100
C20 10
R73 6200
R75 68K
R78 5100
R79 5100
Q26 2N2980
Q27 2N914
R82 5100
R95 1000
Q31 2N914
R68 10K
R70 62K
R72 5100
R74 1000
R80 56
R81 10K
T4
R97 1000
_TLC1H
112
111
_TLC1L
(COARSE TERNARY LEVEL)
CR18 1N660
R83 56K
R94 150K
C22 1UF
Q28 2N998
C23 10
R86 27K
R88 68K
R89 5100
R90 5100
Q29 2N2980
Q30 2N914
R93 5100
R96 1000
Q32 2N914
R84 68K
R85 20K
R87 1000
R91 56
R92 10K
T5
R98 1000
_ADH1
101
102
_ADLO
(AMBIGUITY DETECT)
CR19 1N660
_CHASS
171 (STRUCTURE GROUND)
_CJMPF
103
_CJMPF
164
(SIGNAL GROUND SEE NOTE 5)
_LCCM
122 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2010220

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010013 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	MIT INSTRUMENTATION LAB CAMBRIDGE MASS
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN R. D. Lee DATE 7 APR 64
		MATERIAL	CHECKED
		HEAT TREATMENT	APPROVAL
		FINAL FINISH	NASA APPROVAL
			MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO	SIZE	NASA DRAWING NO
80230	E	2010030

SCALE — WT — SHEET 1 OF 2

2010030 M

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 49666

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12147	9/1/64	[illegible]
B	REVISED PER TDRR 12775	29 SEP 64	[illegible]
C	REVISED PER TDRR 14591	[illegible]	WK
D	REVISED PER TDRR 15146	23 Dec 64	[illegible]
E	REVISED PER TDRR 15563	25 JAN 65	WK
F	REVISED PER TDRR 16263	[illegible] 65	WK
G	REVISED PER TDRR 17615	22 MAR 65	WK
H	REVISED PER TDRR 17969	6 Apr 65	WK
J	REVISED PER TDRR 18532	22 APR 65	WK
K	REVISED PER TDRR 24205	[illegible]	WK
L	REVISED PER TDRR 28185	28 APR -66	3
M	REVISED PER TDRR 29955	JUL 66	8-6

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	- 36		1500		
R 3	- 36		1500		
R 4	- 36		1500		
R 5	- 36		1500		
R 6	- 36		1500		
R 7	- 36		1500		
R 8	- 36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1%	1 W
R 11	1006750 - 36		1500	±2 %	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15 K		
R 18	- 60		15 K		
R 19	- 60		15 K		
R 20	- 60		15 K		
R 21	- 60		15 K		
R 22	- 60		15 K		
R 23	- 60		15 K		
R 24	- 60		15 K		
R 25	- 60		15 K		
R 26	- 60		15 K		
R 27	- 60		15 K		
R 28	- 60		15 K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2 %	1/4 W
R 51	1010733 - 103		4000	± 1%	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± .1 %	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15 K		
R 65	- 117		100 K	± 1%	
R 66	- 117		100 K	± 1%	
R 67	1010733 - 12		25 K	±.1%	1/10 W
R 68	1006750 - 56		10 K	±2 %	1/4 W
R 69	1006750 - 73		51 K		
R 70	1006750 - 75		62 K		
R 71	1010604 - 39		2000	±1%	1 W
R 72	1006750 - 49		5100	±2%	1/4 W
R 73	- 51		6200		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20 K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10 K		
R 82	- 49		5100		
R 83	- 74		56 K		
R 84	- 76		68 K		
R 85	- 63		20 K		
R 86	- 66		27 K		
R 87	- 32		1000		
R 88	- 76		68 K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10 K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	15 UF	±10%	20VDC
C 3	- 33		15		
C 4	- 33		15		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		10		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		10		20
C 24	1006755 - 85		22		35
CR 1	1008815 - 7	DIODE	IN963B		
CR 2	1008815 - 7		IN963B		
CR 3	1008815 - 7		IN963B		
CR 4	1010385		IN660		
CR 5					
CR 6					
CR 7					
CR 8					
CR 9					
CR 10					
CR 11					
CR 12					
CR 13					
CR 14					
CR 15	1010385		IN 660		
CR 16	1010372-13				
CR 17	1008815 - 9		IN965B		
CR 18	1010385		IN 660		
CR 19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652 - 1		2N2980		
Q 27	1010966-1		2N914		
Q 28	1010342		2N 998		
Q 29	1010652 - 1		2N2980		
Q 30	1010966 - 1		2N914		
Q 31	1010966 - 1		2N914		
Q 32	1010966 - 1		2N914		
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010274				
T 5	1010274				

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT

DRAWN A. Di Leo DATE 17 APR 64
CHECKED 1 JUNE 64
APPROVAL 2 JUNE 64
APPROVAL
NASA APPROVAL 6/7/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

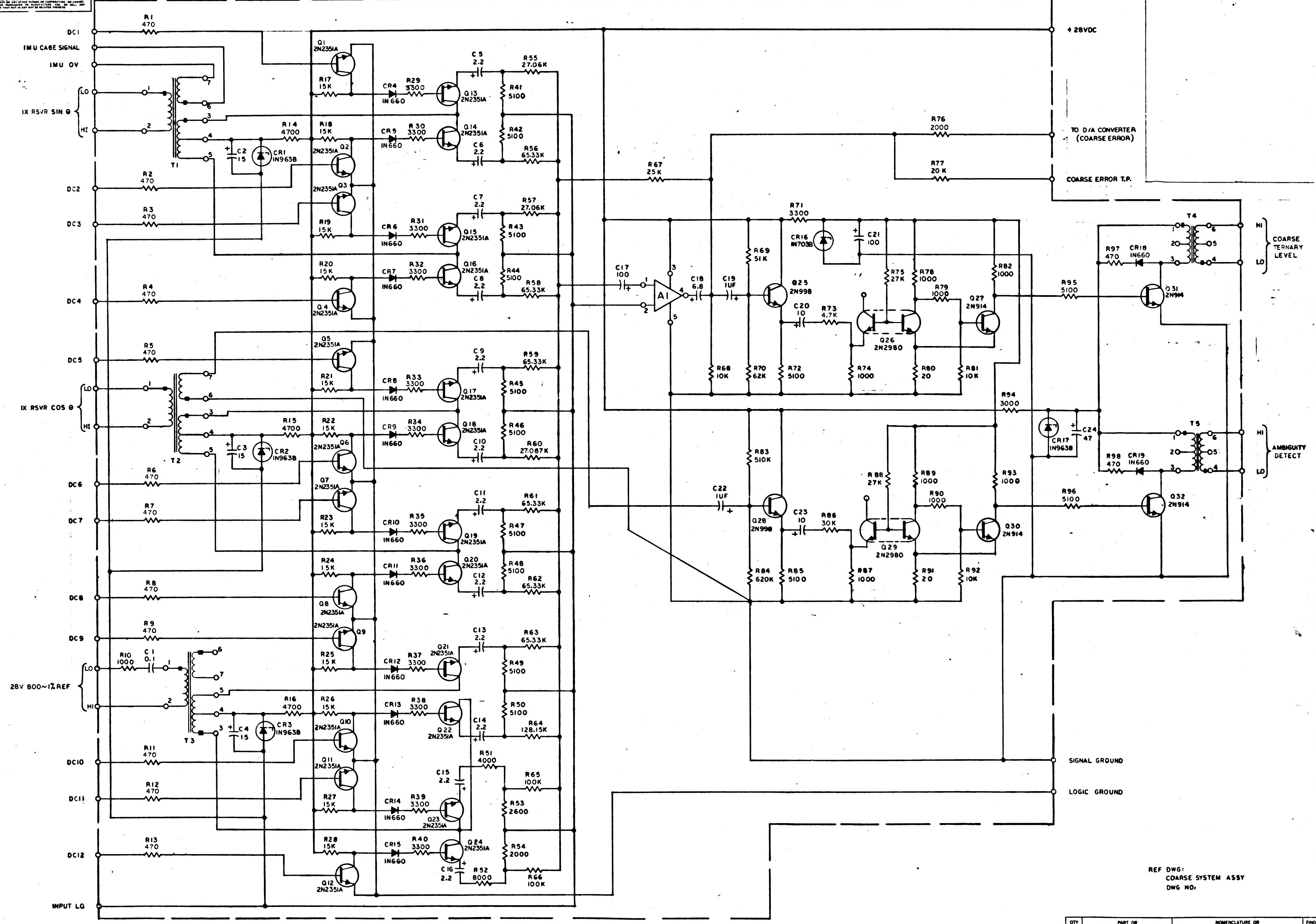
SCHEMATIC
COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010030
SCALE
WT
SHEET 2 OF 2

2010030 M

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 0 9/6/66			
SYM	DESCRIPTION	DATE	APPROVAL


6
5
4
3
2
1
DC1
IMU CAGE SIGNAL
IMU OV
LO
1X RSVR SIN θ
HI
T1
DC2
DC3
DC4
DC5
1X RSVR COS θ
T2
DC6
DC7
DC8
DC9
28V 800~1% REF
T3
DC10
DC11
DC12
INPUT LO
R1 470
R2 470
R3 470
R4 470
R5 470
R6 470
R7 470
R8 470
R9 470
R10 1000
R11 470
R12 470
R13 470
C1 0.1
C2 15
C3 15
C4 15
CR1 1N963B
CR2 1N963B
CR3 1N963B
R14 4700
R15 4700
R16 4700
Q1 2N2351A
Q2 2N2351A
Q3 2N2351A
Q4 2N2351A
Q5 2N2351A
Q6 2N2351A
Q7 2N2351A
Q8 2N2351A
Q9 2N2351A
Q10 2N2351A
Q11 2N2351A
Q12 2N2351A
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
R23 15K
R24 15K
R25 15K
R26 15K
R27 15K
R28 15K
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14 1N660
CR15 1N660
R29 3300
R30 3300
R31 3300
R32 3300
R33 3300
R34 3300
R35 3300
R36 3300
R37 3300
R38 3300
R39 3300
R40 3300
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Q14 2N2351A
Q15 2N2351A
Q16 2N2351A
Q17 2N2351A
Q18 2N2351A
Q19 2N2351A
Q20 2N2351A
Q21 2N2351A
Q22 2N2351A
Q23 2N2351A
Q24 2N2351A
C5 2.2
C6 2.2
C7 2.2
C8 2.2
C9 2.2
C10 2.2
C11 2.2
C12 2.2
C13 2.2
C14 2.2
C15 2.2
C16 2.2
R41 5100
R42 5100
R43 5100
R44 5100
R45 5100
R46 5100
R47 5100
R48 5100
R49 5100
R50 5100
R51 4000
R52 8000
R53 2600
R54 2000
R55 27.06K
R56 65.33K
R57 27.06K
R58 65.33K
R59 65.33K
R60 27.087K
R61 65.33K
R62 65.33K
R63 65.33K
R64 128.15K
R65 100K
R66 100K
+28VDC
TO D/A CONVERTER (COARSE ERROR)
COARSE ERROR T.P.
R76 2000
R77 20K
R67 25K
C17 100
A1
C18 6.8
C19 1UF
R68 10K
R69 51K
R70 62K
R71 3300
CR16 1N703B
C21 100
Q25 2N998
C20 10
R72 5100
R73 4.7K
R74 1000
R75 27K
R78 1000
R79 1000
R80 20
Q26 2N2980
Q27 2N914
R81 10K
R82 1000
R94 3000
CR17 1N963B
C24 47
R95 5100
Q31 2N914
R97 470
CR18 1N660
T4
COARSE TERNARY LEVEL
R83 510K
C22 1UF
Q28 2N998
C23 10
R86 30K
R84 620K
R85 5100
R87 1000
R88 27K
R89 1000
R90 1000
Q29 2N2980
R91 20
R92 10K
Q30 2N914
R93 1000
R96 5100
Q32 2N914
R98 470
CR19 1N660
T5
AMBIGUITY DETECT
SIGNAL GROUND
LOGIC GROUND

REF DWG:
COARSE SYSTEM ASSY
DWG NO:

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG NO. CONTRACT
DRAWN A. D. Lee DATE 17 APR 64
CHECKED CC L. F. Bradley 1 JUNE 64
APPROVAL R. Kowalski 2 June 64
APPROVAL A. J. Cushman 3 June '64
NASA APPROVAL 6/2/64
MIT APPROVAL W Kupfer 2 June 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010030
SCALE —
WT —
SHEET 1 OF 2

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REVISIONS 3/16/66			
SYM	DESCRIPTION	DATE	APPROVAL

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-24	RESISTOR	470	±2%	1/4 W
R2	-24		470		
R3	-24		470		
R4	-24		470		
R5	-24		470		
R6	-24		470		
R7	-24		470		
R8	-24		470		
R9	-24		470		
R10	-32		1000		
R11	-24		470		
R12	-24		470		
R13	-24		470		
R14	-48		4700		
R15	-48		4700		
R16	-48		4700		
R17	-60		15K		
R18	-60		15K		
R19	-60		15K		
R20	-60		15K		
R21	-60		15K		
R22	-60		15K		
R23	-60		15K		
R24	-60		15K		
R25	-60		15K		
R26	-60		15K		
R27	-60		15K		
R28	-60		15K		
R29	-44		3300		
R30	-44		3300		
R31	-44		3300		
R32	-44		3300		
R33	-44		3300		
R34	-44		3300		
R35	-44		3300		
R36	-44		3300		
R37	-44		3300		
R38	-44		3300		
R39	-44		3300		
R40	-44		3300		
R41	-49		5100		
R42	-49		5100		
R43	-49		5100		
R44	-49		5100		
R45	-49		5100		
R46	-49		5100		
R47	-49		5100		
R48	-49		5100		
R49	-49		5100		
R50	1006750-49		5100	±2%	1/4 W
R51	1010733-103		4000	±1%	1/10 W
R52	-104		8000		
R53	-102		2600		
R54	-101		2000		
R55	-8		27.06K	±.1%	
R56	-10		65.33K		
R57	-8		27.06K		
R58	-10		65.33K		
R59	-10		65.33K		
R60	-8		27.06K		
R61	-10		65.33K		
R62	-10		65.33K		
R63	-10		65.33K		
R64	-17		128.15K		
R65	-117		100K	±1%	
R66	-117		100K	±1%	
R67	1010733-12		25K	±.1%	1/10 W
R68	1006750-56		10K	±2%	1/4 W
R69	-73		51K		
R70	-75		62K		
R71	-44		3300		
R72	-49		5100		
R73	-48		4700		
R74	-32		1000		
R75	-66		27K		
R76	-39		2000		
R77	-63		20K		
R78	-32		1000		
R79	1006750-32		1000	±2%	1/4 W
R80	1010369-148		20	±5%	1/8 W
R81	1006750-56		10K	±2%	1/4 W
R82	1006750-32		1000	±2%	1/4 W
R83	1010369-98		510K	±5%	1/8 W
R84	1010369-100		620K	±5%	1/8 W
R85	1006750-49		5100	±2%	1/4 W
R86	-67		30K		
R87	-32		1000		
R88	-66		27K		
R89	-32		1000		
R90	1006750-32		1000	±2%	1/4 W
R91	1010369-148		20	±5%	1/8 W
R92	1006750-56		10K	±2%	1/4 W
R93	-32		1000		
R94	-43		3000		
R95	-49		5100		
R96	-49		5100		
R97	-24		470		
R98	1006750-24		470		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006777-38	CAPACITOR	0.1 UF	±10%	100VDC
C2	1006755-33		15		20
C3	-33		15		
C4	-33		15		
C5	-73		2.2		
C6	-73		2.2		
C7	-73		2.2		
C8	-73		2.2		
C9	-73		2.2		
C10	-73		2.2		
C11	-73		2.2		
C12	-73		2.2		
C13	-73		2.2		
C14	-73		2.2		
C15	-73		2.2		
C16	-73		2.2		20
C17	-14		100		10
C18	-79		6.8		35
C19	-69		1.0		35
C20	-31		10		20
C21	-14		100		10
C22	-69		1.0		35
C23	-31		10		20
C24	1006755-36		47 UF	±10%	20 VDC
CR1	1010786-7	DIODE	IN963B		
CR2	1010786-7		IN963B		
CR3	1010786-7		IN963B		
CR4	1010385		IN660		
CR5					
CR6					
CR7					
CR8					
CR9					
CR10					
CR11					
CR12					
CR13					
CR14					
CR15	1010385		IN660		
CR16	1010372-5		IN703B	±5%	
CR17	1010786-7		IN963B		
CR18	1010385		IN660		
CR19	1010385		IN660		
Q1	1010343-3	TRANSISTOR	2N2351A		
Q2	-				
Q3	-				
Q4	-				
Q5	-				
Q6	-				
Q7	-				
Q8	-				
Q9	-				
Q10	-				
Q11	-				
Q12	-				
Q13	-				
Q14	-				
Q15	-				
Q16	-				
Q17	-				
Q18	-				
Q19	-				
Q20	-				
Q21	-				
Q22	-				
Q23	-				
Q24	1010343-3		2N2351A		
Q25	1010342		2N998		
Q26	1010652		2N2980		
Q27	1006752		2N914		
Q28	1010342		2N998		
Q29	1010652		2N2980		
Q30	1006752		2N914		
Q31	1006752		2N914		
Q32	1006752		2N914		
A1	SEE NOTE 4	AMPLIFIER			
T1	1010725	TRANSFORMER			
T2	1010725				
T3	1010725				
T4	1010274				
T5	1010274				

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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DWG. NO. CONTRACT
DRAWN A. Di Leo DATE 7 APR 64
CHECKED C. I. T. Bakaly 1 June 64
APPROVAL R. Konopka 2 June 64
APPROVAL D. Z. Cushman 2 Jun 64
NASA APPROVAL 6/2/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
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SCHEMATIC, COARSE SYSTEM ELECTRONICS, CDU

CODE IDENT NO. — SIZE E NASA DRAWING NO. 2010030
SCALE — WT — SHEET 2 OF 2

MASTER

2010030

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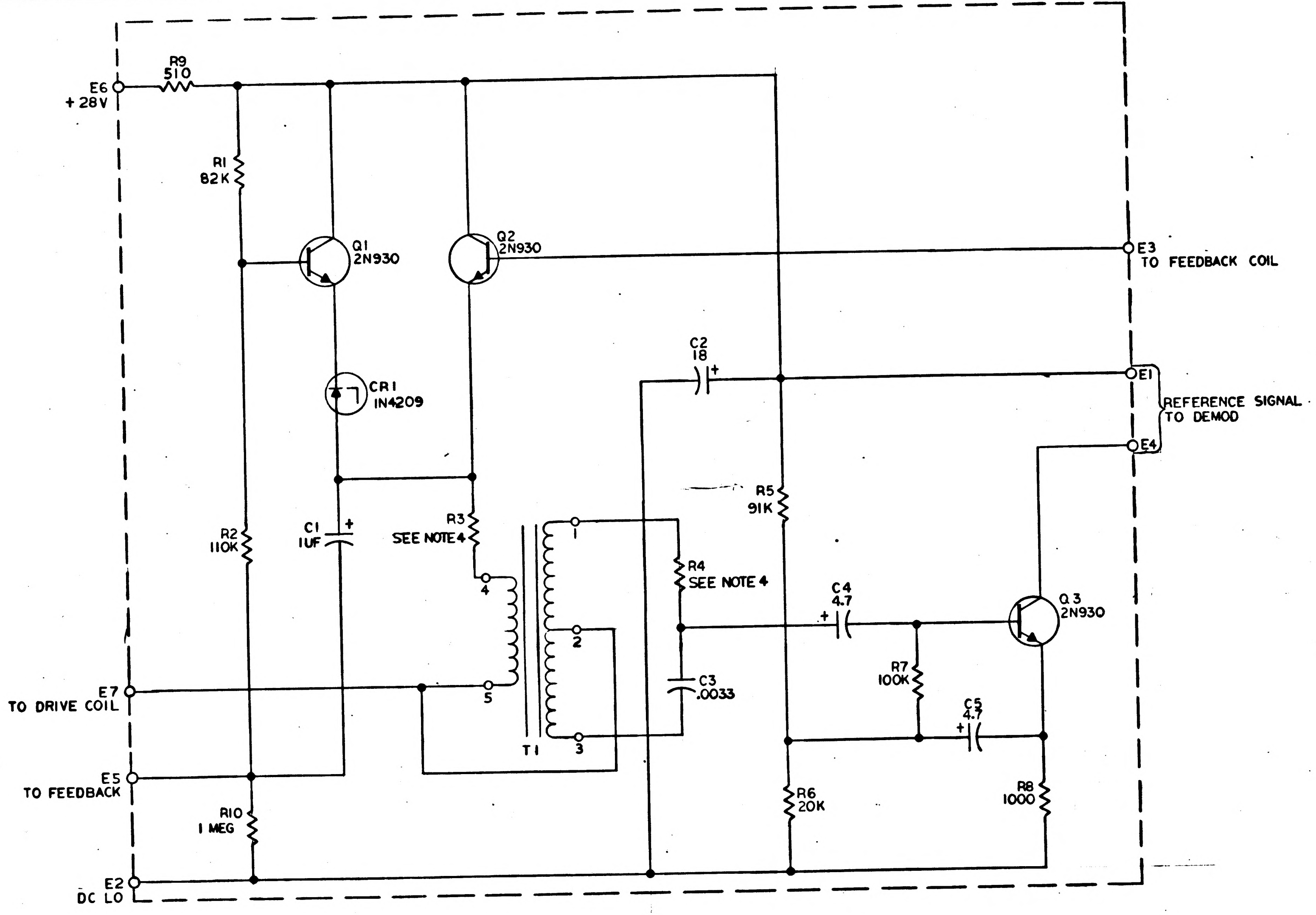
REVISIONS 08632			
SYM	DESCRIPTION	DATE	APPROVAL



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 — 69	CAPACITOR	1 UF	±10%	35V DC
C2	1010393 — 044	↑	18UF	±10%	50V DC
C3	1006793 — 19		.0033UF	± 2%	500V DC
C4	1006755 — 77	↓	4.7UF	±10%	35V DC
C5	1006755 — 77	CAPACITOR	4.7UF	±10%	35V DC
CR1	1012056 — 11	DIODE	1N4109	±5%	15V DC
Q1	1010397 —1	TRANSISTOR	2N930		
Q2	1010397 —1	TRANSISTOR	2N930		
Q3	1010397 —1	TRANSISTOR	2N930		
R1	1006750 — 78	RESISTOR	82 K	±2%	1/4 W
R2	1006750 — 81	↑	110 K	±2%	1/4 W
R3	SEE NOTE 4				
R4	SEE NOTE 4				
R5	1006750 — 79		91 K	±2%	1/4 W
R6	↑ — 63		20K	↑	↑
R7	— 80		100K		
R8	↓ — 32		1000	↓	↓
R9	1006750 — 25	↓	510	±2%	1/4 W
R10	1010768 — 29	RESISTOR	1 MEG	±1%	1/8 W
T1	1010709	TRANSFORMER			

REF DWG:
HEAD "X" ELECTRONICS TRACKER ASSEMBLY
DWG NO. 2007009

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHEWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUES OF R3 AND R4 TO BE SELECTED AT FINAL TEST PART TO BE SELECTED FROM CHARTS A AND B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

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APPROVAL
NASA APPROVAL W. J. Rhine 5-22-64
MIT APPROVAL W. Kupfer 22 May 64

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SCHEMATIC, HEAD "X" ELECTRONICS (TRACKER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010032
SCALE NONE
WT —
SHEET 1 OF 2

2010032

LVD

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

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REVISIONS 06632

SYM	DESCRIPTION	DATE	APPROVAL

CHART A

R3 ±2% 1/4W

PART NO.	VALUE
1006750-32	1000
-33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
-42	2700
1006750-43	3000

CHART B

R4 ±1% 1/8W

PART NO.	VALUE
1010364-635	100K
-637	102K
-639	105K
-641	107K
-643	110K
-645	113K
-647	115K
-649	118K
-651	121K
-653	124K
-655	127K
-657	130K
-659	133K
-661	137K
-663	140K
-665	143K
-667	147K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
-695	205K
-697	210K
-699	215K
-701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
-725	294K
1010364-727	301K

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

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APPROVAL DA Koso
APPROVAL
NASA APPROVAL W.J. Rhine 5-22-64
MIT APPROVAL W Kupfer 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
HEAD "X" ELECTRONICS
(TRACKER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010032
SCALE NONE
WT —
SHEET 2 OF 2

INCHES
0 1 2

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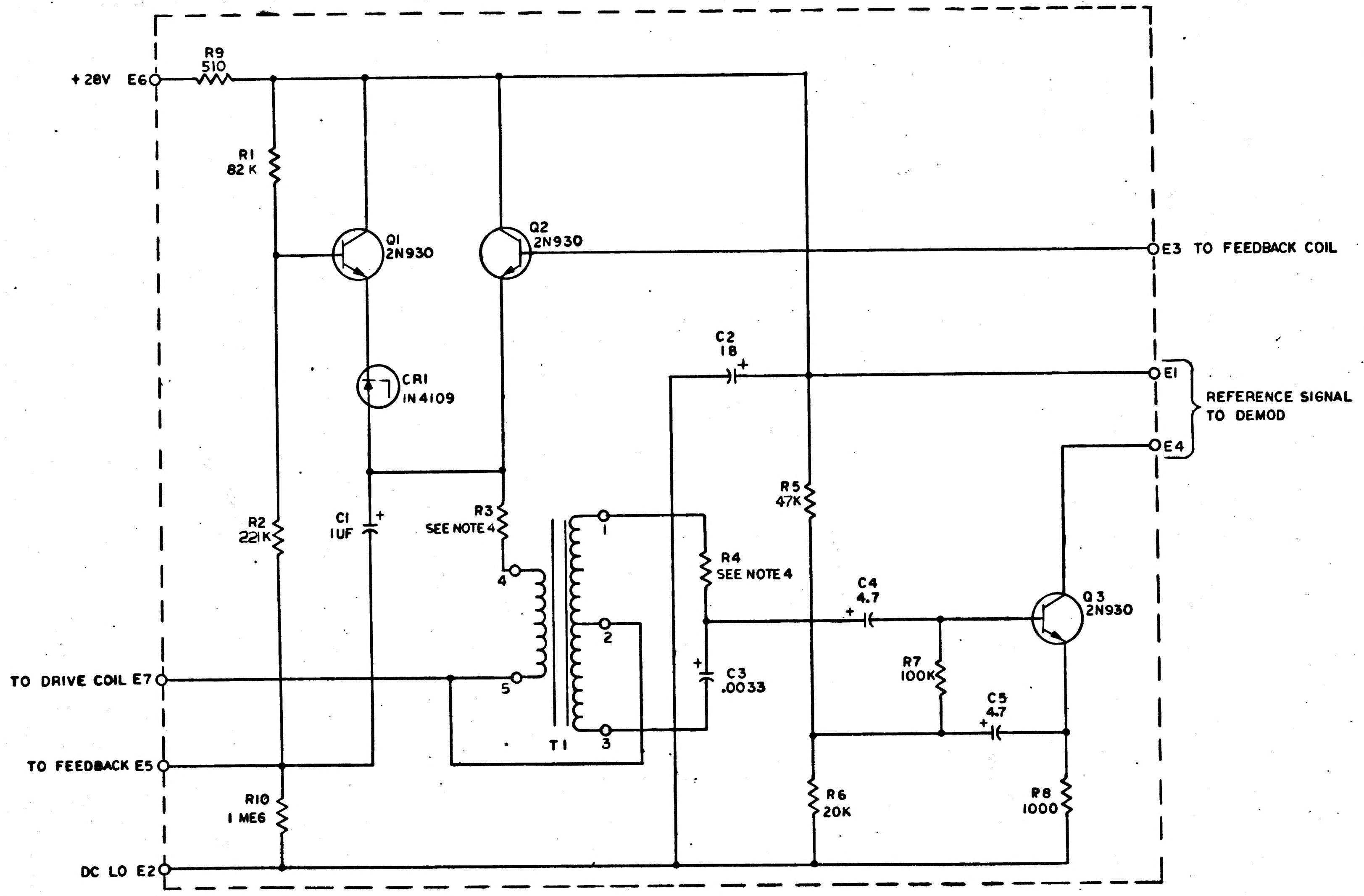
REVISIONS 08632

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 11643	[illegible]	[illegible]



+28V E6
R9 510
R1 82K
Q1 2N930
Q2 2N930
E3 TO FEEDBACK COIL
CR1 1N4109
C2 18
E1
E4
REFERENCE SIGNAL TO DEMOD
R2 221K
C1 1UF
R3 SEE NOTE 4
R4 SEE NOTE 4
R5 47K
C4 4.7
Q3 2N930
R7 100K
C3 .0033
C5 4.7
TO DRIVE COIL E7
TO FEEDBACK E5
T1
1
2
3
4
5
R10 1 MEG
R6 20K
R8 1000
DC LO E2

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 – 69	CAPACITOR	1 UF	± 10 %	35V DC
C2	1010393 – 044	↑	18UF	± 10%	50VDC
C3	1006793 – 19		.0033UF	± 2 %	500V DC
C4	1006755 – 77	↓	4.7UF	± 10 %	35V DC
C5	1006755 – 77	CAPACITOR	4.7UF	± 10%	35VDC
CR1	1012056 – 11	DIODE	1N4109	±5%	15V DC
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010397-1	TRANSISTOR	2N930		
R1	1006750 – 78	RESISTOR	82 K	±2%	1/4 W
R2	1010364 - 701	↑	221K	±2%	1/8 W
R3	SEE NOTE 4				
R4	SEE NOTE 4				
R5	1006750 - 72		47K	±2%	1/4 W
R6	↑ - 63		20K	↑	↑
R7	- 80		100K		
R8	↓ - 32		1000	↓	↓
R9	1006750 – 25	↓	510	±2 %	1/4 W
R10	1010768 – 29	RESISTOR	1 MEG	±.1 %	1/8 W
T1	1010709	TRANSFORMER			

REF DWG:
HEAD Y ELECTRONICS (TRACKER)
DWG NO.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUES OF R3 AND R4 TO BE SELECTED AT FINAL TEST PART TO BE SELECTED FROM CHARTS A AND B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DWG. NO. CONTRACT
DRAWN R.D. [illegible] DATE [illegible]
CHECKED M. [illegible]
APPROVAL DaKoso
APPROVAL
NASA APPROVAL W. J. [illegible] 5-22-64
MIT APPROVAL [illegible] 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, HEAD Y ELECTRONICS (TRACKER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010033
SCALE — WT — SHEET 1 OF 2

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REVISIONS 08632

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 11643	18 Aug 64	L.T.B. WK

CHART A

R3 ±2% 1/4W	
PART NO.	VALUE
1006750-32	1000
-33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
-42	2700
1006750-43	3000

CHART B

R4 ±1% 1/8W	
PART NO.	VALUE
1010364-635	100K
-637	102 K
-639	105K
-641	107K
-643	110K
-645	113K
-647	115K
-649	118K
-651	121K
-653	124K
-655	127K
-657	130K
-659	133K
-661	137K
-663	140K
-665	143K
-667	147 K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
-695	205K
-697	210K
-699	215K
-701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
-725	294K
1010364-727	301K

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

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DRAWN R.D. DATE 12 MAY 64
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APPROVAL
NASA APPROVAL W. J. 5-22-64
MIT APPROVAL 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, HEAD Y ELECTRONICS (TRACKER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010033
SCALE —
WT —
SHEET 2 OF 2

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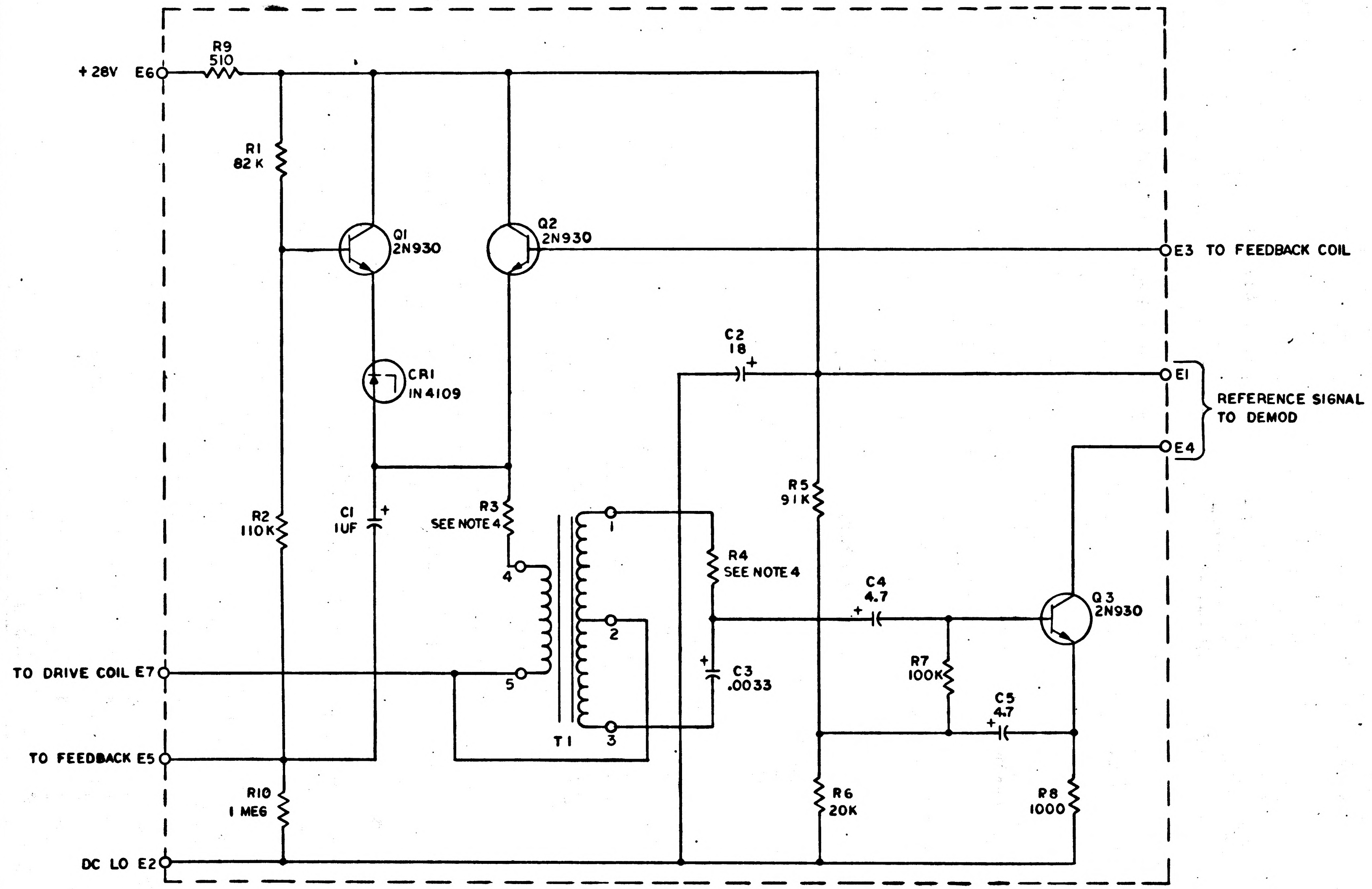
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

OR632


+28V E6
R9
510
R1
82 K
Q1
2N930
Q2
2N930
E3 TO FEEDBACK COIL
CR1
IN4109
C2
18
E1
REFERENCE SIGNAL
TO DEMOD
E4
R2
110K
C1
1UF
R3
SEE NOTE 4
R5
91K
R4
SEE NOTE 4
1
4
2
C4
4.7
Q3
2N930
TO DRIVE COIL E7
5
C3
.0033
R7
100K
C5
4.7
T1
3
TO FEEDBACK E5
R10
1 MEG
R6
20K
R8
1000
DC LO E2

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 – 69	CAPACITOR	1 UF	± 10 %	35V DC
C2	1010393 – 044	↑	18UF	± 10%	50VDC
C3	1006793 – 19		.0033UF	± 2 %	500V DC
C4	1006755 – 77	↓	4.7UF	± 10 %	35V DC
C5	1006755 – 77	CAPACITOR	4.7UF	± 10%	35V DC
CR1	1012056 – 11	DIODE	IN4109	±5%	15V DC
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010397-1	TRANSISTOR	2N930		
R1	1006750 – 78	RESISTOR	82 K	±2%	1/4 W
R2	1006750 – 81	↑	110 K	±2%	1/4 W
R3	SEE NOTE 4				
R4	SEE NOTE 4				
R5	1006750 – 79		91K	±2%	1/4 W
R6	↑ – 63		20K	↑	↑
R7	– 80		100K		
R8	↓ – 32		1000	↓	↓
R9	1006750 – 25	↓	510	±2 %	1/4 W
R10	1010768 – 29	RESISTOR	1 MEG	±.1%	1/8 W
T1	1010709	TRANSFORMER			

REF DWG:
HEAD Y ELECTRONICS (TRACKER)
DWG NO.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUES OF R3 AND R4 TO BE SELECTED AT FINAL TEST PART TO BE SELECTED FROM CHARTS A AND B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R.D. Glaning DATE 12 May 64
CHECKED M Tanton
APPROVAL DAKoso
APPROVAL
NASA APPROVAL W J Rhine 5-22-64
MIT APPROVAL W Cypher 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, HEAD Y ELECTRONICS (TRACKER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010033
SCALE — WT — SHEET 1 OF 2

INCHES
0 1 2

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS 08632

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

CHART A

R3 ±2% 1/4W

PART NO.	VALUE
1006750-32	1000
-33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
-42	2700
1006750-43	3000

CHART B

R4 ±1% 1/8W

PART NO.	VALUE
1010364-635	100K
-637	102K
-639	105K
-641	107K
-643	110K
-645	113K
-647	115K
-649	118K
-651	121K
-653	124K
-655	127K
-657	130K
-659	133K
-661	137K
-663	140K
-665	143K
-667	147K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
-695	205K
-697	210K
-699	215K
-701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
-725	294K
1010364-727	301K

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R.D. DATE 12 MAY 69
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 5-22-69
MIT APPROVAL 22 May 69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, HEAD Y ELECTRONICS (TRACKER)

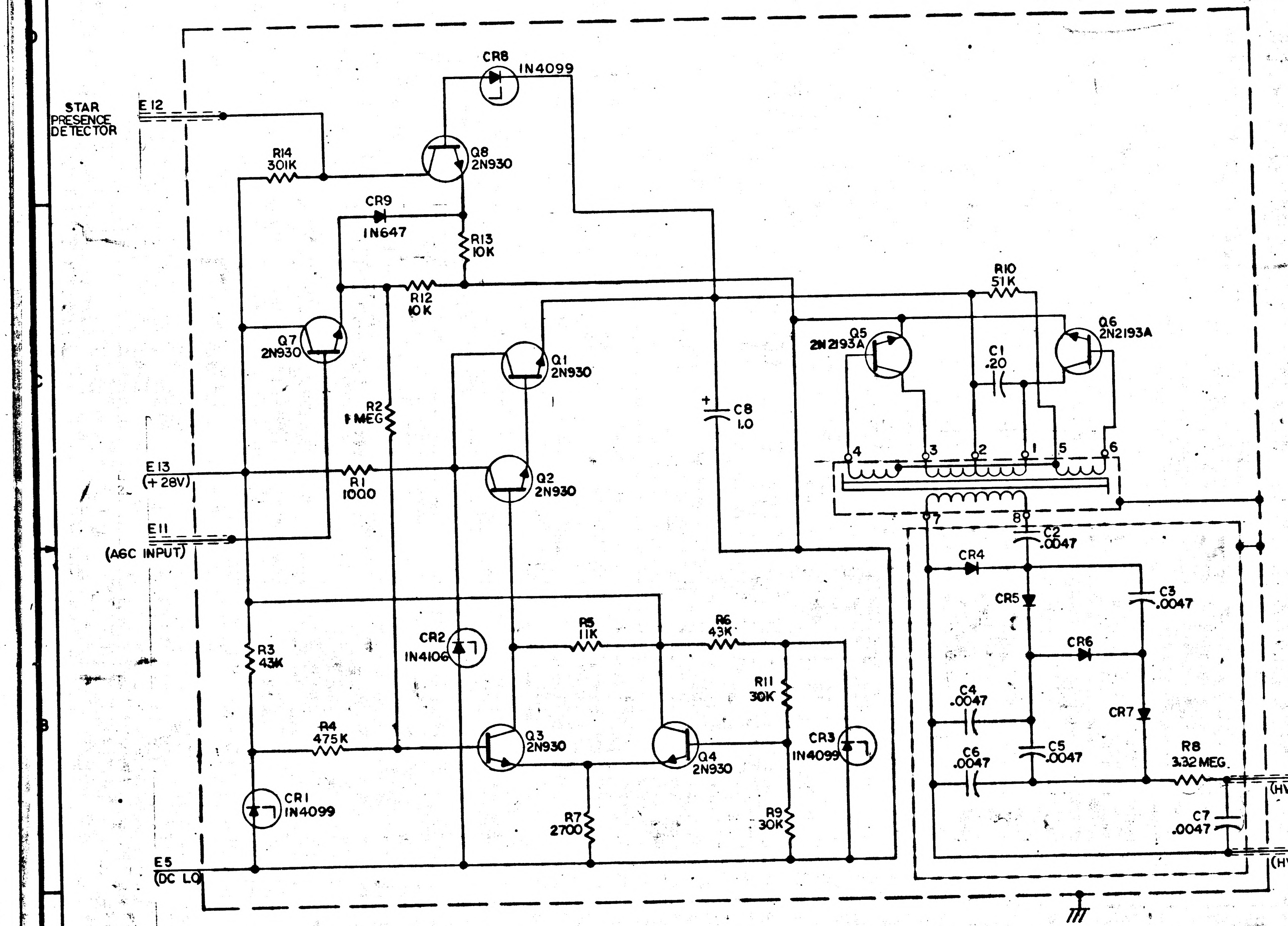
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010033
SCALE —
WT —
SHEET 2 OF 2

LVD

INCHES
0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY [illegible] OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 8632			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12879	11 Apr 65	[illegible]


STAR PRESENCE DETECTOR
E12
E13
(+28V)
E11
(AGC INPUT)
E5
(DC LO)
E4
(HV+)
E1
(HV–)
CR8
IN4099
Q8
2N930
R14
301K
CR9
IN647
R13
10K
R12
10K
Q7
2N930
R2
1 MEG
R1
1000
Q1
2N930
Q2
2N930
C8
1.0
R10
51K
Q5
2N2193A
Q6
2N2193A
C1
.20
4
3
2
1
5
6
7
8
C2
.0047
CR4
CR5
C3
.0047
CR6
CR7
C4
.0047
C6
.0047
C5
.0047
R8
3.32 MEG.
C7
.0047
R3
43K
R4
475K
CR1
IN4099
CR2
IN4106
R5
11K
R6
43K
Q3
2N930
Q4
2N930
R11
30K
CR3
IN4099
R7
2700
R9
30K

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1012141	CAPACITOR	.20 UF	±20%	200VDC
C2	1012041 – 3		.0047UF		4KVDC
C3	–3				
C4	–3				
C5	–3				
C6	–3				
C7	1012041 – 3		.0047UF	±20%	4KVDC
C8	1006755–69	CAPACITOR	1.0UF	±10%	35VDC
CR1	1012056 – 1	DIODE	IN4099	±5%	6.8V
CR2	1012056 – 8		IN4106		12V
CR3	1012056 – 1		IN4099		6.8V
CR4	1012042				4KV
CR5	1012042				4KV
CR6	1012042				4KV
CR7	1012042				4KV
CR8	1012056 – 1		IN4099	±5%	6.8V
CR9	1010362–002	DIODE	IN647		400V
Q1	1010397 –1	TRANSISTOR	2N930		
Q2	1010397 –1		2N930		
Q3	1010397 –1		2N930		
Q4	1010397 –1		2N930		
Q5	1010398 – 1		2N2193A		
Q6	1010398 – 1		2N2193A		
Q7	1010397 – 1		2N930		
Q8	1010397 – 1	TRANSISTOR	2N930		
R1	1006750 – 32	RESISTOR	1000	±2%	1/4 W
R2	1010768 – 29		1 MEG	±1%	1/8 W
R3	1006750 – 71		43K	±2%	1/4 W
R4	1010364–765		475 K	±1%	1/8 W
R5	1006750 – 57		11K	±2%	1/4 W
R6	1006750– 71		43K	±2	1/4 W
R7	1006750– 42		2700	±2	1/4 W
R8	1010768 –79		3.32MEG	±1	1/8 W
R9	1006750– 67		30K	±2	1/4 W
R10	1006750 – 73		51 K	±2%	1/4 W
R11	1006750 – 67		30K	±2%	1/4 W
R12	1006750 – 56		10 K	±2%	1/4 W
R13	1006750 – 56		10 K	±2%	1/4 W
R14	1010364 – 727	RESISTOR	301 K	±1%	1/8 W
T1	1012148	TRANSFORMER			

REF DRAWING:
POWER SUPPLY (TRACKER) ASSEMBLY
DWG NO. 2007006

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES TO BE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES TO BE IN MICROFARADS
4. DASH LINES INDICATE METAL SHIELD

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Walsh DATE 5/8/64
CHECKED M. Boston
APPROVAL D.A. Kosso
APPROVAL
NASA APPROVAL W. J. Rhine 5-22-64
MIT APPROVAL [illegible] 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

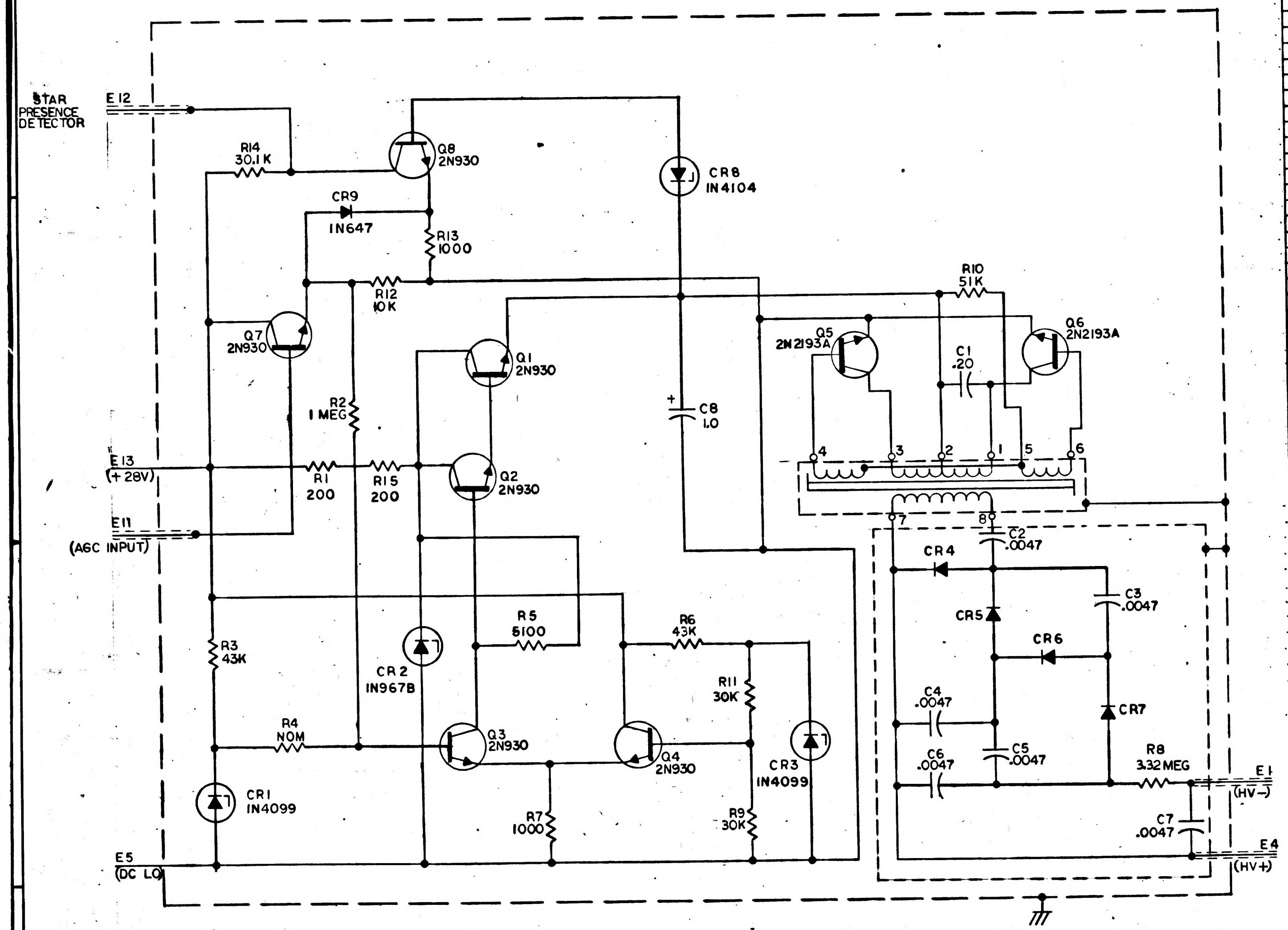
SCHEMATIC, POWER SUPPLY (TRACKER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010036
SCALE — WT — SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 8632

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12879	[illegible]	[illegible]
B	REVISED PER TDRR 18132	16APR65	WK


STAR PRESENCE DETECTOR
E12
E13 (+28V)
E11 (AGC INPUT)
E5 (DC LO)
E1 (HV−)
E4 (HV+)
R14 30.1K
Q8 2N930
CR9 1N647
R13 1000
R12 10K
CR8 1N4104
Q7 2N930
Q1 2N930
R2 1 MEG
C8 1.0
R1 200
R15 200
Q2 2N930
R10 51K
Q5 2N2193A
Q6 2N2193A
C1 .20
4 3 2 1 5 6
7 8
C2 .0047
CR4
CR5
CR6
C3 .0047
CR7
C4 .0047
C5 .0047
C6 .0047
R8 3.32MEG
C7 .0047
R5 5100
R6 43K
R3 43K
CR2 1N967B
R11 30K
R4 NOM
Q3 2N930
Q4 2N930
CR3 1N4099
CR1 1N4099
R7 1000
R9 30K

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1012141	CAPACITOR	.20 UF	±20%	200VDC
C2	1012041 — 3	↑	.0047UF	↑	4KVDC
C3	↑ — 3		↑		↑
C4	— 3				
C5	— 3				
C6	↓ — 3		↓	↓	↓
C7	1012041 — 3	↓	.0047UF	±20%	4KVDC
C8	1006755—69	CAPACITOR	1.0UF	±10%	35VDC
CR1	1012056 - 1	DIODE	IN4099	±5%	6.8V
CR2	1010830-11	↑	IN967B	↑	18V
CR3	1012056 - 1		IN4099		6.8V
CR4	1012042				4KV
CR5	1012042				4KV
CR6	1012042				4KV
CR7	1012042			↓	4KV
CR8	1012056-6	↓	IN4104	±5%	10V
CR9	1010362-002	DIODE	IN647		400V
Q1	1010397 -1	TRANSISTOR	2N930		
Q2	1010397 -1	↑	2N930		
Q3	1010397 -1		2N930		
Q4	1010397 -1		2N930		
Q5	1010398 -1		2N2193A		
Q6	1010398 -1		2N2193A		
Q7	1010397 -1	↓	2N930		
Q8	1010397 -1	TRANSISTOR	2N930		
R1	1006750—15	RESISTOR	200	±2 %	1/4 W
R2	1010768—29	↑	1 MEG	±1 %	1/8 W
R3	1006750—71		43K	±2 %	1/4 W
R4	SEE NOTE 5		NOM	±1 %	1/8 W
R5	1006750—49		5100	±2 %	1/4 W
R6	1006750—71		43K	±2 %	1/4 W
R7	1006750-32		1000	±2 %	1/4 W
R8	1010768—79		3.32MEG	±1 %	1/8 W
R9	1006750—67		30K	±2 %	1/4 W
R10	1006750 — 73		51 K	±2 %	1/4 W
R11	1006750—67		30K	±2 %	1/4 W
R12	1006750 — 56		10 K	±2 %	1/4 W
R13	1006750 — 32		1000	±2 %	1/4 W
R14	1010364 —535	↓	30.1K	±1 %	1/8 W
R15	1006750-15	RESISTOR	200	±2 %	1/4 W
T1	1012148	TRANSFORMER			

REF DRAWING:
POWER SUPPLY (TRACKER) ASSEMBLY
DWG NO. 2007032

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES TO BE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES TO BE IN MICROFARADS
4. DASH LINES INDICATE METAL SHIELD
5. SELECT R4 PER APPLICABLE PS FROM APPROPRIATE CHART

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —/—
HEAT TREATMENT —/—
FINAL FINISH —/—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Welch DATE 5/8/64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 5-22-64
MIT APPROVAL 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
POWER SUPPLY
(TRACKER)

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010036
SCALE —/— WT —/— SHEET 1 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
B		REVISED PER TDRR 18132	adL	cap	14APR65	

R 4	
PART NO.	VALUE
1010768 - 127	100 K
- 128	102 K
- 129	105 K
- 130	107 K
- 131	110 K
- 132	113 K
- 133	115 K
- 134	118 K
- 135	121 K
- 136	124 K
- 137	127 K
- 138	130 K
- 139	133 K
- 140	137 K
- 141	140 K
- 142	143 K
- 143	147 K
- 144	150 K
- 145	154 K
- 146	158 K
- 147	162 K
- 148	165 K
- 149	169 K
- 150	174 K
- 151	178 K
- 152	182 K
- 153	187 K
- 154	191 K
- 155	196 K
- 156	200 K
- 157	205 K
- 158	210 K
- 159	215 K
- 160	221 K
- 161	226 K
- 162	232 K
- 163	237 K
- 164	243 K
- 165	249 K
- 166	255 K
- 167	261 K
- 168	267 K
- 169	274 K
- 170	280 K
- 171	287 K
- 172	294 K
- 173	301 K
- 174	309 K
- 175	316 K
1010768 - 176	324 K

R4	
PART NO.	VALUE
1010768 -177	332 K
-178	340 K
-179	348 K
-180	357 K
-181	365 K
-182	374 K
-183	383 K
-184	392 K
-185	402 K
-186	412 K
-187	422 K
-188	432 K
-189	442 K
-190	453 K
-191	464 K
-192	475 K
-193	487 K
-194	499 K
-1	511 K
-2	523 K
-3	536 K
-4	549 K
-5	562 K
-6	576 K
-7	590 K
-8	604 K
-9	619 K
-10	634 K
-11	649 K
-12	665 K
-13	681 K
-14	698 K
-15	715 K
-16	732 K
-17	750 K
-18	768 K
-19	787 K
-20	806 K
-21	825 K
-22	845 K
-23	866 K
-24	887 K
-25	909 K
-26	931 K
-27	953 K
-28	976 K
1010768 - 29	1 MEG

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 15 APR 65
CHECKED
APPROVED 21 APR 65
APPROVED
APPROVED MIT 21 4 65
APPROVED MSC 4/21/65
DATE

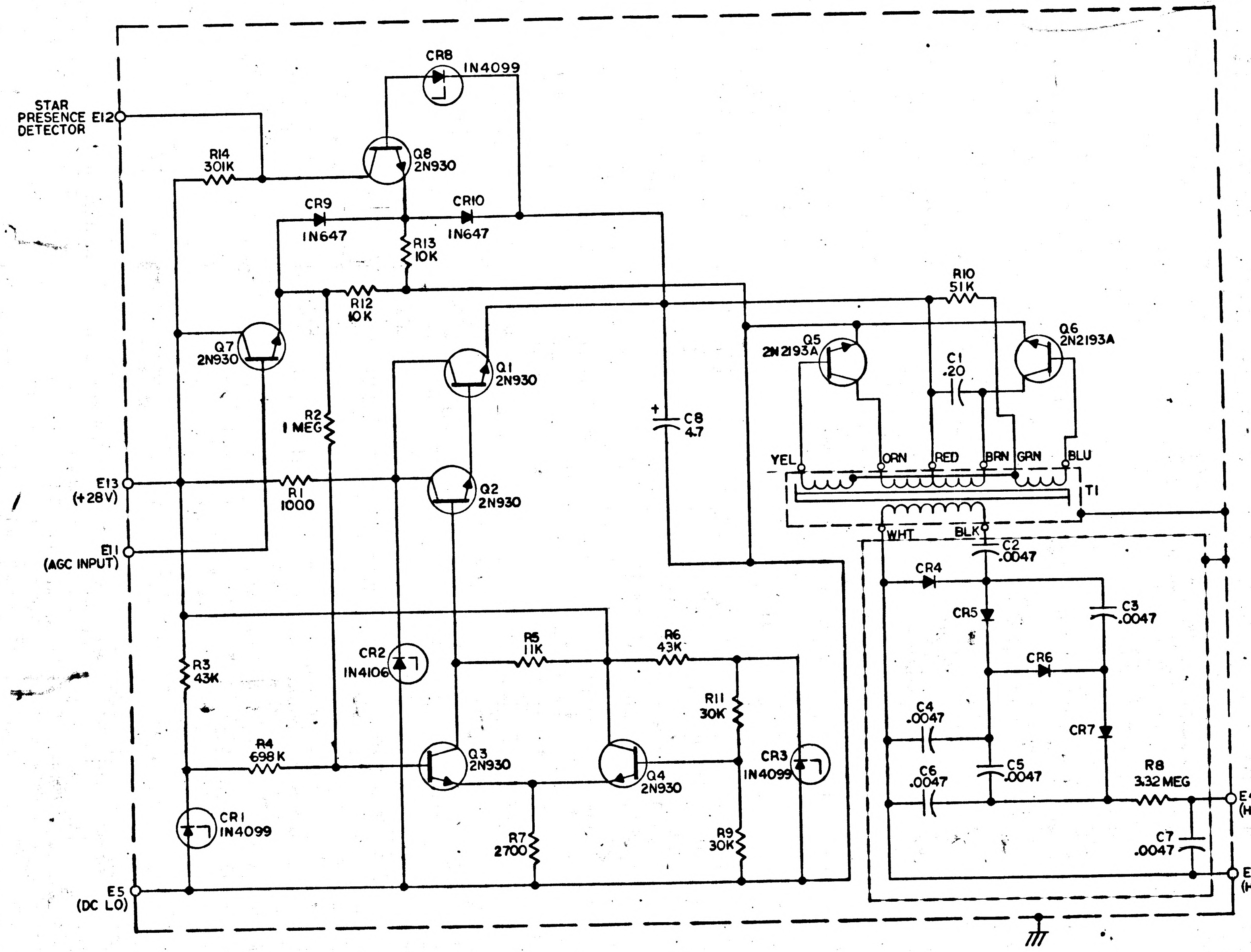
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
POWER SUPPLY
(TRACKER)

CODE IDENT NO. 80230
SIZE D
DRAWING NO. 2010036
SCALE
SHEET 2 OF 2

REVISIONS 8632			
SYM	DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


STAR PRESENCE DETECTOR E12
CR8 1N4099
Q8 2N930
R14 301K
CR9 1N647
CR10 1N647
R13 10K
R12 10K
Q7 2N930
Q1 2N930
R2 1 MEG
C8 4.7
E13 (+28V)
R1 1000
Q2 2N930
E11 (AGC INPUT)
R10 51K
Q5 2N2193A
C1 .20
Q6 2N2193A
YEL
ORN
RED
BRN
GRN
BLU
T1
WHT
BLK
C2 .0047
CR4
CR5
C3 .0047
CR6
CR7
C4 .0047
C5 .0047
C6 .0047
R8 3.32 MEG
C7 .0047
E4 (HV +)
E1 (HV −)
CR2 1N4106
R5 11K
R6 43K
R3 43K
R11 30K
R4 698K
Q3 2N930
Q4 2N930
CR3 1N4099
CR1 1N4099
R7 2700
R9 30K
E5 (DC LO)

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1012141	CAPACITOR	.20 UF	±20%	200VDC
C2	1012041 − 3		.0047UF		4KVDC
C3	−3				
C4	−3				
C5	−3				
C6	−3				
C7	1012041 − 3		.0047UF	±20%	4KVDC
C8	1006755−77	CAPACITOR	4.7UF	±10%	35VDC
CR1	1012056 − 1	DIODE	IN4099	±5%	6.8V
CR2	1012056 − 8		IN4106		12V
CR3	1012056 − 1		IN4099		6.8V
CR4	1012042				4KV
CR5	1012042				4KV
CR6	1012042				4KV
CR7	1012042				4KV
CR8	1012056 − 1		IN4099	±5%	6.8V
CR9	1010362-002		IN647		400V
CR10	1010362-002	DIODE	IN647		400V
Q1	1010397 −1	TRANSISTOR	2N930		
Q2	1010397 −1		2N930		
Q3	1010397 −1		2N930		
Q4	1010397 −1		2N930		
Q5	1010398 − 1		2N2193A		
Q6	1010398 − 1		2N2193A		
Q7	1010397 −1		2N930		
Q8	1010397 −1	TRANSISTOR	2N930		
R1	1006750−32	RESISTOR	1000	±2%	1/4 W
R2	1010768−29		1 MEG	±1%	1/8 W
R3	1006750−71		43K	±2%	1/4 W
R4	1010768 − 14		698K	±1%	1/8 W
R5	1006750−57		11K	±2%	1/4 W
R6	1006750−71		43K	±2	1/4 W
R7	1006750−42		2700	±2	1/4 W
R8	1010768−79		3.32MEG	±1	1/8 W
R9	1006750−67		30K	±2	1/4 W
R10	1006750 −73		51 K	±2%	1/4 W
R11	1006750−67		30K	±2%	1/4 W
R12	1006750 − 56		10 K	±2%	1/4 W
R13	1006750 − 56		10 K	±2%	1/4 W
R14	1010364 −727	RESISTOR	301 K	±1%	1/8 W
T1	1012047	TRANSFORMER			

REF DRAWING:
POWER SUPPLY (TRACKER) ASSEMBLY
DWG NO. 2007006

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES TO BE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES TO BE IN MICROFARADS
4. DASH LINES INDICATE METAL SHIELD

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J.F. Welch DATE 5/8/64
CHECKED M. Gorstein
APPROVAL D.A. Koso
APPROVAL
NASA APPROVAL W. J. Rhine 6-22-64
MIT APPROVAL 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY (TRACKER)

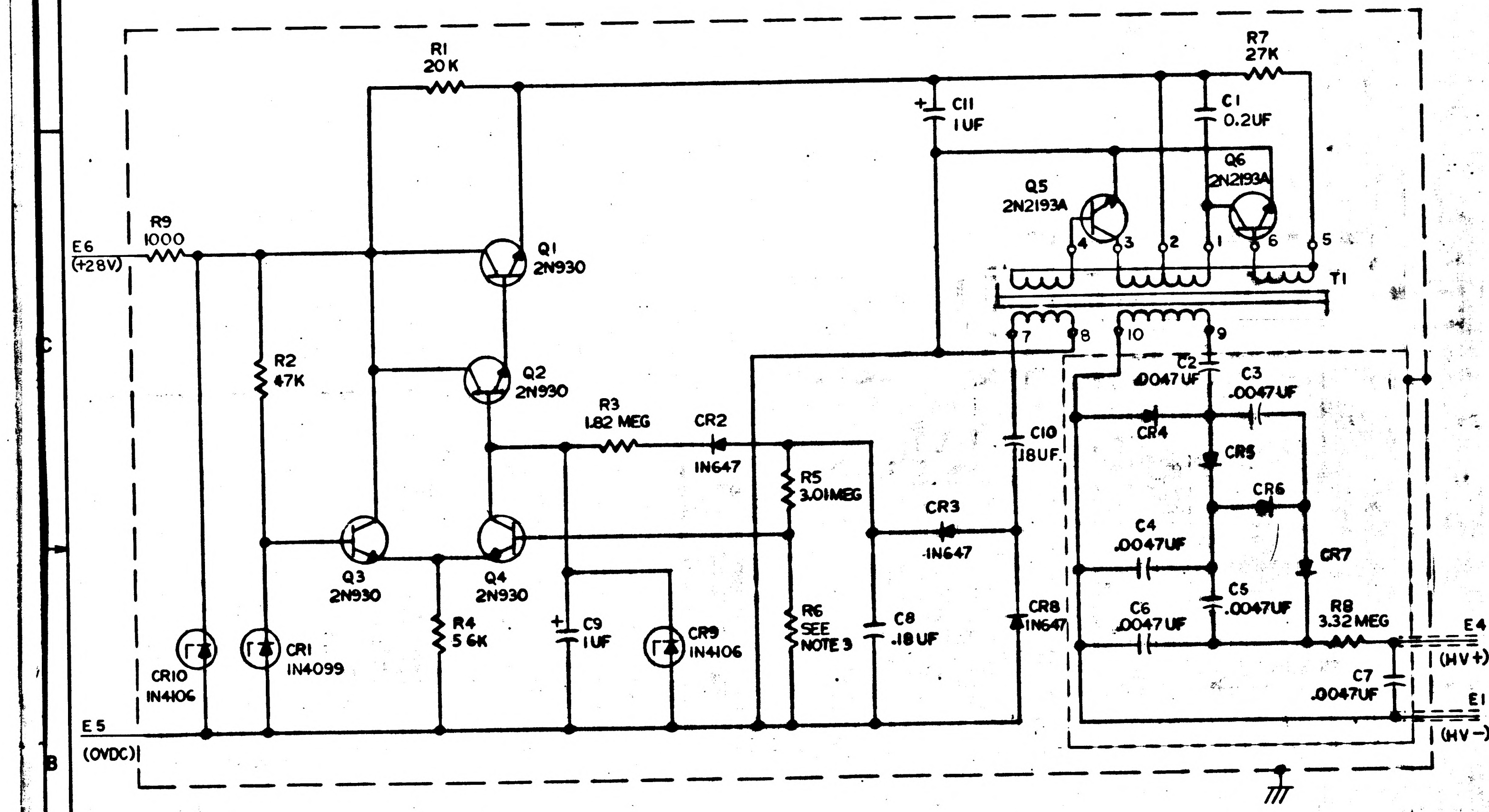
CODE IDENT NO. — SIZE D NASA DRAWING NO. 2010036
SCALE — WT — SHEET 1 OF 1

2010036

INCHES
0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08632			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12820		


R1
20K
R7
27K
C11
1UF
C1
0.2UF
Q5
2N2193A
Q6
2N2193A
4
3
2
1
6
5
T1
7
8
10
9
E6
(+28V)
R9
1000
Q1
2N930
Q2
2N930
R2
47K
R3
1.82 MEG
CR2
1N647
C2
.0047UF
C3
.0047UF
C10
.18UF.
CR4
CR5
CR6
R5
3.01MEG
CR3
1N647
C4
.0047UF
CR7
Q3
2N930
Q4
2N930
C9
1UF
CR9
1N4106
R6
SEE
NOTE 3
C8
.18UF
CR8
1N647
C6
.0047UF
C5
.0047UF
R8
3.32 MEG
E4
(HV+)
C7
.0047UF
E1
(HV-)
CR10
1N4106
CR1
1N4099
R4
5.6K
E5
(OVDC)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1012141	CAPACITOR	.2 UF	±20%	200VDC
C2	1012041 -3		.0047UF	±20 %	4 KVDC
C3	-3				
C4	-3				
C5	-3				
C6	-3				
C7	1012041 -3		.0047UF	±20%	4 KVDC
C8	1012142		.18 UF	±20%	150 VDC
C9	10006755-69		1 UF	±10%	35 VDC
C10	1012142		.18UF	±20%	150 VDC
C11	1006755-69	CAPACITOR	1UF	±10%	35VDC
CR1	1012056-1	DIODE	1N4099		6.8V
CR2	1010362-002		1N647		400V
CR3	1010362 -002		1N647		400V
CR4	1012042		MC1916		4KV
CR5	1012042		MC1916		4KV
CR6	1012042		MC1916		4KV
CR7	1012042		MC1916		4KV
CR8	1010362 - 002		1N647		400V
CR9	1012056 - 8		1N4106		12 V
CR10	1012 056 - 8	DIODE	1N4106		12 V
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	-1				
Q3	-1				
Q4	1010397 - 1		2N930		
Q5	1010398 - 1		2N2193A		
Q6	1010398 - 1	TRANSISTOR	2N2193A		
R1	1006750 - 63	RESISTOR	20K	±2%	1/4W
R2	1006750 - 72		47K	±2%	1/4W
R3	1010768 - 54		1.82MEG	±1%	1/8W
R4	1006750 - 74		56K	±2%	1/4W
R5	1010768 - 75		3.01MEG	±1%	1/8W
R6	SEE NOTE 4				
R7	1006750 - 66		27K	±2%	1/4W
R8	1010768 - 79		3.32MEG	±1%	1/8W
R9	1006760 - 32	RESISTOR	1000	±2%	1/2W
T1	1012149	TRANSFORMER			

REF DWG:
POWER SUPPLY PHOTOMETER ASS'Y
DWG NO. 2007005

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUE OF R6 TO BE SELECTED PER ATP
   PART TO BE SELECTED FROM CHART A
5. DASH LINES INDICATE METAL SHIELD

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN G. Babel DATE 5-11-64
CHECKED M. Gostus
APPROVAL AAKoso
APPROVAL
NASA APPROVAL W. J. Rhine 5-22-64
MIT APPROVAL W Kupfer 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY
(PHOTOMETER)

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010037
SCALE —
WT —
SHEET 1 OF 2

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08637

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12820		

CHART A

R6 ±1% 1/8W	
PART NO	VALUE
1010364-635	100 K
-637	102 K
-639	105 K
-641	107 K
-643	110 K
-645	113 K
-647	115 K
-649	118 K
-651	121 K
-653	124 K
-655	127 K
-657	130 K
-659	133 K
-661	137 K
-663	140 K
-665	143 K
-667	147 K
-669	150 K
-671	154 K
-673	158 K
-675	162 K
-677	165 K
-679	169 K
-681	174 K
-683	178 K
-685	182 K
-687	187 K
-689	191 K
-691	196 K
-693	200 K
-695	205 K
-697	210 K
-699	215 K
-701	221 K
-703	226 K
-705	232 K
-707	237 K
-709	243 K
-711	249 K
-713	255 K
-715	261 K
-717	267 K
-719	274 K
1010364-721	280K

CHART A

PART NO	VALUE
1010364 -723	287 K
-725	294 K
-727	301 K
-729	309 K
-731	316 K
-733	324 K
-735	332 K
-737	340 K
-739	348 K
-741	357 K
-743	365 K
-745	374 K
-747	383 K
-749	392 K
-751	402 K
-753	412 K
-755	422 K
-757	432 K
-759	442 K
-761	453 K
-763	464 K
-765	475 K
-767	487 K
1010364-769	499 K

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 5-22-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY
(PHOTOMETER)

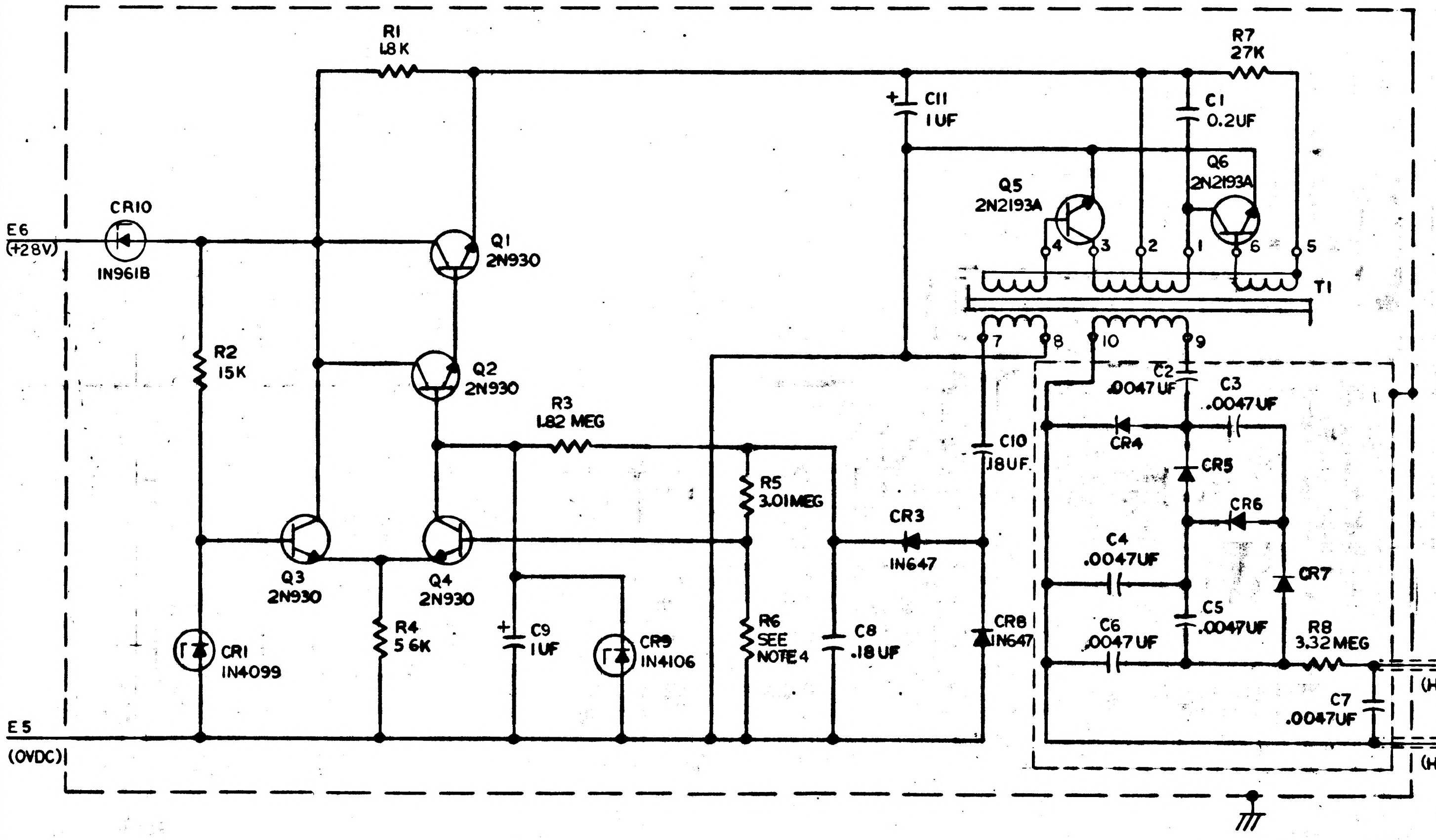
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010037
SCALE —
WT —
SHEET 2 OF 2

INCHES
0 1 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 0632

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12820	11 Sept 64	
B	REVISED PER TDRR 18131	15 Jan 65	


E6
(+28V)
CR10
IN961B
R1
1.8K
R2
15K
Q1
2N930
Q2
2N930
R3
1.82 MEG
Q3
2N930
Q4
2N930
CR1
IN4099
R4
5.6K
C9
1UF
CR9
IN4106
R5
3.01MEG
R6
SEE NOTE 4
C8
.18 UF
CR3
IN647
CR8
IN647
C10
.18UF
C11
1UF
Q5
2N2193A
Q6
2N2193A
C1
0.2UF
R7
27K
T1
1
2
3
4
5
6
7
8
9
10
C2
.0047UF
C3
.0047UF
CR4
CR5
CR6
CR7
C4
.0047UF
C5
.0047UF
C6
.0047UF
R8
3.32 MEG
C7
.0047UF
E1
(HV−)
E4
(HV+)
E5
(OVDC)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1012141	CAPACITOR	.2 UF	±20%	200VDC
C2	1012041 -3		.0047UF	±20 %	4 KVDC
C3	-3				
C4	-3				
C5	-3				
C6	-3				
C7	1012041 -3		.0047UF	±20%	4 KVDC
C8	1012142		.18 UF	±20%	150 VDC
C9	10006755-69		1 UF	±10%	35 VDC
C10	1012142		.18UF	±20%	150 VDC
C11	1006755-69	CAPACITOR	1UF	±10%	35VDC
CR1	1012056-1	DIODE	IN4099		6.8V
CR3	1010362 -002		IN647		400V
CR4	1012042		MC1916		4KV
CR5	1012042		MC1916		4KV
CR6	1012042		MC1916		4KV
CR7	1012042		MC1916		4KV
CR8	1010362 - 002		IN647		400V
CR9	1012056 - 8		IN4106		12V
CR10	1010830 - 5	DIODE	IN961B		10V
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	-1				
Q3	-1				
Q4	1010397 - 1		2N930		
Q5	1010398 - 1		2N2193A		
Q6	1010398 - 1	TRANSISTOR	2N2193A		
R1	1006750 - 38	RESISTOR	1.8K	±2%	1/4W
R2	1006750 - 60		15K	±2%	1/4W
R3	1010768 - 54		1.82 MEG	±1%	1/8W
R4	1006750 - 74		56K	±2%	1/4W
R5	1010768 - 75		3.01MEG	±1%	1/8W
R6	SEE NOTE 4				
R7	1006750 - 66		27K	±2%	1/4W
R8	1010768 - 79	RESISTOR	3.32MEG	±1%	1/8W
T1	1012149	TRANSFORMER			

REF DWG:
POWER SUPPLY PHOTOMETER ASS'Y
DWG NO. 2007031

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUE OF R6 TO BE SELECTED FROM CHART A
5. DASH LINES IDICATES METAL SHIELD

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

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DWG. NO. CONTRACT
DRAWN G. Babcock DATE 5-11-64
CHECKED M. Faustini
APPROVAL D.W. Koso
APPROVAL
NASA APPROVAL W. J. Rhine 5-22-64
MIT APPROVAL W Kupfer 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY
(PHOTOMETER)

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010037
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08632

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12820	[illegible]	[illegible]
B	REVISED PER TDRR 18131	[illegible] 65	WK

CHART A

R6 ±1% 1/8W	
PART NO.	VALUE
1010768 - 127	100K
-128	102K
-129	105K
-130	107K
-131	110K
-132	113K
-133	115K
-134	118K
-135	121K
-136	124K
-137	127K
-138	130K
-139	133K
-140	137K
-141	140K
-142	143K
-143	147K
-144	150K
-145	154K
-146	158K
-147	162K
-148	165K
-149	169K
-150	174K
-151	178K
-152	182K
-153	187K
-154	191K
-155	196K
-156	200K
-157	205K
-158	210K
-159	215K
-160	221K
-161	226K
-162	232K
-163	237K
-164	243K
-165	249K
-166	255K
-167	261K
-168	267K
-169	274K
-170	280K
-171	287K
-172	294K
-173	301K
-174	309K
1010768 -175	316K

CHART A (CONT.)

PART NO.	VALUE
1010768 -176	324K
-177	332K
-178	340K
-179	348K
-180	357K
-181	365K
-182	374K
-183	383K
-184	392K
-185	402K
-186	412K
-187	422K
-188	432K
-189	442K
-190	453K
-191	464K
-192	475K
-193	487K
-194	499K
-1	511K
-2	523K
-3	536K
-4	549K
-5	562K
-6	576K
-7	590K
-8	604K
-9	619K
-10	634K
-11	649K
-12	665K
-13	681K
-14	698K
-15	715K
-16	732K
-17	750K
-18	768K
-19	787K
-20	806K
-21	825K
-22	845K
-23	866K
-24	887K
-25	909K
-26	931K
-27	953K
-28	976K
1010768-29	1MEG

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN [illegible] DATE 5-1-64
CHECKED C M [illegible]
APPROVAL [illegible]
APPROVAL
NASA APPROVAL W J [illegible] 5-22-64
MIT APPROVAL W [illegible] 22 My 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY
(PHOTOMETER)

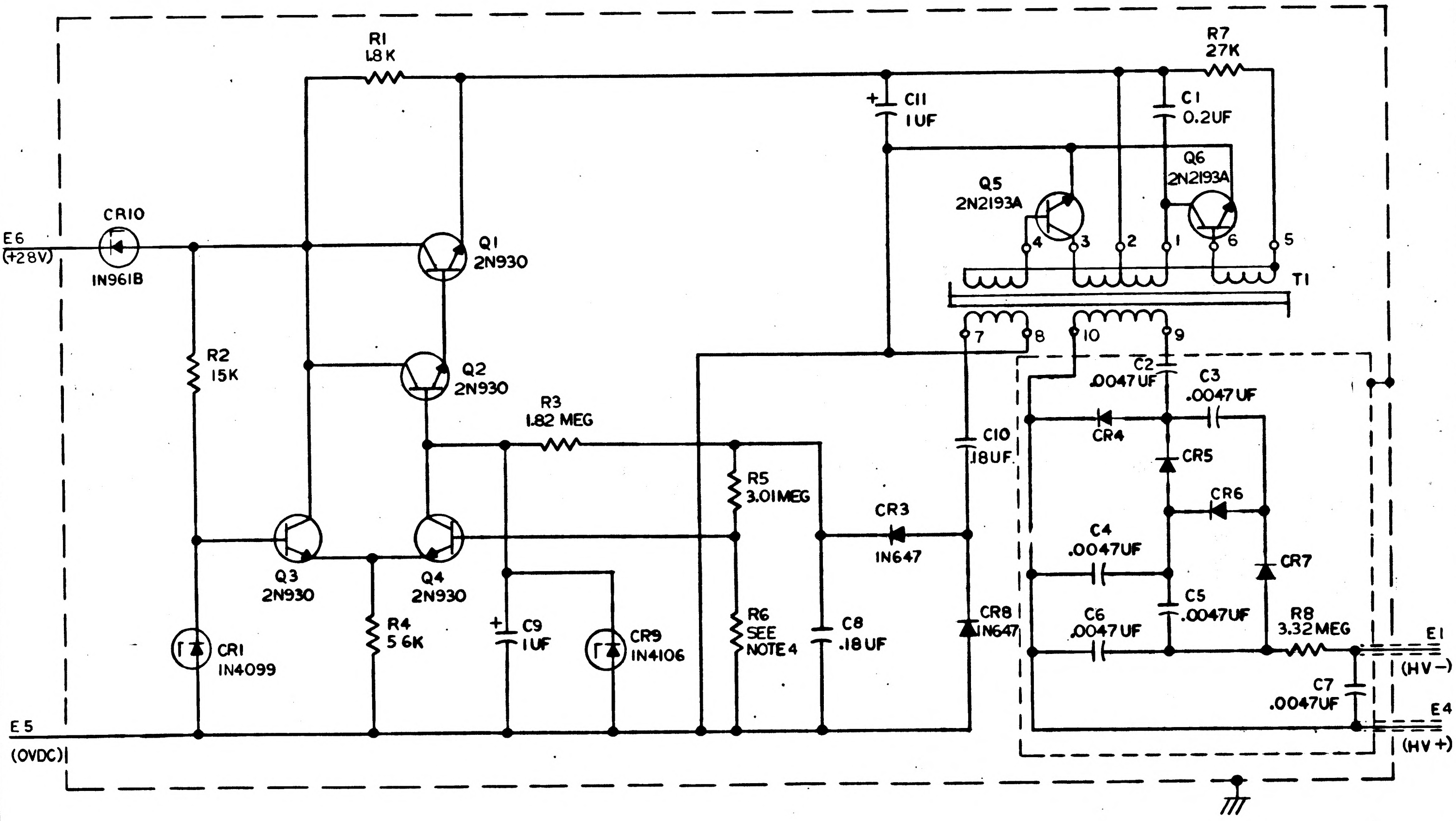
CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010037
SCALE —
WT —
SHEET 2 OF 2

2010037 B

END

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08632			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12820	11 Sept 64	E.H.L.
B	REVISED PER TDRR 18131	15 Dec 65	[illegible]
C	REVISED PER TDRR 21123	23 July 65	[illegible]


E6
(+28V)
CR10
IN961B
R1
1.8K
Q1
2N930
R2
15K
Q2
2N930
R3
1.82 MEG
Q3
2N930
Q4
2N930
CR1
IN4099
R4
5.6K
C9
1UF
CR9
IN4106
R5
3.01MEG
R6
SEE NOTE 4
C8
.18UF
CR3
IN647
C10
.18UF
CR8
IN647
C11
1UF
C1
0.2UF
R7
27K
Q5
2N2193A
Q6
2N2193A
1
2
3
4
5
6
7
8
9
10
T1
C2
.0047UF
C3
.0047UF
CR4
CR5
CR6
CR7
C4
.0047UF
C5
.0047UF
C6
.0047UF
R8
3.32MEG
C7
.0047UF
E1
(HV−)
E4
(HV+)
E5
(OVDC)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1012141	CAPACITOR	.2 UF	±20%	200VDC
C2	1012041 -3	↕	.0047UF	±20 %	4 KVDC
C3	↕ -3	↕	↕	↕	↕
C4	↕ -3	↕	↕	↕	↕
C5	↕ -3	↕	↕	↕	↕
C6	↕ -3	↕	↕	↕	↕
C7	1012041 -3	↕	.0047UF	±20%	4 KVDC
C8	1012142	↕	.18 UF	±20%	150 VDC
C9	10006755-69	↕	1 UF	±10%	35 VDC
C10	1012142	↕	.18UF	±20%	150 VDC
C11	1006755 - 69	CAPACITOR	1UF	±10%	35VDC
CR1	1012056 -1	DIODE	IN4099		6.8V
		↕			
CR3	1010362 -002	↕	IN647		400V
CR4	1012042	↕	MC1916		4KV
CR5	1012042	↕	MC1916		4KV
CR6	1012042	↕	MC1916		4KV
CR7	1012042	↕	MC1916		4KV
CR8	1010362 - 002	↕	IN647		400V
CR9	1012056 - 8	↕	IN4106		12V
CR10	1010830 - 5	DIODE	IN961B		10V
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	↕ -1	↕	↕		
Q3	↕ -1	↕	↕		
Q4	1010397 - 1	↕	2N930		
Q5	1010398 - 1	↕	2N2193A		
Q6	1010398 - 1	TRANSISTOR	2N2193A		
R1	1006750 - 38	RESISTOR	1.8K	±2%	1/4W
R2	1006750 - 60	↕	15K	±2%	1/4W
R3	1010768 - 54	↕	1.82 MEG	±1%	1/8W
R4	1006750 - 74	↕	56K	±2%	1/4W
R5	1010768 - 75	↕	3.01MEG	±1%	1/8W
R6	SEE NOTE 4	↕			
R7	1006750 - 66	↕	27K	±2%	1/4W
R8	1010768 - 79	RESISTOR	3.32MEG	±1%	1/8W
T1	1012149	TRANSFORMER			

REF DWG:
POWER SUPPLY PHOTOMETER ASS'Y
DWG NO. 2007031

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUE OF R6 TO BE SELECTED FROM APPROPRIATE CHART
5. DASH LINES IDICATES METAL SHIELD

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN G. Bahr DATE 5-11-64
CHECKED M. Forster
APPROVAL D.A. Koso
APPROVAL
NASA APPROVAL W. J. Rhine 5-22-64
MIT APPROVAL W Kupfer 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY
(PHOTOMETER)

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	D	2010037
SCALE —	WT —	SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 08637

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 12820	17 [illegible] 64	[illegible]
B	REVISED PER TDRR 18131	16 [illegible] 65	WK
C	REVISED PER TDRR 21123	23 July 65	WK

R6±1% 1/8W

PART NO.	VALUE	PART NO.	VALUE	PART NO.	VALUE
1010364-635	100K	1010364-703	226K	1010768-1	511K
-637	102K	-705	232K	-2	523K
-639	105K	-707	237K	-3	536K
-641	107K	-709	243K	-4	549K
-643	110K	-711	249K	-5	562K
-645	113K	-713	255K	-6	576K
-647	115K	-715	261K	-7	590K
-649	118K	-717	267K	-8	604K
-651	121K	-719	274K	-9	619K
-653	124K	-721	280K	-10	634K
-655	127K	-723	287K	-11	649K
-657	130K	-725	294K	-12	665K
-659	133K	-727	301K	-13	681K
-661	137K	-729	309K	-14	698K
-663	140K	-731	316K	-15	715K
-665	143K	-733	324K	-16	732K
-667	147K	-735	332K	-17	750K
-669	150K	-737	340K	-18	768K
-670	154K	-739	348K	-19	787K
-673	158K	-741	357K	-20	806K
-675	162K	-743	365K	-21	825K
-677	165K	-745	374K	-22	845K
-679	169K	-747	383K	-23	866K
-681	174K	-749	392K	-24	887K
-683	178K	-751	402K	-25	909K
-685	182K	-753	412K	-26	931K
-687	187K	-755	422K	-27	953K
-689	191K	-757	432K	-28	976K
-691	196K	-759	442K	1010768-29	1MEG
-693	200K	-761	453K		
-695	205K	-763	464K		
-697	210K	-765	475K		
-699	215K	-767	487K		
1010364-701	221K	1010364-769	499K		

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN DATE 5-11-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 5-22-64
MIT APPROVAL 22 May 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, POWER SUPPLY (PHOTOMETER)

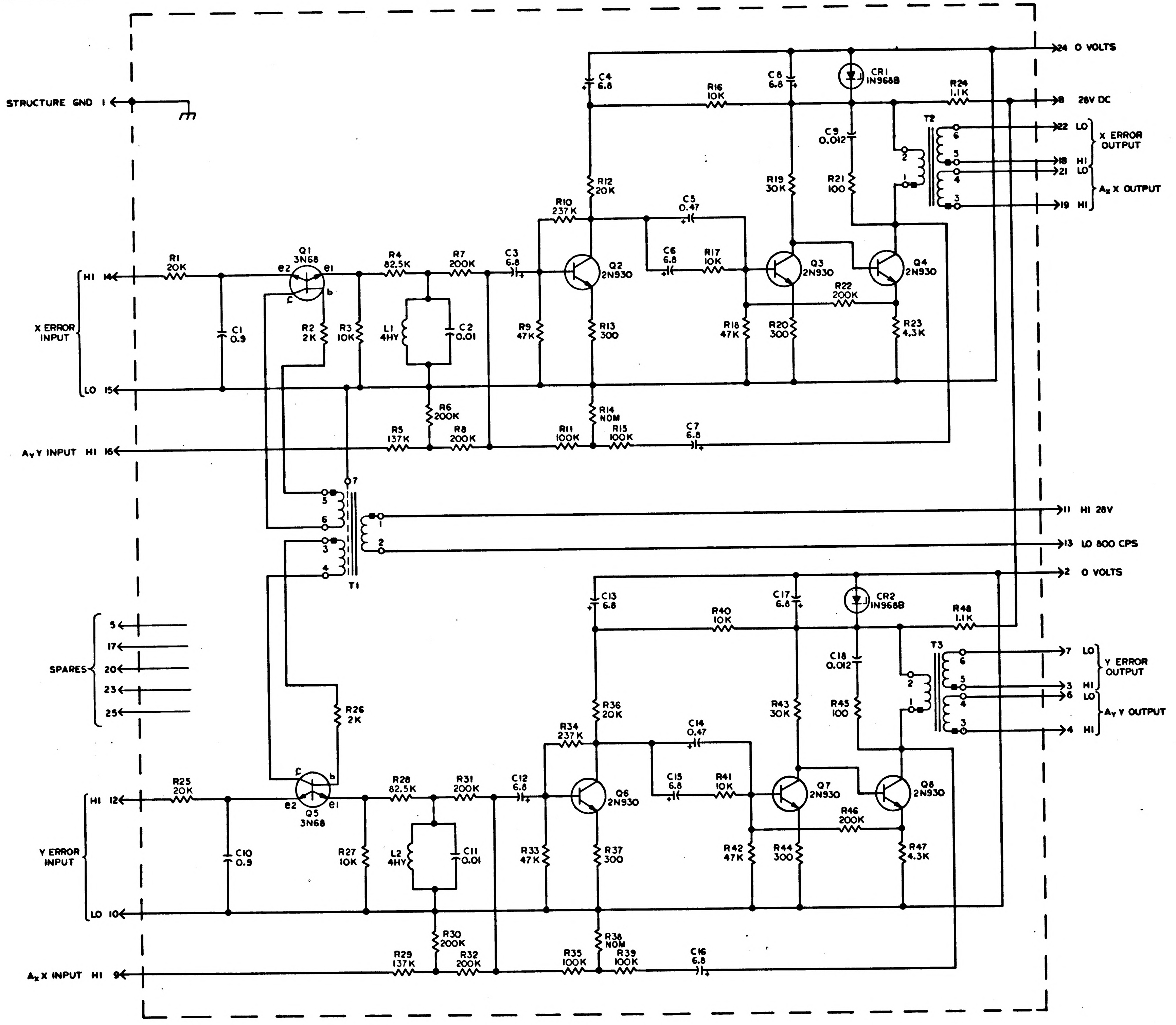
CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010037
SCALE —
WT —
SHEET 2 OF 2

LUD

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18598

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 20133	88			


STRUCTURE GND 1
24 0 VOLTS
8 28V DC
22 LO
X ERROR OUTPUT
18 HI
21 LO
AX X OUTPUT
19 HI
C4 6.8
R16 10K
C8 6.8
CR1 1N968B
R24 1.1K
T2
C9 0.012
R19 30K
R21 100
R12 20K
R10 237K
C5 0.47
C6 6.8
R17 10K
R1 20K
Q1 3N68
e2 e1 c b
R4 82.5K
R7 200K
C3 6.8
Q2 2N930
Q3 2N930
Q4 2N930
R22 200K
HI 14
X ERROR INPUT
LO 15
C1 0.9
R2 2K
R3 10K
L1 4HY
C2 0.01
R9 47K
R13 300
R18 47K
R20 300
R23 4.3K
R6 200K
R14 NOM
R5 137K
R8 200K
R11 100K
R15 100K
C7 6.8
AY Y INPUT HI 16
11 HI 28V
13 LO 800 CPS
2 0 VOLTS
T1
C13 6.8
C17 6.8
CR2 1N968B
R40 10K
R48 1.1K
T3
C18 0.012
7 LO
Y ERROR OUTPUT
3 HI
6 LO
AY Y OUTPUT
4 HI
R43 30K
R45 100
SPARES 5 17 20 23 25
R26 2K
R36 20K
R34 237K
C14 0.47
C15 6.8
R41 10K
R25 20K
Q5 3N68
R28 82.5K
R31 200K
C12 6.8
Q6 2N930
Q7 2N930
Q8 2N930
R46 200K
HI 12
Y ERROR INPUT
LO 10
C10 0.9
R27 10K
L2 4HY
C11 0.01
R33 47K
R37 300
R42 47K
R44 300
R47 4.3K
R30 200K
R38 NOM
R29 137K
R32 200K
R35 100K
R39 100K
C16 6.8
AX X INPUT HI 9

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1010279-111	CAPACITOR	0.9	±10%	[illegible]
C2	1010316-13		0.01	±1%	[illegible]
C3	1006755-79		6.8	±10%	35V
C4	1006755-79		6.8	±10%	35V
C5	1006755-65		0.47	±10%	35V
C6	1006755-79		6.8	±10%	35V
C7	1006755-79		6.8	±10%	35V
C8	1006755-79		6.8	±10%	35V
C9	1010264-14		0.012	±5%	200V
C10	1010279-111		0.9	±10%	15V
C11	1010316-13		0.01	±1%	100V
C12	1006755-79		6.8	±10%	35V
C13	1006755-79		6.8	±10%	35V
C14	1006755-65		0.47	±10%	35V
C15	1006755-79		6.8	±10%	35V
C16	1006755-79		6.8	±10%	35V
C17	1006755-79		6.8	±10%	35V
C18	1010264-14	CAPACITOR	0.012	±5%	200V
CR1	1010830-12	DIODE	1N968B		
CR2	1010830-12	DIODE	1N968B		
L1	1010277-6	INDUCTOR	4HY		
L2	1010277-6	INDUCTOR	4HY		
Q1	1010367	TRANSISTOR	3N68		
Q2	1010397-1		2N930		
Q3	1010397-1		2N930		
Q4	1010397-1		2N930		
Q5	1010367		3N68		
Q6	1010397-1		2N930		
Q7	1010397-1		2N930		
Q8	1010397-1	TRANSISTOR	2N930		
R1	1010364-501	RESISTOR	20K	±1%	1/8 W
R2	1006750-39		2K	±2%	1/4 W
R3	1010364-443		10K	±1%	1/8 W
R4	1010364-619		82.5K	±1%	1/8 W
R5	1010364-661		137K	±1%	1/8 W
R6	1010364-693		200K	±1%	1/8 W
R7	1010364-693		200K	±1%	1/8 W
R8	1010364-693		200K	±1%	1/8 W
R9	1006750-72		47K	±2%	1/4 W
R10	1010364-707		237K	±1%	1/8 W
R11	1010364-635		100K	±1%	1/8 W
R12	1006750-63		20K	±2%	1/4 W
R13	1006750-19		300	±2%	1/4 W
R14	SEE CHART			±1%	1/8 W
R15	1010364-635		100K	±1%	1/8 W
R16	1006750-56		10K	±2%	1/4 W
R17	1006750-56		10K	±2%	1/4 W
R18	1006750-72		47K	±2%	1/4 W
R19	1006750-67		30K	±2%	1/4 W
R20	1006750-19		300	±2%	1/4 W
R21	1006750-8		100	±2%	1/4 W
R22	1010364-693		200K	±1%	1/8 W
R23	1006750-47		4.3K	±2%	1/4 W
R24	1006750-33		1.1K	±2%	1/4 W
R25	1010364-501		20K	±1%	1/8 W
R26	1006750-39		2K	±2%	1/4 W
R27	1010364-443		10K	±1%	1/8 W
R28	1010364-619		82.5K	±1%	1/8 W
R29	1010364-661		137K	±1%	1/8 W
R30	1010364-693		200K	±1%	1/8 W
R31	1010364-693		200K	±1%	1/8 W
R32	1010364-693		200K	±1%	1/8 W
R33	1006750-72		47K	±2%	1/4 W
R34	1010364-707		237K	±1%	1/8 W
R35	1010364-635		100K	±1%	1/8 W
R36	1006750-63		20K	±2%	1/4 W
R37	1006750-19		300	±2%	1/4 W
R38	SEE CHART			±1%	1/8 W
R39	1010364-635		100K	±1%	1/8 W
R40	1006750-56		10K	±2%	1/4 W
R41	1006750-56		10K	±2%	1/4 W
R42	1006750-72		47K	±2%	1/4 W
R43	1006750-67		30K	±2%	1/4 W
R44	1006750-19		300	±2%	1/4 W
R45	1006750-8		100	±2%	1/4 W
R46	1010364-693		200K	±1%	1/8 W
R47	1006750-47		4.3K	±2%	1/4 W
R48	1006750-33	RESISTOR	1.1K	±2%	1/4 W
T1	1010753	TRANSFORMER			
T2	1010934	TRANSFORMER			
T3	1010934	TRANSFORMER			

REF DWG
MODULATOR AND LOOP COMPENSATION ASSY
DWG NO. 2007125

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. VALUE OF R14 AND R38 TO BE SELECTED FROM CHART PER ATP

R14 AND R38	
PART NUMBER	VALUE
1010364-393	5.49K
1010364-403	6.19K
1010364-415	7.15K
1010364-427	8.25K
1010364-443	10K
1010364-461	12.4K
1010364-487	16.9K
1010364-519	24.9K
1010364-577	49.9K

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Wunderlich 3-11-65
CHECKED C.W. Crouch 3-12-65
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

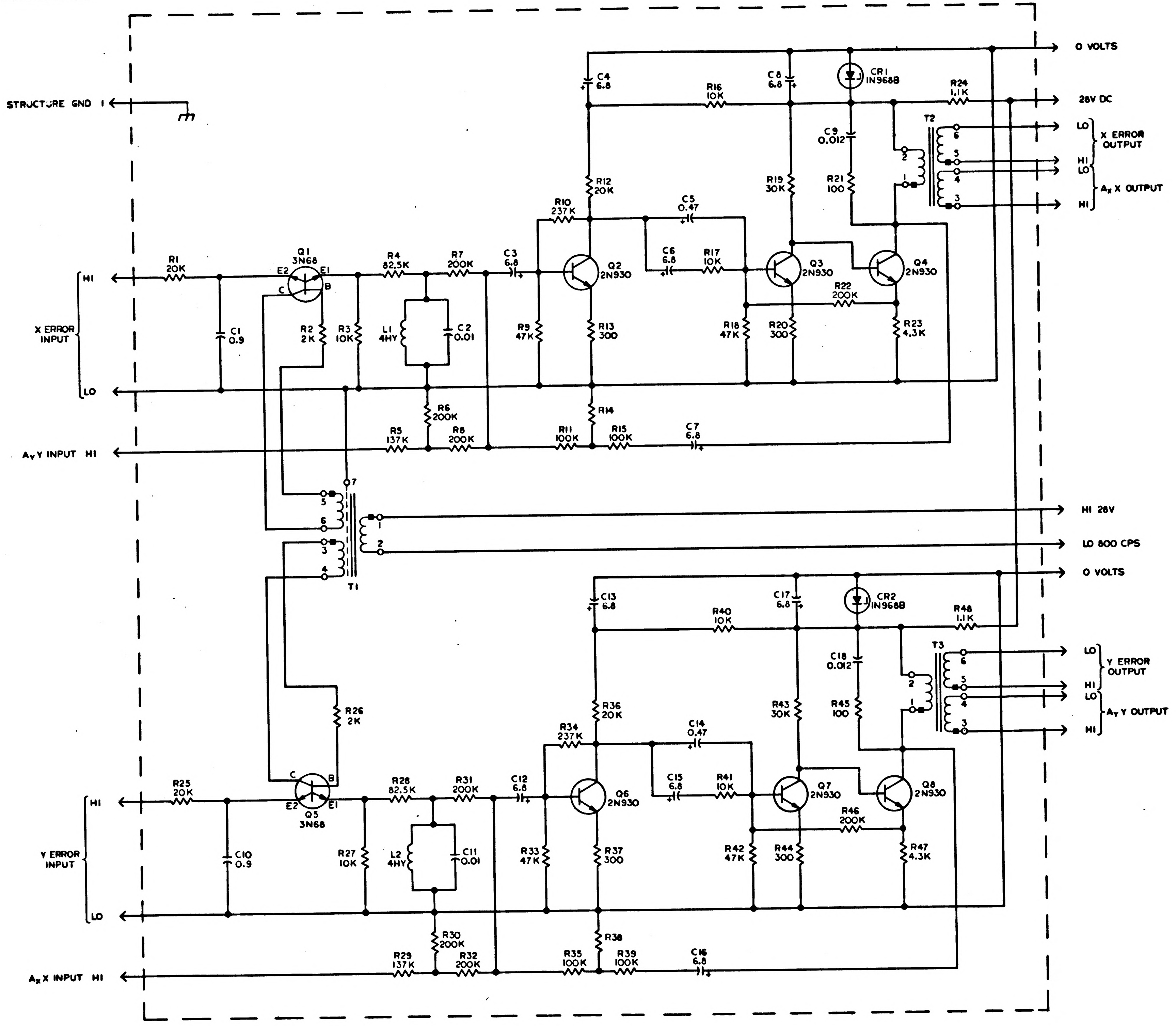
SCHEMATIC
MODULATOR AND LOOP
COMPENSATION

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010038
SCALE —
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 18598

SYM	ZONE	DESCRIPTION	BR	CHK	DATE	APPROVED


STRUCTURE GND I
X ERROR INPUT
HI
LO
AYY INPUT HI
Y ERROR INPUT
AXX INPUT HI
0 VOLTS
28V DC
X ERROR OUTPUT
AXX OUTPUT
HI 28V
LO 800 CPS
Y ERROR OUTPUT
AYY OUTPUT
R1 20K
Q1 3N68
E2
E1
C
B
R2 2K
R3 10K
R4 82.5K
L1 4HY
C2 0.01
C1 0.9
R5 137K
R6 200K
R7 200K
R8 200K
C3 6.8
R9 47K
R10 237K
Q2 2N930
R11 100K
R12 20K
R13 300
R14
R15 100K
C4 6.8
R16 10K
C5 0.47
C6 6.8
R17 10K
Q3 2N930
R18 47K
R19 30K
R20 300
R22 200K
C7 6.8
C8 6.8
CR1 IN968B
C9 0.012
R21 100
Q4 2N930
R23 4.3K
R24 1.1K
T2
T1
R25 20K
Q5 3N68
R26 2K
R27 10K
L2 4HY
C10 0.9
C11 0.01
R28 82.5K
R29 137K
R30 200K
R31 200K
R32 200K
C12 6.8
R33 47K
R34 237K
Q6 2N930
R35 100K
R36 20K
R37 300
R38
R39 100K
C13 6.8
R40 10K
C14 0.47
C15 6.8
R41 10K
Q7 2N930
R42 47K
R43 30K
R44 300
R46 200K
C16 6.8
C17 6.8
CR2 IN968B
C18 0.012
R45 100
Q8 2N930
R47 4.3K
R48 1.1K
T3

REF DESIG	PART NUMBER	DESCRIPTION	VALUE	TOL	RATING
C1	1010279-111	CAPACITOR	0.9	±10%	15V
C2	1010316-13		0.01	± 1%	100V
C3	1006755-79		6.8	±10%	35V
C4	1006755-79		6.8	±10%	35V
C5	1006755-65		0.47	±10%	35V
C6	1006755-79		6.8	±10%	35V
C7	1006755-79		6.8	±10%	35V
C8	1006755-79		6.8	±10%	35V
C9	1010264-14		0.012	± 5%	200V
C10	1010279-111		0.9	±10%	15V
C11	1010316-13		0.01	± 1%	100V
C12	1006755-79		6.8	±10%	35V
C13	1006755-79		6.8	±10%	35V
C14	1006755-65		0.47	±10%	35V
C15	1006755-79		6.8	±10%	35V
C16	1006755-79		6.8	±10%	35V
C17	1006755-79		6.8	±10%	35V
C18	1010264-14	CAPACITOR	0.012	± 5%	200V
CR1	1010830-12	DIODE	IN968B		
CR2	1010830-12	DIODE	IN968B		
L1	1010277-6	INDUCTOR	4HY		
L2	1010277-6	INDUCTOR	4HY		
Q1	1010367	TRANSISTOR	3N68		
Q2	1010397-1		2N930		
Q3	1010397-1		2N930		
Q4	1010397-1		2N930		
Q5	1010367		3N68		
Q6	1010397-1		2N930		
Q7	1010397-1		2N930		
Q8	1010397-1	TRANSISTOR	2N930		
R1	1010364-501	RESISTOR	20K	± 1%	1/8 W
R2	1006750-39		2K	± 2%	1/4 W
R3	1010364-443		10K	± 1%	1/8 W
R4	1010364-619		82.5K	± 1%	1/8 W
R5	1010364-661		137K	± 1%	1/8 W
R6	1010364-693		200K	± 1%	1/8 W
R7	1010364-693		200K	± 1%	1/8 W
R8	1010364-693		200K	± 1%	1/8 W
R9	1006750-72		47K	± 2%	1/4 W
R10	1010364-707		237K	± 1%	1/8 W
R11	1010364-635		100K	± 1%	1/8 W
R12	1006750-63		20K	± 2%	1/4 W
R13	1006750-19		300	± 2%	1/4 W
R14	SEE CHART			± 1%	1/8 W
R15	1010364-635		100K	± 1%	1/8 W
R16	1006750-56		10K	± 2%	1/4 W
R17	1006750-56		10K	± 2%	1/4 W
R18	1006750-72		47K	± 2%	1/4 W
R19	1006750-67		30K	± 2%	1/4 W
R20	1006750-19		300	± 2%	1/4 W
R21	1006750-8		100	± 2%	1/4 W
R22	1010364-693		200K	± 1%	1/8 W
R23	1006750-47		4.3K	± 2%	1/4 W
R24	1006750-33		1.1K	± 2%	1/4 W
R25	1010364-501		20K	± 1%	1/8 W
R26	1006750-39		2K	± 2%	1/4 W
R27	1010364-443		10K	± 1%	1/8 W
R28	1010364-619		82.5K	± 1%	1/8 W
R29	1010364-661		137K	± 1%	1/8 W
R30	1010364-693		200K	± 1%	1/8 W
R31	1010364-693		200K	± 1%	1/8 W
R32	1010364-693		200K	± 1%	1/8 W
R33	1006750-72		47K	± 2%	1/4 W
R34	1010364-707		237K	± 1%	1/8 W
R35	1010364-635		100K	± 1%	1/4 W
R36	1006750-63		20K	± 2%	1/4 W
R37	1006750-19		300	± 2%	1/4 W
R38	SEE CHART			± 1%	1/8 W
R39	1010364-635		100K	± 1%	1/8 W
R40	1006750-56		10K	± 2%	1/4 W
R41	1006750-56		10K	± 2%	1/4 W
R42	1006750-72		47K	± 2%	1/4 W
R43	1006750-67		30K	± 2%	1/4 W
R44	1006750-19		300	± 2%	1/4 W
R45	1006750-8		100	± 2%	1/4 W
R46	1010364-693		200K	± 1%	1/8 W
R47	1006750-47		4.3K	± 2%	1/4 W
R48	1006750-33	RESISTOR	1.1K	± 2%	1/4 W
T1	1010753	TRANSFORMER			
T2	1010934	TRANSFORMER			
T3	1010934	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

REF DWG
MODULATOR AND LOOP COMPENSATION ASSY
DWG NO

R14 AND R38	
PART NUMBER	VALUE
1010364-393	5.49K
1010364-403	6.19K
1010364-415	7.15K
1010364-427	8.25K
1010364-443	10K
1010364-461	12.4K
1010364-487	16.9K
1010364-519	24.9K
1010364-577	49.9K

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. VALUE OF R14 AND R38 TO BE SELECTED FROM CHART PER ATP

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Wunderlich 9-1-65
CHECKED T. W. [illegible] 9-8-65
APPROVED [illegible] 9-6-65
APPROVED
APPROVED MIT W. [illegible] 27 Sept 65
APPROVED MSC W. J. [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
MODULATOR AND LOOP
COMPENSATION

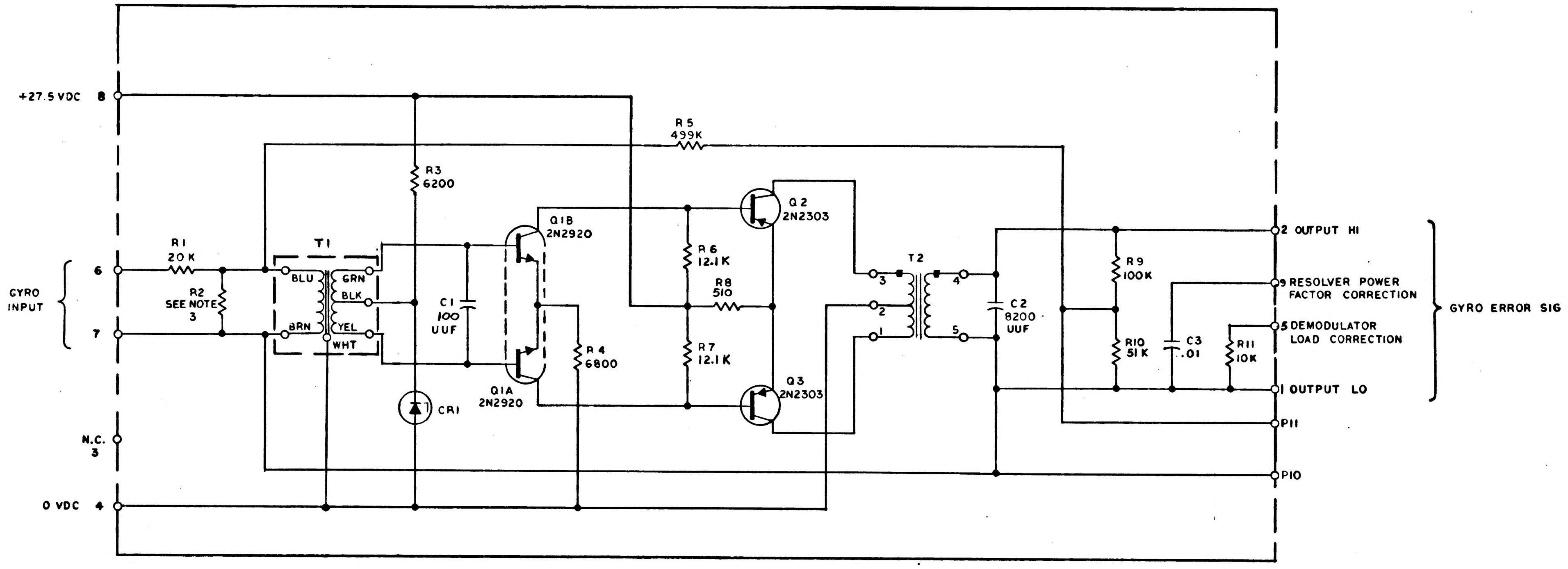
CODE IDENT NO.
SIZE E
DRAWING NO. 2010038
SCALE —
SHEET 1 OF 1

2010038

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 14738

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15092	[illegible]	WR


+27.5 VDC 8
GYRO INPUT
6
7
N.C. 3
0 VDC 4
R1 20 K
R2 SEE NOTE 3
T1
BLU
BRN
GRN
BLK
YEL
WHT
R3 6200
C1 100 UUF
CR1
Q1B 2N2920
Q1A 2N2920
R4 6800
R5 499K
R6 12.1K
R8 510
R7 12.1K
Q2 2N2303
Q3 2N2303
T2
3
2
1
4
5
C2 8200 UUF
R9 100K
R10 51K
C3 .01
R11 10K
2 OUTPUT HI
9 RESOLVER POWER FACTOR CORRECTION
5 DEMODULATOR LOAD CORRECTION
1 OUTPUT LO
P11
P10
GYRO ERROR SIG

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364 -501	RESISTOR	20 K	± 1%	1/8 W
R 2	1006750 -		SEE NOTE 3	± 2%	1/4 W
R 3	1006750-51		6200	± 2%	1/4 W
R 4	1006750-52		6800	± 2%	1/4 W
R 5	1010364-769		499K	± 1%	1/8 W
R 6	1010364 -459		12.1K	± 1%	1/8 W
R 7	1010364 -459		12.1K	± 1%	1/8 W
R 8	1006750 -25		510	± 2%	1/4 W
R 9	1006750 -80		100K	± 2%	1/4 W
R 10	1006750 -73		51 K	± 2%	1/4 W
R 11	1006750-56	RESISTOR	10 K	± 2%	1/4 W
C 1	1010359-5	CAPACITOR	100 UUF	± 10%	200 VDC
C 2	1010359-28	CAPACITOR	8200UUF	± 10%	200 VDC
C 3	1010264-118	CAPACITOR	.01	± 5%	200VDC
CR1	1010372-15	DIODE			
Q 1	1010431	TRANSISTOR			
Q 2	1010633-2	TRANSISTOR	2N2303	MATCHED PAIR	
Q 3		TRANSISTOR			
T 1	1007080-011	TRANSFORMER			
T 2	1010291-6	TRANSFORMER			

R2	
PART NO.	VALUE
1006750-84	150 K
-154	41K
-149	25.5K
-62	18K
-143	14K
-57	1K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. THE VALUE OF R2 TO BE SELECTED BY ELECTRICAL TEST AT ASSEMBLY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN A. P. Leo DATE 9 JUL 64
CHECKED
APPROVAL
APPROVAL RA Bent 12-1-64
NASA APPROVAL W. J. Rhine 12-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
IRIG PRE-AMPLIFIER

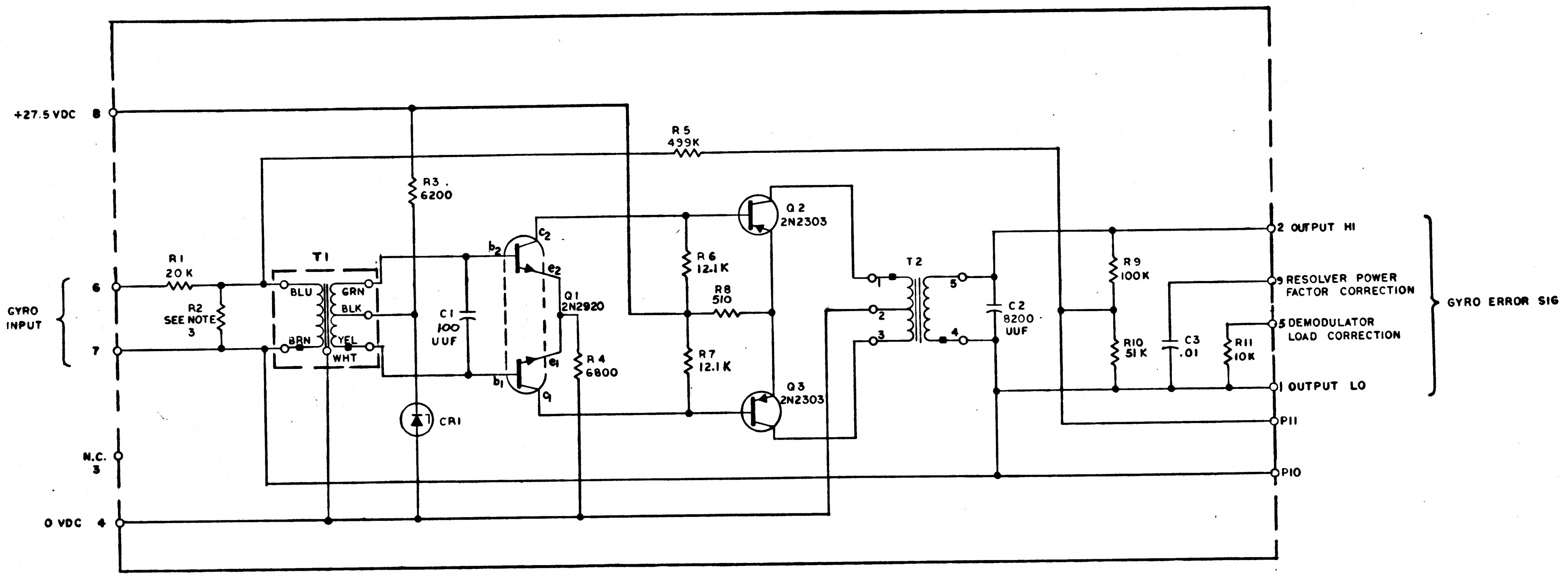
CODE IDENT NO —
SIZE E
NASA DRAWING NO 2010040
SCALE — WT — SHEET 1 OF 1

Royce

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 14738

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15092	[illegible]	WK
B	REVISED PER TDRR 15797	[illegible] 65	WK


+27.5 VDC 8
GYRO INPUT
6
7
N.C. 3
0 VDC 4
R1 20 K
R2 SEE NOTE 3
T1
BLU
BRN
GRN
BLK
YEL
WHT
R3 6200
C1 100 UUF
CR1
b2
c2
e2
b1
e1
c1
Q1 2N2920
R4 6800
R5 499K
R6 12.1K
R8 510
R7 12.1K
Q2 2N2303
Q3 2N2303
T2
1
2
3
4
5
C2 8200 UUF
R9 100K
R10 51 K
C3 .01
R11 10K
2 OUTPUT HI
9 RESOLVER POWER FACTOR CORRECTION
5 DEMODULATOR LOAD CORRECTION
1 OUTPUT LO
P11
P10
GYRO ERROR SIG

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364 -501	RESISTOR	20 K	± 1%	1/8 W
R 2	1006750 -		SEE NOTE 3	± 2%	1/4 W
R 3	1006750-51		6200	± 2%	1/4 W
R 4	1006750-52		6800	± 2%	1/4 W
R 5	1010364-769		499K	± 1%	1/8 W
R 6	1010364 -459		12.1K	± 1%	1/8 W
R 7	1010364 -459		12.1K	± 1%	1/8 W
R 8	1006750 -25		510	± 2%	1/4 W
R 9	1006750 -80		100K	± 2%	1/4 W
R 10	1006750 -73		51 K	± 2%	1/4 W
R 11	1006750-56	RESISTOR	10 K	± 2%	1/4 W
C 1	1010359 - 5	CAPACITOR	100 UUF	± 10%	200 VDC
C 2	1010359 - 28	CAPACITOR	8200UUF	± 10%	200 VDC
C 3	1010264 - 118	CAPACITOR	.01	± 5%	200VDC
CR1	1010372-15	DIODE			
Q 1	1010431-001	TRANSISTOR	2N2920		
Q 2	1010633-3	TRANSISTOR	2N2303	MATCHED PAIR	
Q 3		TRANSISTOR			
T 1	1007080-011	TRANSFORMER			
T 2	1010291-6	TRANSFORMER			

R2	
PART NO.	VALUE
1006750-84	150 K
-154	41 K
-149	25.5 K
-62	18 K
-143	14 K
-57	1K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. THE VALUE OF R2 TO BE SELECTED BY ELECTRICAL TEST AT ASSEMBLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN A. Di Leo DATE 9 Jul 64
CHECKED
APPROVAL [illegible]
APPROVAL R.A. Booth 12-1-64
NASA APPROVAL W.D. Rhine 12-8-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

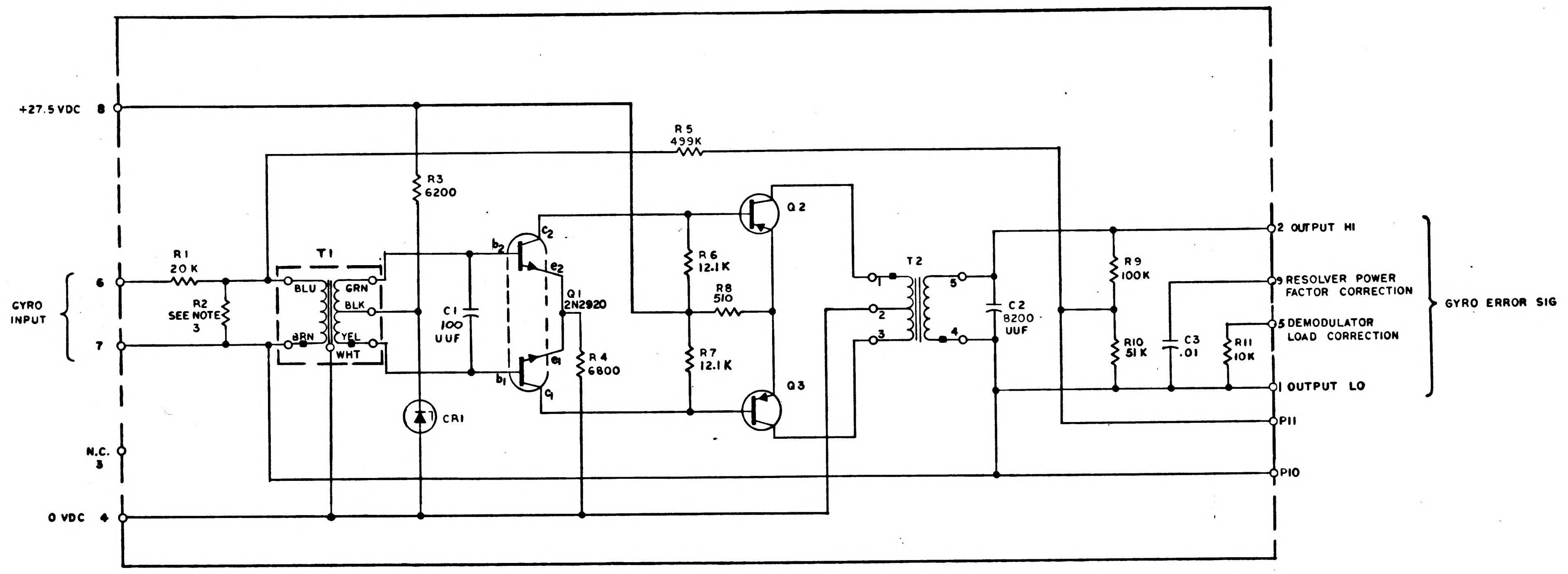
SCHEMATIC,
IRIG PRE-AMPLIFIER

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010040
SCALE —
WT —
SHEET OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 14739

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15092	[illegible]	WK
B	REVISED PER TDRR 15797	23 Jun 65	WK
C	REVISED PER TDRR 18971	[illegible] 65	WK


+27.5 VDC 8
GYRO INPUT
6
7
N.C. 3
0 VDC 4
R1 20 K
R2 SEE NOTE 3
T1
BLU
BRN
GRN
BLK
YEL
WHT
R3 6200
C1 100 UUF
CR1
b2
c2
e2
b1
e1
c1
Q1 2N2920
R4 6800
R5 499K
R6 12.1K
R7 12.1K
R8 510
Q2
Q3
T2
1
2
3
4
5
C2 8200 UUF
R9 100K
R10 51 K
C3 .01
R11 10K
2 OUTPUT HI
9 RESOLVER POWER FACTOR CORRECTION
5 DEMODULATOR LOAD CORRECTION
1 OUTPUT LO
P11
P10
GYRO ERROR SIG

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364 -501	RESISTOR	20 K	± 1%	1/8 W
R 2	1006750 -		SEE NOTE 3	± 2%	1/4 W
R 3	1006750-51		6200	± 2%	1/4 W
R 4	1006750-52		6800	± 2%	1/4 W
R 5	1010364-769		499K	± 1%	1/8 W
R 6	1010364 -459		12.1K	± 1%	1/8 W
R 7	1010364 -459		12.1K	± 1%	1/8 W
R 8	1006750 -25		510	± 2%	1/4 W
R 9	1006750 -80		100K	± 2%	1/4 W
R 10	1006750 -73		51 K	± 2%	1/4 W
R 11	1006750-56	RESISTOR	10 K	± 2%	1/4 W
C 1	1010359 -5	CAPACITOR	100 UUF	± 10%	200 VDC
C 2	1010359 -28	CAPACITOR	8200UUF	± 10%	200 VDC
C 3	1010264 -118	CAPACITOR	.01	± 5%	200 VDC
CR1	1010372-15	DIODE			
Q 1	1010431-001	TRANSISTOR	2N2920		
Q 2	1010950-2	TRANSISTOR		MATCHED PAIR	
Q 3		TRANSISTOR			
T 1	1007080-011	TRANSFORMER			
T 2	1010291 -6	TRANSFORMER			

R2	
PART NO.	VALUE
1006750-84	150 K
-154	41 K
-149	25.5 K
-62	18 K
-143	14 K
-57	1K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

REF DWG:
IRIG PREAMP ASSEMBLY DWG NO. 2021785

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. THE VALUE OF R2 TO BE SELECTED BY ELECTRICAL TEST AT ASSEMBLY

MASTER

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. Di Leo DATE 9 JUL 64
CHECKED
APPROVAL
APPROVAL RA Booth 12-1-64
NASA APPROVAL W.D. Rhine 12-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

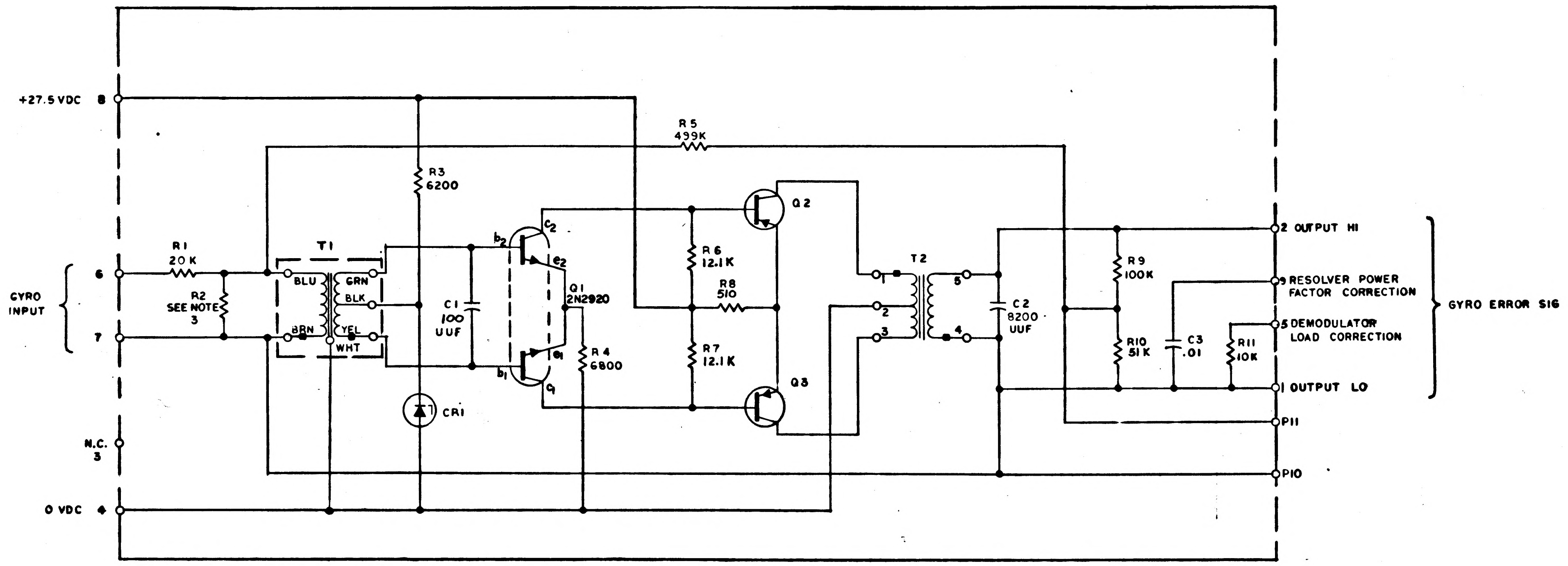
SCHEMATIC,
IRIG PRE-AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010040
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDP 14739

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15092		WK
B	REVISED PER TDRR 15797		
C	REVISED PER TDRR 18971		
D	REVISED PER TDRR19222		


+27.5 VDC 8
GYRO INPUT
6
7
N.C. 3
0 VDC 4
R1 20 K
R2 SEE NOTE 3
T1
BLU
BRN
GRN
BLK
YEL
WHT
R3 6200
C1 100 UUF
CR1
b2
c2
e2
e1
b1
c1
Q1 2N2920
R4 6800
R5 499K
R6 12.1K
R8 510
R7 12.1K
Q2
Q3
T2
1
2
3
4
5
C2 8200 UUF
R9 100K
R10 51K
C3 .01
R11 10K
2 OUTPUT HI
9 RESOLVER POWER FACTOR CORRECTION
5 DEMODULATOR LOAD CORRECTION
1 OUTPUT LO
P11
P10
GYRO ERROR SIG

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364 -501	RESISTOR	20 K	± 1%	1/8 W
R2	1006750 -		SEE NOTE 3	± 2%	1/4 W
R3	1006750-51		6200	± 2%	1/4 W
R4	1006750-52		6800	± 2%	1/4 W
R5	1010364-769		499K	± 1%	1/8 W
R6	1010364 -459		12.1K	± 1%	1/8 W
R7	1010364 -459		12.1K	± 1%	1/8 W
R8	1006750 -25		510	± 2%	1/4 W
R9	1006750 -80		100K	± 2%	1/4 W
R10	1006750 -73		51 K	± 2%	1/4 W
R11	1006750-56	RESISTOR	10 K	± 2%	1/4 W
C1	1010359 -5	CAPACITOR	100 UUF	± 10%	200 VDC
C2	1010359 -28	CAPACITOR	8200UUF	± 10%	200 VDC
C3	1010264 -118	CAPACITOR	.01	± 5%	200 VDC
CR1	1010372-15	DIODE			
Q1	1010431-001	TRANSISTOR	2N2920		
Q2	1010950-2	TRANSISTOR	2N2303	MATCHED PAIR	
Q3		TRANSISTOR			
T1	1007080-011	TRANSFORMER			
T2	1010291-6	TRANSFORMER			

R2	
PART NO.	VALUE
1006750-84	150 K
-154	41 K
-149	25.5 K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750 -34	1200

REF DWG:
IRIG PREAMP ASSEMBLY DWG NO. 2021785

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. THE VALUE OF R2 TO BE SELECTED BY ELECTRICAL TEST AT ASSEMBLY

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO.
CONTRACT
DRAWN A. Di Leo DATE
CHECKED
APPROVAL
APPROVAL RA Booth 12-1-64
NASA APPROVAL W. J. Rhine 12-8-64
MIT APPROVAL

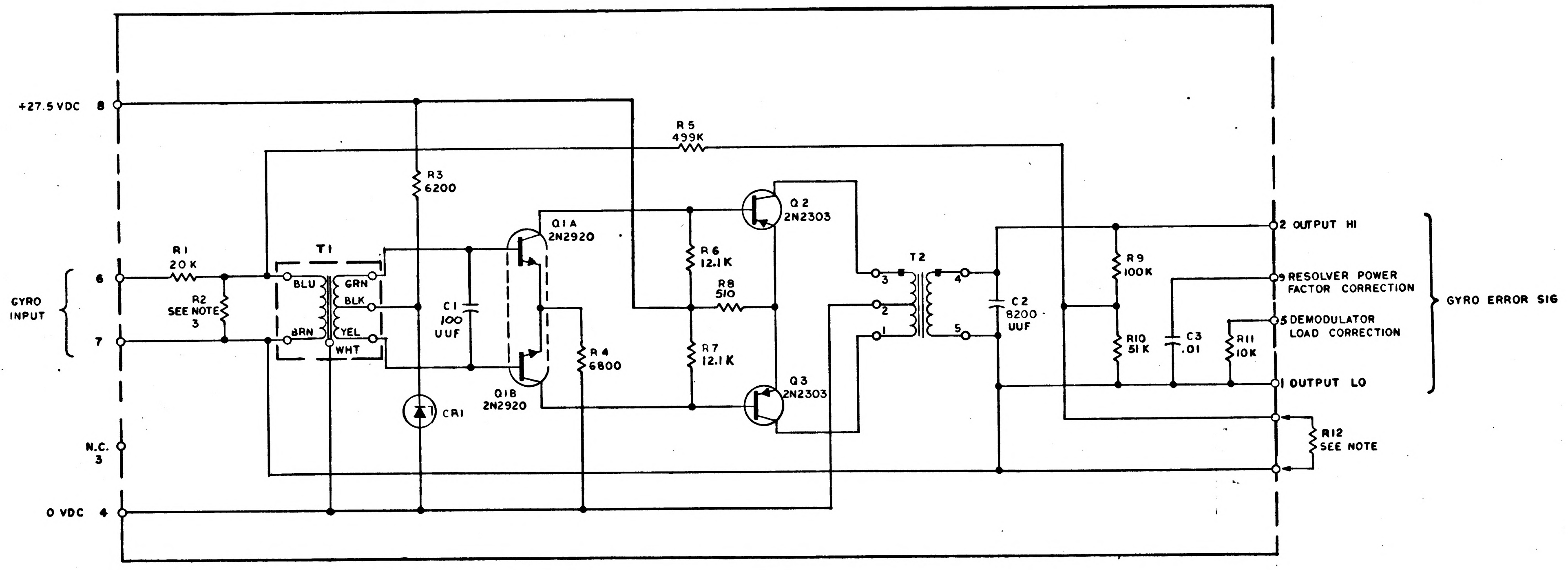
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
IRIG PRE-AMPLIFIER

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010040
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS TDRR 14738			
SYM	DESCRIPTION	DATE	APPROVAL



+27.5 VDC 8
GYRO INPUT
6
7
N.C. 3
0 VDC 4
R1 20 K
R2 SEE NOTE 3
T1
BLU
BRN
GRN
BLK
YEL
WHT
R3 6200
C1 100 UUF
CR1
Q1A 2N2920
Q1B 2N2920
R4 6800
R5 499K
R6 12.1K
R7 12.1K
R8 510
Q2 2N2303
Q3 2N2303
T2
3
2
1
4
5
C2 8200 UUF
R9 100K
R10 51K
C3 .01
R11 10K
R12 SEE NOTE
2 OUTPUT HI
9 RESOLVER POWER FACTOR CORRECTION
5 DEMODULATOR LOAD CORRECTION
1 OUTPUT LO
GYRO ERROR SIG

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364 -501	RESISTOR	20 K	± 1%	1/8 W
R2	1006750 -		SEE NOTE 3	± 2%	1/4 W
R3	1006750-51		6200	± 2%	1/4 W
R4	1006750-52		6800	± 2%	1/4 W
R5	1010364-769		499K	± 1%	1/8 W
R6	1010364 -459		12.1K	± 1%	1/8 W
R7	1010364 -459		12.1K	± 1%	1/8 W
R8	1006750 -25		510	± 2%	1/4 W
R9	1006750 -80		100K	± 2%	1/4 W
R10	1006750 -73		51 K	± 2%	1/4 W
R11	1006750-56		10 K	± 2%	1/4 W
R12	1006750 -		SEE NOTE 3	± 2%	1/4 W
C1	1010359-5	CAPACITOR	100 UUF	± 10%	200 VDC
C2	1010359-28		8200 UUF	± 10%	
C3	1010264-118		.01	± 5%	
CR1	1010372-15	DIODE			
Q1	1010431	TRANSISTOR			
Q2 Q3	1010633-2		2N2303	MATCHED PAIR	
T1	1007080-011	TRANSFORMER			
T2	1010291-6	"			

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. THE VALUE OF R2 & R12 TO BE SELECTED BY ELECTRICAL TEST AT ASSEMBLY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
LIST OF MATERIALS		

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN A. Di Leo DATE 9/18/64
CHECKED
APPROVAL Manuel Kramer 12-1-64
APPROVAL RA Booth 12-1-64
NASA APPROVAL W. J. Rhine 12-8-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
IRIG PRE-AMPLIFIER

CODE IDENT NO. — SIZE E NASA DRAWING NO. 2010040
SCALE — WT — SHEET 1 OF

MASTER

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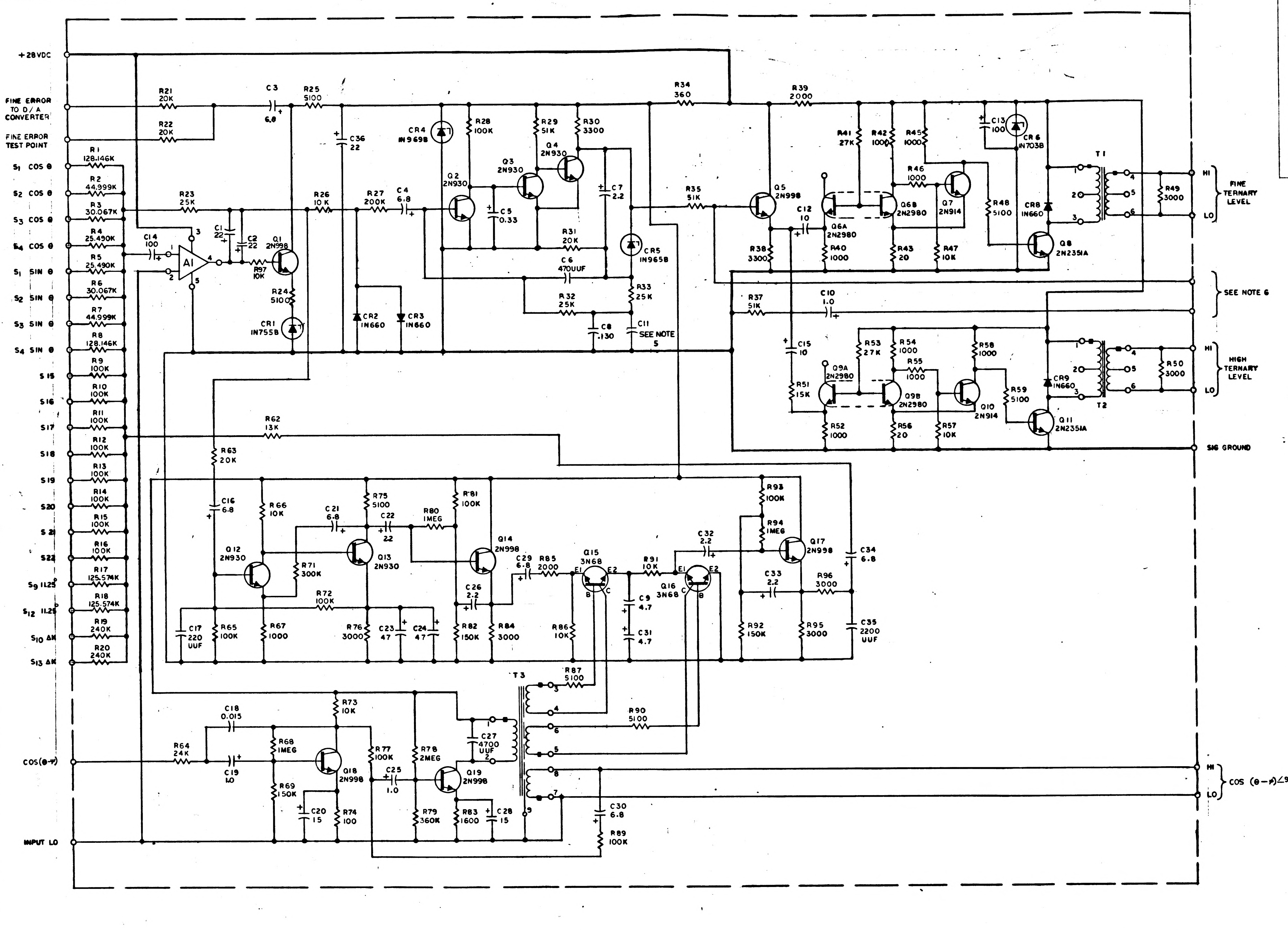
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


+28VDC
FINE ERROR TO D/A CONVERTER
FINE ERROR TEST POINT
S1 COS θ
S2 COS θ
S3 COS θ
S4 COS θ
S1 SIN θ
S2 SIN θ
S3 SIN θ
S4 SIN θ
S15
S16
S17
S18
S19
S20
S21
S22
S9 11.25
S12 11.25
S10 ΔK
S13 ΔK
COS(θ-ψ)
INPUT LO
R1 128.146K
R2 44.999K
R3 30.067K
R4 25.490K
R5 25.490K
R6 30.067K
R7 44.999K
R8 128.146K
R9 100K
R10 100K
R11 100K
R12 100K
R13 100K
R14 100K
R15 100K
R16 100K
R17 125.574K
R18 125.574K
R19 240K
R20 240K
R21 20K
R22 20K
R23 25K
C14 100
A1
C1 22
C2 22
R97 10K
Q1 2N998
R24 5100
CR1 1N755B
C3 6.8
R25 5100
C36 22
R26 10K
CR2 1N660
CR3 1N660
R27 200K
C4 6.8
CR4 1N969B
R28 100K
Q2 2N930
C5 0.33
Q3 2N930
R29 51K
Q4 2N930
R30 3300
C7 2.2
R31 20K
C6 470UUF
CR5 1N965B
R32 25K
R33 25K
C8 .130
C11 SEE NOTE 5
R34 360
R35 51K
Q5 2N998
R38 3300
R39 2000
C12 10
R41 27K
R42 1000
R45 1000
Q6A 2N2980
Q6B 2N2980
R40 1000
R43 20
R46 1000
Q7 2N914
R47 10K
R48 5100
C13 100
CR6 1N703B
CR8 1N660
Q8 2N2351A
T1
R49 3000
HI
LO
FINE TERNARY LEVEL
SEE NOTE 6
R37 51K
C10 1.0
C15 10
R51 15K
R53 27K
R54 1000
R55 1000
R58 1000
Q9A 2N2980
Q9B 2N2980
Q10 2N914
R59 5100
CR9 1N660
T2
R50 3000
HIGH TERNARY LEVEL
R52 1000
R56 20
R57 10K
Q11 2N2351A
SIG GROUND
R62 13K
R63 20K
C16 6.8
R66 10K
C21 6.8
R75 5100
C22 22
R80 1MEG
R81 100K
Q12 2N930
R71 300K
Q13 2N930
Q14 2N998
R72 100K
C17 220 UUF
R65 100K
R67 1000
R76 3000
C23 47
C24 47
C26 2.2
R82 150K
R84 3000
C29 6.8
R85 2000
Q15 3N68
E1 E2 B C
R86 10K
C9 4.7
C31 4.7
R91 10K
Q16 3N68
C32 2.2
R93 100K
R94 1MEG
Q17 2N998
C33 2.2
R96 3000
C34 6.8
R92 150K
R95 3000
C35 2200 UUF
T3
R87 5100
R90 5100
C18 0.015
R64 24K
C19 1.0
R68 1MEG
R69 150K
C20 15
R73 10K
Q18 2N998
R74 100
R77 100K
C25 1.0
R78 2MEG
Q19 2N998
R79 360K
R83 1600
C28 15
C27 4700 UUF
C30 6.8
R89 100K
COS (θ-ψ)∠90°

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. THE VALUE OF C11 TO BE SELECTED AT FINAL TEST, PART TO BE SELECTED FROM CHART A
6. CONNECT FOR IMU OPERATION

REF DWG:
MSA & QUADRATURE REJECTION ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. D. Lee DATE 4 MAY 64
CHECKED
APPROVAL 7 July 64
APPROVAL 7 July 64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MSA & QUADRATURE REJECTION

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010047
SCALE —
WT —
SHEET 1 OF 2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 10802			
SYM	DESCRIPTION	DATE	APPROVAL
6			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377 - 313	RESISTOR	128.146K	±.01%	1/10 W
R2	- 311		44.999K		
R3	- 310		30.067K		
R4	- 308		25.490K		
R5	- 308		25.490K		
R6	- 310		30.067K		
R7	- 311		44.999K		
R8	- 313		128.146K		
R9	- 312		100K		
R10	1010377 - 312		100K	±.01 %	
R11	1010733 - 11		100K	± .1 %	
R12	- 11		100K		
R13	- 11		100K		
R14	- 11		100K		
R15	- 11		100K		
R16	1010733 - 11		100K	± .1 %	
R17	1010377 - 316		125.574K	±.01%	
R18	1010377 - 316		125.574K	±.01%	1/10W
R19	1010369 - 90		240K	± 5%	1/8 W
R20	1010369 - 90		240K	± 5%	1/8 W
R21	1006750 - 63		20K	± 2%	1/4 W
R22	1006750 - 63		20K	± 2%	1/4 W
R23	1010733 - 12		25K	±.1 %	1/10 W
R24	1006750 - 49		5100	± 2 %	1/4 W
R25	1006750 - 49		5100	± 2 %	1/4 W
R26	1006750 - 58		10K	± 2 %	1/4 W
R27	1010733 - 119		200K	± 1 %	1/10 W
R28	1006750 - 80		100K	± 2 %	1/4 W
R29	- 73		51K		
R30	- 44		3300		
R31	1006750 - 63		20K	± 2 %	1/4 W
R32	1010733 - 12		25K	± .1%	1/10 W
R33	1010733 - 12		25K	± .1%	1/10 W
R34	1006750 - 21		360	± 2%	1/4 W
R35	1006750 - 73		51 K	± 2%	1/4 W
R37	- 73		51K		
R38	- 44		3300		
R39	1010604 - 39		2000	± 1%	1W
R40	1006750 - 32		1000	2%	1/4W
R41	- 66		27K		
R42	1006750 - 32		1000	± 2%	1/4 W
R43	1010369 - 148		20	± 5%	1/8 W
R45	1006750 - 32		1000	2%	1/4 W
R46	- 32		1000		
R47	- 56		10K		
R48	- 49		5100		
R49	- 43		3000		
R50	- 43		3000		
R51	- 60		15K		
R52	- 32		1000		
R53	- 66		27K		
R54	- 32		1000		
R55	1006750 - 32		1000	± 2%	1/4 W
R56	1010369 - 148		20	± 5%	1/8 W
R57	1006750 - 56		10 K	± 2%	1/4 W
R58	- 32		1000		
R59	- 49		5100		
R62	- 59		13K		
R63	- 63		20K		
R64	- 65		24K		
R65	- 80		100 K		
R66	- 56		10 K		
R67	1006750 - 32		1000	± 2%	1/4 W
R68	1010369 - 105		1MEG	±5%	1/8 W
R69	1006750 - 84		150K	± 2%	1/4 W
R71	1010369 - 92		300K	± 5 %	1/8 W
R72	1006750 - 80		100K	± 2 %	1/4 W
R73	- 56		10 K		
R74	- 8		100		
R75	- 49		5100		
R76	- 43		3000		
R77	1006750 - 80		100K	± 2 %	1/4 W
R78	1010369 - 112		2MEG	± 5%	1/8 W
R79	1010369 - 94		360K	± 5%	1/8 W
R80	1010369 - 105		1MEG	± 5%	1/8 W
R81	1006750 - 80		100K	± 2%	1/4 W
R82	- 84		150K		
R83	- 37		1600		
R84	- 43		3000		
R85	- 39		2000		
R86	- 56		10K		
R87	- 49		5100		
R89	- 80		100K		
R90	- 49		5100		
R91	- 56		10K		
R92	- 84		150K		
R93	1006750 - 80		100K	± 2%	1/4 W
R94	1010369 - 105		1MEG	± 5%	1/8 W
R95	1006750 - 43		3000	± 2%	1/4 W
R96	1006750 - 43		3000	± 2%	1/4 W
R97	1006750 - 56		10K	± 2%	1 4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 - 85	CAPACITOR	22	±10 %	35 VDC
C2	- 85		22		
C3	- 79		6.8		
C4	- 79		6.8		
C5	1006755 - 63		0.33		35 VDC
C6	1006777 - 20		470UUF		100VDC
C7	1006755 - 73		2.2	±10 %	35 VDC
C8	1010317 - 4		.130	± 1 %	30
C9	1006755 - 10		4.7	±10 %	10
C10	1006755 - 69		1.0		35 VDC
C11	SEE NOTE 5				
C12	1006755 - 81		10		35
C13	- 14		100		10
C14	- 14		100		10
C15	- 81		10		35
C16	1006755 - 79		6.8		35
C17	1006777 - 16		220UUF		100
C18	1006777 - 39		0.015		100
C19	1006755 - 69		1.0		35 VDC
C20	- 33		15		20
C21	- 79		6.8		35
C22	- 73		2.2		35
C23	- 36		47		20
C24	- 36		47		20
C25	- 69		1.0		35
C26	1006755 - 73		2.2		35 VDC
C27	1006777 - 28		4700UUF		100VDC
C28	1006755 - 33		15		20 VDC
C29	- 79		6.8		35
C30	- 79		6.8		35
C31	- 10		4.7		10
C32	- 73		2.2		35
C33	- 73		2.2		35
C34	1006755 - 79		6.8		35 VDC
C35	1006777 - 26		2200UUF		100 VDC
C36	1006755 - 85		22	10%	35 VDC
CR1	1010372 - 15	DIODE	IN755B		
CR2	1010385		IN660		
CR3	1010385		IN660		
CR4	1010286 - 13		IN969B		
CR5	1010286 - 9		IN965B		
CR6	1010372 - 5		IN703B		
CR8	1010385		IN660		
CR9	1010385		IN660		
Q1	1010342	TRANSISTOR	2N998		
Q2	1010397 - 1		2N930		
Q3	1010397 - 1		2N930		
Q4	1010397 - 1		2N930		
Q5	1010342		2N998		
Q6	1010652 - 1		2N2980		
Q7	1006752		2N914		
Q8	1010343 - 3		2N2351A		
Q9	1010652 - 1		2N2980		
Q10	1006752		2N914		
Q11	1010343 - 3		2N2351A		
Q12	1010397 - 1		2N930		
Q13	1010397		2N930		
Q14	1010342		2N998		
Q15	1010367		3N68		
Q16	1010367		3N68		
Q17	1010342		2N998		
Q18					
Q19					
A1	2007144	AMPLIFIER	SEE NOTE 4		
T1	1010274	TRANSFORMER			
T2	1010274				
T3	1010724				

CHART A C11	
PART NO.	VALUE
1006777-24	1000 UUF
-25	2000 UUF
-26	2200 UUF
-27	3300 UUF
-28	4700 UUF
-29	5000 UUF
-30	6800 UUF
1006777-31	.010

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN A. Di Leo DATE 4 JUN 64
CHECKED
APPROVAL 7 July 64
APPROVAL
NASA APPROVAL 7/9/64
MIT APPROVAL 7/7/64

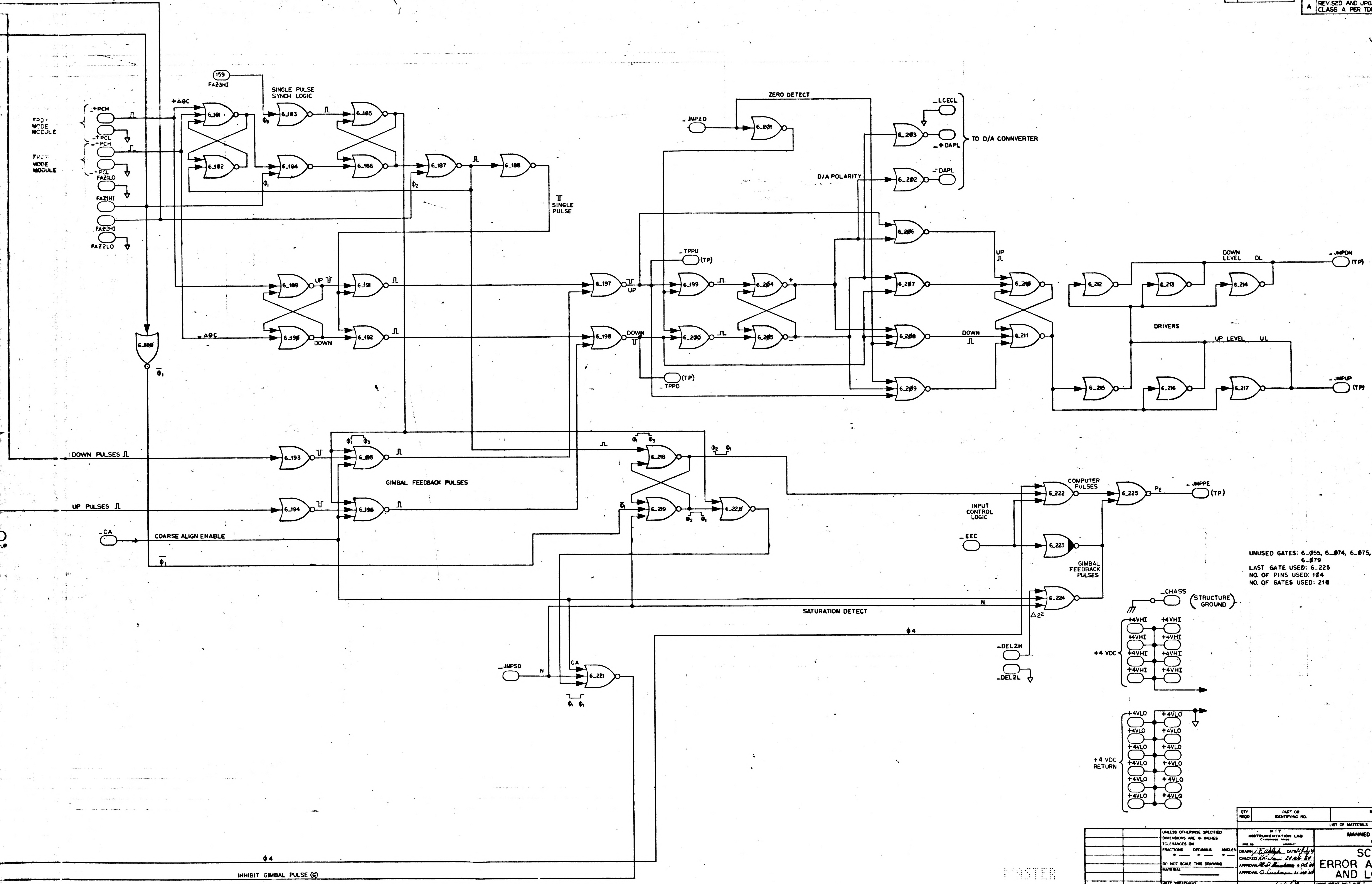
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MSA & QUADRATURE REJECTION

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010047
SCALE — WT — SHEET 2 OF 2

2010048 A

	REVISIONS		
	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR		



159
FAZ3HI
SINGLE PULSE SYNCH LOGIC
+ΔΘC
FROM MODE MODULE
+PCH
+PCL
-PCH
-PCL
FAZ1LO
FAZ1HI
FAZ2HI
FAZ2LO
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
Φ0
Φ1
Φ2
SINGLE PULSE
6_180
Φ̄1
6_189
6_190
UP
DOWN
6_191
6_192
-ΔΘC
6_197
6_198
UP
DOWN
-TPPU
(TP)
-TPPD
(TP)
6_199
6_200
6_204
6_205
+
-
ZERO DETECT
-JMPZD
6_201
-LCECL
6_203
-+DAPL
D/A POLARITY
6_202
-DAPL
TO D/A CONNVERTER
6_206
6_207
6_208
6_209
UP
DOWN
6_210
6_211
DOWN LEVEL DL
-JMPDN
(TP)
6_212
6_213
6_214
DRIVERS
UP LEVEL UL
6_215
6_216
6_217
-JMPUP
(TP)
DOWN PULSES
UP PULSES
6_193
6_194
Φ1 Φ3
6_195
6_196
GIMBAL FEEDBACK PULSES
Φ1 Φ3
6_218
6_219
Φ̄1
Φ2 Φ1
6_220
-CA
COARSE ALIGN ENABLE
Φ̄1
COMPUTER PULSES
6_222
6_225
PE
-JMPPE
(TP)
INPUT CONTROL LOGIC
-EEC
6_223
GIMBAL FEEDBACK PULSES
6_224
N
-CHASS
(STRUCTURE GROUND)
SATURATION DETECT
Δ2²
Φ4
-DEL2H
-DEL2L
-JMPSD
N
CA
6_221
Φ1 Φ1
+4 VDC
+4VHI
+4 VDC RETURN
+4VLO
Φ4
INHIBIT GIMBAL PULSE (G)

UNUSED GATES: 6_055, 6_074, 6_075, 6_076, 6_077, 6_078,
6_079
LAST GATE USED: 6_225
NO. OF PINS USED: 104
NO. OF GATES USED: 218

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL
HEAT TREATMENT
FINAL FINISH

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. F. Walsh DATE 21 July 64
CHECKED R. K. [illegible] 24 July 64
APPROVAL M. D. [illegible] 6 Oct 64
APPROVAL D. [illegible] 21 Sep 64
NASA APPROVAL W. J. [illegible] 10-14-64
MIT APPROVAL [illegible] 10-14-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

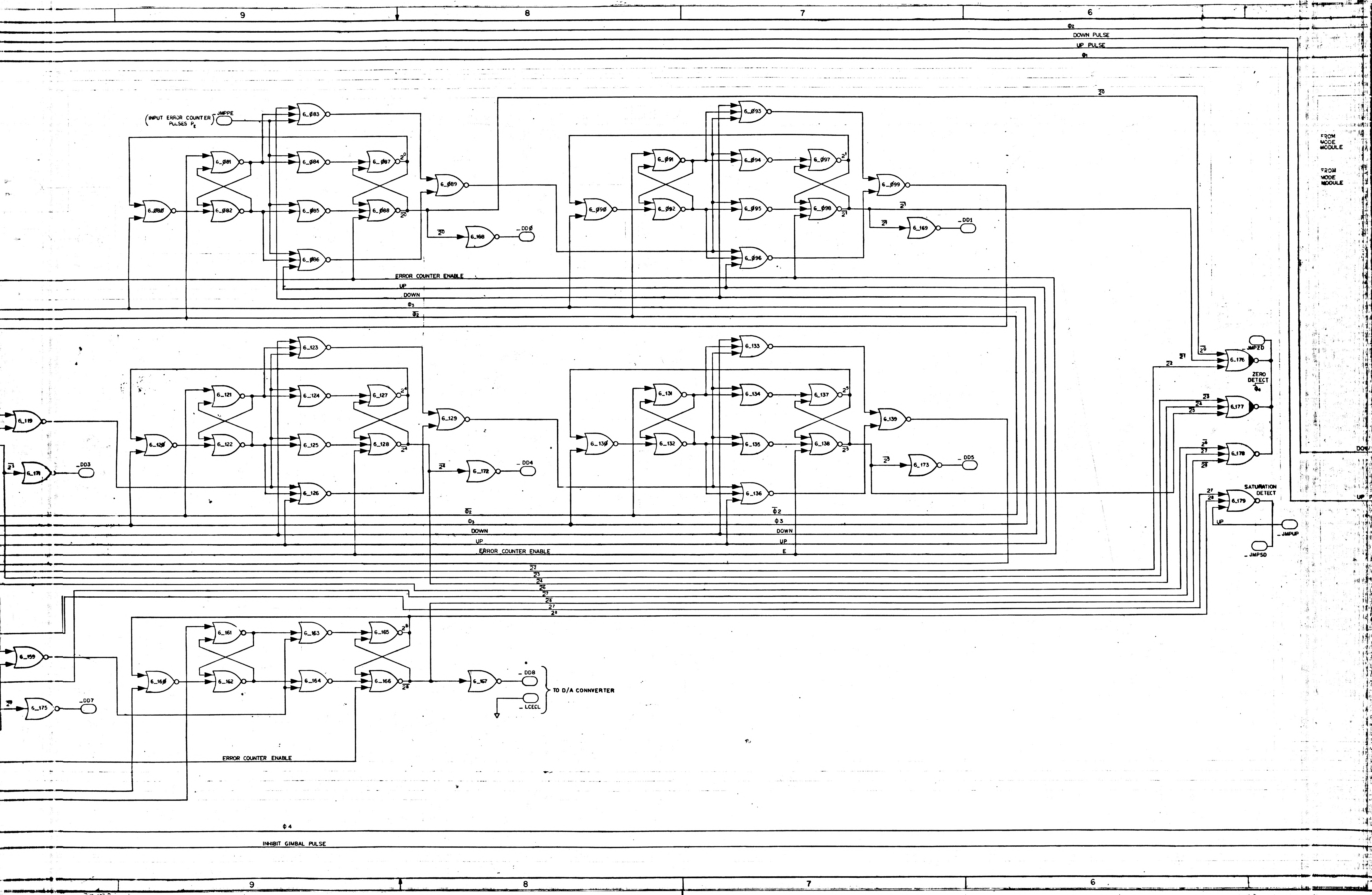
SCHEMATIC ERROR ANGLE COUNTER AND LOGIC MODULE

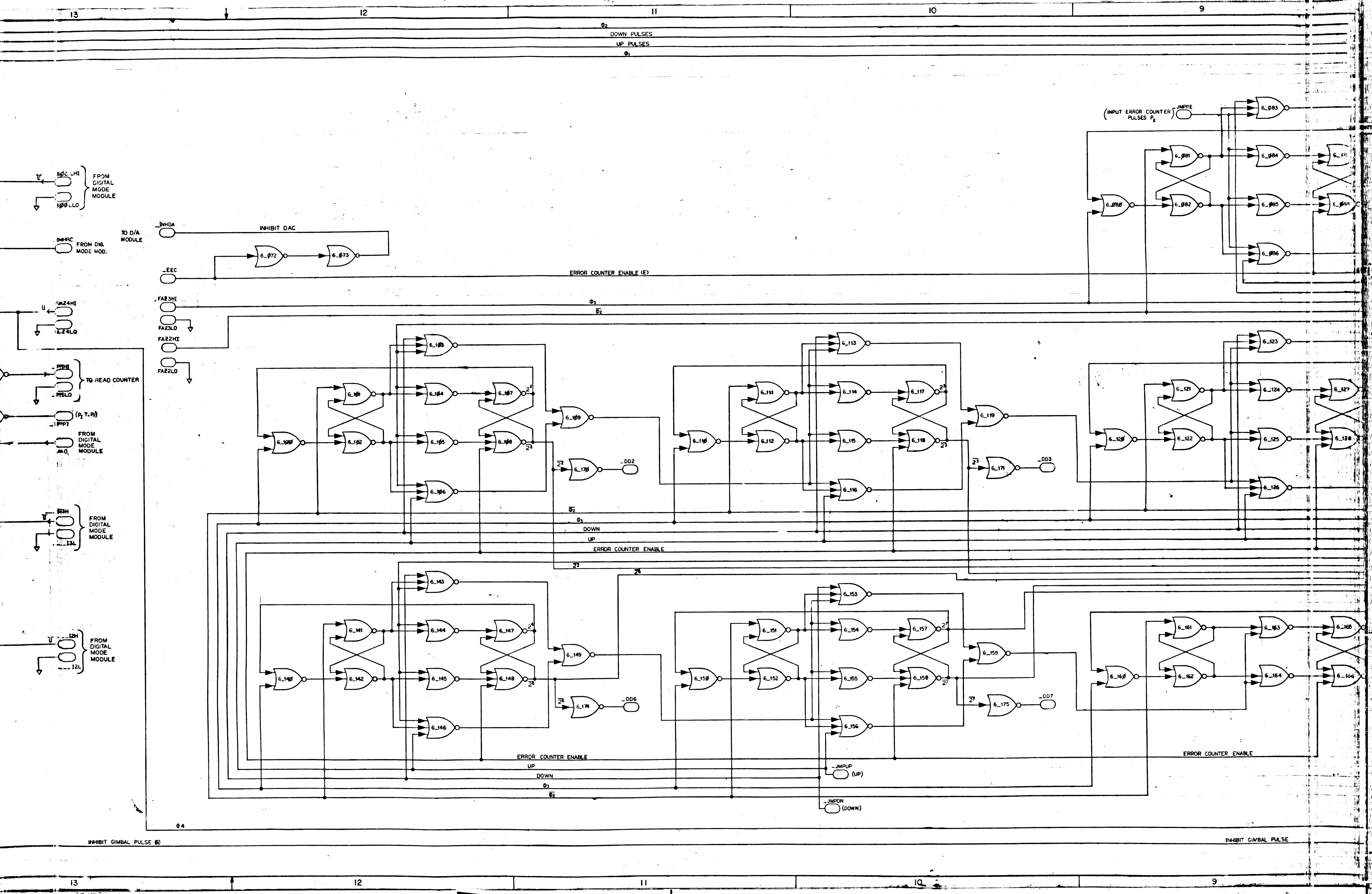
CODE IDENT NO. — | SIZE J | NASA DWG NO. 2010046
SCALE — | WT — | SHEET 1 OF 1

MASTER

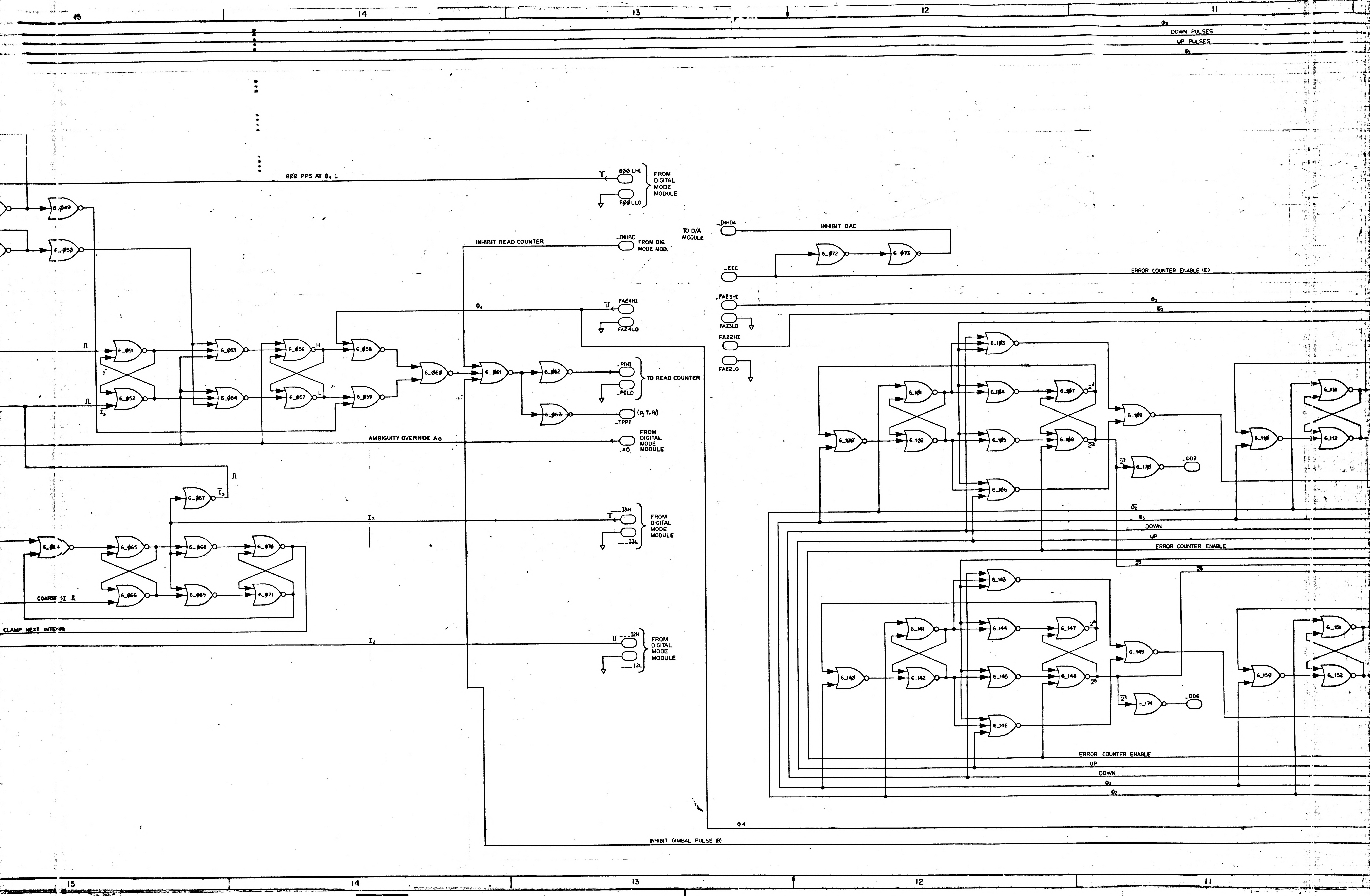
2010048 A

E-6

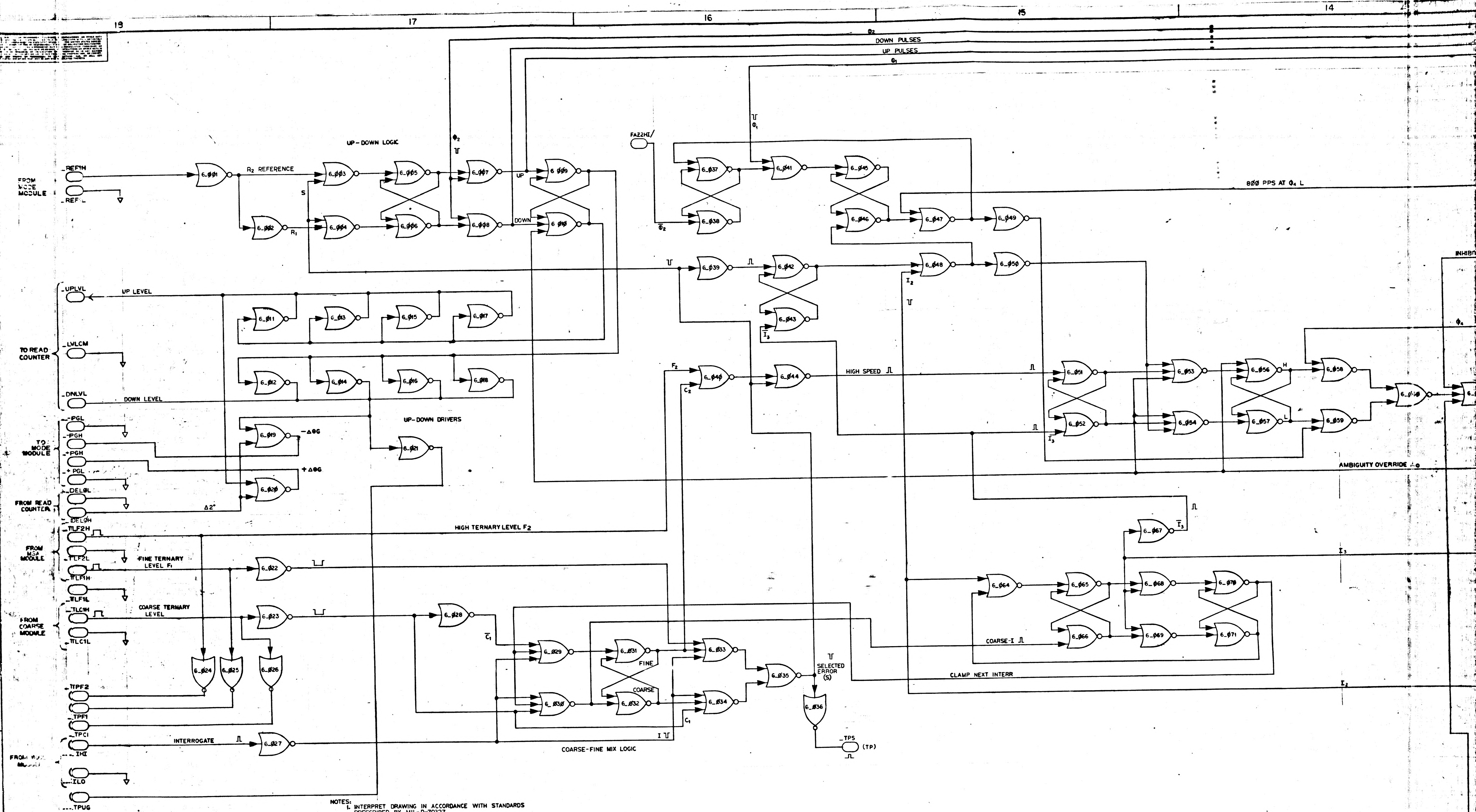

9
8
7
6
Φ2
DOWN PULSE
UP PULSE
Φ1
(INPUT ERROR COUNTER PULSES P_E)
_JMPPE
6_083
6_081
6_084
6_087
6_080
6_082
6_085
6_088
6_086
6_089
6_168
_DD0
6_093
6_091
6_094
6_097
6_090
6_092
6_095
6_098
6_096
6_099
6_169
_DD1
FROM MODE MODULE
FROM MODE MODULE
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ2
6_123
6_121
6_124
6_127
6_120
6_122
6_125
6_128
6_126
6_129
6_172
_DD4
6_133
6_131
6_134
6_137
6_130
6_132
6_135
6_138
6_136
6_139
6_173
_DD5
6_119
6_171
_DD3
_JMPZD
6_176
ZERO DETECT
Φ4
6_177
6_178
SATURATION DETECT
6_179
_JMPUP
_JMPSD
Φ2
Φ3
DOWN
UP
E
ERROR COUNTER ENABLE
6_161
6_163
6_165
6_159
6_160
6_162
6_164
6_166
6_167
_DD8
_LCECL
TO D/A CONNVERTER
6_175
_DD7
ERROR COUNTER ENABLE
Φ 4
INHIBIT GIMBAL PULSE
DOWN
UP


13
12
11
10
9
Φ2
DOWN PULSES
UP PULSES
Φ1
(INPUT ERROR COUNTER PULSES P_E)
JMPPE
6_083
6_081
6_084
6_080
6_082
6_085
6_086
800 LHI
800 LLO
FROM DIGITAL MODE MODULE
INHDA
TO D/A MODULE
INHIBIT DAC
INHRC
FROM DIG. MODE MOD.
6_072
6_073
EEC
ERROR COUNTER ENABLE (E)
FAZ4HI
FAZ4LO
FAZ3HI
FAZ3LO
FAZ2HI
FAZ2LO
Φ3
$\overline{Φ2}$
PTHI
PTLO
TO READ COUNTER
IPPT
(P_I T.P_I)
FROM DIGITAL MODE MODULE
MO
6_103
6_101
6_104
6_107
2^2
6_109
6_100
6_102
6_105
6_108
$\overline{2^2}$
$\overline{2^2}$
6_170
DD2
6_106
6_113
6_111
6_114
6_117
2^3
6_119
6_110
6_112
6_115
6_118
$\overline{2^3}$
$\overline{2^3}$
6_171
DD3
6_116
6_123
6_121
6_124
6_127
6_120
6_122
6_125
6_128
6_126
I3H
I3L
FROM DIGITAL MODE MODULE
DOWN
UP
ERROR COUNTER ENABLE
2^2
2^6
6_143
6_141
6_144
6_147
2^6
6_149
6_140
6_142
6_145
6_148
$\overline{2^6}$
$\overline{2^6}$
6_174
DD6
6_146
I2H
I2L
FROM DIGITAL MODE MODULE
6_153
6_151
6_154
6_157
2^7
6_159
6_150
6_152
6_155
6_158
$\overline{2^7}$
$\overline{2^7}$
6_175
DD7
6_156
6_161
6_163
6_165
6_160
6_162
6_164
6_166
ERROR COUNTER ENABLE
UP
DOWN
Φ3
$\overline{Φ2}$
JMPUP
(UP)
JMPDN
(DOWN)
Φ4
INHIBIT GIMBAL PULSE (G)
INHIBIT GIMBAL PULSE
13
12
11
10
9

F-4


15
14
13
12
11
Φ2
DOWN PULSES
UP PULSES
Φ1
800 PPS AT Φ4 L
800 LHI
800 LLO
FROM DIGITAL MODE MODULE
6_049
6_050
INHIBIT READ COUNTER
_INHRC
FROM DIG. MODE MOD.
TO D/A MODULE
_INHDA
INHIBIT DAC
6_072
6_073
_EEC
ERROR COUNTER ENABLE (E)
Φ4
FAZ4HI
FAZ4LO
FAZ3HI
FAZ3LO
FAZ2HI
FAZ2LO
Φ3
Φ̄2
6_051
6_052
6_053
6_054
6_056
6_057
H
L
6_058
6_059
6_060
6_061
6_062
6_063
_PIHI
_PILO
TO READ COUNTER
_TPPI
(P2 T. P3)
AMBIGUITY OVERRIDE A0
_AO
FROM DIGITAL MODE MODULE
6_100
6_101
6_102
6_103
6_104
6_105
6_106
6_107
6_108
6_109
6_110
6_111
6_112
6_170
_DD2
2^2
$\bar{2}^2$
6_067
$\bar{I}_3$
I_3
I3H
I3L
FROM DIGITAL MODE MODULE
6_064
6_065
6_066
6_068
6_069
6_070
6_071
COARSE -I
CLAMP NEXT INTER
I_2
I2H
I2L
FROM DIGITAL MODE MODULE
Φ̄2
Φ3
DOWN
UP
ERROR COUNTER ENABLE
2^2
2^6
6_140
6_141
6_142
6_143
6_144
6_145
6_146
6_147
6_148
6_149
6_150
6_151
6_152
6_174
_DD6
2^6
$\bar{2}^6$
$\bar{2}^2$
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ̄2
Φ4
INHIBIT GIMBAL PULSE (6)
15
14
13
12
11

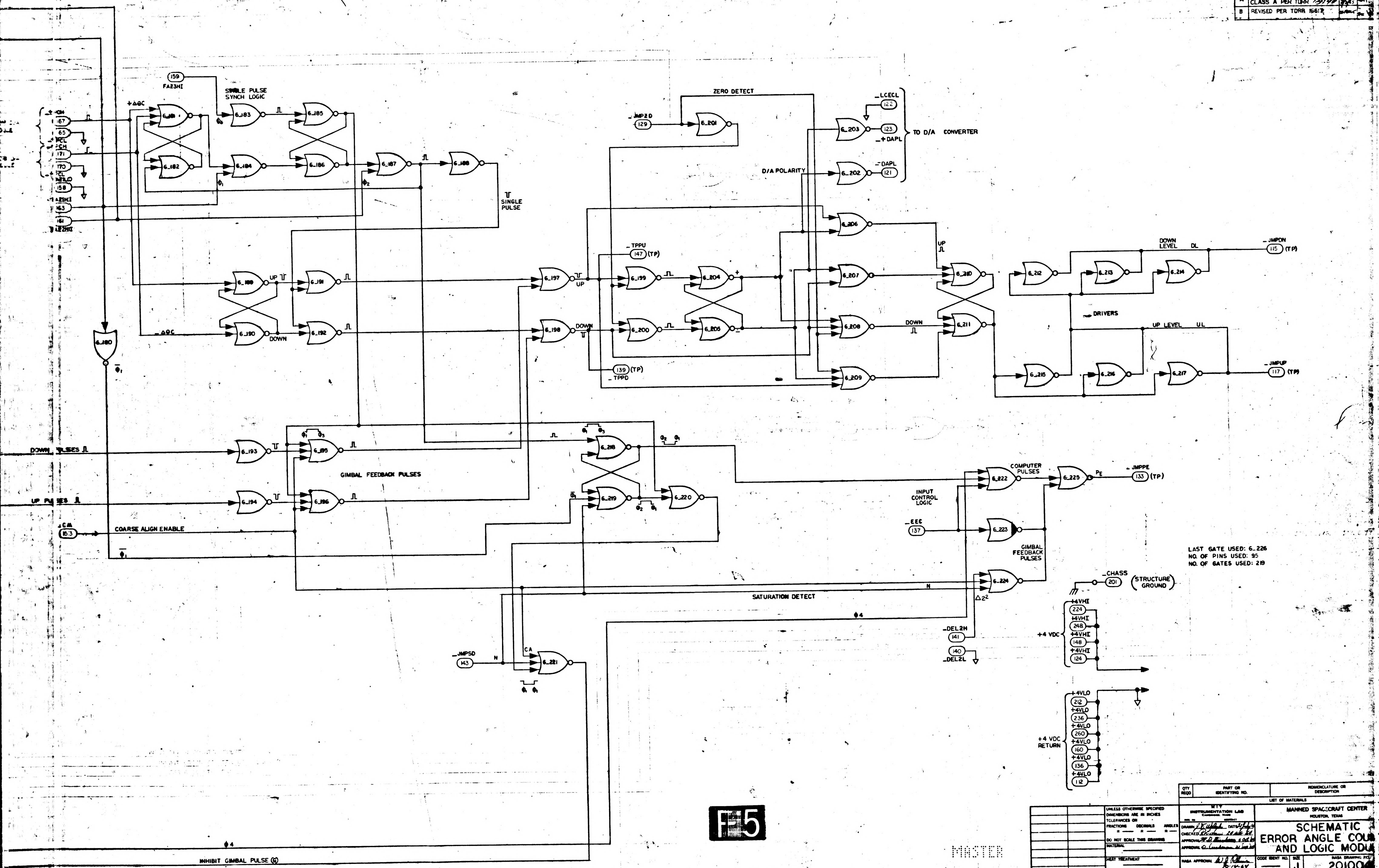
F-2


19
17
16
15
14
UP-DOWN LOGIC
FROM MODE MODULE
_REF1H
_REF-L
6_001
R₂ REFERENCE
6_002
R₁
S
6_003
6_004
6_005
6_006
Φ₂
6_007
6_008
UP
DOWN
6_009
6_010
Φ₂
DOWN PULSES
UP PULSES
Φ₁
FAZ2HI/
Φ̄₂
6_037
6_038
6_041
6_045
6_046
6_047
6_049
6_039
6_042
6_043
6_048
6_050
I₂
Ī₃
800 PPS AT Φ₄ L
TO READ COUNTER
_UPLVL
UP LEVEL
6_011
6_013
6_015
6_017
_LVLCM
6_012
6_014
6_016
6_018
_DNLVL
DOWN LEVEL
UP-DOWN DRIVERS
TO MODE MODULE
-PGL
-PGH
+PGH
+PGL
6_019
-ΔΘG
6_020
+ΔΘG
6_021
FROM READ COUNTER
_DELØL
_DELØH
Δ2⁰
F₂
C₂
6_040
6_044
HIGH SPEED
6_051
6_052
Ī₃
6_053
6_054
6_056
6_057
H
L
6_058
6_059
6_060
Φ₄
INHIBI
AMBIGUITY OVERRIDE
HIGH TERNARY LEVEL F2
FROM M5A MODULE
_TLF2H
_TLF2L
FINE TERNARY LEVEL F₁
_TLF1H
_TLF1L
6_022
FROM COARSE MODULE
_TLC1H
_TLC1L
COARSE TERNARY LEVEL
6_023
6_028
C̄₁
6_024
6_025
6_026
_TPF2
_TPF1
_TPC1
_IHI
FROM
INTERROGATE
6_027
6_029
6_030
6_031
6_032
FINE
COARSE
6_033
6_034
C₁
I
6_035
SELECTED ERROR (S)
6_036
_TPS
(TP)
COARSE-FINE MIX LOGIC
_ILO
_TPUG
6_067
Ī₃
I₃
6_064
6_065
6_066
6_068
6_069
6_070
6_071
COARSE-I
CLAMP NEXT INTERR
I₂
18
17
16
15
14

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
3. ⬭ INDICATES EXTERNAL PIN CONNECTIONS
4. ▷o— DENOTES SINGLE MICRO-NOR GATE
5. ▷o— DENOTES FAN-IN GATE
6. POWER CONNECTIONS TO GATES NOT SHOWN
7. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN
8. ▽ INDICATES MODULE POWER BUSS-4V RETURN

SYM	DESCRIPTION	DATE	APP
A	REVISED AND UPGRADED TO CLASS A PER TDRR 15948	3/4/65	[illegible]
B	REVISED PER TDRR 16617	[illegible]	[illegible]

2010043 B


5
4
3
2
1
D
C
B
A
159
FAZ3HI
SINGLE PULSE
SYNCH LOGIC
+ΔθC
167
65
PCL
PCH
171
170
PCL
AZ1LO
158
AZ1HI
163
161
AZ2HI
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
ϕ_2
ϕ_1
SINGLE PULSE
6_189
UP
6_190
DOWN
−ΔθC
6_191
6_192
6_180
$\overline{\phi}_1$
ZERO DETECT
_JMPZD
129
6_201
_LCECL
122
6_203
123
_+DAPL
TO D/A CONVERTER
D/A POLARITY
6_202
_DAPL
121
6_197
6_198
UP
DOWN
_TPPU
147 (TP)
6_199
6_200
6_204
6_205
+
−
139 (TP)
_TPPD
6_206
6_207
6_208
6_209
UP
DOWN
6_210
6_211
6_212
6_213
6_214
6_215
6_216
6_217
DOWN LEVEL DL
_JMPDN
115 (TP)
DRIVERS
UP LEVEL UL
_JMPUP
117 (TP)
DOWN PULSES
UP PULSES
6_193
6_194
6_195
6_196
GIMBAL FEEDBACK PULSES
ϕ_1 ϕ_3
6_218
6_219
6_220
ϕ_2 ϕ_1
_ECM
153
COARSE ALIGN ENABLE
$\overline{\phi}_1$
INPUT CONTROL LOGIC
_EEC
137
6_222
6_223
6_224
6_225
COMPUTER PULSES
GIMBAL FEEDBACK PULSES
P_E
_JMPPE
133 (TP)
N
SATURATION DETECT
$\Delta 2^2$
$\phi 4$
_DEL2H
141
140
_DEL2L
_JMPSD
143
N
CA
6_221
ϕ_1 ϕ_1
_CHASS
201
(STRUCTURE GROUND)
+4 VDC
+4VHI
224
+4VHI
248
+4VHI
148
+4VHI
124
+4 VDC RETURN
+4VLO
212
+4VLO
236
+4VLO
260
+4VLO
160
+4VLO
136
+4VLO
112
$\phi 4$
INHIBIT GIMBAL PULSE (G)

LAST GATE USED: 6_226
NO. OF PINS USED: 95
NO. OF GATES USED: 219

F-5

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

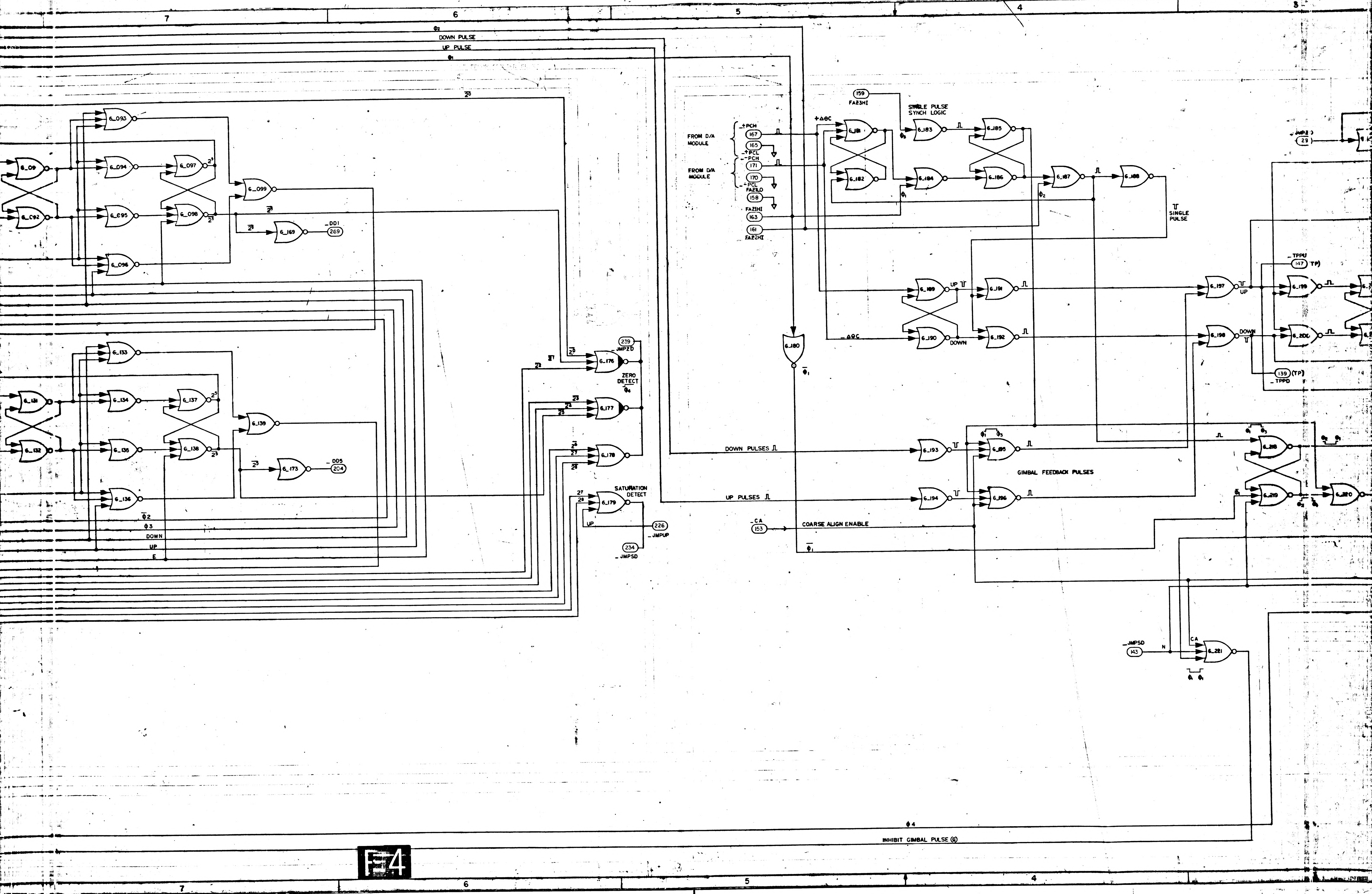
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT
DRAWN J. E. Ward DATE 2 July 64
CHECKED R. K. [illegible] 24 Jul 64
APPROVAL W. D. [illegible] 6 Oct 64
APPROVAL C. [illegible] 21 Sep 64
NASA APPROVAL [illegible] 10-14-64
MIT APPROVAL [illegible]

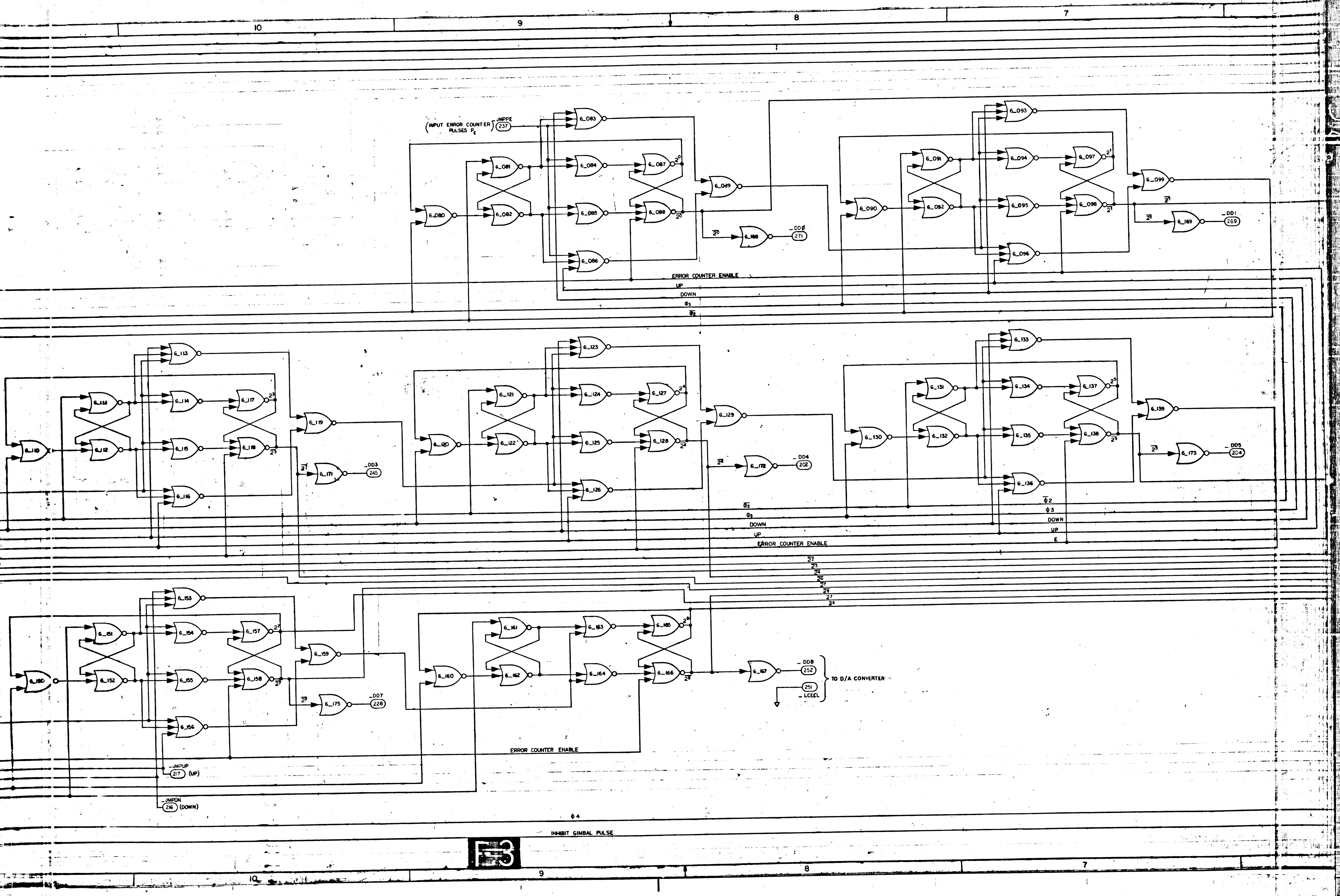
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

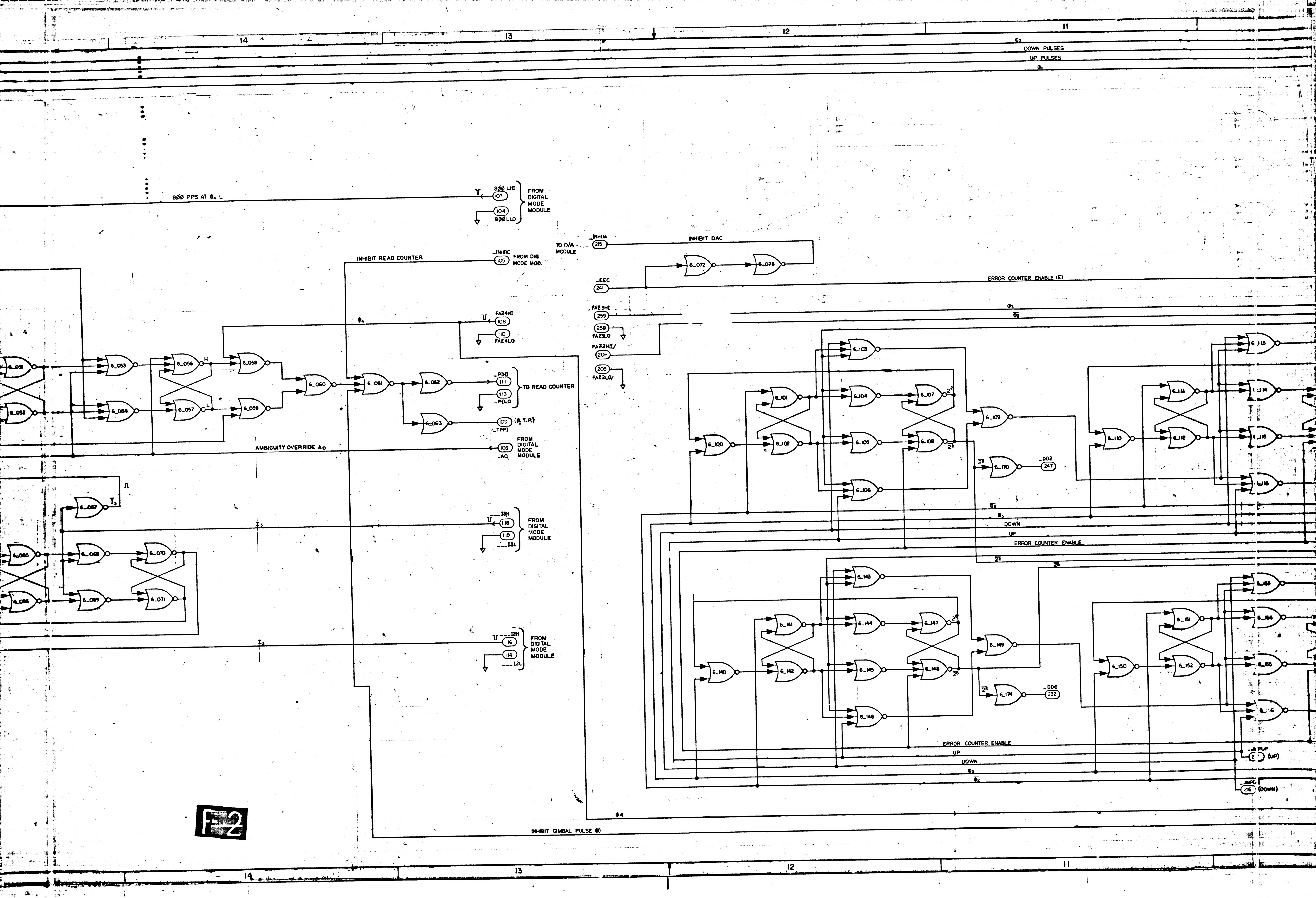
SCHEMATIC
ERROR ANGLE COUNTER AND LOGIC MODULE

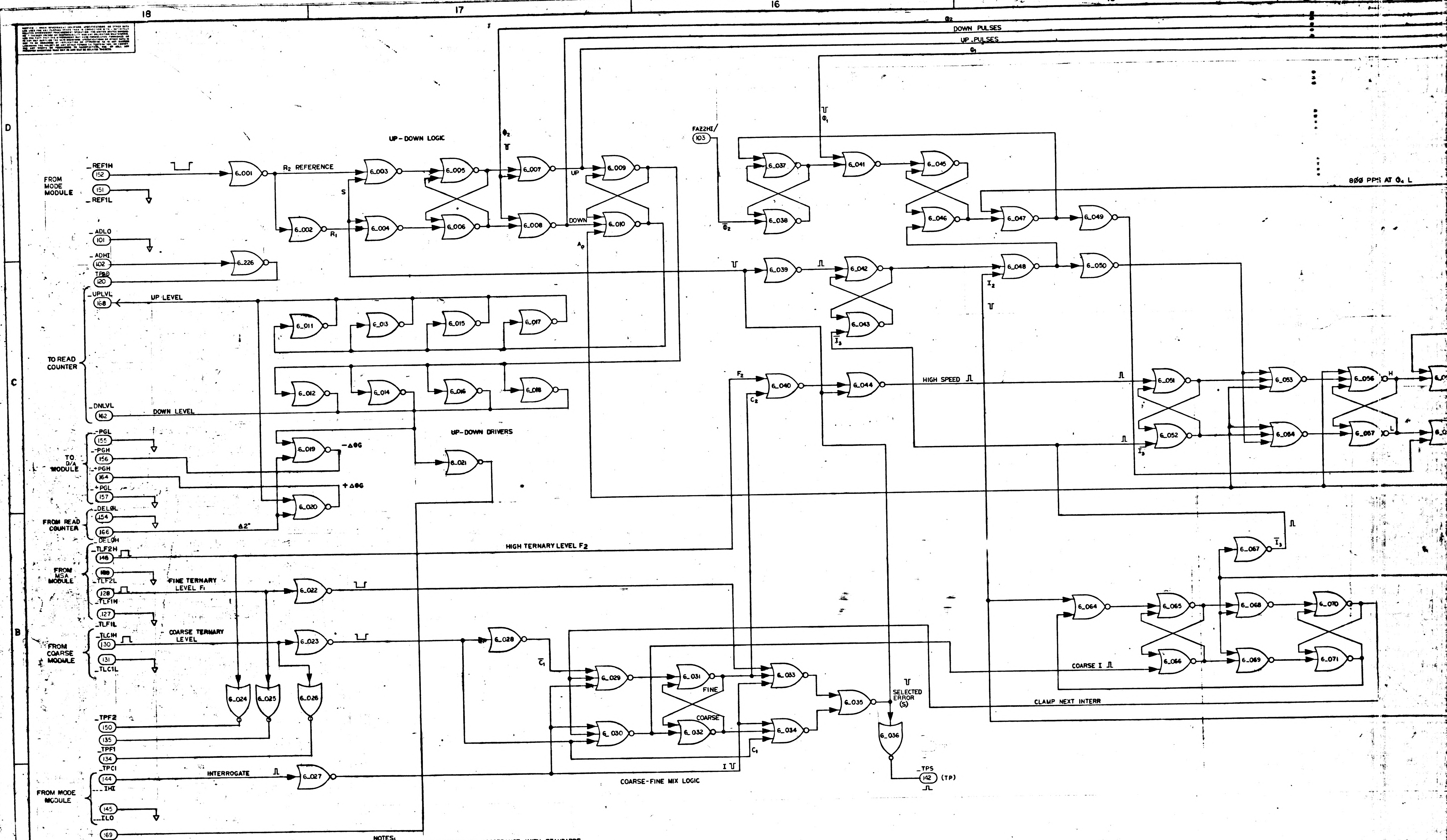
CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 201004
SCALE —
WT —
SHEET

2010048 b


7
6
5
4
3
Φ2
DOWN PULSE
UP PULSE
Φ1
2⁰
6_093
6_09
6_094
6_097
6_C92
6_095
6_098
6_096
6_099
6_169
_DD1
269
6_133
6_131
6_134
6_137
6_132
6_135
6_138
6_136
6_139
6_173
_DD5
204
Φ2
Φ3
DOWN
UP
E
239
JMPZD
6_176
ZERO DETECT
6_177
6_178
SATURATION DETECT
6_179
226
_JMPUP
234
_JMPSD
FROM D/A MODULE
FROM D/A MODULE
_+PCH
167
165
_+PCL
_-PCH
171
170
_-PCL
FAZILO
158
FAZIHI
163
161
FAZ2HI
159
FAZ3HI
+Δθc
SINGLE PULSE SYNCH LOGIC
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
SINGLE PULSE
6_180
_Δθc
6_189
6_190
6_191
6_192
UP
DOWN
6_197
6_198
_TPPU
147 (TP)
6_199
6_200
139 (TP)
_TPPD
_JMPZD
29
DOWN PULSES
UP PULSES
6_193
6_194
6_195
6_196
GIMBAL FEEDBACK PULSES
6_218
6_219
6_220
_CA
153
COARSE ALIGN ENABLE
_JMPSD
143
N
CA
6_221
Φ4
INHIBIT GIMBAL PULSE (G)
F-4


10
9
8
7
(INPUT ERROR COUNTER PULSES P_E)
-JMPPE
237
6_080
6_081
6_082
6_083
6_084
6_085
6_086
6_087
6_088
6_089
2^0
$\overline{2^0}$
6_188
-DD0
271
6_090
6_091
6_092
6_093
6_094
6_095
6_096
6_097
6_098
6_099
2^1
$\overline{2^1}$
6_169
-DD1
269
ERROR COUNTER ENABLE
UP
DOWN
Φ_3
$\overline{\Phi_2}$
6_110
6_111
6_112
6_113
6_114
6_115
6_116
6_117
6_118
6_119
2^3
$\overline{2^3}$
6_171
-DD3
245
6_120
6_121
6_122
6_123
6_124
6_125
6_126
6_127
6_128
6_129
2^4
$\overline{2^4}$
6_172
-DD4
202
6_130
6_131
6_132
6_133
6_134
6_135
6_136
6_137
6_138
6_139
2^5
$\overline{2^5}$
6_173
-DD5
204
$\overline{\Phi 2}$
$\Phi 3$
DOWN
UP
E
$\overline{\Phi_2}$
Φ_3
DOWN
UP
ERROR COUNTER ENABLE
$\overline{2^2}$
$\overline{2^3}$
$\overline{2^4}$
$\overline{2^6}$
2^7
2^8
$\overline{2^7}$
2^8
6_150
6_151
6_152
6_153
6_154
6_155
6_156
6_157
6_158
6_159
2^7
$\overline{2^7}$
6_175
-DD7
228
6_160
6_161
6_162
6_163
6_164
6_165
6_166
2^8
$\overline{2^8}$
6_167
-DD8
252
251
-LCEEL
TO D/A CONVERTER
ERROR COUNTER ENABLE
-JMPUP
217 (UP)
-JMPDN
216 (DOWN)
$\Phi 4$
INHIBIT GIMBAL PULSE
F-3
10
9
8
7


14
13
12
11
Φ2
DOWN PULSES
UP PULSES
Φ1
800 PPS AT Φ4 L
800 LHI
107
104
800LLO
FROM DIGITAL MODE MODULE
TO D/A MODULE
_INHDA
215
INHIBIT DAC
6_072
6_073
INHIBIT READ COUNTER
_INHRC
105
FROM DIG. MODE MOD.
_EEC
241
ERROR COUNTER ENABLE (E)
FAZ3HI
259
258
FAZ3LO
FAZ2HI/
206
208
FAZ2LO/
Φ3
Φ̄2
Φ4
FAZ4HI
108
110
FAZ4LO
6_051
6_052
6_053
6_054
6_056
6_057
H
L
6_058
6_059
6_060
6_061
6_062
6_063
_PIHI
111
113
_PILO
TO READ COUNTER
109
(P1 T. P1)
_TPPI
AMBIGUITY OVERRIDE A0
106
_AO
FROM DIGITAL MODE MODULE
6_067
Ī3
I3
_I3H
118
119
_I3L
FROM DIGITAL MODE MODULE
6_065
6_066
6_068
6_069
6_070
6_071
I2
_I2H
116
114
_I2L
FROM DIGITAL MODE MODULE
6_100
6_101
6_102
6_103
6_104
6_105
6_106
6_107
6_108
2^2
2̄^2
6_109
2̄^2
6_170
_DD2
247
6_110
6_111
6_112
6_113
6_114
6_115
6_116
Φ̄2
Φ3
DOWN
UP
ERROR COUNTER ENABLE
2^2
2^6
6_140
6_141
6_142
6_143
6_144
6_145
6_146
6_147
6_148
2^6
2̄^6
6_149
2̄^6
6_174
_DD6
232
6_150
6_151
6_152
6_153
6_154
6_155
6_156
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ̄2
_INPUP
2
(UP)
_INPDC
216
(DOWN)
Φ4
INHIBIT GIMBAL PULSE (G)
F-2
14
13
12
11


18
17
16
15
D
C
B
A
UP-DOWN LOGIC
FROM MODE MODULE
_REF1H
152
151
_REF1L
6_001
R2 REFERENCE
6_002
R1
S
6_003
6_004
6_005
6_006
Φ2
6_007
6_008
UP
DOWN
6_009
6_010
A0
Φ2
DOWN PULSES
UP PULSES
Φ1
_ADLO
101
_ADHI
102
TPDB
120
6_226
_UPLVL
168
UP LEVEL
TO READ COUNTER
6_011
6_013
6_015
6_017
6_012
6_014
6_016
6_018
_DNLVL
162
DOWN LEVEL
UP-DOWN DRIVERS
TO D/A MODULE
_-PGL
155
_-PGH
156
_+PGH
164
_+PGL
157
6_019
-ΔΘG
6_020
+ΔΘG
6_021
FROM READ COUNTER
_DELØL
154
166
Δ2"
_DELØH
HIGH TERNARY LEVEL F2
FROM MSA MODULE
_TLF2H
148
188
_TLF2L
FINE TERNARY LEVEL F1
128
_TLF1H
127
_TLF1L
6_022
FROM COARSE MODULE
_TLC1H
130
COARSE TERNARY LEVEL
131
_TLC1L
6_023
6_024
6_025
6_026
_TPF2
150
135
_TPF1
134
_TPC1
FROM MODE MODULE
144
_IHI
INTERROGATE
6_027
145
_ILO
169
_TPUG
6_028
C̄1
6_029
6_030
6_031
6_032
FINE
COARSE
6_033
6_034
C1
6_035
SELECTED ERROR (S)
6_036
_TPS
142
(TP)
I
COARSE-FINE MIX LOGIC
FAZ2HI/
103
Φ1
6_037
6_038
Φ̄2
6_041
6_045
6_046
6_047
6_049
800 PPS AT Φ4 L
6_039
6_042
6_043
Ī3
6_048
I2
6_050
F2
C2
6_040
6_044
HIGH SPEED
6_051
6_052
I3
6_053
6_054
6_056
6_057
H
L
6_067
Ī3
6_064
6_065
6_066
6_068
6_069
6_070
6_071
COARSE I
CLAMP NEXT INTERR
18
17
16
15
14

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. ⬭ INDICATES EXTERNAL PIN CONNECTIONS

3. DENOTES SINGLE MICRO-NOR GATE

4. DENOTES FAN-IN GATE

5. POWER CONNECTIONS TO GATES NOT SHOWN

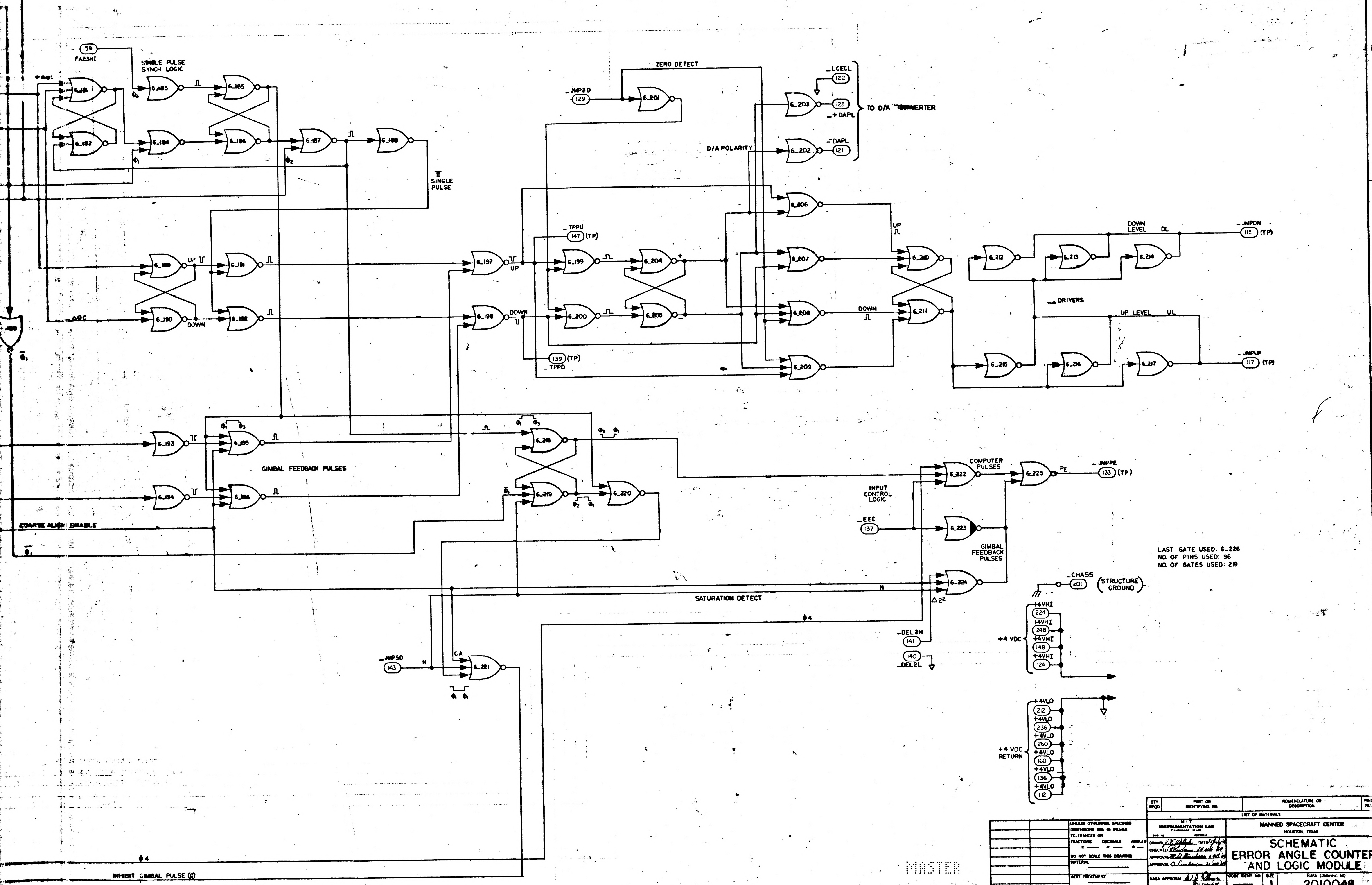
6. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN

7. ↓ INDICATES MODULE POWER BUSS-4V RETURN

8. ⬭ (XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

2010048 C

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 15748		
B	REVISED PER TDRR 16617		
C	REVISED PER TDRR 17421	16 Mar 65	



59
FAZ3HI
SINGLE PULSE SYNCH LOGIC
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
SINGLE PULSE
6_189
6_190
6_191
6_192
UP
DOWN
AOC
6_180
6_193
6_194
6_195
6_196
GIMBAL FEEDBACK PULSES
COARSE ALIGN ENABLE
ZERO DETECT
_JMP2D
129
6_201
6_197
6_198
6_199
6_200
6_204
6_205
_TPPU
147 (TP)
139 (TP)
_TPPD
D/A POLARITY
6_202
6_203
_LCECL
122
123
_+DAPL
_DAPL
121
TO D/A CONVERTER
6_206
6_207
6_208
6_209
6_210
6_211
6_212
6_213
6_214
6_215
6_216
6_217
DOWN LEVEL DL
UP LEVEL UL
DRIVERS
_JMPDN
115 (TP)
_JMPUP
117 (TP)
6_218
6_219
6_220
6_221
6_222
6_223
6_224
6_225
COMPUTER PULSES
P_E
_JMPPE
133 (TP)
INPUT CONTROL LOGIC
_EEC
137
GIMBAL FEEDBACK PULSES
SATURATION DETECT
N
CA
_JMPSD
143
$\phi 4$
_DEL2H
141
140
_DEL2L
$\Delta 2^2$
_CHASS
201
(STRUCTURE GROUND)
+4 VDC
+4VHI
224
248
148
124
+4 VDC RETURN
+4VLO
212
236
260
160
136
112
INHIBIT GIMBAL PULSE (G)

LAST GATE USED: 6_226
NO. OF PINS USED: 96
NO. OF GATES USED: 219

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

NEXT ASSY | USED ON
APPLICATION

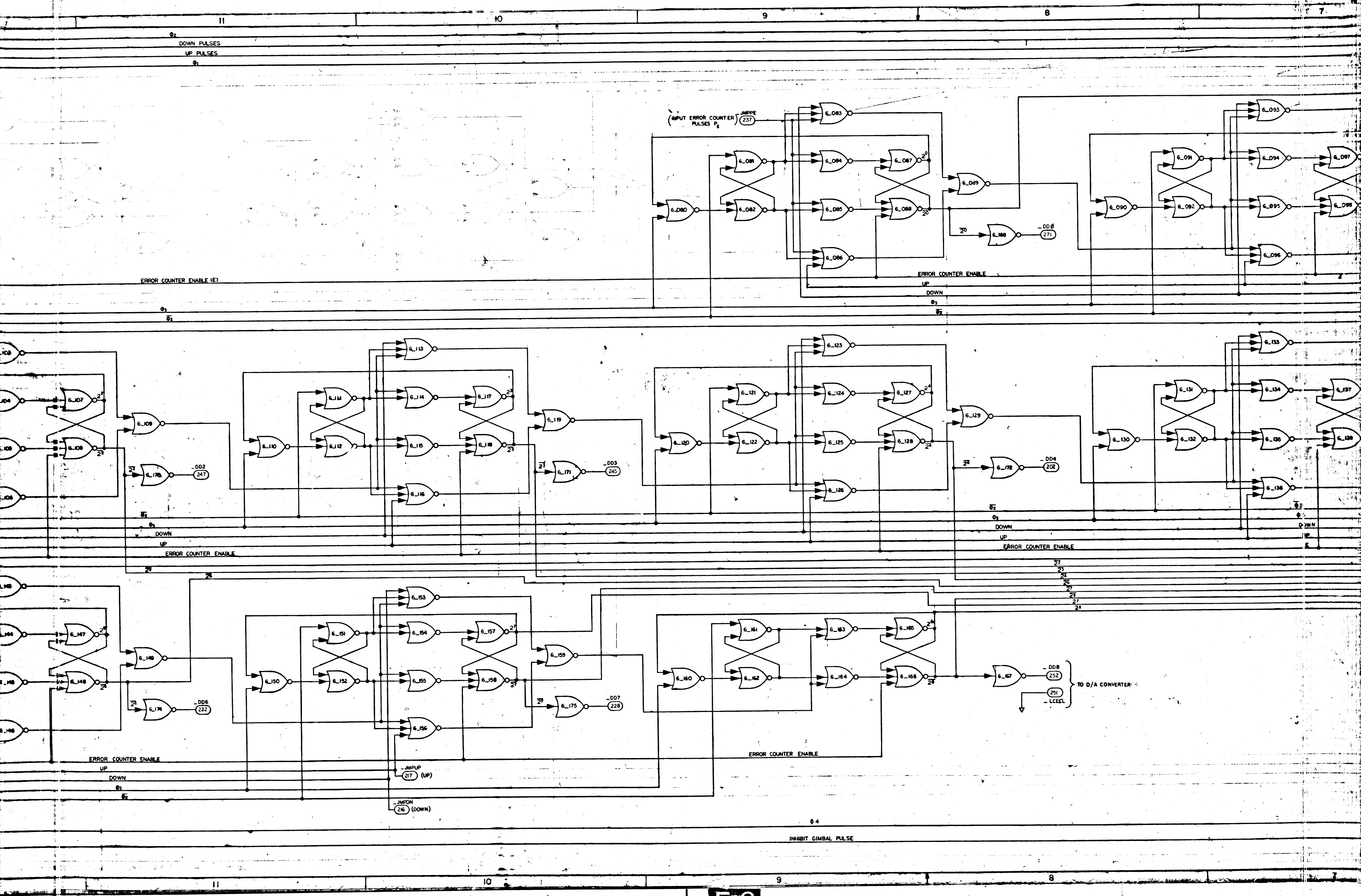
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL 10-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

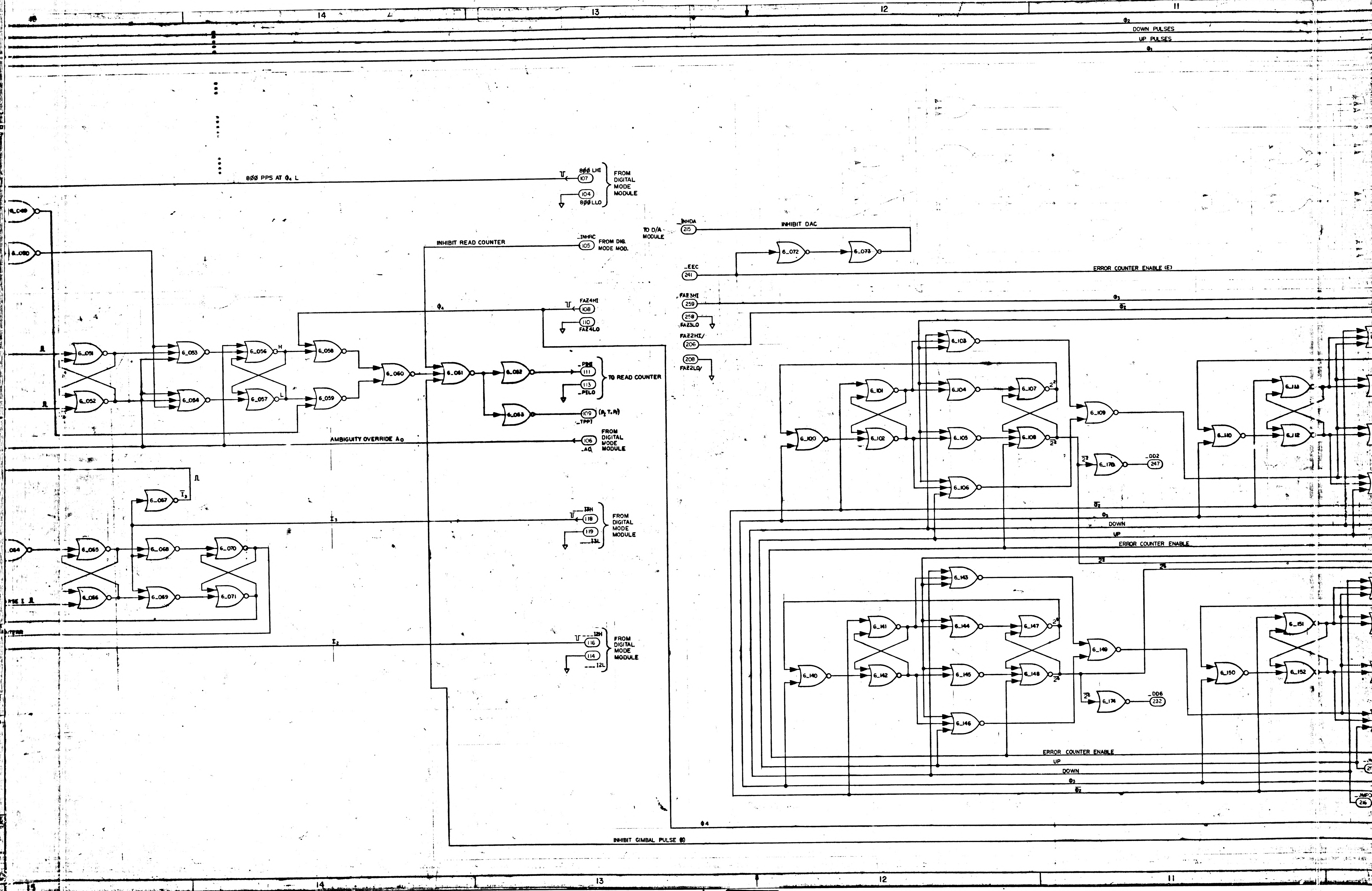
SCHEMATIC ERROR ANGLE COUNTER AND LOGIC MODULE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010048
SCALE — WT — SHEET 1 OF 1

2010048 C


11
10
9
8
7
Φ2
DOWN PULSES
UP PULSES
Φ1
(INPUT ERROR COUNTER PULSES P_E)
JMPPE
237
6_080
6_081
6_082
6_083
6_084
6_085
6_086
6_087
6_088
6_089
6_090
6_091
6_092
6_093
6_094
6_095
6_096
6_097
6_098
6_188
_DD0
271
ERROR COUNTER ENABLE (E)
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ2
6_106
6_107
6_108
6_109
6_110
6_111
6_112
6_113
6_114
6_115
6_116
6_117
6_118
6_119
6_120
6_121
6_122
6_123
6_124
6_125
6_126
6_127
6_128
6_129
6_130
6_131
6_132
6_133
6_134
6_135
6_136
6_137
6_138
6_170
_DD2
247
6_171
_DD3
245
6_172
_DD4
208
E
6_145
6_146
6_147
6_148
6_149
6_150
6_151
6_152
6_153
6_154
6_155
6_156
6_157
6_158
6_159
6_160
6_161
6_162
6_163
6_164
6_165
6_166
6_167
6_174
_DD6
232
6_175
_DD7
228
_DD8
252
251
_LCEEL
TO D/A CONVERTER
_JMPUP
217
(UP)
_JMPDN
216
(DOWN)
Φ4
INHIBIT GIMBAL PULSE

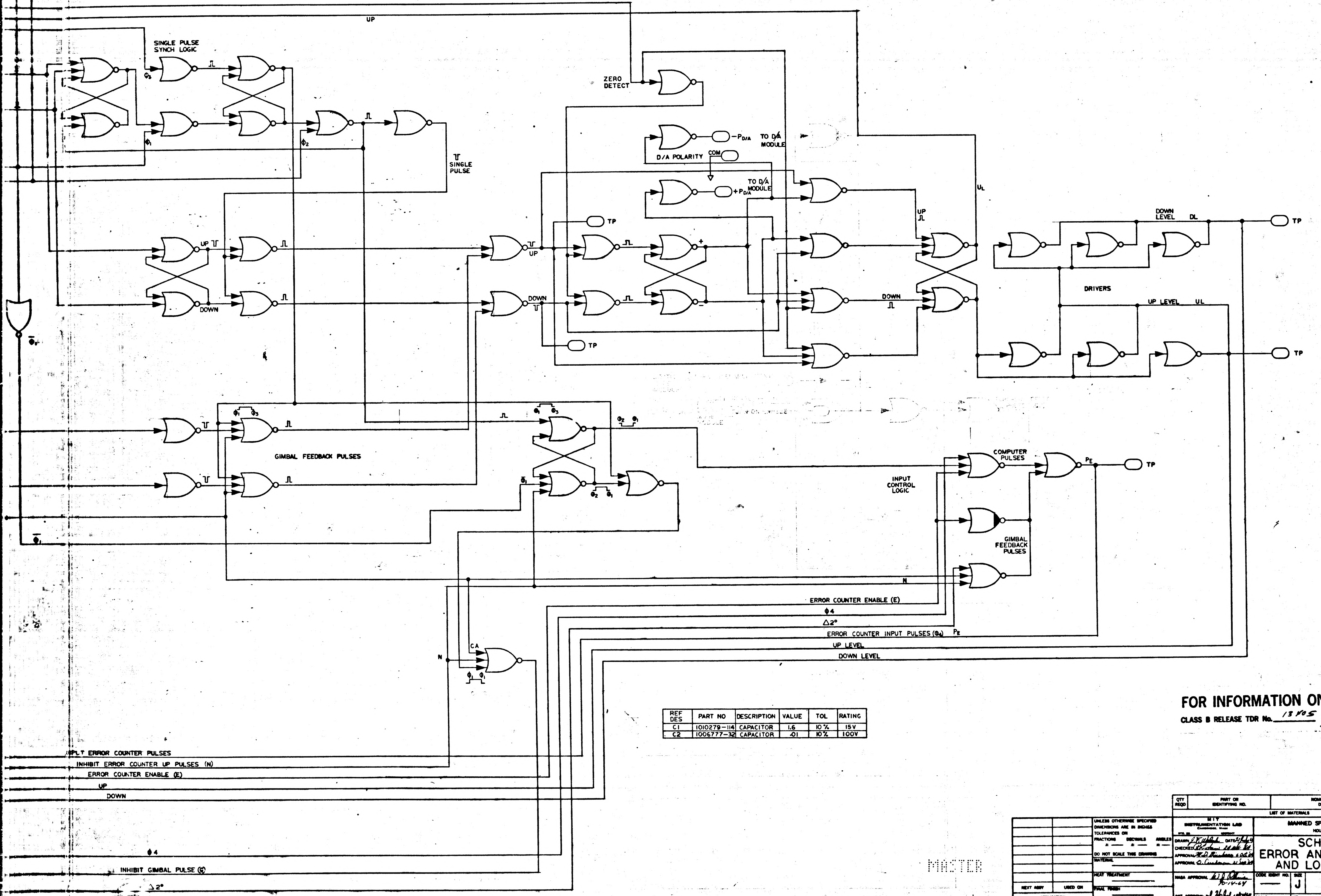
E3


14
13
12
11
Φ_2
DOWN PULSES
UP PULSES
Φ_1
800 PPS AT Φ_4 L
800 LHI
107
104
800 LLO
FROM DIGITAL MODE MODULE
INHIBIT READ COUNTER
_INHRC
105
FROM DIG. MODE MOD.
TO D/A MODULE
_INHDA
215
INHIBIT DAC
6_072
6_073
_EEC
241
ERROR COUNTER ENABLE (E)
FAZ3HI
259
258
FAZ3LO
FAZ2HI/
206
208
FAZ2LO/
Φ_3
$\overline{\Phi_2}$
Φ_4
FAZ4HI
108
110
FAZ4LO
6_080
6_051
6_052
6_053
6_054
6_056
6_057
H
L
6_058
6_059
6_060
6_061
6_062
6_063
_PIHI
111
113
_PILO
TO READ COUNTER
109
$(P_2 T.P.)$
_TPPI
AMBIGUITY OVERRIDE A_O
106
_AO
FROM DIGITAL MODE MODULE
6_067
$\overline{I_3}$
I_3
_I3H
118
119
_I3L
FROM DIGITAL MODE MODULE
6_064
6_065
6_066
6_068
6_069
6_070
6_071
I_2
_I2H
116
114
_I2L
FROM DIGITAL MODE MODULE
6_100
6_101
6_102
6_103
6_104
6_105
6_106
6_107
6_108
2^2
$\overline{2^2}$
6_109
6_170
_DD2
247
6_110
6_111
6_112
$\overline{\Phi_2}$
Φ_3
DOWN
UP
ERROR COUNTER ENABLE
$\overline{2^2}$
$\overline{2^6}$
6_140
6_141
6_142
6_143
6_144
6_145
6_146
6_147
6_148
2^6
$\overline{2^6}$
6_149
6_174
_DD6
232
6_150
6_151
6_152
ERROR COUNTER ENABLE
UP
DOWN
Φ_3
$\overline{\Phi_2}$
_IMPO
216
Φ_4
INHIBIT GIMBAL PULSE (B)
14
13
12
11

F-2

2010048

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


UP
SINGLE PULSE
SYNCH LOGIC
φ3
φ1
φ2
SINGLE PULSE
UP
DOWN
ZERO
DETECT
-P D/A
TO D/A MODULE
D/A POLARITY
COM
+P D/A
TO D/A MODULE
TP
UP
DOWN
TP
+
−
UL
UP
DOWN
DOWN LEVEL DL
DRIVERS
UP LEVEL UL
TP
TP
GIMBAL FEEDBACK PULSES
φ1 φ3
φ1 φ3
φ2 φ1
φ2 φ1
φ̄1
COMPUTER PULSES
PE
TP
INPUT CONTROL LOGIC
GIMBAL FEEDBACK PULSES
N
ERROR COUNTER ENABLE (E)
φ4
Δ2°
ERROR COUNTER INPUT PULSES (Φ4) PE
UP LEVEL
DOWN LEVEL
CA
N
φ1 φ1
φ̄4
φ̄1
PLT ERROR COUNTER PULSES
INHIBIT ERROR COUNTER UP PULSES (N)
ERROR COUNTER ENABLE (E)
UP
DOWN
φ4
INHIBIT GIMBAL PULSE (G)
Δ2°

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1010279-114	CAPACITOR	1.6	10%	15V
C2	1006777-32	CAPACITOR	.01	10%	100V

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 13405 DATE

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. F. Whitlock DATE 21 July 64
CHECKED R. Kochman 20 Aug 64
APPROVAL H. D. Rinehart 6 Oct 64
APPROVAL D. Cushman 21 Sep 64
NASA APPROVAL W. J. Rhine 10-14-64
MIT APPROVAL

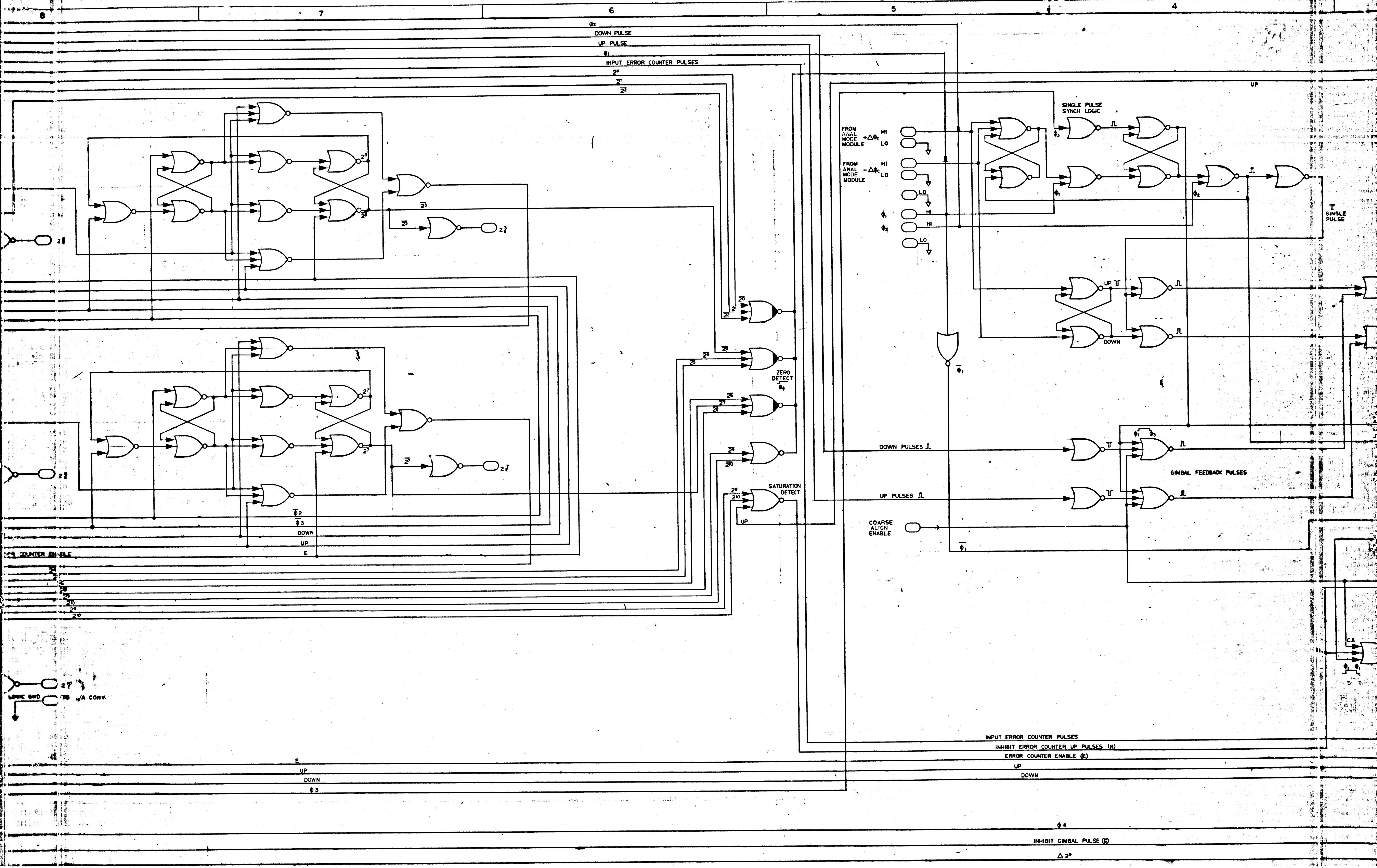
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC ERROR ANGLE COUNTER AND LOGIC MODULE

CODE IDENT NO. — SIZE J NASA DRAWING NO. 2010048
SCALE — WT — SHEET 1 OF 1

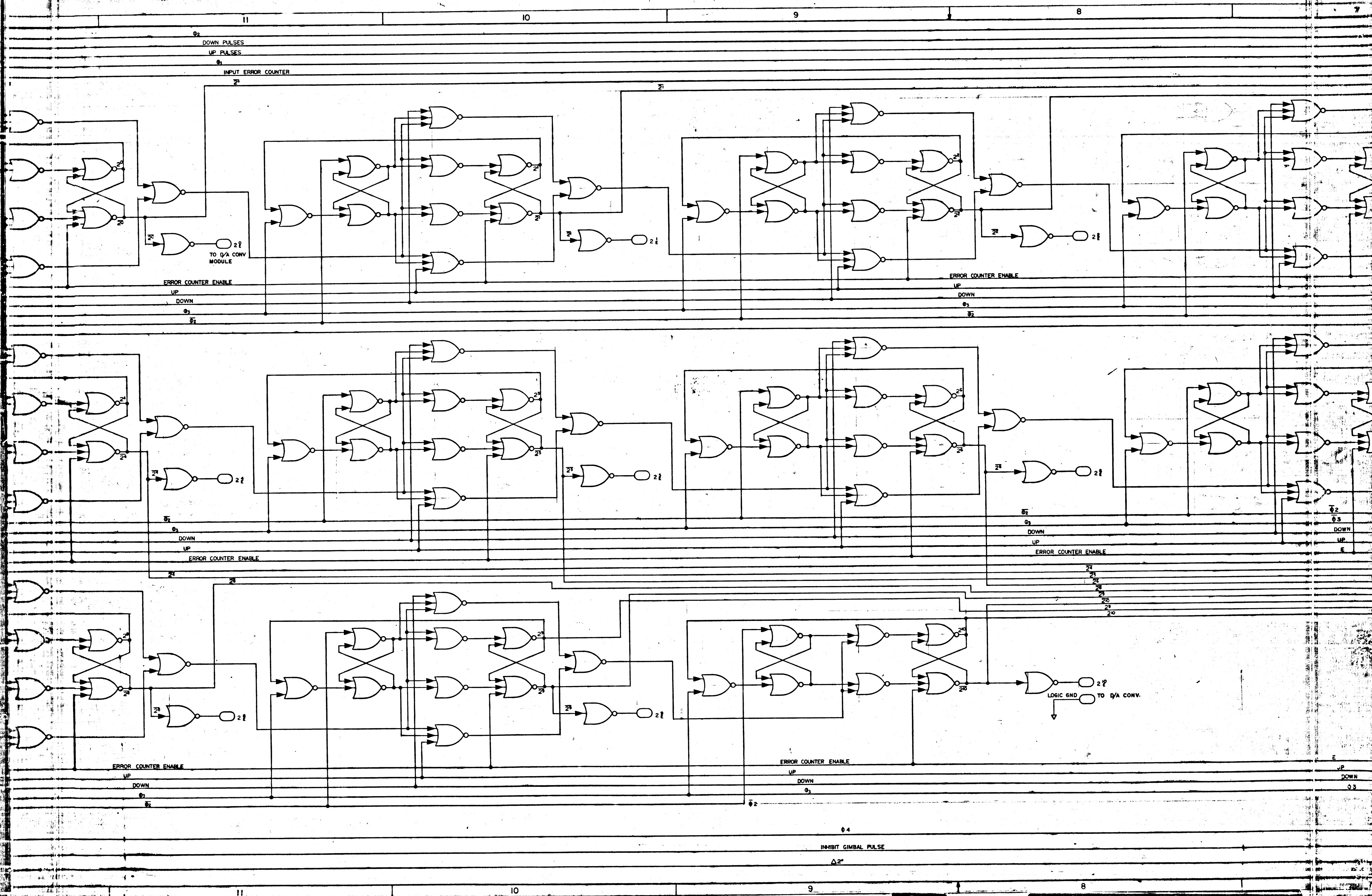
2010048

F-5


8
7
6
5
4
φ2
DOWN PULSE
UP PULSE
φ1
INPUT ERROR COUNTER PULSES
$\overline{2^0}$
$\overline{2^1}$
$\overline{2^2}$
UP
2^3
$\overline{2^3}$
2^3_E
2^7
$\overline{2^7}$
2^7_E
2^2_E
2^6_E
$\overline{2^0}$
$\overline{2^1}$
$\overline{2^2}$
$\overline{2^3}$
$\overline{2^4}$
$\overline{2^5}$
$\overline{2^6}$
$\overline{2^7}$
$\overline{2^8}$
$\overline{2^9}$
$\overline{2^{10}}$
ZERO DETECT
φ4
SATURATION DETECT
2^9
2^{10}
UP
$\overline{φ2}$
$\overline{φ3}$
DOWN
UP
E
COUNTER ENABLE
2^9
2^{10}
2^{10}_E
LOGIC GND
TO D/A CONV.
FROM ANAL MODE MODULE +Δφc
HI
LO
FROM ANAL MODE MODULE −Δφc
HI
LO
LO
φ1
HI
φ4
HI
LO
SINGLE PULSE SYNCH LOGIC
φ3
φ1
φ2
SINGLE PULSE
UP
DOWN
$\overline{φ_1}$
DOWN PULSES
UP PULSES
φ1
φ3
GIMBAL FEEDBACK PULSES
COARSE ALIGN ENABLE
$\overline{φ_1}$
CA
φ4
φ1
INPUT ERROR COUNTER PULSES
INHIBIT ERROR COUNTER UP PULSES (N)
ERROR COUNTER ENABLE (E)
UP
DOWN
E
UP
DOWN
φ3
φ4
INHIBIT GIMBAL PULSE (G)
Δ 2°

F4

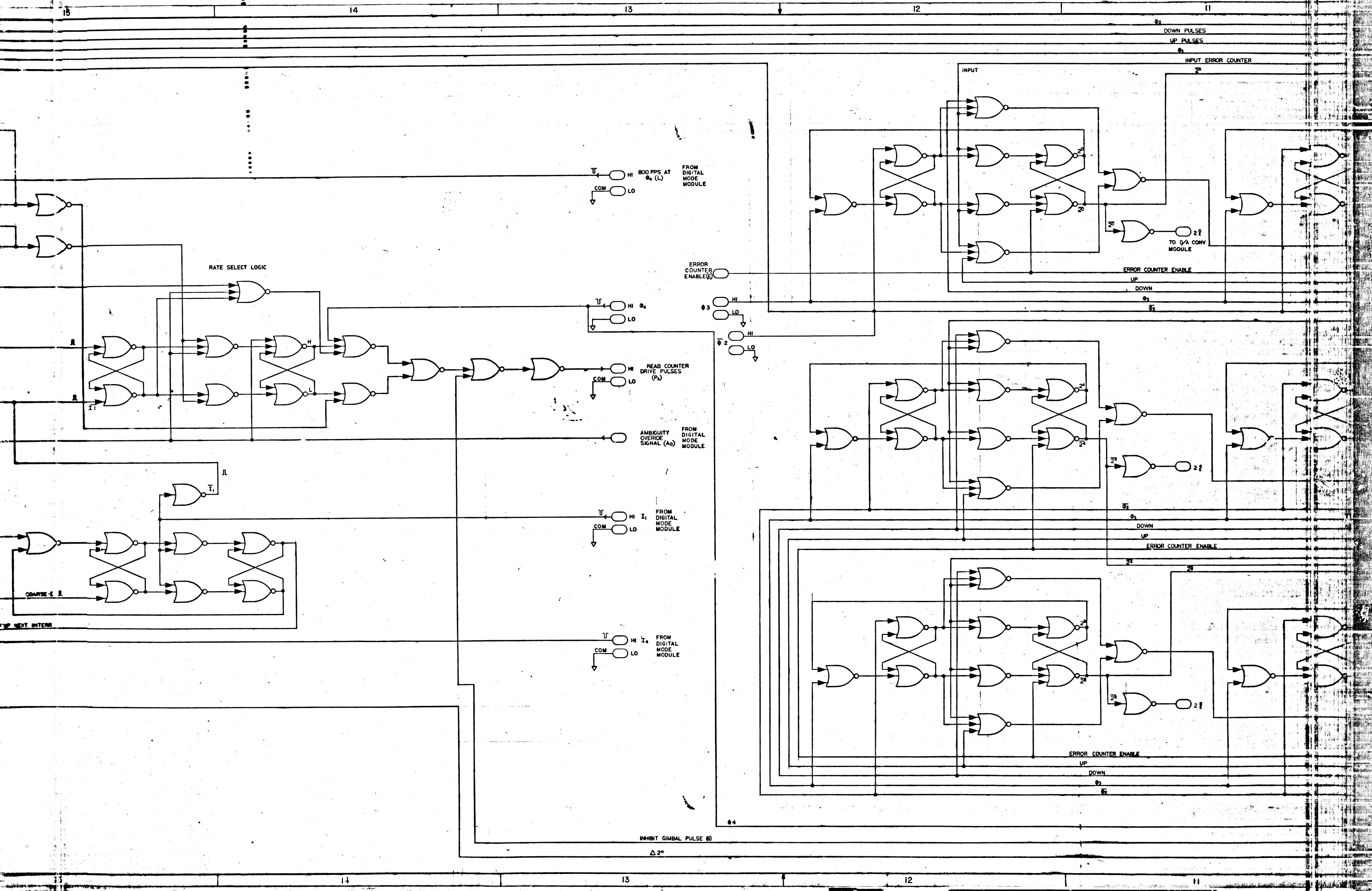
20 00048



11
10
9
8
Φ2
DOWN PULSES
UP PULSES
Φ1
INPUT ERROR COUNTER
$\overline{2^0}$
$\overline{2^1}$
2^0
2^1
2^2
2^0_E
TO D/A CONV MODULE
2^1_E
2^2_E
ERROR COUNTER ENABLE
UP
DOWN
Φ3
$\overline{\Phi_2}$
2^3
2^4
2^5
2^6
$\overline{2^3}$
$\overline{2^4}$
2^3_E
2^4_E
2^5_E
2^6_E
$\overline{2^5}$
$\overline{2^6}$
$\overline{2^7}$
$\overline{2^8}$
$\overline{2^9}$
$\overline{2^{10}}$
E
2^7
2^8
2^9
2^{10}
2^7_E
2^8_E
2^9_E
2^{10}_E
LOGIC GND
TO D/A CONV.
Φ4
INHIBIT GIMBAL PULSE
Δ2°

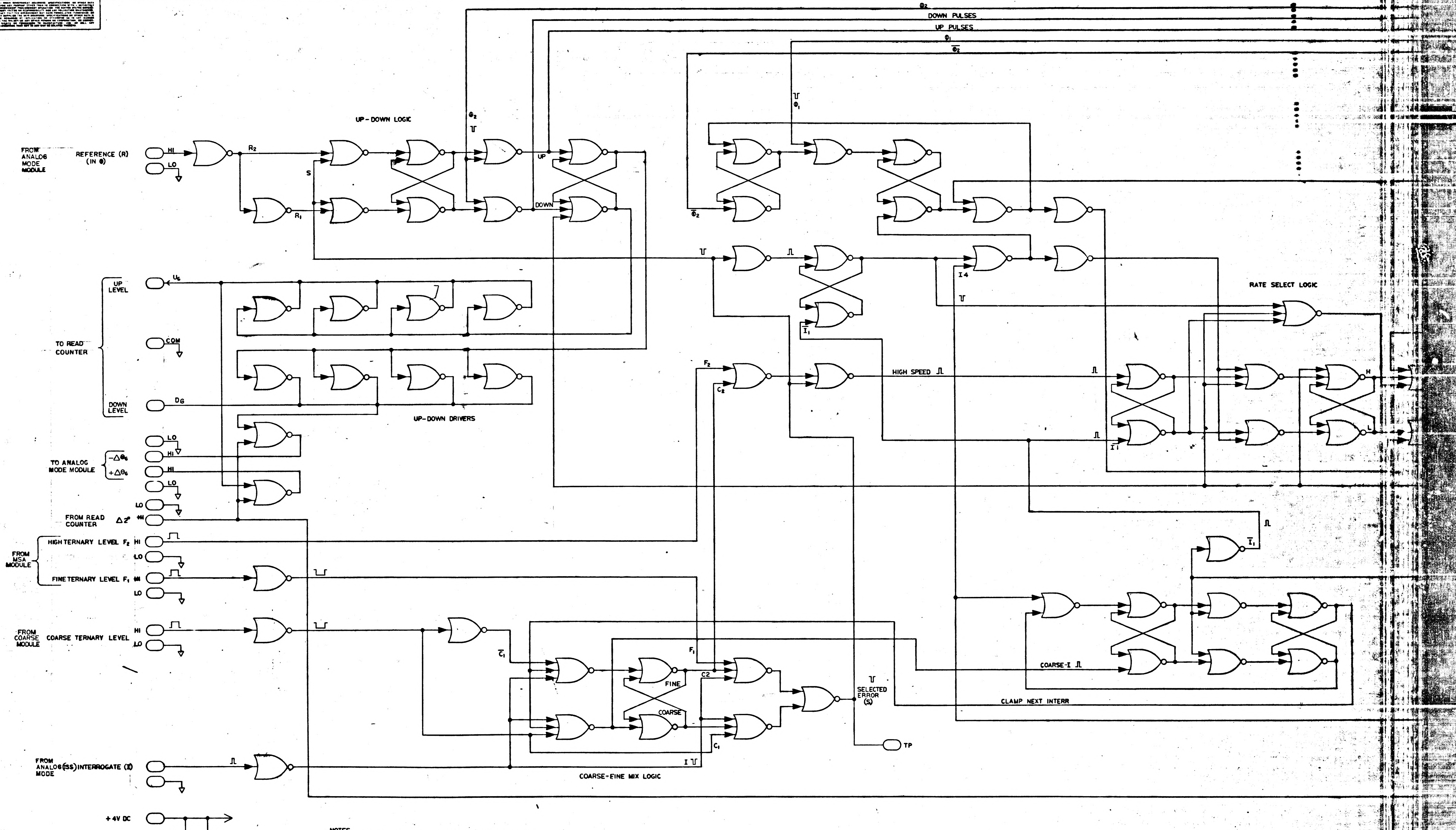
E3

2010048


15
14
13
12
11
Φ2
DOWN PULSES
UP PULSES
Φ1
INPUT ERROR COUNTER
$\overline{2^0}$
INPUT
HI
800 PPS AT Φ4 (L)
FROM DIGITAL MODE MODULE
COM
LO
RATE SELECT LOGIC
ERROR COUNTER ENABLE(E)
Φ3
HI
LO
Φ4
$\overline{Φ}$ 2
H
L
READ COUNTER DRIVE PULSES (P2)
AMBIGUITY OVERIDE SIGNAL (A0)
FROM DIGITAL MODE MODULE
$\overline{I}_1$
I_1
2^0
$\overline{2^0}$
$2^0_?$
TO D/A CONV MODULE
ERROR COUNTER ENABLE
UP
DOWN
Φ3
$\overline{Φ}_2$
2^1
$\overline{2^1}$
COARSE-I
NEXT INTERR
I_4
2^2
$\overline{2^2}$
INHIBIT GIMBAL PULSE (G)
Δ2⁰
Φ4
14
13
12
11

F2 20-0048

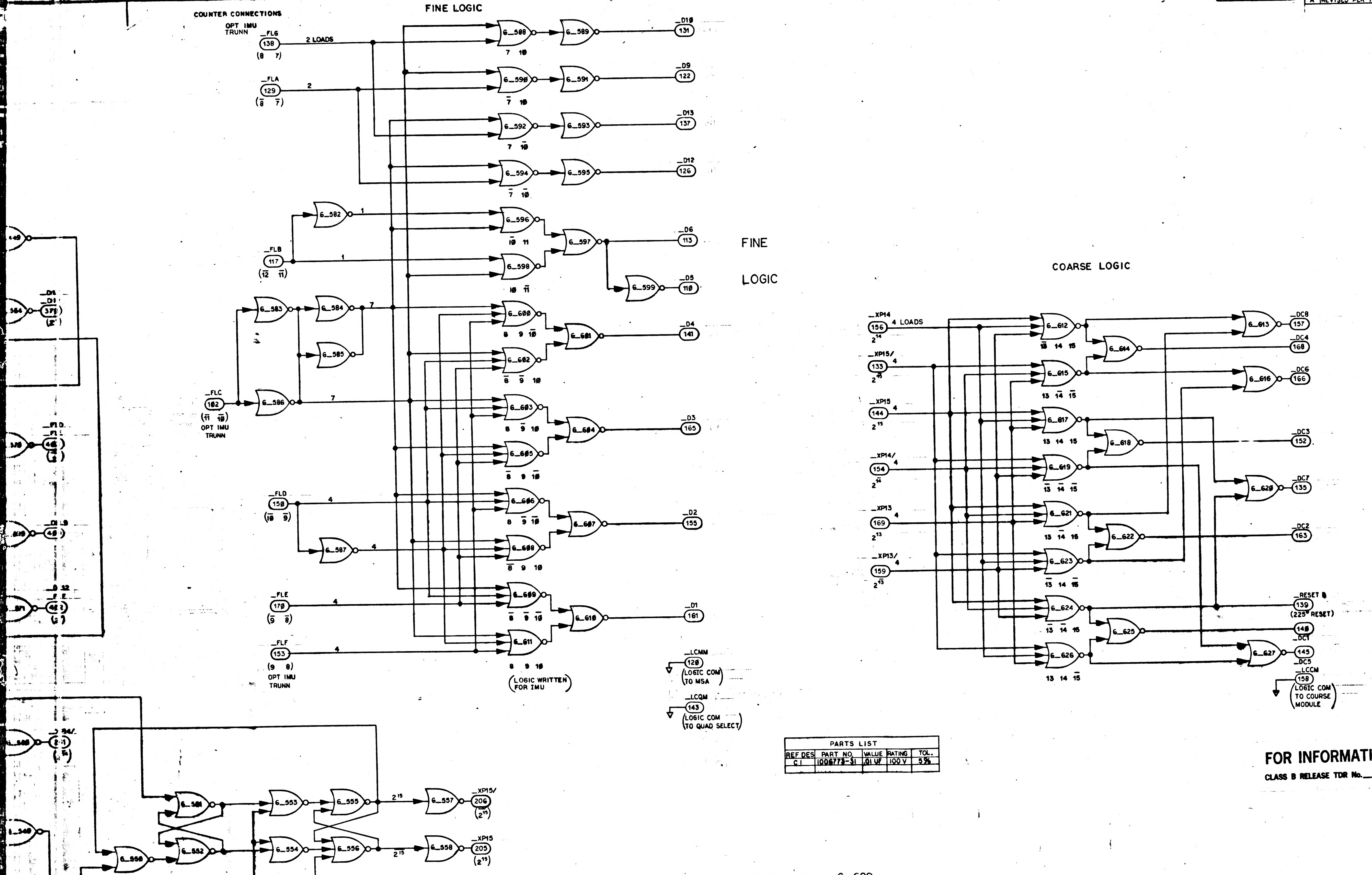
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


18
17
16
15
D
C
B
A
Φ2
DOWN PULSES
UP PULSES
Φ1
$\overline{Φ_2}$
UP-DOWN LOGIC
FROM ANALOG MODE MODULE
REFERENCE (R) (IN Θ)
HI
LO
R2
R1
S
Φ2
UP
DOWN
Φ1
$\overline{Φ_2}$
I4
$\overline{I_1}$
RATE SELECT LOGIC
UP LEVEL
U6
TO READ COUNTER
COM
DOWN LEVEL
D6
UP-DOWN DRIVERS
F2
C2
HIGH SPEED
H
L
TO ANALOG MODE MODULE
−ΔΘ6
+ΔΘ6
LO
HI
HI
LO
LO
FROM READ COUNTER
Δ2°
HI
FROM MSA MODULE
HIGH TERNARY LEVEL F2
HI
LO
FINE TERNARY LEVEL F1
HI
LO
FROM COARSE MODULE
COARSE TERNARY LEVEL
HI
LO
$\overline{C_1}$
FINE
COARSE
C2
F1
C1
SELECTED ERROR (S)
TP
COARSE-I
CLAMP NEXT INTERR
$\overline{I_1}$
I
COARSE-FINE MIX LOGIC
FROM ANALOG (SS) INTERROGATE (I) MODE
+4V DC
C1
C2
+4 V DC RETURN

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
3. ⬭ INDICATES EXTERNAL PIN CONNECTIONS
4. DENOTES SINGLE MICRO-NOR GATE
5. DENOTES FAN-IN GATE
6. POWER CONNECTIONS TO GATES NOT SHOWN
7. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN
8. ▽ INDICATES MODULE POWER BUSS-4V RETURN

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14448	Nov 64	WR

2010049


COUNTER CONNECTIONS
OPT IMU
TRUNN
FINE LOGIC
_FLG
138
(8 7)
2 LOADS
_FLA
129
($\bar{8}$ $\bar{7}$)
2
_FLB
117
($\overline{12}$ $\overline{11}$)
1
_FLC
102
($\overline{11}$ $\overline{10}$)
OPT IMU
TRUNN
7
_FLD
150
($\overline{10}$ $\bar{9}$)
4
_FLE
170
($\bar{9}$ $\bar{8}$)
_FLF
153
(9 8)
OPT IMU
TRUNN
6_588
6_589
7 10
6_590
6_591
$\bar{7}$ 10
6_592
6_593
7 $\overline{10}$
6_594
6_595
$\bar{7}$ $\overline{10}$
6_582
6_596
$\overline{10}$ 11
6_597
6_598
10 $\overline{11}$
6_599
6_583
6_584
6_585
6_586
6_600
8 9 $\overline{10}$
6_601
6_602
$\bar{8}$ $\bar{9}$ 10
6_603
8 $\bar{9}$ 10
6_604
6_605
$\bar{8}$ 9 $\overline{10}$
6_606
8 $\bar{9}$ $\overline{10}$
6_607
6_587
6_608
$\bar{8}$ 9 10
6_609
$\bar{8}$ $\bar{9}$ $\overline{10}$
6_610
6_611
8 9 10
(LOGIC WRITTEN FOR IMU)
_D10
131
_D9
122
_D13
137
_D12
126
_D6
113
_D5
110
_D4
141
_D3
165
_D2
155
_D1
161
_LCMM
120
(LOGIC COM TO MSA)
_LCQM
143
(LOGIC COM TO QUAD SELECT)
FINE
LOGIC
COARSE LOGIC
_XP14
156
2^{14}
4 LOADS
_XP15/
133
$2^{\overline{15}}$
4
_XP15
144
2^{15}
_XP14/
154
$2^{\overline{14}}$
_XP13
169
2^{13}
_XP13/
159
$2^{\overline{13}}$
6_612
$\overline{13}$ 14 15
6_613
6_614
6_615
13 $\overline{14}$ $\overline{15}$
6_616
6_617
13 14 15
6_618
6_619
$\overline{13}$ $\overline{14}$ $\overline{15}$
6_620
6_621
13 $\overline{14}$ 15
6_622
6_623
$\overline{13}$ 14 $\overline{15}$
6_624
$\overline{13}$ $\overline{14}$ 15
6_625
6_626
13 14 $\overline{15}$
6_627
_DC8
157
_DC4
168
_DC6
166
_DC3
152
_DC7
135
_DC2
163
_RESET
139
(225° RESET)
140
_DC1
145
_DC5
_LCCM
158
(LOGIC COM TO COURSE MODULE)
6_551
6_552
6_550
6_553
6_554
6_555
6_556
6_557
6_558
2^{15}
$2^{\overline{15}}$
_XP15/
206
($2^{\overline{15}}$)
_XP15
205
(2^{15})
_XP14
(2^{14})

PARTS LIST				
REF DES	PART NO.	VALUE	RATING	TOL.
C1	1006773-31	.01 UF	100 V	5%

LAST GATE CIRCUIT NO. USED – 6_629

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 13405 DATE

4H

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tony Bell DATE 22 Jul 64
CHECKED R. Lufani 24 Jul 64
APPROVAL W. Ruckman 7 Oct 64
APPROVAL D. Cushman 21 Sep 64
NASA APPROVAL W. J. Rhine 10-7-64
MIT APPROVAL 10/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

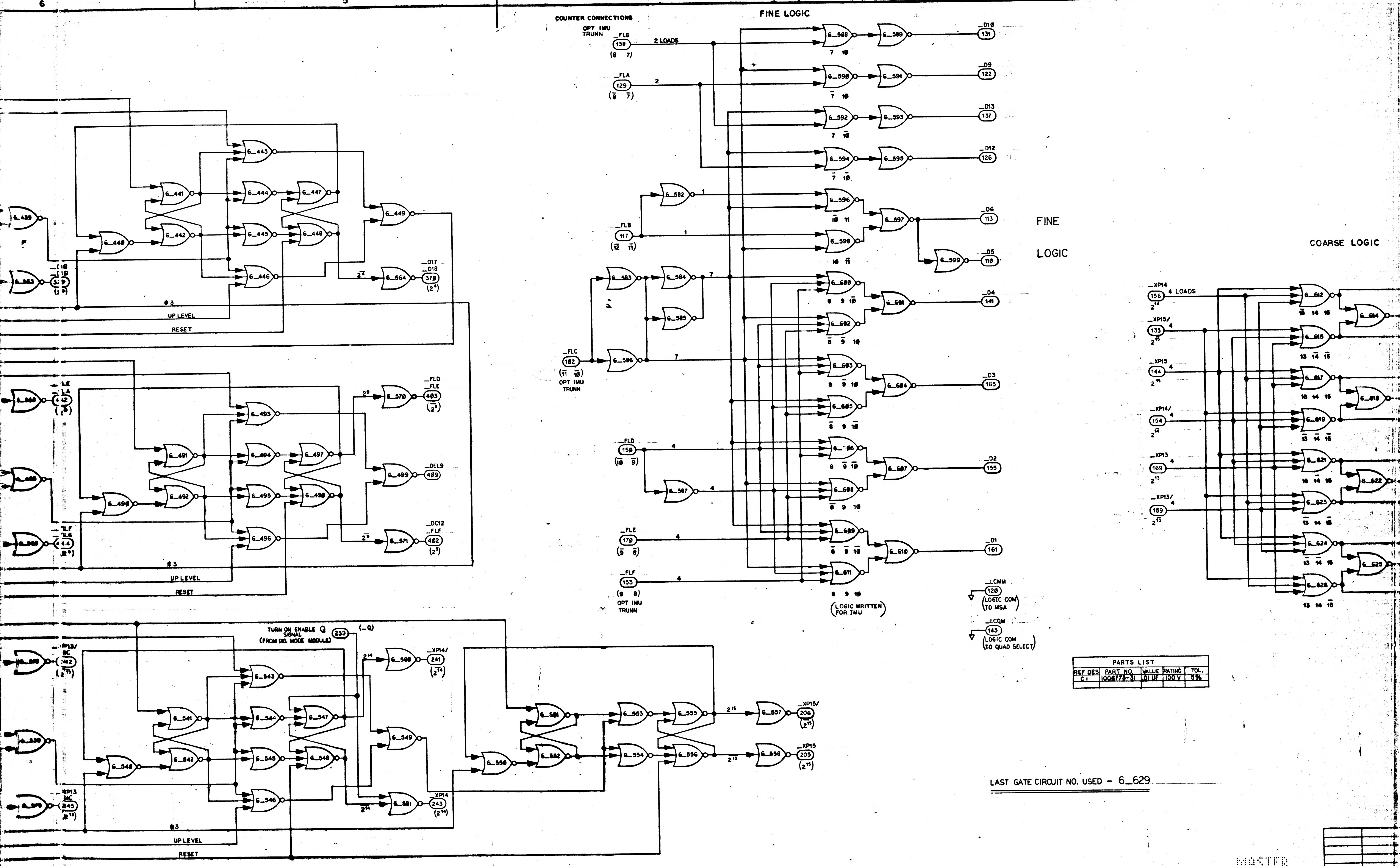
SCHEMATIC
READ COUNTER MODULE

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 2010049
SCALE NONE
WT
SHEET 1 OF 1

2010049 A

2010049

E-4



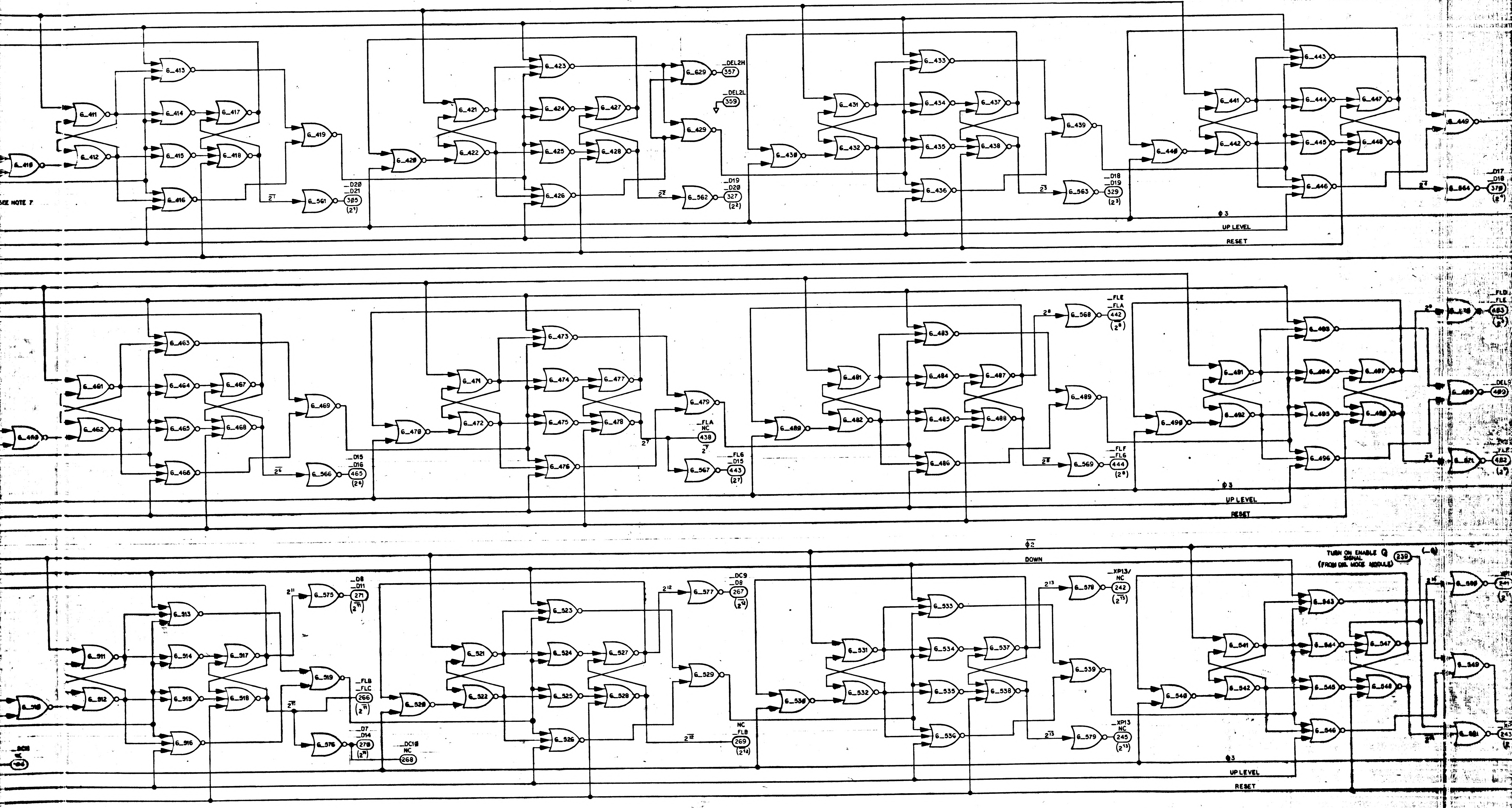
6
5
4
3
2
COUNTER CONNECTIONS
OPT IMU
TRUNN
FINE LOGIC
_FLG
138
2 LOADS
_FLA
129
_FLB
117
_FLC
102
OPT IMU
TRUNN
_FLD
150
_FLE
170
_FLF
153
OPT IMU
TRUNN
6_588
6_589
6_590
6_591
6_592
6_593
6_594
6_595
6_596
6_597
6_598
6_599
6_582
6_583
6_584
6_585
6_586
6_587
6_600
6_601
6_602
6_603
6_604
6_605
6_606
6_607
6_608
6_609
6_610
6_611
_D10
131
_D9
122
_D13
137
_D12
126
_D6
113
_D5
110
_D4
141
_D3
165
_D2
155
_D1
161
LOGIC WRITTEN FOR IMU
_LCMM
120
LOGIC COM TO MSA
_LCQM
143
LOGIC COM TO QUAD SELECT
FINE
LOGIC
COARSE LOGIC
_XP14
156
4 LOADS
_XP15/
133
_XP15
144
_XP14/
154
_XP13
169
_XP13/
159
6_612
6_614
6_615
6_617
6_618
6_619
6_621
6_622
6_623
6_624
6_625
6_626
6_439
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_440
6_564
_D17
_D18
370
Φ3
UP LEVEL
RESET
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
6_490
6_570
6_571
_FLD
_FLE
403
_DEL9
409
_DC12
_FLF
402
Φ3
UP LEVEL
RESET
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
239
(_Q)
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_549
6_540
6_580
6_581
_XP14/
241
_XP14
243
6_551
6_552
6_553
6_554
6_555
6_556
6_550
6_557
6_558
_XP15/
206
_XP15
205
Φ3
UP LEVEL
RESET

PARTS LIST				
REF DES	PART NO.	VALUE	RATING	TOL.
C1	1006773-31	.01 UF	100 V	5%

LAST GATE CIRCUIT NO. USED - 6_629

MASTER

2010049



6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
6_420
6_421
6_422
6_423
6_424
6_425
6_426
6_427
6_428
6_629
6_429
DEL2H
357
DEL2L
359
6_430
6_431
6_432
6_433
6_434
6_435
6_436
6_437
6_438
6_439
6_440
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_561
D20
D21
305
(2^1)
6_562
D19
D20
327
(2^2)
6_563
D18
D19
329
(2^3)
6_564
D17
D18
370
(2^4)
SEE NOTE 7
Φ3
UP LEVEL
RESET
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
6_470
6_471
6_472
6_473
6_474
6_475
6_476
6_477
6_478
6_479
FLA
NC
438
6_480
6_481
6_482
6_483
6_484
6_485
6_486
6_487
6_488
6_489
6_490
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
DEL9
6_566
D15
D16
465
(2^6)
6_567
FL6
D15
443
(2^7)
6_568
FLE
FLA
442
(2^8)
6_569
FLF
FL6
444
(2^9)
FLD
FLE
463
482
Φ2
DOWN
TURN ON ENABLE Q SIGNAL (FROM DIS. MODE MODULE)
239
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
FLB
FLC
266
6_520
6_521
6_522
6_523
6_524
6_525
6_526
6_527
6_528
6_529
NC
FLB
269
(2^{14})
6_530
6_531
6_532
6_533
6_534
6_535
6_536
6_537
6_538
6_539
6_540
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_549
6_575
D8
D11
271
6_576
D7
D14
278
DC10
NC
268
6_577
DC9
D8
267
(2^{12})
6_578
XP13/
NC
242
(2^{13})
6_579
XP13
NC
245
(2^{13})
241
243
9
8
7
6
5

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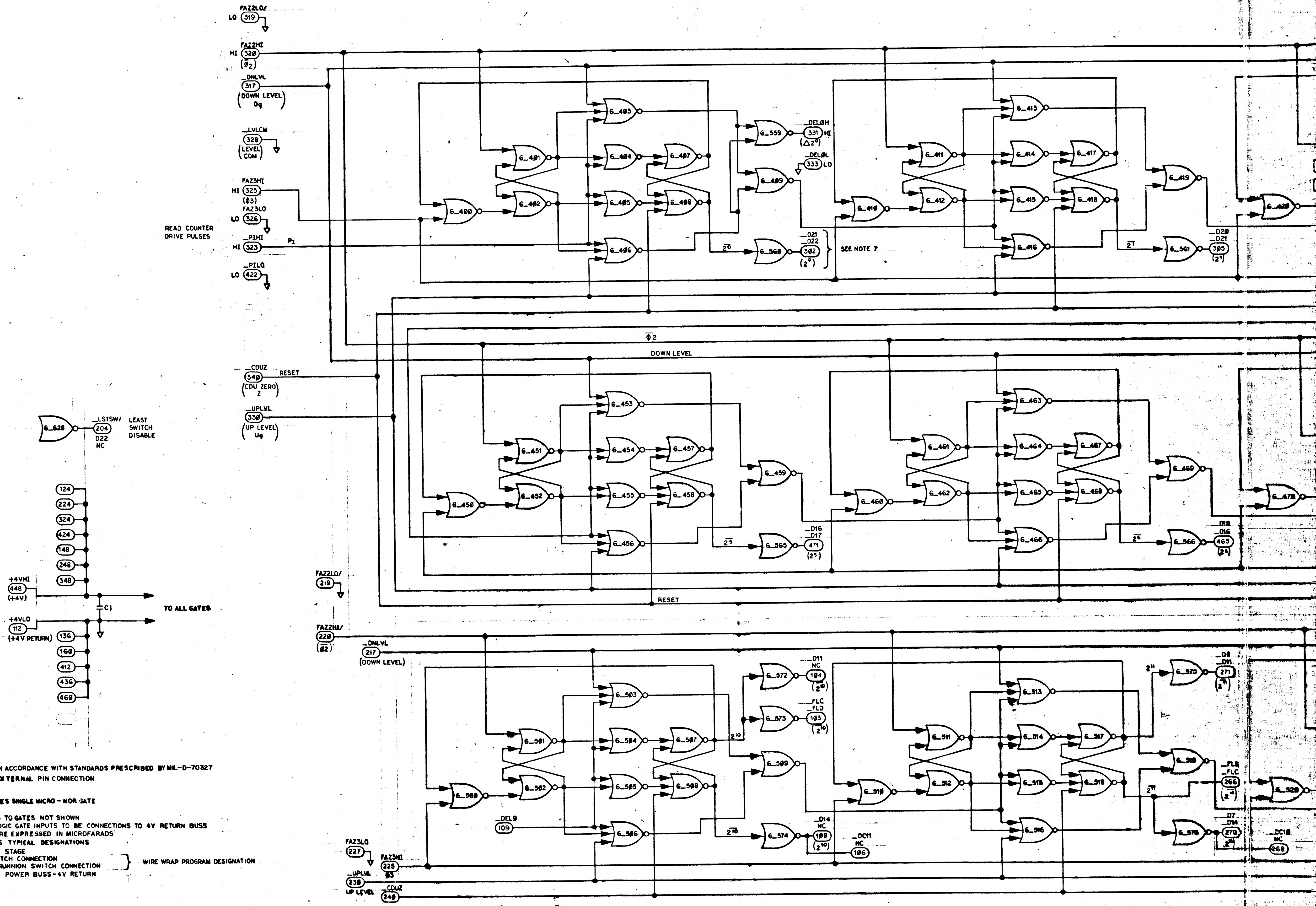
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


FAZ2LO/
LO 319
FAZ2HI
HI 320
(Ø2)
_DNLVL
317
(DOWN LEVEL Dg)
_LVLCM
328
(LEVEL COM)
FAZ3HI
HI 325
(Ø3)
FAZ3LO
LO 326
READ COUNTER DRIVE PULSES
_P1HI
HI 323
P1
_P1LO
LO 422
6_400
6_401
6_402
6_403
6_404
6_405
6_406
6_407
6_408
6_409
6_559
_DEL0H
331 HI
(Δ2⁰)
_DEL0L
333 LO
$\overline{2^0}$
6_560
_D21
_D22
302
(2⁰)
SEE NOTE 7
6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
6_420
$\overline{2^1}$
6_561
_D20
_D21
305
(2¹)
$\overline{\phi}2$
DOWN LEVEL
_CDUZ
340
RESET
(CDU ZERO Z)
_UPLVL
330
(UP LEVEL Ug)
6_628
_LSTSW/
204
D22
NC
LEAST SWITCH DISABLE
124
224
324
424
148
248
348
+4VHI
448
(+4V)
C1
TO ALL GATES
+4VLO
112
(+4V RETURN)
136
160
412
436
460
6_450
6_451
6_452
6_453
6_454
6_455
6_456
6_457
6_458
6_459
$\overline{2^5}$
6_565
_D16
_D17
471
(2⁵)
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
6_470
$\overline{2^6}$
6_566
_D15
_D16
465
(2⁶)
RESET
FAZ2LO/
219
FAZ2HI/
220
(Ø2)
_DNLVL
217
(DOWN LEVEL)
6_500
6_501
6_502
6_503
6_504
6_505
6_506
6_507
6_508
6_509
_DEL9
109
6_572
_D11
NC
104
(2¹⁰)
6_573
_FLC
_FLD
103
(2¹⁰)
2¹⁰
6_574
$\overline{2^{10}}$
_D14
NC
108
(2¹⁰)
_DC11
NC
106
FAZ3LO
227
FAZ3HI
225
Ø3
_UPLVL
230
UP LEVEL
_CDUZ
240
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
6_520
2¹¹
6_575
_D8
_D11
271
(2¹¹)
_FLB
_FLC
266
(2¹¹)
$\overline{2^{11}}$
6_576
_D7
_D14
270
(2¹¹)
_DC18
NC
268

NOTES:

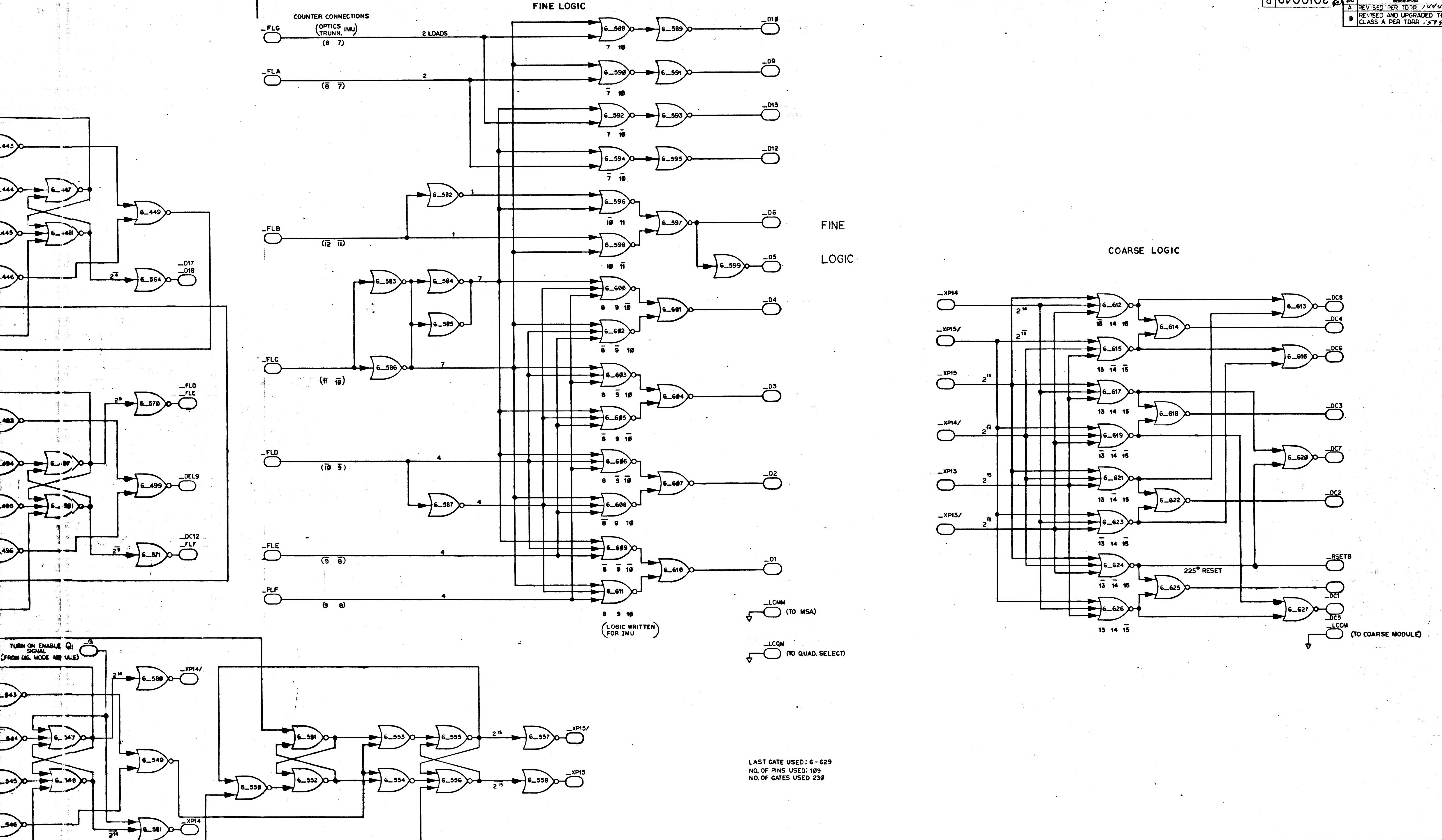
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO-NOR GATE
4. POWER CONNECTIONS TO GATES NOT SHOWN
5. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN BUSS
6. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
7. ON COUNTER OUTPUTS TYPICAL DESIGNATIONS
   - 2⁶-COUNTER STAGE
   - _D15-IMU SWITCH CONNECTION } WIRE WRAP PROGRAM DESIGNATION
   - _D16-OPTIC TRUNNION SWITCH CONNECTION
8. INDICATES MODULE POWER BUSS-4V RETURN

2010049

2010049 B

REVISIONS 13462

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14448		WK.
B	REVISED AND UPGRADED TO CLASS A PER TDRR 15943	1/12/65	WK.



5
4
3
2
1
FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG
(8 7)
2 LOADS
_FLA
(8̄ 7̄)
2
_FLB
(1̄2 1̄1)
1
_FLC
(1̄1 1̄0)
7
_FLD
(1̄0 9̄)
4
_FLE
(9̄ 8̄)
_FLF
(9 8)
6_588
6_589
6_590
6_591
6_592
6_593
6_594
6_595
6_582
6_596
6_597
6_598
6_599
6_583
6_584
6_585
6_586
6_600
6_601
6_602
6_603
6_604
6_605
6_587
6_606
6_607
6_608
6_609
6_610
6_611
_D10
_D9
_D13
_D12
_D6
_D5
_D4
_D3
_D2
_D1
(LOGIC WRITTEN FOR IMU)
_LCMM
(TO MSA)
_LCQM
(TO QUAD. SELECT)
FINE
LOGIC
COARSE LOGIC
_XP14
_XP15/
_XP15
_XP14/
_XP13
_XP13/
6_612
6_613
6_614
6_615
6_616
6_617
6_618
6_619
6_620
6_621
6_622
6_623
6_624
6_625
6_626
6_627
_DC8
_DC4
_DC6
_DC3
_DC7
_DC2
_RSETB
225° RESET
_DC1
_DC5
_LCCM
(TO COARSE MODULE)
13 14 15
6_443
6_444
6_445
6_446
6_147
6_1481
6_449
6_564
_D17
_D18
6_570
_FLD
_FLE
6_499
_DEL9
6_571
_DC12
_FLF
TURN ON ENABLE SIGNAL
(FROM DIG. MODE MODULE)
_G
6_580
_XP14/
6_549
6_581
_XP14
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
6_558
_XP15/
_XP15

LAST GATE USED: 6-629
NO. OF PINS USED: 109
NO. OF GATES USED 230

NEXT ASSY	USED ON
APPLICATION	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN Tony Bell DATE 22 Jul 64
CHECKED 21 Jul 64
APPROVAL 7 Oct. 64
APPROVAL 21 Sep '64
NASA APPROVAL 10-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

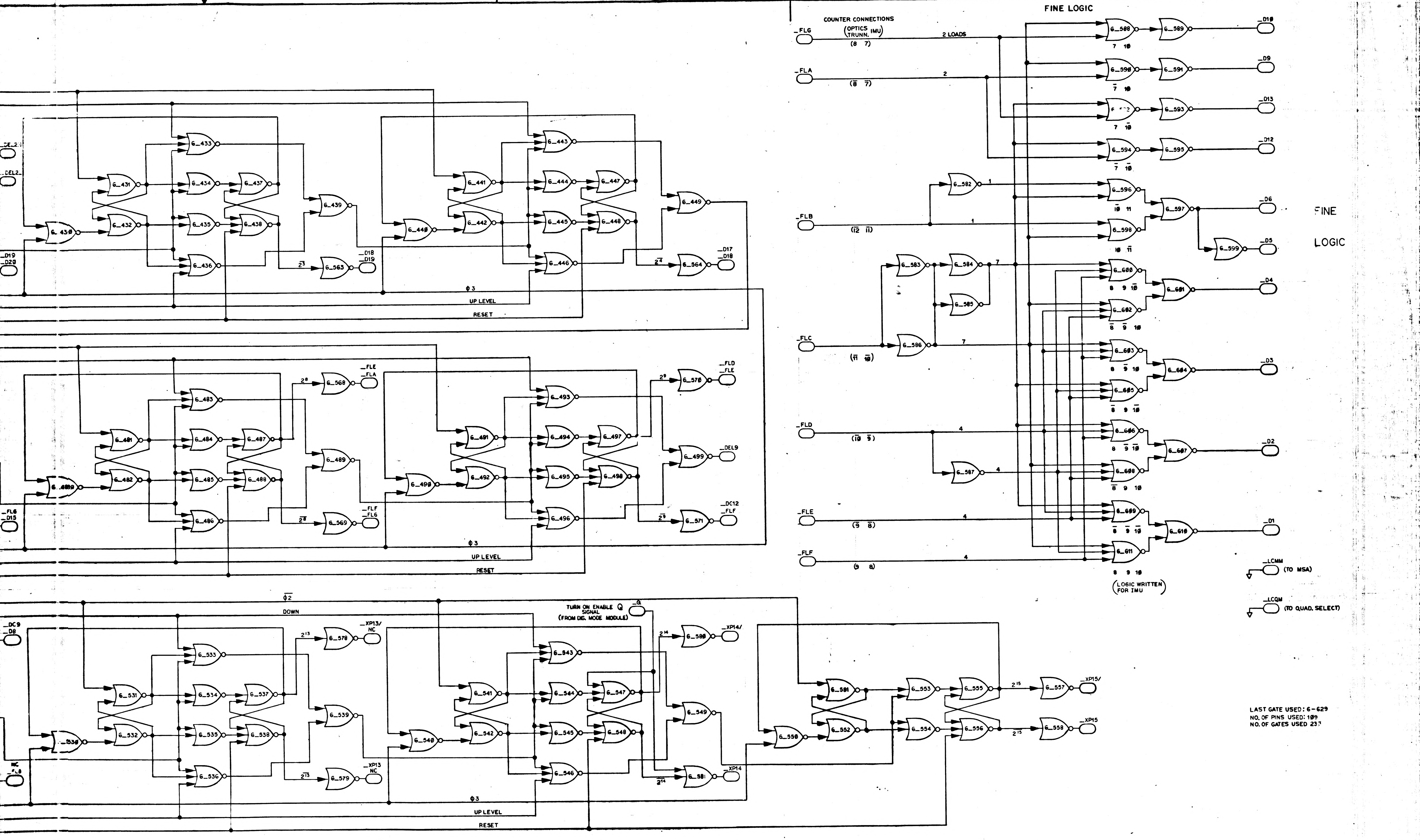
SCHEMATIC
READ COUNTER MODULE

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 2010049
SCALE NONE
WT
SHEET 1 OF 1

MASTER

2010049 B

2010049 B


FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG
(8 7)
2 LOADS
_FLA
2
_FLB
1
_FLC
7
_FLD
4
_FLE
_FLF
(LOGIC WRITTEN FOR IMU)
_D10
_D9
_D13
_D12
_D6
_D5
_D4
_D3
_D2
_D1
_LCMM
(TO MSA)
_LCQM
(TO QUAD. SELECT)
FINE
LOGIC
φ3
UP LEVEL
RESET
φ2
DOWN
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
_Q
_D17
_D18
_D19
_D20
_FLE
_FLA
_FLD
_DEL9
_FLF
_FL6
_DC12
_D15
_DC9
_D8
_XP13/ NC
_XP13 NC
_XP14/
_XP14
_XP15/
_XP15
6_431
6_432
6_433
6_434
6_435
6_436
6_437
6_438
6_439
6_440
6_441
6_442
6_443
6_444
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6_446
6_447
6_448
6_449
6_563
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6_481
6_482
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6_488
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6_491
6_492
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6_568
6_569
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6_582
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6_593
6_594
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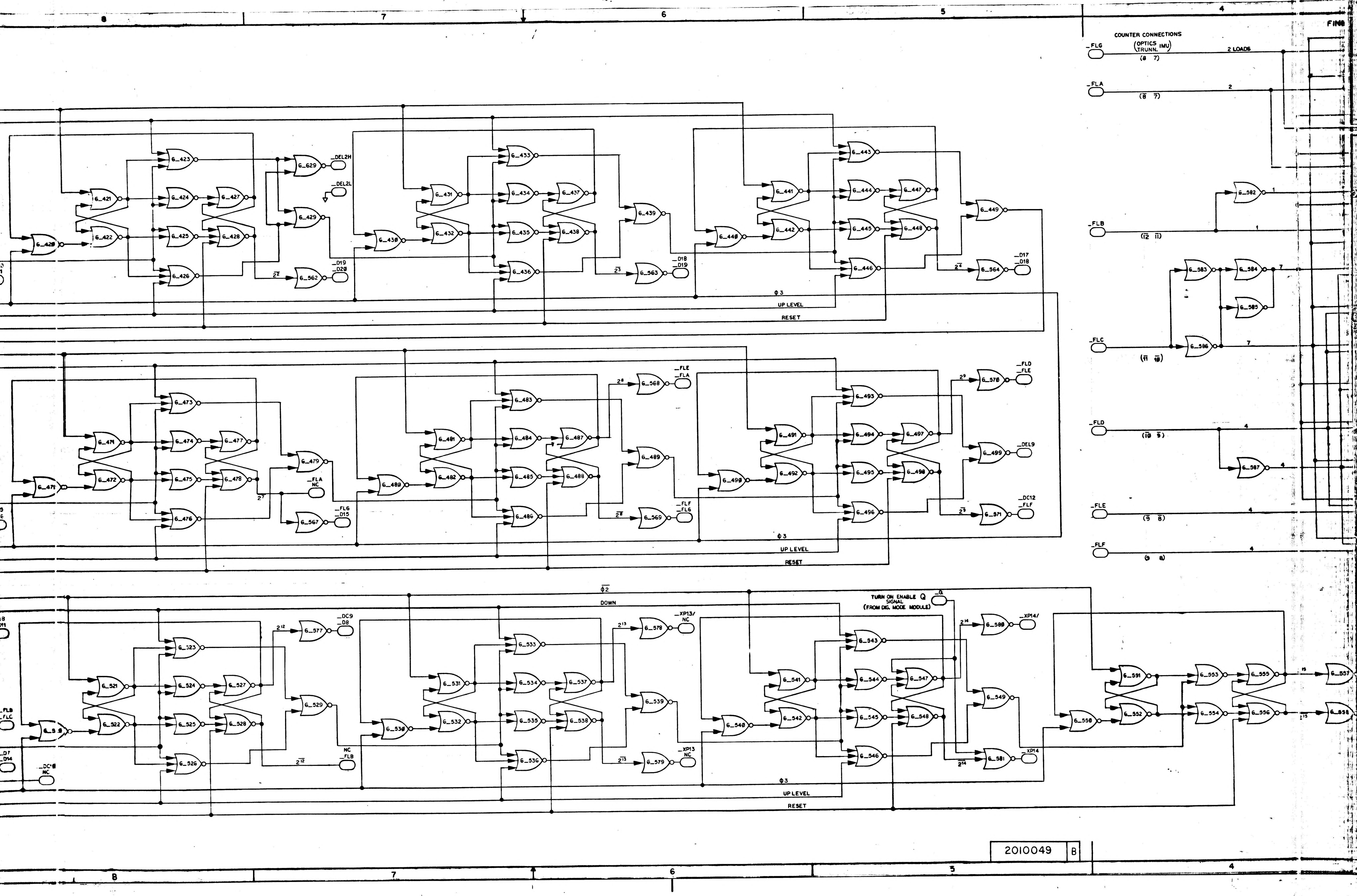
6_596
6_597
6_598
6_599
6_600
6_601
6_602
6_603
6_604
6_605
6_606
6_607
6_608
6_609
6_610
6_611

LAST GATE USED: 6-629
NO. OF PINS USED: 109
NO. OF GATES USED 237

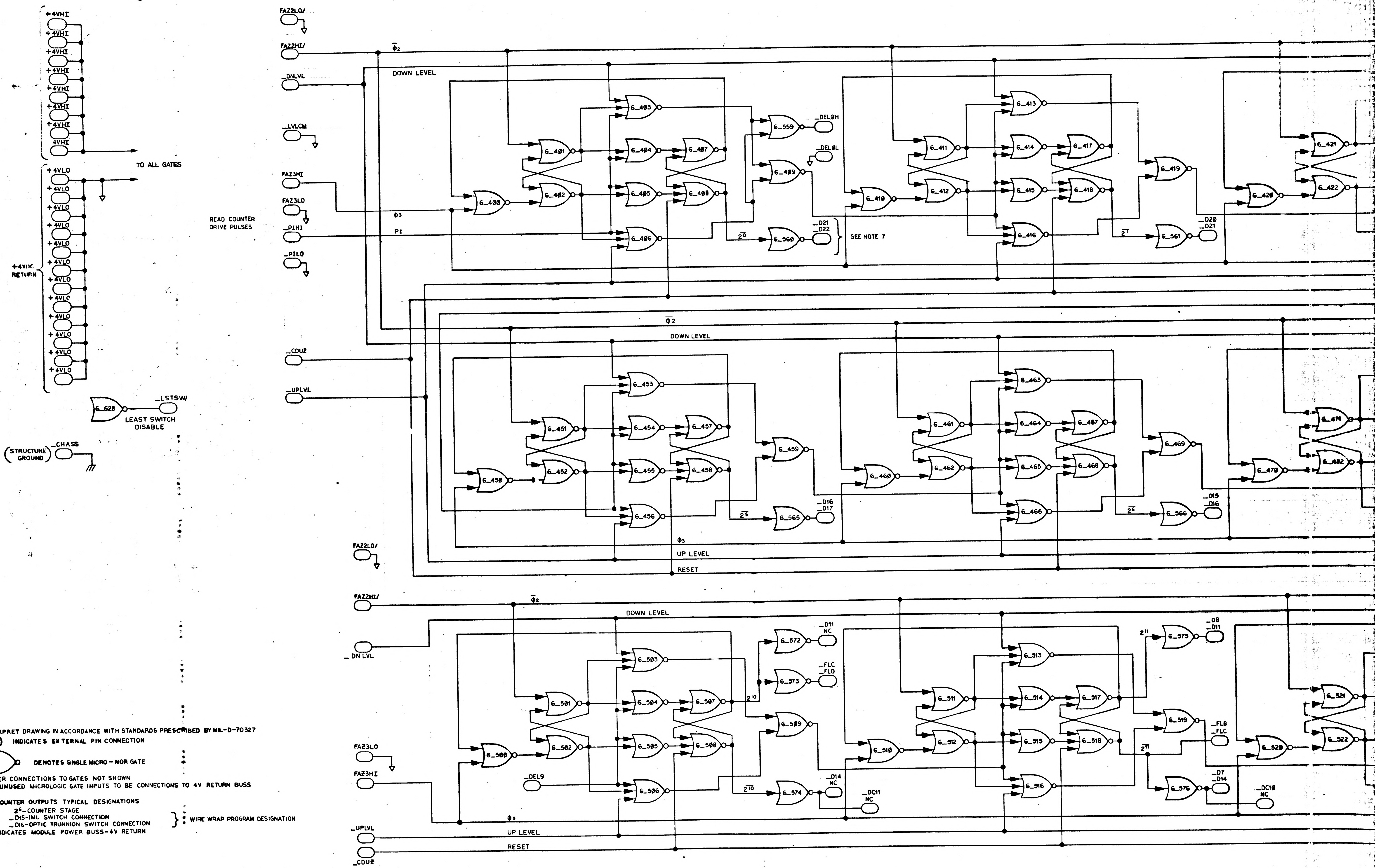
2010049 | B



8
7
6
5
4
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG
(8 7)
2 LOADS
_FLA
(8̄ 7̄)
2
_FLB
(12 11)
1
_FLC
(1̄1̄ 1̄0̄)
7
_FLD
(10 9)
4
_FLE
(9 8̄)
4
_FLF
(9 8)
4
6_582
6_583
6_584
6_585
6_586
6_587
6_420
6_421
6_422
6_423
6_424
6_425
6_426
6_427
6_428
6_429
6_629
_DEL2H
_DEL2L
6_562
_D19
_D20
6_430
6_431
6_432
6_433
6_434
6_435
6_436
6_437
6_438
6_439
6_563
_D18
_D19
6_440
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_564
_D17
_D18
φ3
UP LEVEL
RESET
6_470
6_471
6_472
6_473
6_474
6_475
6_476
6_477
6_478
6_479
_FLA
NC
6_567
_FL6
_D15
6_480
6_481
6_482
6_483
6_484
6_485
6_486
6_487
6_488
6_489
6_568
_FLE
_FLA
6_569
_FLF
_FL6
6_490
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
_DEL9
6_570
_FLD
_FLE
6_571
_DC12
_FLF
φ̄2
DOWN
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
_Q
6_520
6_521
6_522
6_523
6_524
6_525
6_526
6_527
6_528
6_529
6_577
_DC9
_D8
_DC10
NC
NC
_FLB
_FLB
_FLC
_D7
_D14
6_530
6_531
6_532
6_533
6_534
6_535
6_536
6_537
6_538
6_539
6_578
_XP13/
NC
6_579
_XP13
NC
6_540
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_549
6_580
_XP14/
6_581
_XP14
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
6_558
FINE

2010049 B

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

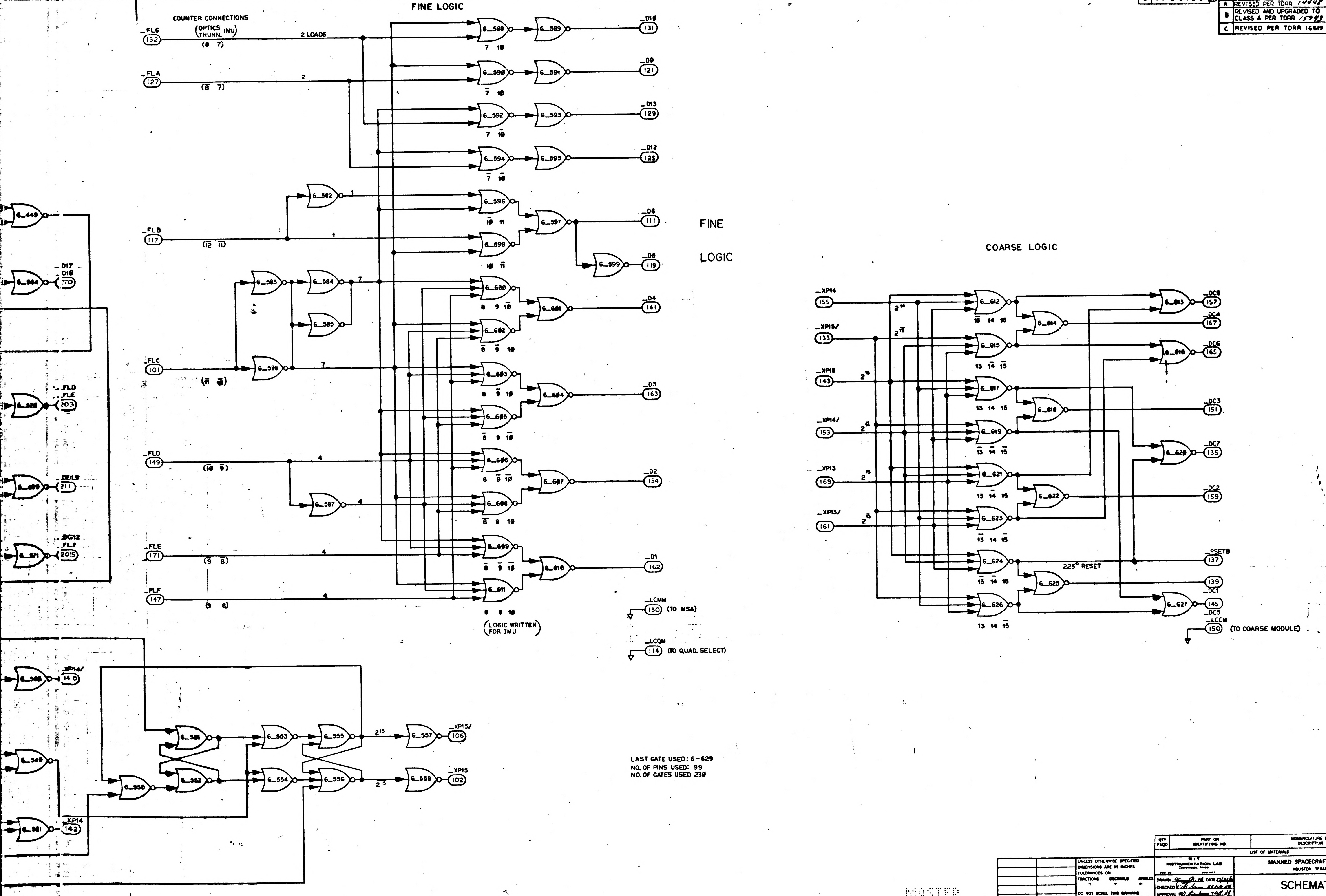

+4VHI
4VHI
TO ALL GATES
+4VLO
+4VHC RETURN
6_628
_LSTSW/
LEAST SWITCH DISABLE
(STRUCTURE GROUND)
_CHASS
FAZ2LO/
FAZ2HI/
_DNLVL
_LVLCM
FAZ3HI
FAZ3LO
_PIHI
_PILO
READ COUNTER DRIVE PULSES
$\overline{\Phi}_2$
DOWN LEVEL
Φ_3
PI
6_400
6_401
6_402
6_403
6_404
6_405
6_406
6_407
6_408
6_409
6_559
_DEL0H
_DEL0L
2^0
6_560
_D21
_D22
SEE NOTE 7
6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
2^1
6_561
_D20
_D21
6_420
6_421
6_422
_CDUZ
_UPLVL
6_450
6_451
6_452
6_453
6_454
6_455
6_456
6_457
6_458
6_459
2^5
6_565
_D16
_D17
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
2^6
6_566
_D15
_D16
6_470
6_471
6_472
UP LEVEL
RESET
FAZ2LO/
FAZ2HI/
_DN LVL
6_500
6_501
6_502
6_503
6_504
6_505
6_506
6_507
6_508
6_509
2^{10}
6_572
_D11
NC
6_573
_FLC
_FLD
6_574
_D14
NC
_DC11
NC
FAZ3LO
FAZ3HI
_DEL9
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
2^{11}
6_575
_D8
_D11
_FLB
_FLC
6_576
_D7
_D14
_DC10
NC
6_520
6_521
6_522
_UPLVL
_CDUZ

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO-NOR GATE
4. POWER CONNECTIONS TO GATES NOT SHOWN
5. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN BUSS
6. ON COUNTER OUTPUTS TYPICAL DESIGNATIONS
   - 2^6-COUNTER STAGE
   - _D15-IMU SWITCH CONNECTION } WIRE WRAP PROGRAM DESIGNATION
   - _D16-OPTIC TRUNNION SWITCH CONNECTION
7. ↓ INDICATES MODULE POWER BUSS-4V RETURN

2010049 B

LTR	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14448		WK.
B	REVISED AND UPGRADED TO CLASS A PER TDRR 15943	2/4/65	WK.
C	REVISED PER TDRR 16619	2/27/65	

REVISIONS 15415


FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG 132
(8 7)
2 LOADS
_FLA 127
($\overline{8}$ $\overline{7}$)
2
_FLB 117
($\overline{12}$ $\overline{11}$)
1
_FLC 101
($\overline{11}$ $\overline{10}$)
7
_FLD 149
($\overline{10}$ $\overline{9}$)
4
_FLE 171
($\overline{9}$ $\overline{8}$)
_FLF 147
(9 8)
6_588
6_589
7 10
_D10 131
6_590
6_591
$\overline{7}$ 10
_D9 121
6_592
6_593
7 $\overline{10}$
_D13 129
6_594
6_595
$\overline{7}$ $\overline{10}$
_D12 125
6_582
6_596
$\overline{10}$ 11
6_597
_D6 111
6_598
10 $\overline{11}$
6_599
_D5 119
6_583
6_584
6_585
6_586
6_587
6_600
8 9 $\overline{10}$
6_601
_D4 141
6_602
$\overline{8}$ $\overline{9}$ 10
6_603
8 $\overline{9}$ 10
6_604
_D3 163
6_605
$\overline{8}$ 9 $\overline{10}$
6_606
8 $\overline{9}$ $\overline{10}$
6_607
_D2 154
6_608
$\overline{8}$ 9 10
6_609
$\overline{8}$ $\overline{9}$ $\overline{10}$
6_610
_D1 162
6_611
8 9 10
(LOGIC WRITTEN FOR IMU)
_LCMM 130 (TO MSA)
_LCQM 114 (TO QUAD. SELECT)
FINE
LOGIC
COARSE LOGIC
_XP14 155
2^{14}
_XP15/ 133
$2^{\overline{15}}$
_XP15 143
2^{15}
_XP14/ 153
$2^{\overline{14}}$
_XP13 169
2^{13}
_XP13/ 161
$2^{\overline{13}}$
6_612
$\overline{13}$ 14 15
6_613
_DC8 157
6_614
_DC4 167
6_615
13 $\overline{14}$ $\overline{15}$
6_616
_DC6 165
6_617
13 14 15
6_618
_DC3 151
6_619
$\overline{13}$ $\overline{14}$ $\overline{15}$
6_620
_DC7 135
6_621
13 $\overline{14}$ 15
6_622
_DC2 159
6_623
$\overline{13}$ 14 $\overline{15}$
6_624
$\overline{13}$ $\overline{14}$ 15
225° RESET
_RSETB 137
6_625
139
6_626
13 14 $\overline{15}$
6_627
_DC1 145
_DC5
_LCCM 150 (TO COARSE MODULE)
6_449
6_564
_D17
_D18
170
_FLD
_FLE
203
_DEIL9
211
_DC12
_FLF
205
6_585
_XP14/ 140
6_549
6_550
6_561
_XP14 142
6_551
6_552
6_553
6_554
6_555
6_556
2^{15}
6_557
_XP15/ 106
6_558
_XP15 102

LAST GATE USED: 6-629
NO. OF PINS USED: 99
NO. OF GATES USED 230

MASTER

(4H)

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

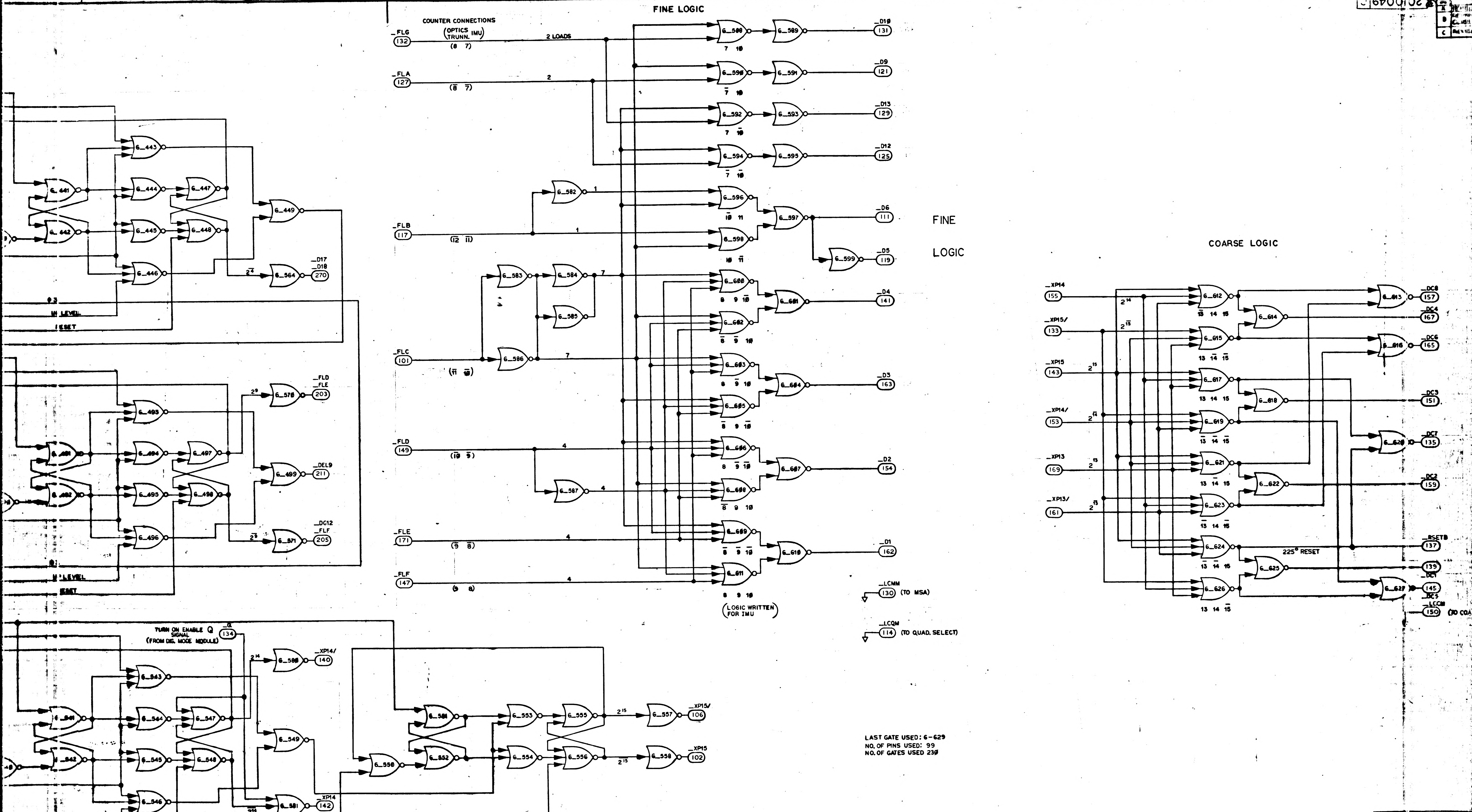
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN Tony Bell DATE 22 Jul 64
CHECKED 24 Jul 64
APPROVAL 10 Jul 64
APPROVAL 21 Sep 64
NASA APPROVAL 10/21/64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
READ COUNTER MODULE

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 2010049
SCALE NONE
WT
SHEET 1 OF 1

F-4


FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG 132
2 LOADS
(8 7)
_FLA 127
(8 7)
_FLB 117
(12 11)
_FLC 101
(11 10)
_FLD 149
(10 9)
_FLE 171
(9 8)
_FLF 147
(9 8)
6_582
6_583
6_584
6_585
6_586
6_587
6_588
6_589
6_590
6_591
6_592
6_593
6_594
6_595
6_596
6_597
6_598
6_599
6_600
6_601
6_602
6_603
6_604
6_605
6_606
6_607
6_608
6_609
6_610
6_611
_D10 131
_D9 121
_D13 129
_D12 125
_D6 111
_D5 119
_D4 141
_D3 163
_D2 154
_D1 162
(LOGIC WRITTEN FOR IMU)
_LCMM 130 (TO MSA)
_LCQM 114 (TO QUAD. SELECT)
FINE
LOGIC
COARSE LOGIC
_XP14 155
_XP15/ 133
_XP15 143
_XP14/ 153
_XP13 169
_XP13/ 161
6_612
6_613
6_614
6_615
6_616
6_617
6_618
6_619
6_620
6_621
6_622
6_623
6_624
6_625
6_626
6_627
13 14 15
225° RESET
_DC8 157
_DC4 167
_DC6 165
_DC3 151
_DC7 135
_DC2 159
_RSETB 137
139
_DC1 145
_DC5
_LCCM 150 (TO COA
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_564
_D17 _D18 270
IN LEVEL
RESET
6_493
6_494
6_495
6_496
6_497
6_498
6_499
6_570
6_571
_FLD _FLE 203
_DEL9 211
_DC12 _FLF 205
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
_G 134
6_543
6_544
6_545
6_546
6_547
6_548
6_549
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
6_558
6_580
6_581
_XP14/ 140
_XP14 142
_XP15/ 106
_XP15 102
LEVEL
RESET

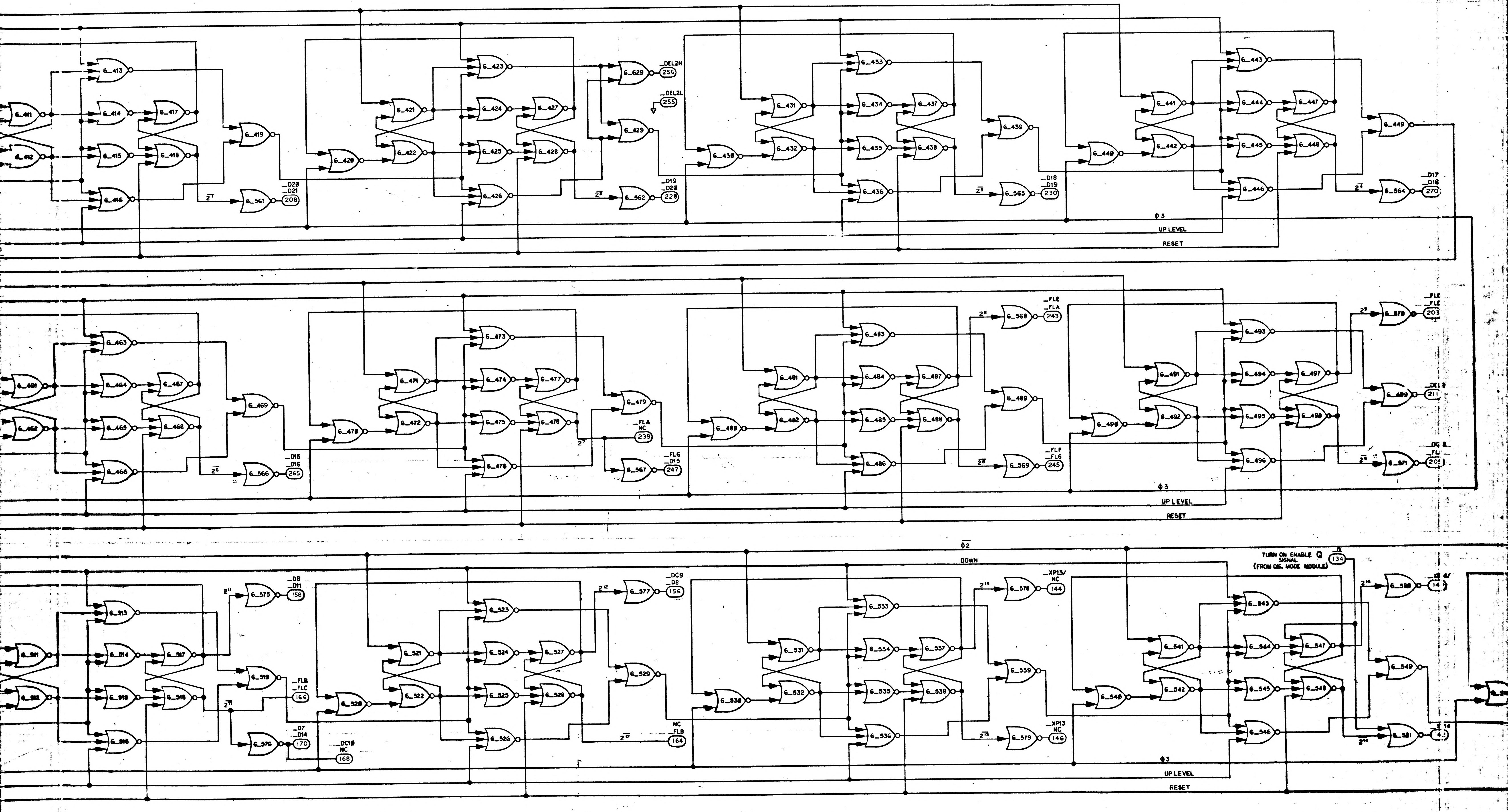
LAST GATE USED: 6-629
NO. OF PINS USED: 99
NO. OF GATES USED 230

MASTER

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	QTY REQD	PART OR IDENTIFYING NO.
		MATERIAL	INSTRUMENTATION LAB	
		HEAT TREATMENT	DRAWN	DATE
NEXT ASSY	USED ON	FINAL FINISH	CHECKED	
APPLICATION			APPROVAL	
			APPROVAL	
			NASA APPROVAL	
			MIT APPROVAL	

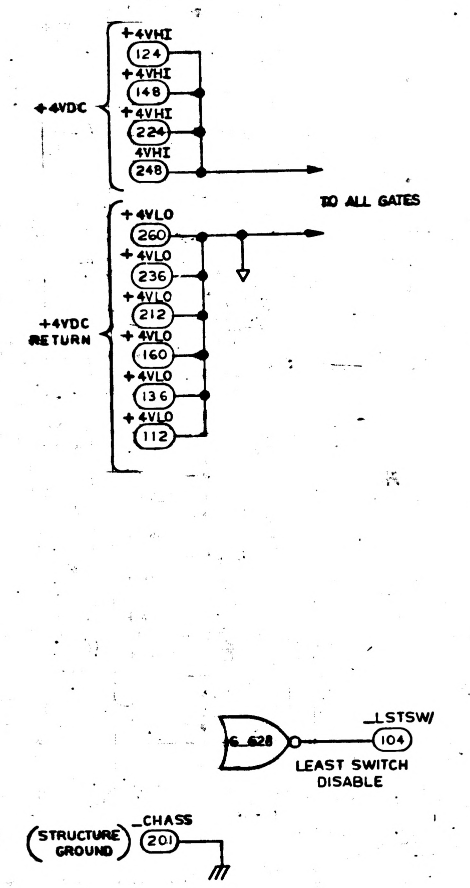
2010049

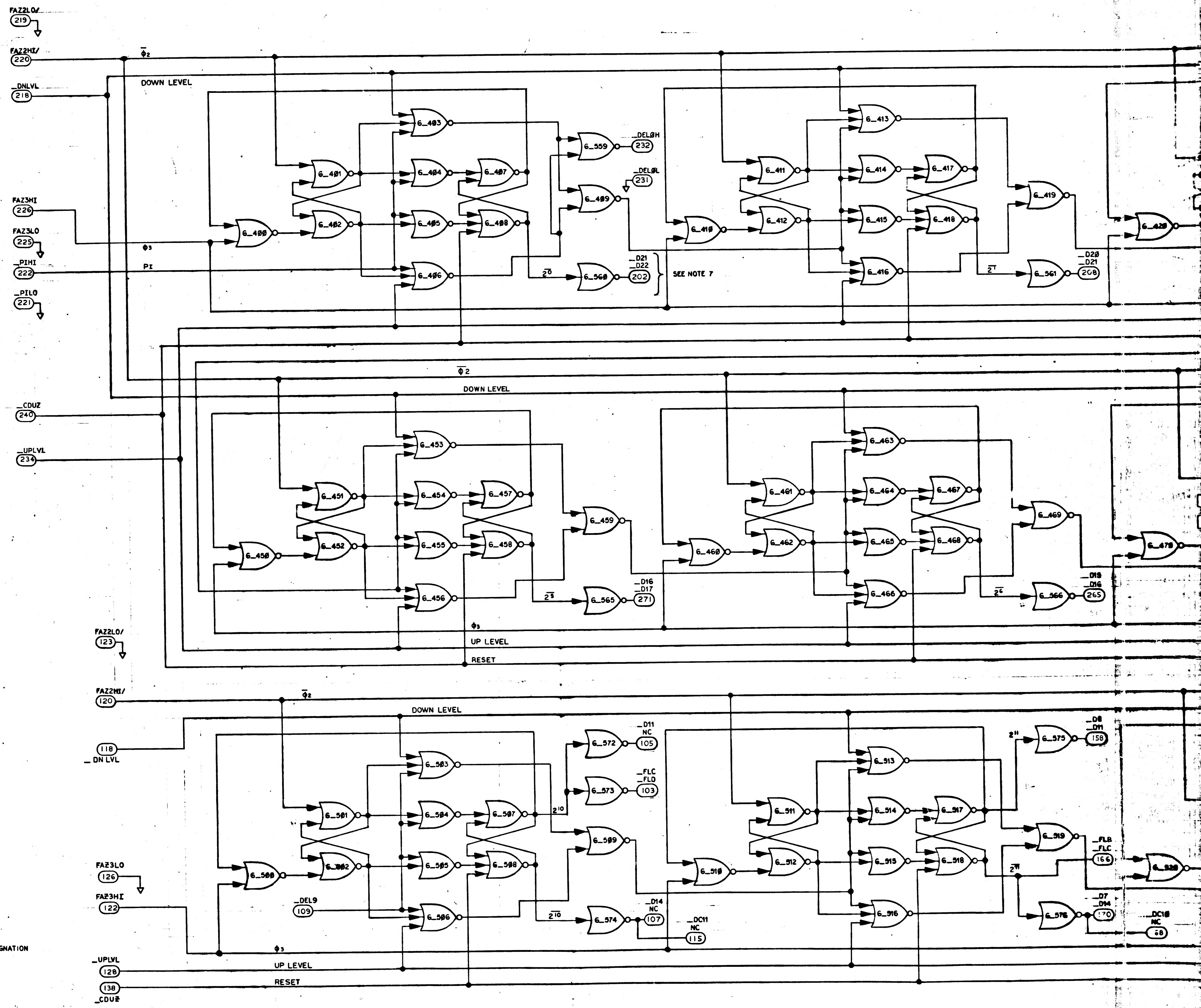
F3


G_411
G_412
G_413
G_414
G_415
G_416
G_417
G_418
G_419
G_420
G_421
G_422
G_423
G_424
G_425
G_426
G_427
G_428
G_429
G_629
G_430
G_431
G_432
G_433
G_434
G_435
G_436
G_437
G_438
G_439
G_440
G_441
G_442
G_443
G_444
G_445
G_446
G_447
G_448
G_449
G_561
G_562
G_563
G_564
_DEL2H
256
_DEL2L
255
_D20
_D21
208
_D19
_D20
228
_D18
_D19
230
_D17
_D18
270
$\overline{2^1}$
$\overline{2^2}$
$\overline{2^3}$
$\overline{2^4}$
φ3
UP LEVEL
RESET
G_461
G_462
G_463
G_464
G_465
G_466
G_467
G_468
G_469
G_470
G_471
G_472
G_473
G_474
G_475
G_476
G_477
G_478
G_479
G_480
G_481
G_482
G_483
G_484
G_485
G_486
G_487
G_488
G_489
G_490
G_491
G_492
G_493
G_494
G_495
G_496
G_497
G_498
G_499
G_566
G_567
G_568
G_569
G_570
G_571
_D15
_D16
265
$\overline{2^5}$
2^7
_FLA
NC
239
_FL6
_D15
247
2^8
_FLE
_FLA
243
$\overline{2^8}$
_FLF
_FL6
245
2^9
203
_DEL
211
$\overline{2^9}$
_DC
205
φ3
UP LEVEL
RESET
$\overline{φ2}$
DOWN
TURN ON ENABLE Q SIGNAL (FROM DIS. MODE MODULE)
_G
134
G_511
G_512
G_513
G_514
G_515
G_516
G_517
G_518
G_519
G_520
G_521
G_522
G_523
G_524
G_525
G_526
G_527
G_528
G_529
G_530
G_531
G_532
G_533
G_534
G_535
G_536
G_537
G_538
G_539
G_540
G_541
G_542
G_543
G_544
G_545
G_546
G_547
G_548
G_549
G_575
G_576
G_577
G_578
G_579
G_580
G_581
2^{11}
_D8
_D11
158
$\overline{2^{11}}$
_FLB
_FLC
166
_D7
_D14
170
_DC10
NC
168
2^{12}
_DC9
_D8
156
$\overline{2^{12}}$
NC
_FLB
164
2^{13}
_XP13/
NC
144
$\overline{2^{13}}$
_XP13
NC
146
2^{14}
$\overline{2^{14}}$
φ3
UP LEVEL
RESET

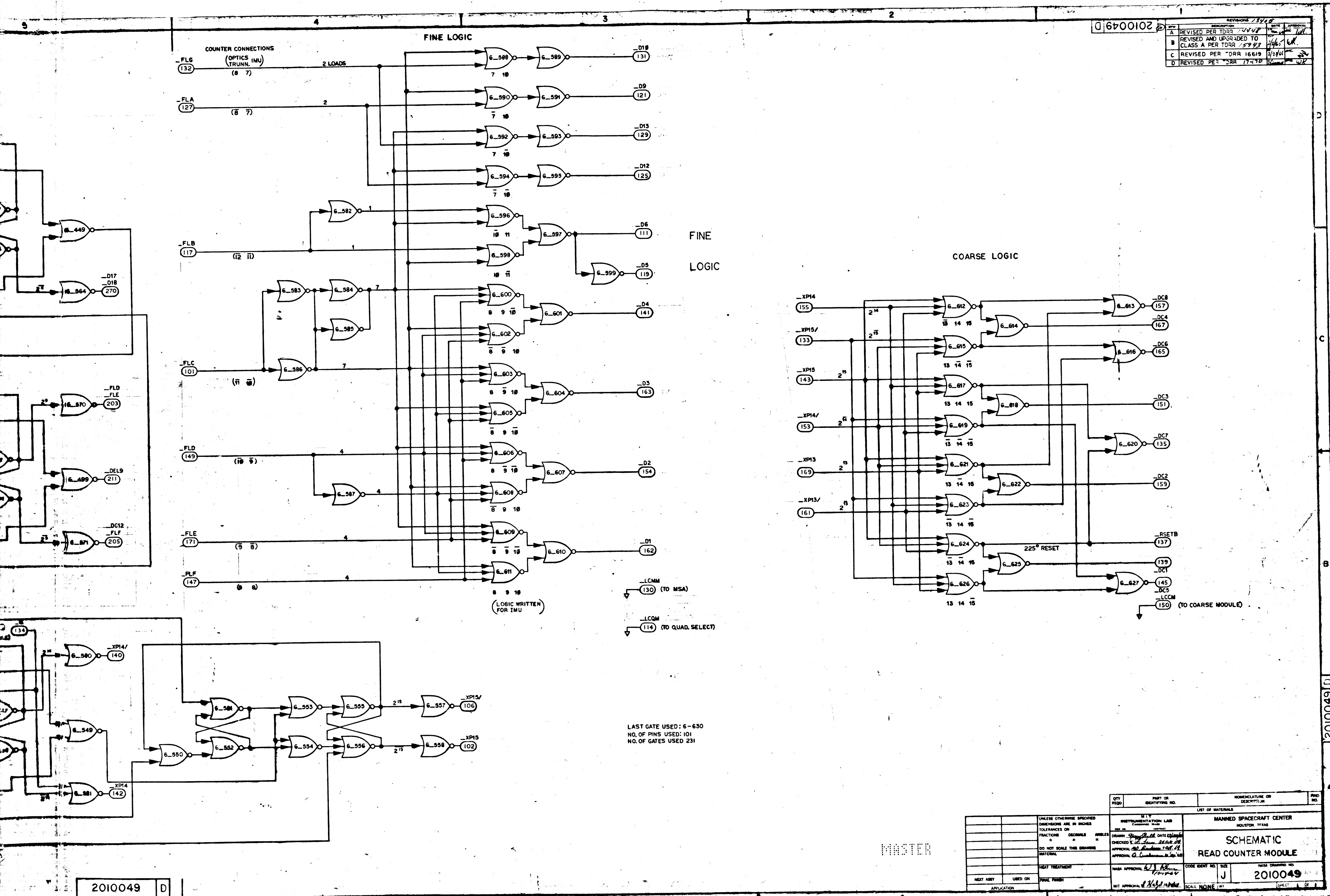
2010049 C

2010049


+4VDC
+4VHI
124
+4VHI
148
+4VHI
224
4VHI
248
TO ALL GATES
+4VDC RETURN
+4VLO
260
+4VLO
236
+4VLO
212
+4VLO
160
+4VLO
136
+4VLO
112
6_628
_LSTSW/
104
LEAST SWITCH DISABLE
STRUCTURE GROUND
_CHASS
201


FAZ2LO/
219
FAZ2HI/
220
$\overline{\Phi}_2$
_DNLVL
218
DOWN LEVEL
FAZ3HI
226
FAZ3LO
225
READ COUNTER DRIVE PULSES
_PIHI
222
_PILO
221
Φ3
PI
6_400
6_401
6_402
6_403
6_404
6_405
6_406
6_407
6_408
6_409
6_559
_DELØH
232
_DELØL
231
$2^{\overline{0}}$
6_560
_D21
_D22
202
SEE NOTE 7
6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
6_420
$2^{\overline{1}}$
6_561
_D20
_D21
208
_CDUZ
240
_UPLVL
234
$\overline{\Phi}2$
DOWN LEVEL
6_450
6_451
6_452
6_453
6_454
6_455
6_456
6_457
6_458
6_459
$2^{\overline{5}}$
6_565
_D16
_D17
271
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
6_470
$2^{\overline{6}}$
6_566
_D15
_D16
265
Φ3
UP LEVEL
RESET
FAZ2LO/
123
FAZ2HI/
120
$\overline{\Phi}_2$
DOWN LEVEL
118
_DN LVL
6_500
6_501
6_502
6_503
6_504
6_505
6_506
6_507
6_508
6_509
6_572
_D11
NC
105
6_573
_FLC
_FLD
103
2^{10}
$2^{\overline{10}}$
6_574
_D14
NC
107
_DC11
NC
115
FAZ3LO
126
FAZ3HI
122
_DEL9
109
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
6_520
2^{11}
6_575
_D8
_D11
158
_FLB
_FLC
166
$2^{\overline{11}}$
6_576
_D7
_D14
170
_DC10
NC
68
Φ3
_UPLVL
128
UP LEVEL
138
_CDUZ
RESET

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO-NOR GATE
4. POWER CONNECTIONS TO GATES NOT SHOWN
5. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN BUSS
6. ON COUNTER OUTPUTS TYPICAL DESIGNATIONS
   - 2^6-COUNTER STAGE
   - _D15-IMU SWITCH CONNECTION } WIRE WRAP PROGRAM DESIGNATION
   - _D16-OPTIC TRUNNION SWITCH CONNECTION
7. ↓ INDICATES MODULE POWER BUSS-4V RETURN
8. $\overset{XXX}{⬭}$ XXX INDICATES WIRE WRAP PROGRAM DESIGNATIONS


FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG 132
_FLA 127
_FLB 117
_FLC 101
_FLD 149
_FLE 171
_FLF 147
2 LOADS
6_588
6_589
6_590
6_591
6_592
6_593
6_594
6_595
6_596
6_597
6_598
6_599
6_600
6_601
6_602
6_603
6_604
6_605
6_606
6_607
6_608
6_609
6_610
6_611
6_582
6_583
6_584
6_585
6_586
6_587
_D19 131
_D9 121
_D13 129
_D12 125
_D6 111
_D5 119
_D4 141
_D3 163
_D2 154
_D1 162
(LOGIC WRITTEN FOR IMU)
_LCMM 130 (TO MSA)
_LCQM 114 (TO QUAD. SELECT)
FINE
LOGIC
COARSE LOGIC
_XP14 155
_XP15/ 133
_XP15 143
_XP14/ 153
_XP13 169
_XP13/ 161
6_612
6_613
6_614
6_615
6_616
6_617
6_618
6_619
6_620
6_621
6_622
6_623
6_624
6_625
6_626
6_627
_DC8 157
_DC4 167
_DC6 165
_DC3 151
_DC7 135
_DC2 159
_RSETB 137
225° RESET
139
_DC1 145
_DC5
_LCCM 150 (TO COARSE MODULE)
6_449
6_564
_D17
_D18 270
6_570
_FLD
_FLE 203
6_499
_DEL9 211
6_571
_DC12
_FLF 205
134
6_580
_XP14/ 140
6_549
6_581
_XP14 142
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
6_558
_XP15/ 106
_XP15 102
LAST GATE USED: 6-630
NO. OF PINS USED: 101
NO. OF GATES USED 231
MASTER

2010049 D

REVISIONS 13405

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14448		WR.
B	REVISED AND UPGRADED TO CLASS A PER TDRR 15943	2/2/65	WR.
C	REVISED PER TDRR 16619	2/23/66	WR
D	REVISED PER TDRR 17470		WR

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Gary Bell DATE 22/aug/64
CHECKED 24 Aug 64
APPROVAL 7 Oct. 64
APPROVAL 21 Sep '64
NASA APPROVAL W J Rhine 10-14-64
MIT APPROVAL

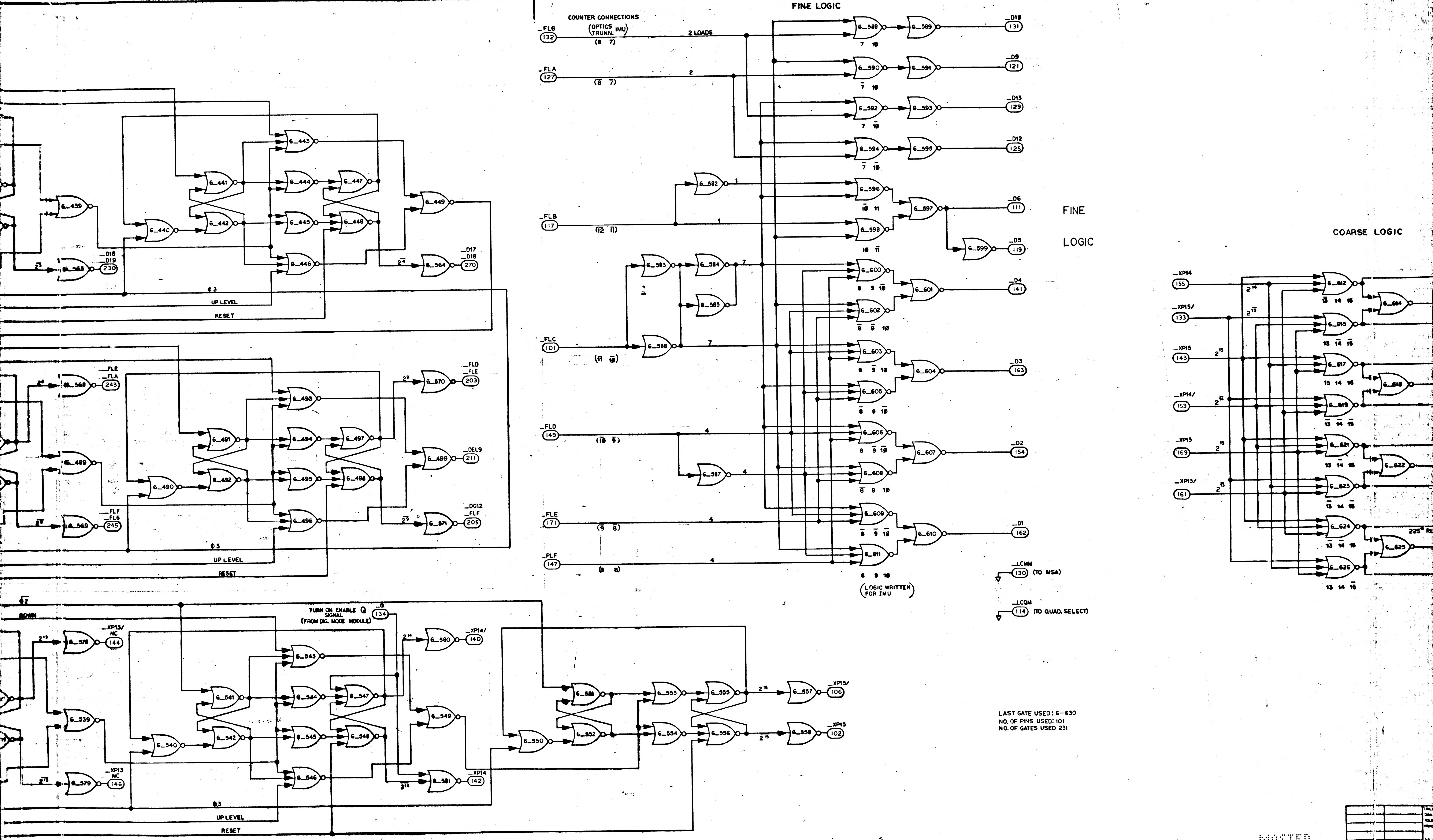
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
READ COUNTER MODULE

CODE IDENT NO. | SIZE J | NASA DRAWING NO. 2010049
SCALE NONE | WT | SHEET 1 OF 1

2010049 D

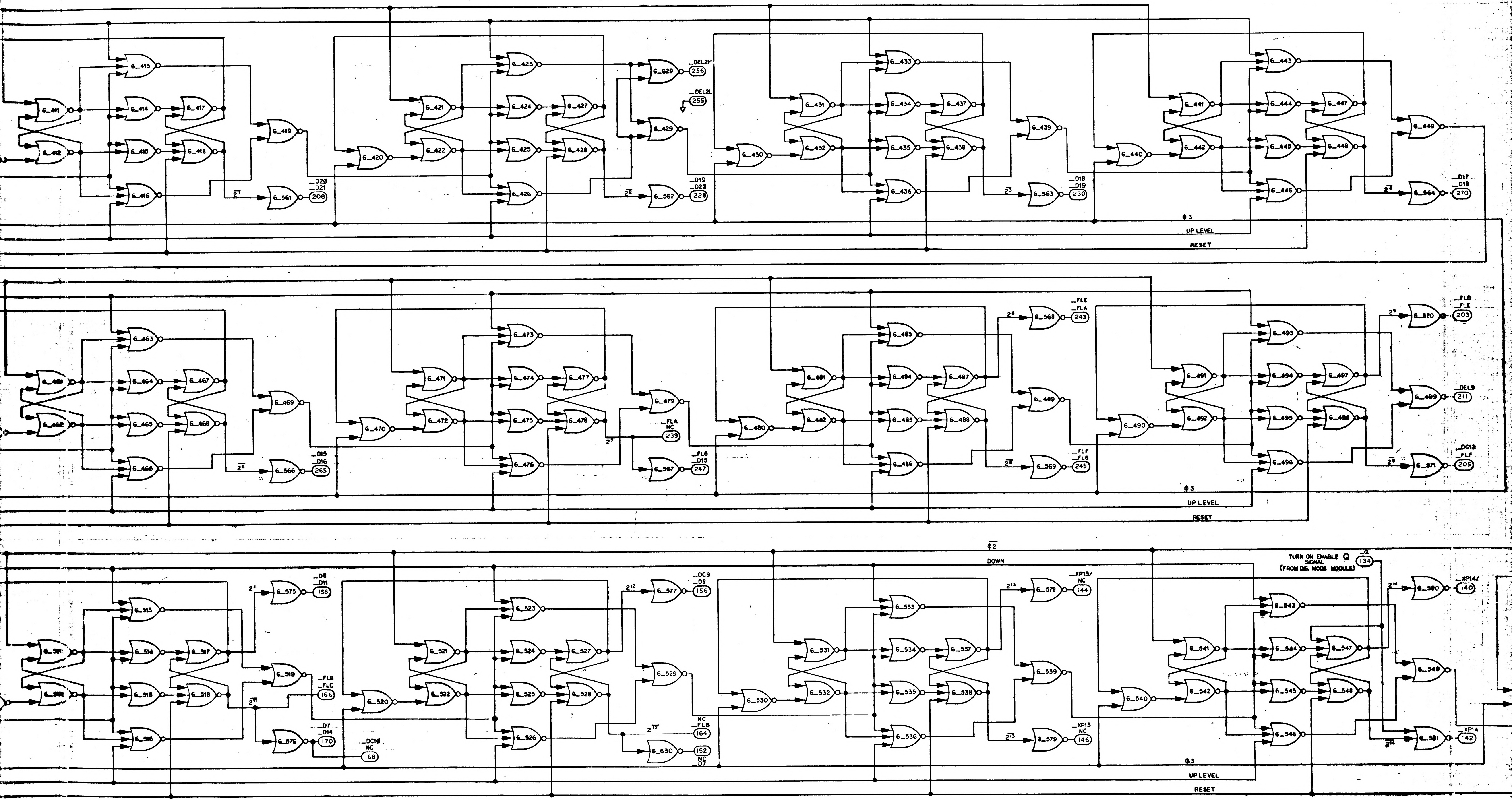
4H

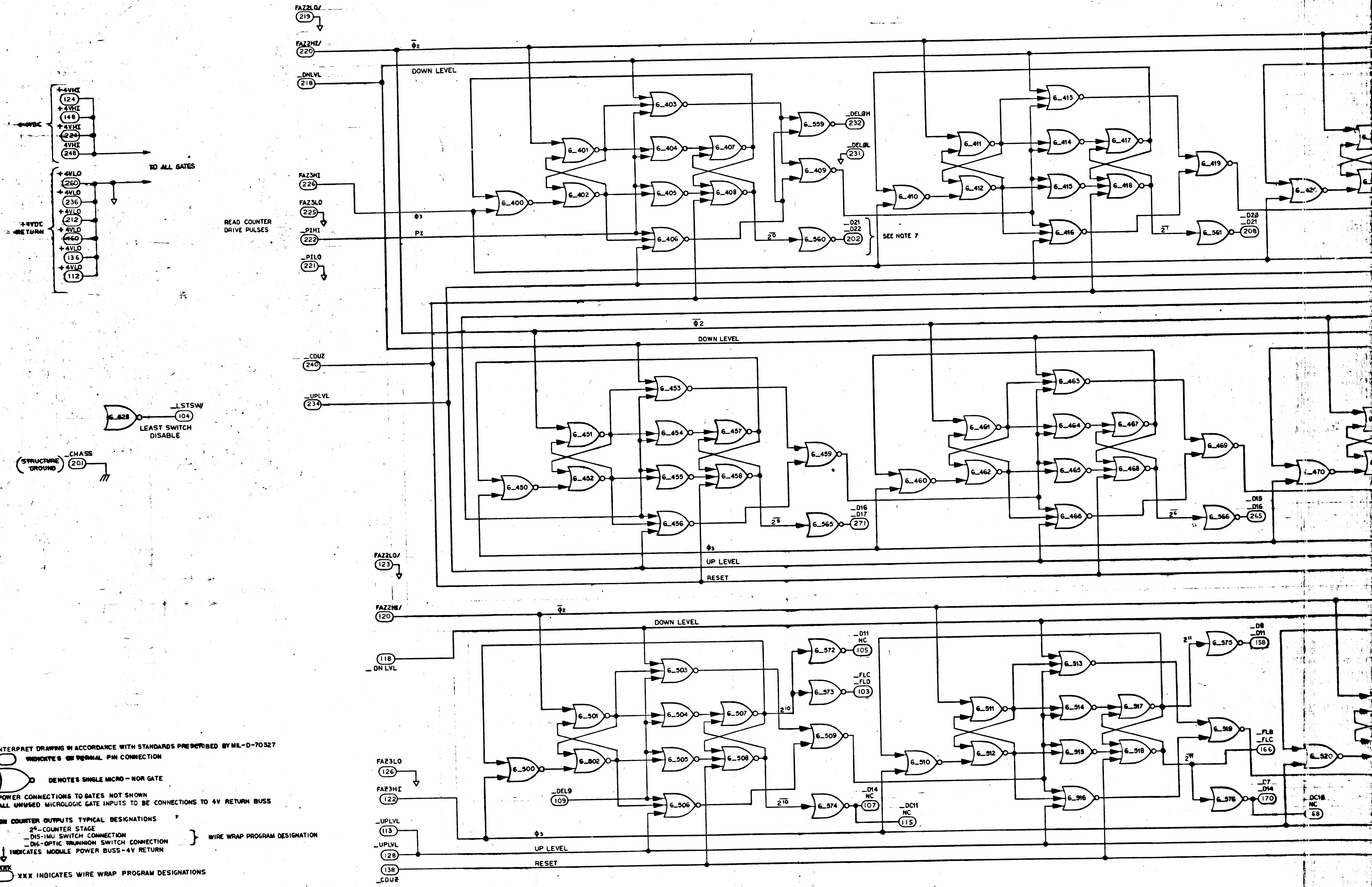

FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
(8 7)
2 LOADS
_FLG 132
_FLA 127
_FLB 117
_FLC 101
_FLD 149
_FLE 171
_FLF 147
(12 11)
(11 10)
(10 9)
(9 8)
6_582
6_583
6_584
6_585
6_586
6_587
6_588
6_589
6_590
6_591
6_592
6_593
6_594
6_595
6_596
6_597
6_598
6_599
6_600
6_601
6_602
6_603
6_604
6_605
6_606
6_607
6_608
6_609
6_610
6_611
_D10 131
_D9 121
_D13 129
_D12 125
_D6 111
_D5 119
_D4 141
_D3 163
_D2 154
_D1 162
(LOGIC WRITTEN FOR IMU)
FINE
LOGIC
_LCMM 130 (TO MSA)
_LCQM 114 (TO QUAD. SELECT)
COARSE LOGIC
_XP14 155
_XP15/ 133
_XP15 143
_XP14/ 153
_XP13 169
_XP13/ 161
6_612
6_614
6_615
6_617
6_618
6_619
6_621
6_622
6_623
6_624
6_625
6_626
13 14 15
225° RE
6_439
6_440
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_563
6_564
_D18 _D19 230
_D17 _D18 270
Φ3
UP LEVEL
RESET
6_568
6_569
6_570
6_571
6_489
6_490
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
_FLE _FLA 243
_FLF _FLG 245
_FLD _FLE 203
_DEL9 211
_DC12 _FLF 205
Φ2
DOWN
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
_Q 134
6_578
6_579
6_539
6_540
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_549
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
6_558
6_580
6_581
_XP13/ NC 144
_XP13 NC 146
_XP14/ 140
_XP14 142
_XP15/ 106
_XP15 102

LAST GATE USED: 6-630
NO. OF PINS USED: 101
NO. OF GATES USED 231

MASTER

2010049 D

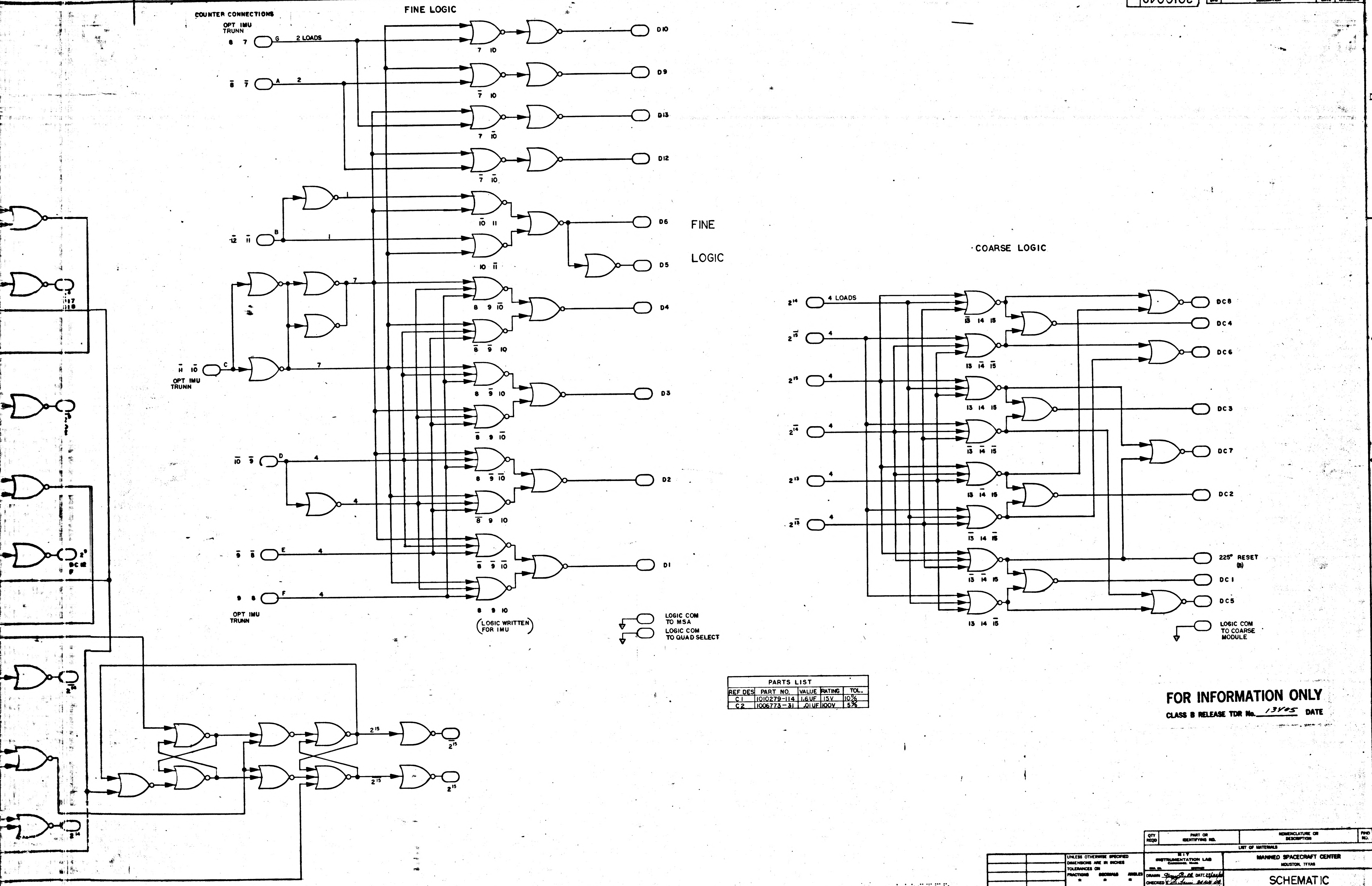

6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
2^1
6_561
D20
D21
208
6_420
6_421
6_422
6_423
6_424
6_425
6_426
6_427
6_428
6_629
DEL2H
256
DEL2L
255
6_429
2^2
6_562
D19
D20
228
6_430
6_431
6_432
6_433
6_434
6_435
6_436
6_437
6_438
6_439
2^3
6_563
D18
D19
230
6_440
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
2^4
6_564
D17
D18
270
φ3
UP LEVEL
RESET
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
2^6
6_566
D15
D16
265
6_470
6_471
6_472
6_473
6_474
6_475
6_476
6_477
6_478
6_479
2^7
FLA
NC
239
6_567
FL6
D15
247
6_480
6_481
6_482
6_483
6_484
6_485
6_486
6_487
6_488
6_489
2^8
6_568
FLE
FLA
243
2^8
6_569
FLF
FL6
245
6_490
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
2^9
6_570
FLD
FLE
203
DEL9
211
2^9
6_571
DC12
FLF
205
φ3
UP LEVEL
RESET
$\overline{\phi 2}$
DOWN
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
2^{11}
6_575
D8
D11
158
FLB
FLC
166
2^{11}
6_576
D7
D14
170
DC10
NC
168
6_520
6_521
6_522
6_523
6_524
6_525
6_526
6_527
6_528
6_529
2^{12}
6_577
DC9
D8
156
2^{12}
6_630
152
NC
D7
NC
FLB
164
6_530
6_531
6_532
6_533
6_534
6_535
6_536
6_537
6_538
6_539
2^{13}
6_578
XP13/
NC
144
2^{13}
6_579
XP13
NC
146
TURN ON ENABLE Q SIGNAL (FROM DIS. MODE MODULE)
Q
134
6_540
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_549
2^{14}
6_580
XP14/
140
2^{14}
6_581
XP14
142
φ3
UP LEVEL
RESET


+4VDC
+4VHI 124
+4VHI 148
+4VHI 224
4VHI 248
TO ALL GATES
+4VDC RETURN
+4VLO 260
+4VLO 236
+4VLO 212
+4VLO 160
+4VLO 136
+4VLO 112
6_628
_LSTSW/ 104
LEAST SWITCH DISABLE
STRUCTURE GROUND
_CHASS 201
READ COUNTER DRIVE PULSES
FAZ2LO/ 219
FAZ2HI/ 220
_DNLVL 218
FAZ3HI 226
FAZ3LO 225
_PIHI 222
_PILO 221
DOWN LEVEL
Φ2
Φ3
PI
6_400
6_401
6_402
6_403
6_404
6_405
6_406
6_407
6_408
6_409
6_559
6_560
_DELØH 232
_DELØL 231
2⁰
_D21 _D22 202
SEE NOTE 7
6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
6_420
6_561
2¹
_D20 _D21 208
_CDUZ 240
_UPLVL 234
6_450
6_451
6_452
6_453
6_454
6_455
6_456
6_457
6_458
6_459
6_565
2⁵
_D16 _D17 271
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
6_470
6_566
2⁶
_D15 _D16 265
UP LEVEL
RESET
FAZ2LO/ 123
FAZ2HI/ 120
118 _DN LVL
FAZ3LO 126
FAZ3HI 122
_DEL9 109
_UPLVL 113
_UPLVL 128
138 _CDUZ
6_500
6_501
6_502
6_503
6_504
6_505
6_506
6_507
6_508
6_509
6_572
6_573
6_574
_D11 NC 105
_FLC _FLD 103
2¹⁰
_D14 NC 107
_DC11 NC 115
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
6_520
6_575
6_576
2¹¹
_D8 _D11 158
_FLB _FLC 166
_D7 _D14 170
_DC16 NC 68

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO - NOR GATE
4. POWER CONNECTIONS TO GATES NOT SHOWN
5. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN BUSS
6. ON COUNTER OUTPUTS TYPICAL DESIGNATIONS
   - 2⁶-COUNTER STAGE
   - _D15-IMU SWITCH CONNECTION } WIRE WRAP PROGRAM DESIGNATION
   - _D16-OPTIC TRUNNION SWITCH CONNECTION
7. INDICATES MODULE POWER BUSS-4V RETURN
8. XXX INDICATES WIRE WRAP PROGRAM DESIGNATIONS

2010049 D


COUNTER CONNECTIONS
OPT IMU TRUNN
FINE LOGIC
2 LOADS
D10
D9
D13
D12
D6
D5
D4
D3
D2
D1
FINE LOGIC
(LOGIC WRITTEN FOR IMU)
LOGIC COM TO MSA
LOGIC COM TO QUAD SELECT
COARSE LOGIC
4 LOADS
DC8
DC4
DC6
DC3
DC7
DC2
225° RESET (b)
DC1
DC5
LOGIC COM TO COARSE MODULE
2^{15}
$\overline{2^{15}}$
2^{14}

PARTS LIST				
REF DES	PART NO.	VALUE	RATING	TOL.
C1	1010279-114	1.6UF	15V	10%
C2	1006773-31	.01UF	100V	5%

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 13V05 DATE

(4H)

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.

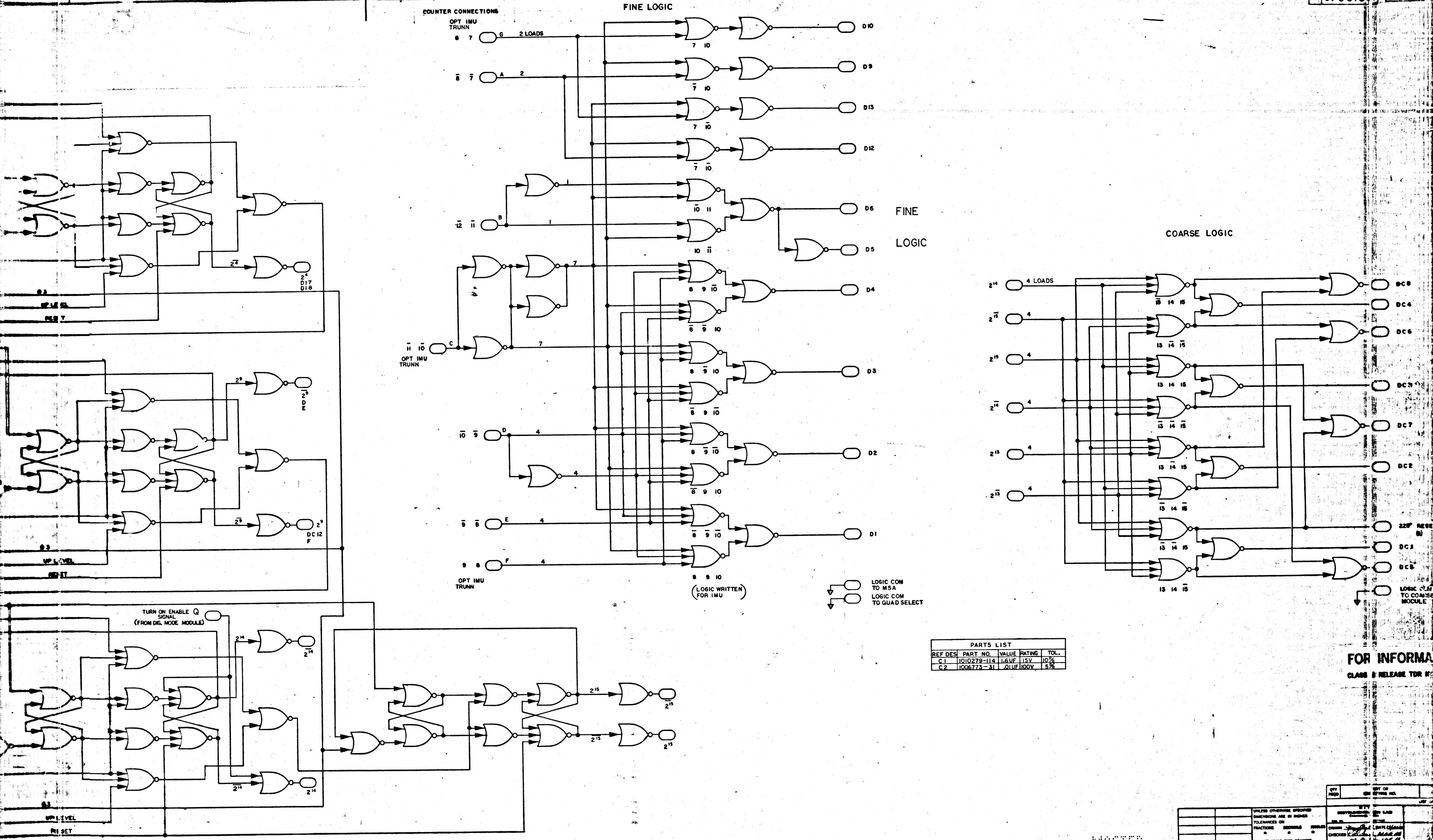
DRAWN DATE 22 Jul 64
CHECKED 24 Jul 64
APPROVAL 7 Oct 64
APPROVAL 21 Sep '64
NASA APPROVAL W J Rhine 10-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
READ COUNTER MODULE

CODE IDENT NO.
SIZE J
NASA DRAWING NO. 2010049
SCALE NONE
WT
SHEET 1 OF 1

2010049



COUNTER CONNECTIONS
OPT IMU TRUNN
FINE LOGIC
2 LOADS
D10
D9
D13
D12
D6
D5
D4
D3
D2
D1
FINE
LOGIC
COARSE LOGIC
4 LOADS
DC8
DC4
DC6
DC3
DC7
DC2
DC1
DC5
(LOGIC WRITTEN FOR IMU)
LOGIC COM TO MSA
LOGIC COM TO QUAD SELECT
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
UP LEVEL
RESET

PARTS LIST				
REF DES	PART NO.	VALUE	RATING	TOL.
C1	1010279-114	1.6UF	15V	10%
C2	1006773-31	.01UF	100V	5%

FOR INFORMA

CLASS I RELEASE FOR

MASTER

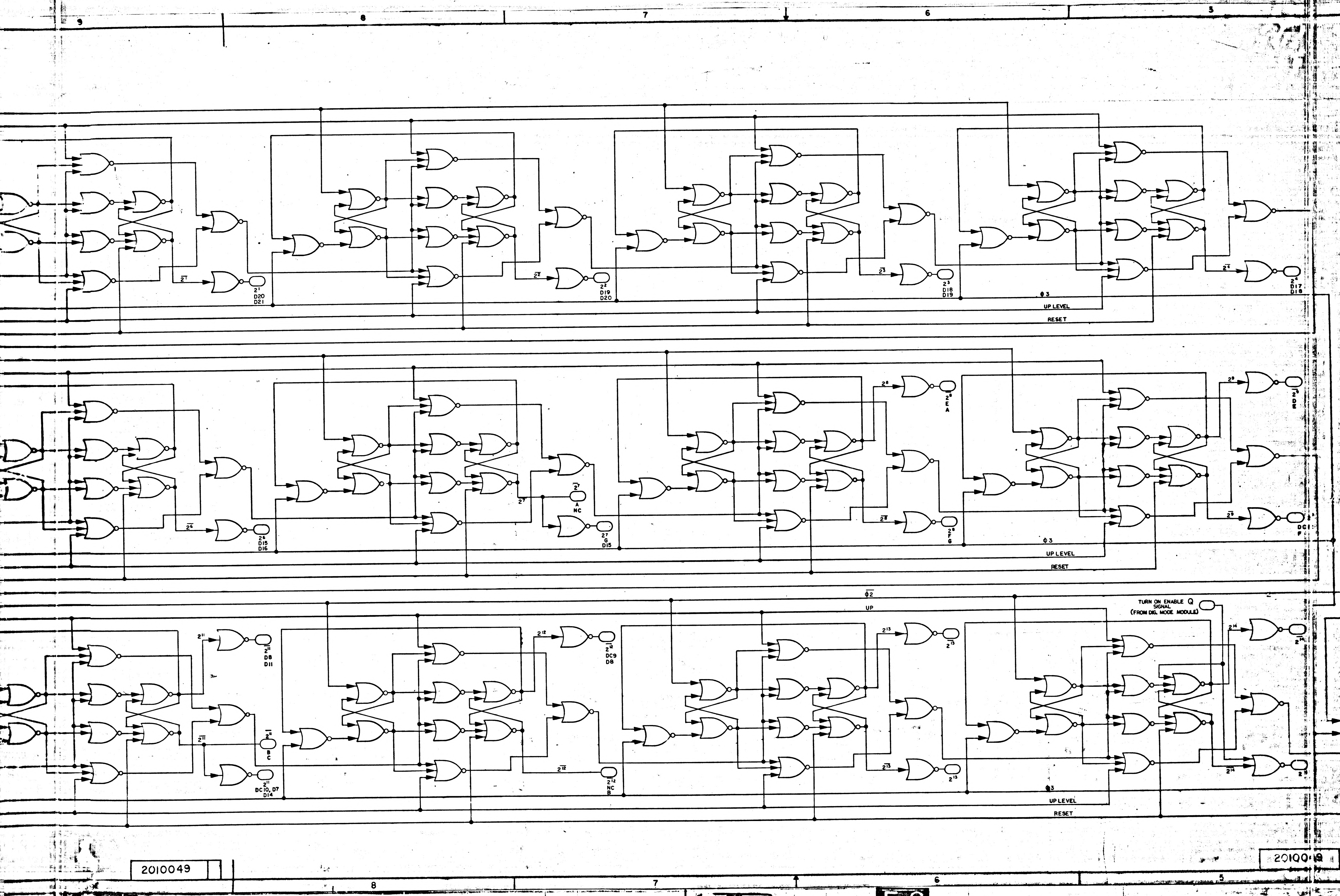
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

QTY REQD
PART OR IDENTIFYING NO.

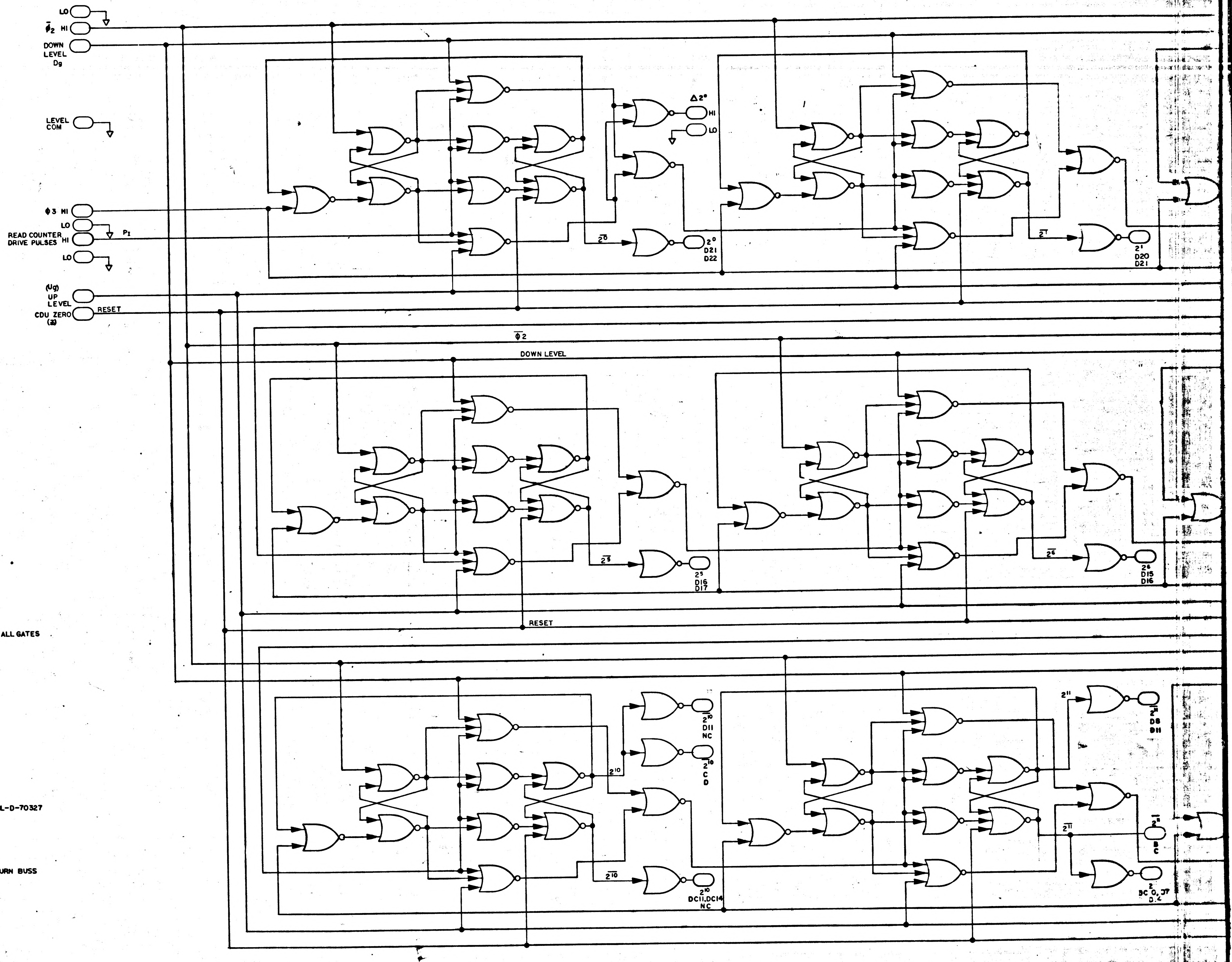
MIT
INSTRUMENTATION LAB
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

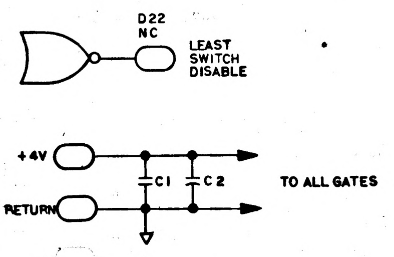
F3


9
8
7
6
5
$\overline{2^{1}}$
2^{1} D20 D21
$\overline{2^{2}}$
2^{2} D19 D20
$\overline{2^{3}}$
2^{3} D18 D19
$\overline{2^{4}}$
2^{4} D17 D18
Φ3
UP LEVEL
RESET
$\overline{2^{6}}$
2^{6} D15 D16
2^{7}
$\overline{2^{7}}$ A NC
2^{7} G D15
2^{8}
2^{8} E A
$\overline{2^{8}}$
2^{8} F G
2^{9}
2^{9} D E
$\overline{2^{9}}$
DC1 F
Φ3
UP LEVEL
RESET
$\overline{Φ2}$
UP
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
2^{11}
$\overline{2^{11}}$ D8 D11
$\overline{2^{11}}$
$\overline{2^{11}}$ B C
2^{11} DC10, D7 D14
2^{12}
$\overline{2^{12}}$ DC9 D8
$\overline{2^{12}}$
2^{12} NC B
2^{13}
$\overline{2^{13}}$
$\overline{2^{13}}$
2^{13}
2^{14}
$\overline{2^{14}}$
$\overline{2^{14}}$
2^{14}
Φ3
UP LEVEL
RESET
2010049
8
7
6
5
20100-19

E-2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


LO
$\bar{\phi}_2$ HI
DOWN LEVEL D_g
LEVEL COM
Δ2°
HI
LO
ϕ3 HI
LO
READ COUNTER DRIVE PULSES HI
P1
LO
$\overline{2^0}$
2^0 D21 D22
$\overline{2^1}$
2^1 D20 D21
(U_g) UP LEVEL
CDU ZERO (3)
RESET
$\bar{\Phi}_2$
DOWN LEVEL
$\overline{2^5}$
2^5 D16 D17
$\overline{2^6}$
2^6 D15 D16
RESET
2^{10} D11 NC
2^{10} C D
2^{10}
$\overline{2^{10}}$
2^{10} DC11, DC14 NC
2^{11}
2^{11} D8 D11
$\overline{2^{11}}$
$\overline{2}$ B C
2 BC 0, JF D 4

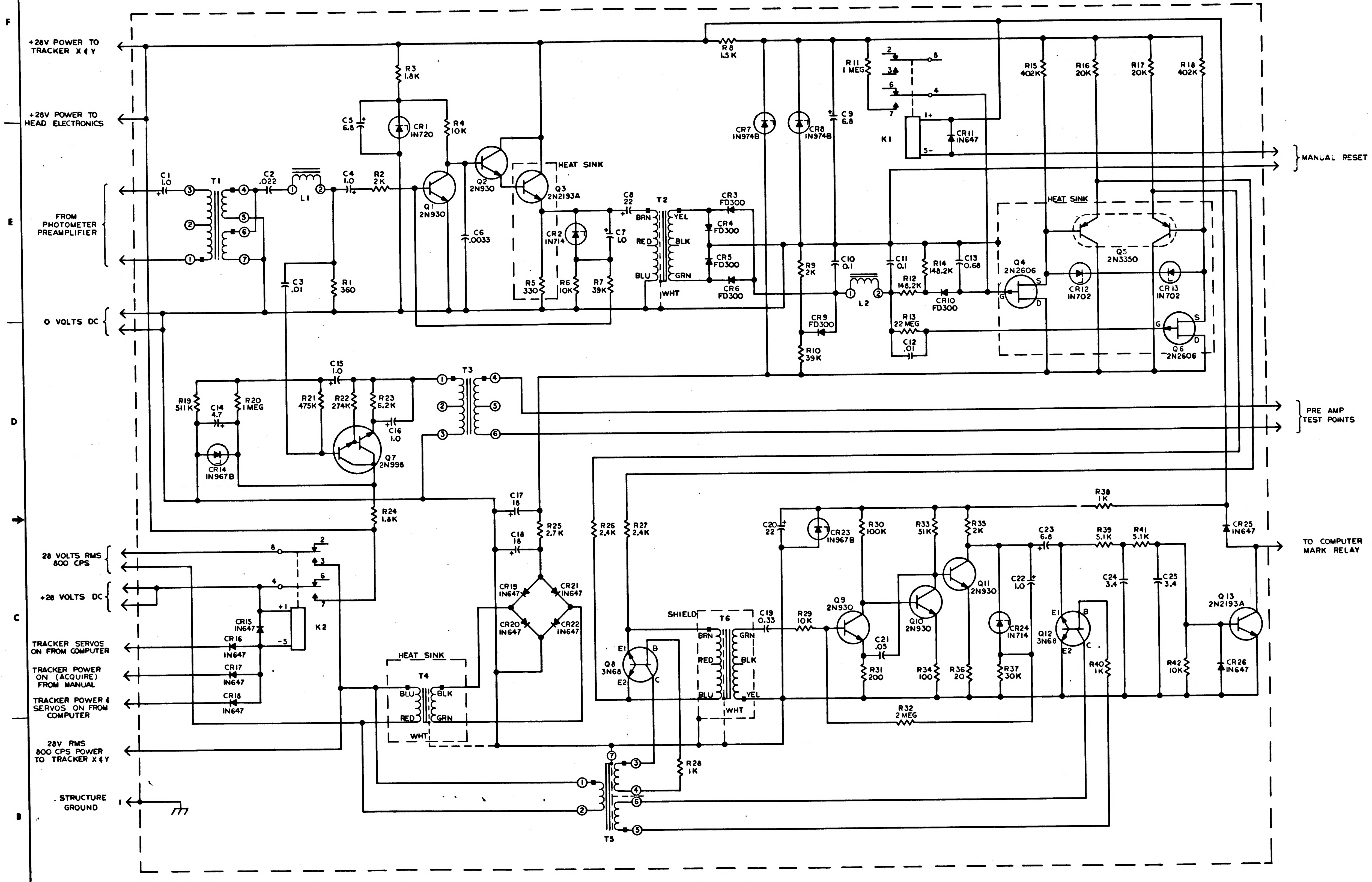

D22 NC
LEAST SWITCH DISABLE
+4V
C1
C2
TO ALL GATES
+4V RETURN

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO - NOR GATE
4. POWER CONNECTIONS TO GATES NOT SHOWN
5. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO 4V RETURN BUSS
6. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
7. ON COUNTER OUTPUTS TYPICAL DESIGNATIONS
   - 2^6-COUNTER STAGE
   - D15-IMU SWITCH CONNECTION
   - D16-OPTIC TRUNNION SWITCH CONNECTION
8. ↓ INDICATES MODULE POWER BUSS-4V RETURN

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22196

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED


+28V POWER TO TRACKER X & Y
+28V POWER TO HEAD ELECTRONICS
FROM PHOTOMETER PREAMPLIFIER
0 VOLTS DC
28 VOLTS RMS 800 CPS
+28 VOLTS DC
TRACKER SERVOS ON FROM COMPUTER
TRACKER POWER ON (ACQUIRE) FROM MANUAL
TRACKER POWER & SERVOS ON FROM COMPUTER
28V RMS 800 CPS POWER TO TRACKER X & Y
STRUCTURE GROUND
MANUAL RESET
PRE AMP TEST POINTS
TO COMPUTER MARK RELAY
C1 1.0
T1
C2 .022
L1
C4 1.0
R2 2K
R3 1.8K
C5 6.8
CR1 1N720
R4 10K
Q1 2N930
Q2 2N930
HEAT SINK
Q3 2N2193A
C6 .0033
C3 .01
R1 360
CR2 1N714
C7 1.0
R5 330
R6 10K
R7 39K
C8 22
T2
BRN
RED
BLU
YEL
BLK
GRN
WHT
CR3 FD300
CR4 FD300
CR5 FD300
CR6 FD300
R8 1.5K
CR7 1N974B
CR8 1N974B
C9 6.8
R11 1 MEG
K1
CR11 1N647
R9 2K
C10 0.1
L2
CR9 FD300
R10 39K
C11 0.1
R12 148.2K
R14 148.2K
C13 0.68
CR10 FD300
R13 22 MEG
C12 .01
R15 402K
R16 20K
R17 20K
R18 402K
Q4 2N2606
Q5 2N3350
CR12 1N702
CR13 1N702
Q6 2N2606
G
S
D
C15 1.0
T3
R19 511K
C14 4.7
R20 1 MEG
R21 475K
R22 274K
R23 6.2K
C16 1.0
CR14 1N967B
Q7 2N998
R24 1.8K
C17 18
C18 18
R25 2.7K
CR19 1N647
CR21 1N647
CR20 1N647
CR22 1N647
K2
CR15 1N647
CR16 1N647
CR17 1N647
CR18 1N647
T4
R26 2.4K
R27 2.4K
Q8 3N68
E1
E2
B
C
SHIELD
T6
C19 0.33
R29 10K
R28 1K
T5
R38 1K
C20 22
CR23 1N967B
R30 100K
R33 51K
R35 2K
Q9 2N930
C21 .05
Q10 2N930
Q11 2N930
R31 200
R34 100
R36 20
C22 1.0
CR24 1N714
R37 30K
C23 6.8
R39 5.1K
R41 5.1K
C24 3.4
C25 3.4
Q12 3N68
R40 1K
R32 2 MEG
R42 10K
Q13 2N2193A
CR25 1N647
CR26 1N647

REF DWG:
PHOTOMETER ELECTRONICS ASSY
DWG NO.

NOTE:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Wunderlich 8-26-65
CHECKED 8-30-65
APPROVED 8/30/65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC PHOTOMETER ELECTRONICS

CODE IDENT NO.
SIZE E
DRAWING NO. 2010051
SCALE —
SHEET 1 OF 2

2010051

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 22196

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
Q1	1010397-001	TRANSISTOR	2N930		
Q2	1010397-001		2N930		
Q3	1010398-1		2N2193A		
Q4	1012048		2N2606		
Q5	1010990		2N3350		
Q6	1012048		2N2606		
Q7	1010342		2N998		
Q8	1010367		3N68		
Q9	1010397-001		2N930		
Q10	1010397-001		2N930		
Q11	1010397-001		2N930		
Q12	1010367		3N68		
Q13	1010398-1	TRANSISTOR	2N2193A		
R1	1006750-21	RESISTOR	360	±2%	1/4 W
R2	1006750-39		2K	±2%	1/4 W
R3	1006760-38		1.8K	±2%	1/2 W
R4	1006750-56		10K	±2%	1/4 W
R5	1010389-44		330	±1%	3 W
R6	1006750-56		10K	±2%	1/4 W
R7	1006750-70		39K	±2%	1/4 W
R8	1006760-36		1.5K	±2%	1/2 W
R9	1006750-39		2K	±2%	1/4 W
R10	1006750-70		39K	±2%	1/4 W
R11	1010368-121		1 MEG	±5%	1/4 W
R12	2021505-275		148.2K	±0.1%	1/8 W
R13	1010368-153		22 MEG	±5%	1/4 W
R14	2021505-275		148.2K	±0.1%	1/8 W
R15	1010364-752		402K	±1%	1/8 W
R16	1010321-251		20K	±1%	1/4 W
R17	1010321-251		20K	±1%	1/4 W
R18	1010364-752		402K	±1%	1/8 W
R19	1010374-1		511K	±1%	1/8 W
R20	1010374-29		1 MEG	±1%	1/8 W
R21	1010364-765		475K	±1%	1/8 W
R22	1010364-719		274K	±1%	1/8 W
R23	1006750-51		6.2K	±2%	1/4 W
R24	1006760-38		1.8K	±2%	1/2 W
R25	1006760-42		2.7K	±2%	1/4 W
R26	1006750-41		2.4K	±2%	1/4 W
R27	-41		2.4K	±2%	1/4 W
R28	-32		1K	±2%	1/4 W
R29	-56		10K	±2%	1/4 W
R30	-80		100K	±2%	1/4 W
R31	1006750-15		200	±2%	1/4 W
R32	1010368-128		2 MEG	±5%	1/4 W
R33	1006750-73		51K	±2%	1/4 W
R34	1006750-8		100	±2%	1/4 W
R35	1006750-39		2K	±2%	1/4 W
R36	1010368-8		20	±5%	1/4 W
R37	1006750-67		30K	±2%	1/4 W
R38	1006760-32		1K	±2%	1/2 W
R39	1006750-49		5.1K	±2%	1/4 W
R40	-32		1K	±2%	1/4 W
R41	-49		5.1K	±2%	1/4 W
R42	1006750-56	RESISTOR	10K	±2%	1/4 W
T1	1010365	TRANSFORMER			
T2	1010471				
T3	1010329				
T4	1008816				
T5	1010753				
T6	1010880	TRANSFORMER			

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-69	CAPACITOR	1.0	±10%	35 VDC
C2	1010264-17		.022	±5%	200 VDC
C3	1010359-29		.01	±10%	200 VDC
C4	1006755-69		1.0	±10%	35 VDC
C5	1006755-79		6.8	±10%	35 VDC
C6	1006777-27		.0033	±10%	100 VDC
C7	1006755-69		1.0	±10%	35 VDC
C8	1006755-85		22	±10%	35 VDC
C9	1006755-79		6.8	±10%	35 VDC
C10	1006777-38		0.1	±10%	100 VDC
C11	1006777-38		0.1	±10%	100 VDC
C12	1006777-31		.01	±10%	100 VDC
C13	1010317-2		0.68	±1%	30 VDC
C14	1010393-037		4.7	±10%	50 VDC
C15	1006755-69		1.0	±10%	35 VDC
C16	-69		1.0	±10%	35 VDC
C17	-133		18	±10%	50 VDC
C18	1006755-133		18	±10%	50 VDC
C19	1010264-31		0.33	±5%	200 VDC
C20	1006755-85		22	±10%	35 VDC
C21	1006777-36		.05	±10%	100 VDC
C22	1006755-69		1.0	±10%	35 VDC
C23	1006755-79		6.8	±10%	35 VDC
C24	1010279-238		3.4	±10%	35 VDC
C25	1010279-238	CAPACITOR	3.4	±10%	35 VDC
CR1	1010372-24	DIODE	IN720		
CR2	1010372-18		IN714		
CR3	1010775-1		FD300		
CR4	-1		FD300		
CR5	-1		FD300		
CR6	1010775-1		FD300		
CR7	1010830-18		IN974B		
CR8	1010830-9		IN965B		
CR9	1010775-1		FD300		
CR10	1010775-1		FD300		
CR11	1010837-002		IN647		
CR12	1010372-4		IN702		
CR13	1010372-4		IN702		
CR14	1010830-11		IN967B		
CR15	1010837-002		IN647		
CR16	-002		IN647		
CR17	-002		IN647		
CR18	-002		IN647		
CR19	-002		IN647		
CR20	-002		IN647		
CR21	-002		IN647		
CR22	1010837-002		IN647		
CR23	1010830-11		IN967B		
CR24	1010372-18		IN714		
CR25	1010837-002		IN647		
CR26	1010837-002	DIODE	IN647		
K1	1010353-7	RELAY			
K2	1010353-7	RELAY			
L1	1010277-6	REACTOR			
L2	1010277-10	REACTOR			

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

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NEXT ASSY	USED ON

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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Wunderlich 8-26-65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PHOTOMETER ELECTRONICS

CODE IDENT NO.
SIZE E
DRAWING NO. 2010051
SCALE —
SHEET 2 OF 2

2010051

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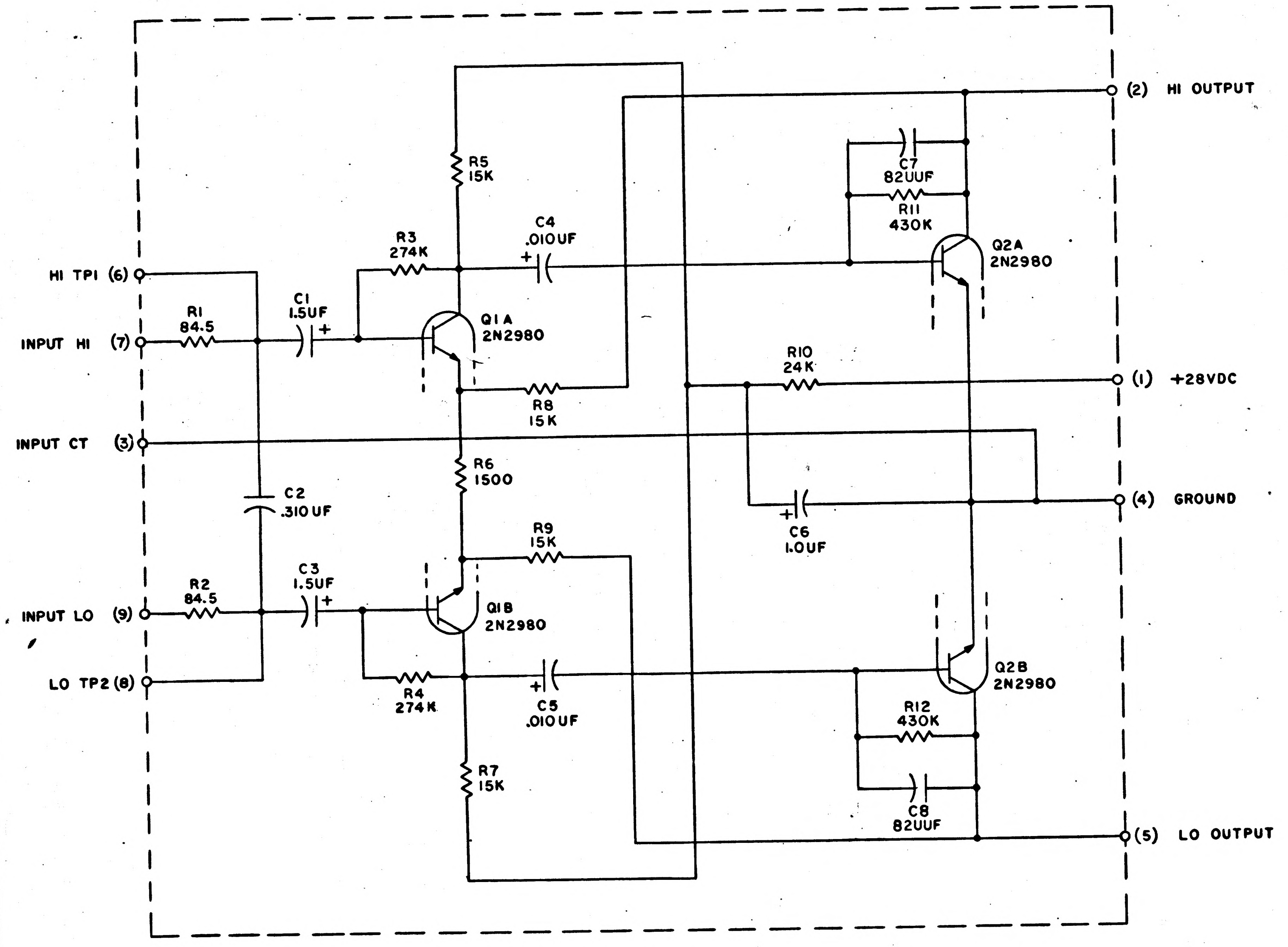
REVISIONS 15242

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17008	8 Mar 65	


(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT
HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
R10 24K
R11 430K
R12 430K
C1 1.5UF
C2 .310UF
C3 1.5UF
C4 .010UF
C5 .010UF
C6 1.0UF
C7 82UUF
C8 82UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010321-360		274K	±1%	1/4W
R4	1010321-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1010317-1		.310UF	±1%	30V
C3	1006755-71		1.5UF	±10%	35V
C4	1006755-45		.010UF	±10%	35V
C5	1006755-45		.010UF	±10%	35V
C6	1010393-029		1.0UF	±10%	50V
C7	1010359-4		82UUF	±10%	200V
C8	1010359-4	CAPACITOR	82UUF	±10%	200V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
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FINAL FINISH #

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN J Brigham DATE 4/3/64
CHECKED
APPROVAL J. C. Smith 12-23-64
APPROVAL 12/3/64
NASA APPROVAL W. J. [illegible] 1-5-65
MIT APPROVAL

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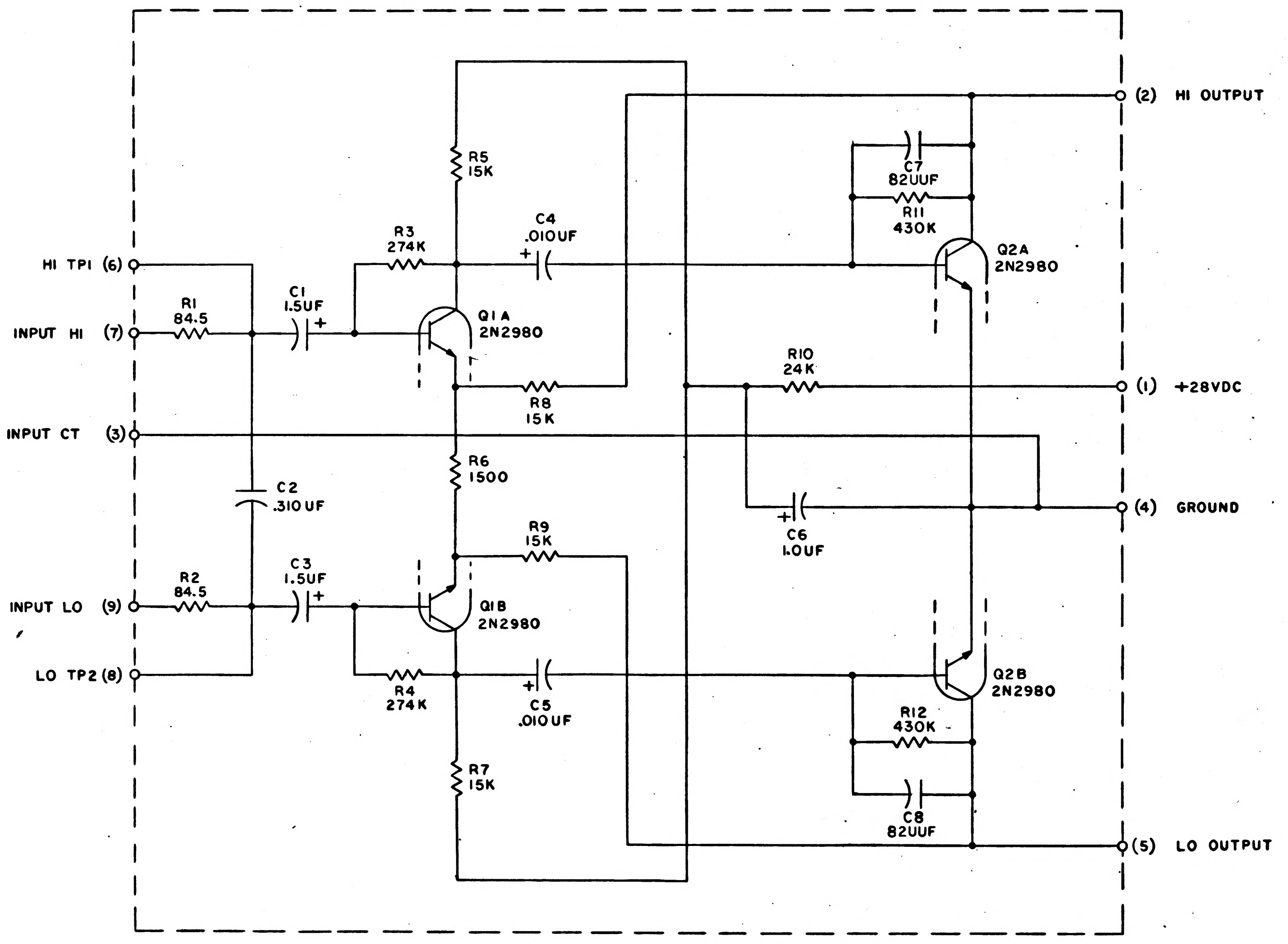
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15242

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17008	[illegible] 65	
B	REVISED PER TDRR 24289		


HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF +
C2 .310UF
C3 1.5UF +
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
R10 24K
R11 430K
R12 430K
C4 .010UF +
C5 .010UF +
C6 1.0UF +
C7 82UUF
C8 82UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010321-360		274K	±1%	1/4W
R4	1010321-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1010317-1	CAPACITOR	.310UF	±1%	30V
C3	1006755-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5% MATCH	35V
C5			.010UF		35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1010359-32	CAPACITOR MATCHED PAIR	82UUF	±5% MATCH.	200V
C8			82UUF		200V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN DATE 11/3/64
CHECKED
APPROVAL 12-28-64
APPROVAL 12/10/64
NASA APPROVAL 1-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
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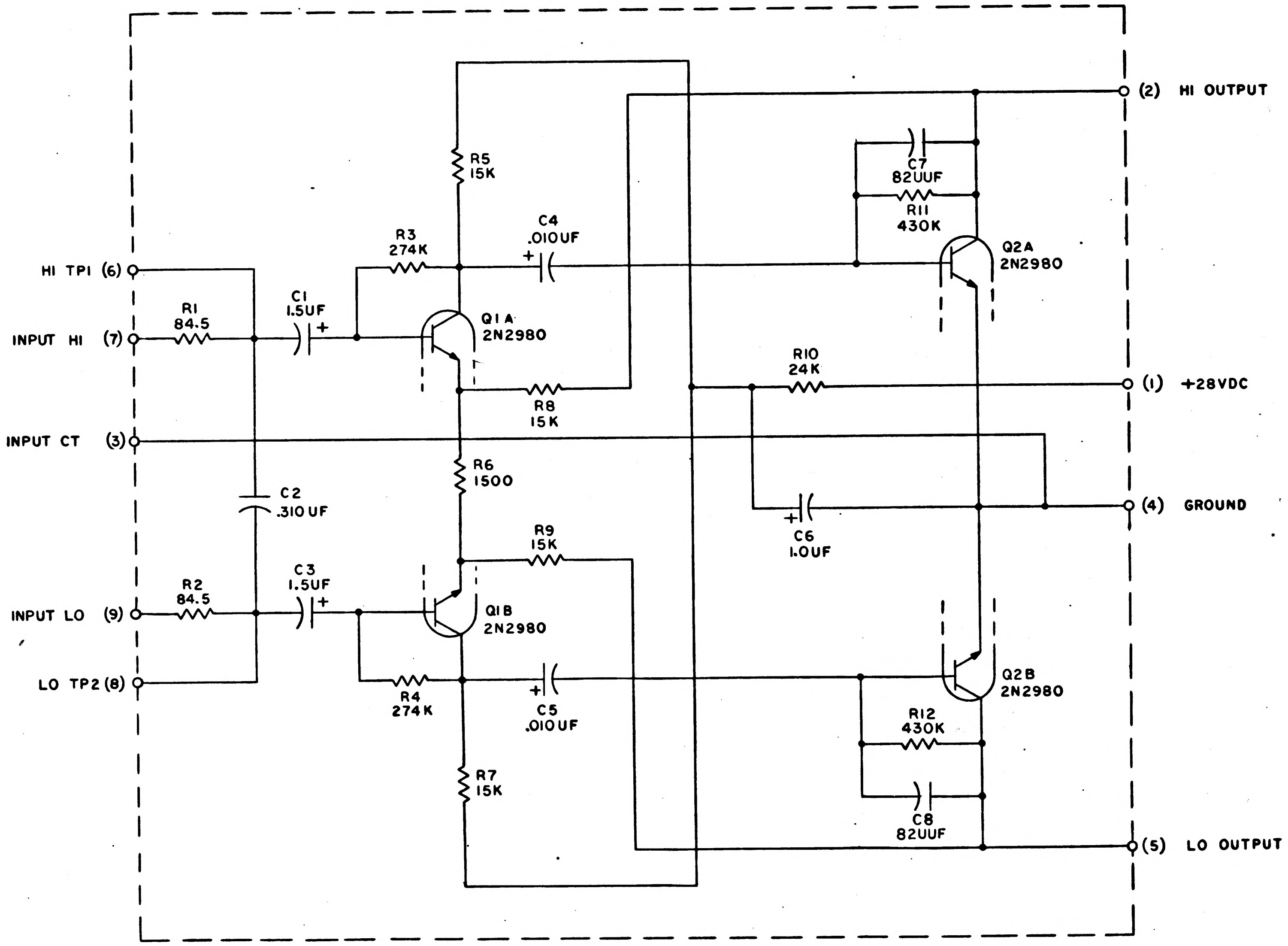
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15242

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17008	8 Mar 65	
B	REVISED PER TDRR 24289	24Nov65	
C	REVISED PER TDRR 24539	22Dec65	



(2) HI OUTPUT
C7 82UUF
R11 430K
Q2A 2N2980
R5 15K
R3 274K
C4 .010UF
HI TP1 (6)
INPUT HI (7)
R1 84.5
C1 1.5UF
Q1A 2N2980
R10 24K
(1) +28VDC
R8 15K
INPUT CT (3)
R6 1500
C2 .310UF
C6 1.0UF
(4) GROUND
R9 15K
C3 1.5UF
INPUT LO (9)
R2 84.5
Q1B 2N2980
Q2B 2N2980
LO TP2 (8)
R4 274K
C5 .010UF
R12 430K
R7 15K
C8 82UUF
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010969-360		274K	±1%	1/4W
R4	1010969-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1010317-1	CAPACITOR	.310UF	±1%	30V
C3	1006755-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5% MATCH	35V
C5			.010UF		35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1010359-32	CAPACITOR MATCHED PAIR	82UUF	±5% MATCH.	200V
C8			82UUF		200V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
HEAT TREATMENT #
FINAL FINISH #

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN J Brigham DATE 4/3/64
CHECKED
APPROVAL 12-23-64
APPROVAL 12/23/64
NASA APPROVAL 1-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PIP PREAMP

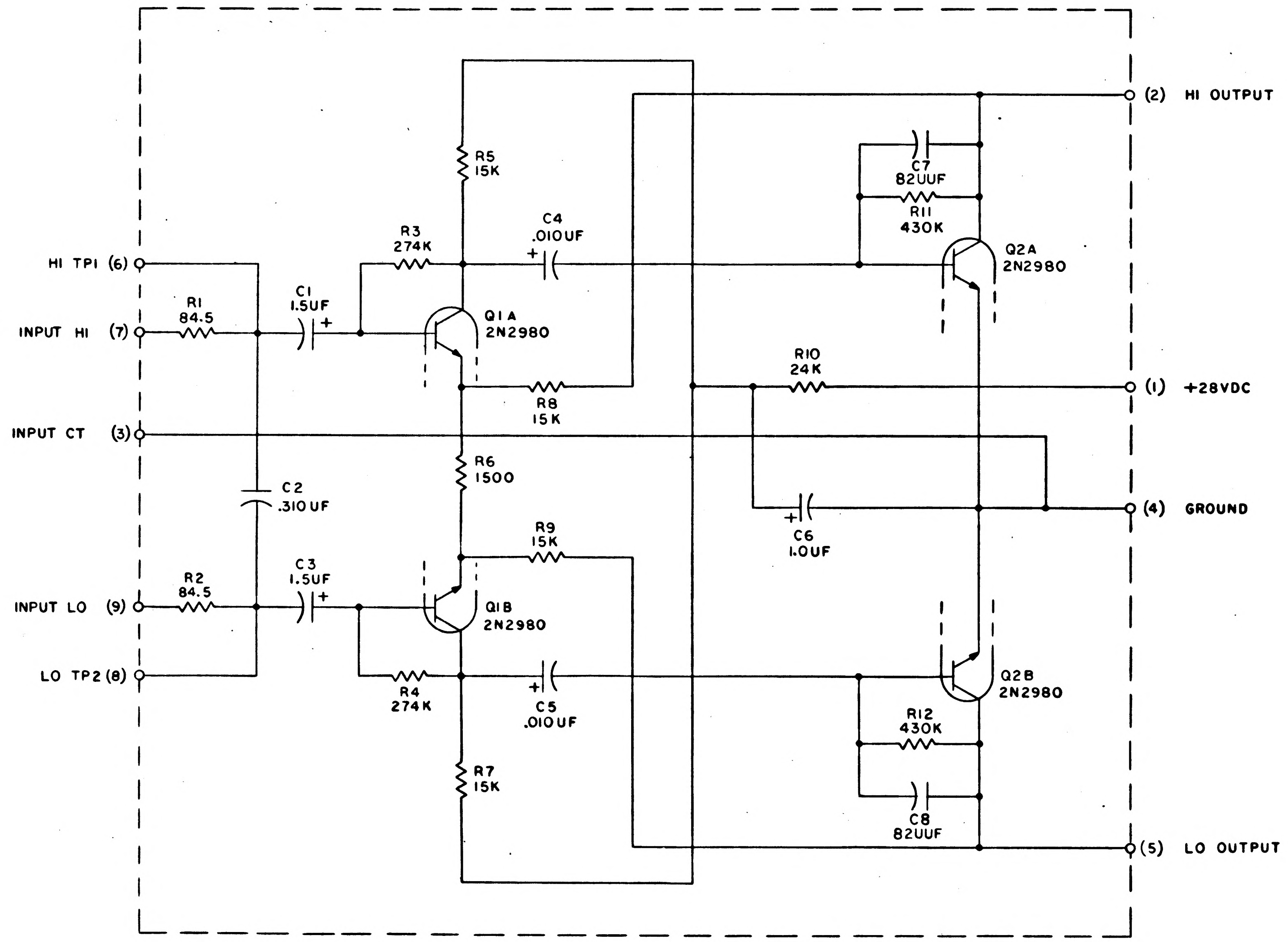
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

2010052 C

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15243

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17008	[illegible]	WK
B	REVISED PER TDRR 24289	24 Nov 65	WK
C	REVISED PER TDRR 24539	22 DEC 65	WK
D	REVISED PER TDRR 27501	4 APR 66	J.K. PF



HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF
C2 .310UF
C3 1.5UF
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
C4 .010UF
C5 .010UF
Q1A 2N2980
Q1B 2N2980
R10 24K
C6 1.0UF
C7 82UUF
R11 430K
Q2A 2N2980
Q2B 2N2980
R12 430K
C8 82UUF
(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010969-360		274K	±1%	1/4W
R4	1010969-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1008848-001	CAPACITOR	.310UF	±1%	30V
C3	1006735-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5%	35V
C5			.010UF	MATCH	35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1010359-32	CAPACITOR MATCHED PAIR	82UUF	±5%	200V
C8			82UUF	MATCH	200V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
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2. RESISTOR VALUES ARE EXPRESSED IN OHMS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
HEAT TREATMENT #
FINAL FINISH #

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN DATE 1/3/64
CHECKED
APPROVAL 12-23-64
APPROVAL 12/10/64
NASA APPROVAL 1-5-65
MIT APPROVAL

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HOUSTON, TEXAS

SCHEMATIC
PIP PREAMP

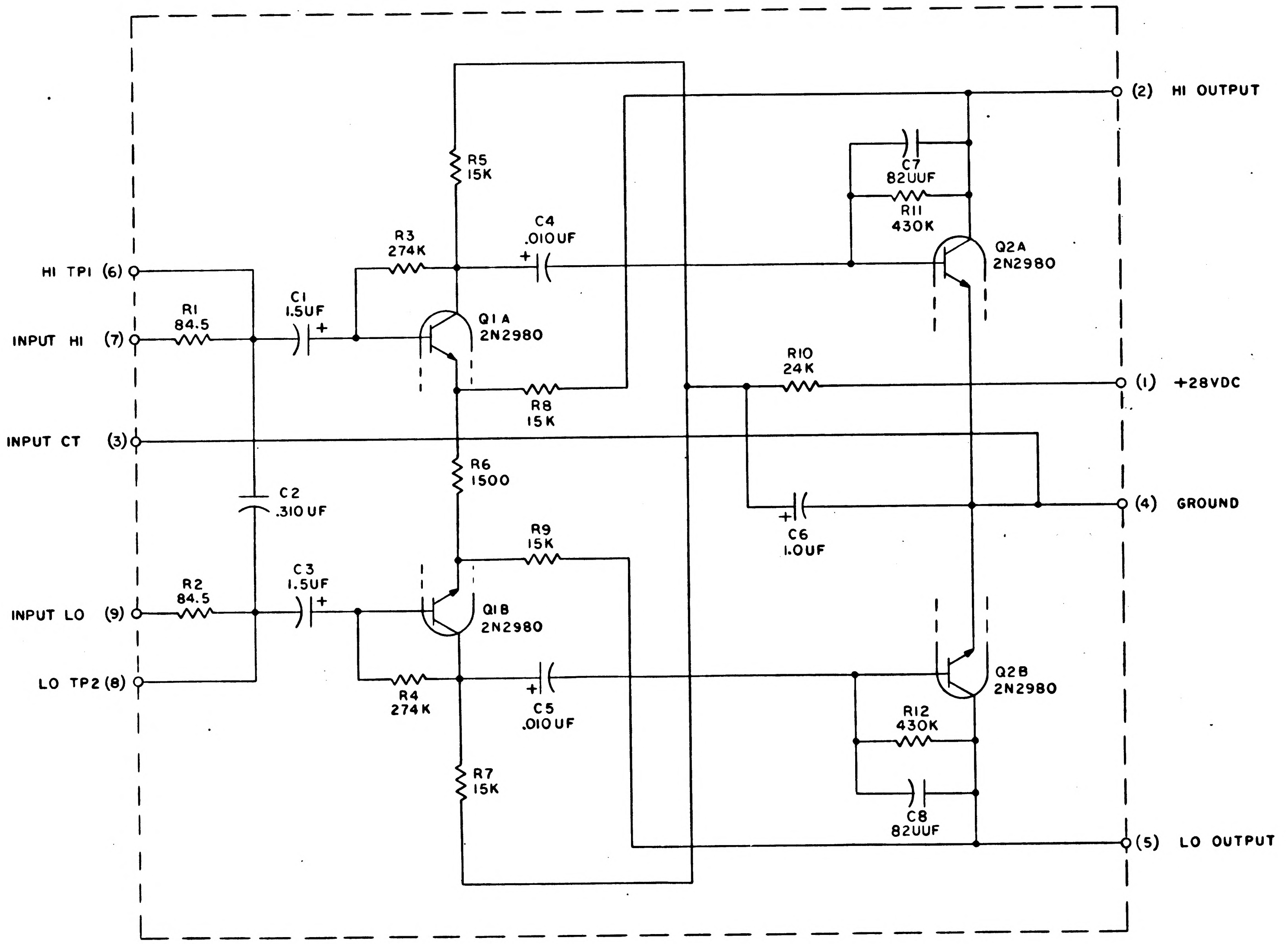
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

2010052 D

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 15242

	SYM	DESCRIPTION	DATE	APPROVAL
M	A	REVISED PER TDRR 17008		WK
Ⓜ	B	REVISED PER TDRR 24289	24 Nov 65	WK
	C	REVISED PER TDRR 24539	22 Dec 65	WK
Ⓜ	D	REVISED PER TDRR 27501	4 APR 66	JK. PT
	E	REVISED PER TDRR 29760	27 JUN 66	B. JAC



HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF
C2 .310UF
C3 1.5UF
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
R10 24K
R11 430K
R12 430K
C4 .010UF
C5 .010UF
C6 1.0UF
C7 82UUF
C8 82UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010969-360		274K	±1%	1/4W
R4	1010969-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1008848-001	CAPACITOR	.310UF	±1%	30V
C3	1006735-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5%	35V
C5			.010UF	MATCH	35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1008900-004	CAPACITOR	82UUF	±1%	100V
C8			82UUF		100V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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DIMENSIONS ARE IN INCHES
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FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
HEAT TREATMENT #
FINAL FINISH #

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS 9-497
DRAWN J Brigham DATE 1/3/64
CHECKED
APPROVAL 12-23-64
APPROVAL 12/10/64
NASA APPROVAL 1-5-65
MIT APPROVAL

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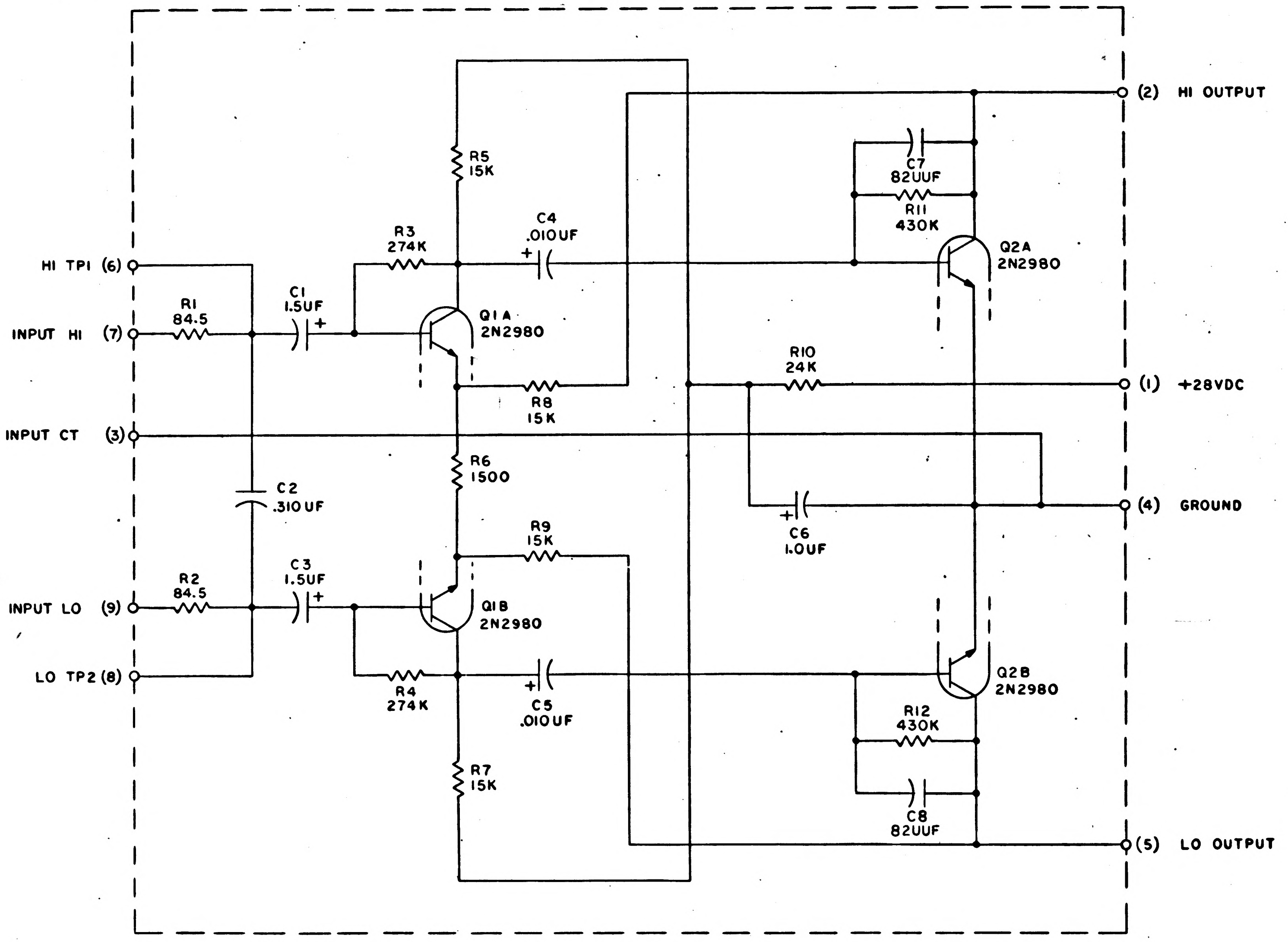
CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

2010052 E

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15242

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17008	8 Mar 65	WK
B	REVISED PER TDRR 24289	29 Nov 65	WK
C	REVISED PER TDRR 24539	22 Dec 65	WK
D	REVISED PER TDRR 27501	4 APR 66	JK PJ
E	REVISED PER TDRR 29760	27 JUN-66	B. JRC
F.	REVISED PER TDRR 30795	1-SEPT 66	JJB JI



HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF
C2 .310UF
C3 1.5UF
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
R10 24K
R11 430K
R12 430K
C4 .010UF
C5 .010UF
C6 1.0UF
C7 82UUF
C8 82UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010969-360		274K	±1%	1/4W
R4	1010969-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1008848-001	CAPACITOR	.310UF	±1%	30V
C3	1006735-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5%	35V
C5			.010UF	MATCH	35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1008900-004	CAPACITOR	82UUF	±1%	100V
C8			82UUF		100V
Q1	1010652-5	DUAL TRANSISTOR	2N2980		
Q2	1010652-5	DUAL TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2 RESISTOR VALUES ARE EXPRESSED IN OHMS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
HEAT TREATMENT #
FINAL FINISH #

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT NAS 9-497

DRAWN J Brigham DATE 1/3/64
CHECKED
APPROVAL 12-23-64
APPROVAL 12/10/64
NASA APPROVAL 1-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PIP PREAMP

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

2010052 F

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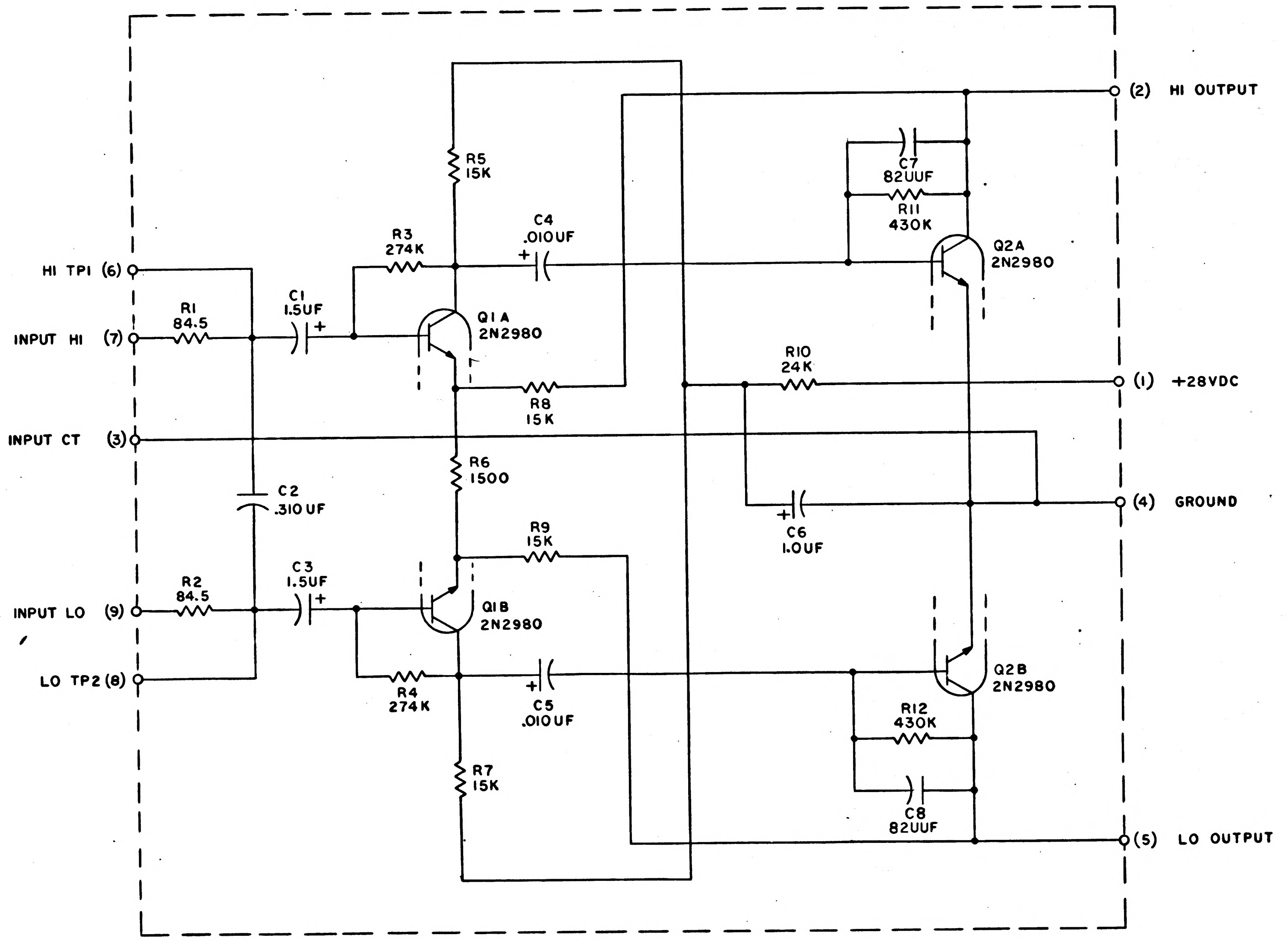
REVISIONS 15242

SYM	DESCRIPTION	DATE	APPROVAL



(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT
HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF
C2 .310 UF
C3 1.5UF
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
R10 24K
R11 430K
R12 430K
C4 .010UF
C5 .010UF
C6 1.0UF
C7 82UUF
C8 82UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010321-360		274K	±1%	1/4W
R4	1010321-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-120		430K	±5%	1/8W
R12	1010369-120	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1010317-1		.310UF	±1%	30V
C3	1006755-71		1.5UF	±10%	35V
C4	1006755-45		.010UF	±10%	35V
C5	1006755-45		.010UF	±10%	35V
C6	1010393-029		1.0UF	±10%	50V
C7	1010359-4		82UUF	±10%	200V
C8	1010359-4	CAPACITOR	82UUF	±10%	200V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
HEAT TREATMENT #
FINAL FINISH #

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Brigham DATE 4/3/64
CHECKED
APPROVAL 12-23-64
APPROVAL 12/30/64
NASA APPROVAL 1-5-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

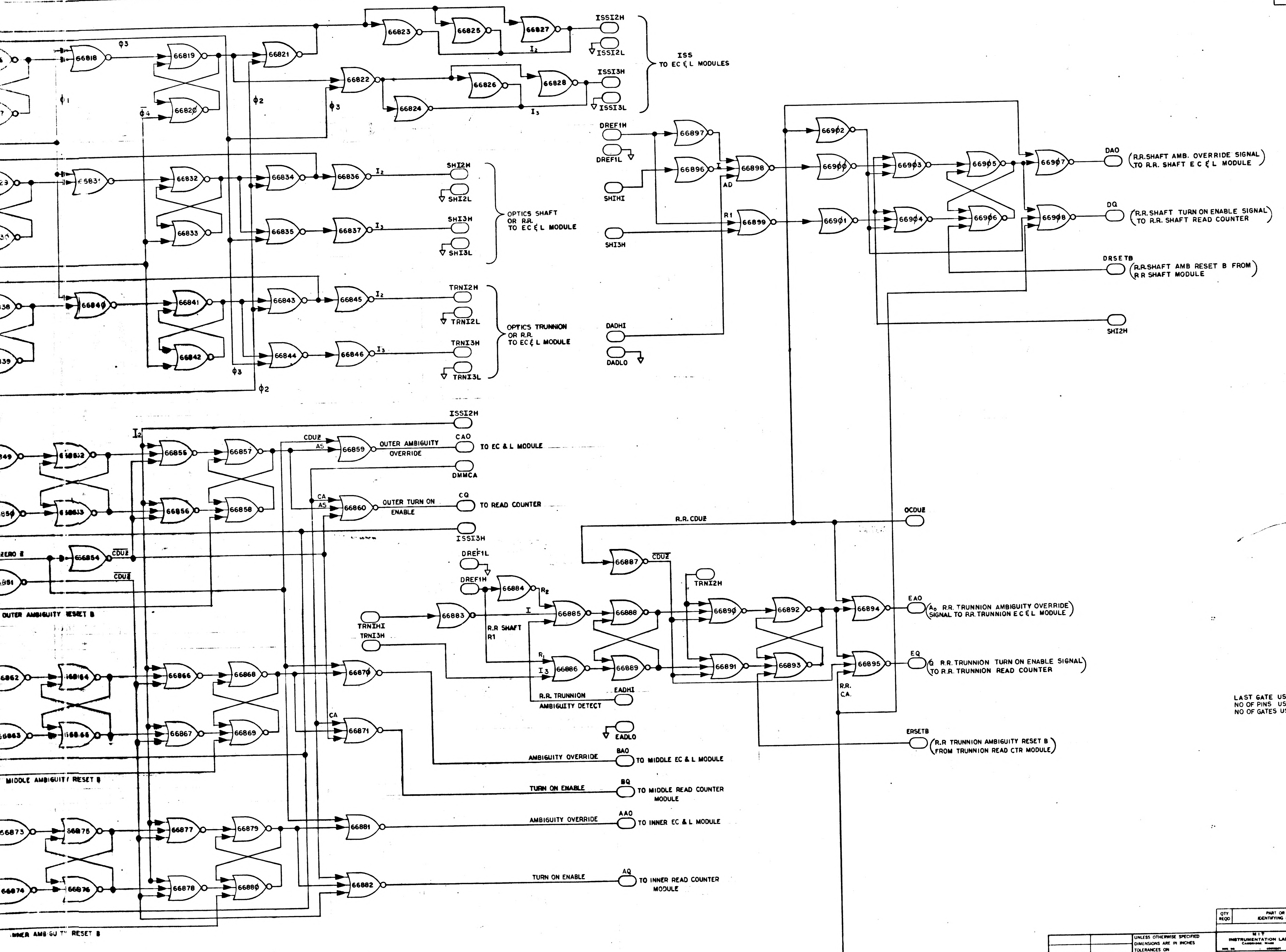
SCHEMATIC
PIP PREAMP

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010052
SCALE —
WT
SHEET 1 OF 1

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 15944	2/2/65	W.R.

REVISIONS 13405

2010053 A



4
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66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
φ1
φ2
φ3
φ4
I2
I3
ISSI2H
ISSI2L
ISSI3H
ISSI3L
ISS
TO EC & L MODULES
65831
66832
66833
66834
66835
66836
66837
SHI2H
SHI2L
SHI3H
SHI3L
OPTICS SHAFT
OR R.R.
TO EC & L MODULE
66840
66841
66842
66843
66844
66845
66846
TRNI2H
TRNI2L
TRNI3H
TRNI3L
OPTICS TRUNNION
OR R.R.
TO EC & L MODULE
DREF1H
DREF1L
SHIHI
SHI3H
66896
66897
66898
66899
AD
R1
DADHI
DADLO
66900
66901
66902
66903
66904
66905
66906
66907
66908
DAO
(R.R. SHAFT AMB. OVERRIDE SIGNAL TO R.R. SHAFT E C & L MODULE)
DQ
(R.R. SHAFT TURN ON ENABLE SIGNAL TO R.R. SHAFT READ COUNTER)
DRSETB
(R.R. SHAFT AMB RESET B FROM R.R. SHAFT MODULE)
SHI2H
66852
66853
66854
66855
66856
66857
66858
66859
66860
CDU2
AS
CA
OUTER AMBIGUITY OVERRIDE
OUTER TURN ON ENABLE
CAO
TO EC & L MODULE
DMMCA
CQ
TO READ COUNTER
ISSI2H
ISSI3H
ZERO 2
OUTER AMBIGUITY RESET B
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
MIDDLE AMBIGUITY RESET B
AMBIGUITY OVERRIDE
BAO
TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ
TO MIDDLE READ COUNTER MODULE
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO
TO INNER EC & L MODULE
TURN ON ENABLE
AQ
TO INNER READ COUNTER MODULE
INNER AMBIGUITY RESET B
R.R. CDU2
OCDU2
66883
66884
66885
66886
66887
66888
66889
66890
66891
66892
66893
66894
66895
TRNIHI
TRNI3H
R2
R.R SHAFT
R1
I
R.R. TRUNNION AMBIGUITY DETECT
EADHI
EADLO
TRNI2H
EAO
(A0 R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO R.R. TRUNNION EC & L MODULE)
EQ
(Q R.R. TRUNNION TURN ON ENABLE SIGNAL TO R.R. TRUNNION READ COUNTER)
R.R.
CA.
ERSETB
(R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)
D
C
B
A

LAST GATE USED: 66913
NO OF PINS USED: 127
NO OF GATES USED: 213

4H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE 2-21-64
CHECKED 24 AUG 64
APPROVAL 1 Oct 64
APPROVAL G. Cushman 21 Sep 64
NASA APPROVAL W. J. 10-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

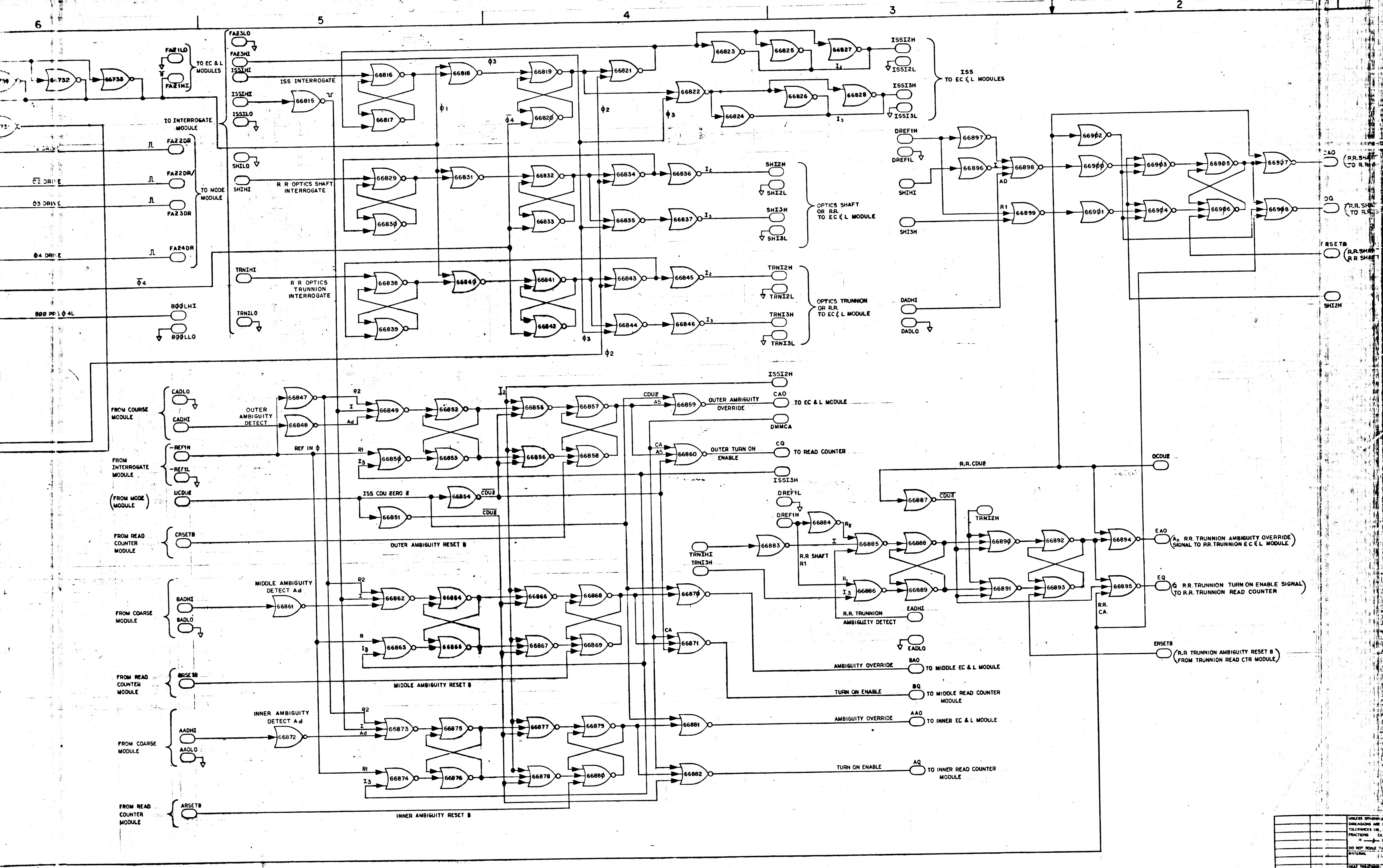
SCHEMATIC DIGITAL MODE MODULE

CODE IDENT NO —
SIZE J
NASA DRAWING NO. 2010053
SCALE
WT
SHEET 1 OF 1

MASTER

2010053 A

F4

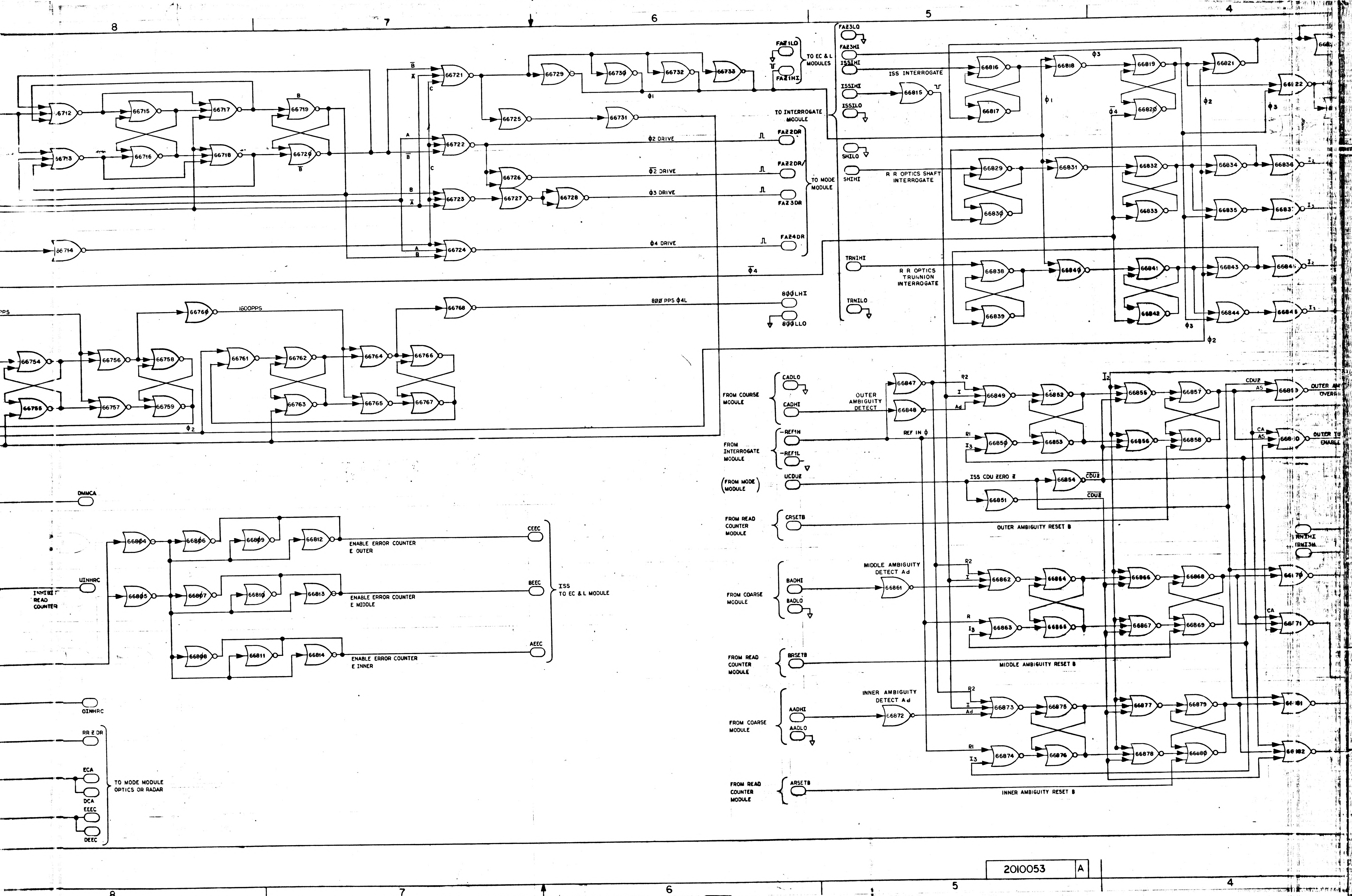

6
5
4
3
2
FAZ3LO
FAZ3HI
ISSIHI
ISSIHI
ISSILO
FAZ1LO
FAZ1HI
TO EC & L MODULES
66732
66733
TO INTERROGATE MODULE
FAZ2DR
FAZ2DR/
FAZ3DR
FAZ4DR
TO MODE MODULE
Ø2 DRIVE
Ø2 DRIVE
Ø3 DRIVE
Ø4 DRIVE
Ø4
800 PPS Ø 4L
800LHI
800LLO
ISS INTERROGATE
66815
66816
66817
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
ISSI2H
ISSI2L
ISSI3H
ISSI3L
ISS
TO EC & L MODULES
Ø1
Ø2
Ø3
Ø4
I2
I3
SHILO
SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
66831
66832
66833
66834
66835
66836
66837
SHI2H
SHI2L
SHI3H
SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
TRNIHI
TRNILO
R R OPTICS TRUNNION INTERROGATE
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H
TRNI2L
TRNI3H
TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
DREFIH
DREFIL
SHIHI
SHI3H
66896
66897
66898
66899
AD
R1
66900
66901
66902
66903
66904
66905
66906
66907
66908
CAO
R.R. SHAFT TO R.R.
DQ
R.R. SHAFT TO R.R.
RSETB
R.R. SHAFT
SHI2H
DADHI
DADLO
FROM COURSE MODULE
CADLO
CADHI
OUTER AMBIGUITY DETECT
66847
66848
R2
I
Ad
R1
I3
66849
66850
66851
66852
66853
66854
66855
66856
66857
66858
66859
66860
CDUZ
AS
CA
OUTER AMBIGUITY OVERRIDE
CAO
TO EC & L MODULE
DMMCA
OUTER TURN ON ENABLE
CQ
TO READ COUNTER
ISSI2H
ISSI3H
FROM INTERROGATE MODULE
REFIH
REFIL
REF IN Ø
(FROM MODE MODULE)
UCDUZ
ISS CDU ZERO Z
CDUZ
FROM READ COUNTER MODULE
CRSETB
OUTER AMBIGUITY RESET B
FROM COARSE MODULE
BADHI
BADLO
MIDDLE AMBIGUITY DETECT Ad
66861
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
AMBIGUITY OVERRIDE
BAO
TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ
TO MIDDLE READ COUNTER MODULE
FROM READ COUNTER MODULE
BRSETB
MIDDLE AMBIGUITY RESET B
FROM COARSE MODULE
AADHI
AADLO
INNER AMBIGUITY DETECT Ad
66872
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO
TO INNER EC & L MODULE
TURN ON ENABLE
AQ
TO INNER READ COUNTER MODULE
FROM READ COUNTER MODULE
ARSETB
INNER AMBIGUITY RESET B
R.R. CDUZ
OCDUZ
DREFIL
DREFIH
66883
66884
66885
66886
66887
66888
66889
66890
66891
66892
66893
66894
66895
CDUZ
TRNI2H
TRNIHI
TRNI3H
R.R SHAFT R1
R.R. TRUNNION AMBIGUITY DETECT
EADHI
EADLO
R.R. CA.
EAO
(A0 R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO RR TRUNNION EC & L MODULE)
EQ
(Q R.R. TRUNNION TURN ON ENABLE SIGNAL TO R.R. TRUNNION READ COUNTER)
ERSETB
(R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)
UNLESS OTHERWISE
DIMENSIONS ARE
TOLERANCES ON
FRACTIONS
DO NOT SCALE
MATERIAL
HEAT TREATMENT
FINAL FINISH
NEXT ASSY
USED ON
APPLICATION

MASTER

2010053 A

6 5 4 3 2

E-3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6
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66712
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66716
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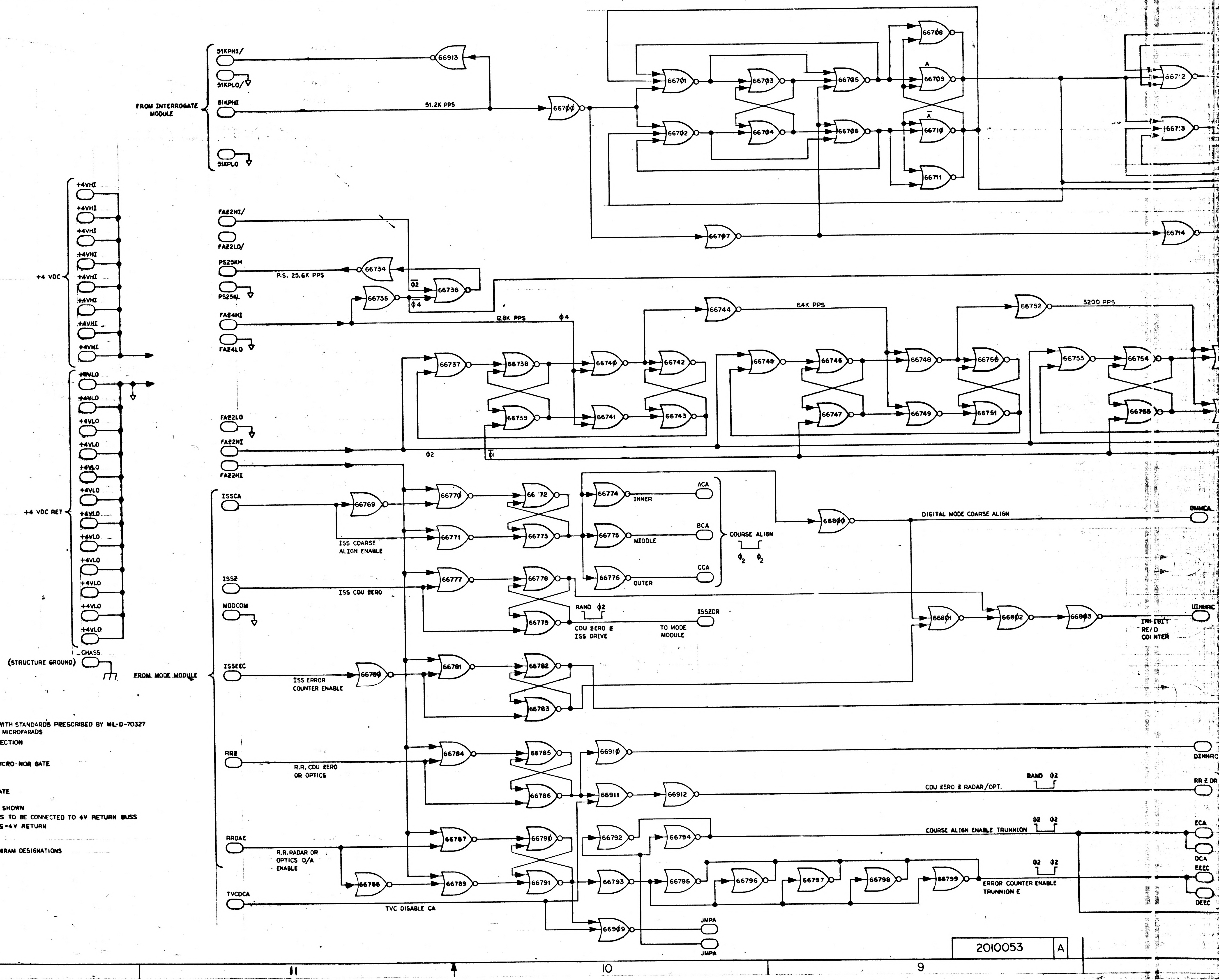
66719
66720
66721
66722
66723
66724
66725
66726
66727
66728
66729
66730
66731
66732
66733
B
A
C
φ1
φ2 DRIVE
φ2 DRIVE
φ3 DRIVE
φ4 DRIVE
φ4
FAZ1LO
FAZ1HI
TO EC & L MODULES
TO INTERROGATE MODULE
FAZ2DR
FAZ2DR
FAZ3DR
FAZ4DR
TO MODE MODULE
FAZ3LO
FAZ3HI
ISSIHI
ISSIHI
ISSILO
ISS INTERROGATE
66815
66816
66817
66818
66819
66820
66821
66822
φ3
φ1
φ2
φ4
SHILO
SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
66831
66832
66833
66834
66835
66836
66837
I2
I3
TRNIHI
TRNILO
R R OPTICS TRUNNION INTERROGATE
66838
66839
66840
66841
66842
66843
66844
66845
66846
PPS
1600PPS
800 PPS φ4L
800LHI
800LLO
66754
66755
66756
66757
66758
66759
66760
66761
66762
66763
66764
66765
66766
66767
66768
φ2
FROM COURSE MODULE
CADLO
CADHI
OUTER AMBIGUITY DETECT
66847
66848
R2
I
Ad
66849
66852
66855
66857
66853
66856
66858
66850
66859
66860
FROM INTERROGATE MODULE
-REF1H
-REF1L
REF IN φ
R1
I3
CDUZ
AS
CA
OUTER AM
OVERF
OUTER TU
ENABL
(FROM MODE MODULE)
UCDUZ
ISS CDU ZERO Z
66854
66851
CDUZ
FROM READ COUNTER MODULE
CRSETB
OUTER AMBIGUITY RESET B
RNIHI
TRNIHA
DMMCA
INHIBIT READ COUNTER
UINHRC
66804
66805
66806
66807
66808
66809
66810
66811
66812
66813
66814
ENABLE ERROR COUNTER E OUTER
ENABLE ERROR COUNTER E MIDDLE
ENABLE ERROR COUNTER E INNER
CEEC
BEEC
AEEC
ISS TO EC & L MODULE
MIDDLE AMBIGUITY DETECT Ad
FROM COARSE MODULE
BADHI
BADLO
66861
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
R
FROM READ COUNTER MODULE
BRSETB
MIDDLE AMBIGUITY RESET B
INNER AMBIGUITY DETECT Ad
FROM COARSE MODULE
AADHI
AADLO
66872
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
FROM READ COUNTER MODULE
ARSETB
INNER AMBIGUITY RESET B
OINHRC
RR Z DR
ECA
DCA
EEEC
DEEC
TO MODE MODULE OPTICS OR RADAR
2010053
A

E2

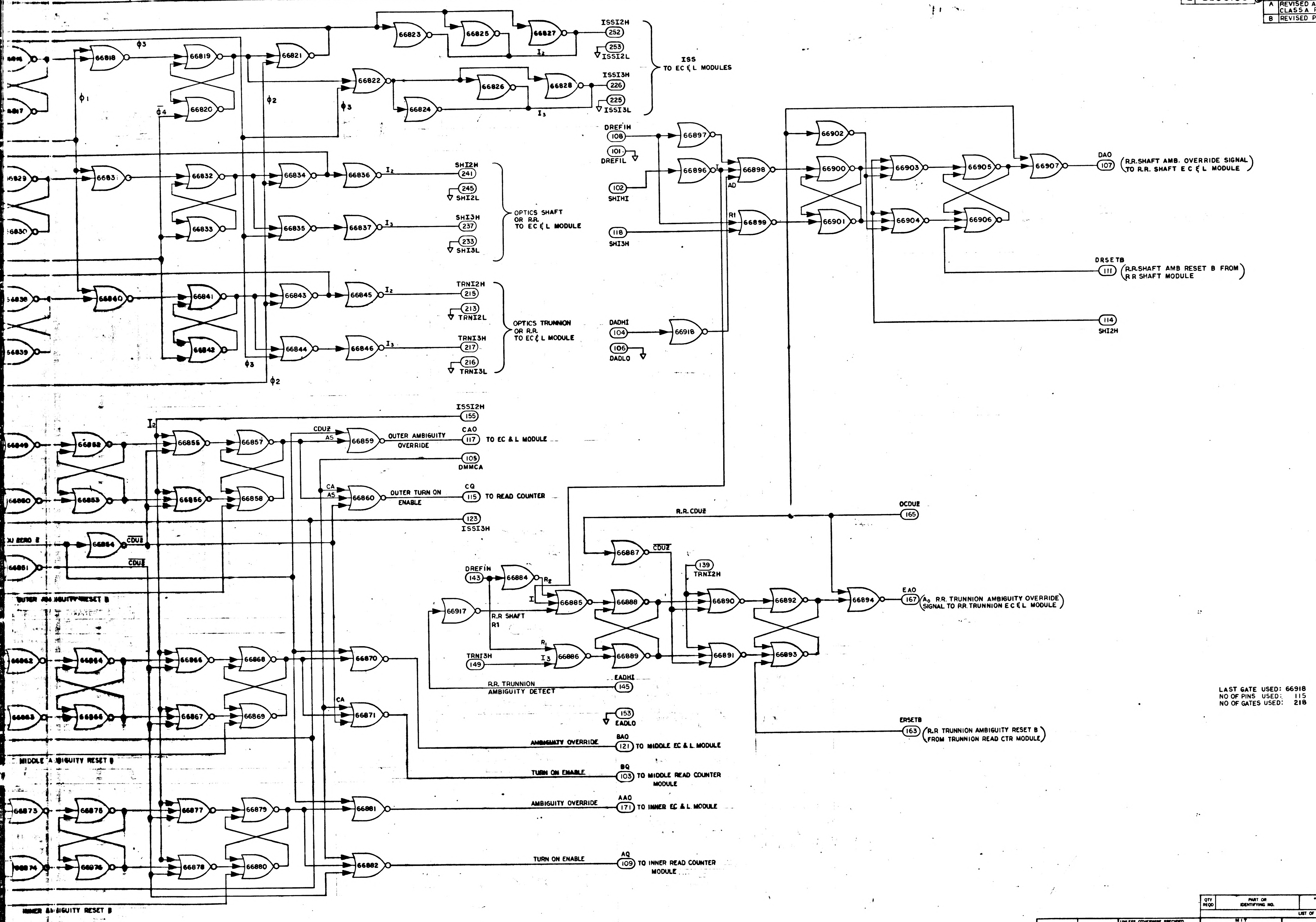

FROM INTERROGATE MODULE
51KPHI/
51KPLO/
51KPHI
51KPLO
51.2K PPS
66913
66700
66701
66702
66703
66704
66705
66706
66707
66708
66709
66710
66711
66712
66713
66714
+4 VDC
+4VHI
+4 VDC RET
+4VLO
CHASS
(STRUCTURE GROUND)
FA22HI/
FA22LO/
PS25KH
PS25KL
P.S. 25.6K PPS
66734
66735
66736
FA24HI
FA24LO
12.8K PPS
64K PPS
3200 PPS
66737
66738
66739
66740
66741
66742
66743
66744
66745
66746
66747
66748
66749
66750
66751
66752
66753
66754
66755
FA22LO
FA22HI
φ1
φ2
φ4
FROM MODE MODULE
ISSCA
66769
ISS COARSE ALIGN ENABLE
66770
66771
66772
66773
66774
66775
66776
INNER
MIDDLE
OUTER
ACA
BCA
CCA
COURSE ALIGN
66800
DIGITAL MODE COARSE ALIGN
DMMCA
ISSZ
ISS CDU ZERO
66777
66778
66779
MODCOM
RAND φ2
CDU ZERO & ISS DRIVE
TO MODE MODULE
ISSZOR
66801
66802
66803
INHIBIT RE/D COUNTER
UINHRC
ISSEEC
ISS ERROR COUNTER ENABLE
66780
66781
66782
66783
RRZ
R.R. CDU ZERO OR OPTICS
66784
66785
66786
66910
66911
66912
DINHRC
CDU ZERO Z RADAR/OPT.
RR Z OR
RRDAE
R.R. RADAR OR OPTICS D/A ENABLE
66787
66788
66789
66790
66791
66792
66793
66794
66795
66796
66797
66798
66799
COURSE ALIGN ENABLE TRUNNION
ECA
DCA
ERROR COUNTER ENABLE TRUNNION E
EEEC
DEEC
TVCDCA
TVC DISABLE CA
66909
JMPA
12
11
10
9
D
C
B
A
2010053
A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
3. ⬭ INDICATES EXTERNAL PIN CONNECTION
4. —DENOTES SINGLE MICRO-NOR GATE
5. —DENOTES FAN-IN GATE
6. POWER CONNECTIONS TO GATES NOT SHOWN
7. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTED TO 4V RETURN BUSS
8. ⏚ INDICATES MODULE POWER BUSS-4V RETURN
9. ⬭ (XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 15944	2/1/65	WK
B	REVISED PER TDRR 16618	23 Feb 65	LK WK

REVISIONS 13405

2010053 B



4
3
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1
D
C
B
A
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
ϕ3
ϕ1
ϕ4
ϕ2
ϕ3
I2
I3
ISSI2H
252
253
ISSI2L
ISSI3H
226
225
ISSI3L
ISS TO EC & L MODULES
66817
66831
66832
66833
66834
66835
66836
66837
66829
66830
SHI2H
241
245
SHI2L
SHI3H
237
233
SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H
215
213
TRNI2L
TRNI3H
217
216
TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
DREFIH
108
101
DREFIL
102
SHIHI
118
SHI3H
66896
66897
66898
66899
66900
66901
66902
66903
66904
66905
66906
66907
AD
R1
DAO
107
(R.R. SHAFT AMB. OVERRIDE SIGNAL TO R.R. SHAFT E C & L MODULE)
DRSETB
111
(R.R. SHAFT AMB RESET B FROM R R SHAFT MODULE)
114
SHI2H
DADHI
104
66918
106
DADLO
ISSI2H
155
66849
66850
66851
66852
66853
66854
66855
66856
66857
66858
66859
66860
CDU2
AS
CA
OUTER AMBIGUITY OVERRIDE
CAO
117
TO EC & L MODULE
105
DMMCA
OUTER TURN ON ENABLE
CQ
115
TO READ COUNTER
123
ISSI3H
CDU ZERO 2
OUTER AMBIGUITY RESET B
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
AMBIGUITY OVERRIDE
BAO
121
TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ
103
TO MIDDLE READ COUNTER MODULE
MIDDLE AMBIGUITY RESET B
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO
171
TO INNER EC & L MODULE
TURN ON ENABLE
AQ
109
TO INNER READ COUNTER MODULE
INNER AMBIGUITY RESET B
R.R. CDU2
OCDU2
165
66887
CDU2
DREFIH
143
66884
R2
I
66885
66886
66888
66889
66890
66891
66892
66893
66894
66917
R.R SHAFT R1
R1
I3
TRNI3H
149
139
TRNI2H
EAO
167
(A0 R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO R.R. TRUNNION E C & L MODULE)
R.R. TRUNNION AMBIGUITY DETECT
EADHI
145
153
EADLO
ERSETB
163
(R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)

LAST GATE USED: 66918
NO OF PINS USED: 115
NO OF GATES USED: 218

4H

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

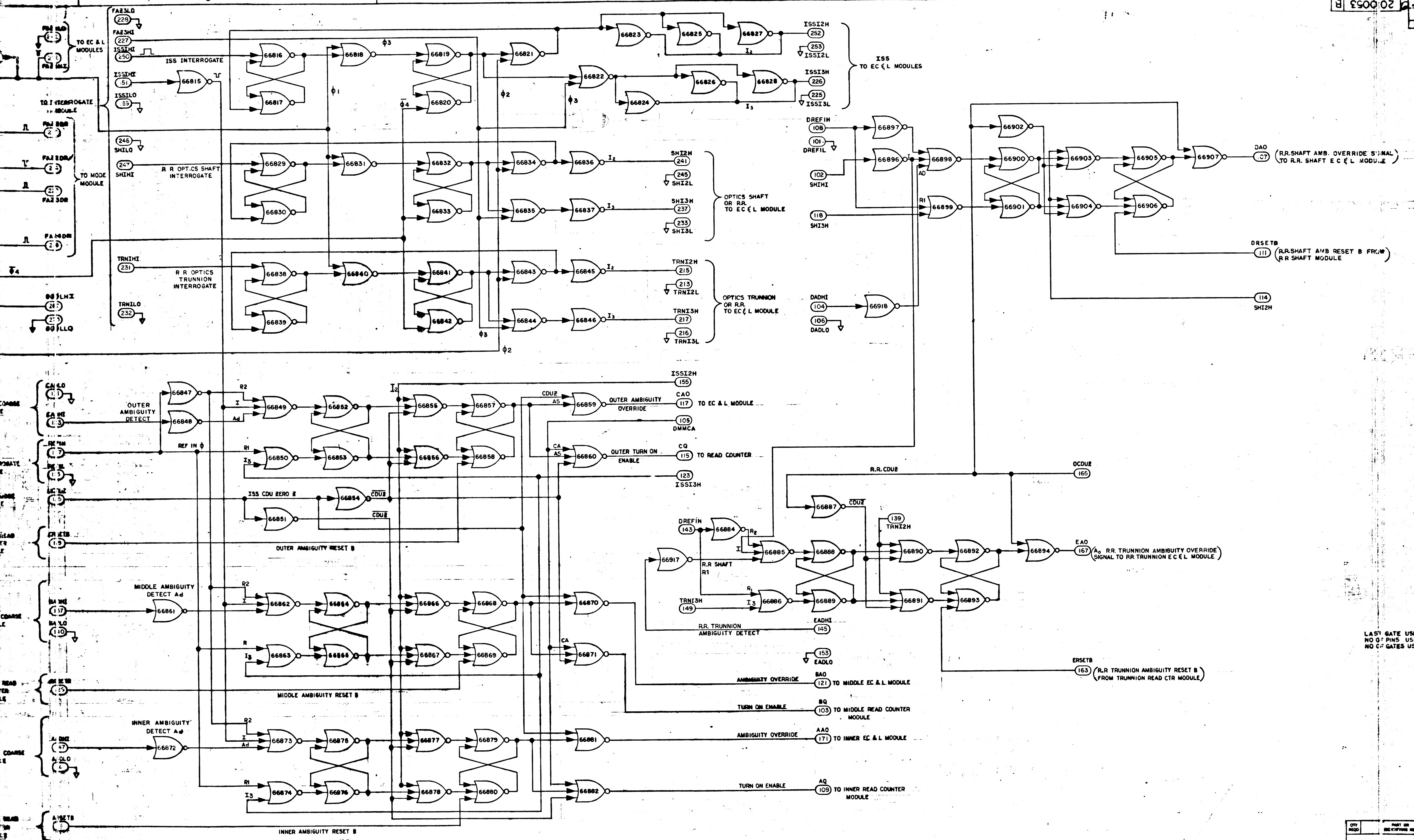
DRAWN DATE 2-21-64
CHECKED R. Lindeman 24 Feb 64
APPROVAL 1 Oct 64
APPROVAL G. Cushman 21 Sep 64
NASA APPROVAL W. J. Rhine 10-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIGITAL MODE MODULE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010053
SCALE
WT
SHEET 1 OF 1

F24


FA23LO 228
FA23HI 227
ISSIHI 250
ISS INTERROGATE
ISSIHI 51
ISSILO 55
TO EC & L MODULES
TO INTERROGATE MODULE
TO MODE MODULE
FA23DR
FA24DR
66815
66816
66817
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
φ3
φ1
φ4
φ2
ISSI2H 252
253 ISSI2L
ISSI3H 226
225 ISSI3L
I2
I3
ISS TO EC & L MODULES
246 SHILO
247 SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
66831
66832
66833
66834
66835
66836
66837
SHI2H 241
245 SHI2L
SHI3H 237
233 SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
TRNIHI 231
R R OPTICS TRUNNION INTERROGATE
TRNILO 232
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H 215
213 TRNI2L
TRNI3H 217
216 TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
DREFIH 108
101 DREFIL
102 SHIHI
118 SHI3H
DADHI 104
106 DADLO
66896
66897
66898
66899
66900
66901
66902
66903
66904
66905
66906
66907
66918
AD
RI
DAO 07 (R.R.SHAFT AMB. OVERRIDE SIGNAL TO R.R. SHAFT E C & L MODULE)
DRSETB 111 (R.R.SHAFT AMB RESET B FROM R R SHAFT MODULE)
114 SHI2H
OUTER AMBIGUITY DETECT
66847
66848
66849
66850
66851
66852
66853
66854
66855
66856
66857
66858
66859
66860
R2
I
Ad
REF IN φ
R1
I3
ISS CDU ZERO Z
CDUZ
AS
CA
ISSI2H 155
OUTER AMBIGUITY OVERRIDE
CAO 117 TO EC & L MODULE
105 DMMCA
OUTER TURN ON ENABLE
CQ 115 TO READ COUNTER
123 ISSI3H
OUTER AMBIGUITY RESET B
R.R. CDUZ
OCDUZ 165
66884
66885
66886
66887
66888
66889
66890
66891
66892
66893
66894
66917
DREFIH 143
R.R SHAFT R1
TRNI3H 149
139 TRNI2H
R.R. TRUNNION AMBIGUITY DETECT
EADHI 145
153 EADLO
EAO 167 (A0 RR TRUNNION AMBIGUITY OVERRIDE SIGNAL TO RR TRUNNION E C & L MODULE)
ERSETB 163 (R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)
MIDDLE AMBIGUITY DETECT Ad
66861
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
MIDDLE AMBIGUITY RESET B
AMBIGUITY OVERRIDE
BAO 121 TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ 103 TO MIDDLE READ COUNTER MODULE
INNER AMBIGUITY DETECT Ad
66872
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO 171 TO INNER EC & L MODULE
TURN ON ENABLE
AQ 109 TO INNER READ COUNTER MODULE
INNER AMBIGUITY RESET B
COARSE
READ
47
117
110
125

LAST GATE USED: 6691
NO OF PINS USED: 11
NO OF GATES USED: 2

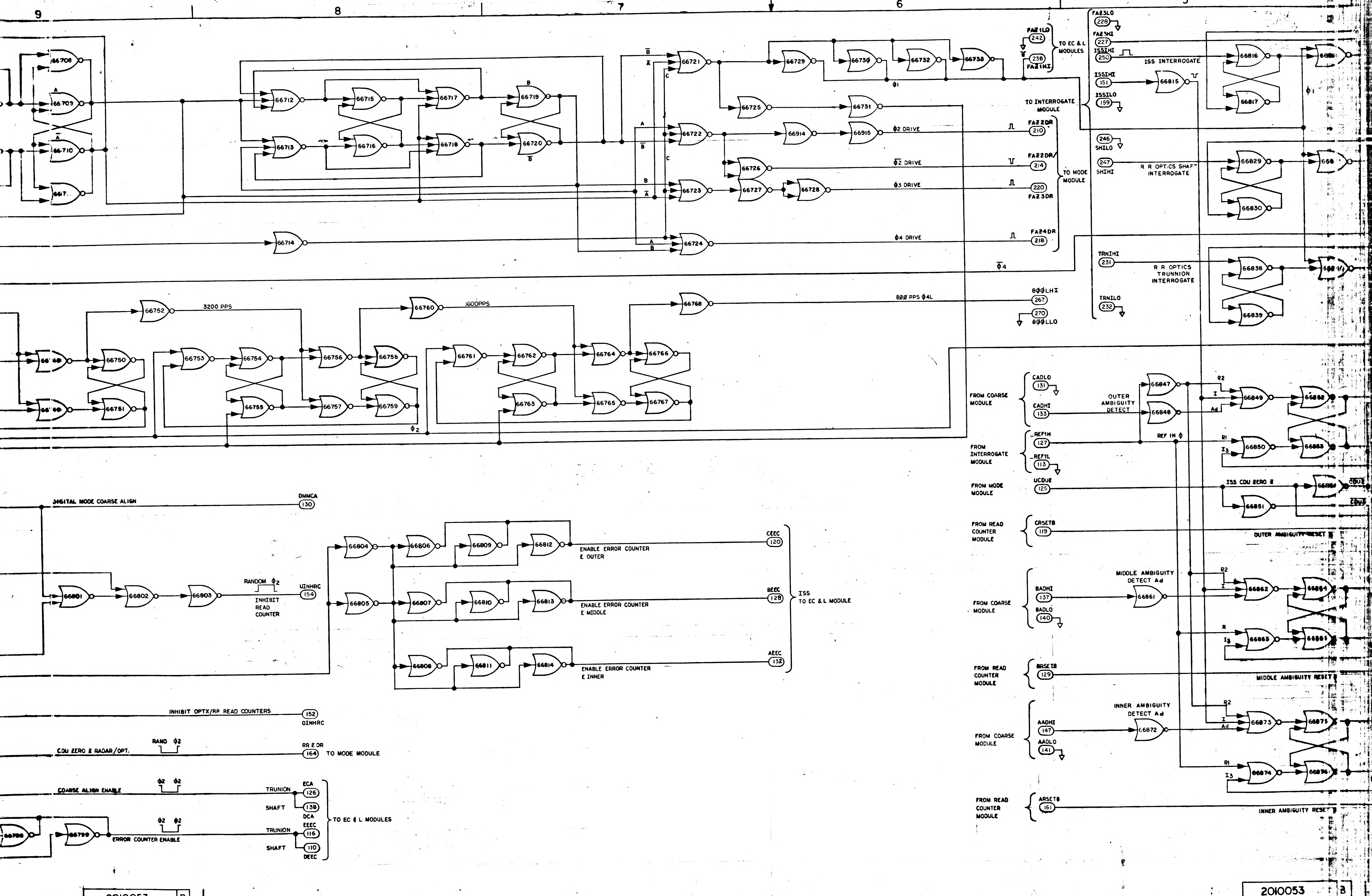
QTY REQD	PART OR IDENTIFYING NO.

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING
		MATERIAL
		HEAT TREATMENT
NEXT ASSY	USED ON	FINAL FINISH
APPLICATION		

INSTRUMENTATION LAB

DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MASTER


9
8
7
6
5
66708
66709
66710
667..
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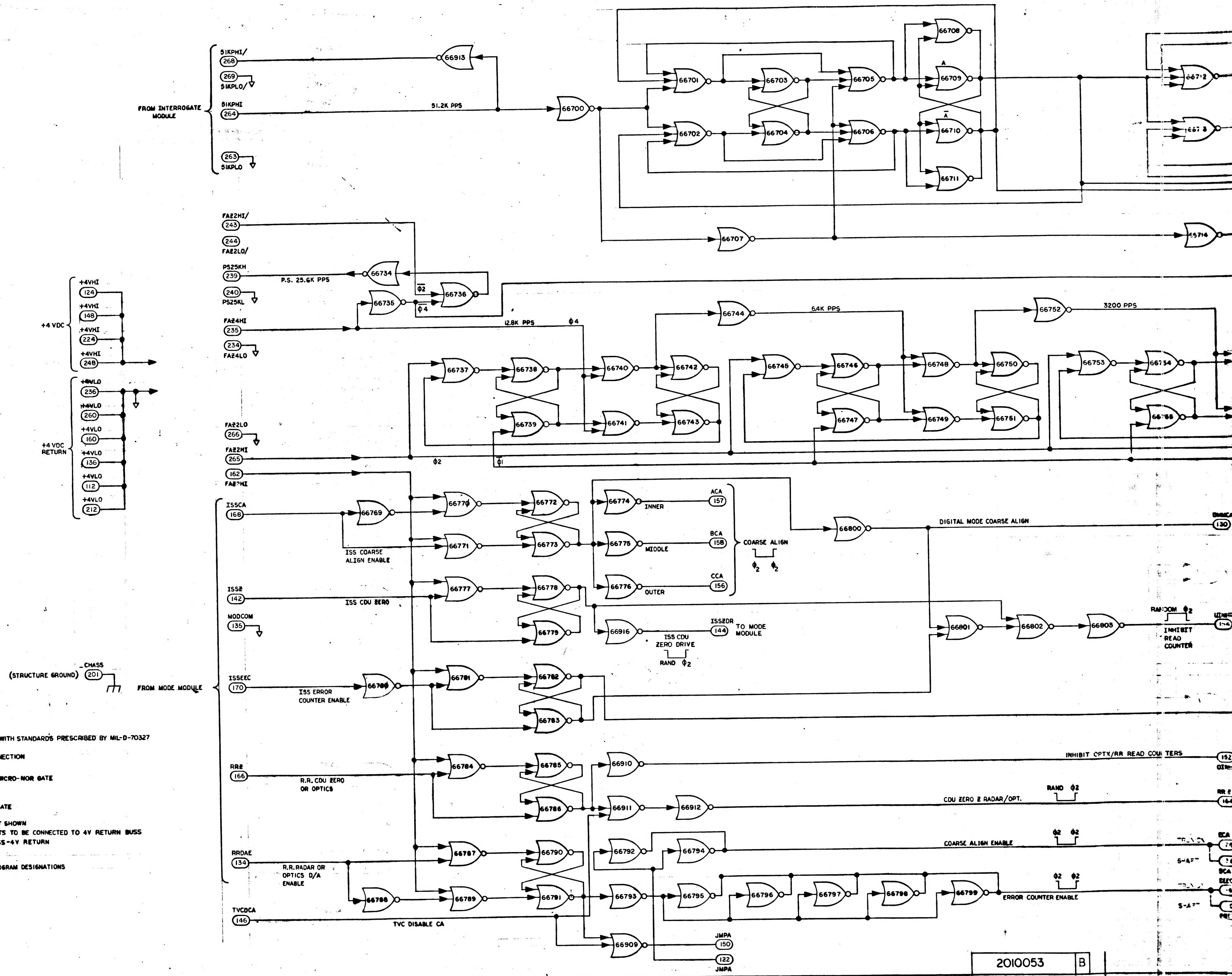
66720
66721
66722
66723
66724
66725
66726
66727
66728
66729
66730
66731
66732
66733
66914
66915
A
B
C
FAZ1LO
242
238
FAZ1HI
TO EC & L MODULES
TO INTERROGATE MODULE
Φ1
Φ2 DRIVE
FAZ2DR
210
Φ̄2 DRIVE
FAZ2DR/
214
Φ3 DRIVE
220
FAZ3DR
TO MODE MODULE
Φ4 DRIVE
FAZ4DR
218
Φ̄4
FAZ3LO
228
FAZ3HI
227
ISSIHI
250
ISS INTERROGATE
ISSIHI
151
ISSILO
159
66815
66816
66817
Φ1
246
SHILO
247
SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
TRNIHI
231
R R OPTICS TRUNNION INTERROGATE
66838
66839
TRNILO
232
66752
3200 PPS
66760
1600PPS
66768
800 PPS Φ4L
800LHI
267
270
800LLO
66750
66751
66753
66754
66755
66756
66757
66758
66759
66761
66762
66763
66764
66765
66766
66767
Φ2
FROM COARSE MODULE
CADLO
131
CADHI
133
OUTER AMBIGUITY DETECT
66847
66848
R2
I
Ad
66849
66852
REF IN Φ
FROM INTERROGATE MODULE
REF1H
127
REF1L
113
R1
I3
66850
66853
FROM MODE MODULE
UCDUZ
125
ISS CDU ZERO Z
66851
66854
CDUZ
FROM READ COUNTER MODULE
CRSETB
119
OUTER AMBIGUITY RESET
DIGITAL MODE COARSE ALIGN
DMMCA
130
66801
66802
66803
RANDOM Φ2
INHIBIT READ COUNTER
UINHRC
154
66804
66805
66806
66807
66808
66809
66810
66811
66812
66813
66814
ENABLE ERROR COUNTER E OUTER
CEEC
120
ENABLE ERROR COUNTER E MIDDLE
BEEC
128
ENABLE ERROR COUNTER E INNER
AEEC
132
ISS TO EC & L MODULE
FROM COARSE MODULE
BADHI
137
BADLO
140
MIDDLE AMBIGUITY DETECT Ad
66861
R2
I
66862
66864
R
I3
66863
66865
FROM READ COUNTER MODULE
BRSETB
129
MIDDLE AMBIGUITY RESET
INHIBIT OPTX/RP READ COUNTERS
152
OINHRC
RAND Φ2
CDU ZERO Z RADAR/OPT.
RR Z DR
164
TO MODE MODULE
FROM COARSE MODULE
AADHI
147
AADLO
141
INNER AMBIGUITY DETECT Ad
66872
R2
I
Ad
66873
66875
R1
I3
66874
66876
FROM READ COUNTER MODULE
ARSETB
161
INNER AMBIGUITY RESET
Φ2 Φ2
COARSE ALIGN ENABLE
TRUNION
ECA
126
SHAFT
138
DCA
Φ2 Φ2
66798
66799
ERROR COUNTER ENABLE
TRUNION
EEEC
116
SHAFT
110
DEEC
TO EC & L MODULES

2010053 B

2010053 B


12
11
10
9
D
C
B
A
FROM INTERROGATE MODULE
51KPHI/
268
269
51KPLO/
51KPHI
264
263
51KPLO
51.2K PPS
66913
66700
66701
66702
66703
66704
66705
66706
66708
A
66709
Ā
66710
66711
66707
66712
66713
66714
FA22HI/
243
244
FA22LO/
PS25KH
239
P.S. 25.6K PPS
66734
Φ2
66736
66735
Φ4
240
PS25KL
FA24HI
235
234
FA24LO
12.8K PPS
Φ4
66744
64K PPS
66752
3200 PPS
+4 VDC
+4VHI
124
+4VHI
148
+4VHI
224
+4VHI
248
+4VDC RETURN
+4VLO
236
+4VLO
260
+4VLO
160
+4VLO
136
+4VLO
112
+4VLO
212
66737
66738
66739
66740
66741
66742
66743
66745
66746
66747
66748
66749
66750
66751
66753
66754
66755
FA22LO
266
FA22HI
265
Φ2
Φ1
162
FA22HI
ISSCA
168
66769
66770
66771
ISS COARSE ALIGN ENABLE
66772
66773
66774
INNER
ACA
157
66775
MIDDLE
BCA
158
66776
OUTER
CCA
156
COARSE ALIGN
Φ2 Φ2
66800
DIGITAL MODE COARSE ALIGN
DMMCA
130
ISSZ
142
ISS CDU ZERO
66777
66778
66779
MODCOM
135
66916
ISS CDU ZERO DRIVE
RAND Φ2
ISSZDR
144
TO MODE MODULE
66801
66802
66803
RANDOM Φ2
INHIBIT READ COUNTER
UINH
144
(STRUCTURE GROUND)
CHASS
201
FROM MODE MODULE
ISSEEC
170
ISS ERROR COUNTER ENABLE
66780
66781
66782
66783
RRZ
166
R.R. CDU ZERO OR OPTICS
66784
66785
66786
66910
66911
66912
INHIBIT OPTX/RR READ COUNTERS
152
CDU ZERO Z RADAR/OPT.
RAND Φ2
164
RRDAE
134
R.R. RADAR OR OPTICS D/A ENABLE
66787
66788
66789
66790
66791
66792
66793
66794
COARSE ALIGN ENABLE
Φ2 Φ2
66795
66796
66797
66798
66799
ERROR COUNTER ENABLE
Φ2 Φ2
TVCDCA
146
TVC DISABLE CA
66909
JMPA
150
122
JMPA
S-A
2010053
B

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

2. ⬭ INDICATES EXTERNAL PIN CONNECTION

DENOTES SINGLE MICRO-NOR GATE

DENOTES FAN-IN GATE

POWER CONNECTIONS TO GATES NOT SHOWN

ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTED TO 4V RETURN BUSS

4 ▽ INDICATES MODULE POWER BUSS-4V RETURN

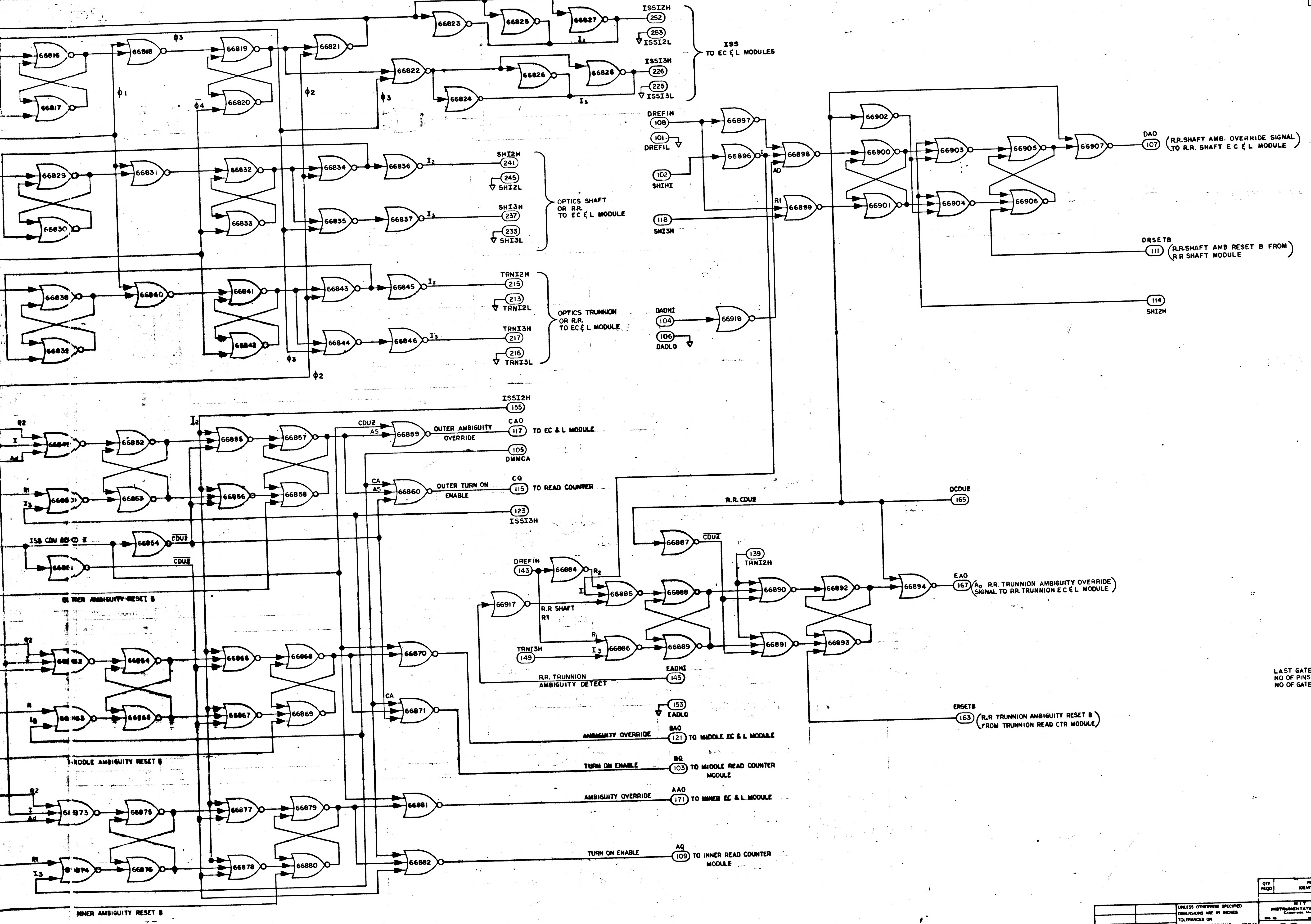
3. ⬭ XXX (XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

F-1

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED AND UPGRADED TO CLASS A PER TDRR 15944	2/2/65	WR
B	REVISED PER TDRR 16618	23Feb65	
C	REVISED PER TDRR 177		WR

REVISIONS 13405

2010053 C



66816
66817
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
φ3
φ1
φ2
φ4
ISSI2H
252
253
ISSI2L
ISSI3H
226
225
ISSI3L
I2
I3
ISS TO EC & L MODULES
66829
66830
66831
66832
66833
66834
66835
66836
66837
SHI2H
241
245
SHI2L
SHI3H
237
233
SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H
215
213
TRNI2L
TRNI3H
217
216
TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
DREFIH
108
101
DREFIL
102
SHIHI
118
SHI3H
66896
66897
66898
66899
AD
RI
66900
66901
66902
66903
66904
66905
66906
66907
DAO
107
R.R. SHAFT AMB. OVERRIDE SIGNAL TO R.R. SHAFT EC & L MODULE
DRSETB
111
R.R. SHAFT AMB RESET B FROM R R SHAFT MODULE
114
SHI2H
DADHI
104
106
DADLO
66918
ISSI2H
155
R2
I
Ad
R1
I3
66851
66852
66853
66855
66856
66857
66858
CDUZ
AS
66859
OUTER AMBIGUITY OVERRIDE
CAO
117
TO EC & L MODULE
105
DMMCA
CA
AS
66860
OUTER TURN ON ENABLE
CQ
115
TO READ COUNTER
123
ISSI3H
ISS CDU ZERO
66854
66861
CDUZ
OUTER AMBIGUITY RESET B
R.R. CDUZ
OCDUZ
165
66887
CDUZ
139
TRNI2H
DREFIH
143
66884
R2
66885
66888
66890
66892
66894
EAO
167
A0 R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO R.R. TRUNNION EC & L MODULE
66917
R.R SHAFT R1
TRNI3H
149
66886
66889
66891
66893
R.R. TRUNNION AMBIGUITY DETECT
EADHI
145
153
EADLO
ERSETB
163
R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
CA
AMBIGUITY OVERRIDE
BAO
121
TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ
103
TO MIDDLE READ COUNTER MODULE
MIDDLE AMBIGUITY RESET B
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO
171
TO INNER EC & L MODULE
TURN ON ENABLE
AQ
109
TO INNER READ COUNTER MODULE
INNER AMBIGUITY RESET B

LAST GATE USED: 66918
NO OF PINS USED: 116
NO OF GATES USED: 218

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 31 Sep
NASA APPROVAL 10-14-64
MIT APPROVAL

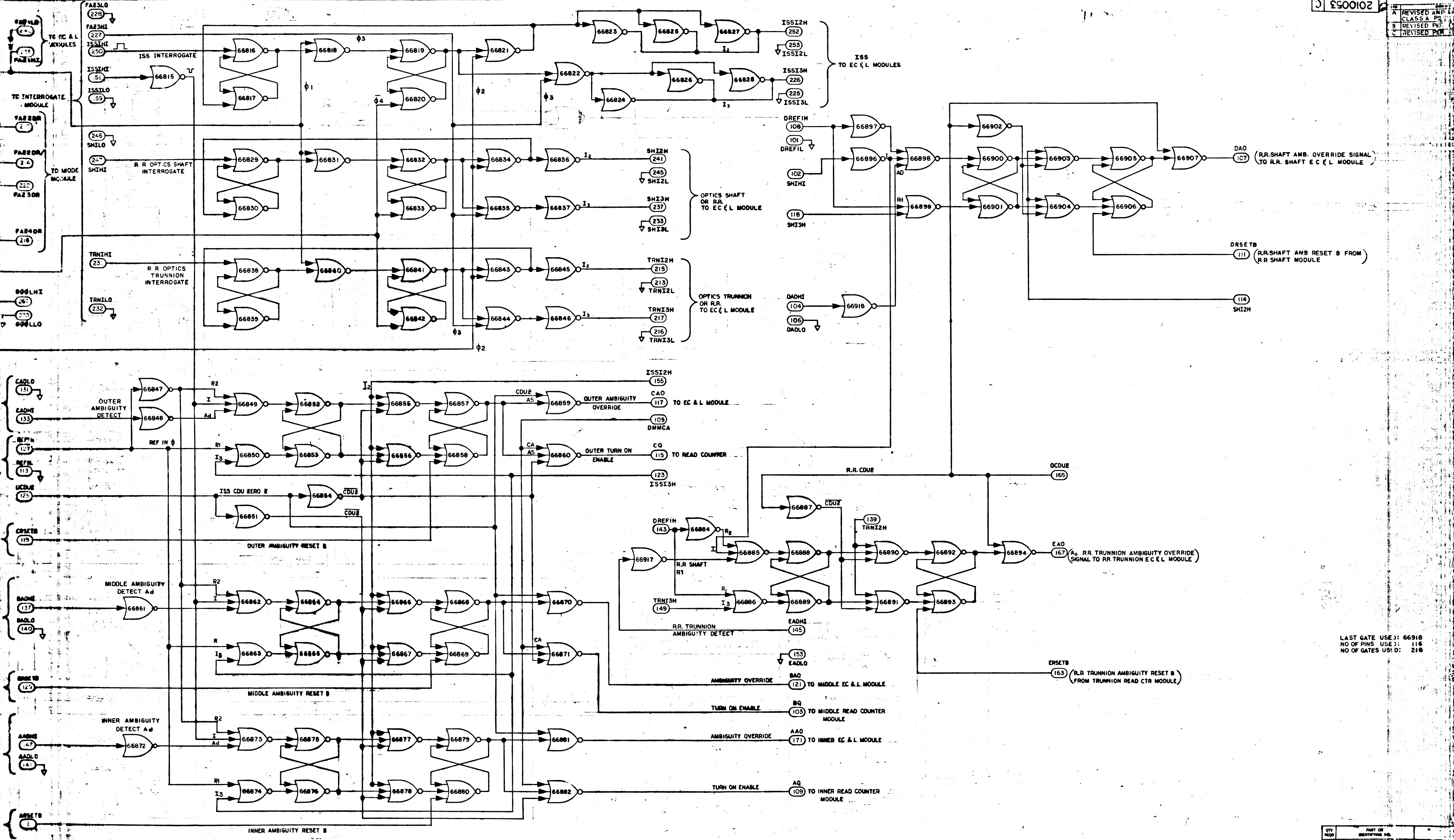
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIGITAL
MODE MODULE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010053
SCALE
WT
SHEET 1 OF 1

MASTER

2010053 C


5
4
3
2
FA23LO 228
FA23HI 227
ISSIHI 250
ISS INTERROGATE
TO EC & L MODULES
ISSIHI 51
ISSILO 59
TO INTERROGATE MODULE
FA22OR
FA22OR
FA23OR
FA24OR 218
TO MODE MODULE
245 SHILO
247 SHIHI
R R OPTICS SHAFT INTERROGATE
TRNIHI 231
R R OPTICS TRUNNION INTERROGATE
TRNILO 232
66815
66816
66817
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
φ1
φ2
φ3
φ4
I2
I3
ISSI2H 252
253 ISSI2L
ISSI3H 226
225 ISSI3L
ISS TO EC & L MODULES
66829
66830
66831
66832
66833
66834
66835
66836
66837
SHI2H 241
245 SHI2L
SHI3H 237
233 SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H 215
213 TRNI2L
TRNI3H 217
216 TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
DREFIH 108
101 DREFIL
102 SHIHI
118 SHI3H
66896
66897
66898
66899
AD
RI
66900
66901
66902
66903
66904
66905
66906
66907
DAO 107 (R.R. SHAFT AMB. OVERRIDE SIGNAL TO R.R. SHAFT E C & L MODULE)
DRSETB 111 (R.R. SHAFT AMB RESET B FROM R R SHAFT MODULE)
114 SHI2H
DADHI 104
106 DADLO
66918
CADLO 131
CADHI 133
OUTER AMBIGUITY DETECT
66847
66848
REF IN φ
REFIH 127
REFIL 113
R2
I
Ad
R1
I3
66849
66850
66852
66853
66855
66856
66857
66858
66859
66860
CDU2
AS
CA
AS
ISSI2H 155
CAO 117 TO EC & L MODULE
OUTER AMBIGUITY OVERRIDE
105 DMMCA
OUTER TURN ON ENABLE
CQ 115 TO READ COUNTER
123 ISSI3H
UCDUZ 125
ISS CDU ZERO Z
66854
66851
CDUZ
CRSETB 119
OUTER AMBIGUITY RESET B
R.R. CDUZ
OCDUZ 165
66887
CDUZ
DREFIH 143
66884
R2
66917
R.R SHAFT R1
66885
66886
66888
66889
139 TRNI2H
TRNI3H 149
R1
I3
66890
66891
66892
66893
66894
EAO 167 (Ad R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO RR TRUNNION E C & L MODULE)
R.R. TRUNNION AMBIGUITY DETECT
EADHI 145
153 EADLO
ERSETB 163 (R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)
MIDDLE AMBIGUITY DETECT Ad
BADHI 137
BADLO 140
66861
R2
I
R
I3
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
CA
AMBIGUITY OVERRIDE
BAO 121 TO MIDDLE EC & L MODULE
BRSETB 129
MIDDLE AMBIGUITY RESET B
TURN ON ENABLE
BQ 103 TO MIDDLE READ COUNTER MODULE
INNER AMBIGUITY DETECT Ad
AADHI 147
AADLO 141
66872
R2
I
Ad
R1
I3
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO 171 TO INNER EC & L MODULE
TURN ON ENABLE
AQ 109 TO INNER READ COUNTER MODULE
ARSETB 6
INNER AMBIGUITY RESET B
LAST GATE USED: 66918
NO OF PINS USED: 116
NO OF GATES USED: 218

2010053 C

A	REVISED AND CLASS A PS
B	REVISED PER
C	REVISED PER

2010053 C

MASTER

QTY REQD	PART OR IDENTIFYING NO.

LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

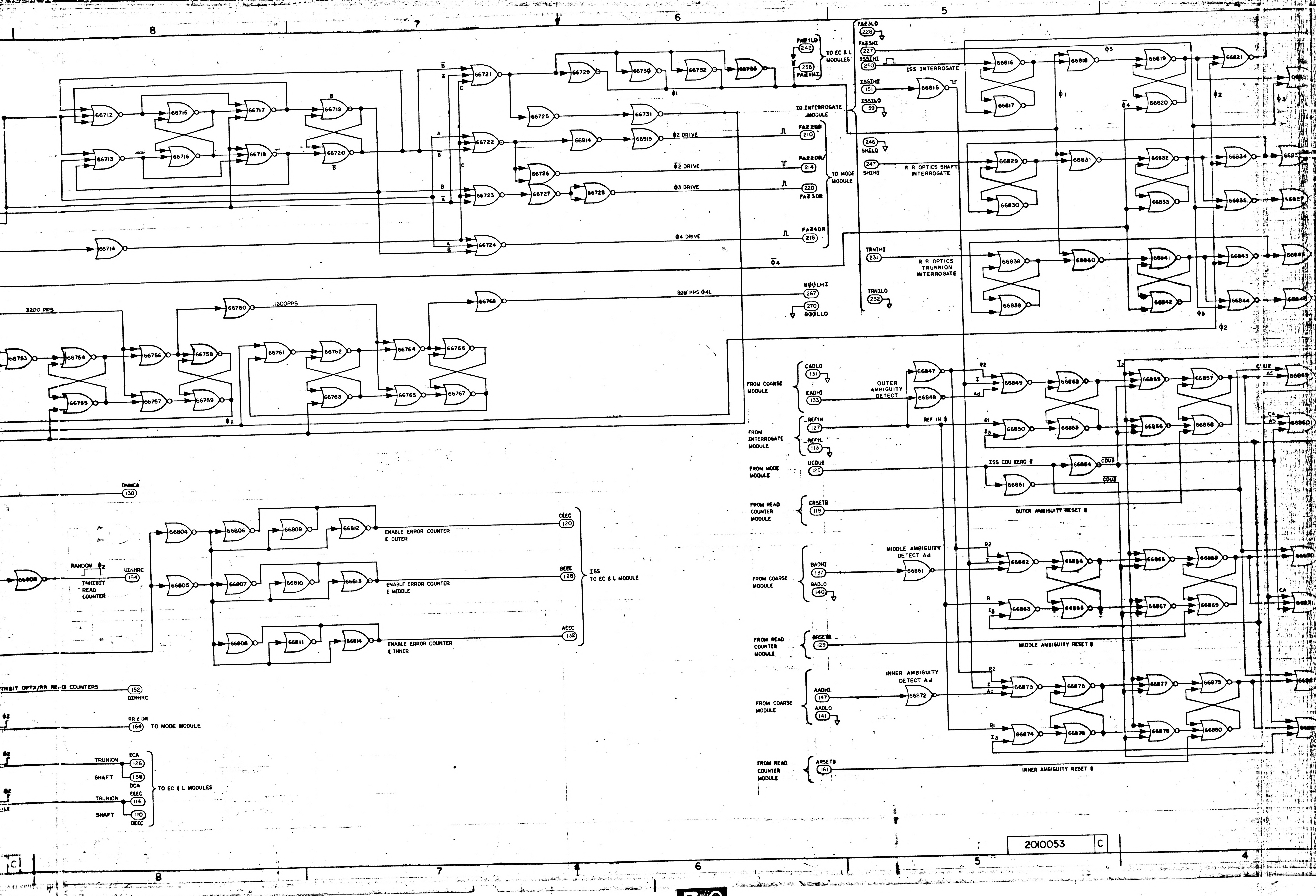
NEXT ASSY
USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

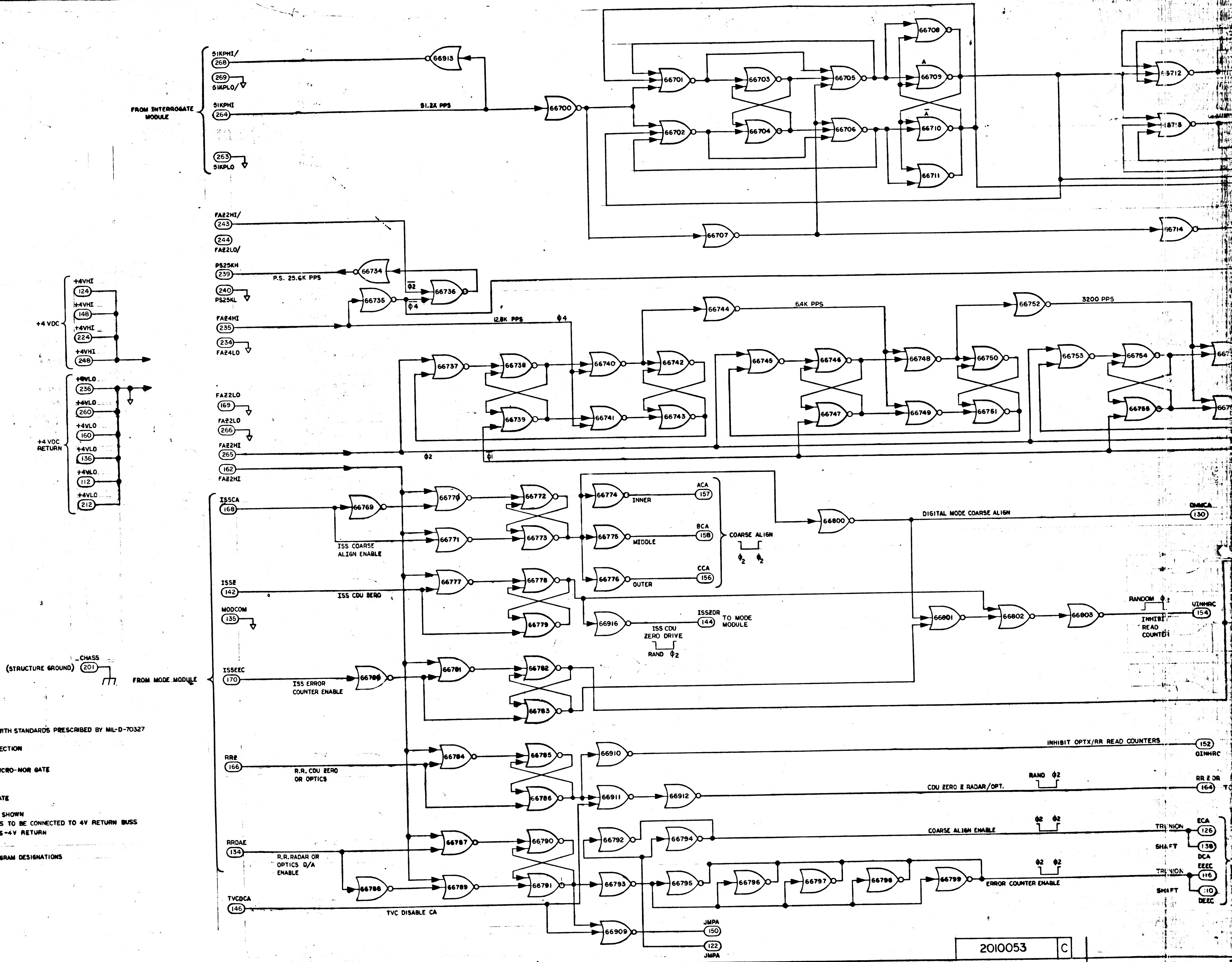
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

SCHEM

J


8
7
6
5
4
66712
66713
66714
66715
66716
66717
66718
66719
66720
66721
66722
66723
66724
66725
66726
66727
66728
66729
66730
66731
66732
66733
66914
66915
FA21LO
242
238
FA21HI
TO EC & L MODULES
TO INTERROGATE MODULE
φ1
φ2 DRIVE
FA22DR
210
φ2 DRIVE
FA22DR/
214
φ3 DRIVE
220
FA23DR
TO MODE MODULE
φ4 DRIVE
FA24DR
218
φ4
FA23LO
228
FA23HI
227
ISSIHI
250
ISS INTERROGATE
ISSIHI
151
ISSILO
159
66815
66816
66817
66818
66819
66820
66821
φ3
φ2
246
SHILO
247
SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
66831
66832
66833
66834
66835
TRNIHI
231
R R OPTICS TRUNNION INTERROGATE
TRNILO
232
66838
66839
66840
66841
66842
66843
66844
3200 PPS
1600PPS
800 PPS φ4L
800LHI
267
270
800LLO
66753
66754
66755
66756
66757
66758
66759
66760
66761
66762
66763
66764
66765
66766
66767
66768
φ2
FROM COARSE MODULE
CADLO
131
CADHI
133
OUTER AMBIGUITY DETECT
66847
66848
R2
I
Ad
66849
66850
66851
66852
66853
66854
66855
66856
66857
66858
REF IN φ
R1
I3
FROM INTERROGATE MODULE
REFIH
127
REFIL
113
FROM MODE MODULE
UCDUZ
125
ISS CDU ZERO Z
CDUZ
FROM READ COUNTER MODULE
CRSETB
119
OUTER AMBIGUITY RESET B
CA
AS
DMMCA
130
RANDOM φ2
INHIBIT READ COUNTER
UINHRC
154
66803
66804
66805
66806
66807
66808
66809
66810
66811
66812
66813
66814
ENABLE ERROR COUNTER E OUTER
CEEC
120
ENABLE ERROR COUNTER E MIDDLE
BEEC
128
ENABLE ERROR COUNTER E INNER
AEEC
132
ISS TO EC & L MODULE
MIDDLE AMBIGUITY DETECT Ad
BADHI
137
BADLO
140
66861
66862
66863
66864
66865
66866
66867
66868
66869
R
MIDDLE AMBIGUITY RESET B
BRSETB
129
INNER AMBIGUITY DETECT Ad
AADHI
147
AADLO
141
66872
66873
66874
66875
66876
66877
66878
66879
66880
INNER AMBIGUITY RESET B
ARSETB
161
INHIBIT OPTX/RR READ COUNTERS
152
OINHRC
RR Z DR
164
TO MODE MODULE
TRUNION
ECA
126
SHAFT
138
DCA
TRUNION
EEEC
116
SHAFT
110
DEEC
TO EC & L MODULES

2010053 C


12
11
10
9
D
C
B
A
FROM INTERROGATE MODULE
51KPHI/
268
269
51KPLO/
51KPHI
264
263
51KPLO
66913
51.2K PPS
66700
66701
66702
66703
66704
66705
66706
66708
66709
66710
66711
A
Ā
66712
66713
66707
66714
FAZ2HI/
243
244
FAZ2LO/
PS25KH
239
P.S. 25.6K PPS
66734
240
PS25KL
66735
66736
$\overline{\phi 2}$
$\overline{\phi 4}$
FAZ4HI
235
234
FAZ4LO
12.8K PPS
φ4
66744
6.4K PPS
66752
3200 PPS
+4 VDC
+4VHI
124
148
224
248
+4 VDC RETURN
+4VLO
236
260
160
136
112
212
66737
66738
66739
66740
66741
66742
66743
66745
66746
66747
66748
66749
66750
66751
66753
66754
66755
FAZ2LO
169
FAZ2LO
266
FAZ2HI
265
φ2
$\overline{\phi 1}$
162
FAZ2HI
ISSCA
168
66769
ISS COARSE ALIGN ENABLE
66770
66771
66772
66773
66774
INNER
66775
MIDDLE
66776
OUTER
ACA
157
BCA
158
CCA
156
COARSE ALIGN
ϕ_2 ϕ_2
66800
DIGITAL MODE COARSE ALIGN
DMMCA
130
ISSZ
142
ISS CDU ZERO
66777
66778
66779
66916
ISS CDU ZERO DRIVE
RAND φ2
ISSZDR
144
TO MODE MODULE
MODCOM
135
66801
66802
66803
RANDOM φ2
INHIBIT READ COUNTER
UINHRC
154
CHASS
(STRUCTURE GROUND)
201
FROM MODE MODULE
ISSEEC
170
ISS ERROR COUNTER ENABLE
66780
66781
66782
66783
RRZ
166
R.R. CDU ZERO OR OPTICS
66784
66785
66786
66910
INHIBIT OPTX/RR READ COUNTERS
152
OINHRC
66911
66912
CDU ZERO Z RADAR/OPT.
RAND φ2
RR Z DR
164
RRDAE
134
R.R. RADAR OR OPTICS D/A ENABLE
66787
66788
66789
66790
66791
66792
66793
66794
COARSE ALIGN ENABLE
φ2 φ2
TRUNION
ECA
126
SHAFT
138
DCA
66795
66796
66797
66798
66799
ERROR COUNTER ENABLE
φ2 φ2
TRUNION
EEEC
116
SHAFT
110
DEEC
TVCDCA
146
TVC DISABLE CA
66909
JMPA
150
122
JMPA

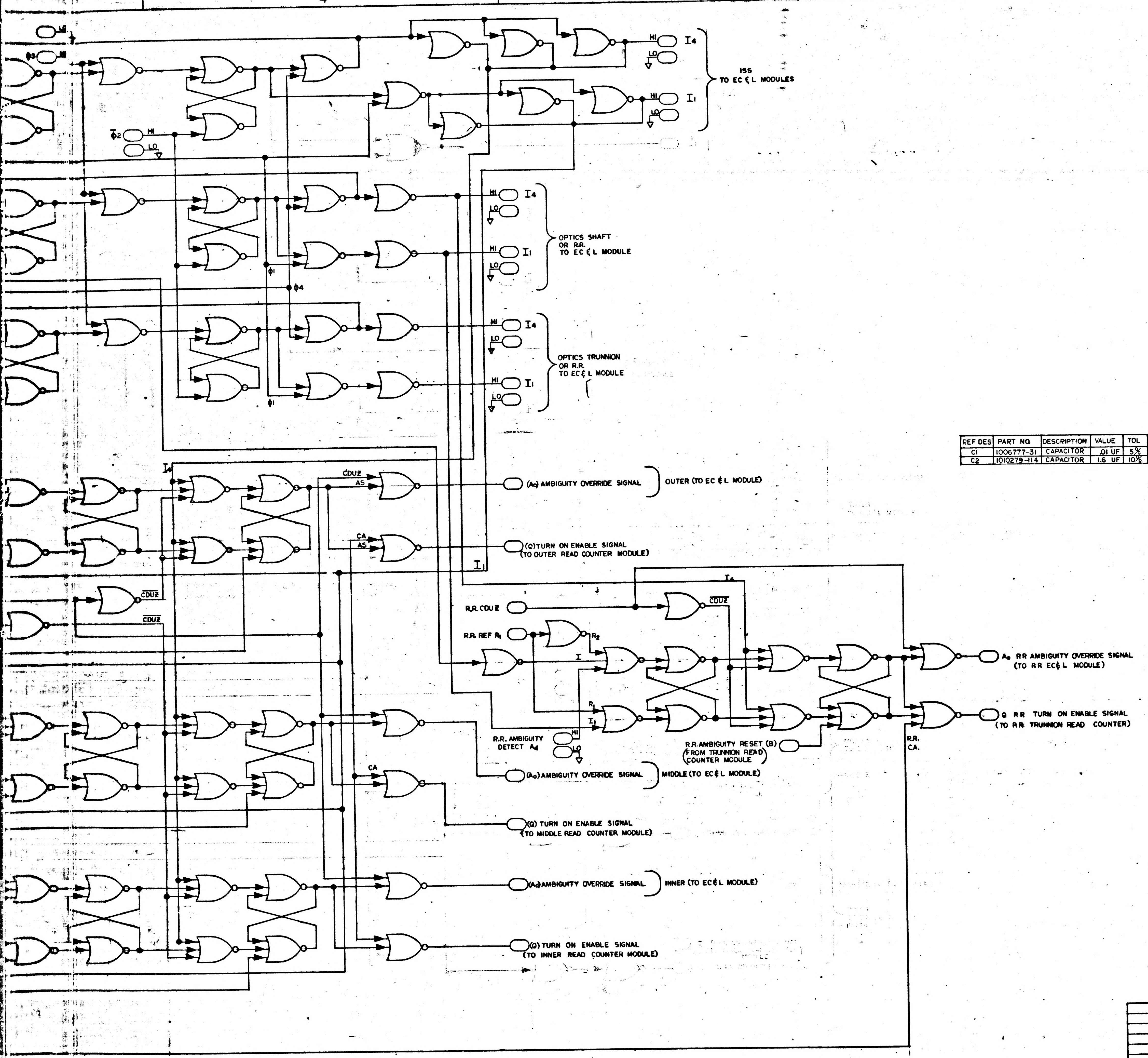
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO-NOR GATE
4. DENOTES FAN-IN GATE
5. POWER CONNECTIONS TO GATES NOT SHOWN
6. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTED TO 4V RETURN BUSS
7. ▽ INDICATES MODULE POWER BUSS-4V RETURN
8. ⬭ (XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

2010053 C

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

2010053


ϕ3
HI
LO
ϕ2
HI
LO
HI
I4
LO
HI
I1
LO
ISS
TO EC & L MODULES
HI
I4
LO
HI
I1
LO
OPTICS SHAFT
OR R.R.
TO EC & L MODULE
ϕ1
ϕ4
HI
I4
LO
HI
I1
LO
OPTICS TRUNNION
OR R.R.
TO EC & L MODULE
ϕ1
I4
CDUZ
AS
(A0) AMBIGUITY OVERRIDE SIGNAL
OUTER (TO EC & L MODULE)
CA
AS
(Q) TURN ON ENABLE SIGNAL
(TO OUTER READ COUNTER MODULE)
I1
I4
CDUZ
CDUZ
R.R. CDUZ
CDUZ
R.R. REF R1
R2
I
R1
I1
HI
LO
R.R. AMBIGUITY
DETECT Ad
A0 RR AMBIGUITY OVERRIDE SIGNAL
(TO RR EC & L MODULE)
Q RR TURN ON ENABLE SIGNAL
(TO RR TRUNNION READ COUNTER)
R.R. AMBIGUITY RESET (B)
(FROM TRUNNION READ COUNTER MODULE)
R.R.
CA.
CA
(A0) AMBIGUITY OVERRIDE SIGNAL
MIDDLE (TO EC & L MODULE)
(Q) TURN ON ENABLE SIGNAL
(TO MIDDLE READ COUNTER MODULE)
(A0) AMBIGUITY OVERRIDE SIGNAL
INNER (TO EC & L MODULE)
(Q) TURN ON ENABLE SIGNAL
(TO INNER READ COUNTER MODULE)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006777-31	CAPACITOR	.01 UF	5%	100 V
C2	1010279-114	CAPACITOR	1.6 UF	10%	15 V

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 13405 DATE

4H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN [illegible] DATE [illegible]
		MATERIAL	CHECKED R. [illegible]
		HEAT TREATMENT	APPROVAL [illegible]
		FINAL FINISH	APPROVAL G. [illegible] 21 Sep '64
			NASA APPROVAL W. J. [illegible] 10-14-64
			MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

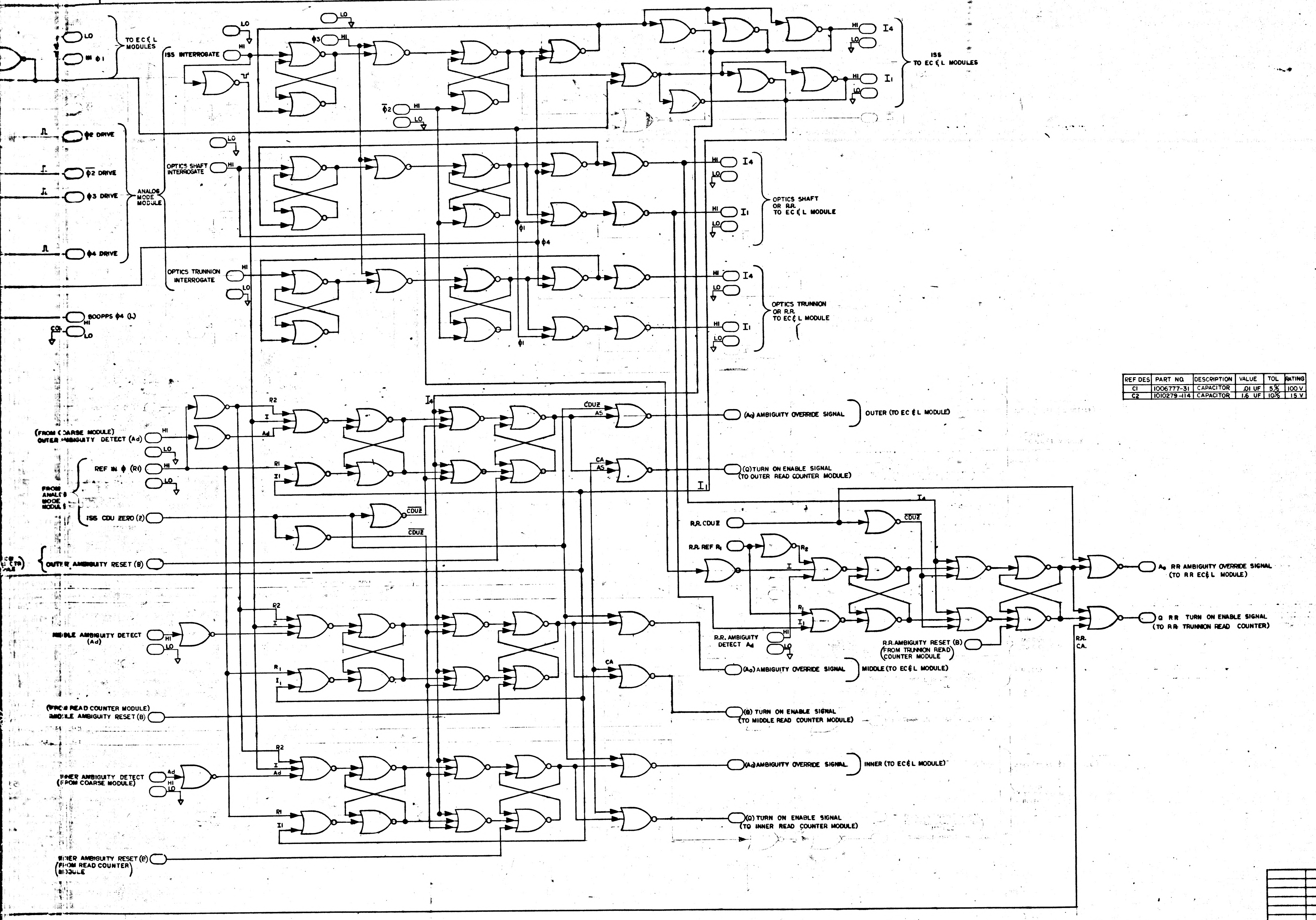
SCHEMATIC DIGITAL
MODE MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
	J	2010053
SCALE	WT	SHEET 1 OF 1

MASTER

2010053

F-4


LO
IN ϕ1
TO EC & L MODULES
ϕ2 DRIVE
$\overline{\phi 2}$ DRIVE
ϕ3 DRIVE
ϕ4 DRIVE
ANALOG MODE MODULE
800PPS ϕ4 (L)
HI
COL
LO
ISS INTERROGATE
OPTICS SHAFT INTERROGATE
OPTICS TRUNNION INTERROGATE
ϕ3
ϕ2
ϕ1
ϕ4
HI
LO
I4
I1
ISS TO EC & L MODULES
OPTICS SHAFT OR R.R. TO EC & L MODULE
OPTICS TRUNNION OR R.R. TO EC & L MODULE
(FROM COARSE MODULE) OUTER AMBIGUITY DETECT (Ad)
REF IN ϕ (R1)
FROM ANALOG MODE MODULE
ISS CDU ZERO (Z)
OUTER AMBIGUITY RESET (B)
R2
I
Ad
R1
I1
$\overline{CDUZ}$
AS
CA
(A0) AMBIGUITY OVERRIDE SIGNAL
OUTER (TO EC & L MODULE)
(Q) TURN ON ENABLE SIGNAL (TO OUTER READ COUNTER MODULE)
MIDDLE AMBIGUITY DETECT (Ad)
(FROM READ COUNTER MODULE) MIDDLE AMBIGUITY RESET (B)
(A0) AMBIGUITY OVERRIDE SIGNAL
MIDDLE (TO EC & L MODULE)
(Q) TURN ON ENABLE SIGNAL (TO MIDDLE READ COUNTER MODULE)
INNER AMBIGUITY DETECT (FROM COARSE MODULE)
INNER AMBIGUITY RESET (B) (FROM READ COUNTER MODULE)
(A0) AMBIGUITY OVERRIDE SIGNAL
INNER (TO EC & L MODULE)
(Q) TURN ON ENABLE SIGNAL (TO INNER READ COUNTER MODULE)
R.R. CDUZ
R.R. REF R1
R.R. AMBIGUITY DETECT Ad
R.R. AMBIGUITY RESET (B) (FROM TRUNNION READ COUNTER MODULE)
R.R. CA.
A0 RR AMBIGUITY OVERRIDE SIGNAL (TO RR EC & L MODULE)
Q RR TURN ON ENABLE SIGNAL (TO RR TRUNNION READ COUNTER)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006777-31	CAPACITOR	.01 UF	5%	100 V
C2	1010279-114	CAPACITOR	1.6 UF	10%	15 V

FOR INFO

CLASS B RELEASE

QTY REQD

PART OR IDENTIFY'G NO.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT TREATMENT

FINAL FINISH

NEXT ASSY | USED ON

APPLICATION

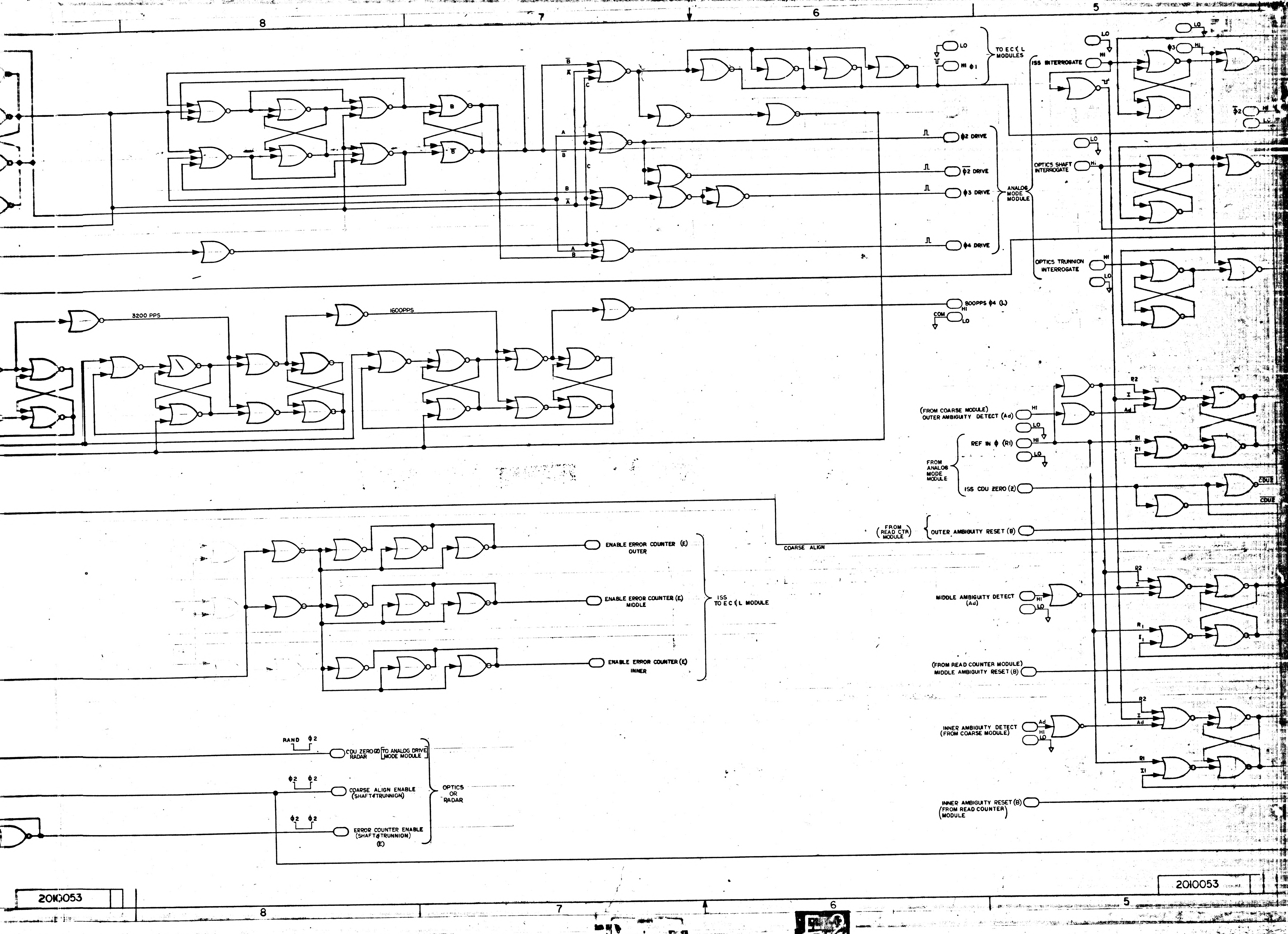
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED

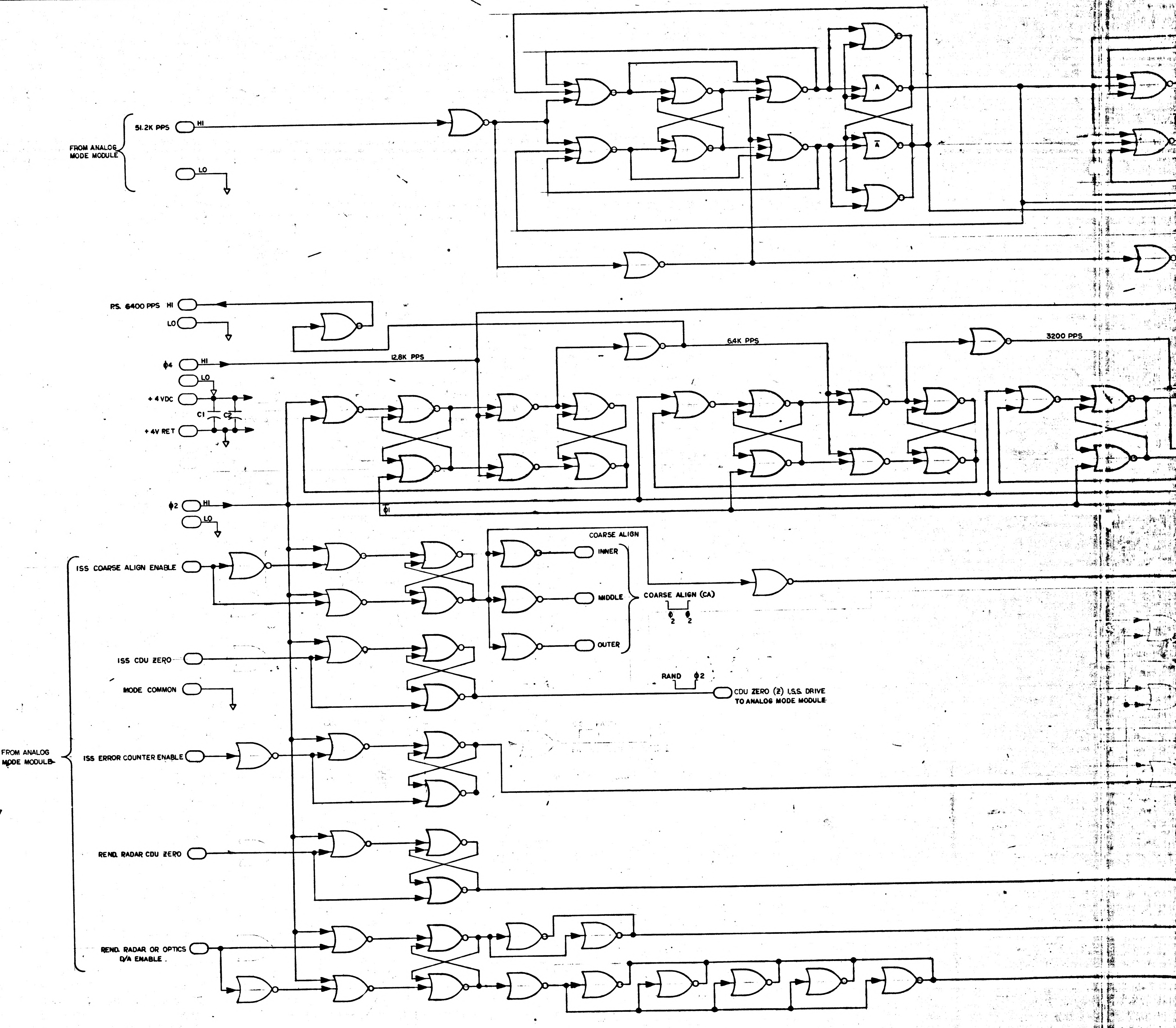
MASTER

2010053

E3

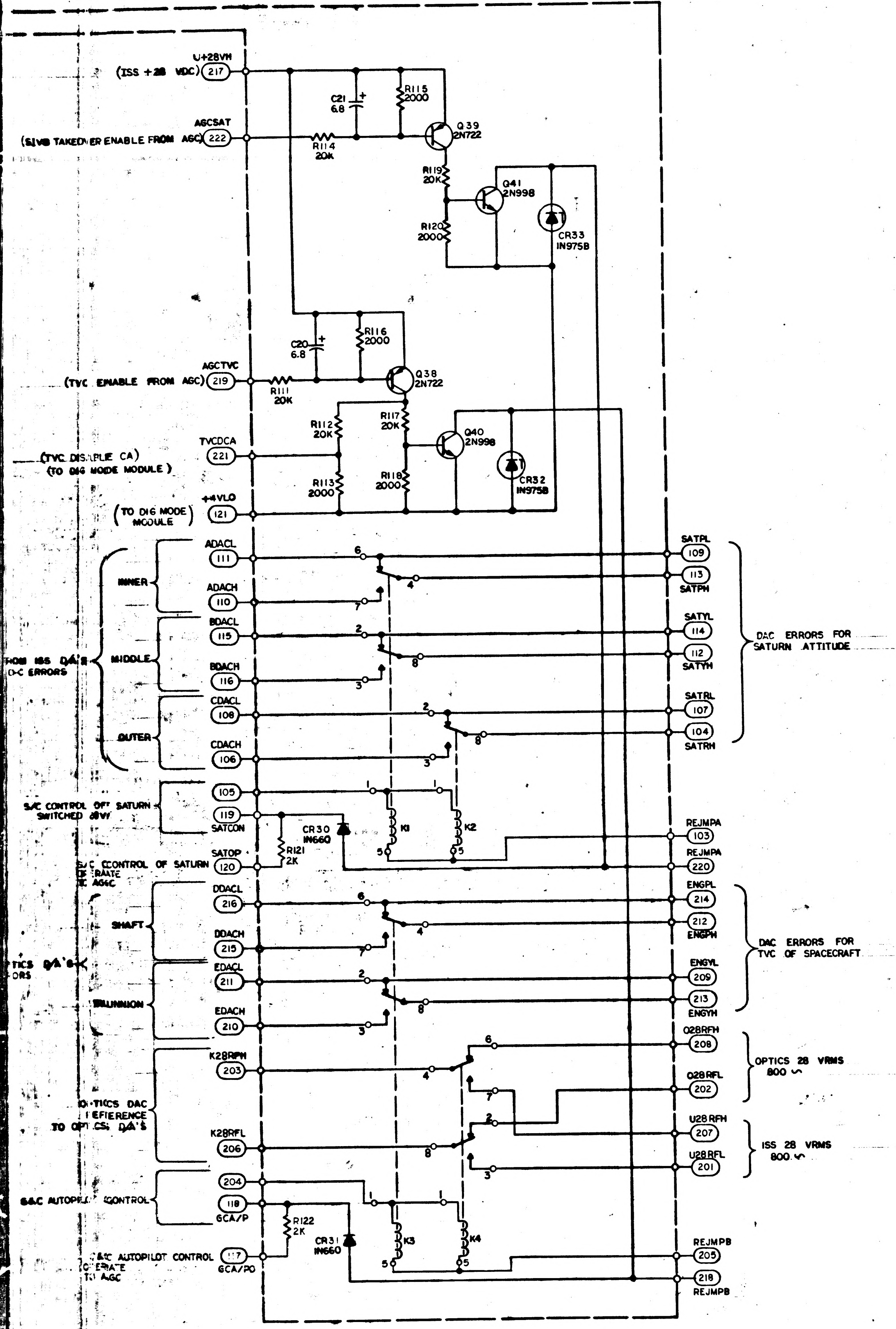

8
7
6
5
TO EC & L MODULES
LO
HI ϕ1
ISS INTERROGATE
HI
LO
ϕ3
HI
ϕ2
HI
LO
B̄
Ā
C
B
B̄
A
B̄
C
B
Ā
A
B
ϕ2 DRIVE
ϕ̄2 DRIVE
ϕ3 DRIVE
ϕ4 DRIVE
ANALOG MODE MODULE
OPTICS SHAFT INTERROGATE
HI
LO
OPTICS TRUNNION INTERROGATE
HI
LO
3200 PPS
1600PPS
800PPS ϕ4 (L)
COM
HI
LO
R2
I
Ad
(FROM COARSE MODULE) OUTER AMBIGUITY DETECT (Ad)
HI
LO
REF IN ϕ (R1)
HI
LO
R1
Σ1
FROM ANALOG MODE MODULE
ISS CDU ZERO (Z)
CDUZ̄
CDUZ
(FROM READ CTR MODULE)
OUTER AMBIGUITY RESET (B)
COARSE ALIGN
ENABLE ERROR COUNTER (E) OUTER
ENABLE ERROR COUNTER (E) MIDDLE
ENABLE ERROR COUNTER (E) INNER
ISS TO EC & L MODULE
MIDDLE AMBIGUITY DETECT (Ad)
HI
LO
R2
I
R1
I1
(FROM READ COUNTER MODULE) MIDDLE AMBIGUITY RESET (B)
INNER AMBIGUITY DETECT (FROM COARSE MODULE)
Ad
HI
LO
R2
I
Ad
R1
Σ1
INNER AMBIGUITY RESET (B) (FROM READ COUNTER MODULE)
RAND ϕ2
CDU ZERO (Z) RADAR
TO ANALOG DRIVE MODE MODULE
ϕ2 ϕ2
COARSE ALIGN ENABLE (SHAFT & TRUNNION)
ϕ2 ϕ2
ERROR COUNTER ENABLE (SHAFT & TRUNNION) (E)
OPTICS OR RADAR
2010053
2010053
8
7
6
5
F2

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
3. INDICATES EXTERNAL PIN CONNECTION
4. DENOTES SINGLE MICRO-NOR GATE
5. DENOTES FAN-IN GATE
6. POWER CONNECTIONS TO GATES NOT SHOWN
7. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTED TO 4V RETURN BUSS
8. INDICATES MODULE POWER BUSS-4V RETURN


12
11
10
9
D
C
B
A
FROM ANALOG MODE MODULE
51.2K PPS
HI
LO
A
Ā
P.S. 6400 PPS HI
LO
φ4 HI
LO
+4VDC
C1
C2
+4V RET
12.8K PPS
6.4K PPS
3200 PPS
φ2 HI
LO
φ1
ISS COARSE ALIGN ENABLE
COARSE ALIGN
INNER
MIDDLE
OUTER
COARSE ALIGN (CA)
φ2 φ2
ISS CDU ZERO
MODE COMMON
RAND φ2
CDU ZERO (Z̄) I.S.S. DRIVE TO ANALOG MODE MODULE
FROM ANALOG MODE MODULE
ISS ERROR COUNTER ENABLE
REND. RADAR CDU ZERO
REND. RADAR OR OPTICS D/A ENABLE

2010053

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17005		


U+28VH
(ISS +28 VDC)
217
AGCSAT
(SIVB TAKEOVER ENABLE FROM AGC)
222
C21
6.8
R115
2000
R114
20K
Q39
2N722
R119
20K
Q41
2N998
R120
2000
CR33
IN975B
C20
6.8
R116
2000
AGCTVC
(TVC ENABLE FROM AGC)
219
R111
20K
Q38
2N722
R112
20K
R117
20K
Q40
2N998
TVCDCA
(TVC DISABLE CA)
(TO DIG MODE MODULE)
221
R113
2000
R118
2000
CR32
IN975B
+4VLO
(TO DIG MODE MODULE)
121
ADACL
111
INNER
ADACH
110
BDACL
115
MIDDLE
BDACH
116
CDACL
108
OUTER
CDACH
106
FROM ISS D/A'S
D-C ERRORS
105
S/C CONTROL OF SATURN SWITCHED 28V
119
SATCON
CR30
IN660
K1
K2
SATOP
R121
2K
S/C CONTROL OF SATURN
120
DDACL
216
SHAFT
DDACH
215
EDACL
211
TRUNNION
EDACH
210
OPTICS D/A'S
K28RFH
203
OPTICS DAC REFERENCE TO OPTICS D/A'S
K28RFL
206
204
G&C AUTOPILOT CONTROL
118
GCA/P
R122
2K
CR31
IN660
K3
K4
G&C AUTOPILOT CONTROL OPERATE TO AGC
117
GCA/PO
SATPL
109
113
SATPH
SATYL
114
112
SATYH
SATRL
107
104
SATRH
DAC ERRORS FOR SATURN ATTITUDE
REJMPA
103
REJMPA
220
ENGPL
214
212
ENGPH
ENGYL
209
213
ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT
O28RFH
208
O28RFL
202
OPTICS 28 VRMS 800 ∿
U28RFH
207
U28RFL
201
ISS 28 VRMS 800 ∿
REJMPB
205
218
REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-39	RESISTOR	2000	±2%	1/4 W
R2	-63		20K		
R3	-63		20K		
R4	-63		20K		
R5	-63		20K		
R6	-63		20K		
R7	-39		2000		
R8	-39		2000		
R9	-39		2000		
R10	-39		2000		
R11	-39		2000		
R12	-39		2000		
R13	-36		1500		
R14	-36		1500		
R15	-36		1500		
R16	-36		1500		
R17	-36		1500		
R18	-63		20K		
R19	-36		1500		
R20	-56		10K		
R21	-63		20K		
R22	-63		20K		
R23	-63		20K		
R24	-63		20K		
R25	-56		10K		
R26	-56		10K		
R27	-39		2000		
R28	-39		2000		
R29	-39		2000		
R30	-39		2000		
R31	-39		2000		
R32	-39		2000		
R33	-36		1500		
R34	-46		3900		
R35	-48		4700		
R36	-31		910		
R37	-27		620		
R38	-36		1500		
R39	-22		390		
R40	-36		1500		
R41	-25		510		
R42	-11		130		
R43	-11		130		
R44	-73		51K		
R45	-73		51K		
R46	-56		10K		
R47	-56		10K		
R48	-80		100K		
R49	-80		100K		
R50	-80		100K		
R51	-80		100K		
R52	-68		33K		
R53	-80		100K		
R54	-80		100K		
R55	-80		100K		
R56	1006750-80		100K	±2%	1/4 W
R57	1010369-101		680K	±5%	1/8 W
R58	1006750-73		51K	±2%	1/4 W
R59	-25		510		
R60	-73		51K		
R61	-73		51K		
R62	-25		510		
R63	-64		22K		
R64	-80		100K		
R65	1006750-43		3000	±2%	1/4 W
R66	1010369-95		390K	±5%	1/8 W
R67	1006750-56		10K	±2%	1/4 W
R68	-39		2000		
R69	-49		5100		
R70	-49		5100		
R71	-49		5100		
R72	-39		2000		
R73	-73		51K		
R74	-73		51K		
R75	-73		51K		
R76	-56		10K		
R77	-56		10K		
R78	-56		10K		
R79	-80		100K		
R80	1006750-80	RESISTOR	100K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R81	1006750-80	RESISTOR	100K	±2%	1/4 W
R82	-80		100K		
R83	-80		100K		
R84	-68		33K		
R85	-80		100K		
R86	-80		100K		
R87	-68		33K		
R88	-80		100K		
R89	-80		100K		
R90	-80		100K		
R91	-80		100K		
R92	-68		33K		
R93	1006750-80		100K	±2%	1/4 W
R94	1010369-101		680K	±5%	1/8 W
R95	1006750-73		51K	±2%	1/4 W
R96	-25		510		
R97	-73		51K		
R98	-73		51K		
R99	-25		510		
R100	-80		100K		
R101	-64		22K		
R102	1006750-43		3000	±2%	1/4 W
R103	1010369-95		390K	±5%	1/8 W
R104	1006750-39		2000	±2%	1/4 W
R105	-56		10K		
R106	-49		5100		
R107	-49		5100		
R108	-39		2000		
R109	-49		5100		
R110	-49		5100		
R111	-63		20K		
R112	-63		20K		
R113	-39		2000		
R114	-63		20K		
R115	-39		2000		
R116	-39		2000		
R117	-63		20K		
R118	-39		2000		
R119	-63		20K		
R120	-39		2000		
R121	-39		2000		
R122	-39		2000		
R123	1006750-68	RESISTOR	33K	2%	1/4 W
C1	1006755-79	CAPACITOR	6.8	±10%	35V
C2					
C3					
C4					
C5					
C6	1006755-79		6.8		35V
C7	1010871-26		2200UUF		100V
C8	1010871-26		2200UUF		100V
C9	1006755-69		1.0		35V
C10	1006755-69		1.0		35V
C11	1006755-85		22		35V
C12	1006755-69		1.0		35V
C13	1010871-26		2200UUF		100V
C14	1010871-26		2200UUF		100V
C15	1010871-26		2200UUF		100V
C16	1006755-69		1.0		35V
C17	-69		1.0		
C18	-85		22		
C19	-69		1.0		
C20	-79		6.8		
C21	1006755-79	CAPACITOR	6.8	±10%	35V
CR1	1010362-2	DIODE	IN647		
CR2	1010362-2		IN647		
CR3	1010830-9		IN965B		5V-400MW
CR4	1010362-2		IN647		
CR5	1010362-2		IN647		
CR6	1010830-19		IN975B		39V-400MW
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	IN660		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR13	1010385	DIODE	IN660		
CR14	1010372-10				4.7V-250MW
CR15	1010372-18				10V-250MW
CR16	1010372-10				4.7V-250MW
CR17	1010385		IN660		
CR18					
CR19					
CR20					
CR21					
CR22					
CR23					
CR24					
CR25					
CR26	1010385		IN660		
CR27	1010372-10				4.7V-250MW
CR28	1010372-18				10V-250MW
CR29	1010372-10				
CR30	1010385		IN660		
CR31	1010385		IN660		
CR32	1010830-19		IN975B		39V-400MW
CR33	1010830-19	DIODE	IN975B		39V-400MW
Q1	1010285	TRANSISTOR	2N722		
Q2	1010343-3				
Q3	1010285		2N722		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010286		2N722		
Q7	1010343-3				
Q8	1010343-3				
Q9	1010343-3				
Q10	1010343-3				
Q11	1010342		2N998		
Q12	1010343-3				
Q13	1010343-3				
Q14	1010343-3				
Q15	1010343-3				
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010397-1		2N930		
Q19	1010285		2N722		
Q20	1010397-1		2N930		
Q21	1010285		2N722		
Q22	1010285		2N722		
Q23	1010397-1		2N930		
Q24	1010285		2N722		
Q25	1010343-3				
Q26	1010343-3				
Q27	1010343-3				
Q28	1010397-1		2N930		
Q29	1010397-1		2N930		
Q30	1010397-1		2N930		
Q31	1010285		2N722		
Q32	1010397-1		2N930		
Q33	1010285		2N722		
Q34	1010285		2N722		
Q35	1010397-1		2N930		
Q36	1010285		2N722		
Q37	1010285		2N722		
Q38	1010285		2N722		
Q39	1010285		2N722		
Q40	1010342		2N998		
Q41	1010342	TRANSISTOR	2N998		
K1	1010353-7	RELAY			
K2	1010353-7	RELAY			
K3	1010353-7	RELAY			
K4	1010353-7	RELAY			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN T. Dowd
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

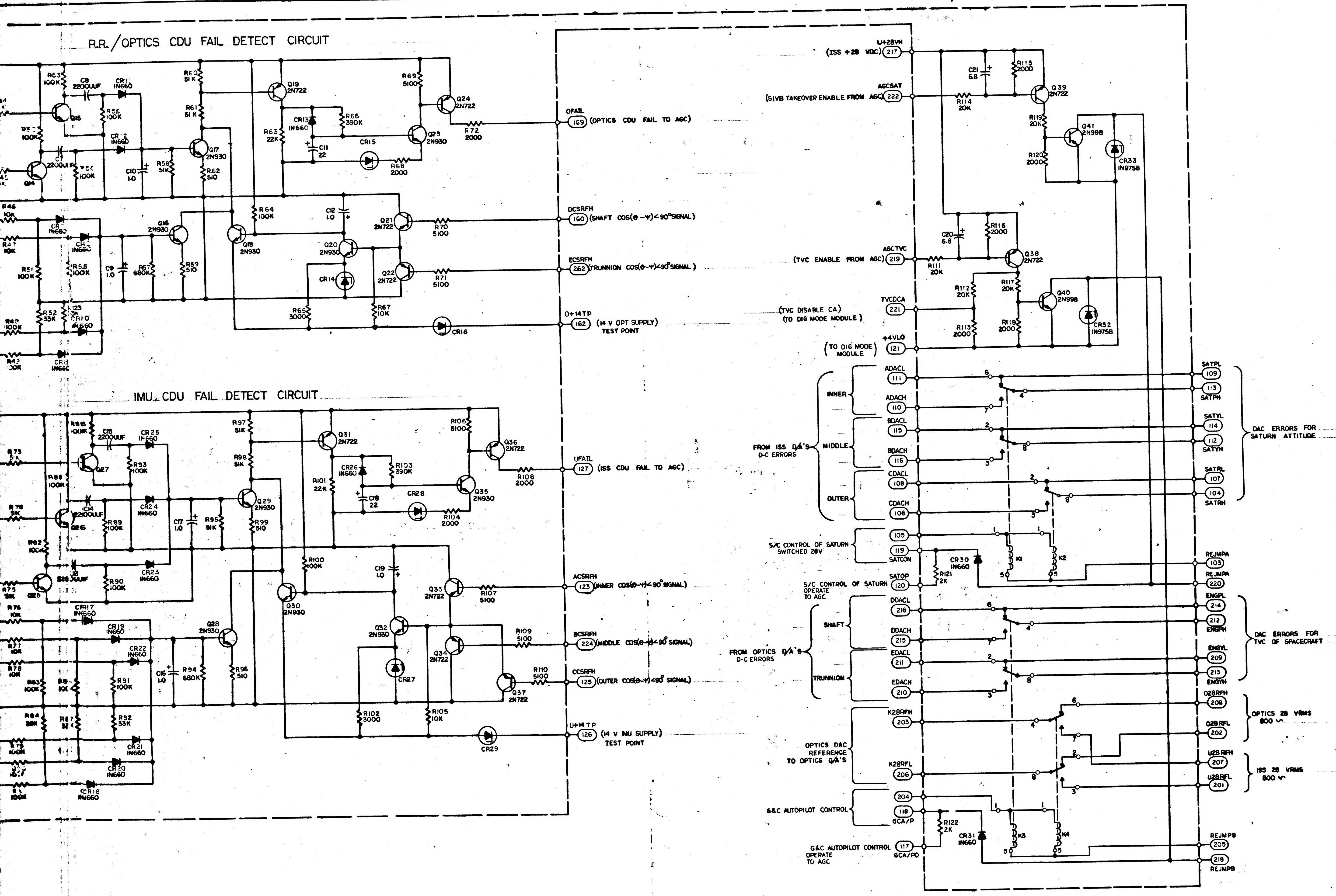
SCHEMATIC, MODE MODULE

CODE IDENT NO. —
SIZE J
NASA DRAWING NO. 2010054
SCALE —
WT —
SHEET OF 1

MASTER

2010054 A

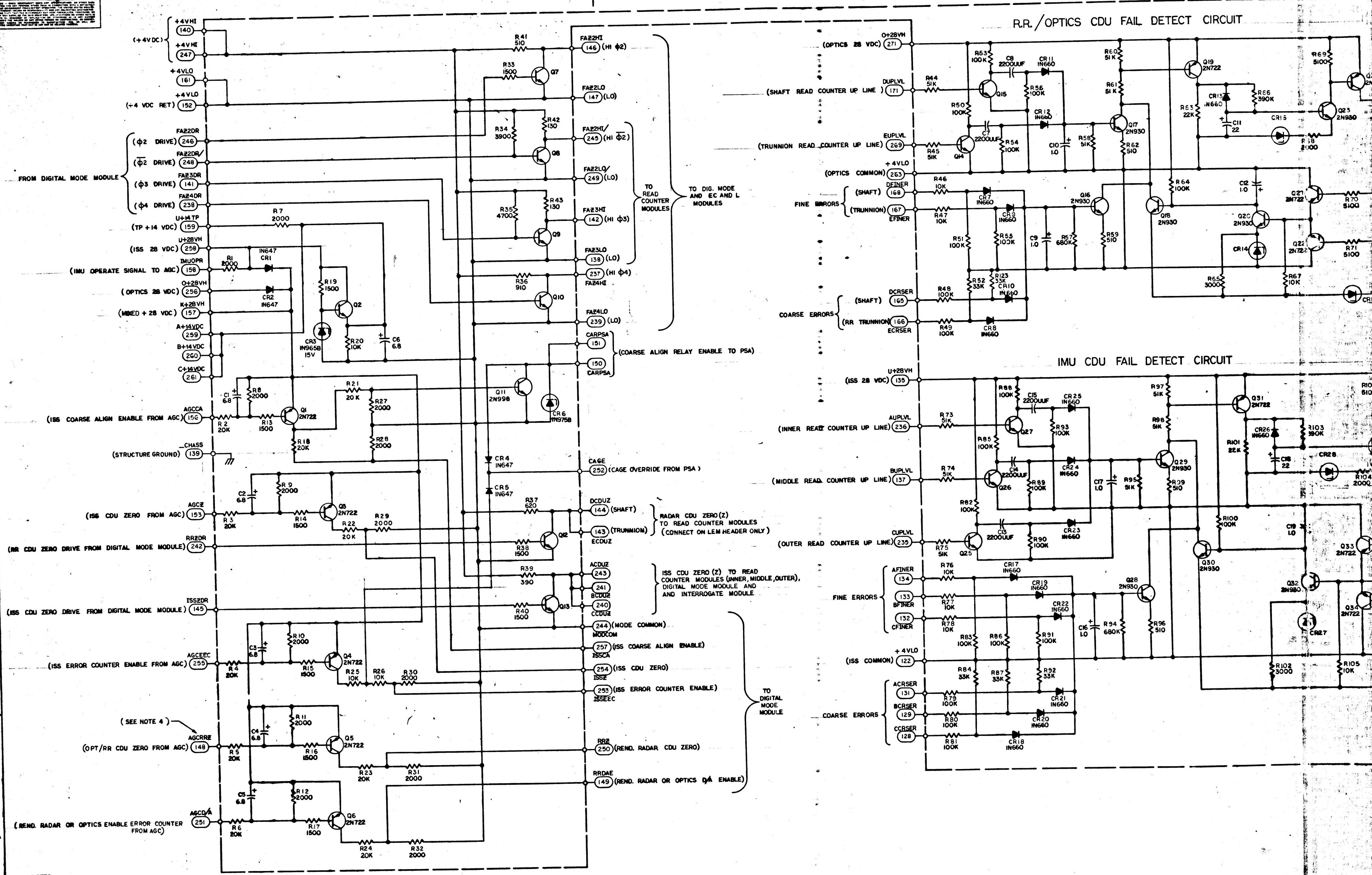
F-3



R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
R53 100K
C8 2200UUF
CR11 IN660
Q15
R56 100K
CR12 IN660
C7 2200UUF
R54 100K
Q14
C10 1.0
R58 51K
R60 51K
R61 51K
Q17 2N930
R62 510
Q19 2N722
CR13 IN660
R66 390K
R63 22K
C11 22
CR15
R68 2000
R69 5100
Q24 2N722
Q23 2N930
R72 2000
OFAIL
169 (OPTICS CDU FAIL TO AGC)
R46 10K
CR7
R47 10K
R51 100K
R55 100K
C9 1.0
R57 680K
Q16 2N930
R59 510
R64 100K
Q18 2N930
C12 1.0
Q20 2N930
CR14
Q21 2N722
Q22 2N722
R70 5100
R71 5100
R65 3000
R67 10K
DCSRFH
160 (SHAFT COS(θ-ψ)<90° SIGNAL)
ECSRFH
262 (TRUNNION COS(θ-ψ)<90° SIGNAL)
R52 33K
R123 3K
CR10 IN660
R49 100K
CR8 IN660
CR16
0+14TP
162 (14 V OPT SUPPLY) TEST POINT
R73 51K
R88 100K
C15 2200UUF
CR25 IN660
Q27
R93 100K
R86 100K
C14 2200UUF
R89 100K
CR24 IN660
R74 51K
Q26
R82 100K
C13 2200UUF
R90 100K
CR23 IN660
Q25
R75 51K
R76 10K
CR17 IN660
CR19 IN660
R77 10K
CR22 IN660
R78 10K
R83 100K
R91 100K
R84 33K
R87 33K
R92 33K
CR21 IN660
CR20 IN660
R81 100K
CR18 IN660
C16 1.0
R94 680K
Q28 2N930
R96 510
C17 1.0
R95 51K
R97 51K
R98 51K
Q29 2N930
R99 510
Q31 2N722
CR26 IN660
R103 390K
R101 22K
C18 22
CR28
R104 2000
R106 5100
Q36 2N722
Q35 2N930
R108 2000
UFAIL
127 (ISS CDU FAIL TO AGC)
R100 100K
Q30 2N930
C19 1.0
Q33 2N722
R107 5100
Q32 2N930
CR27
Q34 2N722
R109 5100
Q37 2N722
R110 5100
R102 3000
R105 10K
CR29
ACSRFH
123 (INNER COS(θ-ψ)<90° SIGNAL)
BCSRFH
224 (MIDDLE COS(θ-ψ)<90° SIGNAL)
CCSRFH
125 (OUTER COS(θ-ψ)<90° SIGNAL)
U+14 TP
126 (14 V IMU SUPPLY) TEST POINT
U+28VH
(ISS +28 VDC) 217
AGCSAT
(SIVB TAKEOVER ENABLE FROM AGC) 222
C21 6.8
R115 2000
R114 20K
Q39 2N722
R119 20K
Q41 2N998
R120 2000
CR33 IN975B
C20 6.8
R116 2000
AGCTVC
(TVC ENABLE FROM AGC) 219
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
CR32 IN975B
TVCDCA
221
(TVC DISABLE CA)
(TO DIG MODE MODULE)
R113 2000
R118 2000
+4VLO
(TO DIG MODE MODULE) 121
ADACL 111
ADACH 110
BDACL 115
BDACH 116
CDACL 108
CDACH 106
INNER
MIDDLE
OUTER
FROM ISS D/A'S D-C ERRORS
SATPL 109
113 SATPH
SATYL 114
112 SATYH
SATRL 107
104 SATRH
DAC ERRORS FOR SATURN ATTITUDE
S/C CONTROL OF SATURN SWITCHED 28V
105
119 SATCON
R121 2K
CR30 IN660
K1
K2
S/C CONTROL OF SATURN OPERATE TO AGC
SATOP 120
REJMPA 103
REJMPA 220
DDACL 216
DDACH 215
EDACL 211
EDACH 210
SHAFT
TRUNNION
FROM OPTICS D/A'S D-C ERRORS
ENGPL 214
212 ENGPH
ENGYL 209
213 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT
K28RFH 203
O28RFH 208
O28RFL 202
OPTICS 28 VRMS 800 ∿
OPTICS DAC REFERENCE TO OPTICS D/A'S
K28RFL 206
U28RFH 207
U28RFL 201
ISS 28 VRMS 800 ∿
204
G&C AUTOPILOT CONTROL
118 GCA/P
R122 2K
CR31 IN660
K3
K4
G&C AUTOPILOT CONTROL OPERATE TO AGC
117 GCA/PO
REJMPB 205
218 REJMPB

REF DES	PART NO.	DESCRIPTION
R1	1006750 - 39	RESISTOR
R2	- 63	
R3	- 63	
R4	- 63	
R5	- 63	
R6	- 63	
R7	- 39	
R8	- 39	
R9	- 39	
R10	- 39	
R11	- 39	
R12	- 39	
R13	- 36	
R14	- 36	
R15	- 36	
R16	- 36	
R17	- 36	
R18	- 63	
R19	- 36	
R20	- 56	
R21	- 63	
R22	- 63	
R23	- 63	
R24	- 63	
R25	- 56	
R26	- 56	
R27	- 39	
R28	- 39	
R29	- 39	
R30	- 39	
R31	- 39	
R32	- 39	
R33	- 36	
R34	- 46	
R35	- 4	
R36	- 31	
R37	- 27	
R38	- 16	
R39	- 22	
R40	- 36	
R41	- 25	
R42	- 1	
R43	- 1	
R44	- 73	
R45	- 73	
R46	- 56	
R47	- 56	
R48	- 80	
R49	- 80	
R50	- 80	
R51	- 80	
R52	- 6	
R53	- 30	
R54	- 80	
R55	- 80	
R56	1006750 - 80	
R57	1010369 - 10	
R58	1006750 - 73	
R59	- 25	
R60	- 73	
R61	- 73	
R62	- 25	
R63	- 6	
R64	- 80	
R65	1006750 - 43	
R66	1010369 - 35	
R67	1006750 - 56	
R68	- 39	
R69	- 43	
R70	- 43	
R71	- 43	
R72	- 39	
R73	- 73	
R74	- 73	
R75	- 73	
R76	- 56	
R77	- 56	
R78	- 56	
R79	- 8	
R80	1006750 - 80	RESISTOR

2010054 A

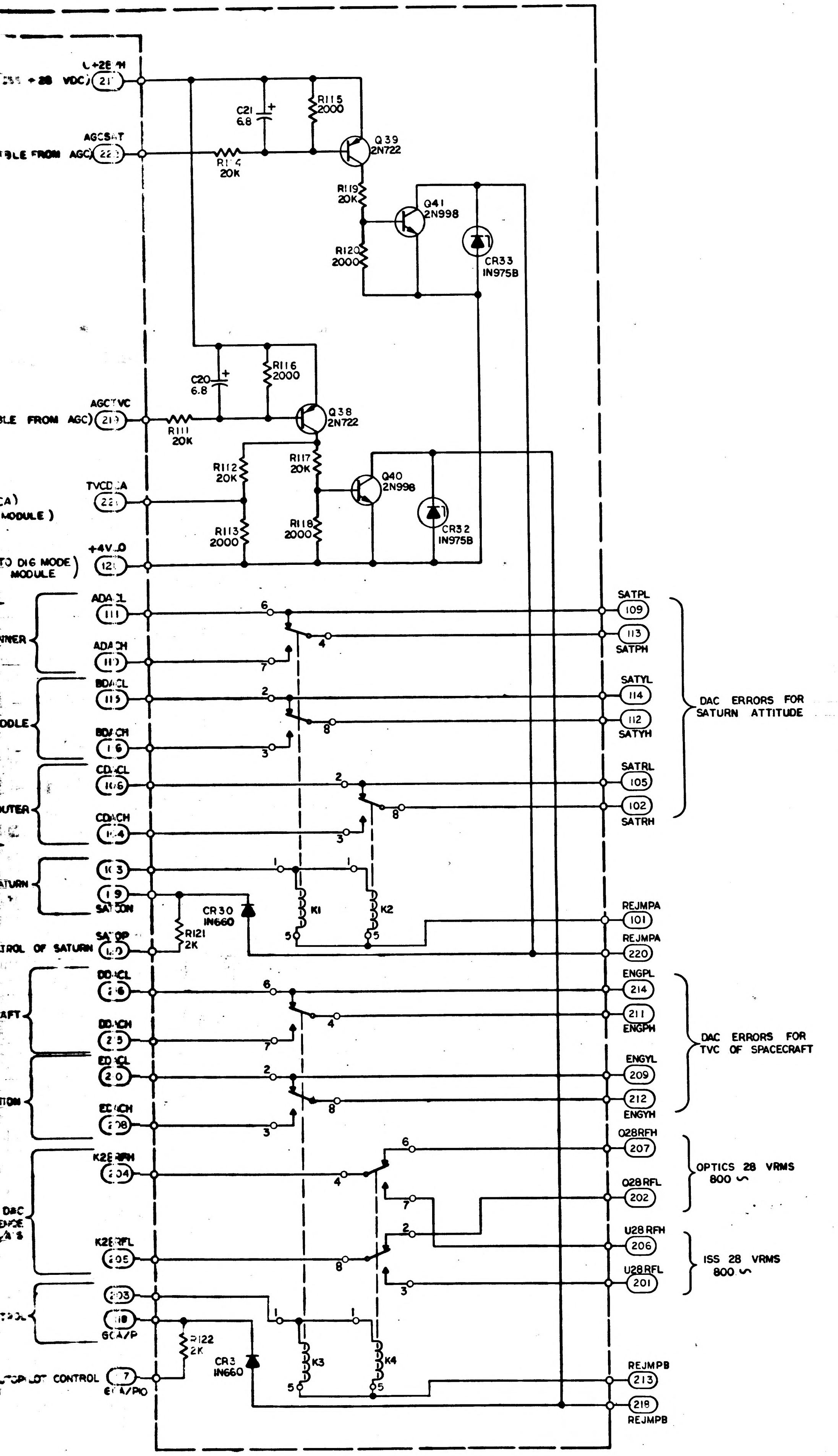

10
9
8
7
D
C
B
A
R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
(+4VDC) +4VHI 140
+4VHI 247
+4VLO 161
(+4 VDC RET) +4VLO 152
FROM DIGITAL MODE MODULE
(φ2 DRIVE) FAZ2DR 246
(φ̄2 DRIVE) FAZ2DR/ 248
(φ3 DRIVE) FAZ3DR 141
(φ4 DRIVE) FAZ4DR 238
(TP +14 VDC) U+14TP 159
(ISS 28 VDC) U+28VH 258
(IMU OPERATE SIGNAL TO AGC) IMUOPR 158
(OPTICS 28 VDC) O+28VH 256
(MIXED + 28 VDC) K+28VH 157
A+14VDC 259
B+14VDC 260
C+14VDC 261
(ISS COARSE ALIGN ENABLE FROM AGC) AGCCA 156
(STRUCTURE GROUND) CHASS 139
(ISS CDU ZERO FROM AGC) AGCZ 153
(RR CDU ZERO DRIVE FROM DIGITAL MODE MODULE) RRZDR 242
(ISS CDU ZERO DRIVE FROM DIGITAL MODE MODULE) ISSZDR 145
(ISS ERROR COUNTER ENABLE FROM AGC) AGCEEC 255
(SEE NOTE 4)
(OPT/RR CDU ZERO FROM AGC) AGCRRZ 148
(REND. RADAR OR OPTICS ENABLE ERROR COUNTER FROM AGC) AGCD/A 251
FAZ2HI 146 (HI φ2)
FAZ2LO 147 (LO)
FAZ2HI/ 245 (HI φ̄2)
FAZ2LO/ 249 (LO)
FAZ3HI 142 (HI φ3)
FAZ3LO 138 (LO)
237 (HI φ4) FAZ4HI
FAZ4LO 239 (LO)
TO READ COUNTER MODULES
TO DIG. MODE AND EC AND L MODULES
CARPSA 151
150 CARPSA
(COARSE ALIGN RELAY ENABLE TO PSA)
CAGE 252 (CAGE OVERRIDE FROM PSA)
DCDUZ 144 (SHAFT)
143 (TRUNNION) ECDUZ
RADAR CDU ZERO (Z) TO READ COUNTER MODULES (CONNECT ON LEM HEADER ONLY)
ACDUZ 243
241 BCDUZ
240 CCDUZ
ISS CDU ZERO (Z) TO READ COUNTER MODULES (INNER, MIDDLE, OUTER), DIGITAL MODE MODULE AND INTERROGATE MODULE
244 (MODE COMMON) MODCOM
257 (ISS COARSE ALIGN ENABLE) ISSCA
254 (ISS CDU ZERO) ISSZ
253 (ISS ERROR COUNTER ENABLE) ISSEEC
RRZ 250 (REND. RADAR CDU ZERO)
RRDAE 149 (REND. RADAR OR OPTICS D/A ENABLE)
TO DIGITAL MODE MODULE
R41 510
R33 1500
Q7
R34 3900
R42 130
Q8
R35 4700
R43 130
Q9
R36 910
Q10
R7 2000
R1 2000
IN647 CR1
CR2 IN647
R19 1500
Q2
CR3 IN965B 15V
R20 10K
C6 6.8
C1 6.8
R8 2000
R2 20K
R13 1500
Q1 2N722
R18 20K
R21 20K
R27 2000
R28 2000
Q11 2N998
CR6 IN975B
CR4 IN647
CR5 IN647
C2 6.8
R9 2000
R3 20K
R14 1500
Q3 2N722
R22 20K
R29 2000
R37 620
R38 1500
Q12
R39 390
R40 1500
Q13
C3 6.8
R10 2000
R4 20K
R15 1500
Q4 2N722
R25 10K
R26 10K
R30 2000
C4 6.8
R11 2000
R5 20K
R16 1500
Q5 2N722
R23 20K
R31 2000
C5 6.8
R12 2000
R6 20K
R17 1500
Q6 2N722
R24 20K
R32 2000
(OPTICS 28 VDC) O+28VH 271
(SHAFT READ COUNTER UP LINE) DUPLVL 171
(TRUNNION READ COUNTER UP LINE) EUPLVL 269
+4VLO (OPTICS COMMON) 263
FINE ERRORS (SHAFT) DEFINER 168
(TRUNNION) 167 EFINER
COARSE ERRORS (SHAFT) DCRSER 165
(RR TRUNNION) 166 ECRSER
R53 100K
C8 2200UUF
CR11 IN660
R44 51K
Q15
R56 100K
R50 100K
CR12 IN660
C7 2200UUF
R54 100K
R45 51K
Q14
C10 1.0
R58 51K
R60 51K
R61 51K
Q17 2N930
R62 510
Q19 2N722
CR13 IN660
R63 22K
C11 22
R66 390K
CR15
R68 2000
R69 5100
Q23 2N930
R46 10K
CR7 IN660
R47 10K
CR9 IN660
R64 100K
C12 1.0
Q16 2N930
Q18 2N930
Q21 2N722
R70 5100
Q20 2N930
R51 100K
R55 100K
C9 1.0
R57 680K
R59 510
CR14
Q22 2N722
R71 5100
R52 33K
R123 33K
CR10 IN660
R48 100K
R49 100K
CR8 IN660
R65 3000
R67 10K
(ISS 28 VDC) U+28VH 135
(INNER READ COUNTER UP LINE) AUPLVL 236
(MIDDLE READ COUNTER UP LINE) BUPLVL 137
(OUTER READ COUNTER UP LINE) CUPLVL 235
FINE ERRORS AFINER 134
133 BFINER
132 CFINER
(ISS COMMON) +4VLO 122
COARSE ERRORS ACRSER 131
BCRSER 129
CCRSER 128
R88 100K
C15 2200UUF
CR25 IN660
R73 51K
Q27
R93 100K
R85 100K
C14 2200UUF
CR24 IN660
R74 51K
Q26
R89 100K
C17 1.0
R95 51K
R82 100K
C13 2200UUF
CR23 IN660
R75 51K
Q25
R90 100K
R97 51K
R98 51K
Q29 2N930
R99 510
Q31 2N722
R101 22K
CR26 IN660
R103 390K
C18 22
CR28
R104 2000
R100 100K
Q30 2N930
C19 1.0
Q33 2N722
Q32 2N930
Q34 2N722
CR27
R76 10K
CR17 IN660
CR19 IN660
R77 10K
CR22 IN660
R78 10K
Q28 2N930
C16 1.0
R94 680K
R96 510
R83 100K
R86 100K
R91 100K
R84 33K
R87 33K
R92 33K
R79 100K
CR21 IN660
R80 100K
CR20 IN660
R81 100K
CR18 IN660
R102 3000
R105 10K
R10 510

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE IN OHMS
3. CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED
4. WIREWRAP PROGRAM PIN DESIGNATIONS ARE LABELED ABOVE PIN NUMBERS

2010054	A

2010054 B

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17005	9 Mar '65	
B	REVISED PER TDRR 17979	5 Apr '65	



L+28 VM
+28 VDC
21
AGCSAT
FROM AGC
22
C21 6.8
R115 2000
R114 20K
Q39 2N722
R119 20K
Q41 2N998
R120 2000
CR33 IN975B
C20 6.8
R116 2000
AGCTVC
FROM AGC
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
TVCDLA
R113 2000
R118 2000
CR32 IN975B
+4V
TO DIG MODE MODULE
ADACL
ADACH
BDACL
BDACH
CDACL
CDACH
SATPL
109
113
SATPH
SATYL
114
112
SATYH
SATRL
105
102
SATRH
DAC ERRORS FOR SATURN ATTITUDE
CR30 IN660
R121 2K
K1
K2
REJMPA
101
REJMPA
220
CONTROL OF SATURN
DDACL
DDACH
EDACL
EDACH
ENGPL
214
211
ENGPH
ENGYL
209
212
ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT
K2ERFH
K2ERFL
O28RFH
207
O28RFL
202
OPTICS 28 VRMS 800 ∽
U28RFH
206
U28RFL
201
ISS 28 VRMS 800 ∽
R122 2K
CR3 IN660
K3
K4
AUTOPILOT CONTROL
REJMPB
213
218
REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-39	RESISTOR	2000	±2%	1/4 W
R2	-63		20K		
R3	-63		20K		
R4	-63		20K		
R5	-63		20K		
R6	-63		20K		
R7	-39		2000		
R8	-39		2000		
R9	-39		2000		
R10	-39		2000		
R11	-39		2000		
R12	-39		2000		
R13	-36		1500		
R14	-36		1500		
R15	-36		1500		
R16	-36		1500		
R17	-36		1500		
R18	-63		20K		
R19	-36		1500		
R20	-56		10K		
R21	-63		20K		
R22	-63		20K		
R23	-63		20K		
R24	-63		20K		
R25	-56		10K		
R26	-56		10K		
R27	-39		2000		
R28	-39		2000		
R29	-39		2000		
R30	-39		2000		
R31	-39		2000		
R32	-39		2000		
R33	-36		1500		
R34	-46		3900		
R35	-48		4700		
R36	-31		910		
R37	-27		620		
R38	-36		1500		
R39	-22		390		
R40	-36		1500		
R41	-25		510		
R42	-11		130		
R43	-11		130		
R44	-73		51K		
R45	-73		51K		
R46	-56		10K		
R47	-56		10K		
R48	-80		100K		
R49	-80		100K		
R50	-80		100K		
R51	-80		100K		
R52	-68		33K		
R53	-80		100K		
R54	-80		100K		
R55	-80		100K		
R56	1006750-80		100K	±2%	1/4 W
R57	1010369-101		680K	±5%	1/8 W
R58	1006750-73		51 K	±2%	1/4 W
R59	-25		510		
R60	-73		51 K		
R61	-73		51 K		
R62	-25		510		
R63	-64		22 K		
R64	-80		100K		
R65	1006750-43		3000	±2%	1/4 W
R66	1010369-95		390K	±5%	1/8 W
R67	1006750-56		10 K	±2%	1/4 W
R68	-39		2000		
R69	-49		5100		
R70	-49		5100		
R71	-49		5100		
R72	-39		2000		
R73	-73		51 K		
R74	-73		51 K		
R75	-73		51 K		
R76	-56		10 K		
R77	-56		10 K		
R78	-56		10 K		
R79	-80		100K		
R80	1006750-80	RESISTOR	100K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R81	1006750-80	RESISTOR	100K	±2%	1/4 W
R82	-80		100K		
R83	-80		100K		
R84	-68		33K		
R85	-80		100K		
R86	-80		100K		
R87	-68		33 K		
R88	-80		100 K		
R89	-80		100K		
R90	-80		100K		
R91	-80		100K		
R92	-68		33K		
R93	1006750-80		100K	±2%	1/4 W
R94	1010369-101		680K	±5%	1/8 W
R95	1006750-73		51 K	±2%	1/4 W
R96	-25		510		
R97	-73		51 K		
R98	-73		51 K		
R99	-25		510		
R100	-80		100K		
R101	-64		22 K		
R102	1006750-43		3000	±2%	1/4 W
R103	1010369-95		390K	±5%	1/8 W
R104	1006750-39		2000	±2%	1/4 W
R105	-56		10 K		
R106	-49		5100		
R107	-49		5100		
R108	-39		2000		
R109	-49		5100		
R110	-49		5100		
R111	-63		20 K		
R112	-63		20 K		
R113	-39		2000		
R114	-63		20 K		
R115	-39		2000		
R116	-39		2000		
R117	-63		20 K		
R118	-39		2000		
R119	-63		20 K		
R120	-39		2000		
R121	-39		2000		
R122	-39		2000		
R123	1006750-68	RESISTOR	33K	2%	1/4W
C1	1006755-79	CAPACITOR	6.8	±10%	35V
C2	-79				
C3	-79				
C4	-79				
C5	-79				
C6	1006755-79		6.8		35V
C7	1006777-26		2200UUF		100V
C8	1006777-26		2200UUF		100V
C9	1006755-69		1.0		35V
C10	1006755-69		1.0		35V
C11	1006755-85		22		35V
C12	1006755-69		1.0		35V
C13	1006777-26		2200UUF		100V
C14	1006777-26		2200UUF		100V
C15	1006777-26		2200UUF		100V
C16	1006755-69		1.0		35V
C17	-69		1.0		
C18	-85		22		
C19	-69		1.0		
C20	-79		6.8		
C21	1006755-79	CAPACITOR	6.8	±10%	35V
CR1	1010362-002	DIODE	IN647		
CR2	1010362-002		IN647		
CR3	1010830-9		IN965B		5V-400MW
CR4	1010362-002		IN647		
CR5	1010362-002		IN647		
CR6	1010830-19		IN975B		39V-400MW
CR7	1010385		IN 660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	IN660		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR13	1010385	DIODE	IN660		
CR14	1010372-10				4.7V-250MW
CR15	1010372-18				10V-250MW
CR16	1010372-10				4.7V-250MW
CR17	1010385		IN660		
CR18					
CR19					
CR20					
CR21					
CR22					
CR23					
CR24					
CR25					
CR26	1010385		IN660		
CR27	1010372-10				4.7V-250MW
CR28	1010372-18				10V-250MW
CR29	1010372-10				
CR30	1010385		IN660		
CR31	1010385		IN660		
CR32	1010830-19		IN975B		39V-400MW
CR33	1010830-19	DIODE	IN975B		39V-400MW
Q1	1010285	TRANSISTOR	2N722		
Q2	1010343-3				
Q3	1010285		2N722		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010285		2N722		
Q7	1010343-3				
Q8	1010343-3				
Q9	1010343-3				
Q10	1010343-3				
Q11	1010342		2N998		
Q12	1010343-3				
Q13	1010343-3				
Q14	1010343-3				
Q15	1010343-3				
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010397-1		2N930		
Q19	1010285		2N722		
Q20	1010397-1		2N930		
Q21	1010285		2N722		
Q22	1010285		2N722		
Q23	1010397-1		2N930		
Q24	1010285		2N722		
Q25	1010343-3				
Q26	1010343-3				
Q27	1010343-3				
Q28	1010397-1		2N930		
Q29	1010397-1		2N930		
Q30	1010397-1		2N930		
Q31	1010285		2N722		
Q32	1010397-1		2N930		
Q33	1010285		2N722		
Q34	1010285		2N722		
Q35	1010397-1		2N930		
Q36	1010285		2N722		
Q37	1010285		2N722		
Q38	1010285		2N722		
Q39	1010285		2N722		
Q40	1010342		2N998		
Q41	1010342	TRANSISTOR	2N998		
K1	1010353-7	RELAY			
K2	1010353-7	RELAY			
K3	1010353-7	RELAY			
K4	1010353-7	RELAY			

REF DWG
MODE MODULE ASSY DWG NO. 2007154

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN T. Duval DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

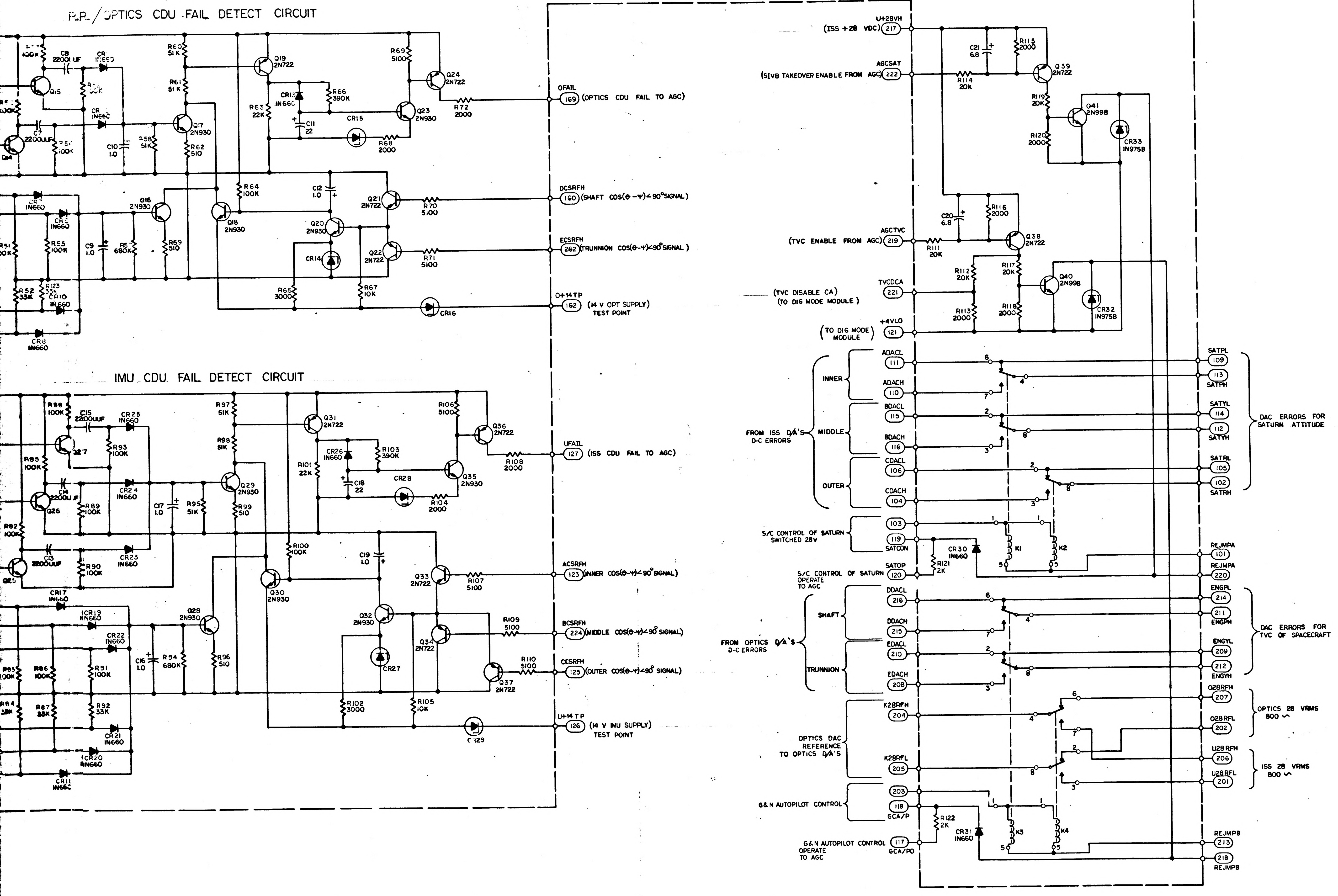
SCHEMATIC, MODE MODULE

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010054
SCALE —
WT —
SHEET 1 OF 1

2010054 B

MASTER

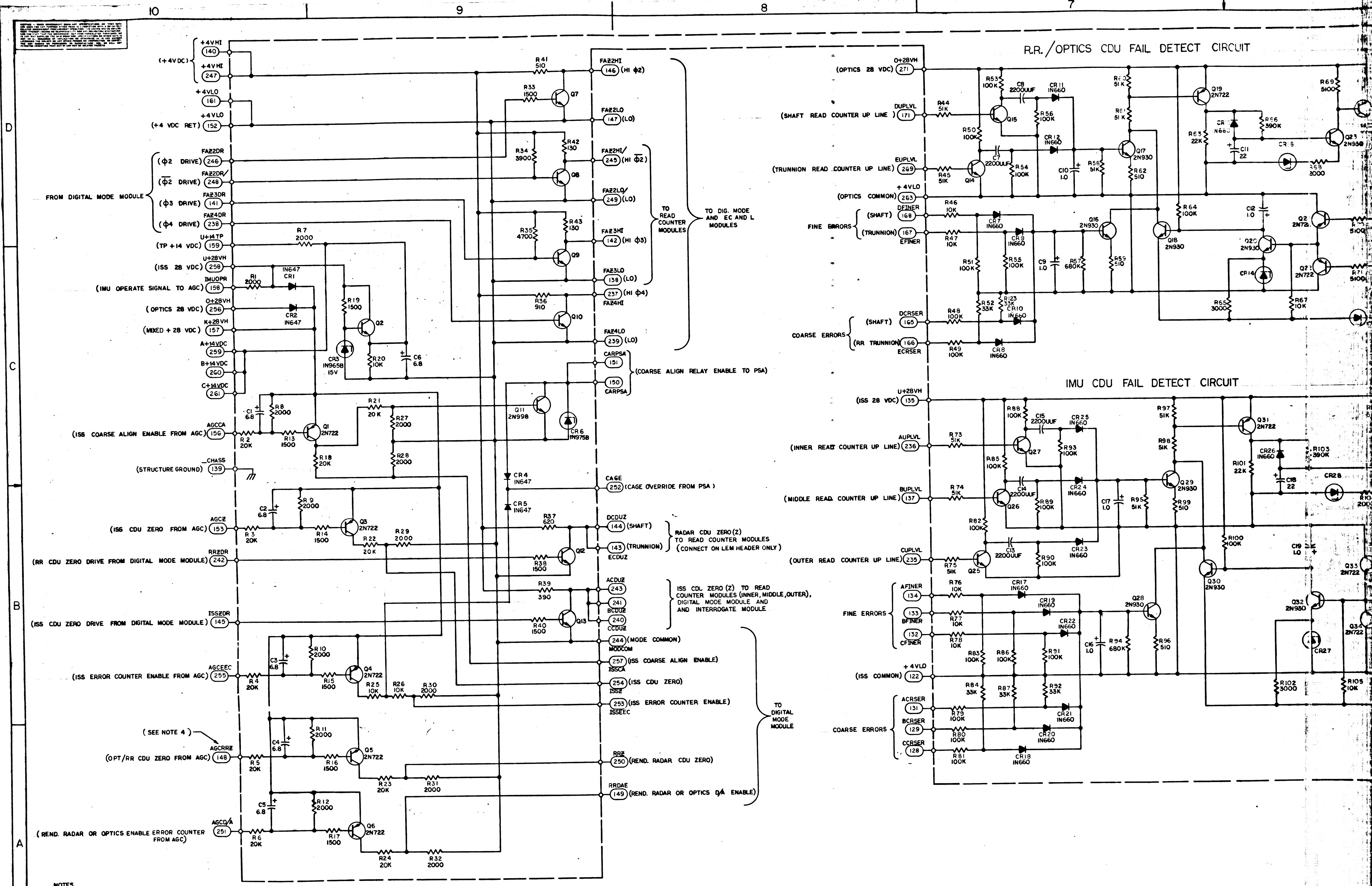
E3


P.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
OFAIL
169 (OPTICS CDU FAIL TO AGC)
DCSRFH
160 (SHAFT COS(θ-ψ)<90° SIGNAL)
ECSRFH
262 (TRUNNION COS(θ-ψ)<90° SIGNAL)
O+14TP
162 (14 V OPT SUPPLY) TEST POINT
UFAIL
127 (ISS CDU FAIL TO AGC)
ACSRFH
123 (INNER COS(θ-ψ)<90° SIGNAL)
BCSRFH
224 (MIDDLE COS(θ-ψ)<90° SIGNAL)
CCSRFH
125 (OUTER COS(θ-ψ)<90° SIGNAL)
U+14TP
126 (14 V IMU SUPPLY) TEST POINT
Q14 Q15 Q16 2N930 Q17 2N930 Q18 2N930 Q19 2N722 Q20 2N930 Q21 2N722 Q22 2N722 Q23 2N930 Q24 2N722
Q25 Q26 Q27 Q28 2N930 Q29 2N930 Q30 2N930 Q31 2N722 Q32 2N930 Q33 2N722 Q34 2N722 Q35 2N930 Q36 2N722 Q37 2N722
C7 2200UUF C8 2200UUF C9 1.0 C10 1.0 C11 22 C12 1.0 C13 2200UUF C14 2200UUF C15 2200UUF C16 1.0 C17 1.0 C18 22 C19 1.0
CR7 IN660 CR8 IN660 CR10 IN660 CR13 IN660 CR14 CR15 CR16 CR17 IN660 CR19 IN660 CR20 IN660 CR21 IN660 CR22 IN660 CR23 IN660 CR24 IN660 CR25 IN660 CR26 IN660 CR27 CR28 CR29
R52 33K R55 100K R5 680K R58 51K R59 510 R60 51K R61 51K R62 510 R63 22K R64 100K R65 3000 R66 390K R67 10K R68 2000 R69 5100 R70 5100 R71 5100 R72 2000 R123 33K
R82 100K R83 100K R84 33K R85 100K R86 100K R87 33K R88 100K R89 100K R90 100K R91 100K R92 33K R93 100K R94 680K R95 51K R96 510 R97 51K R98 51K R99 510 R100 100K R101 22K R102 3000 R103 390K R104 2000 R105 10K R106 5100 R107 5100 R108 2000 R109 5100 R110 5100
U+28VH
(ISS +28 VDC) 217
AGCSAT
(SIVB TAKEOVER ENABLE FROM AGC) 222
AGCTVC
(TVC ENABLE FROM AGC) 219
TVCDCA
(TVC DISABLE CA) (TO DIG MODE MODULE) 221
+4VLO
(TO DIG MODE MODULE) 121
C20 6.8 C21 6.8 R111 20K R112 20K R113 2000 R114 20K R115 2000 R116 2000 R117 20K R118 2000 R119 20K R120 2000
Q38 2N722 Q39 2N722 Q40 2N998 Q41 2N998 CR32 IN975B CR33 IN975B
FROM ISS D/A'S D-C ERRORS
INNER ADACL 111 ADACH 110
MIDDLE BDACL 115 BDACH 116
OUTER CDACL 106 CDACH 104
SATPL 109 113 SATPH
SATYL 114 112 SATYH
SATRL 105 102 SATRH
DAC ERRORS FOR SATURN ATTITUDE
S/C CONTROL OF SATURN SWITCHED 28V 103 119 SATCON
S/C CONTROL OF SATURN OPERATE TO AGC SATOP 120
CR30 IN660 R121 2K K1 K2
REJMPA 101 REJMPA 220
FROM OPTICS D/A'S D-C ERRORS
SHAFT DDACL 216 DDACH 215
TRUNNION EDACL 210 EDACH 208
ENGPL 214 211 ENGPH
ENGYL 209 212 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT
OPTICS DAC REFERENCE TO OPTICS D/A'S K28RFH 204 K28RFL 205
O28RFH 207 O28RFL 202 OPTICS 28 VRMS 800 ∿
U28RFH 206 U28RFL 201 ISS 28 VRMS 800 ∿
G&N AUTOPILOT CONTROL 203 118 GCA/P
G&N AUTOPILOT CONTROL OPERATE TO AGC 117 GCA/PO
R122 2K CR31 IN660 K3 K4
REJMPB 213 218 REJMPB
7 6 5 4 3

REF DES	PART NO.	DESCRIPTION	VALUE
R1	1006750 -39	RESISTOR	2000
R2	-63		20K
R3	-63		20K
R4	-63		20K
R5	-63		20K
R6	-63		20K
R7	-39		2000
R8	-39		2000
R9	-39		2000
R10	-39		2000
R11	-39		2000
R12	-39		2000
R13	-36		1500
R14	-36		1500
R15	-36		1500
R16	-36		1500
R17	-36		1500
R18	-63		20K
R19	-36		1500
R20	-56		10K
R21	-63		20K
R22	-63		20K
R23	-63		20K
R24	-63		20K
R25	-56		10K
R26	-56		10K
R27	-39		2000
R28	-39		2000
R29	-39		2000
R30	-39		2000
R31	-39		2000
R32	-39		2000
R33	-36		1500
R34	-46		3900
R35	-48		4700
R36	-31		910
R37	-27		620
R38	-36		1500
R39	-22		330
R40	-36		1500
R41	-25		510
R42	-11		130
R43	-11		130
R44	-73		51K
R45	-73		51K
R46	-56		10K
R47	-56		10K
R48	-80		100K
R49	-80		100K
R50	-80		100K
R51	-80		100K
R52	-68		33K
R53	-80		100K
R54	-80		100K
R55	-80		100K
R56	1006750 -80		100K
R57	1010369 -101		680K
R58	1006750 -73		51K
R59	-25		510
R60	-73		51K
R61	-73		51K
R62	-25		510
R63	-64		22K
R64	-80		100K
R65	1006750 -43		3000
R66	1010369 -95		390K
R67	1006750 -56		10K
R68	-39		2000
R69	-49		5100
R70	-49		5100
R71	-49		5100
R72	-39		2000
R73	-73		51K
R74	-73		51K
R75	-73		51K
R76	-56		10K
R77	-56		10K
R78	-56		10K
R79	-80		100K
R80	1006750-80	RESISTOR	100K

2010054 B

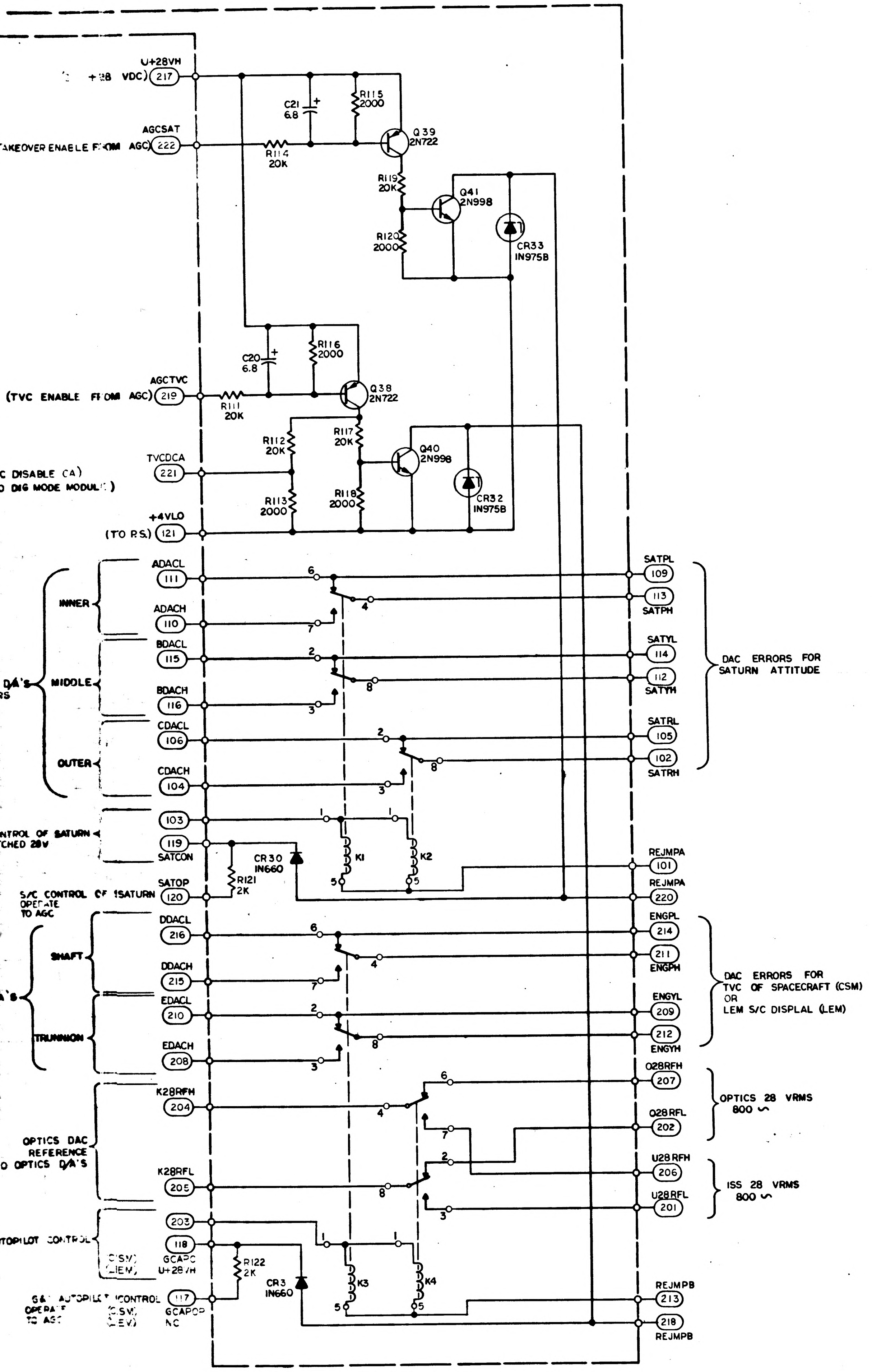
F-2


10
9
8
7
D
C
B
A
R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
(+4 VDC) +4VHI 140 +4VHI 247
+4VLO 161
(+4 VDC RET) +4VLO 152
FROM DIGITAL MODE MODULE
(Φ2 DRIVE) FAZ2DR 246
(Φ̄2 DRIVE) FAZ2DR/ 248
(Φ3 DRIVE) FAZ3DR 141
(Φ4 DRIVE) FAZ4DR 238
(TP +14 VDC) U+14TP 159
(ISS 28 VDC) U+28VH 258
(IMU OPERATE SIGNAL TO AGC) IMUOPR 158
(OPTICS 28 VDC) O+28VH 256
(MIXED + 28 VDC) K+28VH 157
A+14VDC 259
B+14VDC 260
C+14VDC 261
(ISS COARSE ALIGN ENABLE FROM AGC) AGCCA 156
(STRUCTURE GROUND) CHASS 139
(ISS CDU ZERO FROM AGC) AGCZ 153
(RR CDU ZERO DRIVE FROM DIGITAL MODE MODULE) RRZDR 242
(ISS CDU ZERO DRIVE FROM DIGITAL MODE MODULE) ISSZDR 145
(ISS ERROR COUNTER ENABLE FROM AGC) AGCEEC 255
(SEE NOTE 4)
(OPT/RR CDU ZERO FROM AGC) AGCRRZ 148
(REND. RADAR OR OPTICS ENABLE ERROR COUNTER FROM AGC) AGCD/A 251
FAZ2HI 146 (HI Φ2)
FAZ2LO 147 (LO)
FAZ2HI/ 245 (HI Φ̄2)
FAZ2LO/ 249 (LO)
FAZ3HI 142 (HI Φ3)
FAZ3LO 138 (LO)
237 (HI Φ4) FAZ4HI
FAZ4LO 239 (LO)
TO READ COUNTER MODULES
TO DIG. MODE AND EC AND L MODULES
CARPSA 151 150 CARPSA (COARSE ALIGN RELAY ENABLE TO PSA)
CAGE 252 (CAGE OVERRIDE FROM PSA)
DCDUZ 144 (SHAFT)
143 (TRUNNION) ECDUZ
RADAR CDU ZERO (Z) TO READ COUNTER MODULES (CONNECT ON LEM HEADER ONLY)
ACDUZ 243 241 BCDUZ 240 CCDUZ
ISS CDU ZERO (Z) TO READ COUNTER MODULES (INNER, MIDDLE, OUTER), DIGITAL MODE MODULE AND AND INTERROGATE MODULE
244 (MODE COMMON) MODCOM
257 (ISS COARSE ALIGN ENABLE) ISSCA
254 (ISS CDU ZERO) ISSZ
253 (ISS ERROR COUNTER ENABLE) ISSEEC
RRZ 250 (REND. RADAR CDU ZERO)
RRDAE 149 (REND. RADAR OR OPTICS D/A ENABLE)
TO DIGITAL MODE MODULE
R41 510
R33 1500
Q7
R34 3900
R42 130
Q8
R35 4700
R43 130
Q9
R36 910
Q10
R7 2000
R1 2000
1N647 CR1
CR2 1N647
R19 1500
Q2
CR3 1N965B 15V
R20 10K
C6 6.8
C1 6.8
R8 2000
R2 20K
R13 1500
Q1 2N722
R18 20K
R21 20 K
R27 2000
R28 2000
Q11 2N998
CR6 1N975B
CR4 1N647
CR5 1N647
C2 6.8
R9 2000
R3 20K
R14 1500
Q3 2N722
R22 20K
R29 2000
R37 620
R38 1500
Q12
R39 390
Q13
R40 1500
C3 6.8
R10 2000
R4 20K
R15 1500
Q4 2N722
R25 10K
R26 10K
R30 2000
C4 6.8
R11 2000
R5 20K
R16 1500
Q5 2N722
R23 20K
R31 2000
C5 6.8
R12 2000
R6 20K
R17 1500
Q6 2N722
R24 20K
R32 2000
(OPTICS 28 VDC) O+28VH 271
(SHAFT READ COUNTER UP LINE) DUPLVL 171
(TRUNNION READ COUNTER UP LINE) EUPLVL 269
(OPTICS COMMON) +4VLO 263
FINE ERRORS (SHAFT) DFINER 168 (TRUNNION) 167 EFINER
COARSE ERRORS (SHAFT) DCRSER 165 (RR TRUNNION) 166 ECRSER
R44 51K
R53 100K
C8 2200UUF
CR11 1N660
Q15
R56 100K
R50 100K
C7 2200UUF
CR12 1N660
R54 100K
R45 51K
Q14
C10 1.0
R58 51K
Q17 2N930
R62 510
R60 51K
R61 51K
Q19 2N722
R63 22K
CR13 1N660
C11 22
R66 390K
CR15
R68 2000
R69 5100
Q23 2N930
R46 10K
CR7 1N660
CR9 1N660
R47 10K
Q16 2N930
R59 510
R51 100K
R55 100K
C9 1.0
R57 680K
Q18 2N930
R64 100K
C12 1.0
Q2 2N722
Q20 2N930
CR14
Q22 2N722
R65 3000
R67 10K
R52 33K
R123 33K
CR10 1N660
R48 100K
R49 100K
CR8 1N660
(ISS 28 VDC) U+28VH 135
(INNER READ COUNTER UP LINE) AUPLVL 236
(MIDDLE READ COUNTER UP LINE) BUPLVL 137
(OUTER READ COUNTER UP LINE) CUPLVL 235
FINE ERRORS AFINER 134 133 BFINER 132 CFINER
(ISS COMMON) +4VLO 122
COARSE ERRORS ACRSER 131 BCRSER 129 CCRSER 128
R88 100K
C15 2200UUF
CR25 1N660
R73 51K
Q27
R93 100K
R85 100K
C14 2200UUF
CR24 1N660
R74 51K
Q26
R89 100K
C17 1.0
R95 51K
R97 51K
R98 51K
Q31 2N722
R101 22K
CR26 1N660
R103 390K
C18 22
CR28
Q29 2N930
R99 510
R82 100K
C13 2200UUF
R90 100K
CR23 1N660
R75 51K
Q25
R100 100K
Q30 2N930
C19 1.0
Q33 2N722
R76 10K
CR17 1N660
R77 10K
CR19 1N660
CR22 1N660
R78 10K
Q28 2N930
C16 1.0
R94 680K
R96 510
R83 100K
R86 100K
R91 100K
R84 33K
R87 33K
R92 33K
R79 100K
CR21 1N660
R80 100K
CR20 1N660
R81 100K
CR18 1N660
Q32 2N930
Q34 2N722
CR27
R102 3000
R105 10K

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE IN OHMS
3. CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED
4. WIREWRAP PROGRAM PIN DESIGNATIONS ARE LABELED ABOVE PIN NUMBERS

2010054 B

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17005	9 Mar 65	
B	REVISED PER TDRR 17979	5 Mar 65	
C	REVISED PER TDRR 18517	APR 65	



U+28VH
+28 VDC) 217
AGCSAT
TAKEOVER ENABLE FROM AGC) 222
C21 6.8
R115 2000
R114 20K
Q39 2N722
R119 20K
Q41 2N998
R120 2000
CR33 IN975B
C20 6.8
R116 2000
AGCTVC
(TVC ENABLE FROM AGC) 219
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
TVCDCA
C DISABLE (A)
D DIG MODE MODULE)
221
R113 2000
R118 2000
CR32 IN975B
+4VLO
(TO P.S.) 121
ADACL 111
ADACH 110
INNER
BDACL 115
BDACH 116
MIDDLE
D/A'S
CDACL 106
CDACH 104
OUTER
103
119 SATCON
NTROL OF SATURN
CHED 28V
CR30 IN660
K1
K2
R121 2K
SATOP 120
S/C CONTROL OF SATURN OPERATE TO AGC
SATPL 109
113 SATPH
SATYL 114
112 SATYH
SATRL 105
102 SATRH
DAC ERRORS FOR SATURN ATTITUDE
REJMPA 101
REJMPA 220
DDACL 216
DDACH 215
SHAFT
EDACL 210
EDACH 208
TRUNNION
ENGPL 214
211 ENGPH
ENGYL 209
212 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT (CSM) OR LEM S/C DISPLAY (LEM)
K28RFH 204
K28RFL 205
OPTICS DAC REFERENCE TO OPTICS D/A'S
O28RFH 207
O28RFL 202
OPTICS 28 VRMS 800 ~
U28RFH 206
U28RFL 201
ISS 28 VRMS 800 ~
203
118 GCAPC U+28VH
(CSM) (LEM)
TOPILOT CONTROL
R122 2K
CR3 IN660
K3
K4
G&N AUTOPILOT CONTROL OPERATE TO AGC
117 GCAPOP NC
REJMPB 213
218 REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 39	RESISTOR	2000	±2%	1/4 W
R2	- 63		20K		
R3	- 63		20K		
R4	- 63		20K		
R5	- 63		20K		
R6	- 63		20K		
R7	- 39		2000		
R8	- 39		2000		
R9	- 39		2000		
R10	- 39		2000		
R11	- 39		2000		
R12	- 39		2000		
R13	- 36		1500		
R14	- 36		1500		
R15	- 36		1500		
R16	- 36		1500		
R17	- 36		1500		
R18	- 63		20K		
R19	- 36		1500		
R20	- 56		10K		
R21	- 63		20K		
R22	- 63		20K		
R23	- 63		20K		
R24	- 63		20K		
R25	- 56		10K		
R26	- 56		10K		
R27	- 39		2000		
R28	- 39		2000		
R29	- 39		2000		
R30	- 39		2000		
R31	- 39		2000		
R32	- 39		2000		
R34	- 46		3900		
R35	- 46		3900		
R36	- 25		510		
R37	- 25		510		
R38	- 36		1500		
R39	- 20		330		
R40	- 36		1500		
R41	- 25		510		
R42	- 11		130		
R43	- 11		130		
R44	- 73		51K		
R45	- 73		51K		
R46	- 56		10K		
R47	- 56		10K		
R48	- 80		100K		
R49	- 80		100K		
R50	- 80		100K		
R51	- 80		100K		
R52	- 68		33K		
R53	- 80		100K		
R54	- 80		100K		
R55	↓ - 80		100K	↓	↓
R56	1006750 - 80		100K	±2%	1/4 W
R57	1010369 - 101		680K	±5%	1/8 W
R58	1006750 - 73		51 K	±2%	1/4 W
R59	- 25		510		
R60	- 73		51 K		
R61	- 73		51 K		
R62	- 25		510		
R63	- 64		22 K		
R64	↓ - 80		100K	↓	↓
R65	1006750 - 43		3000	±2%	1/4 W
R66	1010369 - 95		390K	±5%	1/8 W
R67	1006750 - 56		10 K	±2%	1/4 W
R68	- 39		2000		
R69	- 49		5100		
R70	- 49		5100		
R71	- 49		5100		
R72	- 39		2000		
R73	- 73		51 K		
R74	- 73		51 K		
R75	- 73		51 K		
R76	- 56		10 K		
R77	- 56		10 K		
R78	- 56		10 K		
R79	↓ - 80	↓	100K	↓	↓
R80	1006750 - 80	RESISTOR	100K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R81	1006750 - 80	RESISTOR	100K	±2%	1/4 W
R82	- 80		100K		
R83	- 80		100K		
R84	- 68		33K		
R85	- 80		100K		
R86	- 80		100K		
R87	- 68		33K		
R88	- 80		100K		
R89	- 80		100K		
R90	- 80		100K		
R91	- 80		100K		
R92	↓ - 68		33K	↓	↓
R93	1006750 - 80		100K	±2%	1/4 W
R94	1010369 - 101		680K	±5%	1/8 W
R95	1006750 - 73		51 K	±2%	1/4 W
R96	- 25		510		
R97	- 73		51 K		
R98	- 73		51 K		
R99	- 25		510		
R100	- 80		100K		
R101	↓ - 64		22 K	↓	↓
R102	1006750 - 43		3000	±2%	1/4 W
R103	1010369 - 95		390K	±5%	1/8 W
R104	1006750 - 39		2000	±2%	1/4 W
R105	- 56		10 K		
R106	- 49		5100		
R107	- 49		5100		
R108	- 39		2000		
R109	- 49		5100		
R110	- 49		5100		
R111	- 63		20 K		
R112	- 63		20 K		
R113	- 39		2000		
R114	- 63		20 K		
R115	- 39		2000		
R116	- 39		2000		
R117	- 63		20 K		
R118	- 39		2000		
R119	- 63		20 K		
R120	- 39		2000		
R121	- 39		2000		
R122	↓ - 39	↓	2000	↓	↓
R123	1006750 - 68	RESISTOR	33K	2%	1/4 W
C1	1006755 - 79	CAPACITOR	6.8	±10%	35V
C2	- 79				
C3	- 79				
C4	- 79				
C5	↓ - 79		↓		↓
C6	1006755 - 79		6.8		35V
C7	1006777 - 26		2200 UUF		100V
C8	1006777 - 26		2200 UUF		100V
C9	1006755 - 69		1.0		35V
C10	1006755 - 69		1.0		35V
C11	1006755 - 85		22		35V
C12	1006755 - 69		1.0		35V
C13	1006777 - 26		2200 UUF		100V
C14	1006777 - 26		2200 UUF		100V
C15	1006777 - 26		2200 UUF		100V
C16	1006755 - 69		1.0		35V
C17	- 69		1.0		
C18	- 85		22		
C19	- 69		1.0		
C20	↓ - 79	↓	6.8	↓	↓
C21	1006755 - 79	CAPACITOR	6.8	±10%	35V
CR1	1010362 - 002	DIODE	IN647		
CR2	1010362 - 002		IN647		
CR3	1010830 - 9		IN965B		15V-400MW
CR4	1010362 - 002		IN647		
CR5	1010362 - 002		IN647		
CR6	1010830 - 19		IN975B		39V-400MW
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11	↓	↓	↓		
CR12	1010385	DIODE	IN660		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR13	1010385	DIODE	IN660		
CR14	1010372 - 10				4.7V-250MW
CR15	1010372 - 18				10V-250MW
CR16	1010372 - 10				4.7V-250MW
CR17	1010385		IN660		
CR18					
CR19					
CR20					
CR21					
CR22					
CR23					
CR24					
CR25	↓		↓		
CR26	1010385		IN660		
CR27	1010372 - 10				4.7V-250MW
CR28	1010372 - 18				10V-250MW
CR29	1010372 - 10				
CR30	1010385		IN660		
CR31	1010385		IN660		
CR32	1010830 - 19	↓	IN975B		39V-400MW
CR33	1010830 - 19	DIODE	IN975B		39V-400MW
Q1	1010285	TRANSISTOR	2N722		
Q2	1010343 - 3				
Q3	1010285		2N722		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010285		2N722		
Q7	1010343 - 3				
Q8	1010343 - 3				
Q9	1010343 - 3				
Q10	1010343 - 3				
Q11	1010342		2N998		
Q12	1010343 - 3				
Q13	1010343 - 3				
Q14	1010343 - 3				
Q15	1010343 - 3				
Q16	1010397 - 1		2N930		
Q17	1010397 - 1		2N930		
Q18	1010397 - 1		2N930		
Q19	1010285		2N722		
Q20	1010397 - 1		2N930		
Q21	1010285		2N722		
Q22	1010285		2N722		
Q23	1010397 - 1		2N930		
Q24	1010285		2N722		
Q25	1010343 - 3				
Q26	1010343 - 3				
Q27	1010343 - 3				
Q28	1010397 - 1		2N930		
Q29	1010397 - 1		2N930		
Q30	1010397 - 1		2N930		
Q31	1010285		2N722		
Q32	1010397 - 1		2N930		
Q33	1010285		2N722		
Q34	1010285		2N722		
Q35	1010397 - 1		2N930		
Q36	1010285		2N722		
Q37	1010285		2N722		
Q38	1010285		2N722		
Q39	1010285		2N722		
Q40	1010342	↓	2N998		
Q41	1010342	TRANSISTOR	2N998		
K1	1010353 - 7	RELAY			
K2	1010353 - 7	RELAY			
K3	1010353 - 7	RELAY			
K4	1010353 - 7	RELAY			

REF DWG
MODE MODULE ASS Y DWG NO. 2007154

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

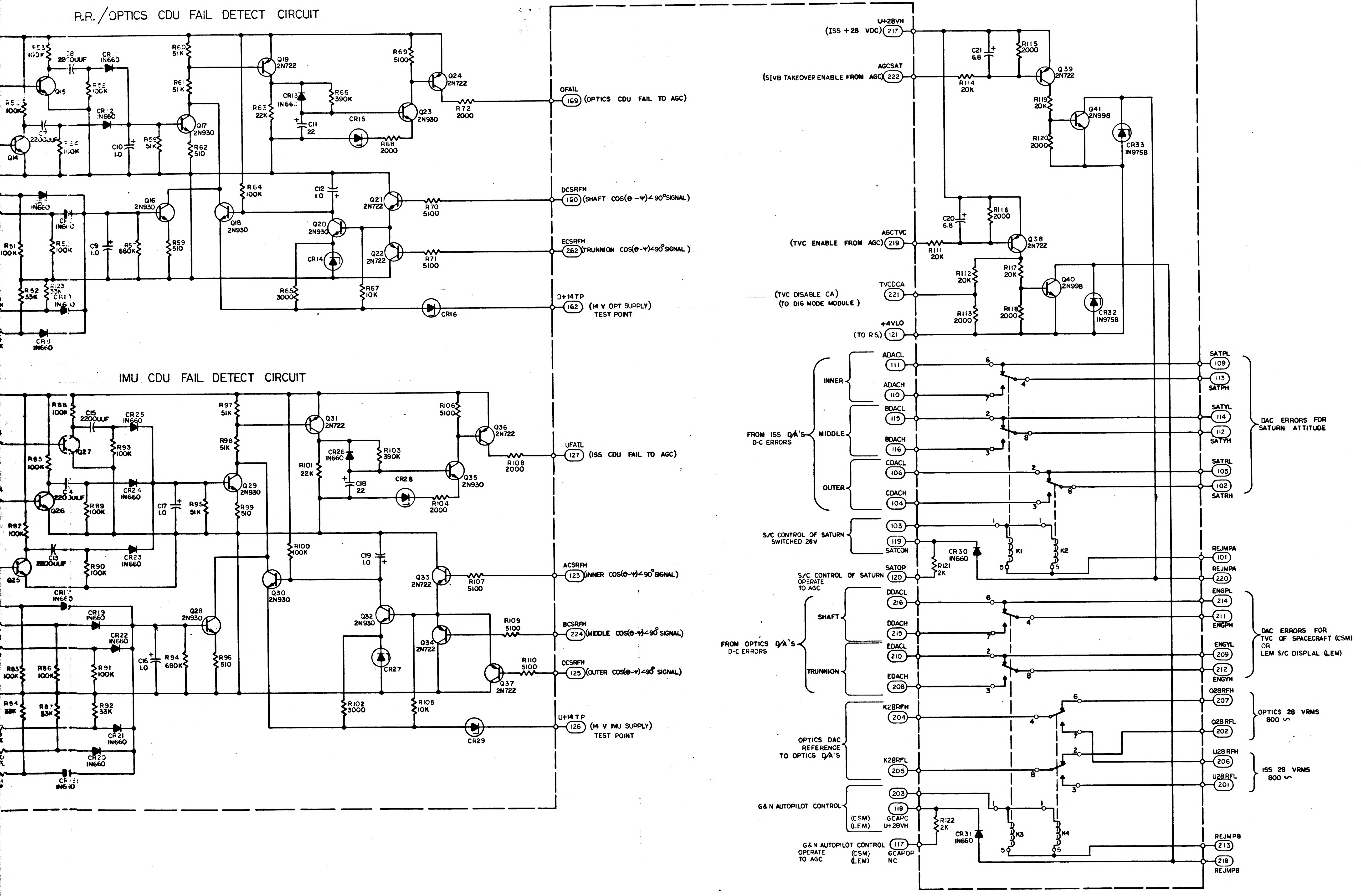
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE
CHECKED
APPROVAL 23 Jan 65
APPROVAL 23 Jan 65
NASA APPROVAL
MIT APPROVAL 26 Jan 65

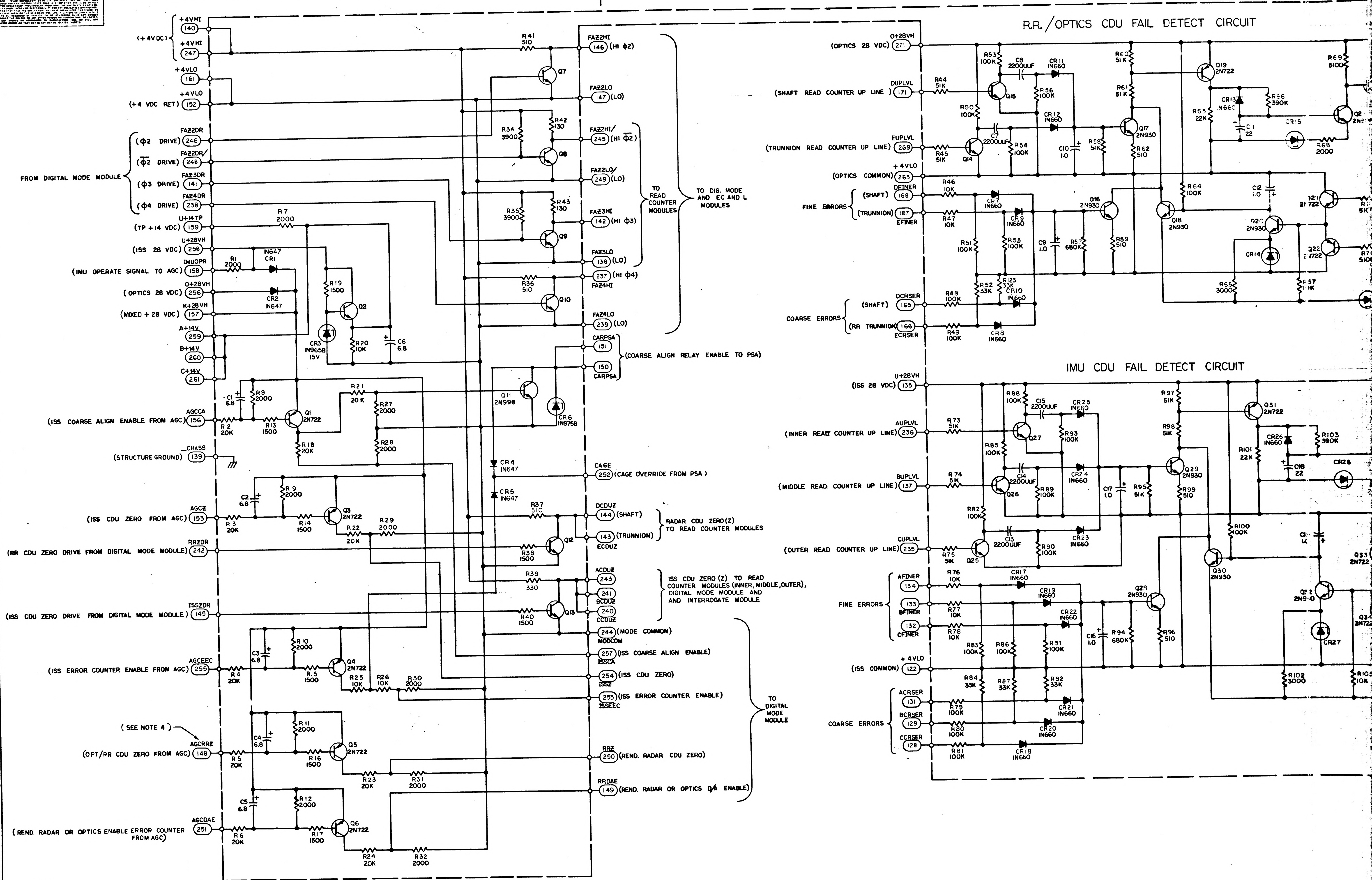
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MODE MODULE

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO. 2010054
SCALE
WT
SHEET 1 OF 1


R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
OFAIL 169 (OPTICS CDU FAIL TO AGC)
DCSRFH 160 (SHAFT COS(θ-ψ)<90° SIGNAL)
ECSRFH 262 (TRUNNION COS(θ-ψ)<90° SIGNAL)
O+14TP 162 (14 V OPT SUPPLY) TEST POINT
UFAIL 127 (ISS CDU FAIL TO AGC)
ACSRFH 123 (INNER COS(θ-ψ)<90° SIGNAL)
BCSRFH 224 (MIDDLE COS(θ-ψ)<90° SIGNAL)
CCSRFH 125 (OUTER COS(θ-ψ)<90° SIGNAL)
U+14TP 126 (14 V IMU SUPPLY) TEST POINT
Q14 Q15 Q16 Q17 2N930 Q18 2N930 Q19 2N722 Q20 2N930 Q21 2N722 Q22 2N722 Q23 2N930 Q24 2N722
Q25 Q26 Q27 Q28 2N930 Q29 2N930 Q30 2N930 Q31 2N722 Q32 2N930 Q33 2N722 Q34 2N722 Q35 2N930 Q36 2N722 Q37 2N722
U+28VH (ISS +28 VDC) 217
AGCSAT (SIVB TAKEOVER ENABLE FROM AGC) 222
AGCTVC (TVC ENABLE FROM AGC) 219
TVCDCA (TVC DISABLE CA) (TO DIG MODE MODULE) 221
+4VLO (TO R.S.) 121
Q38 2N722 Q39 2N722 Q40 2N998 Q41 2N998
CR32 IN975B CR33 IN975B
FROM ISS D/A'S D-C ERRORS
INNER ADACL 111 ADACH 110
MIDDLE BDACL 115 BDACH 116
OUTER CDACL 106 CDACH 104
SATPL 109 113 SATPH SATYL 114 112 SATYH SATRL 105 102 SATRH
DAC ERRORS FOR SATURN ATTITUDE
S/C CONTROL OF SATURN SWITCHED 28V 103 119 SATCON
S/C CONTROL OF SATURN OPERATE TO AGC SATOP 120
CR30 IN660 R121 2K K1 K2
REJMPA 101 REJMPA 220
FROM OPTICS D/A'S D-C ERRORS
SHAFT DDACL 216 DDACH 215
TRUNNION EDACL 210 EDACH 208
ENGPL 214 211 ENGPH ENGYL 209 212 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT (CSM) OR LEM S/C DISPLAL (LEM)
OPTICS DAC REFERENCE TO OPTICS D/A'S K28RFH 204 K28RFL 205
O28RFH 207 O28RFL 202 OPTICS 28 VRMS 800 ∿
U28RFH 206 U28RFL 201 ISS 28 VRMS 800 ∿
G&N AUTOPILOT CONTROL 203 118 GCAPC (CSM) (LEM) U+28VH
G&N AUTOPILOT CONTROL OPERATE TO AGC (CSM) (LEM) 117 GCAPOP NC
R122 2K CR31 IN660 K3 K4
REJMPB 213 218 REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE
R1	1006750 -39	RESISTOR	2000
R2	-63		20K
R3	-63		20K
R4	-63		20K
R5	-63		20K
R6	-63		20K
R7	-39		2000
R8	-39		2000
R9	-39		2000
R10	-39		2000
R11	-39		2000
R12	-39		2000
R13	-36		1500
R14	-36		1500
R15	-36		1500
R16	-36		1500
R17	-36		1500
R18	-63		20K
R19	-36		1500
R20	-56		10K
R21	-63		20K
R22	-63		20K
R23	-63		20K
R24	-63		20K
R25	-56		10K
R26	-56		10K
R27	-39		2000
R28	-39		2000
R29	-39		2000
R30	-39		2000
R31	-39		2000
R32	-39		2000
R34	-46		3900
R35	-46		3900
R36	-25		510
R37	-25		510
R38	-36		1500
R39	-20		330
R40	-36		1500
R41	-25		510
R42	-11		130
R43	-11		130
R44	-73		51K
R45	-73		51K
R46	-56		10K
R47	-56		10K
R48	-80		100K
R49	-80		100K
R50	-80		100K
R51	-80		100K
R52	-68		33K
R53	-80		100K
R54	-80		100K
R55	-80		100K
R56	1006750 -80		100K
R57	1010369 -101		680K
R58	1006750 -73		51K
R59	-25		510
R60	-73		51K
R61	-73		51K
R62	-25		510
R63	-64		22K
R64	-80		100K
R65	1006750 -43		3000
R66	1010369 -95		390K
R67	1006750 -56		10K
R68	-39		2000
R69	-49		5100
R70	-49		5100
R71	-49		5100
R72	-39		2000
R73	-73		51K
R74	-73		51K
R75	-73		51K
R76	-56		10K
R77	-56		10K
R78	-56		10K
R79	-80		100K
R80	1006750-80	RESISTOR	100K

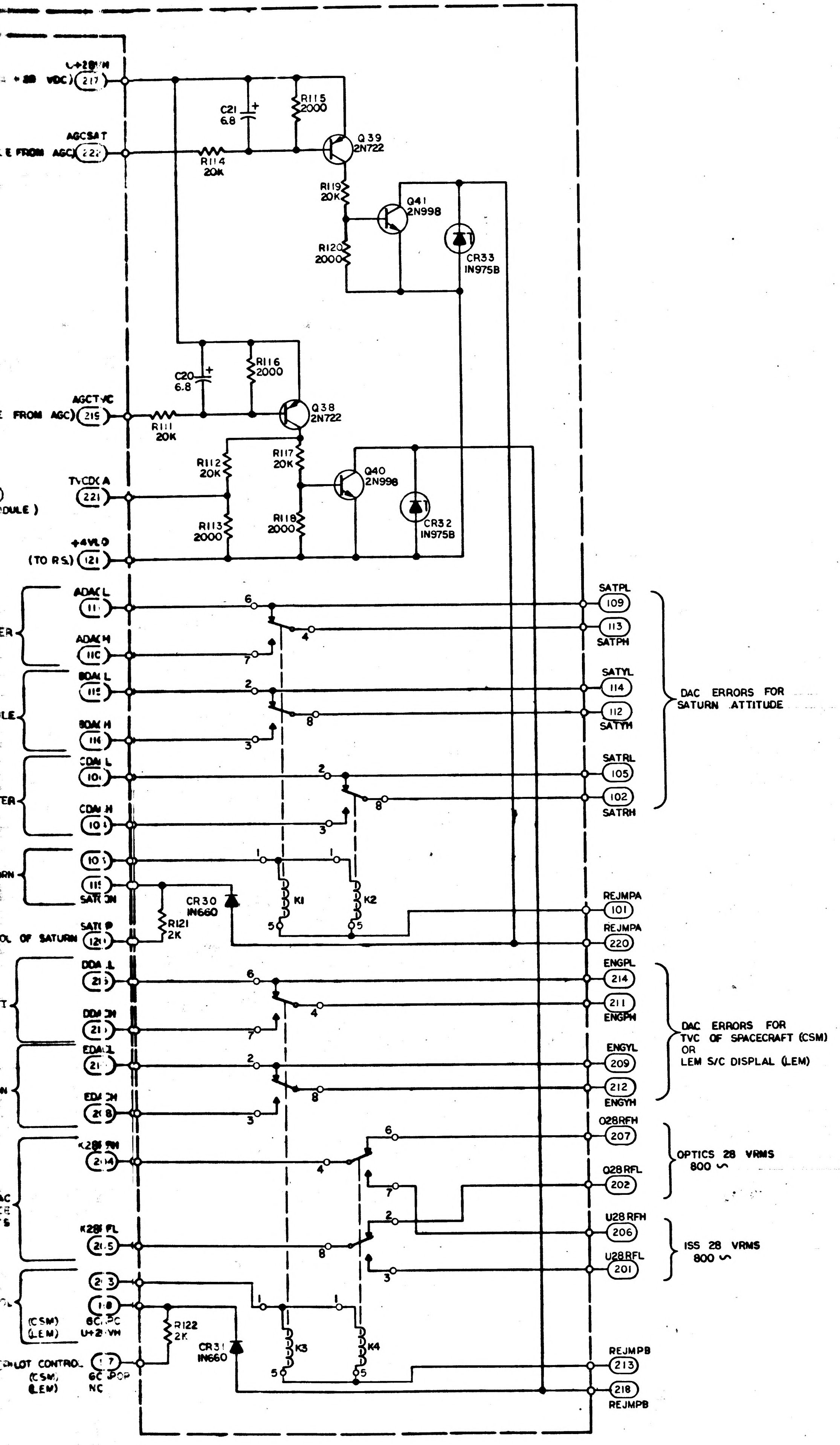

10
9
8
7
D
C
B
A
R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
(+4VDC) +4VHI 140
+4VHI 247
+4VLO 161
(+4 VDC RET) +4VLO 152
FROM DIGITAL MODE MODULE
(φ2 DRIVE) FAZ2DR 246
(φ̄2 DRIVE) FAZ2DR/ 248
(φ3 DRIVE) FAZ3DR 141
(φ4 DRIVE) FAZ4DR 238
(TP +14 VDC) U+14TP 159
(ISS 28 VDC) U+28VH 258
(IMU OPERATE SIGNAL TO AGC) IMUOPR 158
(OPTICS 28 VDC) O+28VH 256
(MIXED + 28 VDC) K+28VH 157
A+14V 259
B+14V 260
C+14V 261
(ISS COARSE ALIGN ENABLE FROM AGC) AGCCA 156
(STRUCTURE GROUND) CHASS 139
(ISS CDU ZERO FROM AGC) AGCZ 153
(RR CDU ZERO DRIVE FROM DIGITAL MODE MODULE) RRZDR 242
(ISS CDU ZERO DRIVE FROM DIGITAL MODE MODULE) ISSZDR 145
(ISS ERROR COUNTER ENABLE FROM AGC) AGCEEC 255
(SEE NOTE 4)
(OPT/RR CDU ZERO FROM AGC) AGCRRZ 148
(REND. RADAR OR OPTICS ENABLE ERROR COUNTER FROM AGC) AGCDAE 251
R41 510
Q7
R34 3900
R42 130
Q8
R35 3900
R43 130
Q9
R36 510
Q10
R7 2000
R1 2000
IN647 CR1
CR2 IN647
R19 1500
Q2
CR3 IN965B 15V
R20 10K
C6 6.8
C1 6.8
R8 2000
R2 20K
R13 1500
Q1 2N722
R18 20K
R21 20K
R27 2000
R28 2000
Q11 2N998
CR6 IN975B
CR4 IN647
CR5 IN647
C2 6.8
R9 2000
R3 20K
R14 1500
Q3 2N722
R22 20K
R29 2000
R37 510
Q12
R38 1500
R39 330
Q13
R40 1500
C3 6.8
R10 2000
Q4 2N722
R4 20K
R5 1500
R25 10K
R26 10K
R30 2000
C4 6.8
R11 2000
R5 20K
R16 1500
Q5 2N722
R23 20K
R31 2000
C5 6.8
R12 2000
R6 20K
R17 1500
Q6 2N722
R24 20K
R32 2000
FAZ2HI 146 (HI φ2)
FAZ2LO 147 (LO)
FAZ2HI/ 245 (HI φ̄2)
FAZ2LO/ 249 (LO)
FAZ3HI 142 (HI φ3)
FAZ3LO 138 (LO)
237 (HI φ4) FAZ4HI
FAZ4LO 239 (LO)
TO READ COUNTER MODULES
TO DIG. MODE AND EC AND L MODULES
CARPSA 151
150 CARPSA
(COARSE ALIGN RELAY ENABLE TO PSA)
CAGE 252 (CAGE OVERRIDE FROM PSA)
DCDUZ 144 (SHAFT)
143 (TRUNNION) ECDUZ
RADAR CDU ZERO (Z) TO READ COUNTER MODULES
ACDUZ 243
241 BCDUZ
240 CCDUZ
ISS CDU ZERO (Z) TO READ COUNTER MODULES (INNER, MIDDLE, OUTER), DIGITAL MODE MODULE AND AND INTERROGATE MODULE
244 (MODE COMMON) MODCOM
257 (ISS COARSE ALIGN ENABLE) ISSCA
254 (ISS CDU ZERO) ISSZ
253 (ISS ERROR COUNTER ENABLE) ISSEEC
RRZ 250 (REND. RADAR CDU ZERO)
RRDAE 149 (REND. RADAR OR OPTICS D/A ENABLE)
TO DIGITAL MODE MODULE
(OPTICS 28 VDC) O+28VH 271
(SHAFT READ COUNTER UP LINE) DUPLVL 171
(TRUNNION READ COUNTER UP LINE) EUPLVL 269
(OPTICS COMMON) +4VLO 263
FINE ERRORS (SHAFT) DFINER 168
(TRUNNION) 167 EFINER
COARSE ERRORS (SHAFT) DCRSER 165
(RR TRUNNION) 166 ECRSER
R53 100K
C8 2200UUF
CR11 IN660
R44 51K
R50 100K
Q15
R56 100K
C7 2200UUF
CR12 IN660
R45 51K
Q14
R54 100K
C10 1.0
R58 51K
R60 51K
R61 51K
Q17 2N930
R62 510
Q19 2N722
R63 22K
CR13 IN660
C11 22
R66 390K
CR15
R68 2000
R69 5100
R46 10K
CR7 IN660
CR9 IN660
R47 10K
R51 100K
R55 100K
C9 1.0
R57 680K
Q16 2N930
R59 510
Q18 2N930
R64 100K
C12 1.0
Q20 2N930
CR14
R65 3000
R67 1.1K
R52 33K
R123 33K
CR10 IN660
R48 100K
R49 100K
CR8 IN660
(ISS 28 VDC) U+28VH 135
(INNER READ COUNTER UP LINE) AUPLVL 236
(MIDDLE READ COUNTER UP LINE) BUPLVL 137
(OUTER READ COUNTER UP LINE) CUPLVL 235
FINE ERRORS AFINER 134
133 BFINER
132 CFINER
(ISS COMMON) +4VLO 122
COARSE ERRORS ACRSER 131
BCRSER 129
CCRSER 128
R88 100K
C15 2200UUF
CR25 IN660
R73 51K
Q27
R93 100K
R85 100K
C14 2200UUF
CR24 IN660
R74 51K
Q26
R89 100K
C17 1.0
R95 51K
R97 51K
R98 51K
Q29 2N930
R99 510
Q31 2N722
R101 22K
CR26 IN660
C18 22
R103 390K
CR28
R82 100K
C13 2200UUF
CR23 IN660
R75 51K
Q25
R90 100K
R100 100K
Q30 2N930
R76 10K
CR17 IN660
CR19 IN660
R77 10K
CR22 IN660
R78 10K
Q28 2N930
C16 1.0
R94 680K
R96 510
R83 100K
R86 100K
R91 100K
CR27
R84 33K
R87 33K
R92 33K
R79 100K
CR21 IN660
R80 100K
CR20 IN660
R81 100K
CR18 IN660
R102 3000

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE IN OHMS
3. CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED
4. WIREWRAP PROGRAM PIN DESIGNATIONS ARE LABELED ABOVE PIN NUMBERS

2010054 SHT

2010054	D

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17005	9 Mar 65	[illegible]
B	REVISED PER TDRR 17979	5 Apr. 65	[illegible]
C	REVISED PER TDRR 18517	23APR65	WK
D	REVISED PER TDRR 21129	29 Jul 65	KCH



+28VDC (+28 VDC) 217
AGCSAT
E FROM AGC 222
C21 6.8
R115 2000
Q39 2N722
R114 20K
R119 20K
Q41 2N998
R120 2000
CR33 IN975B
C20 6.8
R116 2000
AGCTVC
E FROM AGC 215
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
TVCDCA 221
DULE)
R113 2000
R118 2000
CR32 IN975B
+4VLD (TO RS.) 121
ADACL 11
ADACH 11C
BDACL 115
BDACH 116
CDACL 10
CDACH 10
10
11
SAT ON
SAT P 120
OL OF SATURN
CR30 IN660
R121 2K
K1
K2
DDACL 21
DDACH 21
EDACL 21
EDACH 208
K28 RH 204
K28 FL 205
213
18
(CSM) 6C PC
(LEM) U+28VH
PILOT CONTROL 17
(CSM) 6C POP
(LEM) NC
R122 2K
CR31 IN660
K3
K4
SATPL 109
113 SATPH
SATYL 114
112 SATYH
SATRL 105
102 SATRH
DAC ERRORS FOR SATURN ATTITUDE
REJMPA 101
REJMPA 220
ENGPL 214
211 ENGPH
ENGYL 209
212 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT (CSM) OR LEM S/C DISPLAL (LEM)
028RFH 207
028RFL 202
OPTICS 28 VRMS 800 ∽
U28RFH 206
U28RFL 201
ISS 28 VRMS 800 ∽
REJMPB 213
218 REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-39	RESISTOR	2000	±2%	1/4W
R2	-63		20K		
R3	-63		20K		
R4	-63		20K		
R5	-63		20K		
R6	-63		20K		
R7	-39		2000		
R8	-39		2000		
R9	-39		2000		
R10	-39		2000		
R11	-39		2000		
R12	-39		2000		
R13	-36		1500		
R14	-36		1500		
R15	-36		1500		
R16	-36		1500		
R17	-36		1500		
R18	-63		20K		
R19	-36		1500		
R20	-56		10K		
R21	-63		20K		
R22	-63		20K		
R23	-63		20K		
R24	-63		20K		
R25	-56		10K		
R26	-56		10K		
R27	-39		2000		
R28	-39		2000		
R29	-39		2000		
R30	-39		2000		
R31	-39		2000		
R32	-39		2000		
R34	-46		3900		
R35	-46		3900		
R36	-25		510		
R37	-25		510		
R38	-36		1500		
R39	-20		330		
R40	-36		1500		
R41	-25		510		
R42	-11		130		
R43	-11		130		
R44	-73		51K		
R45	-73		51K		
R46	-56		10K		
R47	-56		10K		
R48	-80		100K		
R49	-80		100K		
R50	-80		100K		
R51	-80		100K		
R52	-80		100K		
R53	-80		100K		
R54	-80		100K		
R55	-80		100K		
R56	1006750-80		100K	±2%	1/4 W
R57	1010369-101		680K	±5%	1/8 W
R58	1006750-77		75K	±2%	1/4 W
R59	-25		510		
R60	-73		51K		
R61	-73		51K		
R62	-25		510		
R63	-64		22K		
R64	-80		100K		
R65	1006750-52		6800	±2%	1/4 W
R66	1010369-95		390K	±5%	1/8 W
R67					
R68	1006750-39		2000	±2%	1/4 W
R69	-49		5100		
R70	-49		5100		
R71	-49		5100		
R72	-39		2000		
R73	-73		51K		
R74	-73		51K		
R75	-73		51K		
R76	-56		10K		
R77	-56		10K		
R78	-56		10K		
R79	-80		100K		
R80	1006750-80		100K	±2%	1/4 W
R124	1010604-16		750	±1%	1W
R125	1006750-47		4300	±2%	1/4 W
R126	-31		910		
R127	-63		20K		
R128	-47		4300		
R129	-32		1000		
R130	1006750-63	RESISTOR	20K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R81	1006750-80	RESISTOR	100K	±2%	1/4W
R82	-80		100K		
R83	-80		100K		
R84	-80		100K		
R85	-80		100K		
R86	-80		100K		
R87	-80		100K		
R88	-80		100K		
R89	-80		100K		
R90	-80		100K		
R91	-80		100K		
R92	-80		100K		
R93	1006750-80		100K	±2%	1/4W
R94	1010369-101		680K	±5%	1/8W
R95	1006750-77		75K	±2%	1/4W
R96	-25		510		
R97	-73		51K		
R98	-73		51K		
R99	-25		510		
R100	-80		100K		
R101	-64		22K		
R102	1006750-52		6800	±2%	1/4W
R103	1010369-95		390K	±5%	1/8W
R104	1006750-39		2000	±2%	1/4W
R106	1006750-49		5100	±2%	1/4W
R107	-49		5100		
R108	-39		2000		
R109	-49		5100		
R110	-49		5100		
R111	-63		20K		
R112	-63		20K		
R113	-39		2000		
R114	-63		20K		
R115	-39		2000		
R116	-39		2000		
R117	-63		20K		
R118	-39		2000		
R119	-63		20K		
R120	-39		2000		
R121	-39		2000		
R122	-39		2000		
R123	1006750-80	RESISTOR	100K	2%	1/4W
C1	1006755-79	CAPACITOR	6.8	±10%	35V
C2	-79				
C3	-79				
C4	-79				
C5	-79				
C6	1006755-79		6.8		35V
C7	1006777-26		2200UUF		100V
C8	1006777-26		2200UUF		100V
C9	1006755-69		1.0		35V
C10	1006755-69		1.0		35V
C11	1006755-85		22		35V
C12	1006755-69		1.0		35V
C13	1006777-26		2200UUF		100V
C14	1006777-26		2200UUF		100V
C15	1006777-26		2200UUF		100V
C16	1006755-69		1.0		35V
C17	-69		1.0		
C18	-85		22		
C19	-69		1.0		
C20	-79		6.8		
C21	1006755-79	CAPACITOR	6.8	±10%	35V
CR3	1010830-9	DIODE	IN965B		15V-400MW
CR4	1010362-002		IN647		
CR5	1010362-002		IN647		
CR6	1010830-19		IN975B		39V-400MW
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	IN660		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR13	1010385	DIODE	IN660		
CR14	1010372-16				8.2V-250MW
CR15	1010372-18				10V-250MW
CR16	1010372-16				8.2V-250MW
CR17	1010385		IN660		
CR18					
CR19					
CR20					
CR21					
CR22					
CR23					
CR24					
CR25					
CR26	1010385		IN660		
CR27	1010372-16				8.2V-250MW
CR28	1010372-18				10V-250MW
CR29	1010372-16				8.2V-250MW
CR30	1010385		IN660		
CR31	1010385		IN660		
CR32	1010830-19		IN975B		39V-400MW
CR33	1010830-19	DIODE	IN975B		39V-400MW
Q1	1010285	TRANSISTOR	2N722		
Q2	1010343-3				
Q3	1010285		2N722		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010285		2N722		
Q7	1010343-3				
Q8	1010343-3				
Q9	1010343-3				
Q10	1010343-3				
Q11	1010342		2N998		
Q12	1010343-3				
Q13	1010343-3				
Q14	1010343-3				
Q15	1010343-3				
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010397-1		2N930		
Q19	1010285		2N722		
Q20	1010397-1		2N930		
Q21	1010285		2N722		
Q22	1010285		2N722		
Q23	1010397-1		2N930		
Q24	1010285		2N722		
Q25	1010343-3				
Q26	1010343-3				
Q27	1010343-3				
Q28	1010397-1		2N930		
Q29	1010397-1		2N930		
Q30	1010397-1		2N930		
Q31	1010285		2N722		
Q32	1010397-1		2N930		
Q33	1010285		2N722		
Q34	1010285		2N722		
Q35	1010397-1		2N930		
Q36	1010285		2N722		
Q37	1010285		2N722		
Q38	1010285		2N722		
Q39	1010285		2N722		
Q40	1010342		2N998		
Q41	1010342	TRANSISTOR	2N998		
K1	1010353-7	RELAY			
K2	1010353-7	RELAY			
K3	1010353-7	RELAY			
K4	1010353-7	RELAY			

REF DWG
MODE MODULE ASSY DWG NO. 2007154

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

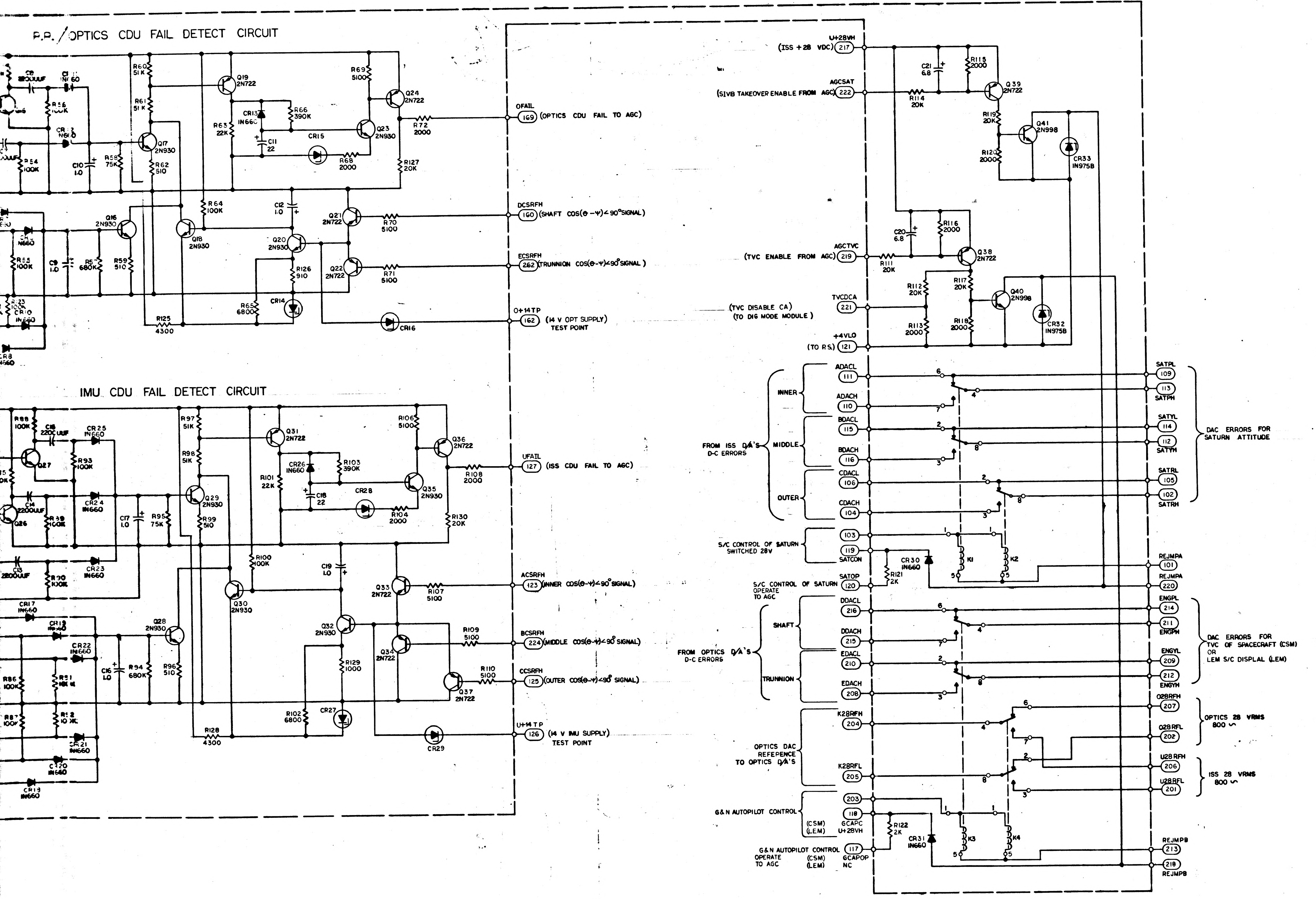
SCHEMATIC,
MODE MODULE

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	J	2010054
SCALE	WT	SHEET 1 OF 1

MASTER

2010054	SHT

7 6 5 4 3



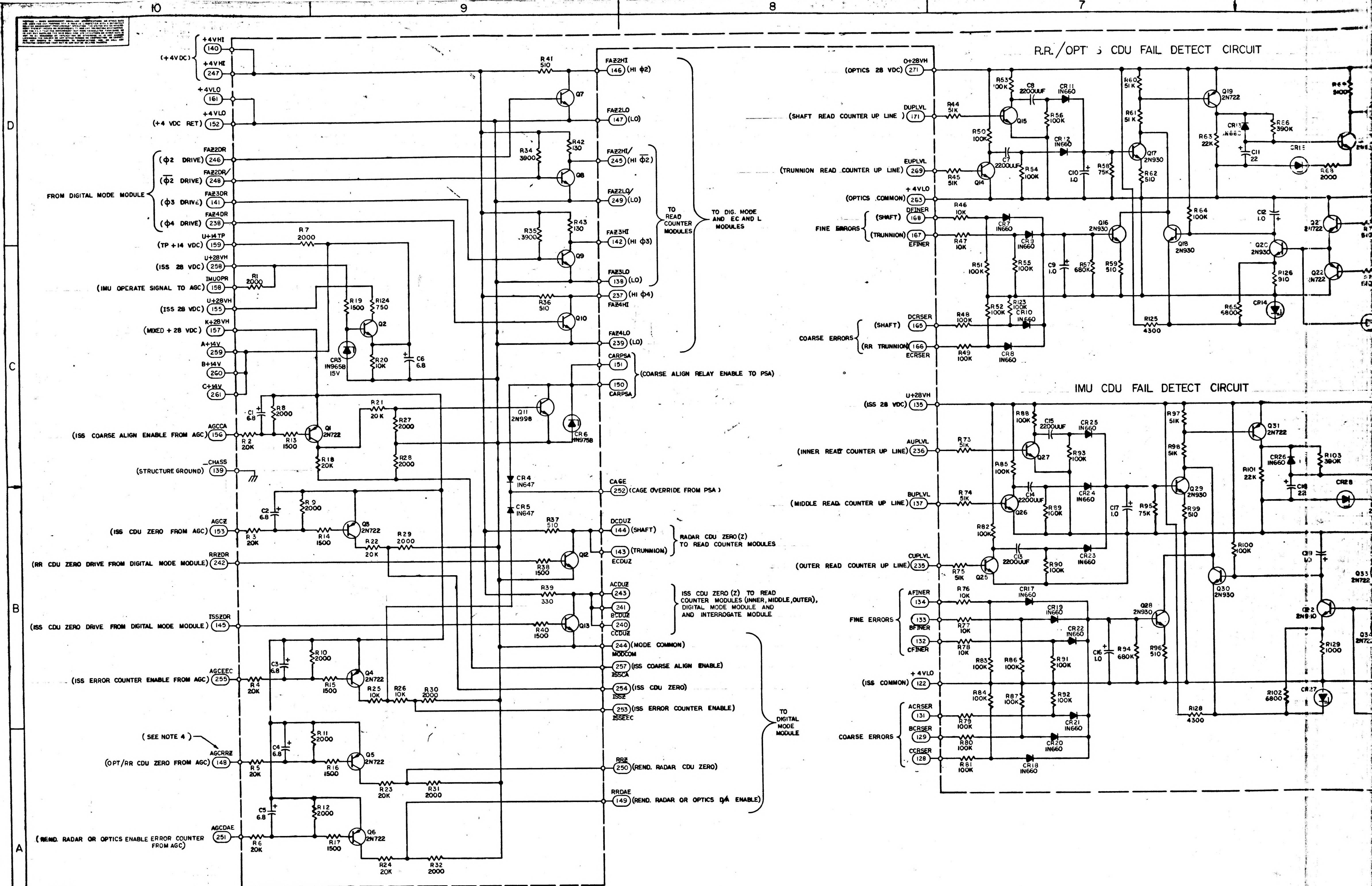
P.P./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
R60 51K
R61 51K
Q17 2N930
R62 510
Q19 2N722
CR13 1N660
R66 390K
R63 22K
C11 22
CR15
R68 2000
Q23 2N930
R69 5100
Q24 2N722
R72 2000
R127 20K
OFAIL
169 (OPTICS CDU FAIL TO AGC)
R64 100K
C12 1.0
Q16 2N930
Q18 2N930
Q20 2N930
Q21 2N722
Q22 2N722
R70 5100
R71 5100
DCSRFH
160 (SHAFT COS(θ-ψ)<90° SIGNAL)
ECSRFH
262 (TRUNNION COS(θ-ψ)<90° SIGNAL)
R126 910
R65 6800
CR14
CR16
R125 4300
O+14TP
162 (14 V OPT SUPPLY) TEST POINT
C8 2200UUF
C10 1.0
R54 100K
R58 75K
C9 1.0
R55 100K
R59 510
R88 100K
C16 2200UUF
CR25 1N660
R93 100K
Q27
C14 2200UUF
Q26
CR24 1N660
R39 100K
C17 1.0
R95 75K
C13 2200UUF
R90 100K
CR23 1N660
CR17 1N660
CR19 1N660
CR22 1N660
Q28 2N930
C15 1.0
R94 680K
R96 510
R86 100K
R91 100K
R92 100K
CR21 1N660
CR20 1N660
CR18 1N660
R97 51K
R98 51K
Q29 2N930
R99 510
Q31 2N722
CR26 1N660
R103 390K
R101 22K
C18 22
CR28
R104 2000
Q35 2N930
R106 5100
Q36 2N722
R108 2000
R130 20K
UFAIL
127 (ISS CDU FAIL TO AGC)
R100 100K
C19 1.0
Q30 2N930
Q33 2N722
R107 5100
ACSRFH
123 (INNER COS(θ-ψ)<90° SIGNAL)
Q32 2N930
Q34 2N722
R109 5100
BCSRFH
224 (MIDDLE COS(θ-ψ)<90° SIGNAL)
R129 1000
Q37 2N722
R110 5100
CCSRFH
125 (OUTER COS(θ-ψ)<90° SIGNAL)
R102 6800
CR27
R128 4300
CR29
U+14 TP
126 (14 V IMU SUPPLY) TEST POINT
U+28VH
(ISS +28 VDC) 217
AGCSAT
(SIVB TAKEOVER ENABLE FROM AGC) 222
C21 6.8
R115 2000
R114 20K
Q39 2N722
R119 20K
Q41 2N998
R120 2000
CR33 1N975B
C20 6.8
R116 2000
AGCTVC
(TVC ENABLE FROM AGC) 219
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
CR32 1N975B
TVCDCA
(TVC DISABLE CA) (TO D16 MODE MODULE) 221
R113 2000
R118 2000
+4VLO
(TO R.S.) 121
FROM ISS D/A'S D-C ERRORS
INNER
MIDDLE
OUTER
ADACL 111
ADACH 110
BDACL 115
BDACH 116
CDACL 106
CDACH 104
SATPL 109
113 SATPH
SATYL 114
112 SATYH
SATRL 105
102 SATRH
DAC ERRORS FOR SATURN ATTITUDE
S/C CONTROL OF SATURN SWITCHED 28V
103
119 SATCON
CR30 1N660
R121 2K
K1
K2
S/C CONTROL OF SATURN OPERATE TO AGC
SATOP 120
REJMPA 101
REJMPA 220
FROM OPTICS D/A'S D-C ERRORS
SHAFT
TRUNNION
DDACL 216
DDACH 215
EDACL 210
EDACH 208
ENGPL 214
211 ENGPH
ENGYL 209
212 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT (CSM) OR LEM S/C DISPLAY (LEM)
OPTICS DAC REFERENCE TO OPTICS D/A'S
K28RFH 204
K28RFL 205
O28RFH 207
O28RFL 202
OPTICS 28 VRMS 800 ∿
U28RFH 206
U28RFL 201
ISS 28 VRMS 800 ∿
G&N AUTOPILOT CONTROL
203
118 GCAPC U+28VH
(CSM) (LEM)
R122 2K
CR31 1N660
K3
K4
G&N AUTOPILOT CONTROL OPERATE TO AGC
(CSM) (LEM)
117 GCAPOP NC
REJMPB 213
218 REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL
R1	1006750 - 39	RESISTOR	2000	±2%
R2	- 63		20K	
R3	- 63		20K	
R4	- 63		20K	
R5	- 63		20K	
R6	- 63		20K	
R7	- 39		2000	
R8	- 39		2000	
R9	- 39		2000	
R10	- 39		2000	
R11	- 39		2000	
R12	- 39		2000	
R13	- 36		1500	
R14	- 36		1500	
R15	- 36		1500	
R16	- 36		1500	
R17	- 36		1500	
R18	- 63		20K	
R19	- 36		1500	
R20	- 56		10K	
R21	- 63		20K	
R22	- 63		20K	
R23	- 63		20K	
R24	- 63		20K	
R25	- 56		10K	
R26	- 56		10K	
R27	- 39		2000	
R28	- 39		2000	
R29	- 39		2000	
R30	- 39		2000	
R31	- 39		2000	
R32	- 39		2000	
R34	- 46		3900	
R35	- 46		3900	
R36	- 25		510	
R37	- 25		510	
R38	- 36		1500	
R39	- 20		330	
R40	- 36		1500	
R41	- 25		510	
R42	- 11		130	
R43	- 11		130	
R44	- 73		51K	
R45	- 73		51K	
R46	- 56		10K	
R47	- 56		10K	
R48	- 80		100K	
R49	- 80		100K	
R50	- 80		100K	
R51	- 80		100K	
R52	- 80		100K	
R53	- 80		100K	
R54	80		100K	
R55	- 80		100K	
R56	1006750 - 80		100K	±2%
R57	1010369 - 101		680K	±5%
R58	1006750 - 77		75K	±2%
R59	- 25		510	
R60	- 73		51 K	
R61	- 73		51 K	
R62	- 25		510	
R63	- 64		22 K	
R64	- 80		100K	
R65	1006750 - 52		6800	±2%
R66	1010369 - 95		390K	±5%
R67				
R68	1006750 - 39		2000	±2%
R69	- 49		5100	
R70	- 49		5100	
R71	- 49		5100	
R72	- 39		2000	
R73	- 73		51 K	
R74	- 73		51 K	
R75	- 73		51 K	
R76	- 56		10 K	
R77	- 56		10 K	
R78	- 56		10 K	
R79	- 80		100K	
R80	1006750 - 80		100K	±2%
R124	1010604 - 16		750	±1%
R125	1006750 - 47		4300	±2%
R126	- 31		910	
R127	- 63		20K	
R128	- 47		4300	
R129	- 32		1000	
R130	1006750 - 63	RESISTOR	20K	±2%

2010054 SHT

7 6 5 4 3

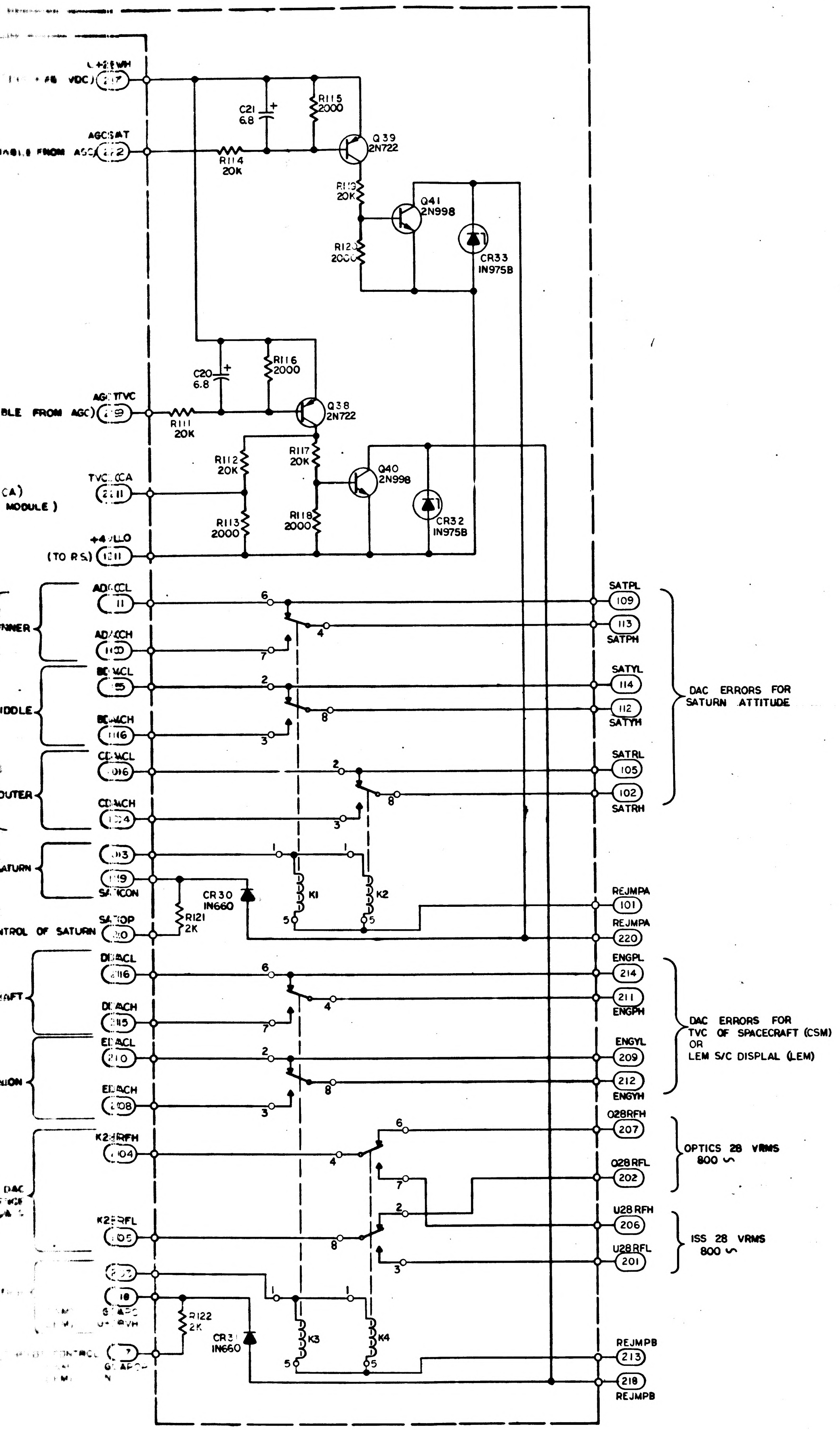
E2


R.R./OPT'S CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
(+4 VDC) +4VHI 140
+4VHI 247
+4VLO 161
(+4 VDC RET) +4VLO 152
FROM DIGITAL MODE MODULE
(Φ2 DRIVE) FAZ2DR 246
(Φ2 DRIVE) FAZ2DR/ 248
(Φ3 DRIVE) FAZ3DR 141
(Φ4 DRIVE) FAZ4DR 238
(TP +14 VDC) U+14TP 159
(ISS 28 VDC) U+28VH 258
(IMU OPERATE SIGNAL TO AGC) IMUOPR 158
(ISS 28 VDC) U+28VH 155
(MIXED + 28 VDC) K+28VH 157
A+14V 259
B+14V 260
C+14V 261
(ISS COARSE ALIGN ENABLE FROM AGC) AGCCA 156
(STRUCTURE GROUND) CHASS 139
(ISS CDU ZERO FROM AGC) AGCZ 153
(RR CDU ZERO DRIVE FROM DIGITAL MODE MODULE) RRZDR 242
(ISS CDU ZERO DRIVE FROM DIGITAL MODE MODULE) ISSZDR 145
(ISS ERROR COUNTER ENABLE FROM AGC) AGCEEC 255
(SEE NOTE 4)
(OPT/RR CDU ZERO FROM AGC) AGCRRZ 148
(REND. RADAR OR OPTICS ENABLE ERROR COUNTER FROM AGC) AGCDAE 251
FAZ2HI 146 (HI Φ2)
FAZ2LO 147 (LO)
FAZ2HI/ 245 (HI Φ2)
FAZ2LO/ 249 (LO)
FAZ3HI 142 (HI Φ3)
FAZ3LO 138 (LO)
237 (HI Φ4) FAZ4HI
FAZ4LO 239 (LO)
TO READ COUNTER MODULES
TO DIG. MODE AND EC AND L MODULES
CARPSA 151
150 CARPSA
(COARSE ALIGN RELAY ENABLE TO PSA)
CAGE 252 (CAGE OVERRIDE FROM PSA)
DCDUZ 144 (SHAFT)
143 (TRUNNION) ECDUZ
RADAR CDU ZERO (Z) TO READ COUNTER MODULES
ACDUZ 243
241 BCDUZ
240 CCDUZ
ISS CDU ZERO (Z) TO READ COUNTER MODULES (INNER, MIDDLE, OUTER), DIGITAL MODE MODULE AND INTERROGATE MODULE
244 (MODE COMMON) MODCOM
257 (ISS COARSE ALIGN ENABLE) ISSCA
254 (ISS CDU ZERO) ISSZ
253 (ISS ERROR COUNTER ENABLE) ISSEEC
RRZ 250 (REND. RADAR CDU ZERO)
RRDAE 149 (REND. RADAR OR OPTICS D/A ENABLE)
TO DIGITAL MODE MODULE
R41 510, Q7, R42 130, R34 3900, Q8, R43 130, R35 3900, Q9, R36 510, Q10
R7 2000, R1 2000, R19 1500, R124 750, Q2, CR3 1N965B 15V, R20 10K, C6 6.8
C1 6.8, R8 2000, R2 20K, R13 1500, Q1 2N722, R18 20K, R21 20K, R27 2000, R28 2000
Q11 2N998, CR6 1N975B, CR4 1N647, CR5 1N647
C2 6.8, R9 2000, R3 20K, R14 1500, Q3 2N722, R22 20K, R29 2000
R37 510, Q12, R38 1500, R39 330, R40 1500, Q13
C3 6.8, R10 2000, R4 20K, R15 1500, Q4 2N722, R25 10K, R26 10K, R30 2000
C4 6.8, R11 2000, R5 20K, R16 1500, Q5 2N722, R23 20K, R31 2000
C5 6.8, R12 2000, R6 20K, R17 1500, Q6 2N722, R24 20K, R32 2000
(OPTICS 28 VDC) O+28VH 271
(SHAFT READ COUNTER UP LINE) DUPLVL 171
(TRUNNION READ COUNTER UP LINE) EUPLVL 269
(OPTICS COMMON) +4VLO 263
FINE ERRORS (SHAFT) DFINER 168, (TRUNNION) 167 EFINER
COARSE ERRORS (SHAFT) DCRSER 165, (RR TRUNNION) 166 ECRSER
R53 100K, C8 2200UUF, CR11 1N660, R44 51K, Q15, R56 100K, R50 100K, CR12 1N660, C7 2200UUF, R54 100K, R45 51K, Q14, C10 1.0, R58 75K
R60 51K, R61 51K, Q17 2N930, R62 510, Q19 2N722, R63 22K, CR13 1N660, C11 22, R66 390K, R69 2000
R46 10K, CR7 1N660, R47 10K, CR9 1N660, R51 100K, R55 100K, C9 1.0, R57 680K, Q16 2N930, R59 510, R64 100K, Q18 2N930, C12 1.0
Q20 2N930, R126 910, Q22 2N722, R65 5800, CR14
R48 100K, R52 100K, R123 100K, CR10 1N660, R49 100K, CR8 1N660, R125 4300
(ISS 28 VDC) U+28VH 135
(INNER READ COUNTER UP LINE) AUPLVL 236
(MIDDLE READ COUNTER UP LINE) BUPLVL 137
(OUTER READ COUNTER UP LINE) CUPLVL 235
FINE ERRORS AFINER 134, 133 BFINER, 132 CFINER
(ISS COMMON) +4VLO 122
COARSE ERRORS ACRSER 131, BCRSER 129, CCRSER 128
R88 100K, C15 2200UUF, CR25 1N660, R73 51K, Q27, R93 100K, R85 100K, C14 2200UUF, CR24 1N660, R74 51K, Q26, R89 100K
R82 100K, C13 2200UUF, CR23 1N660, R75 51K, Q25, R90 100K
R97 51K, R98 51K, Q29 2N930, R99 510, Q31 2N722, CR26 1N660, R103 390K, R101 22K, C18 22, CR28
C17 1.0, R95 75K, R100 100K, Q30 2N930, C19 1.0, Q33 2N722, Q32 2N930, R129 1000, Q34 2N722
R76 10K, CR17 1N660, R77 10K, CR19 1N660, R78 10K, CR22 1N660, Q28 2N930, C16 1.0, R94 680K, R96 510
R83 100K, R86 100K, R91 100K, R84 100K, R87 100K, R92 100K, CR21 1N660, R79 100K, R80 100K, CR20 1N660, R81 100K, CR18 1N660, R102 6800, CR27, R128 4300
10 9 8 7
D C B A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE IN OHMS
3. CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED
4. WIREWRAP PROGRAM PIN DESIGNATIONS ARE LABELED ABOVE PIN NUMBERS

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17005	9 Mar 65	WR
B	REVISED PER TDRR 17979	5 Apr 65	WR
C	REVISED PER TDRR 18517	Apr 65	WR
D	REVISED PER TDRR 21129	Jul 65	WR
E	REVISED PER TDRR 22513	21 Sep	



+28 WH
VDC
217
AGCSAT
FROM AGC
212
C21 6.8
R115 2000
R114 20K
Q39 2N722
R119 20K
Q41 2N998
R120 2000
CR33 IN975B
C20 6.8
R116 2000
AGCTVC
BLE FROM AGC
219
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
TVCCA
211
(CA)
MODULE)
R113 2000
R118 2000
CR32 IN975B
+4 VLLO
(TO R.S.)
1211
ADCCL
11
INNER
ADACH
100
BDACL
15
IDDLE
BDACH
116
CDACL
1016
OUTER
CDACH
1014
013
SATURN
119
SATCON
CR30 IN660
R121 2K
K1
K2
SATOP
NTROL OF SATURN
210
DDACL
116
AFT
DDACH
115
EDACL
210
ION
EDACH
108
K2RFH
104
DAC
K2RFL
105
203
18
R122 2K
CR31 IN660
K3
K4
CONTROL
7
6
4
7
2
8
3
1
5
SATPL
109
113
SATPH
SATYL
114
112
SATYH
SATRL
105
102
SATRH
DAC ERRORS FOR SATURN ATTITUDE
REJMPA
101
REJMPA
220
ENGPL
214
211
ENGPH
ENGYL
209
212
ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT (CSM) OR LEM S/C DISPLAL (LEM)
028RFH
207
028RFL
202
OPTICS 28 VRMS 800 ∽
U28RFH
206
U28RFL
201
ISS 28 VRMS 800 ∽
REJMPB
213
218
REJMPB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 39	RESISTOR	2000	±2%	1/4 W
R2	- 63		20K		
R3	- 63		20K		
R4	- 63		20K		
R5	- 63		20K		
R6	- 63		20K		
R7	- 39		2000		
R8	- 39		2000		
R9	- 39		2000		
R10	- 39		2000		
R11	- 39		2000		
R12	- 39		2000		
R13	- 36		1500		
R14	- 36		1500		
R15	- 36		1500		
R16	- 36		1500		
R17	- 36		1500		
R18	- 63		20K		
R19	- 36		1500		
R20	- 56		10K		
R21	- 63		20K		
R22	- 63		20K		
R23	- 63		20K		
R24	- 63		20K		
R25	- 56		10K		
R26	- 56		10K		
R27	- 39		2000		
R28	- 39		2000		
R29	- 39		2000		
R30	- 39		2000		
R31	- 39		2000		
R32	- 39		2000		
R34	- 46		3900		
R35	- 46		3900		
R36	- 25		510		
R37	- 25		510		
R38	- 36		1500		
R39	- 20		330		
R40	- 36		1500		
R41	- 25		510		
R42	- 11		130		
R43	- 11		130		
R44	- 73		51K		
R45	- 73		51K		
R46	- 56		10K		
R47	- 56		10K		
R48	- 80		100K		
R49	- 80		100K		
R50	- 80		100K		
R51	- 80		100K		
R52	- 80		100K		
R53	- 80		100K		
R54	- 80		100K		
R55	↓ - 80		100K	↓	↓
R56	1006750 - 80		100K	±2%	1/4 W
R57	1010369 - 101		680K	±5%	1/8 W
R58	1006750 - 77		75K	±2%	1/4 W
R59	- 25		510		
R60	- 73		51K		
R61	- 73		51K		
R62	- 25		510		
R63	- 64		22K		
R64	↓ - 80		100K	↓	↓
R65	1006750 - 52		6800	±2%	1/4 W
R66	1010369 - 95		390K	±5%	1/8 W
R67					
R68	1006750 - 39		2000	±2%	1/4 W
R69	- 49		5100		
R70	- 49		5100		
R71	- 51		6200		
R72	- 39		2000		
R73	- 73		51K		
R74	- 73		51K		
R75	- 73		51K		
R76	- 56		10K		
R77	- 56		10K		
R78	- 56		10K		
R79	↓ - 80		100K	↓	↓
R80	1006750 - 80		100K	±2%	1/4 W
R124	1010604 - 16		750	±1%	1 W
R125	1006750 - 47		4300	±2%	1/4 W
R126	- 31		910		
R127	- 63		20K		
R128	- 47		4300		
R129	- 35		1300		
R130	↓ - 63	↓	20K	↓	↓
R131	1006750 - 56	RESISTOR	10K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R81	1006750 - 80	RESISTOR	100K	±2%	1/4 W
R82	- 80		100K		
R83	- 80		100K		
R84	- 80		100K		
R85	- 80		100K		
R86	- 80		100K		
R87	- 80		100K		
R88	- 80		100K		
R89	- 80		100K		
R90	- 80		100K		
R91	- 80		100K		
R92	↓ - 80		100K	↓	↓
R93	1006750 - 80		100K	±2%	1/4 W
R94	1010369 - 101		680K	±5%	1/8 W
R95	1006750 - 77		75K	±2%	1/4 W
R96	- 25		510		
R97	- 73		51K		
R98	- 73		51K		
R99	- 25		510		
R100	- 80		100K		
R101	↓ - 64		22K	↓	↓
R102	1006750 - 52		6800	±2%	1/4 W
R103	1010369 - 95		390K	±5%	1/8 W
R104	1006750 - 39		2000	±2%	1/4 W
R106	1006750 - 49		5100	±2%	1/4 W
R107	- 49		5100		
R108	- 39		2000		
R109	- 49		5100		
R110	- 49		5100		
R111	- 63		20K		
R112	- 63		20K		
R113	- 39		2000		
R114	- 63		20K		
R115	- 39		2000		
R116	- 39		2000		
R117	- 63		20K		
R118	- 39		2000		
R119	- 63		20K		
R120	- 39		2000		
R121	- 39		2000		
R122	↓ - 39	↓	2000	↓	↓
R123	1006750 - 80	RESISTOR	100K	2%	1/4W
C1	1006755 - 79	CAPACITOR	6.8	±10%	35V
C2	- 79				
C3	- 79				
C4	- 79				
C5	↓ - 79		↓		↓
C6	1006755 - 79		6.8		35V
C7	1006777 - 26		2200UUF		100V
C8	1006777 - 26		2200UUF		100V
C9	1006755 - 69		1.0		35V
C10	1006755 - 69		1.0		35V
C11	1006755 - 85		22		35V
C12	1006755 - 69		1.0		35V
C13	1006777 - 26		2200UUF		100V
C14	1006777 - 26		2200UUF		100V
C15	1006777 - 26		2200UUF		100V
C16	1006755 - 69		1.0		35V
C17	- 69		1.0		
C18	- 85		22		
C19	- 69		1.0		
C20	↓ - 79		6.8		↓
C21	1006755 - 79		6.8		35V
C22	1006777 - 34	↓	.033	↓	100V
C23	1010279 - 112	CAPACITOR	1.1	±10%	15V
CR3	1010830 - 9	DIODE	IN965B		15V-400MW
CR4	1010362 - 002		IN647		
CR5	1010362 - 002		IN647		
CR6	1010830 - 19		IN975B		39V-400MW
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11	↓	↓	↓		
CR12	1010385	DIODE	IN660		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR13	1010385	DIODE	IN660		
CR14	1010372 - 16				8.2V-250MW
CR15	1010372 - 18				10V-250MW
CR16	1010372 - 16				8.2V-250MW
CR17	1010385		IN660		
CR18					
CR19					
CR20					
CR21					
CR22					
CR23					
CR24					
CR25	↓		↓		
CR26	1010385		IN660		
CR27	1010372-16				8.2V-250MW
CR28	1010372 -18				10V-250MW
CR29	1010372 -16				8.2V-250MW
CR30	1010385		IN660		
CR31	1010385		IN660		
CR32	1010830 -19	↓	IN975B		39V-400MW
CR33	1010830 -19	DIODE	IN975B		39V-400MW
Q1	1010285	TRANSISTOR	2N722		
Q2	1010343-3				
Q3	1010285		2N722		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010285		2N722		
Q7	1010343-3				
Q8	1010343-3				
Q9	1010343-3				
Q10	1010343-3				
Q11	1010342		2N998		
Q12	1010343-3				
Q13	1010343-3				
Q14	1010343-3				
Q15	1010343-3				
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010397-1		2N930		
Q19	1010285		2N722		
Q20	1010397-1		2N930		
Q21	1010285		2N722		
Q22	1010285		2N722		
Q23	1010397-1		2N930		
Q24	1010285		2N722		
Q25	1010343-3				
Q26	1010343-3				
Q27	1010343-3				
Q28	1010397-1		2N930		
Q29	1010397-1		2N930		
Q30	1010397-1		2N930		
Q31	1010285		2N722		
Q32	1010397-1		2N930		
Q33	1010285		2N722		
Q34	1010285		2N722		
Q35	1010397-1		2N930		
Q36	1010285		2N722		
Q37	1010285		2N722		
Q38	1010285		2N722		
Q39	1010285		2N722		
Q40	1010342	↓	2N998		
Q41	1010342	TRANSISTOR	2N998		
K1	1010353 -7	RELAY			
K2	1010353 -7	RELAY			
K3	1010353 -7	RELAY			
K4	1010353 -7	RELAY			

REF DWG
MODE MODULE ASS'Y DWG NO. 2007154

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

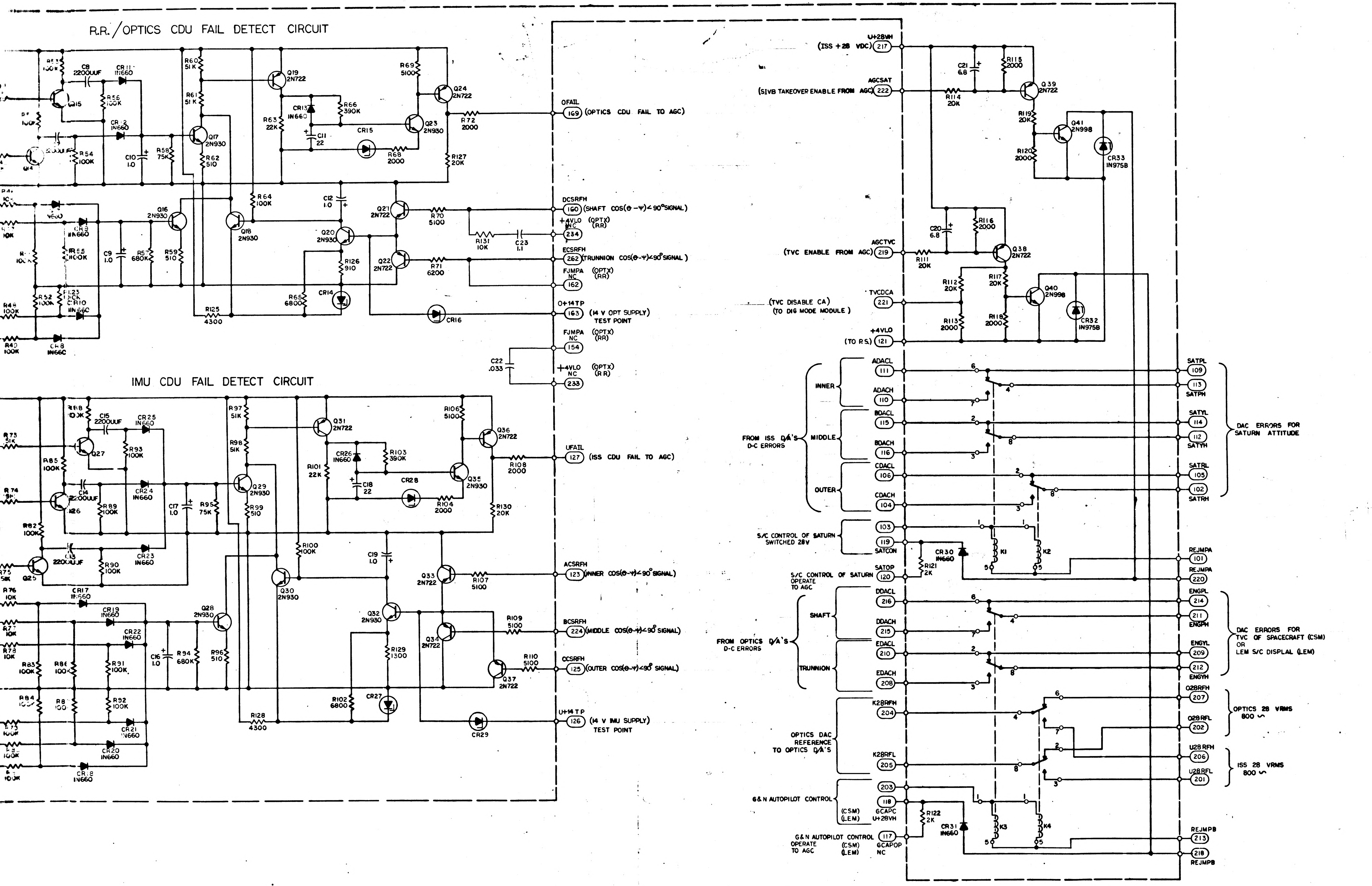
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC,
MODE MODULE

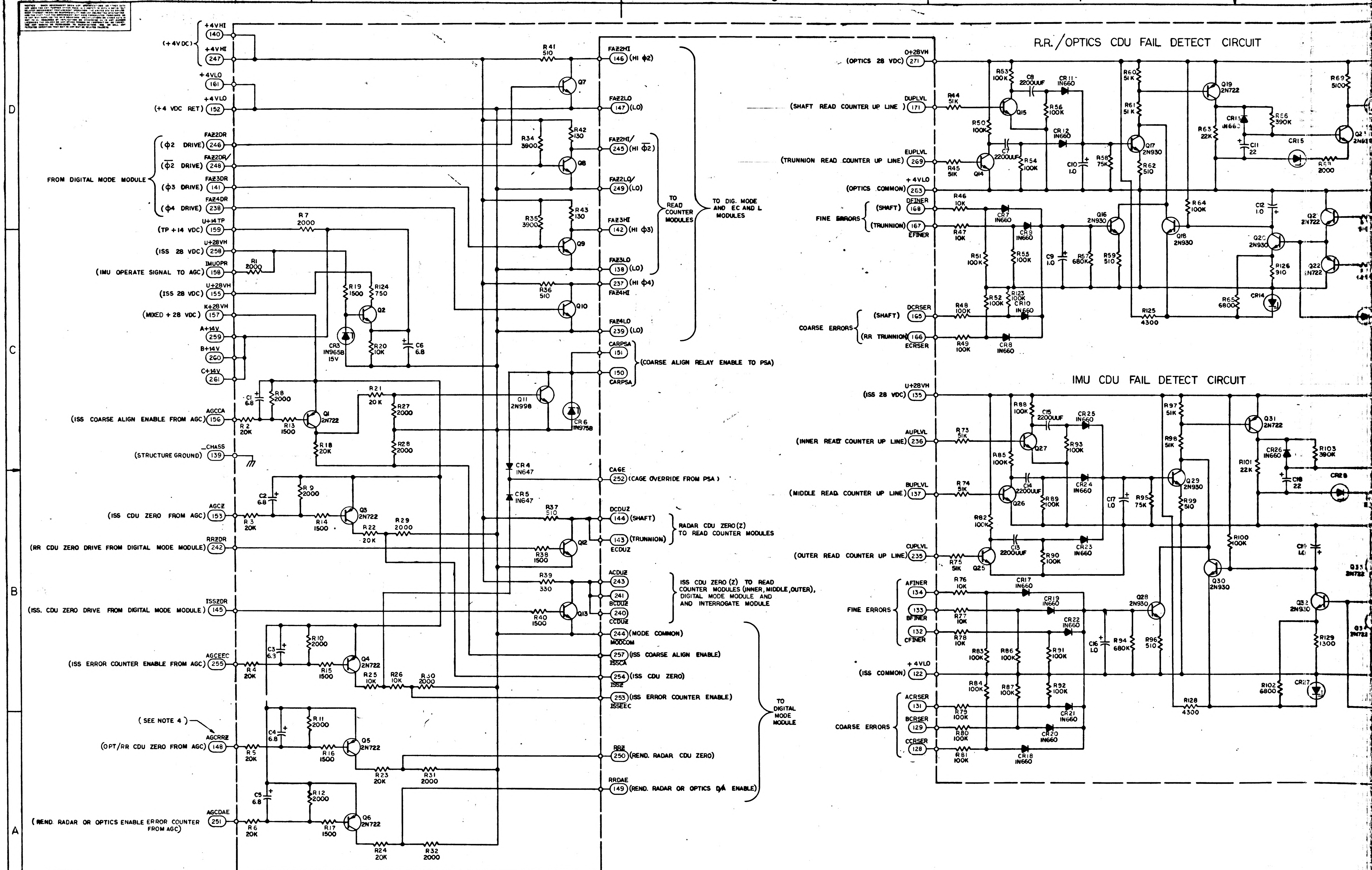
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010054
SCALE —
WT —
SHEET 1 OF 1

MASTER


R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
C8 2200UUF
CR11 IN660
R56 100K
CR12 IN660
Q15
Q14
R54 100K
C10 1.0
R58 75K
R60 51K
R61 51K
Q19 2N722
Q17 2N930
R62 510
R63 22K
CR13 IN660
R66 390K
C11 22
CR15
R68 2000
Q23 2N930
R69 5100
Q24 2N722
R72 2000
R127 20K
R64 100K
Q16 2N930
Q18 2N930
C12 1.0
Q20 2N930
Q21 2N722
Q22 2N722
R70 5100
R71 6200
R131 10K
C23 1.1
C9 1.0
R57 680K
R59 510
R126 910
R65 6800
CR14
CR16
R125 4300
CR9 IN660
R55 100K
R52 100K
R123 10K
CR10 IN660
CR8 IN660
R40 100K
R48 100K
OFAIL
169 (OPTICS CDU FAIL TO AGC)
DCSRFH
160 (SHAFT COS(θ-ψ)<90° SIGNAL)
+4VLO NC
234 (OPTX) (RR)
ECSRFH
262 (TRUNNION COS(θ-ψ)<90° SIGNAL)
FJMPA NC
162 (OPTX) (RR)
O+14TP
163 (14 V OPT SUPPLY) TEST POINT
FJMPA NC
154 (OPTX) (RR)
C22 .033
+4VLO NC
233 (OPTX) (RR)
R88 10K
C15 2200UUF
CR25 IN660
R93 100K
Q27
R85 100K
C14 2200UUF
Q26
R89 100K
CR24 IN660
CR23 IN660
C13 2200UUF
Q25
R90 100K
R82 100K
R73 51K
R74 51K
R75 51K
R76 10K
R77 10K
R78 10K
CR17 IN660
CR19 IN660
CR22 IN660
R91 100K
R92 100K
CR21 IN660
CR20 IN660
CR18 IN660
R83 100K
R86 100K
R84 100K
R87 100
R97 51K
R98 51K
Q29 2N930
R99 510
C17 1.0
R95 75K
R100 100K
Q30 2N930
R101 22K
Q31 2N722
CR26 IN660
R103 390K
C18 22
CR28
R104 2000
Q35 2N930
R106 5100
Q36 2N722
R108 2000
R130 20K
C19 1.0
Q33 2N722
R107 5100
Q32 2N930
Q34 2N722
R109 5100
R110 5100
Q37 2N722
R129 1300
R102 6800
CR27
CR29
R128 4300
Q28 2N930
C16 1.0
R94 680K
R96 510
UFAIL
127 (ISS CDU FAIL TO AGC)
ACSRFH
123 (INNER COS(θ-ψ)<90° SIGNAL)
BCSRFH
224 (MIDDLE COS(θ-ψ)<90° SIGNAL)
CCSRFH
125 (OUTER COS(θ-ψ)<90° SIGNAL)
U+14TP
126 (14 V IMU SUPPLY) TEST POINT
U+28VH
(ISS +28 VDC) 217
AGCSAT
(SIVB TAKEOVER ENABLE FROM AGC) 222
C21 6.8
R115 2000
R114 20K
Q39 2N722
R119 20K
R120 2000
Q41 2N998
CR33 IN975B
AGCTVC
(TVC ENABLE FROM AGC) 219
C20 6.8
R116 2000
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
CR32 IN975B
R113 2000
R118 2000
TVCDCA
(TVC DISABLE CA) (TO DIG MODE MODULE) 221
+4VLO
(TO R.S.) 121
FROM ISS D/A'S D-C ERRORS
INNER
ADACL 111
ADACH 110
MIDDLE
BDACL 115
BDACH 116
OUTER
CDACL 106
CDACH 104
SATPL 109
113 SATPH
SATYL 114
112 SATYH
SATRL 105
102 SATRH
DAC ERRORS FOR SATURN ATTITUDE
S/C CONTROL OF SATURN SWITCHED 28V
103
119 SATCON
CR30 IN660
R121 2K
K1
K2
S/C CONTROL OF SATURN OPERATE TO AGC
SATOP 120
REJMPA 101
REJMPA 220
FROM OPTICS D/A'S D-C ERRORS
SHAFT
DDACL 216
DDACH 215
TRUNNION
EDACL 210
EDACH 208
ENGPL 214
211 ENGPH
ENGYL 209
212 ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT (CSM) OR LEM S/C DISPLAL (LEM)
OPTICS DAC REFERENCE TO OPTICS D/A'S
K28RFH 204
K28RFL 205
O28RFH 207
O28RFL 202
OPTICS 28 VRMS 800 ∿
U28RFH 206
U28RFL 201
ISS 28 VRMS 800 ∿
G&N AUTOPILOT CONTROL
203
118 GCAPC U+28VH (CSM) (LEM)
R122 2K
CR31 IN660
K3
K4
G&N AUTOPILOT CONTROL OPERATE TO AGC (CSM) (LEM)
117 GCAPOP NC
REJMPB 213
218 REJMPB

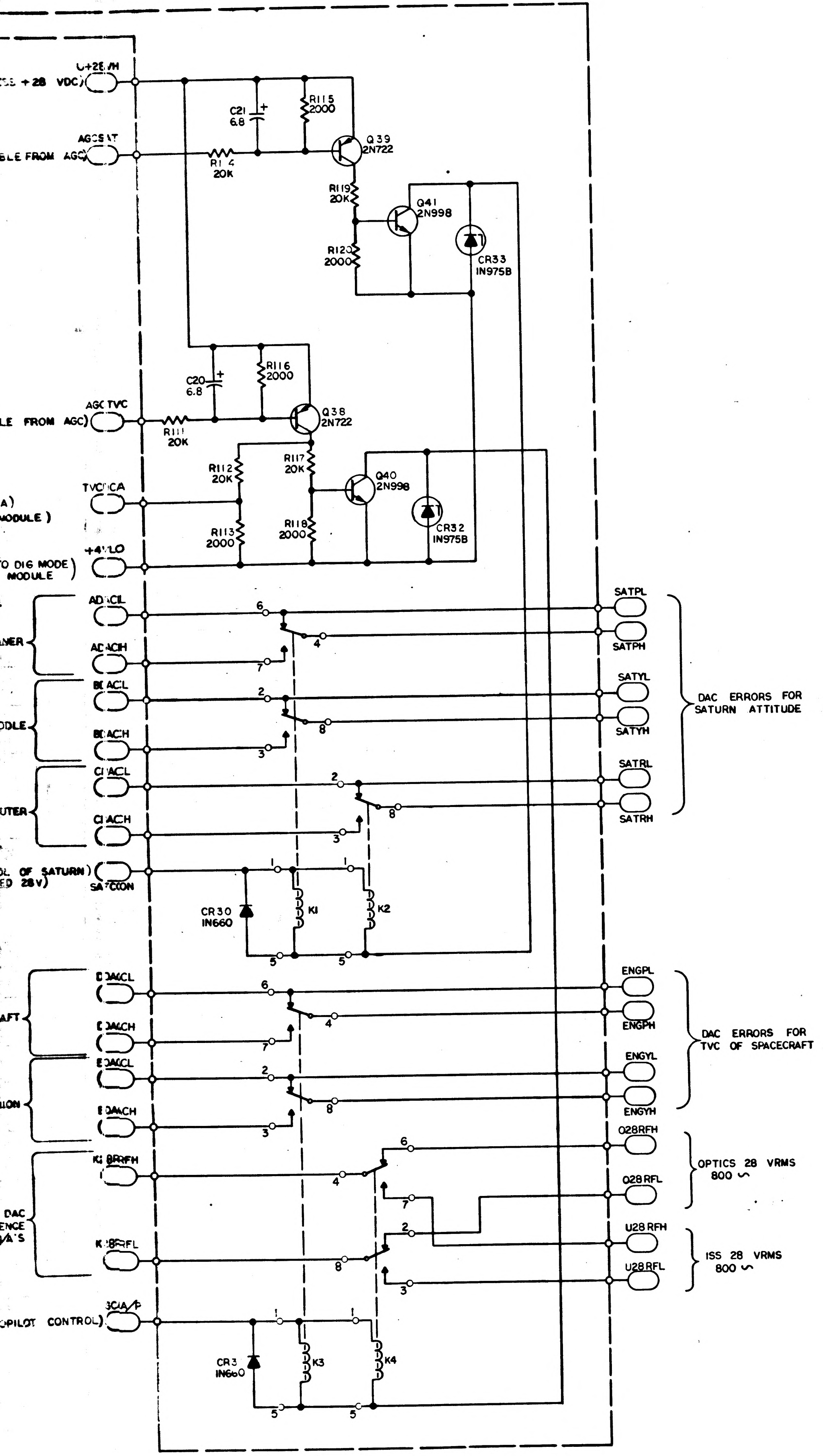
REF DES	PART NO.	DESCRIPTION
R1	1006750 - 39	RESISTOR
R2	- 63	
R3	- 63	
R4	- 63	
R5	- 63	
R6	- 63	
R7	- 39	
R8	- 39	
R9	- 39	
R10	- 39	
R11	- 39	
R12	- 39	
R13	- 36	
R14	- 36	
R15	- 36	
R16	- 36	
R17	- 36	
R18	- 63	
R19	- 36	
R20	- 56	
R21	- 63	
R22	- 63	
R23	- 63	
R24	- 63	
R25	- 56	
R26	- 56	
R27	- 39	
R28	- 39	
R29	- 39	
R30	- 39	
R31	- 39	
R32	- 39	
R34	- 46	
R35	- 46	
R36	- 25	
R37	- 25	
R38	- 36	
R39	- 20	
R40	- 36	
R41	- 25	
R42	- 11	
R43	- 11	
R44	- 73	
R45	- 73	
R46	- 56	
R47	- 56	
R48	- 80	
R49	- 80	
R50	- 80	
R51	- 80	
R52	- 80	
R53	- 8	
R54	- 8	
R55	- 8	
R56	1006750 - 80	
R57	1010369 - 10	
R58	1006750 - 77	
R59	- 25	
R60	- 73	
R61	- 73	
R62	- 25	
R63	- 64	
R64	- 8	
R65	1006750 - 52	
R66	1010369 - 9	
R67		
R68	1006750 - 3	
R69	- 4	
R70	- 4	
R71	- 5	
R72	- 3	
R73	- 7	
R74	- 7	
R75	- 7	
R76	- 5	
R77	- 5	
R78	- 5	
R79	- 8	
R80	1006750 - 8	
R124	1010604 - 16	
R125	1006750 - 4	
R126	- 3	
R127	- 6	
R128	- 4	
R129	- 3	
R130	- 6	
R131	1006750 - 5	RESISTOR

2010054 SHT


R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
(+4VDC) +4VHI 140
+4VHI 247
+4VLO 161
(+4 VDC RET) +4VLO 152
FROM DIGITAL MODE MODULE
(φ2 DRIVE) FAZ2DR 246
(φ2 DRIVE) FAZ2DR 248
(φ3 DRIVE) FAZ3DR 141
(φ4 DRIVE) FAZ4DR 238
(TP +14 VDC) U+14TP 159
(ISS 28 VDC) U+28VH 258
(IMU OPERATE SIGNAL TO AGC) IMUOPR 158
(ISS 28 VDC) U+28VH 155
(MIXED + 28 VDC) K+28VH 157
A+14V 259
B+14V 260
C+14V 261
(ISS COARSE ALIGN ENABLE FROM AGC) AGCCA 156
(STRUCTURE GROUND) CHASS 139
(ISS CDU ZERO FROM AGC) AGCZ 153
(RR CDU ZERO DRIVE FROM DIGITAL MODE MODULE) RRZDR 242
(ISS. CDU ZERO DRIVE FROM DIGITAL MODE MODULE) ISSZDR 145
(ISS ERROR COUNTER ENABLE FROM AGC) AGCEEC 255
(SEE NOTE 4)
(OPT/RR CDU ZERO FROM AGC) AGCRRZ 148
(REND. RADAR OR OPTICS ENABLE ERROR COUNTER FROM AGC) AGCDAE 251
FAZ2HI 146 (HI φ2)
FAZ2LO 147 (LO)
FAZ2HI/ 245 (HI φ2)
FAZ2LO/ 249 (LO)
FAZ3HI 142 (HI φ3)
FAZ3LO 138 (LO)
237 (HI φ4) FAZ4HI
FAZ4LO 239 (LO)
TO READ COUNTER MODULES
TO DIG. MODE AND EC AND L MODULES
CARPSA 151
150 CARPSA (COARSE ALIGN RELAY ENABLE TO PSA)
CAGE 252 (CAGE OVERRIDE FROM PSA)
DCDUZ 144 (SHAFT)
143 (TRUNNION) ECDUZ
RADAR CDU ZERO (Z) TO READ COUNTER MODULES
ACDUZ 243
241 BCDUZ
240 CCDUZ
ISS CDU ZERO (Z) TO READ COUNTER MODULES (INNER, MIDDLE, OUTER), DIGITAL MODE MODULE AND AND INTERROGATE MODULE
244 (MODE COMMON) MODCOM
257 (ISS COARSE ALIGN ENABLE) ISSCA
254 (ISS CDU ZERO) ISSZ
253 (ISS ERROR COUNTER ENABLE) ISSEEC
RRZ 250 (REND. RADAR CDU ZERO)
RRDAE 149 (REND. RADAR OR OPTICS D/A ENABLE)
TO DIGITAL MODE MODULE
Q1 2N722
Q2
Q3 2N722
Q4 2N722
Q5 2N722
Q6 2N722
Q7
Q8
Q9
Q10
Q11 2N998
Q12
Q13
CR3 1N965B 15V
CR4 1N647
CR5 1N647
CR6 1N975B
R1 2000
R2 20K
R3 20K
R4 20K
R5 20K
R6 20K
R7 2000
R8 2000
R9 2000
R10 2000
R11 2000
R12 2000
R13 1500
R14 1500
R15 1500
R16 1500
R17 1500
R18 20K
R19 1500
R20 10K
R21 20K
R22 20K
R23 20K
R24 20K
R25 10K
R26 10K
R27 2000
R28 2000
R29 2000
R30 2000
R31 2000
R32 2000
R34 3900
R35 3900
R36 510
R37 510
R38 1500
R39 330
R40 1500
R41 510
R42 130
R43 130
R124 750
C1 6.8
C2 6.8
C3 6.3
C4 6.8
C5 6.8
C6 6.8
(OPTICS 28 VDC) 0+28VH 271
(SHAFT READ COUNTER UP LINE) DUPLVL 171
(TRUNNION READ COUNTER UP LINE) EUPLVL 269
(OPTICS COMMON) +4VLO 263
FINE ERRORS (SHAFT) DFINER 168
(TRUNNION) EFINER 167
COARSE ERRORS (SHAFT) DCRSER 165
(RR TRUNNION) ECRSER 166
Q14
Q15
Q16 2N930
Q17 2N930
Q18 2N930
Q19 2N722
Q20 2N930
Q21 2N722
Q22 2N722
R44 51K
R45 51K
R46 10K
R47 10K
R48 100K
R49 100K
R50 100K
R51 100K
R52 100K
R53 100K
R54 100K
R55 100K
R56 100K
R57 680K
R58 75K
R59 510
R60 51K
R61 51K
R62 510
R63 22K
R64 100K
R65 6800
R66 390K
R68 2000
R69 5100
R123 100K
R125 4300
R126 910
C7 2200UUF
C8 2200UUF
C9 1.0
C10 1.0
C11 22
C12 1.0
CR7 1N660
CR8 1N660
CR9 1N660
CR10 1N660
CR11 1N660
CR12 1N660
CR13 1N660
CR14
CR15
(ISS 28 VDC) U+28VH 135
(INNER READ COUNTER UP LINE) AUPLVL 236
(MIDDLE READ COUNTER UP LINE) BUPLVL 137
(OUTER READ COUNTER UP LINE) CUPLVL 235
FINE ERRORS AFINER 134
133 BFINER
132 CFINER
(ISS COMMON) +4VLO 122
COARSE ERRORS ACRSER 131
BCRSER 129
CCRSER 128
Q25
Q26
Q27
Q28 2N930
Q29 2N930
Q30 2N930
Q31 2N722
Q32 2N930
Q33 2N722
R73 51K
R74 51K
R75 51K
R76 10K
R77 10K
R78 10K
R79 100K
R80 100K
R81 100K
R82 100K
R83 100K
R84 100K
R85 100K
R86 100K
R87 100K
R88 100K
R89 100K
R90 100K
R91 100K
R92 100K
R93 100K
R94 680K
R95 75K
R96 510
R97 51K
R98 51K
R99 510
R100 100K
R101 22K
R102 6800
R103 390K
R128 4300
R129 1300
C13 2200UUF
C14 2200UUF
C15 2200UUF
C16 1.0
C17 1.0
C18 22
CR17 1N660
CR18 1N660
CR19 1N660
CR20 1N660
CR21 1N660
CR22 1N660
CR23 1N660
CR24 1N660
CR25 1N660
CR26 1N660
CR27
CR28
10
9
8
7
D
C
B
A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE IN OHMS
3. CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED
4. WIREWRAP PROGRAM PIN DESIGNATIONS ARE LABELED ABOVE PIN NUMBERS

2010054 SHT


U+28 VH
+28 VDC
AGC SAT
BLE FROM AGC
C21 6.8
R115 2000
Q39 2N722
R114 20K
R119 20K
Q41 2N998
R120 2000
CR33 IN975B
C20 6.8
R116 2000
AGC TVC
LE FROM AGC
R111 20K
Q38 2N722
R112 20K
R117 20K
Q40 2N998
CR32 IN975B
TVC CA
R113 2000
R118 2000
MODULE
+4V LO
TO DIG MODE MODULE
AD ACL
AD ACH
BD ACL
BD ACH
CD ACL
CD ACH
SATPL
SATPH
SATYL
SATYH
SATRL
SATRH
DAC ERRORS FOR SATURN ATTITUDE
OL OF SATURN
ED 28V
SA CON
CR30 IN660
K1
K2
ED ACL
ED ACH
ENGPL
ENGPH
ENGYL
ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT
K1 28RFH
K1 28RFL
028RFH
028RFL
OPTICS 28 VRMS 800 ∼
U28RFH
U28RFL
ISS 28 VRMS 800 ∼
3CIA/P
OPILOT CONTROL
CR3 IN660
K3
K4

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 39	RESISTOR	2000	±2%	1/4 W
R2	-63		20K		
R3	-63		20K		
R4	-63		20K		
R5	-63		20K		
R6	-63		20K		
R7	-39		2000		
R8	-39		2000		
R9	-39		2000		
R10	-39		2000		
R11	-39		2000		
R12	-39		2000		
R13	-36		1500		
R14	-36		1500		
R15	-36		1500		
R16	-36		1500		
R17	-36		1500		
R18	-63		20K		
R19	-36		1500		
R20	-56		10K		
R21	-63		20K		
R22	-63		20K		
R23	-63		20K		
R24	-63		20K		
R25	-56		10K		
R26	-56		10K		
R27	-39		2000		
R28	-39		2000		
R29	-39		2000		
R30	-39		2000		
R31	-39		2000		
R32	-39		2000		
R33	-36		1500		
R34	-46		3900		
R35	-48		4700		
R36	-31		910		
R37	-27		620		
R38	-36		1500		
R39	-22		390		
R40	-36		1500		
R41	-25		510		
R42	-11		130		
R43	-11		130		
R44	-73		51K		
R45	-73		51K		
R46	-56		10K		
R47	-56		10K		
R48	-80		100K		
R49	-80		100K		
R50	-80		100K		
R51	-80		100K		
R52	-68		33K		
R53	-80		100K		
R54	-80		100K		
R55	-80		100K		
R56	1006750 - 80		100K	±2%	1/4 W
R57	1010369 - 101		680K	±5%	1/8 W
R58	1006750 - 73		51 K	±2%	1/4 W
R59	-25		510		
R60	-73		51 K		
R61	-73		51 K		
R62	-25		510		
R63	-64		22 K		
R64	-80		100K		
R65	1006750 - 43		3000	±2%	1/4 W
R66	1010369 - 95		390K	±5%	1/8 W
R67	1006750 - 56		10 K	±2%	1/4 W
R68	-39		2000		
R69	-49		5100		
R70	-49		5100		
R71	-49		5100		
R72	-39		2000		
R73	-73		51 K		
R74	-73		51 K		
R75	-73		51 K		
R76	-56		10 K		
R77	-56		10 K		
R78	-56		10 K		
R79	-80		100K		
R80	1006750 - 80	RESISTOR	100K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R81	1006750 - 80	RESISTOR	100K	±2%	1/4 W
R82	-80		100K		
R83	-80		100K		
R84	-68		33K		
R85	-80		100K		
R86	-80		100K		
R87	-68		33K		
R88	-80		100K		
R89	-80		100K		
R90	-80		100K		
R91	-80		100K		
R92	-68		33K		
R93	1006750 - 80		100K	±2%	1/4 W
R94	1010369 - 101		680K	±5%	1/8 W
R95	1006750 - 73		51 K	±2%	1/4 W
R96	-25		510		
R97	-73		51 K		
R98	-73		51 K		
R99	-25		510		
R100	-80		100K		
R101	-64		22 K		
R102	1006750 - 43		3000	±2%	1/4 W
R103	1010369 - 95		390K	±5%	1/8 W
R104	1006750 - 39		2000	±2%	1/4 W
R105	-56		10 K		
R106	-49		5100		
R107	-49		5100		
R108	-39		2000		
R109	-49		5100		
R110	-49		5100		
R111	-63		20 K		
R112	-63		20 K		
R113	-39		2000		
R114	-63		20 K		
R115	-39		2000		
R116	-39		2000		
R117	-63		20 K		
R118	-39		2000		
R119	-63		20 K		
R120	1006750 - 39	RESISTOR	2000	2%	1/4 W
C1	1006755 - 79	CAPACITOR	6.8	±10%	35V
C2					
C3					
C4					
C5					
C6	1006755 - 79		6.8		35V
C7	1010871 - 26		2200UUF		100V
C8	1010871 - 26		2200UUF		100V
C9	1006755 - 69		1.0		35V
C10	1006755 - 69		1.0		35V
C11	1006755 - 85		22		35V
C12	1006755 - 69		1.0		35V
C13	1010871 - 26		2200UUF		100V
C14	1010871 - 26		2200UUF		100V
C15	1010871 - 26		2200UUF		100V
C16	1006755 - 69		1.0		35V
C17	-69		1.0		
C18	-85		22		
C19	-69		1.0		
C20	-79		6.8		
C21	1006755 - 79	CAPACITOR	6.8	±10%	35V
CR1	1010362 - 2	DIODE	IN647		
CR2	1010362 - 2		IN647		
CR3	1010830 - 9		IN965B		5V-400MW
CR4	1010362 - 2		IN647		
CR5	1010362 - 2		IN647		
CR6	1010830 - 19		IN975B		39V-400MW
CR7	1010385		IN660		
CR8					
CR9					
CR10					
CR11					
CR12	1010385	DIODE	IN660		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
CR13	1010385	DIODE	IN660		
CR14	1010372 - 10				4.7V-250MW
CR15	1010372 - 18				10V-250MW
CR16	1010372 - 10				4.7V-250MW
CR17	1010385		IN660		
CR18					
CR19					
CR20					
CR21					
CR22					
CR23					
CR24					
CR25					
CR26	1010385		IN660		
CR27	1010372 - 10				4.7V-250MW
CR28	1010372 - 18				10V-250MW
CR29	1010372 - 10				
CR30	1010385		IN660		
CR31	1010385		IN660		
CR32	1010830 - 19		IN975B		39V-400MW
CR33	1010830 - 19	DIODE	IN975B		39V-400MW
Q1	1010285	TRANSISTOR	2N722		
Q2	1010343 - 3				
Q3	1010285		2N722		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010285		2N722		
Q7	1010343 - 3				
Q8	1010343 - 3				
Q9	1010343 - 3				
Q10	1010343 - 3				
Q11	1010342		2N998		
Q12	1010343 - 3				
Q13	1010343 - 3				
Q14	1010343 - 3				
Q15	1010343 - 3				
Q16	1010397 - 1		2N930		
Q17	1010397 - 1		2N930		
Q18	1010397 - 1		2N930		
Q19	1010285		2N722		
Q20	1010397 - 1		2N930		
Q21	1010285		2N722		
Q22	1010285		2N722		
Q23	1010397 - 1		2N930		
Q24	1010285		2N722		
Q25	1010343 - 3				
Q26	1010343 - 3				
Q27	1010343 - 3				
Q28	1010397 - 1		2N930		
Q29	1010397 - 1		2N930		
Q30	1010397 - 1		2N930		
Q31	1010285		2N722		
Q32	1010397 - 1		2N930		
Q33	1010285		2N722		
Q34	1010285		2N722		
Q35	1010397 - 1		2N930		
Q36	1010285		2N722		
Q37	1010285		2N722		
Q38	1010285		2N722		
Q39	1010285		2N722		
Q40	1010342		2N998		
Q41	1010342	TRANSISTOR	2N998		
K1	1010353 - 7	RELAY			
K2	1010353 - 7	RELAY			
K3	1010353 - 7	RELAY			
K4	1010353 - 7	RELAY			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 26 Jan 65

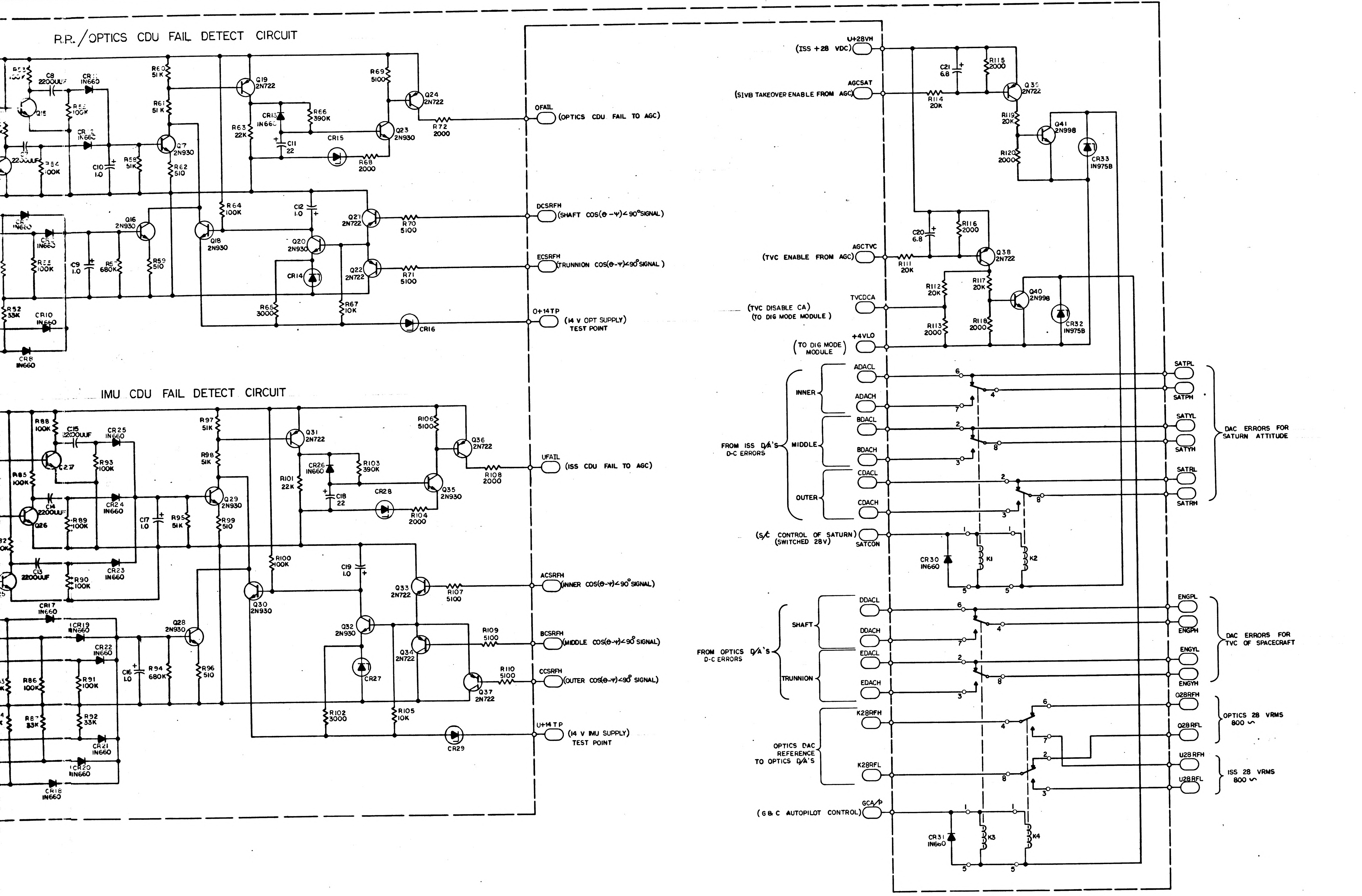
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MODE MODULE

CODE IDENT NO. ——
SIZE J
NASA DRAWING NO. 2010054
SCALE ——
WT ——
SHEET 1 OF 1

F3

7 6 5 4 3


R.P./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
OFAIL (OPTICS CDU FAIL TO AGC)
DCSRFH (SHAFT COS(θ-ψ)<90° SIGNAL)
ECSRFH (TRUNNION COS(θ-ψ)<90° SIGNAL)
O+14TP (14 V OPT SUPPLY) TEST POINT
UFAIL (ISS CDU FAIL TO AGC)
ACSRFH (INNER COS(θ-ψ)<90° SIGNAL)
BCSRFH (MIDDLE COS(θ-ψ)<90° SIGNAL)
CCSRFH (OUTER COS(θ-ψ)<90° SIGNAL)
U+14TP (14 V IMU SUPPLY) TEST POINT
U+28VH (ISS +28 VDC)
AGCSAT (SIVB TAKEOVER ENABLE FROM AGC)
AGCTVC (TVC ENABLE FROM AGC)
TVCDCA (TVC DISABLE CA) (TO DIG MODE MODULE)
+4VLO (TO DIG MODE MODULE)
FROM ISS D/A'S D-C ERRORS
INNER
MIDDLE
OUTER
ADACL
ADACH
BDACL
BDACH
CDACL
CDACH
SATPL
SATPH
SATYL
SATYH
SATRL
SATRH
DAC ERRORS FOR SATURN ATTITUDE
(S/C CONTROL OF SATURN) (SWITCHED 28V) SATCON
FROM OPTICS D/A'S D-C ERRORS
SHAFT
TRUNNION
DDACL
DDACH
EDACL
EDACH
ENGPL
ENGPH
ENGYL
ENGYH
DAC ERRORS FOR TVC OF SPACECRAFT
OPTICS DAC REFERENCE TO OPTICS D/A'S
K28RFH
K28RFL
O28RFH
O28RFL
OPTICS 28 VRMS 800 ∿
U28RFH
U28RFL
ISS 28 VRMS 800 ∿
GCA/P (G&C AUTOPILOT CONTROL)
K1
K2
K3
K4
CR30 IN660
CR31 IN660
CR32 IN975B
CR33 IN975B
Q38 2N722
Q39 2N722
Q40 2N998
Q41 2N998
R111 20K
R112 20K
R113 2000
R114 20K
R115 2000
R116 2000
R117 20K
R118 2000
R119 20K
R120 2000
C20 6.8
C21 6.8
Q7 2N930
Q15
Q16 2N930
Q18 2N930
Q19 2N722
Q20 2N930
Q21 2N722
Q22 2N722
Q23 2N930
Q24 2N722
Q26
Q27
Q28 2N930
Q29 2N930
Q30 2N930
Q31 2N722
Q32 2N930
Q33 2N722
Q34 2N722
Q35 2N930
Q36 2N722
Q37 2N722
R52 33K
R53 100K
R54 100K
R55 100K
R56 100K
R57 680K
R58 51K
R59 510
R60 51K
R61 51K
R62 510
R63 22K
R64 100K
R65 3000
R66 390K
R67 10K
R68 2000
R69 5100
R70 5100
R71 5100
R72 2000
R85 100K
R86 100K
R87 33K
R88 100K
R89 100K
R90 100K
R91 100K
R92 33K
R93 100K
R94 680K
R95 51K
R96 510
R97 51K
R98 51K
R99 510
R100 100K
R101 22K
R102 3000
R103 390K
R104 2000
R105 10K
R106 5100
R107 5100
R108 2000
R109 5100
R110 5100
C8 2200UUF
C9 1.0
C10 1.0
C11 22
C12 1.0
C13 2200UUF
C14 2200UUF
C15 2200UUF
C16 1.0
C17 1.0
C18 22
C19 1.0
CR8 IN660
CR10 IN660
CR11 IN660
CR12 IN660
CR13 IN660
CR14
CR15
CR16
CR17 IN660
CR18 IN660
CR19 IN660
CR20 IN660
CR21 IN660
CR22 IN660
CR23 IN660
CR24 IN660
CR25 IN660
CR26 IN660
CR27
CR28
CR29

REF DES	PART NO.	DESCRIPTION	VALUE
R1	1006750 – 39	RESISTOR	2000
R2	– 63		20K
R3	– 63		20K
R4	– 63		20K
R5	– 63		20K
R6	– 63		20K
R7	– 39		2000
R8	– 39		2000
R9	– 39		2000
R10	– 39		2000
R11	– 39		2000
R12	– 39		2000
R13	– 36		1500
R14	– 36		1500
R15	– 36		1500
R16	– 36		1500
R17	– 36		1500
R18	– 63		20K
R19	– 36		1500
R20	– 56		10K
R21	– 63		20K
R22	– 63		20K
R23	– 63		20K
R24	– 63		20K
R25	– 56		10K
R26	– 56		10K
R27	– 39		2000
R28	– 39		2000
R29	– 39		2000
R30	– 39		2000
R31	– 39		2000
R32	– 39		2000
R33	– 36		1500
R34	– 46		3900
R35	– 48		4700
R36	– 31		910
R37	– 27		620
R38	– 36		1500
R39	– 22		330
R40	– 36		1500
R41	– 25		510
R42	– 11		130
R43	– 11		130
R44	– 73		51K
R45	– 73		51K
R46	– 56		10K
R47	– 56		10K
R48	– 80		100K
R49	– 80		100K
R50	– 80		100K
R51	– 80		100K
R52	– 68		33K
R53	– 80		100K
R54	– 80		100K
R55	– 80		100K
R56	1006750 – 80		100K
R57	1010369 – 101		680K
R58	1006750 – 73		51K
R59	– 25		510
R60	– 73		51K
R61	– 73		51K
R62	– 25		510
R63	– 64		22K
R64	– 80		100K
R65	1006750 – 43		3000
R66	1010369 – 95		390K
R67	1006750 – 56		10K
R68	– 39		2000
R69	– 49		5100
R70	– 49		5100
R71	– 49		5100
R72	– 39		2000
R73	– 73		51K
R74	– 73		51K
R75	– 73		51K
R76	– 56		10K
R77	– 56		10K
R78	– 56		10K
R79	– 80		100K
R80	1006750 – 80	RESISTOR	100K

2010054

7 6 5 4 3

F-2

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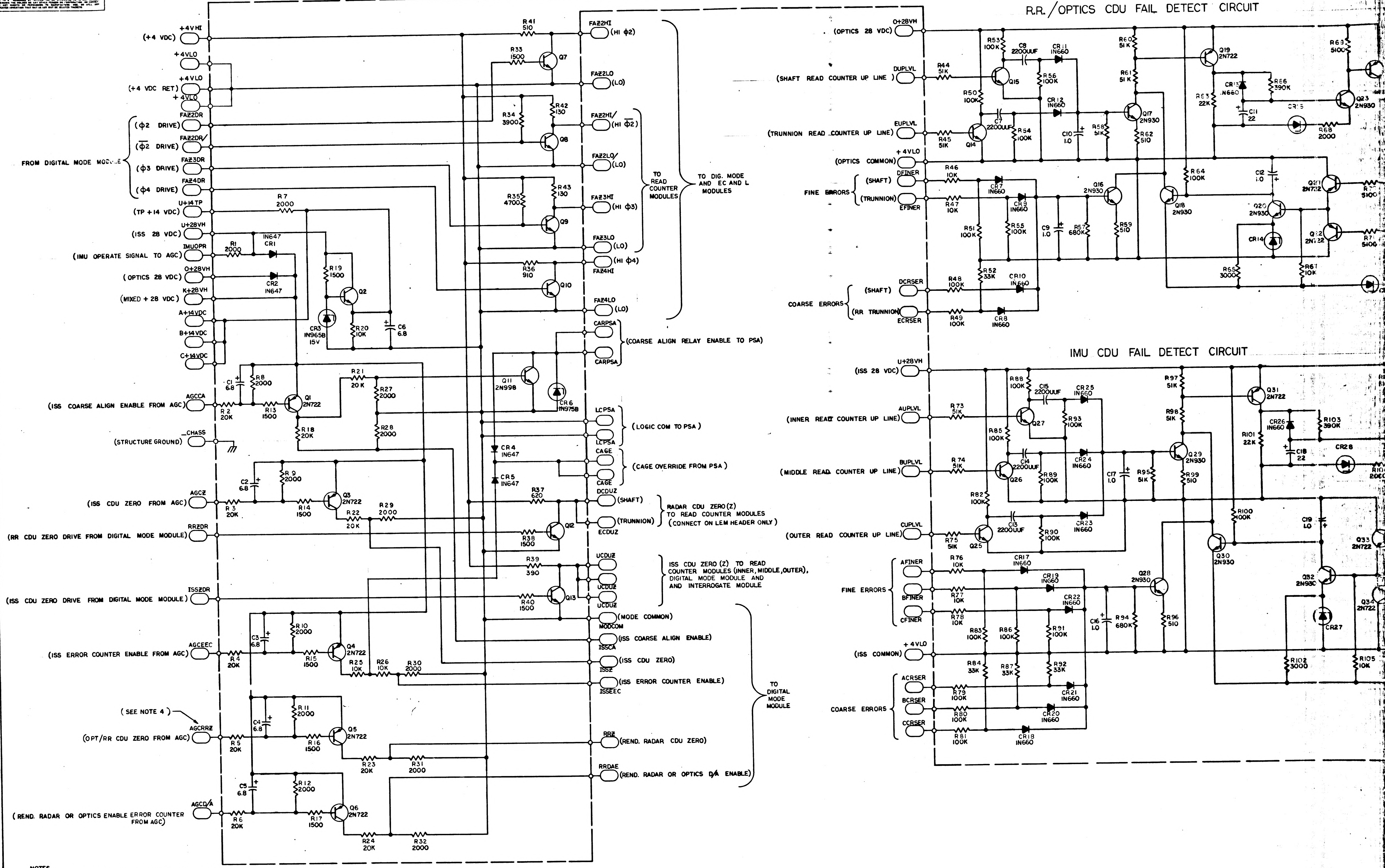
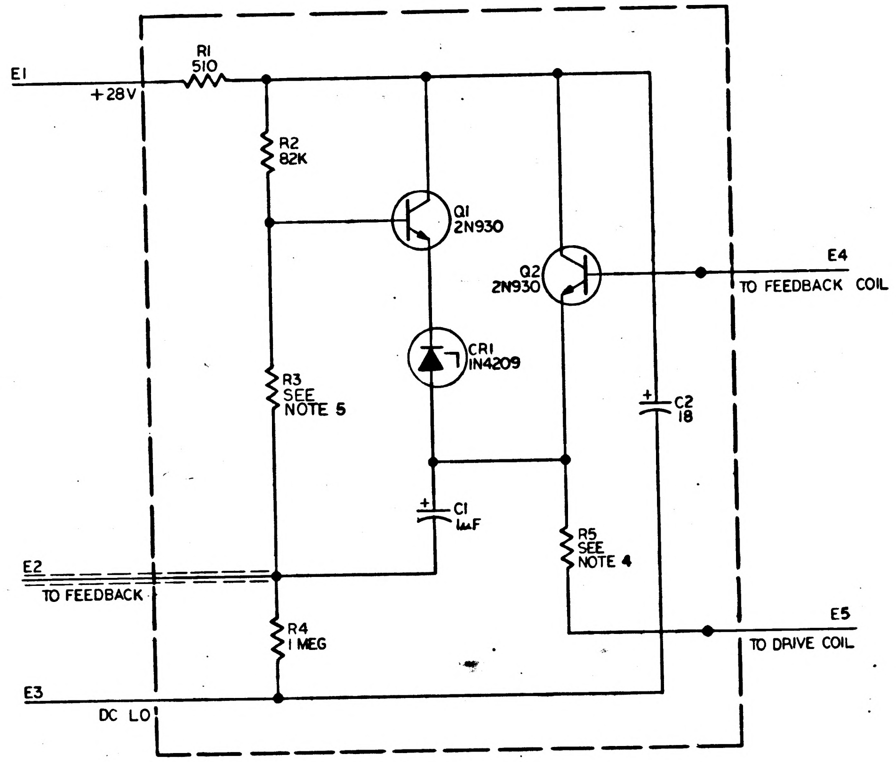

R.R./OPTICS CDU FAIL DETECT CIRCUIT
IMU CDU FAIL DETECT CIRCUIT
D
C
B
A
+4VHI (+4 VDC)
+4VLO
+4VLO (+4 VDC RET)
+4VLO
FAZ2DR (ϕ2 DRIVE)
FAZ2DR/ ($\overline{\phi 2}$ DRIVE)
FAZ3DR (ϕ3 DRIVE)
FAZ4DR (ϕ4 DRIVE)
FROM DIGITAL MODE MODULE
U+14TP (TP +14 VDC)
U+28VH (ISS 28 VDC)
IMUOPR (IMU OPERATE SIGNAL TO AGC)
O+28VH (OPTICS 28 VDC)
K+28VH (MIXED + 28 VDC)
A+14VDC
B+14VDC
C+14VDC
AGCCA (ISS COARSE ALIGN ENABLE FROM AGC)
CHASS (STRUCTURE GROUND)
AGCZ (ISS CDU ZERO FROM AGC)
RRZDR (RR CDU ZERO DRIVE FROM DIGITAL MODE MODULE)
ISSZDR (ISS CDU ZERO DRIVE FROM DIGITAL MODE MODULE)
AGCEEC (ISS ERROR COUNTER ENABLE FROM AGC)
(SEE NOTE 4)
AGCRRZ (OPT/RR CDU ZERO FROM AGC)
AGCO/A (REND. RADAR OR OPTICS ENABLE ERROR COUNTER FROM AGC)
R41 510
R33 1500
Q7
R42 130
R34 3900
Q8
R43 130
R35 4700
Q9
R36 910
Q10
R7 2000
R1 2000
IN647 CR1
CR2 IN647
R19 1500
Q2
CR3 IN965B 15V
R20 10K
C6 6.8
C1 6.8
R8 2000
R2 20K
R13 1500
Q1 2N722
R21 20K
R27 2000
R18 20K
R28 2000
Q11 2N998
CR6 IN975B
CR4 IN647
CR5 IN647
C2 6.8
R9 2000
R3 20K
R14 1500
Q3 2N722
R22 20K
R29 2000
R37 620
R38 1500
Q12
R39 390
R40 1500
Q13
C3 6.8
R10 2000
R4 20K
R15 1500
Q4 2N722
R25 10K
R26 10K
R30 2000
C4 6.8
R11 2000
R5 20K
R16 1500
Q5 2N722
R23 20K
R31 2000
C5 6.8
R12 2000
R6 20K
R17 1500
Q6 2N722
R24 20K
R32 2000
FAZ2HI (HI ϕ2)
FAZ2LO (LO)
FAZ2HI/ (HI $\overline{\phi 2}$)
FAZ2LO/ (LO)
FAZ3HI (HI ϕ3)
FAZ3LO (LO)
(HI ϕ4) FAZ4HI
FAZ4LO (LO)
TO READ COUNTER MODULES
TO DIG. MODE AND EC AND L MODULES
CARPSA
CARPSA (COARSE ALIGN RELAY ENABLE TO PSA)
LCPSA
LCPSA (LOGIC COM TO PSA)
CAGE
CAGE (CAGE OVERRIDE FROM PSA)
DCDUZ (SHAFT)
ECDUZ (TRUNNION)
RADAR CDU ZERO (Z) TO READ COUNTER MODULES (CONNECT ON LEM HEADER ONLY)
UCDUZ
UCDUZ
UCDUZ
UCDUZ
ISS CDU ZERO (Z) TO READ COUNTER MODULES (INNER, MIDDLE, OUTER), DIGITAL MODE MODULE AND AND INTERROGATE MODULE
MODCOM (MODE COMMON)
ISSCA (ISS COARSE ALIGN ENABLE)
ISSZ (ISS CDU ZERO)
ISSEEC (ISS ERROR COUNTER ENABLE)
RRZ (REND. RADAR CDU ZERO)
RRDAE (REND. RADAR OR OPTICS D/A ENABLE)
TO DIGITAL MODE MODULE
O+28VH (OPTICS 28 VDC)
DUPLVL (SHAFT READ COUNTER UP LINE)
EUPLVL (TRUNNION READ COUNTER UP LINE)
+4VLO (OPTICS COMMON)
DFINER (SHAFT)
EFINER (TRUNNION)
FINE ERRORS
DCRSER (SHAFT)
ECRSER (RR TRUNNION)
COARSE ERRORS
R53 100K
C8 2200UUF
CR11 IN660
R44 51K
Q15
R56 100K
R50 100K
C7 2200UUF
CR12 IN660
R45 51K
Q14
R54 100K
C10 1.0
R58 51K
R60 51K
R61 51K
Q17 2N930
R62 510
Q19 2N722
CR13 IN660
R66 390K
R65 22K
C11 22
CR15
R68 2000
Q23 2N930
R63 5100
R46 10K
CR7 IN660
R47 10K
CR9 IN660
C9 1.0
R57 680K
Q16 2N930
R59 510
R64 100K
Q18 2N930
C12 1.0
Q21 2N722
Q20 2N930
Q22 2N722
CR14
R51 100K
R55 100K
R52 33K
R48 100K
CR10 IN660
R49 100K
CR8 IN660
R55 3000
R67 10K
5100
5100
U+28VH (ISS 28 VDC)
AUPLVL (INNER READ COUNTER UP LINE)
BUPLVL (MIDDLE READ COUNTER UP LINE)
CUPLVL (OUTER READ COUNTER UP LINE)
AFINER
BFINER
CFINER
FINE ERRORS
+4VLO (ISS COMMON)
ACRSER
BCRSER
CCRSER
COARSE ERRORS
R88 100K
C15 2200UUF
CR25 IN660
R73 51K
Q27
R93 100K
R85 100K
R74 51K
C14 2200UUF
Q26
R89 100K
CR24 IN660
C17 1.0
R95 51K
R97 51K
R98 51K
Q29 2N930
R99 510
Q31 2N722
CR26 IN660
R103 390K
R101 22K
C18 22
CR28
R82 100K
C13 2200UUF
R75 51K
Q25
R90 100K
CR23 IN660
R100 100K
Q30 2N930
C19 1.0
Q33 2N722
Q32 2N930
Q34 2N722
CR27
R76 10K
CR17 IN660
R77 10K
CR19 IN660
R78 10K
CR22 IN660
Q28 2N930
C16 1.0
R94 680K
R96 510
R83 100K
R86 100K
R91 100K
R84 33K
R87 33K
R92 33K
R79 100K
CR21 IN660
R80 100K
CR20 IN660
R81 100K
CR18 IN660
R102 3000
R105 10K

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE IN OHMS
3. CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED
4. WIREWRAP PROGRAM PIN DESIGNATIONS ARE LABELED ABOVE PIN NUMBERS

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 17908	6 Apr 65	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-69	CAPACITOR	1 µF	±10%	35V DC
C2	1010393-044	CAPACITOR	18µF	±10%	50V DC
CR1	1012056-11	DIODE	1N4109	±5%	15 V DC
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
R1	1006750-25	RESISTOR	510	±2%	1/4W
R2	1006750-78		82K	±2%	1/4W
R3	SEE NOTE 5				
R4	1010768-29		1 MEG	±1%	1/8W
R5	SEE NOTE 4				

CHART A

R3 ±1% 1/8W	
PART NO.	VALUE
1010364-635	100K
-637	102K
-639	105K
-641	107K
-643	110K
-645	113K
-647	115K
-649	118K
-651	121K
-653	124K
-655	127K
-657	130K
-659	133K
-661	137K
-663	140K
-665	143K
-667	147K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
-695	205K
-697	210K
-699	215K
-701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
-725	294K
-727	301K

CHART B

R5 ±2%	1/4W
PART NO.	VALUE
1006750-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
-49	5100
-50	5600
-51	6200
-52	6800
-53	7500
-54	8200
-55	9100

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUE OF R5 TO BE SELECTED PER ATP PART TO BE SELECTED FROM CHART B
5. THE VALUE OF R3 TO BE SELECTED PER ATP PART TO BE SELECTED FROM CHART A

REF DWG:
TUNING FORK ASSEMBLY (PHOTOMETER)
DWG NO. 2007021

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
HEAT TREATMENT ——
FINAL FINISH ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN W. Munson DATE 31 JUL 64
CHECKED A. Lindstrom 5 Aug 64
APPROVAL 9/21/64
APPROVAL
NASA APPROVAL 9-22-64
MIT APPROVAL

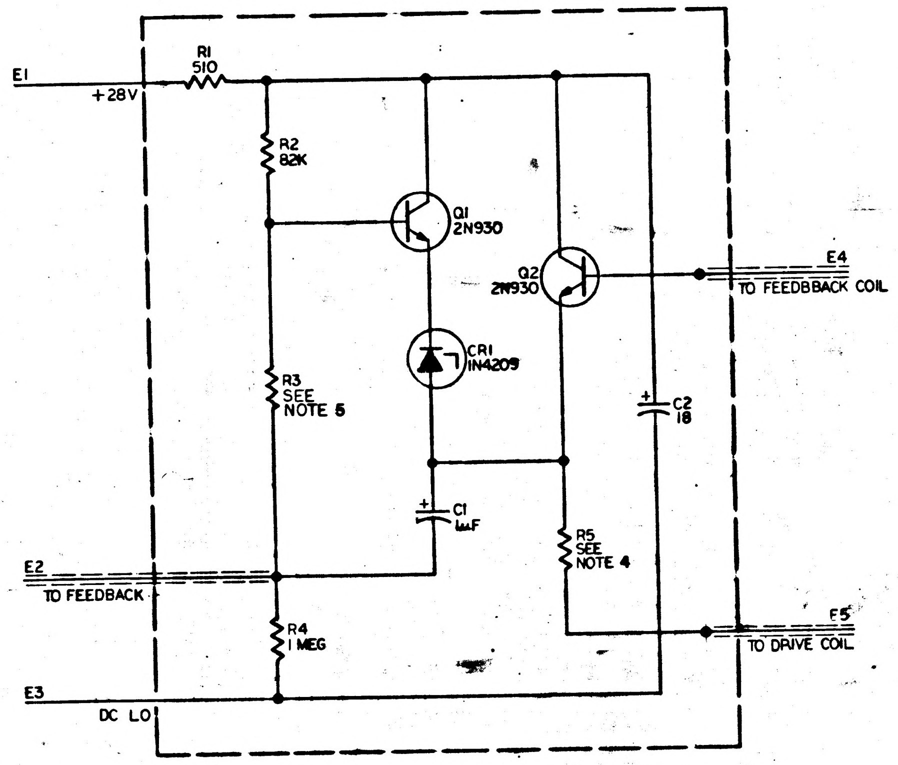
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
TUNING FORK
(PHOTOMETER)

CODE IDENT NO. 80230
SIZE D
NASA DRAWING NO. 2010055
SCALE ——
WT ——
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-69	CAPACITOR	1 uF	±10%	35V DC
C2	1010393-044	CAPACITOR	18uF	±10%	50V DC
CR1	1012056-11	DIODE	1N4108	±5%	15 V DC
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
R1	1006750-25	RESISTOR	510	±2%	1/4W
R2	1006750-78		82K	±2%	1/4W
R3	SEE NOTE 5				
R4	1010768-29		1 MEG	±1%	1/8W
R5	SEE NOTE 4				

CHART A

R3 ±1% 1/8W	
PART NO.	VALUE
1010364-635	100 K
-637	102 K
-639	105 K
-641	107 K
-643	110 K
-645	113 K
-647	115 K
-649	118 K
-651	121 K
-653	124 K
-655	127 K
-657	130 K
-659	133 K
-661	137 K
-663	140 K
-665	143 K
-667	147 K
-669	150 K
-671	154 K
-673	158 K
-675	162 K
-677	165 K
-679	169 K
-681	174 K
-683	178 K
-685	182 K
-687	187 K
-689	191 K
-691	196 K
-693	200K
-695	205K
-697	210K
-699	215K
-701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
-725	294K
-727	301 K

CHART B

R5 ±2%	1/4 W
PART NO.	VALUE
1006750-32	1000
-33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
-42	2700
-43	3000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUE OF R5 TO BE SELECTED PER ATP PART TO BE SELECTED FROM CHART B
5. THE VALUE OF R3 TO BE SELECTED PER ATP PART TO BE SELECTED FROM CHART A

REF DWG:
TUNING FORK ASSEMBLY (PHOTOMETER)
DWG NO.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN W. Munson DATE 9 JUL 64
CHECKED
APPROVAL 9/21/64
APPROVAL
NASA APPROVAL W J Rhine 9-22-64
MIT APPROVAL 9/22/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, TUNING FORK (PHOTOMETER)

CODE IDENT NO.
SIZE D
NASA DRAWING NO. 2010055
SCALE —
WT —
SHEET 1 OF 1

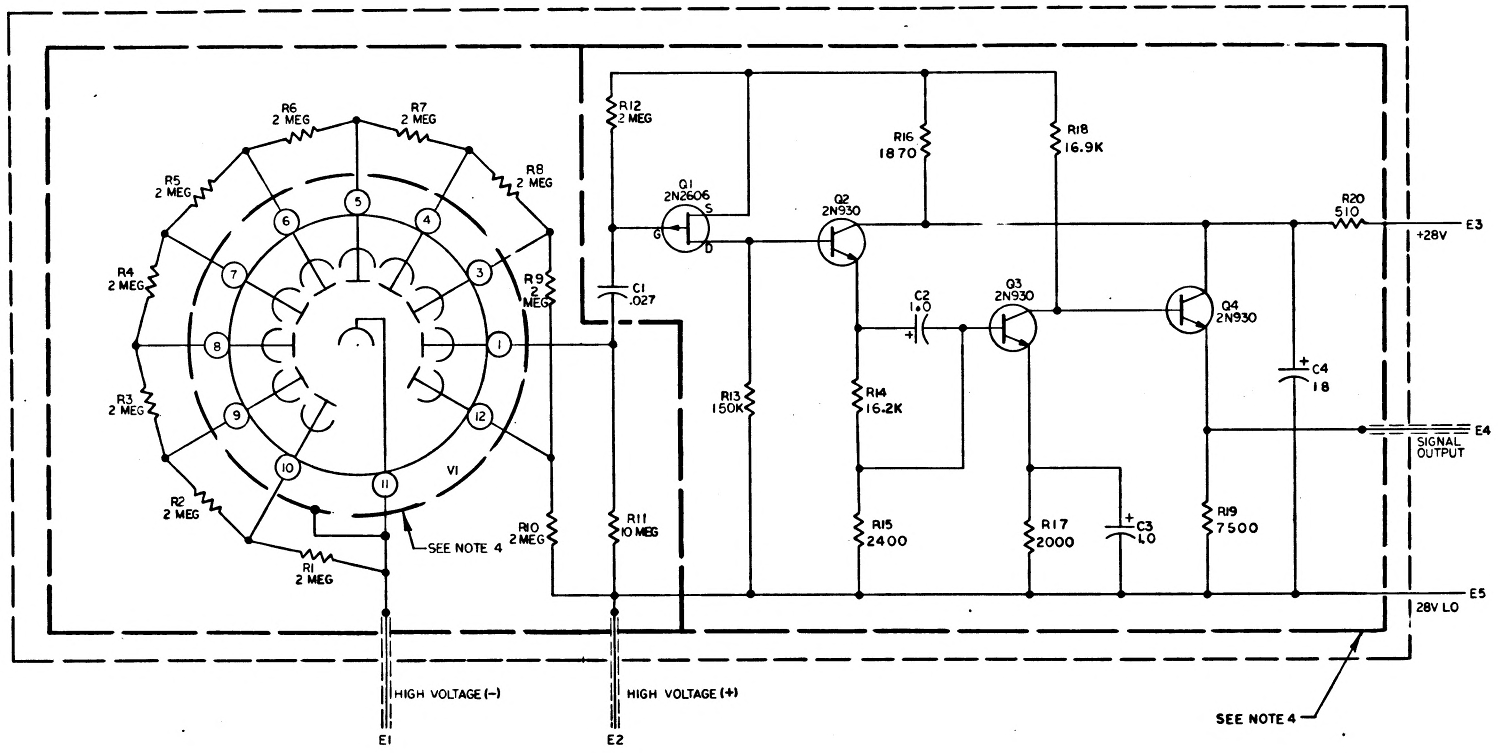
2010055

INCHES
0 1/2

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14960		


R1
2 MEG
R2
2 MEG
R3
2 MEG
R4
2 MEG
R5
2 MEG
R6
2 MEG
R7
2 MEG
R8
2 MEG
R9
2
MEG
R10
2 MEG
R11
10 MEG
R12
2 MEG
R13
150K
R14
16.2K
R15
2400
R16
1870
R17
2000
R18
16.9K
R19
7500
R20
510
C1
.027
C2
1.0
C3
1.0
C4
18
Q1
2N2606
G
S
D
Q2
2N930
Q3
2N930
Q4
2N930
V1
1
2
3
4
5
6
7
8
9
10
11
12
SEE NOTE 4
E3
+28V
E4
SIGNAL
OUTPUT
E5
28V LO
HIGH VOLTAGE (−)
E1
HIGH VOLTAGE (+)
E2
SEE NOTE 4

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010768-58	RESISTOR	2 MEG	±1%	1/8 W
R2	↓	↓	↓	↓	↓
R3	↓	↓	↓	↓	↓
R4	↓	↓	↓	↓	↓
R5	↓	↓	↓	↓	↓
R6	↓	↓	↓	↓	↓
R7	↓	↓	↓	↓	↓
R8	↓	↓	↓	↓	↓
R9	↓	↓	↓	↓	↓
R10	↓	↓	↓	↓	↓
R11	1010768-125	↓	10 MEG	↓	↓
R12	1010768-58	↓	2 MEG	↓	↓
R13	1006750-84	↓	150K	±2%	1/4W
R14	1010364-484	↓	16.2K	±1%	1/8W
R15	1006750-41	↓	2400	±2%	1/4 W
R16	1010364-304	↓	1870	±1%	1/8W
R17	1006750-39	↓	2000	±2%	1/4W
R18	1010364-488	↓	16.9K	±1%	1/8W
R19	1006750-53	↓	7500	±2%	1/4W
R20	1006750-25	↓	510	±2%	1/4W
C1	1010264-117	CAPACITOR	.027	10%	35 VDC
C2	1006755-69	↓	1.0	↓	35 VDC
C3	1006755-69	↓	1.0	↓	35 VDC
C4	1012502	↓	18	↓	50VDC
Q1	1012048	TRANSISTOR	2N2606		
Q2	1010397-1	↓	2N930		
Q3	↓	↓	↓		
Q4	↓	↓	↓		
V1	1012043-1 (SEE NOTE 5)	PHOTO MULTIPLIER TUBE			
V1	1012043-2 (SEE NOTE 6)	PHOTO MULTIPLIER TUBE			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. DASH LINES DENOTES MU METAL SHIELD
5. 1012043-1 USED WITH TRACKER.
6. 1012043-2 USED WITH PHOTOMETER.

REF DRAWINGS:
HEAD ELECTRONICS ASSEMBLY (TRACKER)
DWG NO. 2007024
HEAD ELECTRONICS ASSEMBLY (PHOTOMETER)
DWG NO. 2007025

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
	LIST OF MATERIALS	

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT
DRAWN DATE 5AUG64
CHECKED 6AUG64
APPROVAL 9/21/64
APPROVAL
NASA APPROVAL 9-22-64
MIT APPROVAL 22/9/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
HEAD ELECTRONICS

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 2010056
SCALE —
WT —
SHEET 1 OF 1

MASTER

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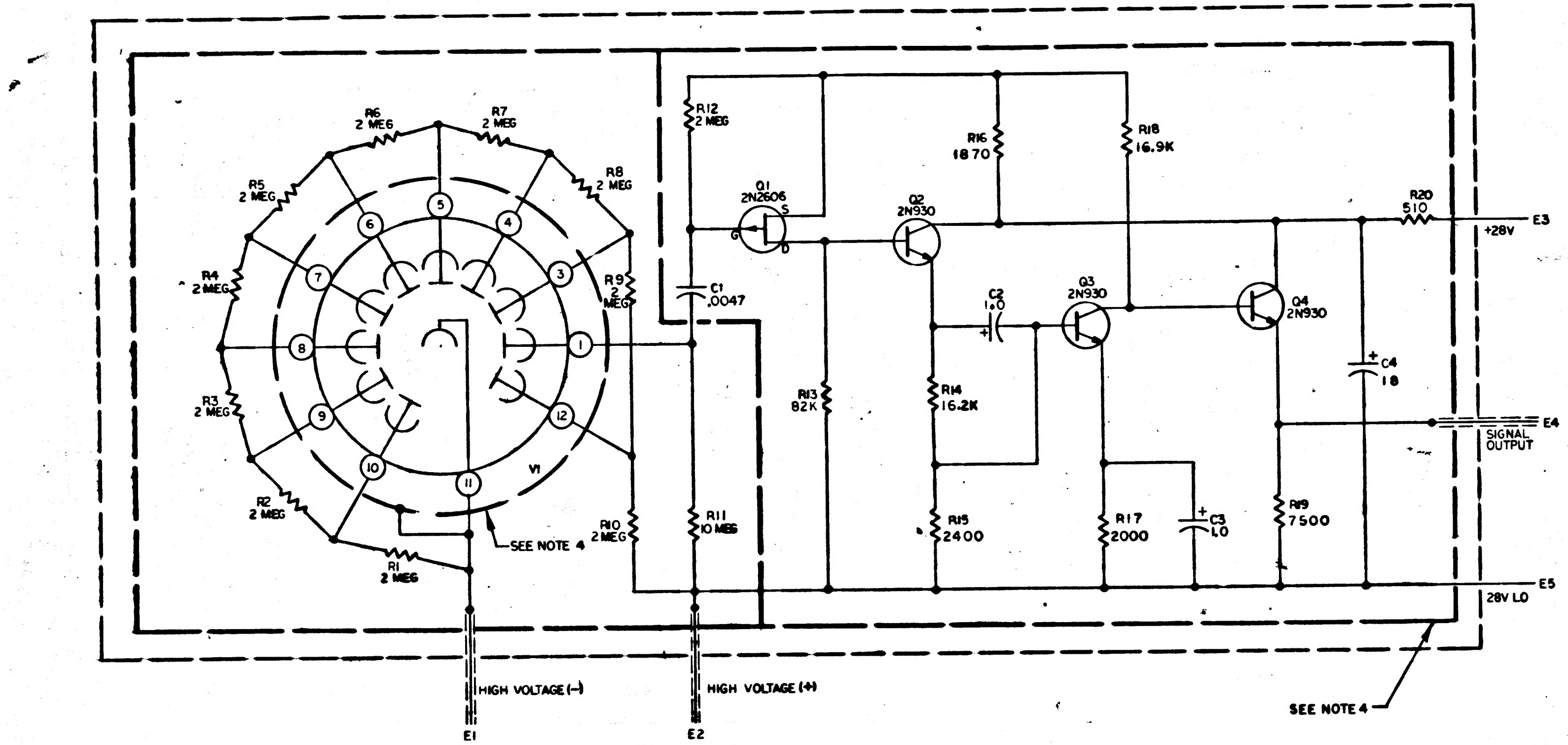
⑥

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 14960		
B	REVISED PER TDRR 18769		


R1
2 MEG
R2
2 MEG
R3
2 MEG
R4
2 MEG
R5
2 MEG
R6
2 MEG
R7
2 MEG
R8
2 MEG
R9
2
MEG
R10
2 MEG
1
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3
4
5
6
7
8
9
10
11
12
V1
SEE NOTE 4
R11
10 MEG
R12
2 MEG
C1
.0047
Q1
2N2606
S
G
D
Q2
2N930
R13
82K
R14
16.2K
R15
2400
R16
1870
C2
1.0
Q3
2N930
R17
2000
C3
1.0
R18
16.9K
Q4
2N930
R19
7500
C4
18
R20
510
+28V
E3
SIGNAL
OUTPUT
E4
28V LO
E5
HIGH VOLTAGE (–)
E1
HIGH VOLTAGE (+)
E2
SEE NOTE 4

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010768-58	RESISTOR	2 MEG	±1%	1/8 W
R2					
R3					
R4					
R5					
R6					
R7					
R8					
R9					
R10					
R11	1010768-125		10 MEG		
R12	1010768-58		2 MEG		
R13	1006750-78		82K	±2%	1/4 W
R14	1010364-484		16.2K	±1%	1/8W
R15	1006750-41		2400	±2%	1/4 W
R16	1010364-304		1870	±1%	1/8W
R17	1006750-39		2000	±2%	1/4W
R18	1010364-488		16.9K	±1%	1/8W
R19	1006750-53		7500	±2%	1/4W
R20	1006750-25		510	±2%	1/4W
C1	1006777-28	CAPACITOR	.0047	±5%	100VDC
C2	1006755-69		1.0		35 VDC
C3	1006755-69		1.0		35 VDC
C4	1012502		18		50VDC
Q1	1012048	TRANSISTOR	2N2606		
Q2	1010397-1		2N930		
Q3					
Q4					
V1	1012043-1	PHOTO MULTIPLIER TUBE			

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. DASH LINES DENOTES MAGNETIC SHIELD

REF DRAWING:
HEAD ELECTRONICS ASSEMBLY (TRACKER)
DWG NO. 2007024

2010056 B

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ——— ± ——— ± ———
DO NOT SCALE THIS DRAWING
MATERIAL ———
HEAT TREATMENT ———
FINAL FINISH ———

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT

DRAWN DATE 5AUG64
CHECKED 6AUG64
APPROVAL 9/21/64
APPROVAL
NASA APPROVAL 9-22-64
MIT APPROVAL

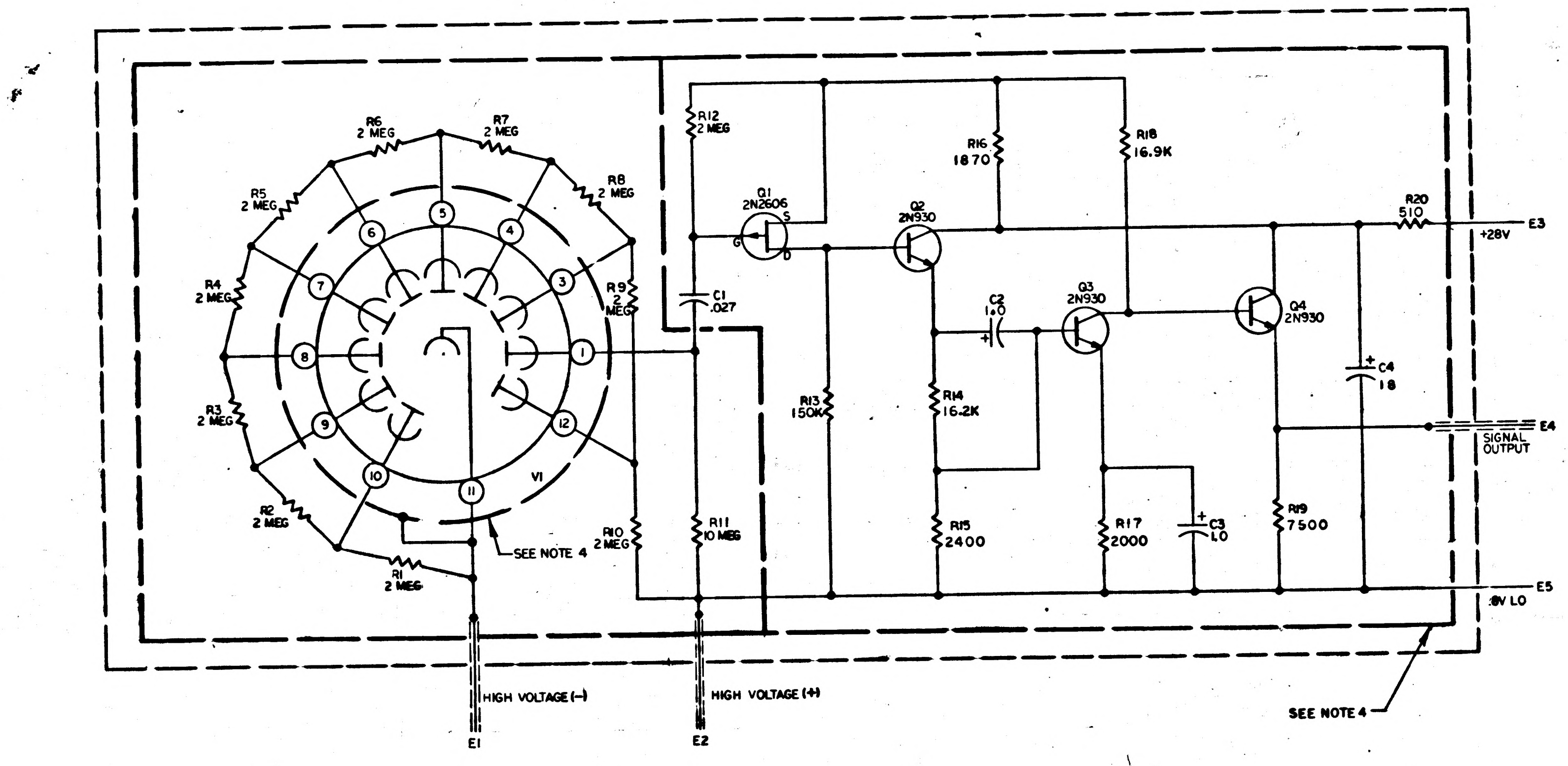
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
HEAD ELECTRONICS
(TRACKER)

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010056
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL


R6 2 MEG
R7 2 MEG
R5 2 MEG
R8 2 MEG
R4 2 MEG
R9 2 MEG
R3 2 MEG
R2 2 MEG
R1 2 MEG
R10 2 MEG
1
2
3
4
5
6
7
8
9
10
11
12
V1
SEE NOTE 4
R12 2 MEG
Q1 2N2606
G
S
D
C1 .027
R11 10 MEG
R13 150K
Q2 2N930
R16 1870
R18 16.9K
R20 510
+28V
E3
C2 1.0
Q3 2N930
Q4 2N930
C4 18
R14 16.2K
E4
SIGNAL OUTPUT
R15 2400
R17 2000
C3 1.0
R19 7500
E5
28V LO
HIGH VOLTAGE (−)
E1
HIGH VOLTAGE (+)
E2
SEE NOTE 4

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1010768-58	RESISTOR	2 MEG	±1%	1/8 W
R2					
R3					
R4					
R5					
R6					
R7					
R8					
R9					
R10					
R11	1010768-125		10 MEG		
R12	1010768-58		2 MEG		
R13	1006750-84		150K	±2%	1/4W
R14	1010364-484		16.2K	±1%	1/8W
R15	1006750-41		2400	±2%	1/4W
R16	1010364-304		1870	±1%	1/8W
R17	1006750-39		2000	±2%	1/4W
R18	1010364-488		16.9K	±1%	1/8W
R19	1006750-53		7500	±2%	1/4W
R20	1006750-25		510	±2%	1/4W
C1	1010264-117	CAPACITOR	.027	10%	35 VDC
C2	1006755-69		1.0		35 VDC
C3	1006755-69		1.0		35 VDC
C4	1010393-044		18		50VDC
Q1	1012048	TRANSISTOR	2N2606		
Q2	1010397-1		2N930		
Q3					
Q4					
V1	1012043	PHOTO MULTIPLIER TUBE	C70129B		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. DASH LINES DENOTES MU METAL SHIELD

REF DRAWINGS:
HEAD ELECTRONICS ASSEMBLY (TRACKER)
DWG NO.
HEAD ELECTRONICS ASSEMBLY (PHOTOMETER)
DWG NO.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN DATE 5 AUG 64
CHECKED 6 AUG 64
APPROVAL 9/21/64
APPROVAL
NASA APPROVAL 9-22-64
MIT APPROVAL 22/9/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

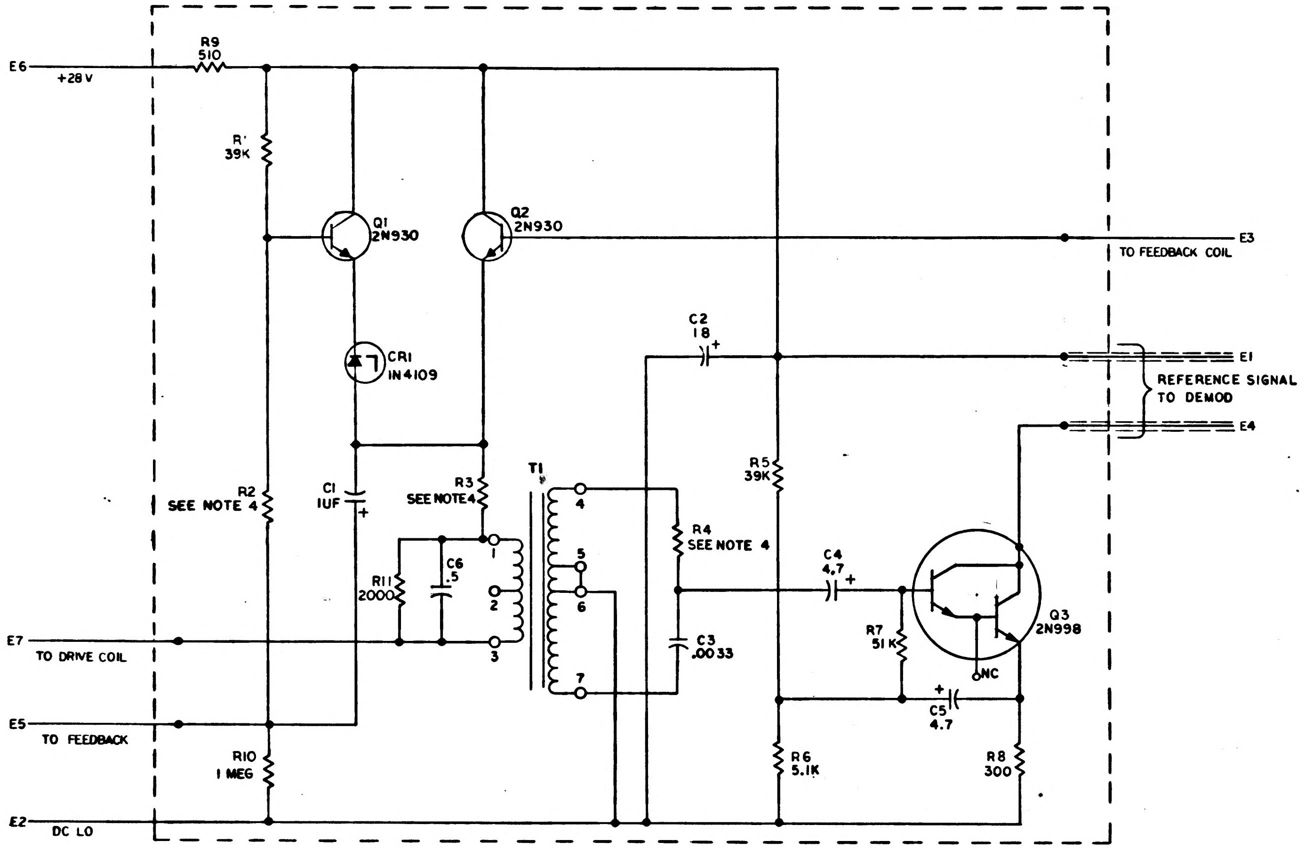
SCHEMATIC, HEAD ELECTRONICS

CODE IDENT NO.
SIZE E
NASA DRAWING NO. 2010056
SCALE —
WT —
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 12878

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 19227		



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 – 69	CAPACITOR	1 UF	± 10%	35V DC
C2	1010393 – 044	↑	18UF	± 10%	50V DC
C3	1006793 – 19	│	.0033UF	± 2%	500V DC
C4	1006755 – 77	│	4.7UF	± 10%	35V DC
C5	1006755 – 77	↓	4.7UF	± 10%	35V DC
C6	1010279 – 228	CAPACITOR	.5UF	± 10%	35V DC
CR1	1012056 – 11	DIODE	IN4109	± 5%	15VDC
Q1	1010397–1	TRANSISTOR	2N930		
Q2	1010397–1	TRANSISTOR	2N930		
Q3	1010342	TRANSISTOR	2N998		
R1	1006750 – 70	RESISTOR	39K	±2%	1/4 W
R2	SEE NOTE 4	↑			
R3	SEE NOTE 4	│			
R4	SEE NOTE 4	│			
R5	1006750 – 70	│	39K	±2%	1/4 W
R6	↑ – 49	│	5.1K	↑	↑
R7	│ – 73	│	51K	│	│
R8	↓ – 19	│	300	↓	↓
R9	1006750 – 25	│	510	±2%	1/4 W
R10	1010768 – 29	↓	1 MEG	±1%	1/8 W
R11	1006750 – 39	RESISTOR	2000	±2%	1/4 W
T1	1010709	TRANSFORMER			

CHART A

R2 ±1% 1/8 W	
PART NO.	VALUE
1010364-699	215K
↑ -701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-663	140K
-665	143K
-667	147K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
↓ -695	205K
1010364-697	210K

CHART B

R3 ±2% 1/4W	
PART NO.	VALUE
1006750-32	1000
↑ -33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
↓ -49	5100
1006750-50	5600

CHART C

R4 ±1% 1/8W	
PART NO.	VALUE
1010364-617	80.6K
↑ -627	90.9K
-635	100K
-643	110K
-651	121K
-657	130K
-663	140K
-669	150K
-673	158K
-679	169K
-683	178K
-687	187K
-691	196K
-693	200K
-697	210K
-701	221K
-705	232K
-709	243K
-713	255K
-717	267K
-719	274K
-723	287K
-727	301K
-729	309K
-731	316K
-733	324K
-735	332K
-737	340K
-739	348K
-741	357K
-743	365K
-745	374K
-747	383K
-749	392K
-751	402K
-753	412K
-755	422K
-757	432K
-759	442K
-761	453K
-763	464K
-765	475K
↓ -767	478K
1010364-769	499K

NOTES
1. INTERPRERT DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUES OF R2, R3 AND R4 TO BE SELECTED FROM CHARTS A, B AND C

REF DWG
TUNING FORK ASSEMBLY (TRACKER)
DWG NO. 2007022

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN R.B. [illegible] DATE 6 AUG 64
CHECKED [illegible] 6 AUG 64
APPROVAL [illegible] 9/21/64
APPROVAL
NASA APPROVAL [illegible] 9-22-64
MIT APPROVAL W Kupfer 22 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
TUNING FORK
(TRACKER)

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2010057
SCALE —	WT —	SHEET 1 OF 1

MASTER

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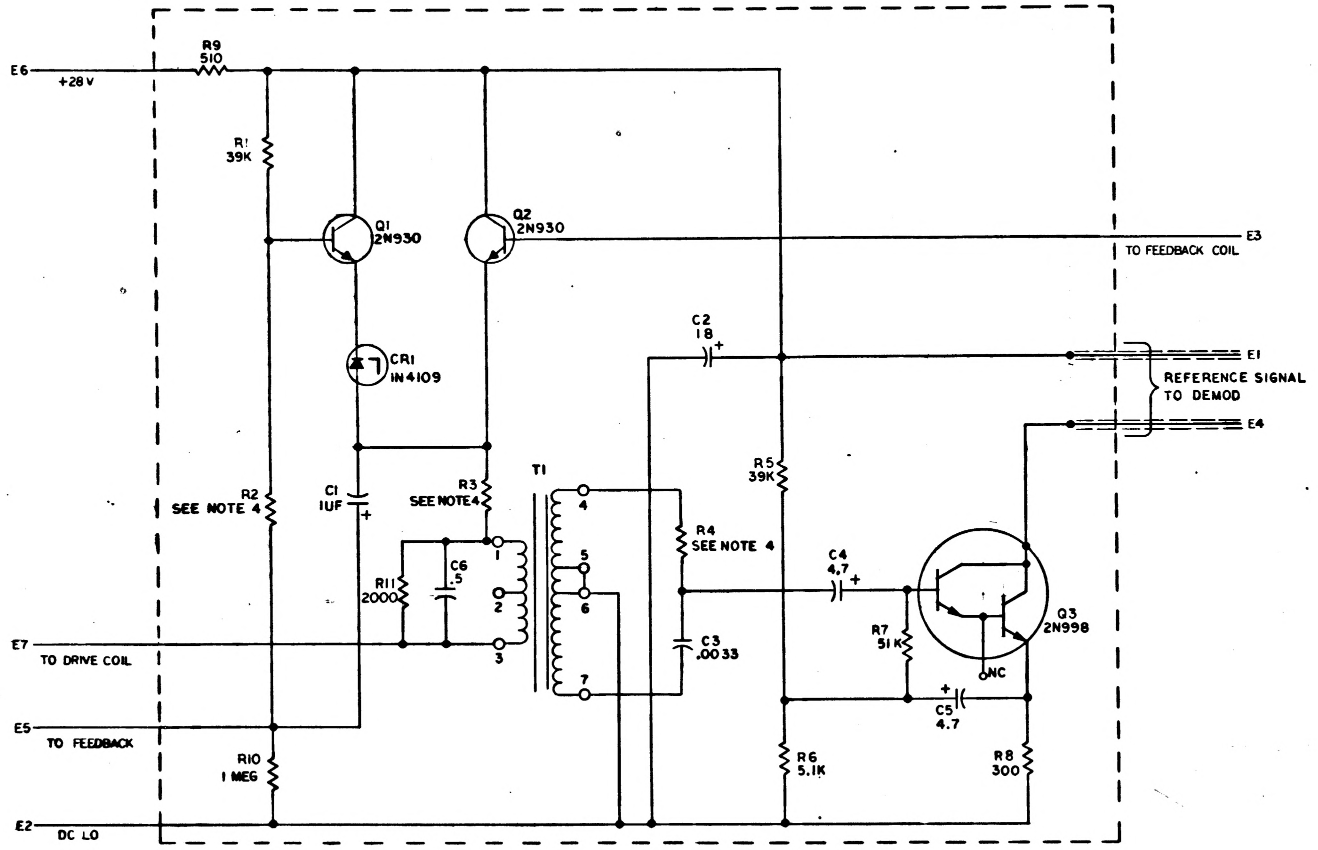
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 19227	[illegible]	[illegible]
B	REVISED PER TDRR 20150	[illegible]	[illegible]



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 – 69	CAPACITOR	1 UF	± 10%	35VDC
C2	1010393 – 044	↑	18UF	± 10%	50VDC
C3	1006793 – 19		.0033UF	± 2 %	500VDC
C4	1006755 – 77		4.7UF	± 10 %	35VDC
C5	1006755 – 77	↓	4.7UF	± 10 %	35VDC
C6	1010279 – 228	CAPACITOR	.5UF	± 10 %	35VDC
CR1	1012056 – 11	DIODE	1N4109	± 5%	15VDC
Q1	1010397 – 1	TRANSISTOR	2N930		
Q2	1010397 – 1	TRANSISTOR	2N930		
Q3	1010342	TRANSISTOR	2N998		
R1	1006750 – 70	RESISTOR	39K	±2%	1/4 W
R2	SEE NOTE 4	↑			
R3	SEE NOTE 4				
R4	SEE NOTE 4				
R5	1006750 – 70		39K	±2%	1/4 W
R6	↑ – 49		5.1K	↑	↑
R7	– 73		51K		
R8	↓ – 19		300	↓	↓
R9	1006750 – 25		510	±2 %	1/4 W
R10	1010768 – 29	↓	1 MEG	±1%	1/8 W
R11	1006750 – 39	RESISTOR	2000	±2%	1/4 W
T1	1010709	TRANSFORMER			

CHART A

R2 ±1% 1/8 W	
PART NO.	VALUE
1010364-699	215K
↑ -701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-663	140K
-665	143K
-667	147K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
↓ -695	205K
1010364-697	210K

CHART B

R3 ±2% 1/4W	
PART NO.	VALUE
1006750-32	1000
↑ -33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
-42	2700
-43	3000
-44	3300
-45	3600
-46	3900
-47	4300
-48	4700
↓ -49	5100
1006750-50	5600

CHART C

R4 ±1% 1/8W	
PART NO.	VALUE
1010364-617	80.6K
↑ -627	90.9K
-635	100K
-643	110K
-651	121K
-657	130K
-663	140K
-669	150K
-673	158K
-679	169K
-683	178K
-687	187K
-691	196K
-693	200K
-697	210K
-701	221K
-705	232K
-709	243K
-713	255K
-717	267K
-719	274K
-723	287K
-727	301K
-729	309K
-731	316K
-733	324K
-735	332K
-737	340K
-739	348K
-741	357K
-743	365K
-745	374K
-747	383K
-749	392K
-751	402K
-753	412K
-755	422K
-757	432K
-759	442K
-761	453K
-763	464K
-765	475K
↓ -767	478K
1010364-769	499K

NOTES

1. INTERPRERT DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUES OF R2, R3 AND R4 TO BE SELECTED FROM CHARTS A, B AND C

REF DWG
TUNING FORK ASSEMBLY (TRACKER)
DWG NO. 2007022

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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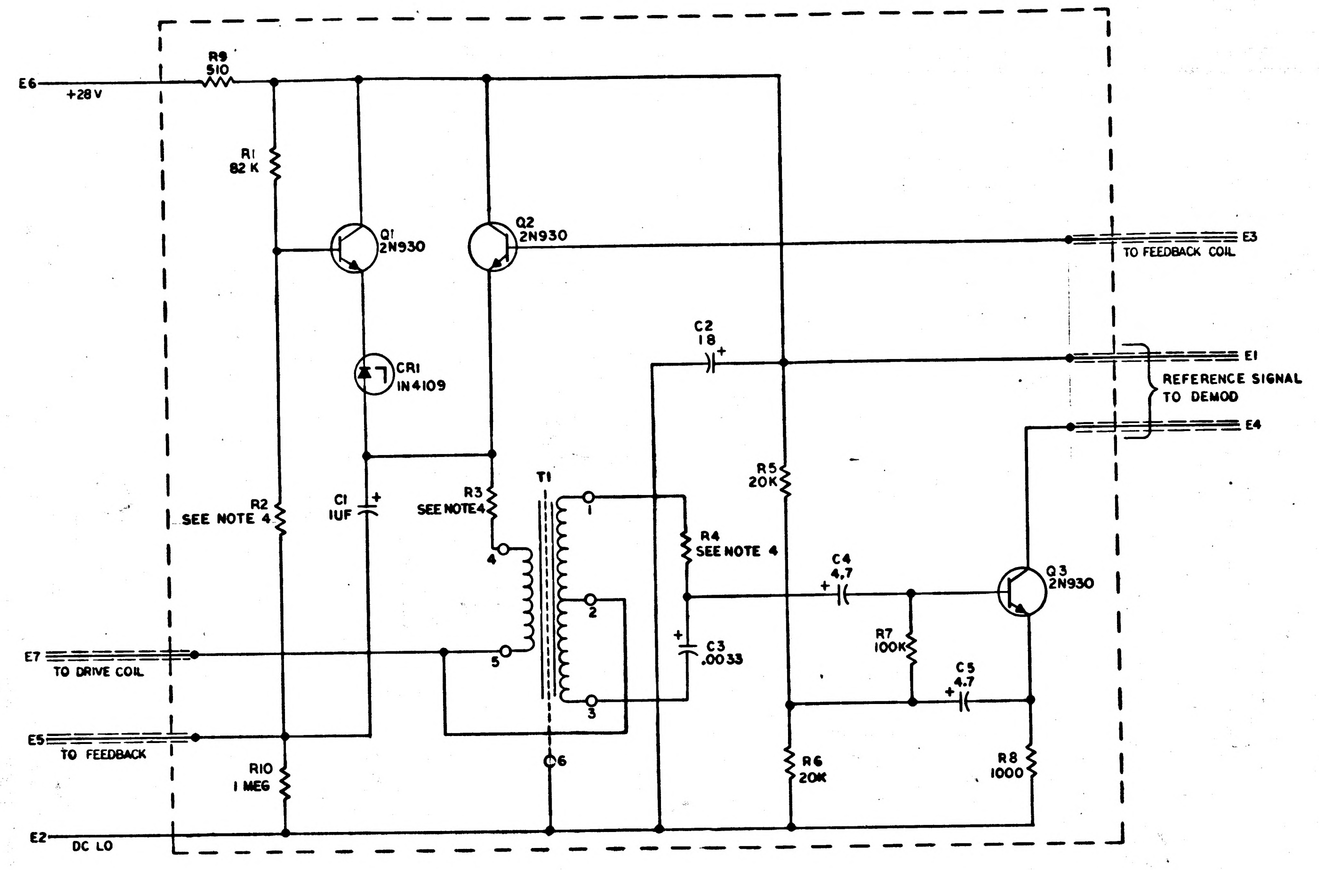
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN R.B. [illegible] DATE 6 AUG
CHECKED [illegible] 6 AUG 64
APPROVAL [illegible] 9/21/64
APPROVAL
NASA APPROVAL W. J. [illegible] 9-22-64
MIT APPROVAL [illegible] 22 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, TUNING FORK (TRACKER)

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010057
SCALE —
WT —
SHEET 1 OF 1

MASTER


E6
+28V
R9
510
R1
82 K
Q1
2N930
Q2
2N930
E3
TO FEEDBACK COIL
C2
18
E1
REFERENCE SIGNAL
TO DEMOD
E4
CR1
1N4109
R5
20K
C1
1UF
R2
SEE NOTE 4
R3
SEE NOTE 4
T1
1
2
3
4
5
6
R4
SEE NOTE 4
C4
4.7
Q3
2N930
R7
100K
C3
.0033
C5
4.7
E7
TO DRIVE COIL
E5
TO FEEDBACK
R10
1 MEG
R6
20K
R8
1000
E2
DC LO

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 – 69	CAPACITOR	1 UF	±10%	35VDC
C2	1010393 – 044	↑	18UF	±10%	50VDC
C3	1006793 – 19		.0033UF	± 2 %	500VDC
C4	1006755 – 77	↓	4.7UF	±10 %	35VDC
C5	1006755 – 77	CAPACITOR	4.7UF	±10 %	35VDC
CR1	1012056 – 11	DIODE	1N4109	±5%	15VDC
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010397-1	TRANSISTOR	2N930		
R1	1006750 – 78	RESISTOR	82 K	±2%	1/4 W
R2	SEE NOTE 4	↑			
R3	SEE NOTE 4				
R4	SEE NOTE 4				
R5	1006750 – 63		20K	±2%	1/4 W
R6	↑ – 63		20K	↑	↑
R7	– 80		100K		
R8	↓ – 32		1000	↓	↓
R9	1006750 – 25	↓	510	±2 %	1/4 W
R10	1010768 – 29	RESISTOR	1 MEG	±1%	1/8 W
T1	1012052	TRANSFORMER			

CHART A

R2 ±1% 1/8 W	
PART NO.	VALUE
1010364-699	215K
↑ -701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
↓ -725	294K
1010364-727	301K

CHART B

R3 ±2% 1/4W	
PART NO.	VALUE
1006750-32	1000
↑ -33	1100
-34	1200
-35	1300
-36	1500
-37	1600
-38	1800
-39	2000
-40	2200
-41	2400
↓ -42	2700
1006750-43	3000

CHART C

R4 ±1% 1/8W	
PART NO.	VALUE
1010364-635	100K
↑ -637	102K
-639	105K
-641	107K
-643	110K
-645	113K
-647	115K
-649	118K
-651	121K
-653	124K
-655	127K
-657	130K
-659	133K
-661	137K
-663	140K
-665	143K
-667	147K
-669	150K
-671	154K
-673	158K
-675	162K
-677	165K
-679	169K
-681	174K
-683	178K
-685	182K
-687	187K
-689	191K
-691	196K
-693	200K
-695	205K
-697	210K
-699	215K
-701	221K
-703	226K
-705	232K
-707	237K
-709	243K
-711	249K
-713	255K
-715	261K
-717	267K
-719	274K
-721	280K
-723	287K
↓ -725	294K
1010364-727	301K

NOTES
1. INTERPRERT DRAWING IN ACCORDANCE WITH.
STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. THE VALUES OF R2, R3 AND R4 TO BE SELECTED PER ATP
PART TO BE SELECTED FROM CHARTS A, B AND C

REF DWG
TUNING FORK ASSEMBLY (TRACKER)
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
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HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN R.B. DATE 6 AUG
CHECK'D 6 AUG 69
APPROVAL 9/22/69
APPROVAL
NASA APPROVAL 9-22-69
MIT APPROVAL 22 69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
TUNING FORK
(TRACKER)

CODE IDENT NO. —
SIZE E
NASA DRAWING NO. 2010057
SCALE —
WT —
SHEET 1 OF 1